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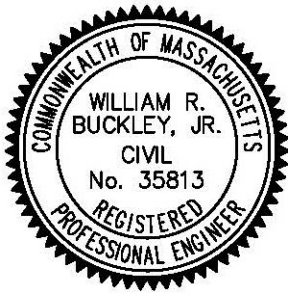
Stormwater Management Plan
"10 Commerce Boulevard"
Wrentham, MA

April, 2023



Prepared for:

Edgewood Development Co., LLC
320 South Street
Plainville, MA 02762

Table of Contents:

1.0 Introduction

The 10 Commerce Boulevard project (Project) is the third and final phase of the development of the Wrentham Business Center. The first phase permitted in 2017 involved the construction of a 90,000 sf indoor recreational building on 40 Commerce Boulevard (Lot 2) and the construction/modification of Commerce Boulevard. The second phase was permitted in 2022 with the approval of a 180,000 sf warehouse located on 15 Commerce Boulevard (Lot 3). Phase 3 involves the construction of a 4,500 sf convenience store that includes six fuel pumps. The facility will be located on Lot 1, which is a 2.6 acre parcel located at the southwest intersection of Commerce Blvd and Route One.

Phase 1 was permitted in 2017 and constructed shortly thereafter and is operational. Phase 2 was permitted in 2022 and is currently being appealed. The design documents for Phase 2 were reviewed for the Town by Beals and Thomas, Inc. and Professional Services Corporation, PC and copies of the final storm water report are relevant to the current design and are available electronically at the BCG FTP site - https://personal.filesanywhere.com/fs/v.aspx?v=8e6e628c5d6273ab72a2

This report will discuss the entire Wrentham Business Center storm water design with an emphasis on Lot 1. Lot 1 was included in the Phase 1 and Phase 2 designs and the Phase 2 design should be reviewed for background,

2.0 Existing Conditions

The project area lies on a terrace that is located between Rabbit Hill Brook and Route One. Because the Wrentham Business Center site had been heavily developed before and during the time when it housed Basic Rental, and in conformance with the 2017 and 2022 Storm Water Reports for Phase 1 and Phase 2, we have used the condition that existed prior to the start of development in 2001, which is more conservative than using the existing condition. The site generally slopes toward Rabbit Hill Brook with a small section of the site flowing to a wetland to the south that is also part of the Rabbit Hill Brook drainage basin. There was a depression in the middle of the site that captures and infiltrates a large area, subarea EA, that at some point overflowed into subarea EC, which drained to Rabbit Hill Brook. That condition was not modeled and an assumption was made that runoff from all events was captured and infiltrated within the depression. This assumption was conservative in that any overflow to subarea EC would result in a higher existing condition rate and volume of runoff to the design point. This would have allowed the developed condition to have a higher rate and volume of runoff. As will be seen, this is not an issue since the post-development rates and volumes are 14-25% of the pre-development conditions. Lot 3 contains a storm water basin that was constructed as part of the 2001 design. Subsequent to that construction, the DEP regulations were modified and now BMPs are not allowed within 200' of a tributary to a surface water supply. The cranberry bogs to the east have been so designated which requires that the existing basin located on Lot 3 to be removed, which was assumed in the design.

The NRCS has logged the soils in the upland portion of the site as Hinckley and Udorthents, sandy; both A soils. The wetland soils were logged as Scarboro, a D soil **Appendix F.** The vegetation on the upland portion of the site was largely a pine forest. Stone walls and trails run throughout the site. BCG conducted soil evaluations throughout the site between 2001 and 2022 for the purpose of determining suitability for storm water and for on-site sewage disposal. The most recent soil evaluations in 2022 were conducted in accordance with Standard 3 of the DEP Stormwater Standards are based on the results of the soil investigations, we confirmed that Lot 1 is dominated by NRCS hydrologic Class A soils. 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. The hydrogeologic investigation done in 2000 determined that the estimated high ground water in the area of the proposed storm water basin on Lot 1 is at about elevation 193.0' (Well CMW-4 3/30/2000).

Copies of the 2022 soil logs are included in **Appendix F**. The locations of the test pits are shown on Sheet 2.0 of the submitted plan.

3.0 Flood Condition Analyses and Flood Control

The storm water management system will consist of a system to capture and infiltrate the roof runoff from the building and fueling facility canopy before discharge into an infiltration system located south of the proposed building. The parking lot runoff will be captured through a catch basin/drain manhole system and conveyed to the street drain system that eventually discharges to the storm water basin on Lot 2 as was anticipated in the subdivision design and 2017 Storm Water Report. The separate system that will capture roof runoff from the proposed building and channel it to the infiltration system without it mixing with the parking lot runoff is an LID element.

The assumed existing land use conditions for the majority of project are woods, gravel and paved parking areas, and buildings. Lot 1 is vacant and consists of gravel, pavement, and concrete with some woods along the south lot line. Proposed land uses include buildings, driveways, sidewalks, parking lots, landscape, and woods. The land uses for existing and proposed conditions are summarized in **Tables 1a** and **1b**. Because the entire site was also once a gravel pit, the existing forested conditions are assumed to be fair. Again, these assumptions are the same as those in the 2017 and 2022 storm water designs. **Appendix A – Figure 1 Existing Conditions Subarea**.

Table 1a – Summary of Existing Land Uses

Subarea	Total Area (acres)	Land use	Area (acres)
EA	6.58	Roofs, HSG A	0.04
		Paved parking, HSG A	0.61
		Woods, fair, HSG A	5.93
EB	2.06	Woods, fair, HSG A	2.06
EC	23.40	Roofs, HSG A	0.04
		Paved parking, HSG A	7.11
		Woods, fair, HSG A	14.15
		Woods, fair, HSG D	2.10
Total:	32.04	Total:	32.04

As was previously described, the developed area of study is divided into two watersheds that discharge toward Rabbit Hill Brook to the east and to the south property line **Appendix A –Developed Conditions Subarea**. One of the goals of the storm water design is to ensure that there is no increase in the rate of runoff from the site to the abutting properties and downstream resources. For proposed conditions with significant grading changes, the sub-watersheds are divided in to six separate subareas as well as four future buildings. Subarea DA, which includes Lot 1, drains to basin C3 on Lot 2 largely through the existing trunk drain. Subarea DB consists of sheet flow off to the south property line. Subareas DA and DB have not changed from the 2017 design. Subareas DC and DD are largely located on Lot 3 and were modified in Phase 2. Subarea DC sheet flows directly to Rabbit Hill Brook through the wooded area that contains wetlands and a drainage ditch. Subarea DD flows to the proposed infiltration basin on Lot 3 through a combination of sheet flow and the proposed drainage system to be constructed on Lot 3.

The Lot 1 parking area will be served by a standard catch basin/drain manhole system that will discharge the runoff into the infiltration basin on Lot 2 through the drain system in Commerce Boulevard. In compliance with the Town of Wrentham standards we have integrated LID into the design by separating the clean roof runoff from the parking lot runoff. This separate drain system eliminates the need to treat the roof runoff prior to discharge to the basin. All runoff from the parking lot will be pretreated by a water quality inlet designed to accept to the 2-inch storm event, as well as deep sump catch basins with oil traps, which then discharge to the trunk drain into the infiltration basin on Lot 2. The infiltration system for roof runoff has been designed to capture and infiltrate all storms up to the 100-year event. The same is true for the existing storm water basin on Lot 2 and the proposed storm water basin on Lot 3. This is necessary to eliminate any discharge to the Zone A and results in a significant reduction in rate and volume of runoff from the site. **Table 2 & Appendix A**

Table 1b – Summary of Proposed Land Uses

Subarea	Total Area (acres)	Land use	Area (acres)
DA	8.13	Paved roads w/curbs & sewer, HSG A	0.69
		Paved parking, HSG A	2.36
		Grass cover >75%, good, HSG A	2.75
		Water surface, 0% imp, HSG A	0.44
		Woods, fair, HSG A	1.89
Building & Canopy	0.21	Unconnected roofs, HSG A	0.21
DB	1.31	Woods, fair, HSG A	1.21
		Grass cover >75%, good, HSG A	0.10
DC	8.50	Grass cover >75%, good, HSG A	0.43
		Woods, fair, HSG A	5.97
		Woods, fair, HSG D	2.10
DD	11.71	Grass cover >75%, good, HSG A	2.70
		Unconnected roofs, HSG A	4.12
		Paved parking, HSG A	4.28
		Water surface, HSG A	0.61
Bldg A	1.09	Roofs, HSG A	1.09
Bldg B	1.09	Roofs, HSG A	1.09
Total:	32.04	Total:	32.04

The closed parking lot and roadway drainage systems were designed using the Rational Method with the capability of handling a 25-year storm event in accordance with the Wrentham standards. The schematic layout and calculation sheets are included in **Appendix D** of this report.

The pre- and post-developed conditions based on the land uses in **Tables 1a** and **1b** are summarized in **Table 2** and detailed calculations can be found in **Appendix A**.

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

Condition		2-inch (cfs)	2-inch (ac-ft)	2-year (cfs)	2-year (ac-ft)	10-year (cfs)	10-year (ac-ft)	50-year (cfs)	50-year (ac-ft)	100-year (cfs)	100-year (ac-ft)
Existing Conditions	South Property Line	0.0	0.000	0.0	0.000	0.0	0.015	0.5	0.114	1.4	0.204
	Rabbit Hill Brook	0.1	0.093	3.4	0.733	15.7	2.229	41.8	5.319	59.2	7.396
	Total	**0.1**	**0.093**	**3.4**	**0.733**	**15.7**	**2.244**	**42.3**	**5.433**	**60.6**	**7.600**
Developed Conditions	South Property Line	0.0	0.000	0.0	0.000	0.0	0.010	0.3	0.072	0.9	0.130
	Rabbit Hill Brook	0.0	0.000	0.1	0.052	1.2	0.339	6.5	1.106	10.7	1.679
	Total	**0.0**	**0.000**	**0.1**	**0.052**	**1.2**	**0.349**	**6.8**	**1.178**	**11.6**	**1.809**

The 2-inch, 2-year, 10-year, 50-year, and 100-year flood elevations in the storm water infiltration system for roof runoff is summarized in **Table 3**. The detailed 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 for Sand and were discussed in **Section 2.0 Existing Conditions**. Infiltration in the existing Lot 2 infiltration basin and the proposed Lot 1 subsurface system is substantial and will satisfy the Required Recharge Volume.

Table 3: Summary of Stormwater Basin Flood Elevations

Condition	2-inch	2-year	10-year	50-year	100-year
Lot 1 Infiltration System Elevation	212.6'	213.0'	213.3'	213.8'	214.2'
Lot 1 Infiltration System Storage Volume	0.001 ac-ft	0.005 ac-ft	0.012 ac-ft	0.025 ac-ft	0.033 ac-ft

4.0 Stormwater Management

The site is not located in a groundwater recharge zone (Zone I, II, III), nor are there private drinking water wells around the project site. Rabbit Hill Brook is in the Zone A as a tributary for the Wading River surface water supply. The DEP Stormwater Standards apply to this project, as do the Wrentham Subdivision Rules and Regulations and the Wrentham Board of Health Stormwater Regulations, 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 resource areas. Runoff from all new pavement on Lot 1 will be routed through a water quality structure and deep sump catch basins equipped with "Snout" water quality elbows, then to manholes, and finally to the above-ground storm water basin on Lot 2.

Standard #2: PEAK RATE ATTENUATION

Stormwater controls have been designed for 2-inch, 2-year, 10-year, 50-year, 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 points. See **Table 2 and Appendix A** for details.

Standard #3: STORMWATER RECHARGE

1) The proposed project is located on a plot with hydrologic class A and D soils based on the NRCS soil map. All of Lot 1 and the majority of the property are in A soils. The target depth factor for an A soil is 0.60 inches. Soil textural analyses

have been conducted in the areas where recharge is proposed and the soils were found to be Sand. Storm water recharge for the parking areas will take place within the infiltration basin on Lot 2 and for the roof runoff in the storm water infiltration system located south of the building. The calculations for the recharge volumes are located in **Appendix B**.

2) The infiltration BMP that will be used will be the above-ground storm water basin on Lot 2 and the subsurface infiltration system on Lot 1. The calculation for the recharge volume is located in **Appendix B**.

3) Due to the use of the multi-stage treatment train, the actual TSS removal is 93% and the standard is met. **Table 4 & Appendix B**

4) Using the RAWLS rate for Sand for the subsurface infiltration system shows that the drawdown of the Required Recharge Volume will take 2 hours. The drawdown of the 10-year storm will take 4 hours and the 100-year storm will take 7 hours. All events meet the required 72 hours dewatering standard **Appendix B**.

5) Capture area adjustment is not necessary since all of the infiltration will take place within the infiltration basin on Lot 2 or the subsurface infiltration system on Lot 1 and 100% of the impervious area will be directed to the facilities, which meets the 65% requirement.

6) Mounding analysis is not necessary because the bottom of the roof infiltration system is more than 4' above the estimated high ground water, but is included due to the local requirement. The mount will be about 19' below the proposed system.

Standard # 4: WATER QUALITY

1) The required water quality volume is based on 8.52 acres of impervious area and 1.0 inch water quality depth, which yields a water quality volume of 0.43 acre-feet.

2) The BMPs used for Lot 1 to enhance water quality includes a water quality structure and deep sump catch basins on the site. All of the runoff from the parking areas will go through deep sump catch basins and a water quality structure prior to passage into the street drain system and to the infiltration basin on Lot 2. Runoff from the roof will be piped separately to the infiltration system south of the building. The estimated overall TSS removal will be 93%, which meets the 80% standard **Appendix B & Table 4.**

3) The Lot 2 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 required

Water Quality Volume is 0.83 ac-ft and the basin has a storage volume of 2.73 ac-ft. Therefore, the standard is met. **Appendix B**

4) The water quality inlet was sized using Contech Cascade Maximum Treatment Flow Rate **Sheet 5.3 & Appendix B**

Table 4: Summary of TSS Removal

Cascade Stream					
Impervious Area =		0.77	acres		
Runoff depth to be treated =		1.77	inches (2" storm)		
Runoff volume to be treated =		0.1136	ac-ft		
BMP	*TSS Removal Rate*	*Starting TSS Load*	*Amount Removed*	*Remaining Load*	
Deep Sump and Hooded CB	0.25	1.00	0.25	0.75	
Cascade CS-8	0.5	0.75	0.38	0.38	
Infiltration Basin (Lot 2)	0.8	0.38	0.30	0.08	
	TOTAL TSS REMOVED =			**93 %**	

Standard # 5: LAND USES WITH HIGHER POTENTIAL POLLUTION LOADS

The facility will consist of a refueling facility which is considered to have a high potential pollutant load. The recommended BMPs for this land use are identified in Chapter 1, P.14, Table LUHPPL of the Massachusetts Stormwater Handbook, which have been used in the design. Recommended pretreatment includes deep sump catch basins and proprietary separators, which are included in the treatment train. Treatment and infiltration recommendations include infiltration basins, and subsurface structures; all of which are included in the treatment train for runoff from Lot 1.

Standard #6: CRITICAL AREAS

Rabbit Hill Brook is part of the Zone A to the Wading River surface water supply. There is no discharge from the project to the brook from any developed areas since the storm water basins can accommodate the 100-year event without overflow. The closest BMP to the river is about 256' and is located on Lot 3. Table CA6, Vol.1, Ch 1., p.18 was used to choose the specific BMPs for Lot 1. The pretreatment BMP is a deep sump catch basin. The treatment BMP includes a water quality structure and infiltration basin. The infiltration BMPs include the subsurface infiltration system on Lot 1.

Standard #7: REDEVELOPMENT

The proposed activity is a combination development/redevelopment project, but all standards for new development will be met.

Standard #8: CONSTRUCTION PERIOD CONTROLS

Silt sock barriers will be installed at the downgradient limit of work 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. Silt sacks will be used in the catch basins 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.

Further, I certify that the stormwater management system as shown on the referenced plans will be maintained in accordance with the conditions of the Long Term Pollution Prevention Plan.

To be signed prior to construction _____

TBD Date

APPENDIX A – Pre- and Post-Development Analysis and Infiltration Systems Designs


3S
Watershed EA
6R
Isolated Depression
7S
Watershed EB
4R
South Property Line
8S
Watershed EC
5R
Rabbit Hill Brook
Subcat
Reach
Pond
Link
Routing Diagram for 990223 Ex-Alt
Prepared by Bay Colony Group, Inc., Printed 9/23/2017
HydroCAD® 10.00-20 s/n 07093 © 2017 HydroCAD Software Solutions LLC

WATER

UDORTHENTS, SANDY

FREETOWN MUCK

STREET

Tc Path

SUBAREA EC
A=23.40 ac
Tc=28.2 min
CN=59

SUBAREA EA
A=6.58 ac
Tc=10.4 min
CN=42

HINCKLEY, SL

HINCKLEY, LS

SUBAREA EB
A=2.06 ac
Tc=15.0 min
CN=36

SCARBORO & BIRDSALL

WASHINGTON STREET

COMMERCE WAY

HAWES STREET

UDORTHENTS, SANDY

DESIGN POINT–
SOUTH PROPERTY
LINE

DESIGN POINT–
RABBIT HILL BROOK

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

PROJECT:

NasKart LLC Indoor Karting & Tranmpoline
Commerce Way
Wrentham,
Massachusetts

OWNERS:

WBH, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762

TAUNTON ST & RTE
ONE REALTY TR
3 BELCHER STREET
PLAINVILLE, MA 02762

APPLICANT:

EDGEWOOD
DEVELOPMENT
COMPANY, LLC
72 TAUNTON STREET
PLAINVILLE, MA 02762

EDGEWOOD
Development Company, LLC

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

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

STAMP

DRAWING TITLE

Existing Subareas

SCALE: 1"=80'

JULY 20, 2017	SHEET NUMBER
990223A	EX

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.720	98	Paved parking, HSG A (3S, 8S)
0.080	98	Roofs, HSG A (3S, 8S)
22.140	36	Woods, Fair, HSG A (3S, 7S, 8S)
2.100	79	Woods, Fair, HSG D (8S)
32.040	**54**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
29.940	HSG A	3S, 7S, 8S
0.000	HSG B	
0.000	HSG C	
2.100	HSG D	8S
0.000	Other	
32.040		**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
7.720	0.000	0.000	0.000	0.000	7.720	Paved parking	3S, 8S
0.080	0.000	0.000	0.000	0.000	0.080	Roofs	3S, 8S
22.140	0.000	0.000	2.100	0.000	24.240	Woods, Fair	3S, 7S, 8S
29.940	**0.000**	**0.000**	**2.100**	**0.000**	**32.040**	**TOTAL AREA**	

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 3S: Watershed EA Runoff Area=6.580 ac 9.88% Impervious Runoff Depth=0.00"
Flow Length=725' Tc=10.4 min CN=42 Runoff=0.0 cfs 0.000 af

Subcatchment 7S: Watershed EB Runoff Area=2.060 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.0 cfs 0.000 af

Subcatchment 8S: Watershed EC Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>0.05"
Flow Length=2,467' Tc=28.2 min CN=59 Runoff=0.1 cfs 0.093 af

Reach 4R: South Property Line Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Reach 5R: Rabbit Hill Brook Inflow=0.1 cfs 0.093 af
Outflow=0.1 cfs 0.093 af

Reach 6R: Isolated Depression Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Total Runoff Area = 32.040 ac Runoff Volume = 0.093 af Average Runoff Depth = 0.03"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

Summary for Subcatchment 3S: Watershed EA

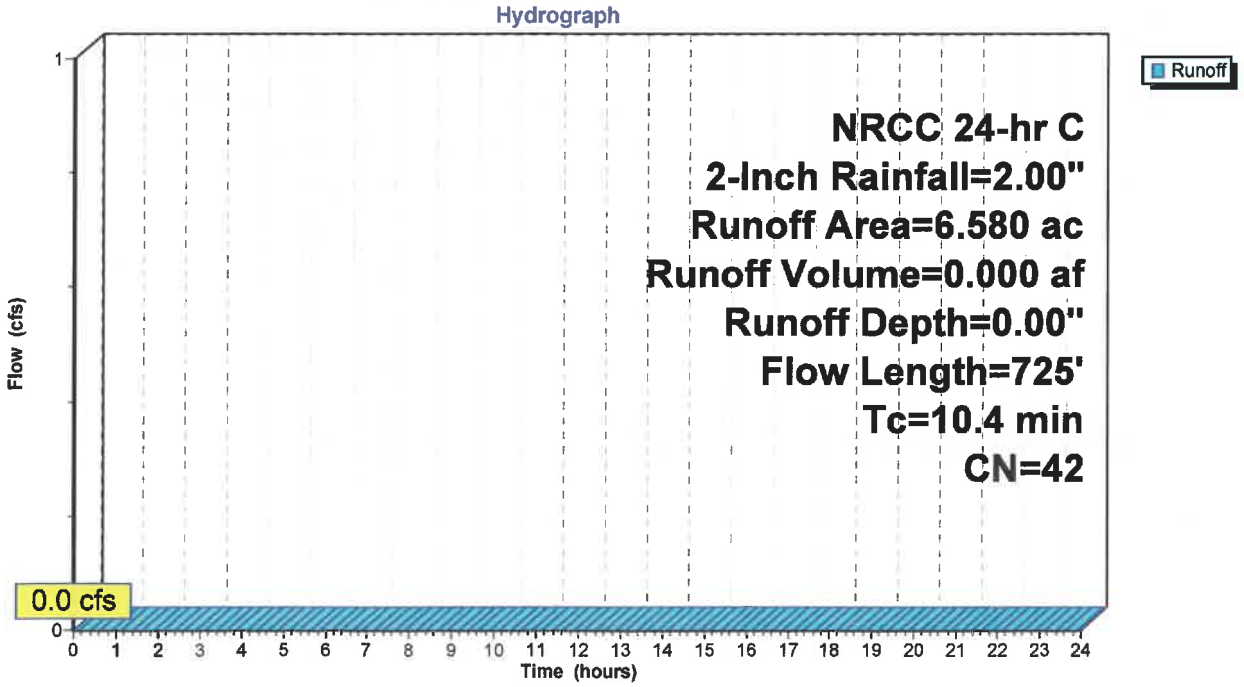
Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	36	Woods, Fair, HSG A
6.580	42	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA



Summary for Subcatchment 7S: Watershed EB

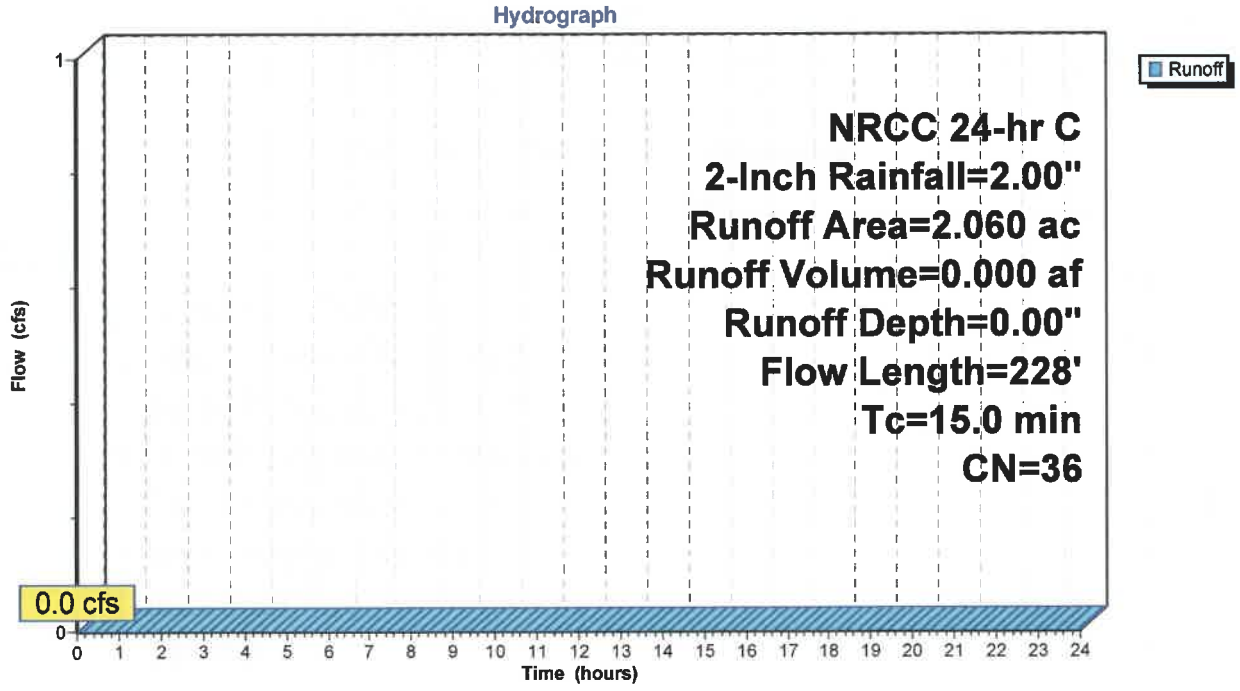
Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
2.060	36	Woods, Fair, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB



Summary for Subcatchment 8S: Watershed EC

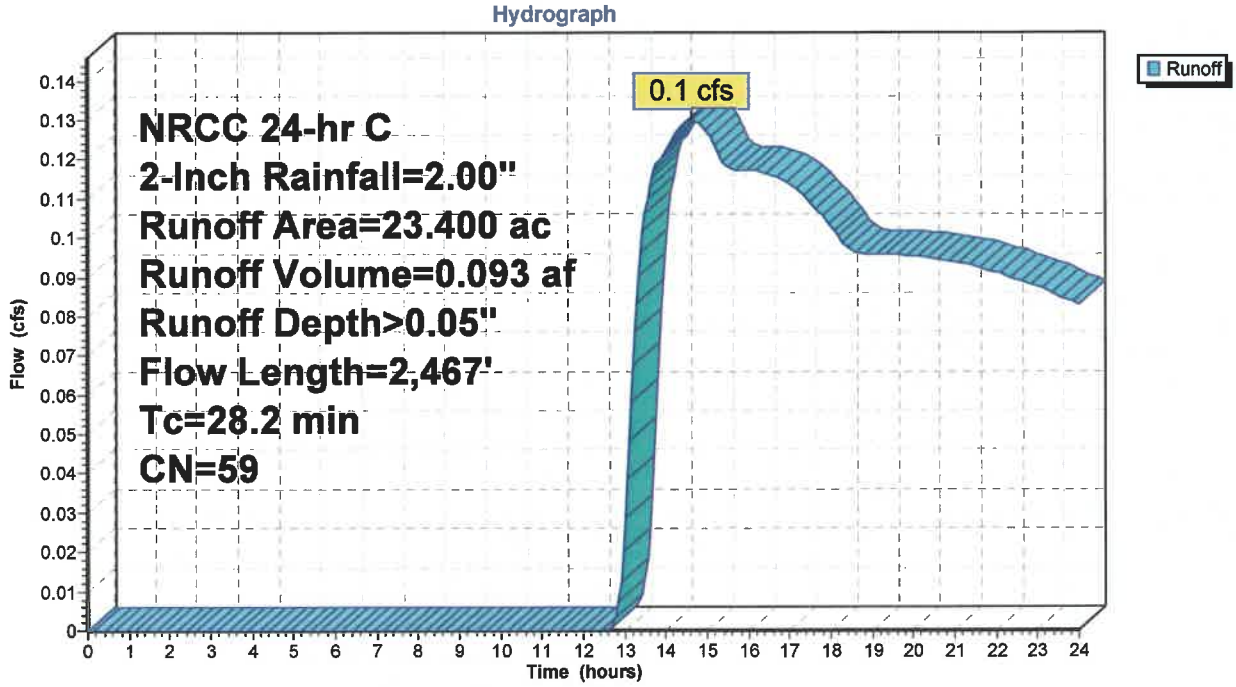
Runoff = 0.1 cfs @ 14.65 hrs, Volume= 0.093 af, Depth> 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
23.400	59	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

Subcatchment 8S: Watershed EC

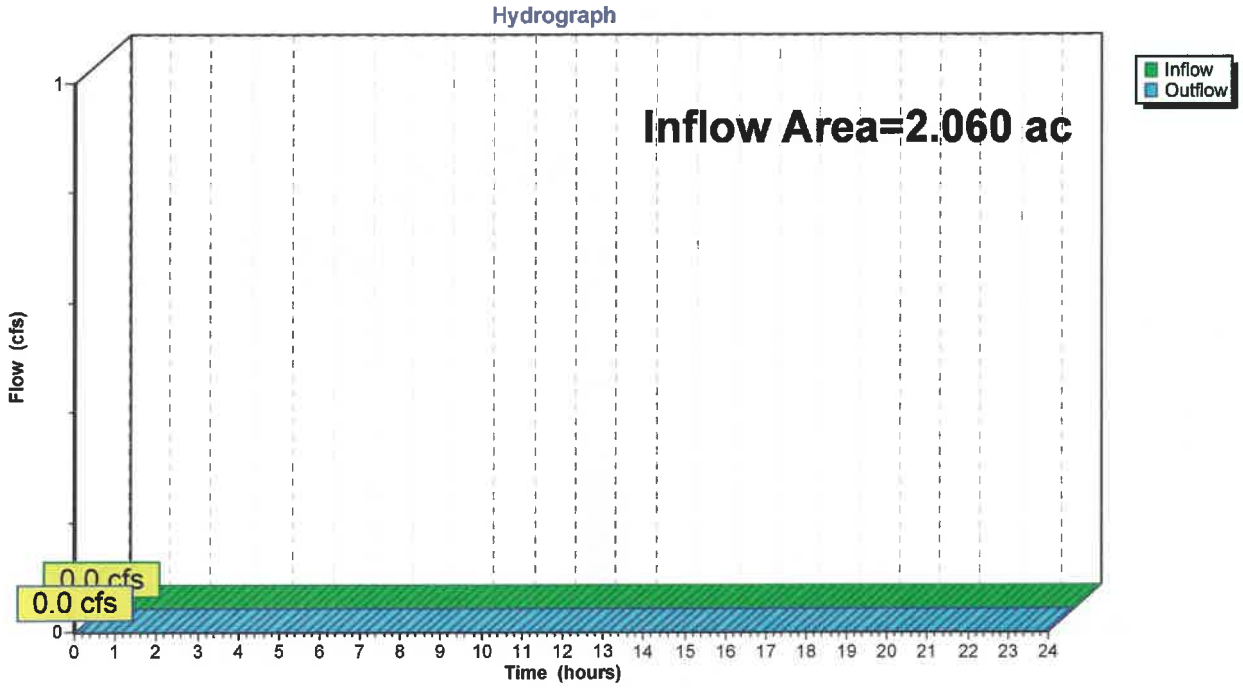


Summary for Reach 4R: South Property Line

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Inch 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 4R: South Property Line

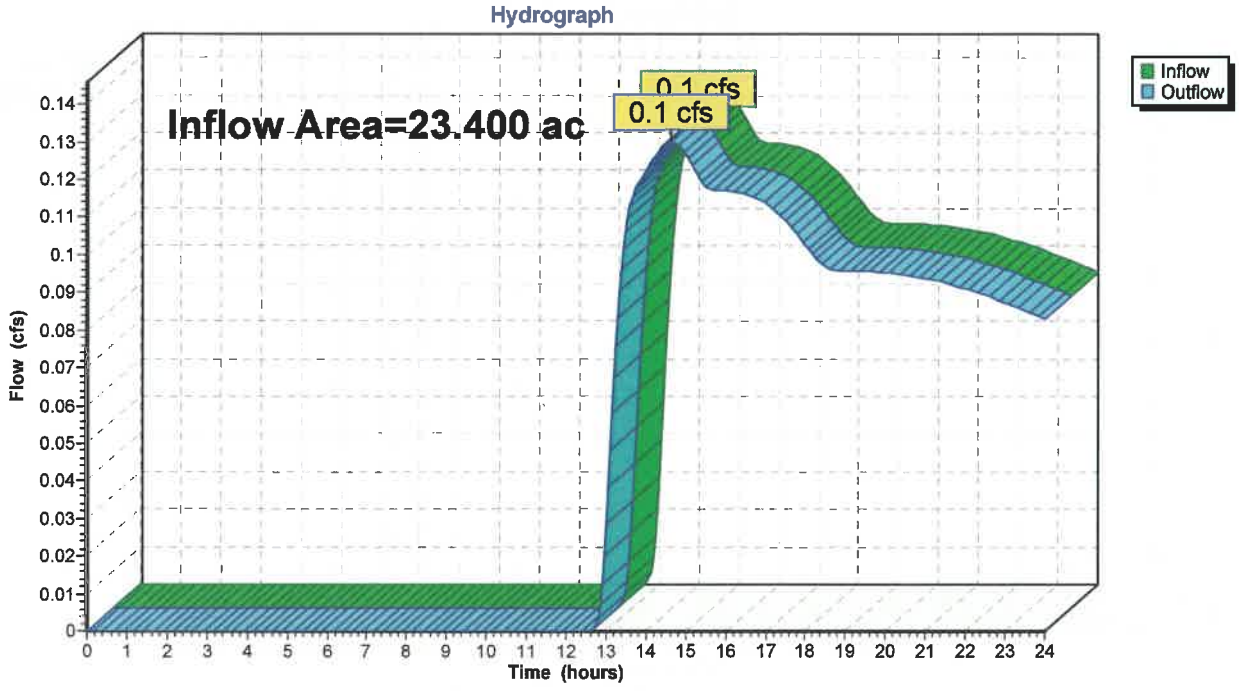


Summary for Reach 5R: Rabbit Hill Brook

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 0.05" for 2-Inch event
Inflow = 0.1 cfs @ 14.65 hrs, Volume= 0.093 af
Outflow = 0.1 cfs @ 14.65 hrs, Volume= 0.093 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: Rabbit Hill Brook

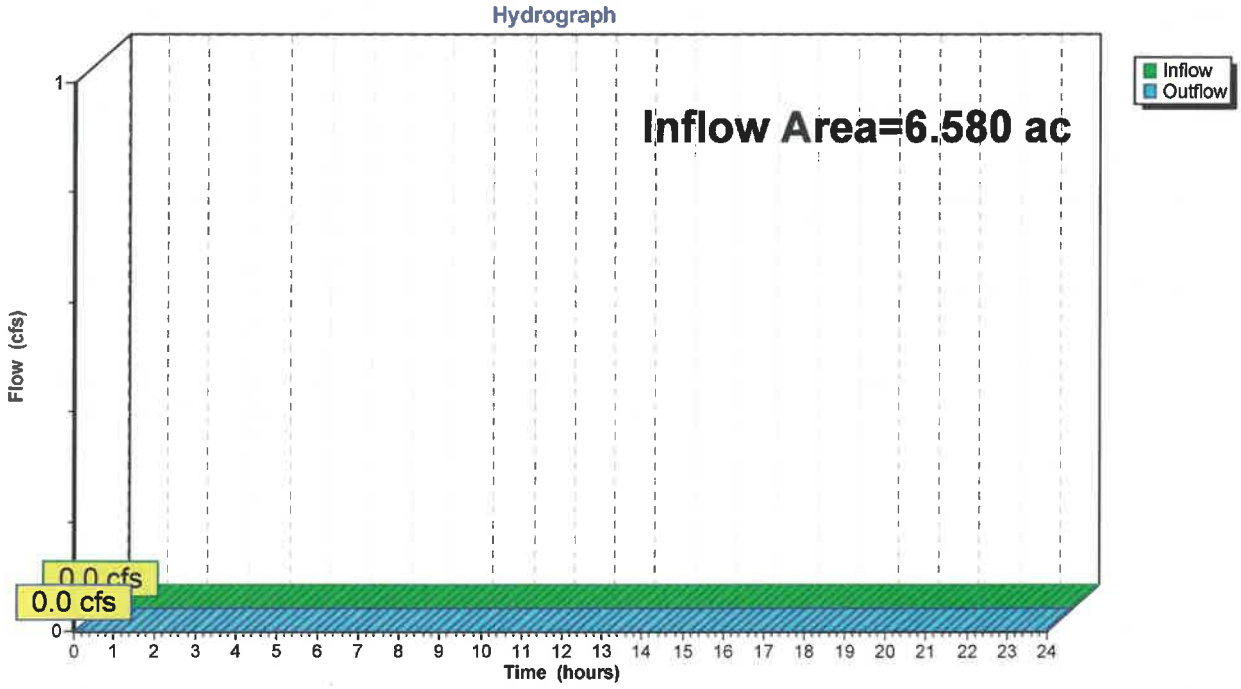


Summary for Reach 6R: Isolated Depression

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth = 0.00" for 2-Inch 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 6R: Isolated Depression



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 3S: Watershed EA Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>0.01"
Flow Length=725' Tc=10.4 min CN=42 Runoff=0.0 cfs 0.008 af

Subcatchment 7S: Watershed EB Runoff Area=2.060 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.0 cfs 0.000 af

Subcatchment 8S: Watershed EC Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>0.38"
Flow Length=2,467' Tc=28.2 min CN=59 Runoff=3.4 cfs 0.733 af

Reach 4R: South Property Line Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Reach 5R: Rabbit Hill Brook Inflow=3.4 cfs 0.733 af
Outflow=3.4 cfs 0.733 af

Reach 6R: Isolated Depression Inflow=0.0 cfs 0.008 af
Outflow=0.0 cfs 0.008 af

Total Runoff Area = 32.040 ac Runoff Volume = 0.741 af Average Runoff Depth = 0.28"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

Summary for Subcatchment 3S: Watershed EA

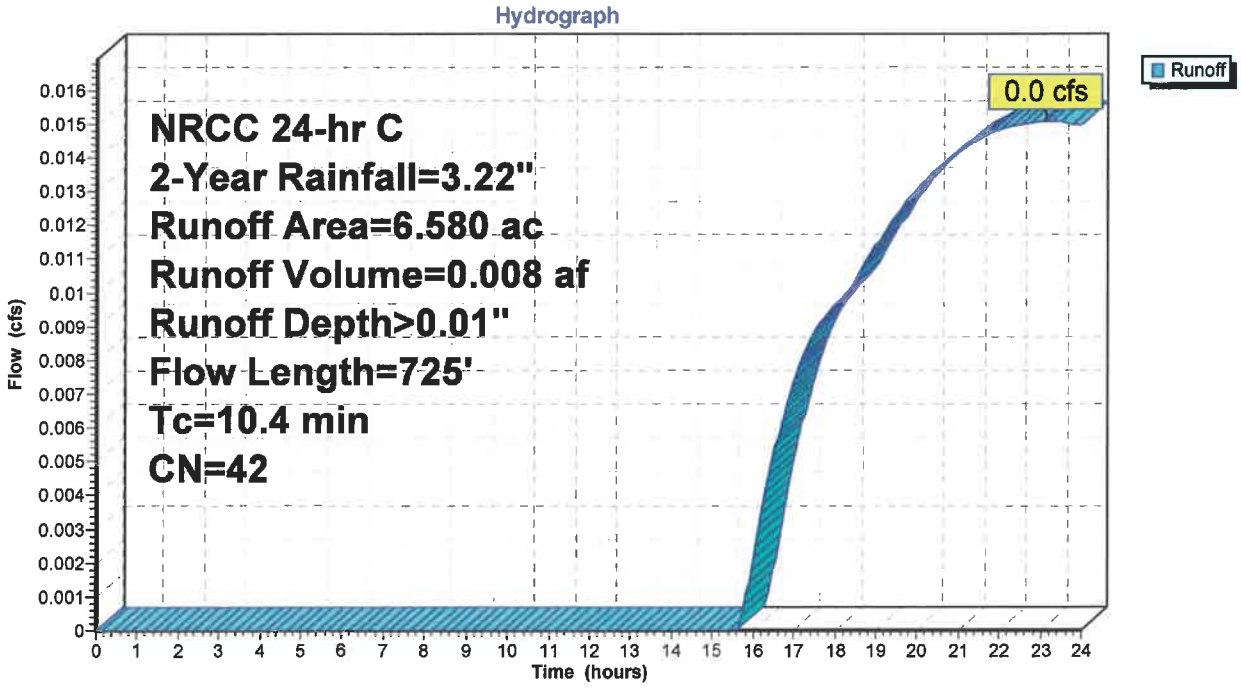
Runoff = 0.0 cfs @ 23.13 hrs, Volume= 0.008 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	36	Woods, Fair, HSG A
6.580	42	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA



Summary for Subcatchment 7S: Watershed EB

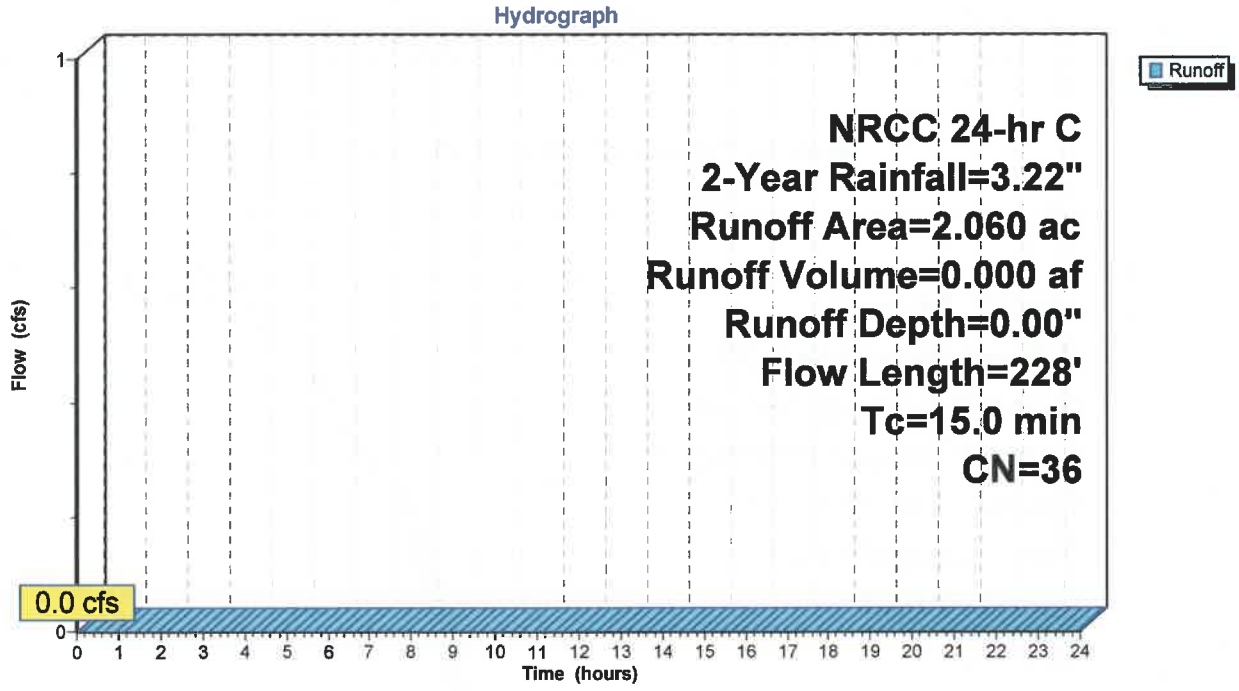
Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
2.060	36	Woods, Fair, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB



Summary for Subcatchment 8S: Watershed EC

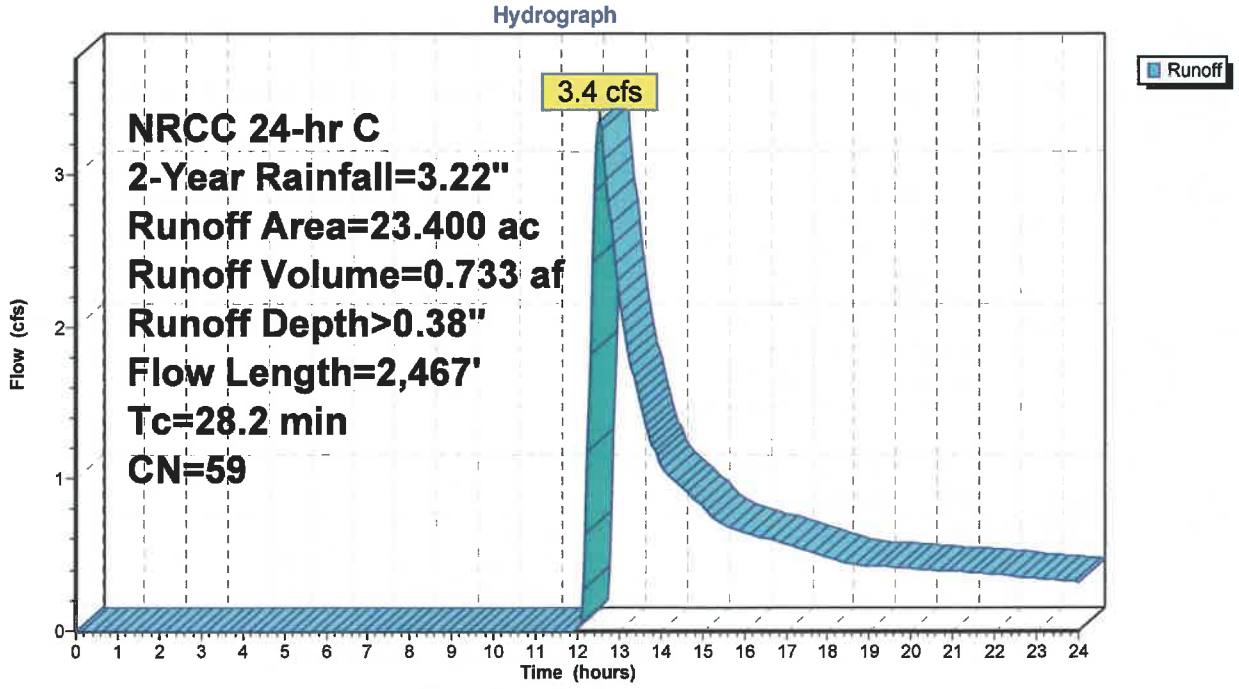
Runoff = 3.4 cfs @ 12.53 hrs, Volume= 0.733 af, Depth> 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
23.400	59	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

Subcatchment 8S: Watershed EC

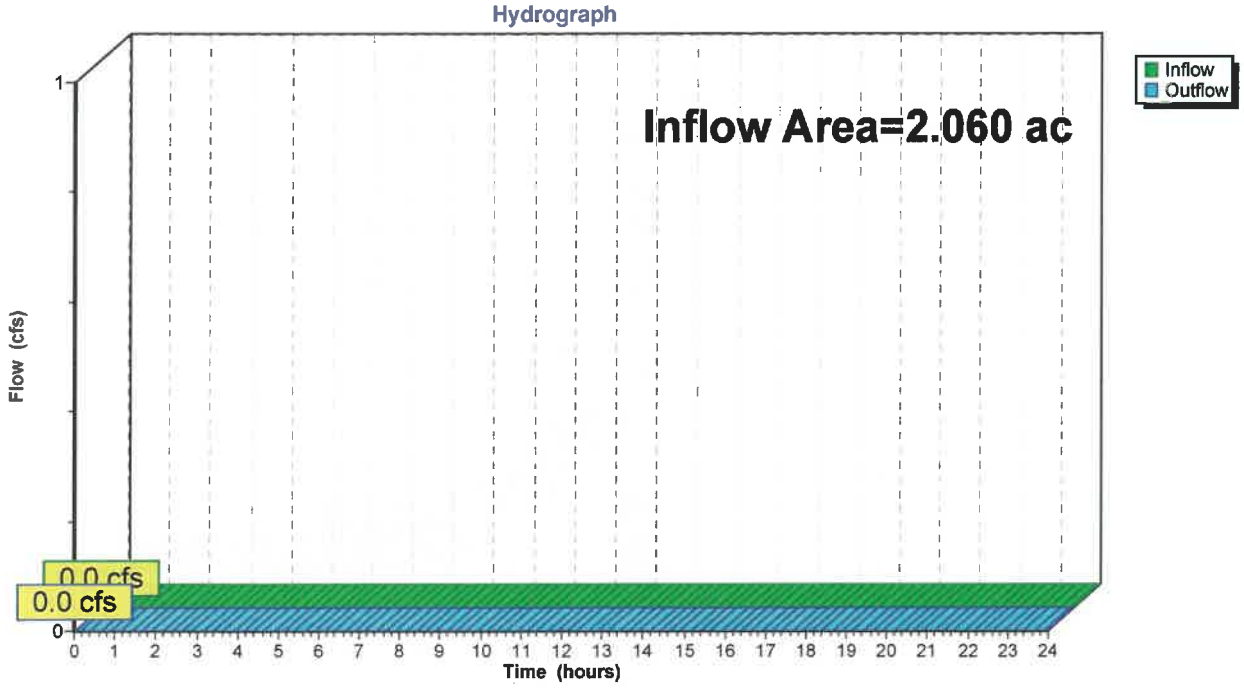


Summary for Reach 4R: South Property Line

Inflow Area = 2.060 ac, 0.00% 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 4R: South Property Line

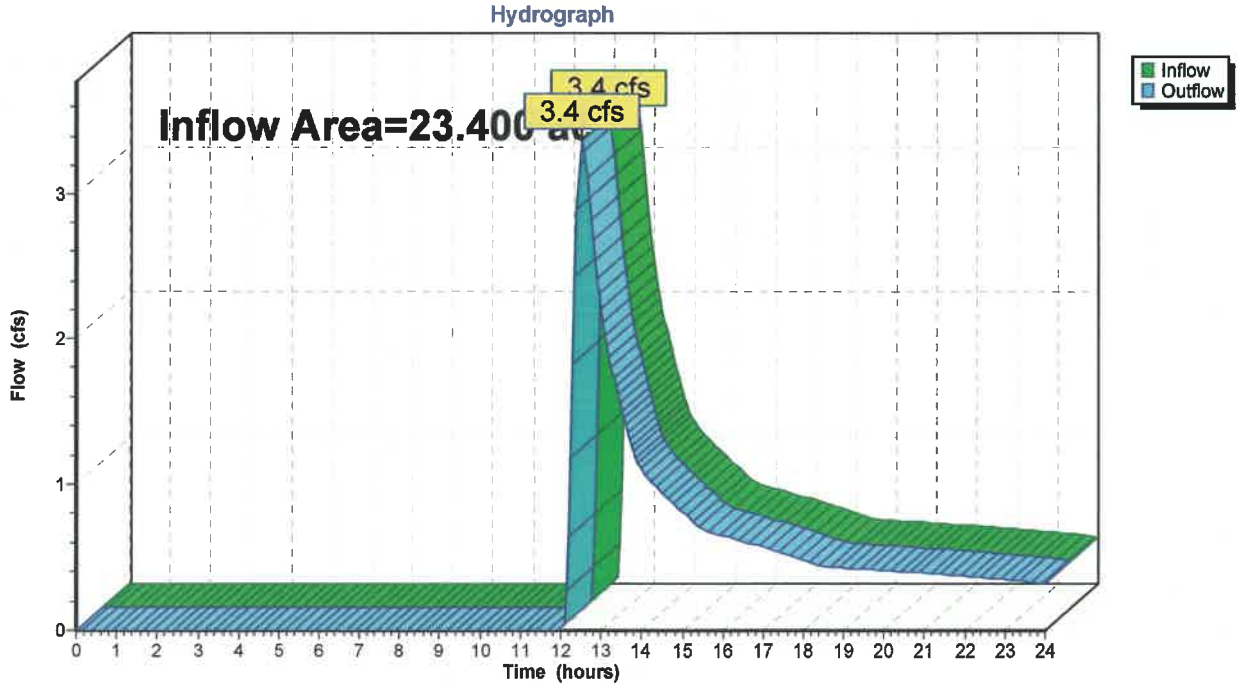


Summary for Reach 5R: Rabbit Hill Brook

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 0.38" for 2-Year event
Inflow = 3.4 cfs @ 12.53 hrs, Volume= 0.733 af
Outflow = 3.4 cfs @ 12.53 hrs, Volume= 0.733 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: Rabbit Hill Brook

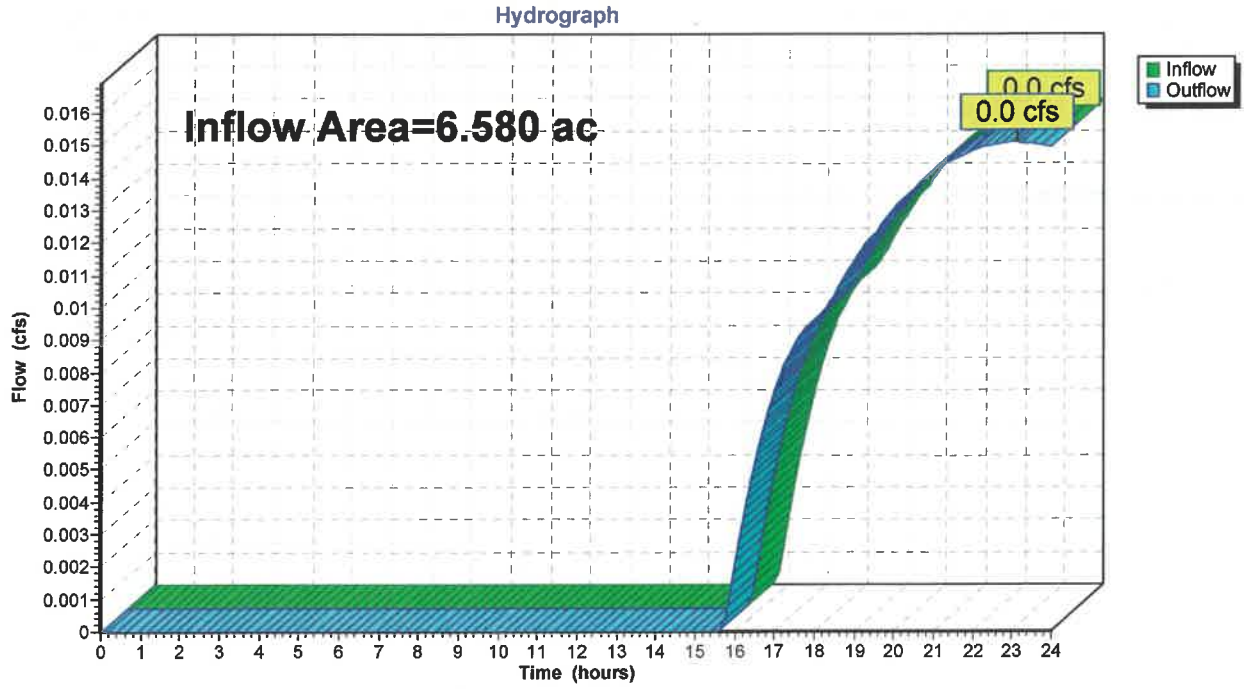


Summary for Reach 6R: Isolated Depression

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 0.01" for 2-Year event
Inflow = 0.0 cfs @ 23.13 hrs, Volume= 0.008 af
Outflow = 0.0 cfs @ 23.13 hrs, Volume= 0.008 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: Isolated Depression



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 3S: Watershed EA Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>0.27"
Flow Length=725' Tc=10.4 min CN=42 Runoff=0.4 cfs 0.151 af

Subcatchment 7S: Watershed EB Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.09"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.0 cfs 0.015 af

Subcatchment 8S: Watershed EC Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>1.14"
Flow Length=2,467' Tc=28.2 min CN=59 Runoff=15.7 cfs 2.229 af

Reach 4R: South Property Line Inflow=0.0 cfs 0.015 af
Outflow=0.0 cfs 0.015 af

Reach 5R: Rabbit Hill Brook Inflow=15.7 cfs 2.229 af
Outflow=15.7 cfs 2.229 af

Reach 6R: Isolated Depression Inflow=0.4 cfs 0.151 af
Outflow=0.4 cfs 0.151 af

Total Runoff Area = 32.040 ac Runoff Volume = 2.395 af Average Runoff Depth = 0.90"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

Summary for Subcatchment 3S: Watershed EA

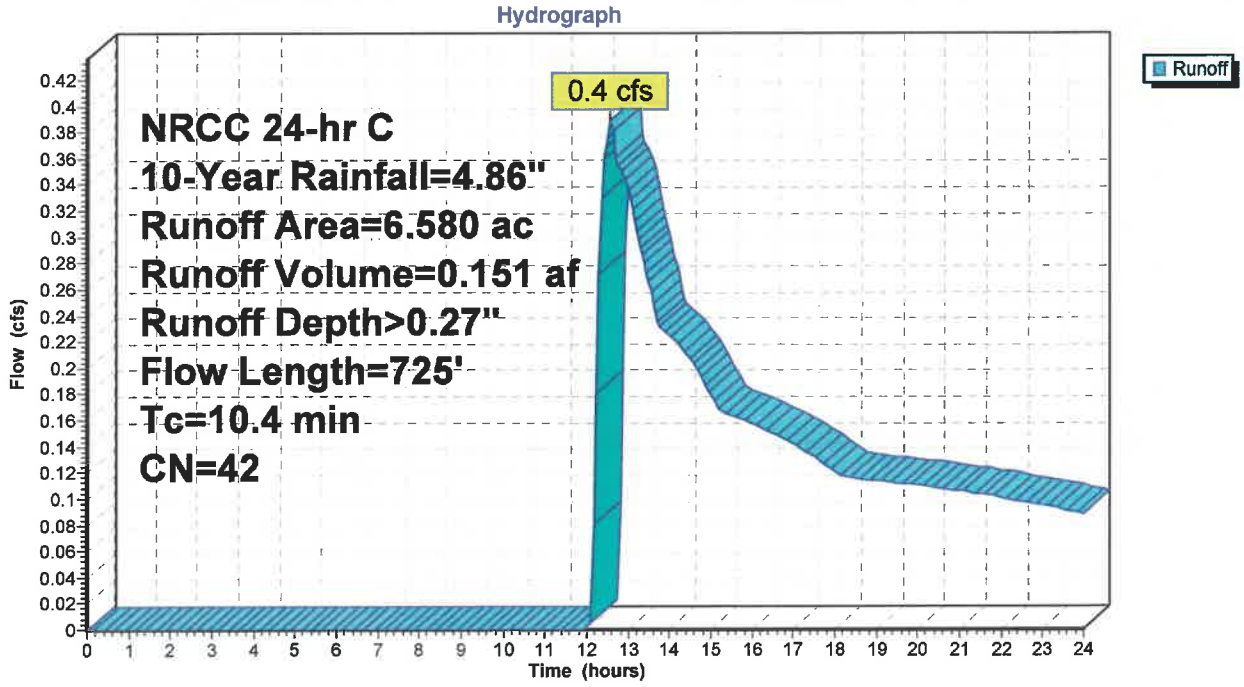
Runoff = 0.4 cfs @ 12.57 hrs, Volume= 0.151 af, Depth> 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	36	Woods, Fair, HSG A
6.580	42	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA



Summary for Subcatchment 7S: Watershed EB

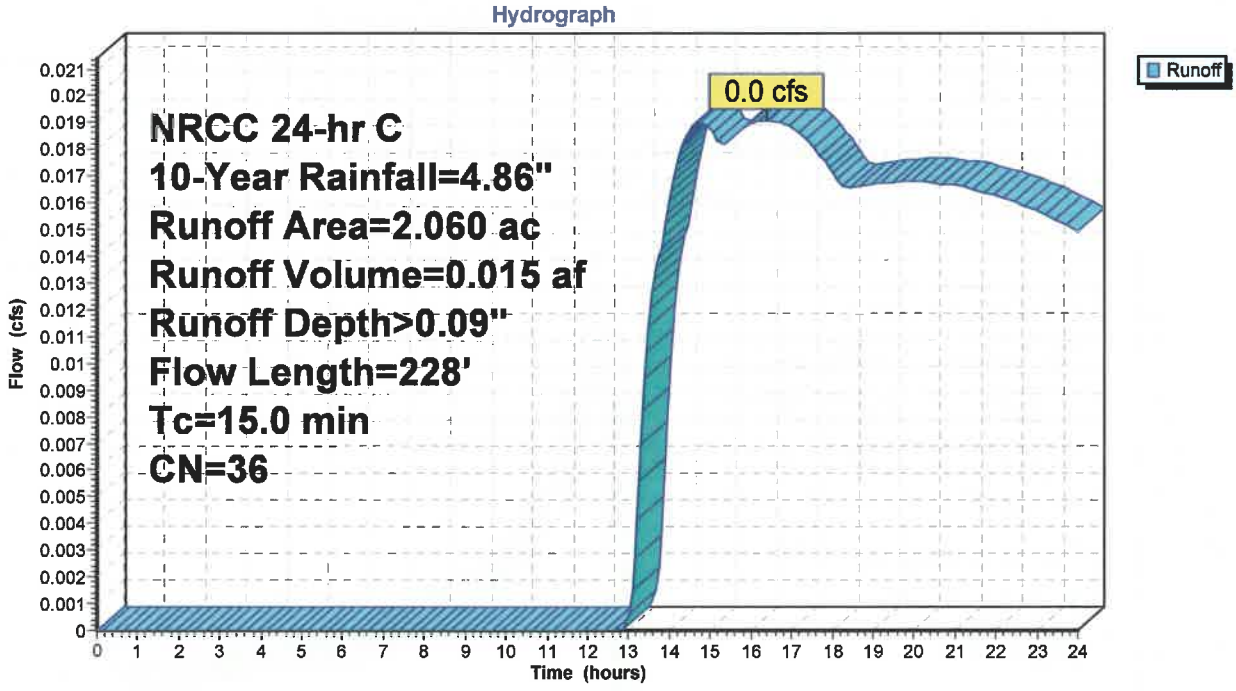
Runoff = 0.0 cfs @ 16.39 hrs, Volume= 0.015 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
2.060	36	Woods, Fair, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB



Summary for Subcatchment 8S: Watershed EC

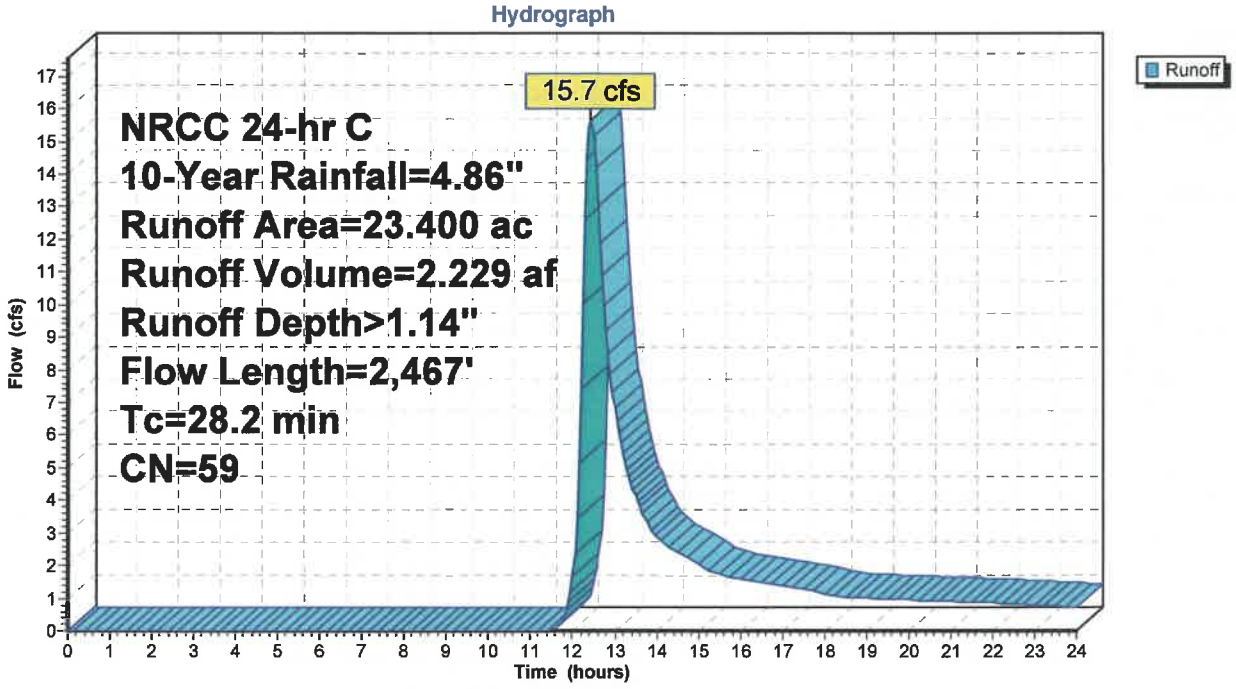
Runoff = 15.7 cfs @ 12.44 hrs, Volume= 2.229 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
23.400	59	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

Subcatchment 8S: Watershed EC

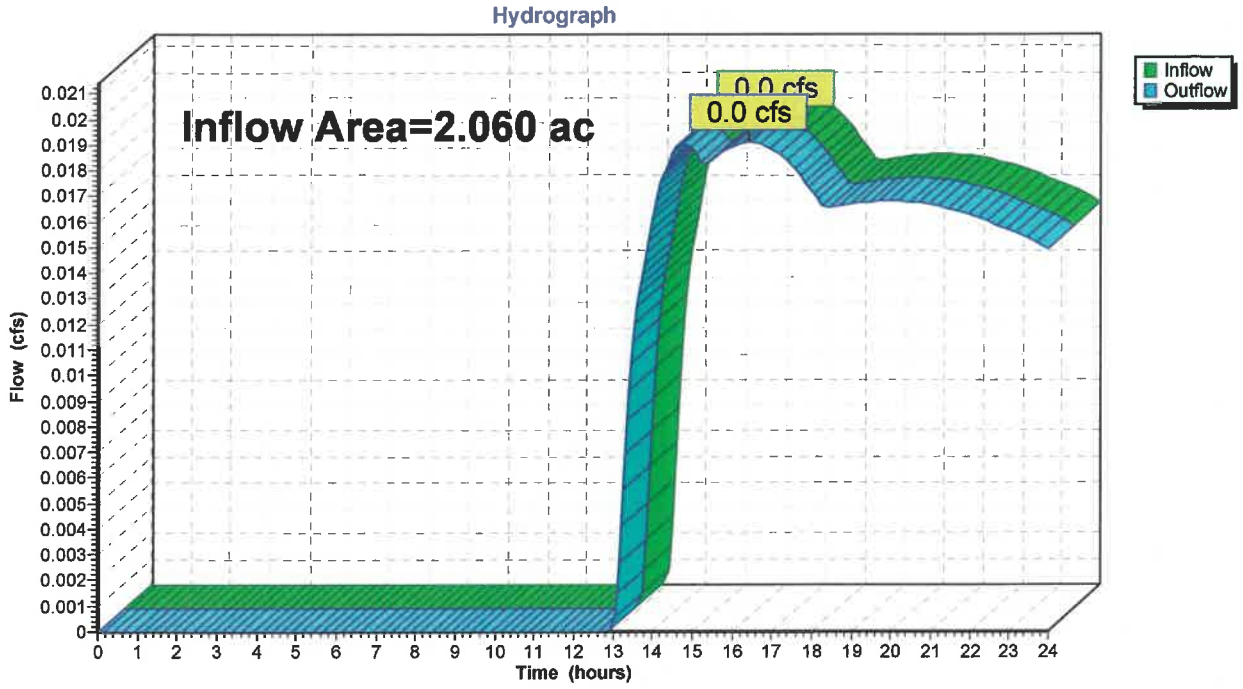


Summary for Reach 4R: South Property Line

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth > 0.09" for 10-Year event
Inflow = 0.0 cfs @ 16.39 hrs, Volume= 0.015 af
Outflow = 0.0 cfs @ 16.39 hrs, Volume= 0.015 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: South Property Line

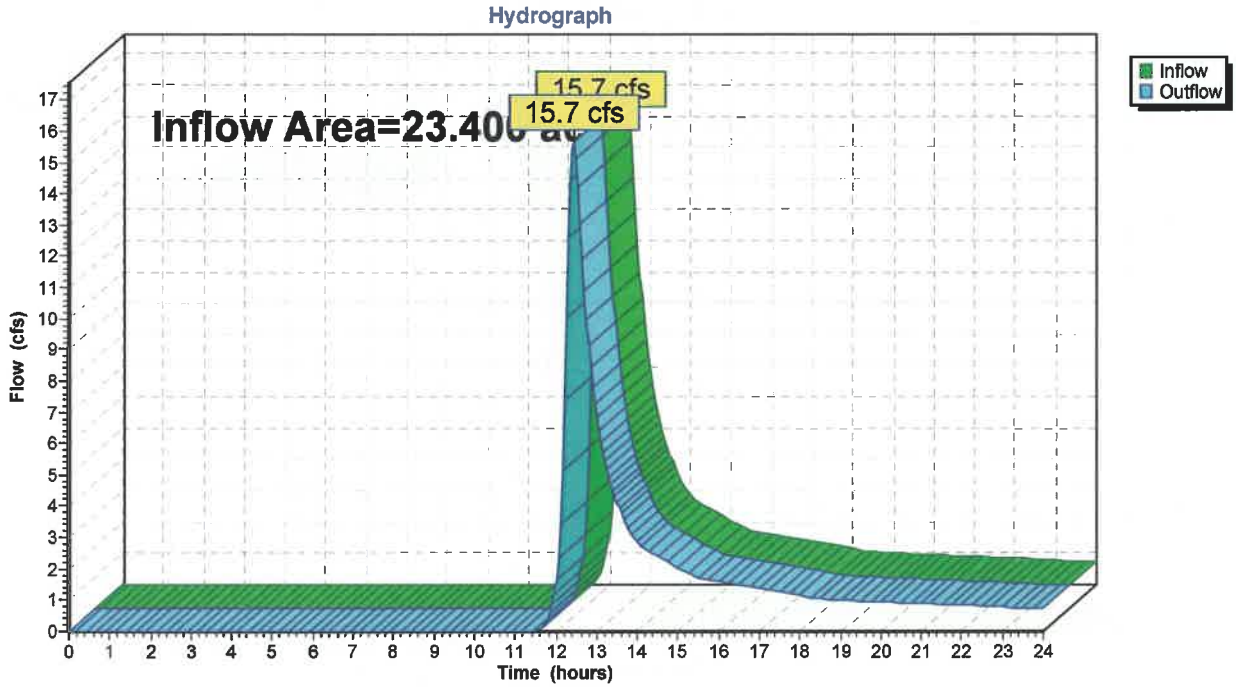


Summary for Reach 5R: Rabbit Hill Brook

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 1.14" for 10-Year event
Inflow = 15.7 cfs @ 12.44 hrs, Volume= 2.229 af
Outflow = 15.7 cfs @ 12.44 hrs, Volume= 2.229 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: Rabbit Hill Brook

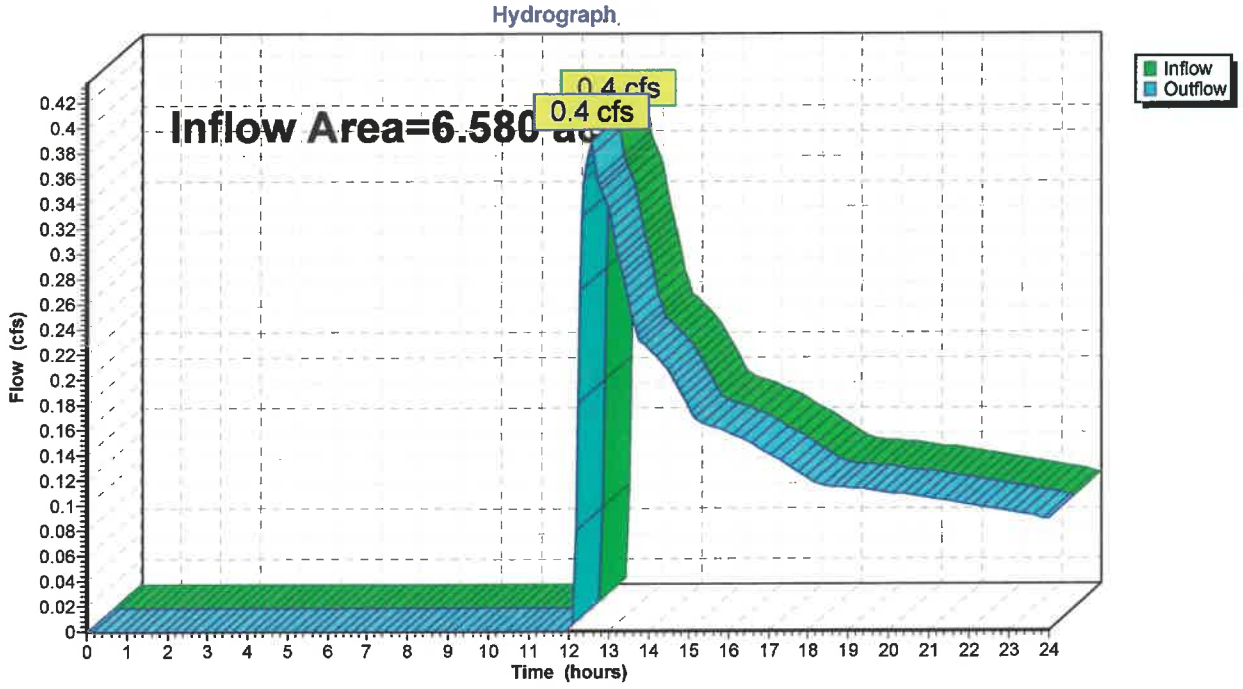


Summary for Reach 6R: Isolated Depression

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 0.27" for 10-Year event
Inflow = 0.4 cfs @ 12.57 hrs, Volume= 0.151 af
Outflow = 0.4 cfs @ 12.57 hrs, Volume= 0.151 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: Isolated Depression



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 3S: Watershed EA Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>1.14"
Flow Length=725' Tc=10.4 min CN=42 Runoff=5.8 cfs 0.625 af

Subcatchment 7S: Watershed EB Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>0.66"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.5 cfs 0.114 af

Subcatchment 8S: Watershed EC Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>2.73"
Flow Length=2,467' Tc=28.2 min CN=59 Runoff=41.8 cfs 5.319 af

Reach 4R: South Property Line Inflow=0.5 cfs 0.114 af
Outflow=0.5 cfs 0.114 af

Reach 5R: Rabbit Hill Brook Inflow=41.8 cfs 5.319 af
Outflow=41.8 cfs 5.319 af

Reach 6R: Isolated Depression Inflow=5.8 cfs 0.625 af
Outflow=5.8 cfs 0.625 af

Total Runoff Area = 32.040 ac Runoff Volume = 6.057 af Average Runoff Depth = 2.27"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

Summary for Subcatchment 3S: Watershed EA

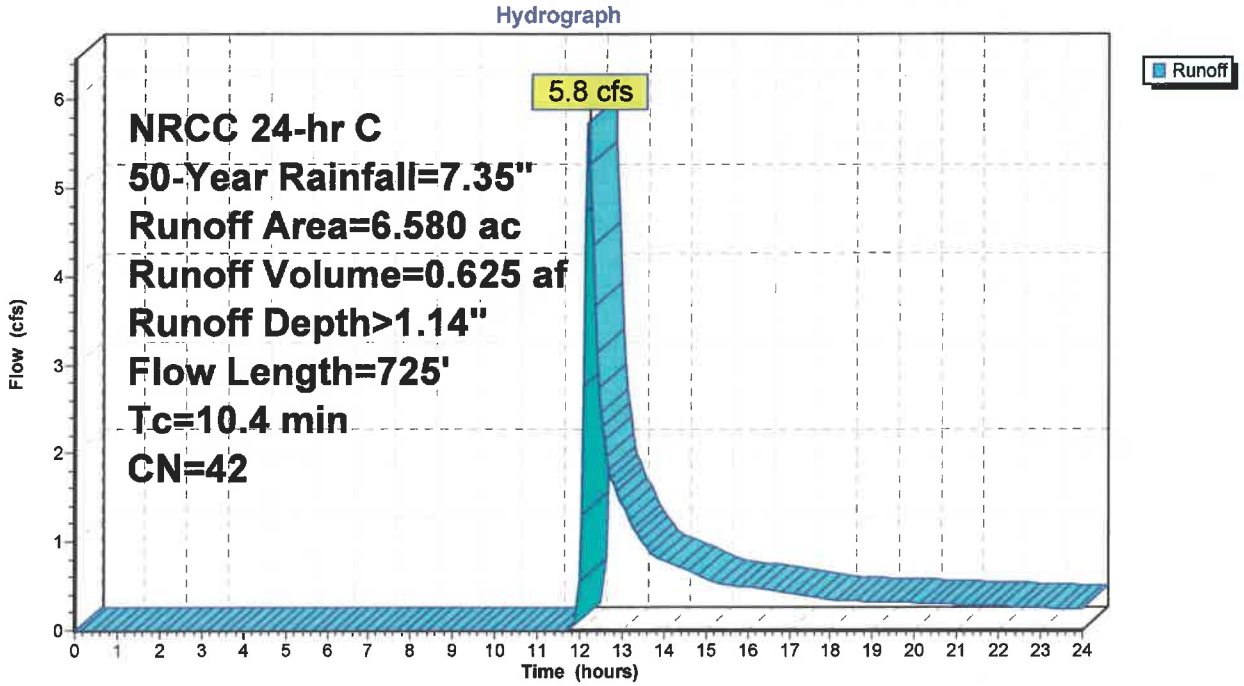
Runoff = 5.8 cfs @ 12.21 hrs, Volume= 0.625 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	36	Woods, Fair, HSG A
6.580	42	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA



Summary for Subcatchment 7S: Watershed EB

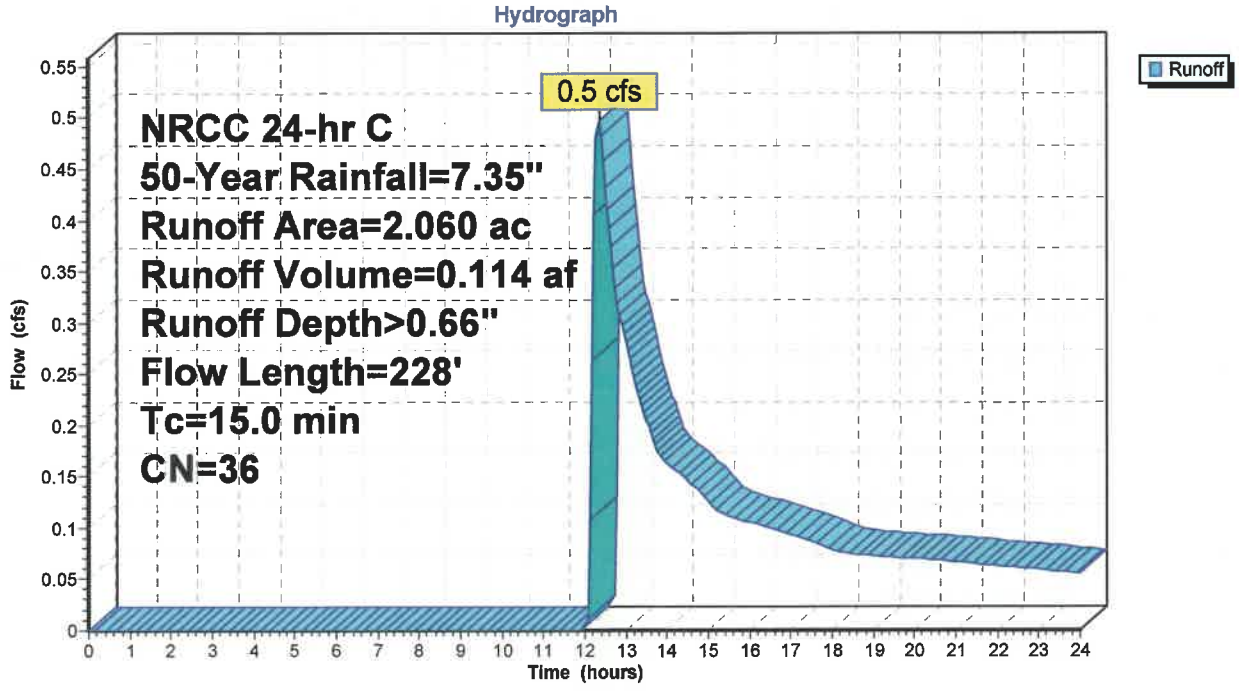
Runoff = 0.5 cfs @ 12.35 hrs, Volume= 0.114 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
2.060	36	Woods, Fair, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB



Summary for Subcatchment 8S: Watershed EC

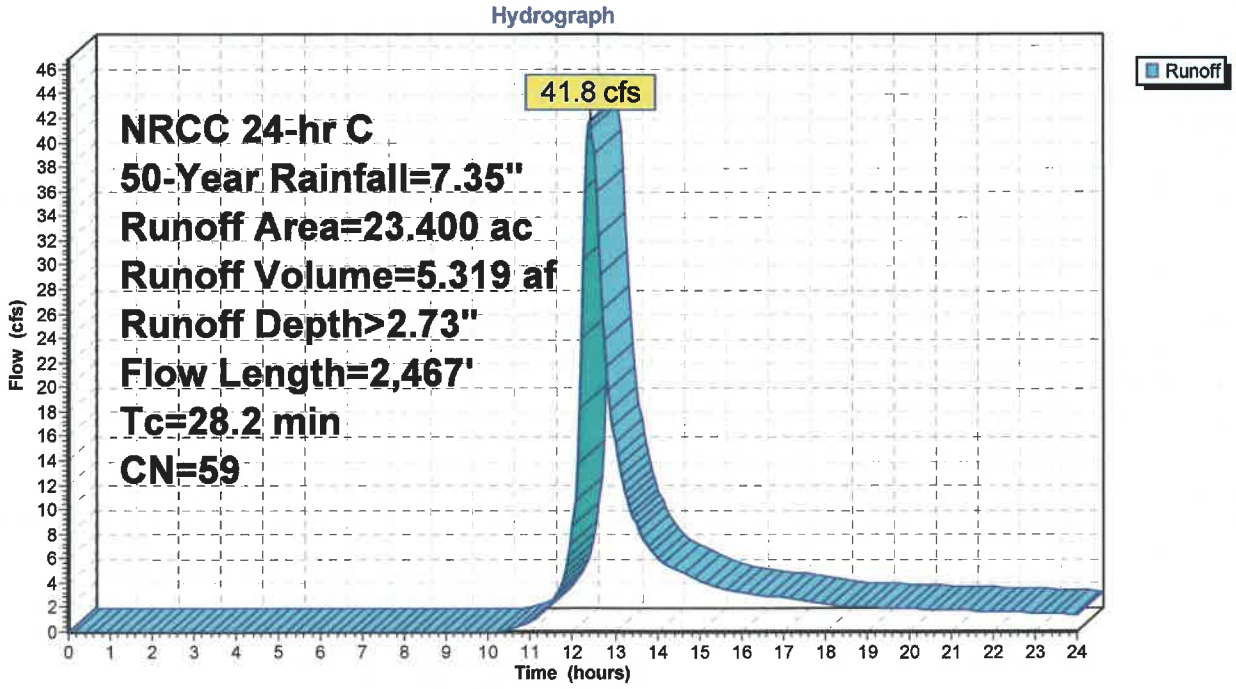
Runoff = 41.8 cfs @ 12.41 hrs, Volume= 5.319 af, Depth> 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
23.400	59	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

Subcatchment 8S: Watershed EC

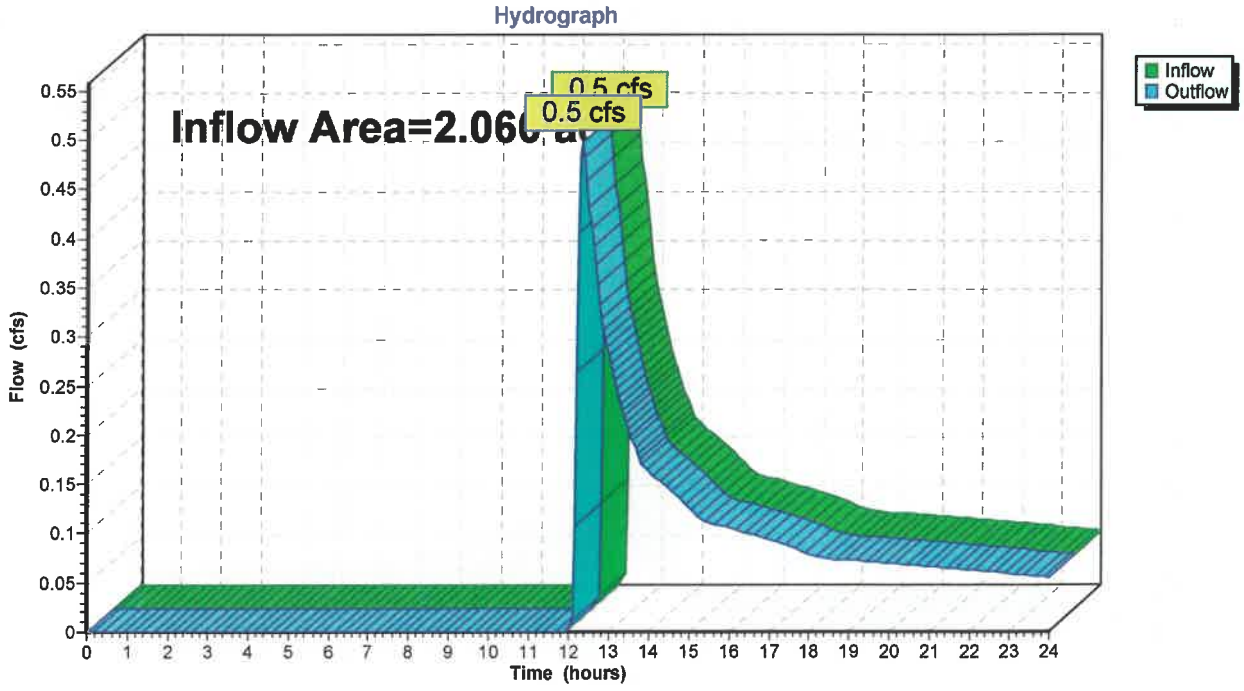


Summary for Reach 4R: South Property Line

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth > 0.66" for 50-Year event
Inflow = 0.5 cfs @ 12.35 hrs, Volume= 0.114 af
Outflow = 0.5 cfs @ 12.35 hrs, Volume= 0.114 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: South Property Line

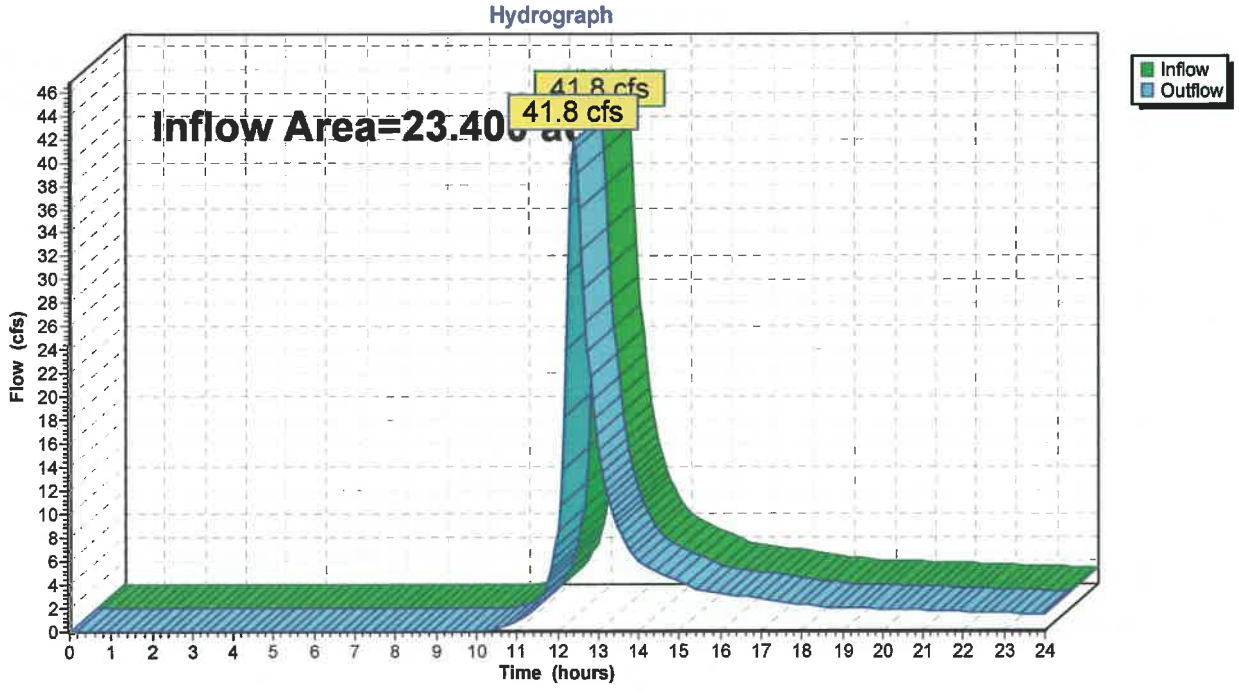


Summary for Reach 5R: Rabbit Hill Brook

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 2.73" for 50-Year event
Inflow = 41.8 cfs @ 12.41 hrs, Volume= 5.319 af
Outflow = 41.8 cfs @ 12.41 hrs, Volume= 5.319 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: Rabbit Hill Brook

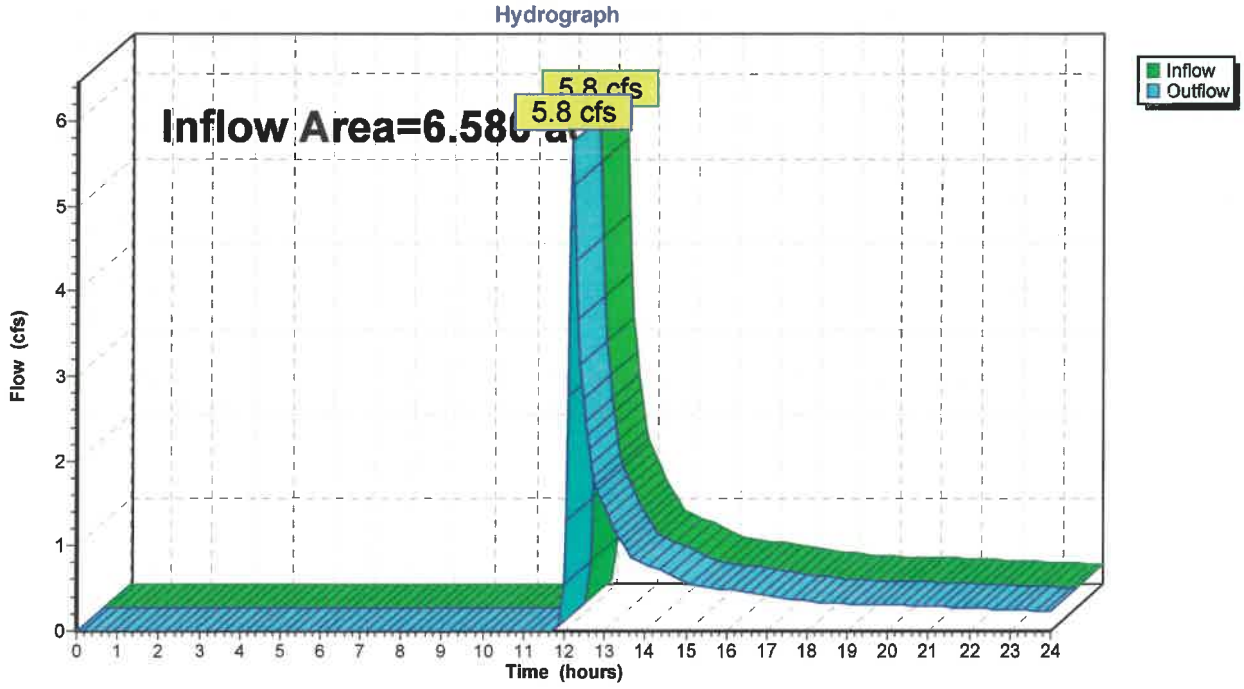


Summary for Reach 6R: Isolated Depression

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 1.14" for 50-Year event
Inflow = 5.8 cfs @ 12.21 hrs, Volume= 0.625 af
Outflow = 5.8 cfs @ 12.21 hrs, Volume= 0.625 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: Isolated Depression



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 3S: Watershed EA Runoff Area=6.580 ac 9.88% Impervious Runoff Depth>1.83"
Flow Length=725' Tc=10.4 min CN=42 Runoff=10.8 cfs 1.003 af

Subcatchment 7S: Watershed EB Runoff Area=2.060 ac 0.00% Impervious Runoff Depth>1.19"
Flow Length=228' Tc=15.0 min CN=36 Runoff=1.4 cfs 0.204 af

Subcatchment 8S: Watershed EC Runoff Area=23.400 ac 30.56% Impervious Runoff Depth>3.79"
Flow Length=2,467' Tc=28.2 min CN=59 Runoff=59.2 cfs 7.396 af

Reach 4R: South Property Line Inflow=1.4 cfs 0.204 af
Outflow=1.4 cfs 0.204 af

Reach 5R: Rabbit Hill Brook Inflow=59.2 cfs 7.396 af
Outflow=59.2 cfs 7.396 af

Reach 6R: Isolated Depression Inflow=10.8 cfs 1.003 af
Outflow=10.8 cfs 1.003 af

Total Runoff Area = 32.040 ac Runoff Volume = 8.603 af Average Runoff Depth = 3.22"
75.66% Pervious = 24.240 ac 24.34% Impervious = 7.800 ac

Summary for Subcatchment 3S: Watershed EA

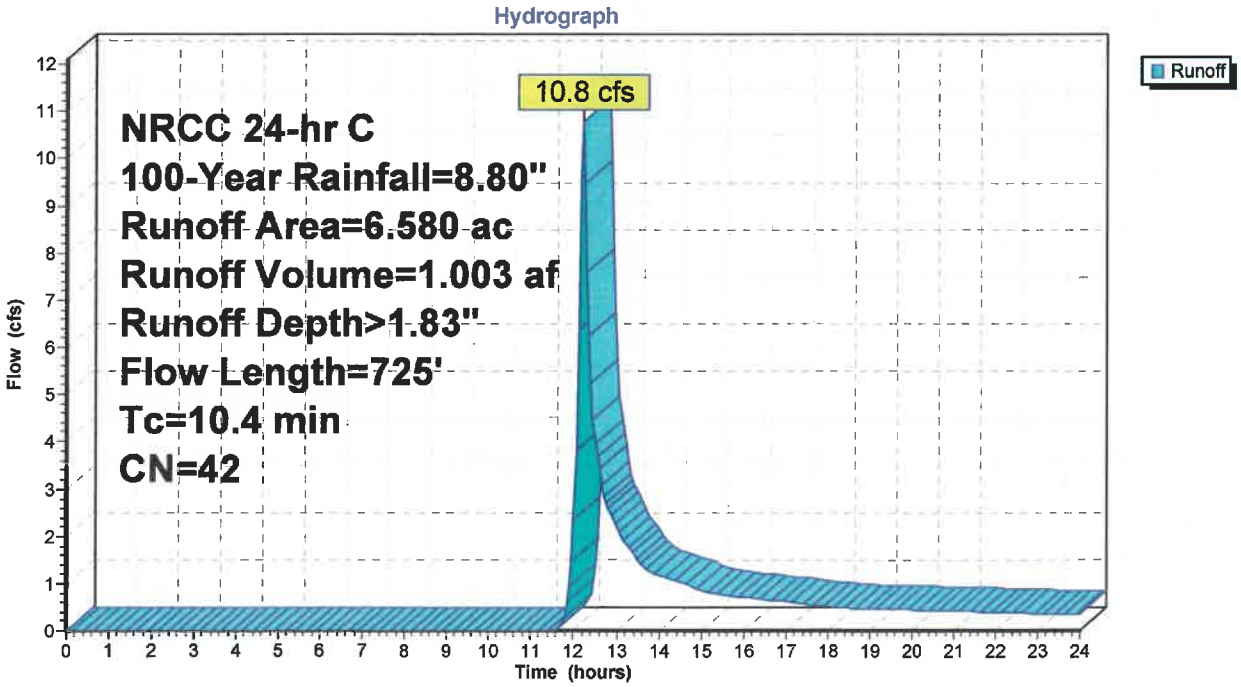
Runoff = 10.8 cfs @ 12.20 hrs, Volume= 1.003 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
0.610	98	Paved parking, HSG A
5.930	36	Woods, Fair, HSG A
6.580	42	Weighted Average
5.930		90.12% Pervious Area
0.650		9.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
1.1	140	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	535	0.0480	1.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	725	Total			

Subcatchment 3S: Watershed EA



Summary for Subcatchment 7S: Watershed EB

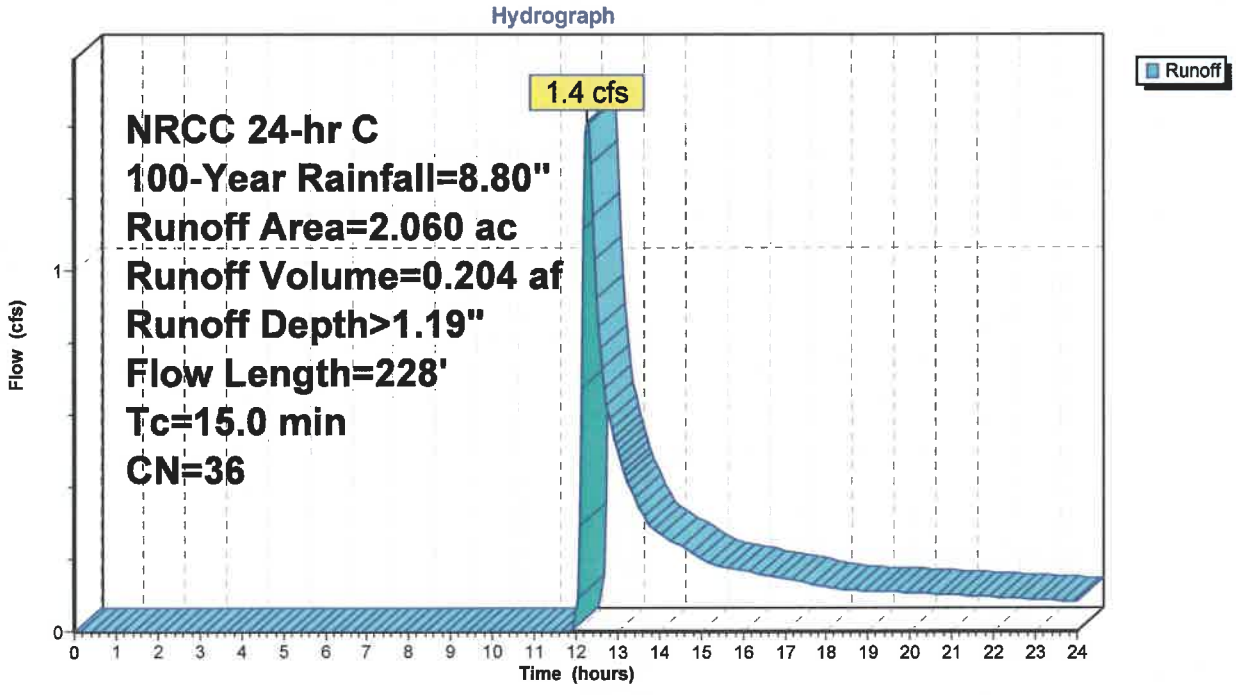
Runoff = 1.4 cfs @ 12.29 hrs, Volume= 0.204 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
2.060	36	Woods, Fair, HSG A
2.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Subcatchment 7S: Watershed EB



Summary for Subcatchment 8S: Watershed EC

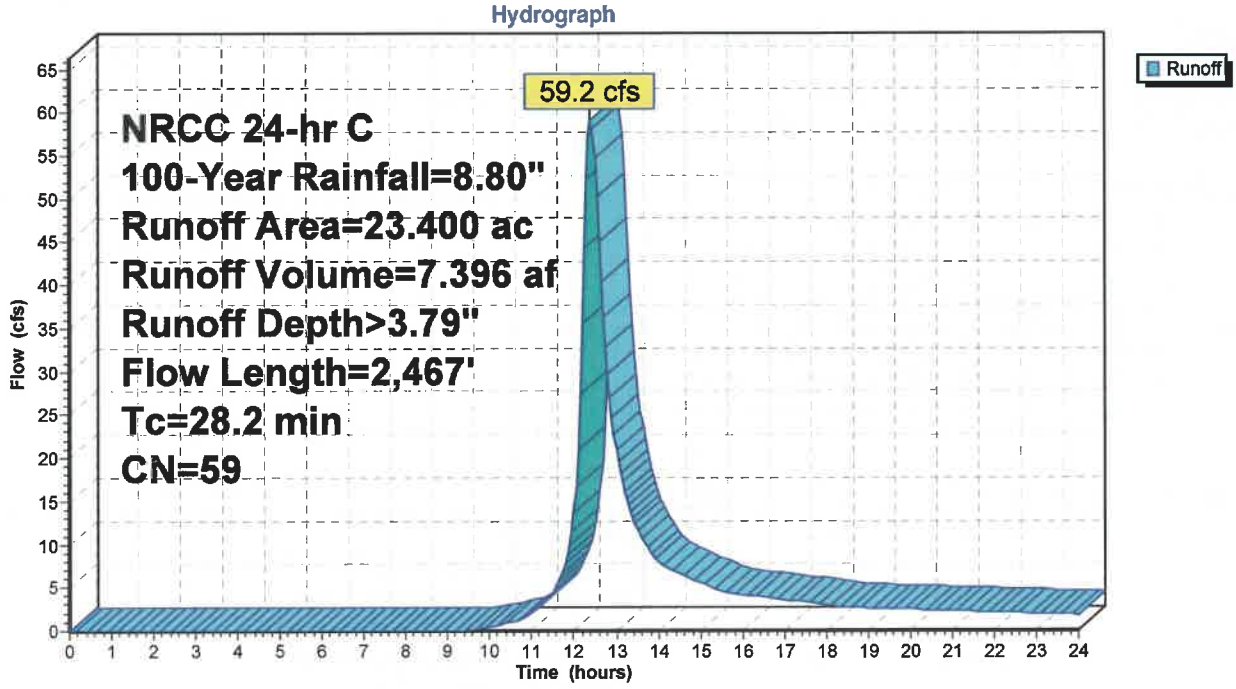
Runoff = 59.2 cfs @ 12.41 hrs, Volume= 7.396 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.040	98	Roofs, HSG A
7.110	98	Paved parking, HSG A
14.150	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
23.400	59	Weighted Average
16.250		69.44% Pervious Area
7.150		30.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	50	0.0050	0.69		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.20"
3.7	580	0.0170	2.65		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
8.1	487	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.5	542	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022 Earth, clean & straight
28.2	2,467	Total			

Subcatchment 8S: Watershed EC

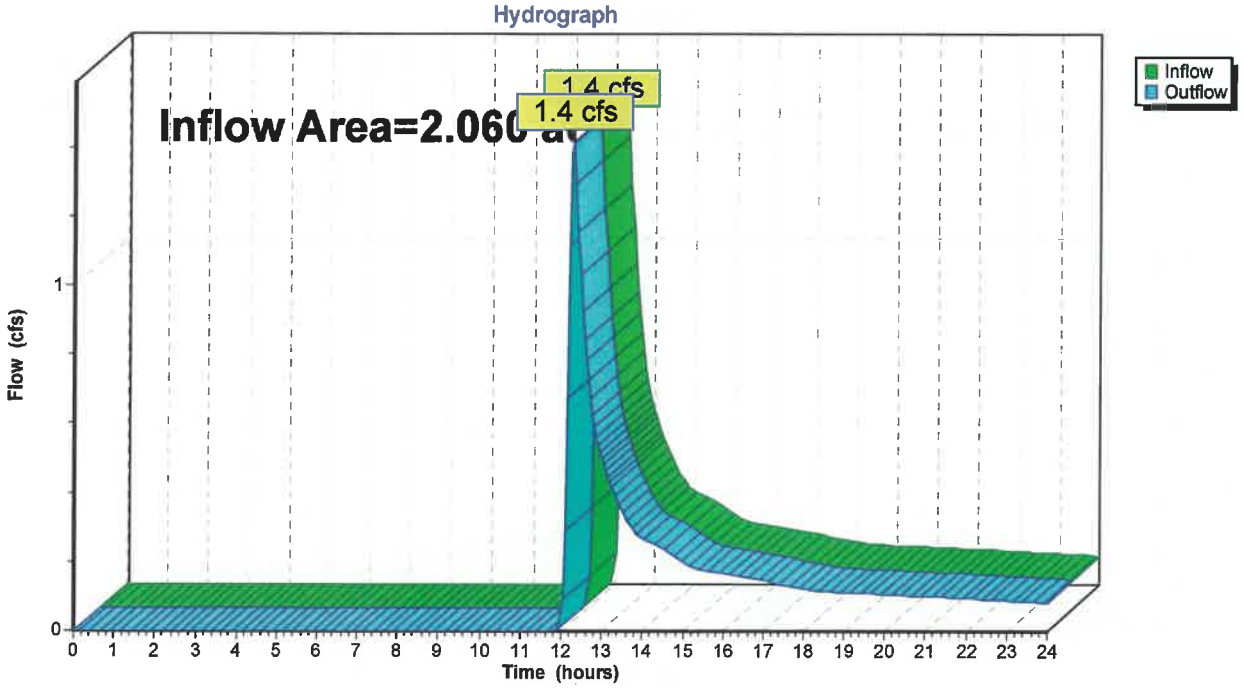


Summary for Reach 4R: South Property Line

Inflow Area = 2.060 ac, 0.00% Impervious, Inflow Depth > 1.19" for 100-Year event
Inflow = 1.4 cfs @ 12.29 hrs, Volume= 0.204 af
Outflow = 1.4 cfs @ 12.29 hrs, Volume= 0.204 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: South Property Line

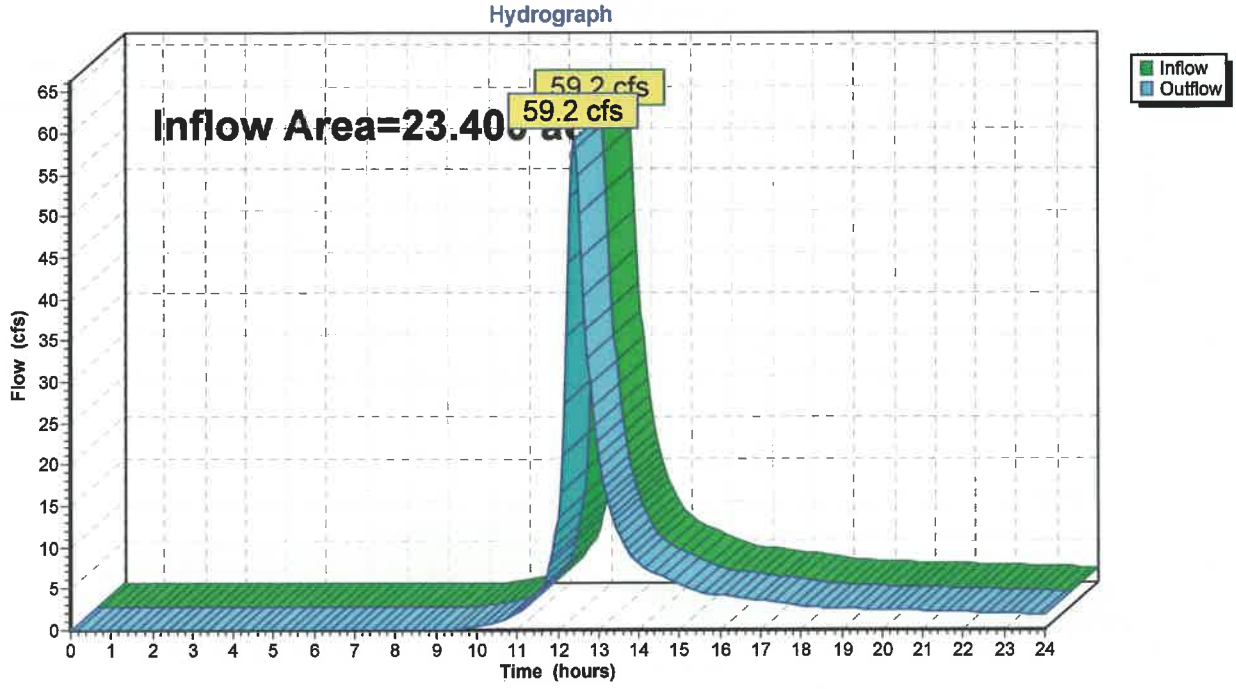


Summary for Reach 5R: Rabbit Hill Brook

Inflow Area = 23.400 ac, 30.56% Impervious, Inflow Depth > 3.79" for 100-Year event
Inflow = 59.2 cfs @ 12.41 hrs, Volume= 7.396 af
Outflow = 59.2 cfs @ 12.41 hrs, Volume= 7.396 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: Rabbit Hill Brook

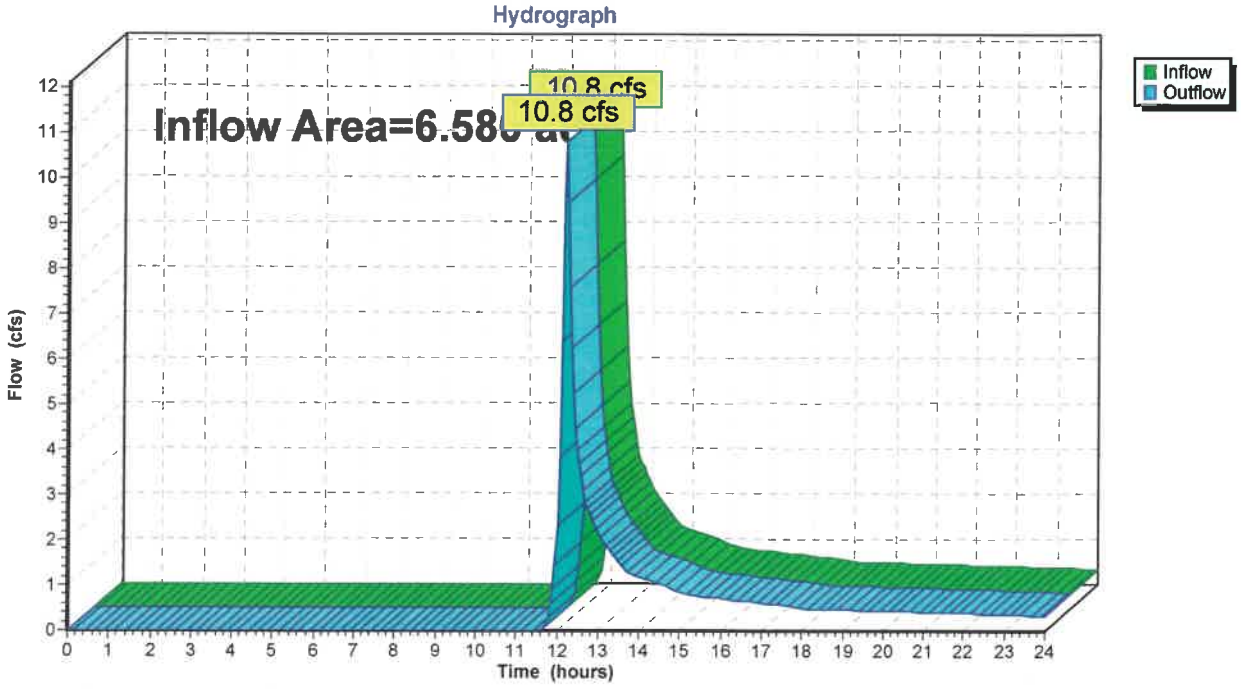


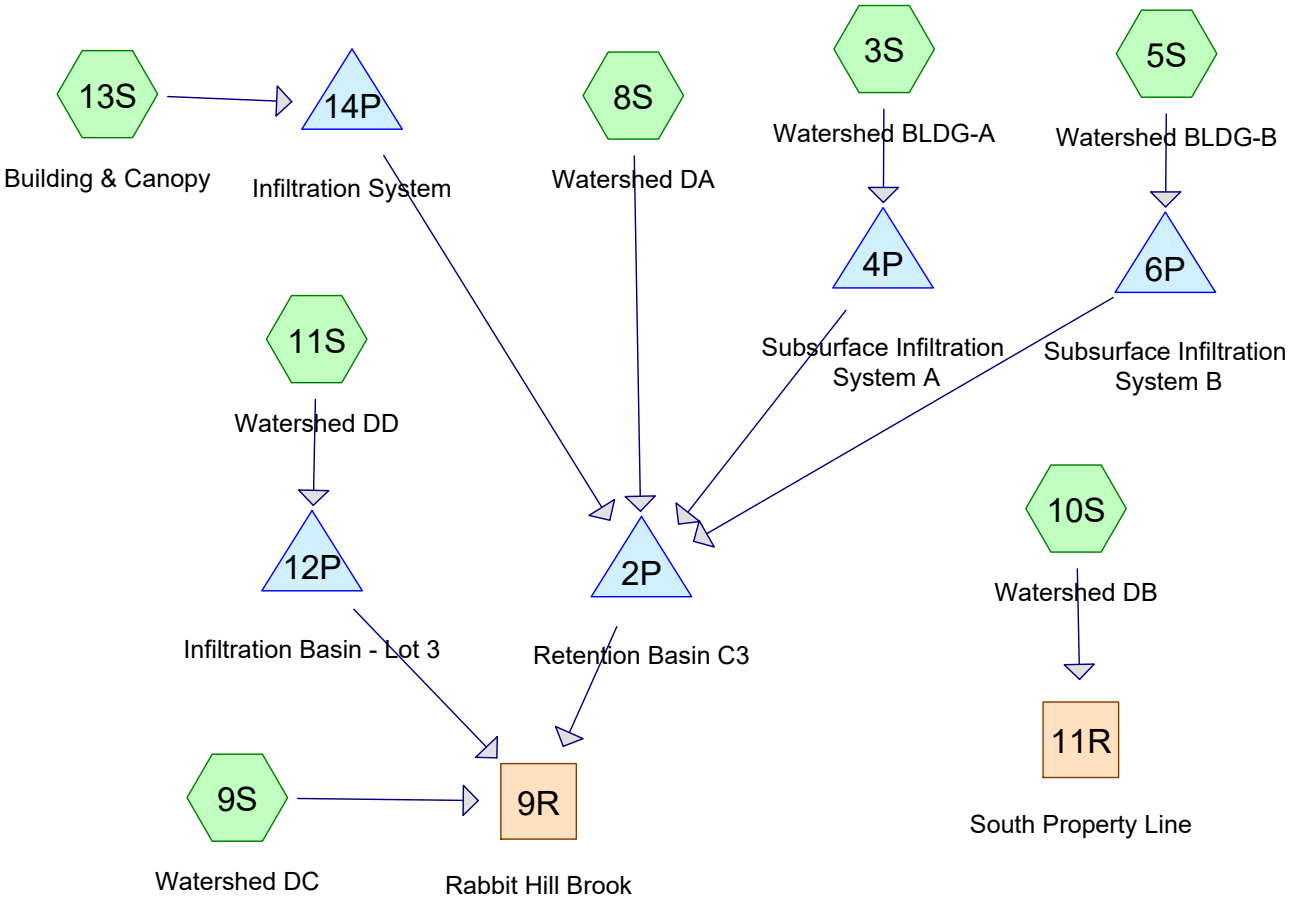
Summary for Reach 6R: Isolated Depression

Inflow Area = 6.580 ac, 9.88% Impervious, Inflow Depth > 1.83" for 100-Year event
Inflow = 10.8 cfs @ 12.20 hrs, Volume= 1.003 af
Outflow = 10.8 cfs @ 12.20 hrs, Volume= 1.003 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: Isolated Depression





Subcat Reach Pond Link

Routing Diagram for 21-0219 Developed
Prepared by Bay Colony Group Inc, Printed 4/17/2023

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Inch	NRCC 24-hr	C	Default	24.00	1	2.00	2
2	2-Year	NRCC 24-hr	C	Default	24.00	1	3.22	2
3	10-Year	NRCC 24-hr	C	Default	24.00	1	4.86	2
4	50-Year	NRCC 24-hr	C	Default	24.00	1	7.35	2
5	100-Year	NRCC 24-hr	C	Default	24.00	1	8.80	2

PROJECT:

10 Commerce Blvd
Wrentham,
Massachusetts

OWNER:

WBH, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762

APPLICANT:

EDGEWOOD DEVELOPMENT COMPANY, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762

EDGEWOOD Development Company, LLC

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

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

REFERENCES

STAMP

DRAWING TITLE

DEVELOPED DRAINAGE SUBAREAS

SCALE: 1"=80'

MARCH 13, 2023	SHEET NUMBER
21-0219F	**PR**

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.980	39	>75% Grass cover, Good, HSG A (8S, 9S, 10S, 11S)
6.640	98	Paved parking, HSG A (8S, 11S)
0.690	98	Paved roads w/curbs & sewers, HSG A (8S)
6.512	98	Unconnected roofs, HSG A (3S, 5S, 11S, 13S)
0.440	98	Water Surface, 0% imp, HSG A (8S)
0.610	98	Water Surface, HSG A (11S)
9.070	36	Woods, Fair, HSG A (8S, 9S, 10S)
2.100	79	Woods, Fair, HSG D (9S)
32.042	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
29.942	HSG A	3S, 5S, 8S, 9S, 10S, 11S, 13S
0.000	HSG B	
0.000	HSG C	
2.100	HSG D	9S
0.000	Other	
32.042		**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	8S	0.00	0.00	50.0	0.0300	0.013	0.0	12.0	0.0
2	8S	0.00	0.00	745.0	0.0150	0.013	0.0	30.0	0.0
3	11S	0.00	0.00	640.0	0.0100	0.013	0.0	12.0	0.0
4	4P	200.66	199.00	118.0	0.0141	0.013	0.0	12.0	0.0
5	6P	198.60	192.00	95.0	0.0695	0.013	0.0	12.0	0.0
6	14P	214.00	211.58	142.0	0.0170	0.013	0.0	6.0	0.0

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 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>1.77"
Tc=10.0 min CN=98 Runoff=1.9 cfs 0.161 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>1.77"
Tc=10.0 min CN=98 Runoff=1.9 cfs 0.161 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>0.12"
Flow Length=1,075' Tc=10.5 min CN=64 Runoff=0.2 cfs 0.079 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,792' Tc=36.9 min CN=47 Runoff=0.0 cfs 0.000 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.0 cfs 0.000 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>0.74"
Flow Length=752' Tc=11.8 min CN=84 Runoff=8.5 cfs 0.723 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>1.77"
Tc=10.0 min CN=98 Runoff=0.4 cfs 0.031 af

Reach 9R: Rabbit Hill Brook Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Reach 11R: South Property Line Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Pond 2P: Retention Basin C3 Peak Elev=186.13' Storage=3,449 cf Inflow=0.2 cfs 0.079 af
Discarded=0.0 cfs 0.000 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af

Pond 4P: Subsurface Infiltration System A Peak Elev=198.73' Storage=0.001 af Inflow=1.9 cfs 0.161 af
Discarded=1.8 cfs 0.161 af Primary=0.0 cfs 0.000 af Outflow=1.8 cfs 0.161 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.05' Storage=0.002 af Inflow=1.9 cfs 0.161 af
Discarded=1.8 cfs 0.161 af Primary=0.0 cfs 0.000 af Outflow=1.8 cfs 0.161 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=191.42' Storage=5,651 cf Inflow=8.5 cfs 0.723 af
Discarded=2.9 cfs 0.722 af Primary=0.0 cfs 0.000 af Outflow=2.9 cfs 0.722 af

Pond 14P: Infiltration System Peak Elev=212.62' Storage=0.001 af Inflow=0.4 cfs 0.031 af
Discarded=0.2 cfs 0.031 af Primary=0.0 cfs 0.000 af Outflow=0.2 cfs 0.031 af

Total Runoff Area = 32.042 ac Runoff Volume = 1.156 af Average Runoff Depth = 0.43"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

Summary for Subcatchment 3S: Watershed BLDG-A

Runoff = 1.9 cfs @ 12.17 hrs, Volume= 0.161 af, Depth> 1.77"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 5S: Watershed BLDG-B

Runoff = 1.9 cfs @ 12.17 hrs, Volume= 0.161 af, Depth> 1.77"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 8S: Watershed DA

Runoff = 0.2 cfs @ 12.57 hrs, Volume= 0.079 af, Depth> 0.12"
Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	36	Woods, Fair, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	64	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% 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"
2.7	230	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Summary for Subcatchment 9S: Watershed DC

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
8.500	47	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Summary for Subcatchment 10S: Watershed DB

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
1.210	36	Woods, Fair, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	36	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Summary for Subcatchment 11S: Watershed DD

Runoff = 8.5 cfs @ 12.20 hrs, Volume= 0.723 af, Depth> 0.74"
Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

Summary for Subcatchment 13S: Building & Canopy

Runoff = 0.4 cfs @ 12.17 hrs, Volume= 0.031 af, Depth> 1.77"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Inch Rainfall=2.00"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Reach 9R: Rabbit Hill Brook

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth = 0.00" for 2-Inch 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

Summary for Reach 11R: South Property Line

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Inch 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

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 0.09" for 2-Inch event
Inflow = 0.2 cfs @ 12.57 hrs, Volume= 0.079 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 186.13' @ 24.00 hrs Surf.Area= 29,292 sf Storage= 3,449 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	188.00'	**21.038 in/hr Exfiltration over Surface area above 188.00'** Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 4P: Subsurface Infiltration System A

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 1.77" for 2-Inch event
Inflow = 1.9 cfs @ 12.17 hrs, Volume= 0.161 af
Outflow = 1.8 cfs @ 12.18 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.5 min
Discarded = 1.8 cfs @ 12.18 hrs, Volume= 0.161 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 198.73' @ 12.18 hrs Surf.Area= 0.081 ac Storage= 0.001 af

Plug-Flow detention time= 0.3 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (773.4 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	**1.50'D x 2.84'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	**12.0" Round Culvert** L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=3.4 cfs @ 12.18 hrs HW=198.72' (Free Discharge)
└**1=Exfiltration** (Controls 3.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')
├**2=Culvert** (Controls 0.0 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

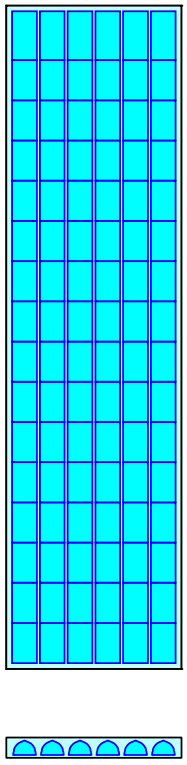
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 1.77" for 2-Inch event
Inflow = 1.9 cfs @ 12.17 hrs, Volume= 0.161 af
Outflow = 1.8 cfs @ 12.18 hrs, Volume= 0.161 af, Atten= 1%, Lag= 0.8 min
Discarded = 1.8 cfs @ 12.18 hrs, Volume= 0.161 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 195.05' @ 12.18 hrs Surf.Area= 0.081 ac Storage= 0.002 af

Plug-Flow detention time= 0.6 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (773.6 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	**1.50'D x 7.00'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	**12.0" Round Culvert** L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=3.5 cfs @ 12.18 hrs HW=195.05' (Free Discharge)
↑—**1=Exfiltration** (Controls 3.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
↑—**2=Culvert** (Controls 0.0 cfs)

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

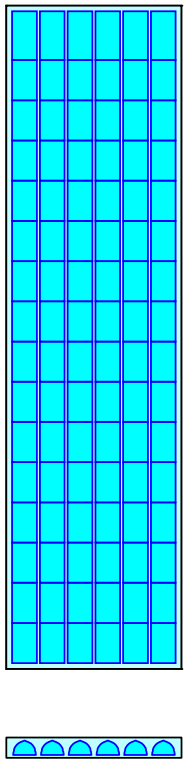
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 0.74" for 2-Inch event
Inflow = 8.5 cfs @ 12.20 hrs, Volume= 0.723 af
Outflow = 2.9 cfs @ 12.51 hrs, Volume= 0.722 af, Atten= 66%, Lag= 18.3 min
Discarded = 2.9 cfs @ 12.51 hrs, Volume= 0.722 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 191.42' @ 12.51 hrs Surf.Area= 13,898 sf Storage= 5,651 cf

Plug-Flow detention time= 13.8 min calculated for 0.722 af (100% of inflow)
Center-of-Mass det. time= 12.6 min (881.7 - 869.1)

Volume	Invert	Avail.Storage	Storage Description
#1	191.00'	145,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=2.9 cfs @ 12.51 hrs HW=191.42' (Free Discharge)
↑—**1=Exfiltration** (Controls 2.9 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
↑—**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 1.77" for 2-Inch event
Inflow = 0.4 cfs @ 12.17 hrs, Volume= 0.031 af
Outflow = 0.2 cfs @ 12.27 hrs, Volume= 0.031 af, Atten= 31%, Lag= 5.8 min
Discarded = 0.2 cfs @ 12.27 hrs, Volume= 0.031 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 212.62' @ 12.27 hrs Surf.Area= 0.029 ac Storage= 0.001 af

Plug-Flow detention time= 1.3 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (774.3 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	**14.75'W x 85.29'L x 2.71'H Infiltration System** 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	**Cultec R-180** x 52 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 192.90'
#2	Primary	214.00'	**6.0" Round Culvert** L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 214.00' / 211.58' S= 0.0170 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

Discarded OutFlow Max=0.2 cfs @ 12.27 hrs HW=212.61' (Free Discharge)
1=Exfiltration (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)
2=Culvert (Controls 0.0 cfs)

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)
Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf
Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 3.44 sf x 4 rows

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

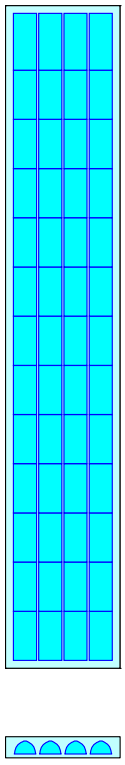
13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length
4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width
6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af
Overall Storage Efficiency = 60.2%
Overall System Size = 85.29' x 14.75' x 2.71'

52 Chambers
126.2 cy Field
83.8 cy Stone



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 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>2.98"
Tc=10.0 min CN=98 Runoff=3.0 cfs 0.271 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>2.98"
Tc=10.0 min CN=98 Runoff=3.0 cfs 0.271 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>0.57"
Flow Length=1,075' Tc=10.5 min CN=64 Runoff=3.8 cfs 0.384 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>0.07"
Flow Length=1,792' Tc=36.9 min CN=47 Runoff=0.1 cfs 0.052 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.0 cfs 0.000 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>1.69"
Flow Length=752' Tc=11.8 min CN=84 Runoff=19.9 cfs 1.653 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>2.98"
Tc=10.0 min CN=98 Runoff=0.6 cfs 0.052 af

Reach 9R: Rabbit Hill Brook Inflow=0.1 cfs 0.052 af
Outflow=0.1 cfs 0.052 af

Reach 11R: South Property Line Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Pond 2P: Retention Basin C3 Peak Elev=186.57' Storage=16,697 cf Inflow=3.8 cfs 0.384 af
Discarded=0.0 cfs 0.000 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af

Pond 4P: Subsurface Infiltration System A Peak Elev=198.74' Storage=0.001 af Inflow=3.0 cfs 0.271 af
Discarded=3.0 cfs 0.271 af Primary=0.0 cfs 0.000 af Outflow=3.0 cfs 0.271 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.08' Storage=0.003 af Inflow=3.0 cfs 0.271 af
Discarded=3.0 cfs 0.271 af Primary=0.0 cfs 0.000 af Outflow=3.0 cfs 0.271 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=192.41' Storage=20,353 cf Inflow=19.9 cfs 1.653 af
Discarded=4.0 cfs 1.650 af Primary=0.0 cfs 0.000 af Outflow=4.0 cfs 1.650 af

Pond 14P: Infiltration System Peak Elev=212.96' Storage=0.005 af Inflow=0.6 cfs 0.052 af
Discarded=0.3 cfs 0.052 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.052 af

Total Runoff Area = 32.042 ac Runoff Volume = 2.683 af Average Runoff Depth = 1.00"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

Summary for Subcatchment 3S: Watershed BLDG-A

Runoff = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af, Depth> 2.98"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 5S: Watershed BLDG-B

Runoff = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af, Depth> 2.98"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 8S: Watershed DA

Runoff = 3.8 cfs @ 12.21 hrs, Volume= 0.384 af, Depth> 0.57"
Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	36	Woods, Fair, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	64	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% 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"
2.7	230	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Summary for Subcatchment 9S: Watershed DC

Runoff = 0.1 cfs @ 14.81 hrs, Volume= 0.052 af, Depth> 0.07"
Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
8.500	47	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Summary for Subcatchment 10S: Watershed DB

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
1.210	36	Woods, Fair, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	36	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Summary for Subcatchment 11S: Watershed DD

Runoff = 19.9 cfs @ 12.20 hrs, Volume= 1.653 af, Depth> 1.69"
Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

Summary for Subcatchment 13S: Building & Canopy

Runoff = 0.6 cfs @ 12.17 hrs, Volume= 0.052 af, Depth> 2.98"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 2-Year Rainfall=3.22"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Reach 9R: Rabbit Hill Brook

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.02" for 2-Year event
Inflow = 0.1 cfs @ 14.81 hrs, Volume= 0.052 af
Outflow = 0.1 cfs @ 14.81 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 11R: South Property Line

Inflow Area = 1.310 ac, 0.00% 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

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 0.44" for 2-Year event
Inflow = 3.8 cfs @ 12.21 hrs, Volume= 0.384 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 186.57' @ 24.00 hrs Surf.Area= 30,850 sf Storage= 16,697 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	188.00'	**21.038 in/hr Exfiltration over Surface area above 188.00'** Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 4P: Subsurface Infiltration System A

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 2.98" for 2-Year event
Inflow = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af
Outflow = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af, Atten= 0%, Lag= 0.5 min
Discarded = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 198.74' @ 12.18 hrs Surf.Area= 0.081 ac Storage= 0.001 af

Plug-Flow detention time= 0.3 min calculated for 0.271 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (761.2 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	**1.50'D x 2.84'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	**12.0" Round Culvert** L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=3.5 cfs @ 12.18 hrs HW=198.74' (Free Discharge)
└**1=Exfiltration** (Controls 3.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')
├**2=Culvert** (Controls 0.0 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

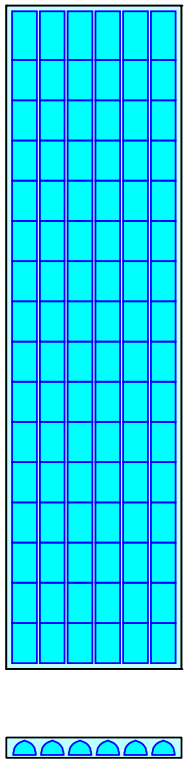
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 2.98" for 2-Year event
Inflow = 3.0 cfs @ 12.17 hrs, Volume= 0.271 af
Outflow = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af, Atten= 1%, Lag= 0.8 min
Discarded = 3.0 cfs @ 12.18 hrs, Volume= 0.271 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 195.08' @ 12.18 hrs Surf.Area= 0.081 ac Storage= 0.003 af

Plug-Flow detention time= 0.6 min calculated for 0.271 af (100% of inflow)
Center-of-Mass det. time= 0.5 min (761.4 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	**1.50'D x 7.00'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	**12.0" Round Culvert** L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=3.5 cfs @ 12.18 hrs HW=195.08' (Free Discharge)
↑**1=Exfiltration** (Controls 3.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
↑**2=Culvert** (Controls 0.0 cfs)

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

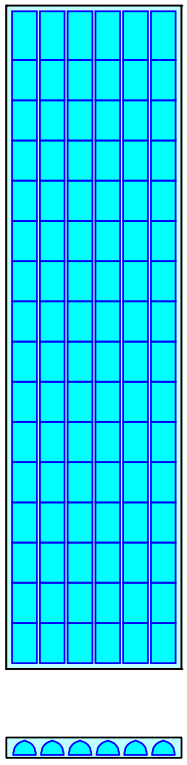
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 1.69" for 2-Year event
Inflow = 19.9 cfs @ 12.20 hrs, Volume= 1.653 af
Outflow = 4.0 cfs @ 12.72 hrs, Volume= 1.650 af, Atten= 80%, Lag= 31.3 min
Discarded = 4.0 cfs @ 12.72 hrs, Volume= 1.650 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 192.41' @ 12.72 hrs Surf.Area= 15,926 sf Storage= 20,353 cf

Plug-Flow detention time= 40.3 min calculated for 1.650 af (100% of inflow)
Center-of-Mass det. time= 39.3 min (882.1 - 842.8)

Volume	Invert	Avail.Storage	Storage Description
#1	191.00'	145,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=4.0 cfs @ 12.72 hrs HW=192.40' (Free Discharge)
↑—**1=Exfiltration** (Controls 4.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
↑—**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 2.98" for 2-Year event
Inflow = 0.6 cfs @ 12.17 hrs, Volume= 0.052 af
Outflow = 0.3 cfs @ 12.34 hrs, Volume= 0.052 af, Atten= 55%, Lag= 10.5 min
Discarded = 0.3 cfs @ 12.34 hrs, Volume= 0.052 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 212.96' @ 12.34 hrs Surf.Area= 0.029 ac Storage= 0.005 af

Plug-Flow detention time= 3.6 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time= 3.5 min (764.4 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	**14.75'W x 85.29'L x 2.71'H Infiltration System** 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	**Cultec R-180** x 52 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 192.90'
#2	Primary	214.00'	**6.0" Round Culvert** L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 214.00' / 211.58' S= 0.0170 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

Discarded OutFlow Max=0.3 cfs @ 12.34 hrs HW=212.96' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)
↑—**2=Culvert** (Controls 0.0 cfs)

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)
Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf
Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 3.44 sf x 4 rows

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

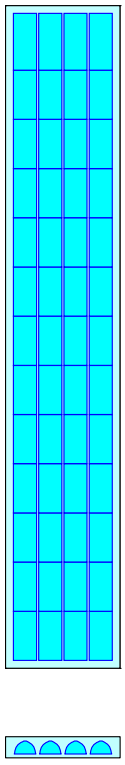
13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length
4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width
6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af
Overall Storage Efficiency = 60.2%
Overall System Size = 85.29' x 14.75' x 2.71'

52 Chambers
126.2 cy Field
83.8 cy Stone



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 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>4.62"
Tc=10.0 min CN=98 Runoff=4.6 cfs 0.420 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>4.62"
Tc=10.0 min CN=98 Runoff=4.6 cfs 0.420 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>1.49"
Flow Length=1,075' Tc=10.5 min CN=64 Runoff=12.0 cfs 1.007 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>0.48"
Flow Length=1,792' Tc=36.9 min CN=47 Runoff=1.2 cfs 0.339 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth>0.09"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.0 cfs 0.010 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>3.13"
Flow Length=752' Tc=11.8 min CN=84 Runoff=36.4 cfs 3.059 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>4.62"
Tc=10.0 min CN=98 Runoff=0.9 cfs 0.081 af

Reach 9R: Rabbit Hill Brook Inflow=1.2 cfs 0.339 af
Outflow=1.2 cfs 0.339 af

Reach 11R: South Property Line Inflow=0.0 cfs 0.010 af
Outflow=0.0 cfs 0.010 af

Pond 2P: Retention Basin C3 Peak Elev=187.41' Storage=43,818 cf Inflow=12.0 cfs 1.007 af
Discarded=0.0 cfs 0.000 af Primary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.000 af

Pond 4P: Subsurface Infiltration System A Peak Elev=199.00' Storage=0.010 af Inflow=4.6 cfs 0.420 af
Discarded=3.6 cfs 0.420 af Primary=0.0 cfs 0.000 af Outflow=3.6 cfs 0.420 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.32' Storage=0.010 af Inflow=4.6 cfs 0.420 af
Discarded=3.6 cfs 0.420 af Primary=0.0 cfs 0.000 af Outflow=3.6 cfs 0.420 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=193.86' Storage=45,743 cf Inflow=36.4 cfs 3.059 af
Discarded=5.8 cfs 3.054 af Primary=0.0 cfs 0.000 af Outflow=5.8 cfs 3.054 af

Pond 14P: Infiltration System Peak Elev=213.28' Storage=0.012 af Inflow=0.9 cfs 0.081 af
Discarded=0.3 cfs 0.081 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.081 af

Total Runoff Area = 32.042 ac Runoff Volume = 5.334 af Average Runoff Depth = 2.00"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

Summary for Subcatchment 3S: Watershed BLDG-A

Runoff = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af, Depth> 4.62"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 5S: Watershed BLDG-B

Runoff = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af, Depth> 4.62"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 8S: Watershed DA

Runoff = 12.0 cfs @ 12.19 hrs, Volume= 1.007 af, Depth> 1.49"
Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	36	Woods, Fair, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	64	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% 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"
2.7	230	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Summary for Subcatchment 9S: Watershed DC

Runoff = 1.2 cfs @ 12.73 hrs, Volume= 0.339 af, Depth> 0.48"
Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
8.500	47	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Summary for Subcatchment 10S: Watershed DB

Runoff = 0.0 cfs @ 16.39 hrs, Volume= 0.010 af, Depth> 0.09"
Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
1.210	36	Woods, Fair, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	36	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Summary for Subcatchment 11S: Watershed DD

Runoff = 36.4 cfs @ 12.20 hrs, Volume= 3.059 af, Depth> 3.13"
Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

Summary for Subcatchment 13S: Building & Canopy

Runoff = 0.9 cfs @ 12.17 hrs, Volume= 0.081 af, Depth> 4.62"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.86"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Reach 9R: Rabbit Hill Brook

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.13" for 10-Year event
Inflow = 1.2 cfs @ 12.73 hrs, Volume= 0.339 af
Outflow = 1.2 cfs @ 12.73 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 11R: South Property Line

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth > 0.09" for 10-Year event
Inflow = 0.0 cfs @ 16.39 hrs, Volume= 0.010 af
Outflow = 0.0 cfs @ 16.39 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 1.15" for 10-Year event
Inflow = 12.0 cfs @ 12.19 hrs, Volume= 1.007 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 187.41' @ 24.00 hrs Surf.Area= 33,923 sf Storage= 43,818 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	188.00'	**21.038 in/hr Exfiltration over Surface area above 188.00'** Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 4P: Subsurface Infiltration System A

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 4.62" for 10-Year event
Inflow = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af
Outflow = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af, Atten= 22%, Lag= 4.5 min
Discarded = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 199.00' @ 12.24 hrs Surf.Area= 0.081 ac Storage= 0.010 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (753.0 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	**1.50'D x 2.84'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	**12.0" Round Culvert** L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=3.6 cfs @ 12.24 hrs HW=199.00' (Free Discharge)
└**1=Exfiltration** (Controls 3.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')
├**2=Culvert** (Controls 0.0 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

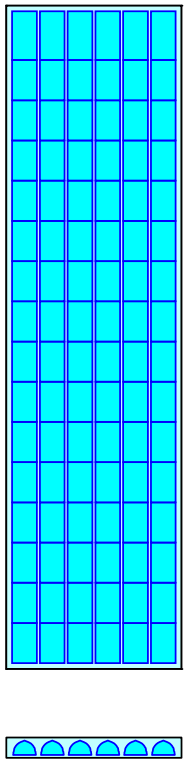
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 4.62" for 10-Year event
Inflow = 4.6 cfs @ 12.17 hrs, Volume= 0.420 af
Outflow = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af, Atten= 21%, Lag= 4.4 min
Discarded = 3.6 cfs @ 12.24 hrs, Volume= 0.420 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 195.32' @ 12.24 hrs Surf.Area= 0.081 ac Storage= 0.010 af

Plug-Flow detention time= 0.8 min calculated for 0.420 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (753.2 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	**1.50'D x 7.00'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	**12.0" Round Culvert** L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=3.6 cfs @ 12.24 hrs HW=195.31' (Free Discharge)
↑**1=Exfiltration** (Controls 3.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
↑**2=Culvert** (Controls 0.0 cfs)

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

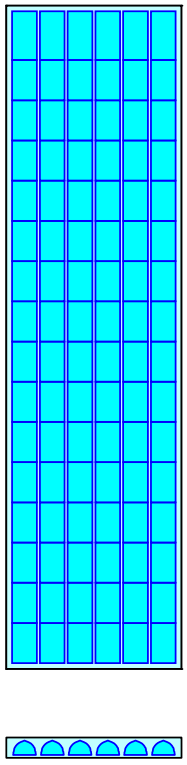
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 3.13" for 10-Year event
Inflow = 36.4 cfs @ 12.20 hrs, Volume= 3.059 af
Outflow = 5.8 cfs @ 12.87 hrs, Volume= 3.054 af, Atten= 84%, Lag= 40.2 min
Discarded = 5.8 cfs @ 12.87 hrs, Volume= 3.054 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 193.86' @ 12.87 hrs Surf.Area= 19,107 sf Storage= 45,743 cf

Plug-Flow detention time= 72.6 min calculated for 3.048 af (100% of inflow)
Center-of-Mass det. time= 71.5 min (895.0 - 823.5)

Volume	Invert	Avail.Storage	Storage Description
#1	191.00'	145,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=5.8 cfs @ 12.87 hrs HW=193.86' (Free Discharge)
↑—**1=Exfiltration** (Controls 5.8 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
↑—**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 4.62" for 10-Year event
Inflow = 0.9 cfs @ 12.17 hrs, Volume= 0.081 af
Outflow = 0.3 cfs @ 12.42 hrs, Volume= 0.081 af, Atten= 68%, Lag= 15.2 min
Discarded = 0.3 cfs @ 12.42 hrs, Volume= 0.081 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.28' @ 12.42 hrs Surf.Area= 0.029 ac Storage= 0.012 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 8.4 min (760.9 - 752.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	**14.75'W x 85.29'L x 2.71'H Infiltration System** 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	**Cultec R-180** x 52 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 192.90'
#2	Primary	214.00'	**6.0" Round Culvert** L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 214.00' / 211.58' S= 0.0170 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

Discarded OutFlow Max=0.3 cfs @ 12.42 hrs HW=213.27' (Free Discharge)
↑**1=Exfiltration** (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)
↑**2=Culvert** (Controls 0.0 cfs)

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)
Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf
Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 3.44 sf x 4 rows

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

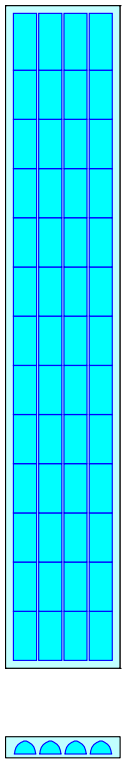
13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length
4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width
6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af
Overall Storage Efficiency = 60.2%
Overall System Size = 85.29' x 14.75' x 2.71'

52 Chambers
126.2 cy Field
83.8 cy Stone



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 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>7.10"
Tc=10.0 min CN=98 Runoff=7.0 cfs 0.646 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>7.10"
Tc=10.0 min CN=98 Runoff=7.0 cfs 0.646 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>3.26"
Flow Length=1,075' Tc=10.5 min CN=64 Runoff=27.6 cfs 2.210 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>1.56"
Flow Length=1,792' Tc=36.9 min CN=47 Runoff=6.5 cfs 1.106 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth>0.66"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.3 cfs 0.072 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>5.46"
Flow Length=752' Tc=11.8 min CN=84 Runoff=61.9 cfs 5.329 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>7.10"
Tc=10.0 min CN=98 Runoff=1.3 cfs 0.124 af

Reach 9R: Rabbit Hill Brook Inflow=6.5 cfs 1.106 af
Outflow=6.5 cfs 1.106 af

Reach 11R: South Property Line Inflow=0.3 cfs 0.072 af
Outflow=0.3 cfs 0.072 af

Pond 2P: Retention Basin C3 Peak Elev=188.37' Storage=78,102 cf Inflow=27.6 cfs 2.210 af
Discarded=0.6 cfs 0.427 af Primary=0.0 cfs 0.000 af Outflow=0.6 cfs 0.427 af

Pond 4P: Subsurface Infiltration System A Peak Elev=199.59' Storage=0.043 af Inflow=7.0 cfs 0.646 af
Discarded=3.9 cfs 0.645 af Primary=0.0 cfs 0.000 af Outflow=3.9 cfs 0.645 af

Pond 6P: Subsurface Infiltration System B Peak Elev=195.89' Storage=0.043 af Inflow=7.0 cfs 0.646 af
Discarded=4.0 cfs 0.645 af Primary=0.0 cfs 0.000 af Outflow=4.0 cfs 0.645 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=195.91' Storage=89,838 cf Inflow=61.9 cfs 5.329 af
Discarded=8.6 cfs 5.321 af Primary=0.0 cfs 0.000 af Outflow=8.6 cfs 5.321 af

Pond 14P: Infiltration System Peak Elev=213.83' Storage=0.025 af Inflow=1.3 cfs 0.124 af
Discarded=0.3 cfs 0.124 af Primary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.124 af

Total Runoff Area = 32.042 ac Runoff Volume = 10.132 af Average Runoff Depth = 3.79"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

Summary for Subcatchment 3S: Watershed BLDG-A

Runoff = 7.0 cfs @ 12.17 hrs, Volume= 0.646 af, Depth> 7.10"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 5S: Watershed BLDG-B

Runoff = 7.0 cfs @ 12.17 hrs, Volume= 0.646 af, Depth> 7.10"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 8S: Watershed DA

Runoff = 27.6 cfs @ 12.19 hrs, Volume= 2.210 af, Depth> 3.26"
Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	36	Woods, Fair, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	64	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% 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"
2.7	230	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Summary for Subcatchment 9S: Watershed DC

Runoff = 6.5 cfs @ 12.58 hrs, Volume= 1.106 af, Depth> 1.56"
Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
8.500	47	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Summary for Subcatchment 10S: Watershed DB

Runoff = 0.3 cfs @ 12.35 hrs, Volume= 0.072 af, Depth> 0.66"
Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
1.210	36	Woods, Fair, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	36	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Summary for Subcatchment 11S: Watershed DD

Runoff = 61.9 cfs @ 12.19 hrs, Volume= 5.329 af, Depth> 5.46"
Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

Summary for Subcatchment 13S: Building & Canopy

Runoff = 1.3 cfs @ 12.17 hrs, Volume= 0.124 af, Depth> 7.10"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 50-Year Rainfall=7.35"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Reach 9R: Rabbit Hill Brook

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.43" for 50-Year event
Inflow = 6.5 cfs @ 12.58 hrs, Volume= 1.106 af
Outflow = 6.5 cfs @ 12.58 hrs, Volume= 1.106 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 11R: South Property Line

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth > 0.66" for 50-Year event
Inflow = 0.3 cfs @ 12.35 hrs, Volume= 0.072 af
Outflow = 0.3 cfs @ 12.35 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 2.52" for 50-Year event
Inflow = 27.6 cfs @ 12.19 hrs, Volume= 2.210 af
Outflow = 0.6 cfs @ 21.56 hrs, Volume= 0.427 af, Atten= 98%, Lag= 562.6 min
Discarded = 0.6 cfs @ 21.56 hrs, Volume= 0.427 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 188.37' @ 21.56 hrs Surf.Area= 37,080 sf Storage= 78,102 cf

Plug-Flow detention time= 488.8 min calculated for 0.427 af (19% of inflow)
Center-of-Mass det. time= 333.7 min (1,189.1 - 855.4)

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	188.00'	**21.038 in/hr Exfiltration over Surface area above 188.00'** Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=0.6 cfs @ 21.56 hrs HW=188.37' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 4P: Subsurface Infiltration System A

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 7.10" for 50-Year event
Inflow = 7.0 cfs @ 12.17 hrs, Volume= 0.646 af
Outflow = 3.9 cfs @ 12.30 hrs, Volume= 0.645 af, Atten= 44%, Lag= 8.1 min
Discarded = 3.9 cfs @ 12.30 hrs, Volume= 0.645 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 199.59' @ 12.30 hrs Surf.Area= 0.081 ac Storage= 0.043 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.5 min (747.4 - 745.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	**1.50'D x 2.84'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	**12.0" Round Culvert** L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=3.9 cfs @ 12.30 hrs HW=199.59' (Free Discharge)
└**1=Exfiltration** (Controls 3.9 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')
├**2=Culvert** (Controls 0.0 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

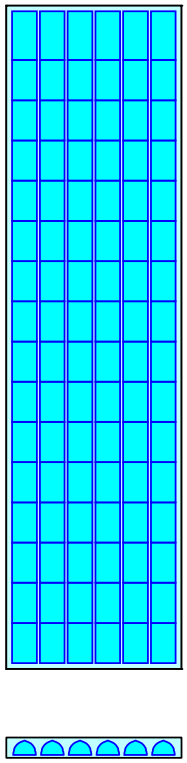
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 7.10" for 50-Year event
Inflow = 7.0 cfs @ 12.17 hrs, Volume= 0.646 af
Outflow = 4.0 cfs @ 12.30 hrs, Volume= 0.645 af, Atten= 42%, Lag= 7.8 min
Discarded = 4.0 cfs @ 12.30 hrs, Volume= 0.645 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 195.89' @ 12.30 hrs Surf.Area= 0.081 ac Storage= 0.043 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.7 min (747.6 - 745.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	**1.50'D x 7.00'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	**12.0" Round Culvert** L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=4.0 cfs @ 12.30 hrs HW=195.89' (Free Discharge)
↑**1=Exfiltration** (Controls 4.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
↑**2=Culvert** (Controls 0.0 cfs)

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

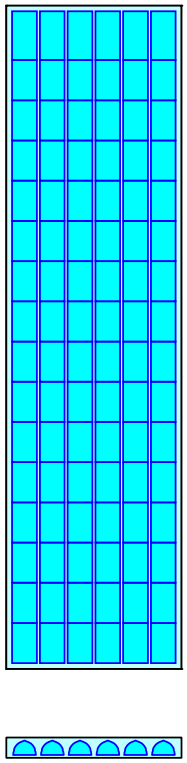
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 5.46" for 50-Year event
Inflow = 61.9 cfs @ 12.19 hrs, Volume= 5.329 af
Outflow = 8.6 cfs @ 12.96 hrs, Volume= 5.321 af, Atten= 86%, Lag= 46.2 min
Discarded = 8.6 cfs @ 12.96 hrs, Volume= 5.321 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 195.91' @ 12.96 hrs Surf.Area= 23,956 sf Storage= 89,838 cf

Plug-Flow detention time= 107.5 min calculated for 5.321 af (100% of inflow)
Center-of-Mass det. time= 106.6 min (912.8 - 806.2)

Volume	Invert	Avail.Storage	Storage Description
#1	191.00'	145,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=8.6 cfs @ 12.96 hrs HW=195.91' (Free Discharge)
↑—**1=Exfiltration** (Controls 8.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
↑—**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 7.10" for 50-Year event
Inflow = 1.3 cfs @ 12.17 hrs, Volume= 0.124 af
Outflow = 0.3 cfs @ 12.53 hrs, Volume= 0.124 af, Atten= 77%, Lag= 21.4 min
Discarded = 0.3 cfs @ 12.53 hrs, Volume= 0.124 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 213.83' @ 12.53 hrs Surf.Area= 0.029 ac Storage= 0.025 af

Plug-Flow detention time= 18.2 min calculated for 0.124 af (100% of inflow)
Center-of-Mass det. time= 18.1 min (764.0 - 745.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	**14.75'W x 85.29'L x 2.71'H Infiltration System** 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	**Cultec R-180** x 52 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 192.90'
#2	Primary	214.00'	**6.0" Round Culvert** L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 214.00' / 211.58' S= 0.0170 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

Discarded OutFlow Max=0.3 cfs @ 12.53 hrs HW=213.83' (Free Discharge)
1=Exfiltration (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=212.50' (Free Discharge)
2=Culvert (Controls 0.0 cfs)

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)
Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf
Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 3.44 sf x 4 rows

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

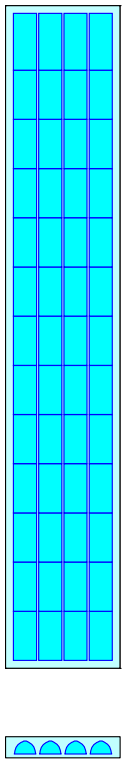
13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length
4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width
6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af
Overall Storage Efficiency = 60.2%
Overall System Size = 85.29' x 14.75' x 2.71'

52 Chambers
126.2 cy Field
83.8 cy Stone



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 3S: Watershed BLDG-A Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>8.55"
Tc=10.0 min CN=98 Runoff=8.4 cfs 0.777 af

Subcatchment 5S: Watershed BLDG-B Runoff Area=1.091 ac 100.00% Impervious Runoff Depth>8.55"
Tc=10.0 min CN=98 Runoff=8.4 cfs 0.777 af

Subcatchment 8S: Watershed DA Runoff Area=8.130 ac 37.52% Impervious Runoff Depth>4.42"
Flow Length=1,075' Tc=10.5 min CN=64 Runoff=37.4 cfs 2.993 af

Subcatchment 9S: Watershed DC Runoff Area=8.500 ac 0.00% Impervious Runoff Depth>2.37"
Flow Length=1,792' Tc=36.9 min CN=47 Runoff=10.7 cfs 1.679 af

Subcatchment 10S: Watershed DB Runoff Area=1.310 ac 0.00% Impervious Runoff Depth>1.19"
Flow Length=228' Tc=15.0 min CN=36 Runoff=0.9 cfs 0.130 af

Subcatchment 11S: Watershed DD Runoff Area=11.710 ac 76.94% Impervious Runoff Depth>6.85"
Flow Length=752' Tc=11.8 min CN=84 Runoff=76.7 cfs 6.685 af

Subcatchment 13S: Building & Canopy Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>8.55"
Tc=10.0 min CN=98 Runoff=1.6 cfs 0.150 af

Reach 9R: Rabbit Hill Brook Inflow=10.7 cfs 1.679 af
Outflow=10.7 cfs 1.679 af

Reach 11R: South Property Line Inflow=0.9 cfs 0.130 af
Outflow=0.9 cfs 0.130 af

Pond 2P: Retention Basin C3 Peak Elev=188.72' Storage=91,184 cf Inflow=37.4 cfs 2.995 af
Discarded=1.3 cfs 1.057 af Primary=0.0 cfs 0.000 af Outflow=1.3 cfs 1.057 af

Pond 4P: Subsurface Infiltration System A Peak Elev=199.95' Storage=0.068 af Inflow=8.4 cfs 0.777 af
Discarded=4.1 cfs 0.777 af Primary=0.0 cfs 0.000 af Outflow=4.1 cfs 0.777 af

Pond 6P: Subsurface Infiltration System B Peak Elev=196.24' Storage=0.067 af Inflow=8.4 cfs 0.777 af
Discarded=4.3 cfs 0.777 af Primary=0.0 cfs 0.000 af Outflow=4.3 cfs 0.777 af

Pond 12P: Infiltration Basin - Lot 3 Peak Elev=196.99' Storage=117,299 cf Inflow=76.7 cfs 6.685 af
Discarded=10.3 cfs 6.676 af Primary=0.0 cfs 0.000 af Outflow=10.3 cfs 6.676 af

Pond 14P: Infiltration System Peak Elev=214.18' Storage=0.033 af Inflow=1.6 cfs 0.150 af
Discarded=0.3 cfs 0.147 af Primary=0.1 cfs 0.002 af Outflow=0.4 cfs 0.150 af

Total Runoff Area = 32.042 ac Runoff Volume = 13.191 af Average Runoff Depth = 4.94"
54.90% Pervious = 17.590 ac 45.10% Impervious = 14.452 ac

Summary for Subcatchment 3S: Watershed BLDG-A

Runoff = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af, Depth> 8.55"
Routed to Pond 4P : Subsurface Infiltration System A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 5S: Watershed BLDG-B

Runoff = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af, Depth> 8.55"
Routed to Pond 6P : Subsurface Infiltration System B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
1.091	98	Unconnected roofs, HSG A
1.091		100.00% Impervious Area
1.091		100.00% Unconnected

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

Summary for Subcatchment 8S: Watershed DA

Runoff = 37.4 cfs @ 12.18 hrs, Volume= 2.993 af, Depth> 4.42"
Routed to Pond 2P : Retention Basin C3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.690	98	Paved roads w/curbs & sewers, HSG A
2.360	98	Paved parking, HSG A
1.030	39	>75% Grass cover, Good, HSG A
0.440	98	Water Surface, 0% imp, HSG A
1.890	36	Woods, Fair, HSG A
1.720	39	>75% Grass cover, Good, HSG A
8.130	64	Weighted Average
5.080		62.48% Pervious Area
3.050		37.52% 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"
2.7	230	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	50	0.0300	7.86	6.17	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
1.2	745	0.0150	10.23	50.24	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013
10.5	1,075	Total			

Summary for Subcatchment 9S: Watershed DC

Runoff = 10.7 cfs @ 12.56 hrs, Volume= 1.679 af, Depth> 2.37"
Routed to Reach 9R : Rabbit Hill Brook

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.430	39	>75% Grass cover, Good, HSG A
5.970	36	Woods, Fair, HSG A
2.100	79	Woods, Fair, HSG D
8.500	47	Weighted Average
8.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	86	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.3	848	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
5.2	350	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	458	0.0040	5.06	91.16	**Trap/Vee/Rect Channel Flow,** Bot.W=5.00' D=2.00' Z= 2.0 '/' Top.W=13.00' n= 0.022
36.9	1,792	Total			

Summary for Subcatchment 10S: Watershed DB

Runoff = 0.9 cfs @ 12.29 hrs, Volume= 0.130 af, Depth> 1.19"
Routed to Reach 11R : South Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
1.210	36	Woods, Fair, HSG A
0.100	39	>75% Grass cover, Good, HSG A
1.310	36	Weighted Average
1.310		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	178	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.0	228	Total			

Summary for Subcatchment 11S: Watershed DD

Runoff = 76.7 cfs @ 12.19 hrs, Volume= 6.685 af, Depth> 6.85"
Routed to Pond 12P : Infiltration Basin - Lot 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
2.700	39	>75% Grass cover, Good, HSG A
4.120	98	Unconnected roofs, HSG A
4.280	98	Paved parking, HSG A
0.610	98	Water Surface, HSG A
11.710	84	Weighted Average
2.700		23.06% Pervious Area
9.010		76.94% Impervious Area
4.120		45.73% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	50	0.0160	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.20"
0.4	62	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	640	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
11.8	752	Total			

Summary for Subcatchment 13S: Building & Canopy

Runoff = 1.6 cfs @ 12.17 hrs, Volume= 0.150 af, Depth> 8.55"
Routed to Pond 14P : Infiltration System

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.80"

Area (ac)	CN	Description
0.210	98	Unconnected roofs, HSG A
0.210		100.00% Impervious Area
0.210		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**
6.0	0	Total, Increased to minimum Tc = 10.0 min			

Summary for Reach 9R: Rabbit Hill Brook

Inflow Area = 30.732 ac, 47.03% Impervious, Inflow Depth > 0.66" for 100-Year event
Inflow = 10.7 cfs @ 12.56 hrs, Volume= 1.679 af
Outflow = 10.7 cfs @ 12.56 hrs, Volume= 1.679 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach 11R: South Property Line

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth > 1.19" for 100-Year event
Inflow = 0.9 cfs @ 12.29 hrs, Volume= 0.130 af
Outflow = 0.9 cfs @ 12.29 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond 2P: Retention Basin C3

Inflow Area = 10.522 ac, 51.72% Impervious, Inflow Depth > 3.42" for 100-Year event
Inflow = 37.4 cfs @ 12.18 hrs, Volume= 2.995 af
Outflow = 1.3 cfs @ 16.89 hrs, Volume= 1.057 af, Atten= 96%, Lag= 282.4 min
Discarded = 1.3 cfs @ 16.89 hrs, Volume= 1.057 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 188.72' @ 16.89 hrs Surf.Area= 38,229 sf Storage= 91,184 cf

Plug-Flow detention time= 399.1 min calculated for 1.057 af (35% of inflow)
Center-of-Mass det. time= 260.9 min (1,106.6 - 845.7)

Volume	Invert	Avail.Storage	Storage Description
#1	186.01'	143,139 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
186.01	28,880	726.0	0	0	28,880
187.50	34,273	765.0	46,992	46,992	33,639
189.20	39,846	811.0	62,942	109,933	39,561
190.00	43,190	1,045.0	33,205	143,139	74,130

Device	Routing	Invert	Outlet Devices
#1	Primary	189.20'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#2	Discarded	188.00'	**21.038 in/hr Exfiltration over Surface area above 188.00'** Conductivity to Groundwater Elevation = 186.00' Excluded Surface area = 35,869 sf

Discarded OutFlow Max=1.3 cfs @ 16.89 hrs HW=188.72' (Free Discharge)
↑—**2=Exfiltration** (Controls 1.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=186.01' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 4P: Subsurface Infiltration System A

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 8.55" for 100-Year event
Inflow = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af
Outflow = 4.1 cfs @ 12.32 hrs, Volume= 0.777 af, Atten= 51%, Lag= 9.3 min
Discarded = 4.1 cfs @ 12.32 hrs, Volume= 0.777 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 199.95' @ 12.32 hrs Surf.Area= 0.081 ac Storage= 0.068 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.4 min (745.9 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.70'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	199.20'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	200.66'	0.000 af	**1.50'D x 2.84'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.70'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	200.66'	**12.0" Round Culvert** L= 118.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 200.66' / 199.00' S= 0.0141 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	202.25'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=4.1 cfs @ 12.32 hrs HW=199.94' (Free Discharge)
└**1=Exfiltration** (Controls 4.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=198.70' TW=193.50' (Fixed TW Elev= 193.50')
├**2=Culvert** (Controls 0.0 cfs)
└**3=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Subsurface Infiltration System A - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

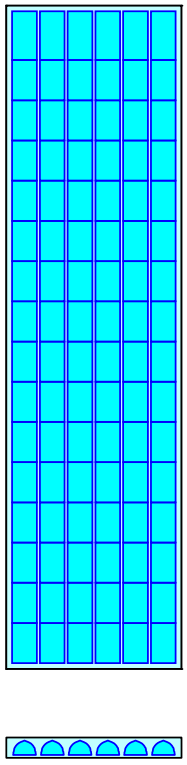
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 6P: Subsurface Infiltration System B

Inflow Area = 1.091 ac,100.00% Impervious, Inflow Depth > 8.55" for 100-Year event
Inflow = 8.4 cfs @ 12.17 hrs, Volume= 0.777 af
Outflow = 4.3 cfs @ 12.32 hrs, Volume= 0.777 af, Atten= 49%, Lag= 9.1 min
Discarded = 4.3 cfs @ 12.32 hrs, Volume= 0.777 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.24' @ 12.32 hrs Surf.Area= 0.081 ac Storage= 0.067 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.5 min (746.0 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	195.00'	0.068 af	**30.50'W x 115.50'L x 3.54'H Field A** 0.286 af Overall - 0.116 af Embedded = 0.170 af x 40.0% Voids
#2A	195.50'	0.116 af	**Cultec R-330XLHD** x 96 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
#3	197.00'	0.000 af	**1.50'D x 7.00'H Vertical Cone/Cylinder**
		0.185 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**42.077 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 186.00'
#2	Primary	198.60'	**12.0" Round Culvert** L= 95.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 198.60' / 192.00' S= 0.0695 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Discarded OutFlow Max=4.3 cfs @ 12.32 hrs HW=196.23' (Free Discharge)
1=Exfiltration (Controls 4.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=195.00' TW=191.00' (Fixed TW Elev= 191.00')
2=Culvert (Controls 0.0 cfs)

Pond 6P: Subsurface Infiltration System B - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

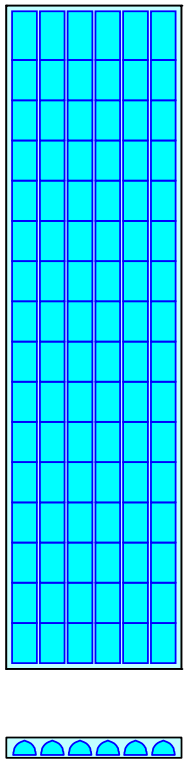
16 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 113.50' Row Length +12.0" End Stone x 2 = 115.50' Base Length
6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

96 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 5,074.1 cf Chamber Storage

12,476.4 cf Field - 5,074.1 cf Chambers = 7,402.3 cf Stone x 40.0% Voids = 2,960.9 cf Stone Storage

Chamber Storage + Stone Storage = 8,035.0 cf = 0.184 af
Overall Storage Efficiency = 64.4%
Overall System Size = 115.50' x 30.50' x 3.54'

96 Chambers
462.1 cy Field
274.2 cy Stone



Summary for Pond 12P: Infiltration Basin - Lot 3

Inflow Area = 11.710 ac, 76.94% Impervious, Inflow Depth > 6.85" for 100-Year event
Inflow = 76.7 cfs @ 12.19 hrs, Volume= 6.685 af
Outflow = 10.3 cfs @ 12.99 hrs, Volume= 6.676 af, Atten= 87%, Lag= 48.0 min
Discarded = 10.3 cfs @ 12.99 hrs, Volume= 6.676 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 9R : Rabbit Hill Brook

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 196.99' @ 12.99 hrs Surf.Area= 26,681 sf Storage= 117,299 cf

Plug-Flow detention time= 123.4 min calculated for 6.676 af (100% of inflow)
Center-of-Mass det. time= 122.5 min (921.8 - 799.3)

Volume	Invert	Avail.Storage	Storage Description
#1	191.00'	145,471 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
191.00	13,068	493.0	0	0	13,068
192.00	15,090	518.0	14,067	14,067	15,142
194.00	19,436	568.0	34,434	48,501	19,597
196.00	24,184	619.0	43,534	92,035	24,559
198.00	29,335	669.0	53,436	145,471	29,843

Device	Routing	Invert	Outlet Devices
#1	Discarded	191.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 187.00'
#2	Primary	197.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Discarded OutFlow Max=10.3 cfs @ 12.99 hrs HW=196.99' (Free Discharge)
↑—**1=Exfiltration** (Controls 10.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=191.00' (Free Discharge)
↑—**2=Sharp-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Pond 14P: Infiltration System

Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 8.55" for 100-Year event
Inflow = 1.6 cfs @ 12.17 hrs, Volume= 0.150 af
Outflow = 0.4 cfs @ 12.49 hrs, Volume= 0.150 af, Atten= 75%, Lag= 19.3 min
Discarded = 0.3 cfs @ 12.49 hrs, Volume= 0.147 af
Primary = 0.1 cfs @ 12.49 hrs, Volume= 0.002 af
Routed to Pond 2P : Retention Basin C3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 214.18' @ 12.49 hrs Surf.Area= 0.029 ac Storage= 0.033 af

Plug-Flow detention time= 22.7 min calculated for 0.150 af (100% of inflow)
Center-of-Mass det. time= 22.6 min (766.1 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	212.50'	0.021 af	**14.75'W x 85.29'L x 2.71'H Infiltration System** 0.078 af Overall - 0.026 af Embedded = 0.052 af x 40.0% Voids
#2A	213.00'	0.026 af	**Cultec R-180** x 52 Inside #1 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 4 rows
		0.047 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	212.50'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 192.90'
#2	Primary	214.00'	**6.0" Round Culvert** L= 142.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 214.00' / 211.58' S= 0.0170 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

Discarded OutFlow Max=0.3 cfs @ 12.49 hrs HW=214.18' (Free Discharge)
1=Exfiltration (Controls 0.3 cfs)

Primary OutFlow Max=0.1 cfs @ 12.49 hrs HW=214.18' (Free Discharge)
2=Culvert (Inlet Controls 0.1 cfs @ 1.27 fps)

Pond 14P: Infiltration System - Chamber Wizard Infiltration System

Chamber Model = Cultec R-180 (Cultec Recharger® 180HD)
Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf
Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 3.44 sf x 4 rows

36.0" Wide + 3.0" Spacing = 39.0" C-C Row Spacing

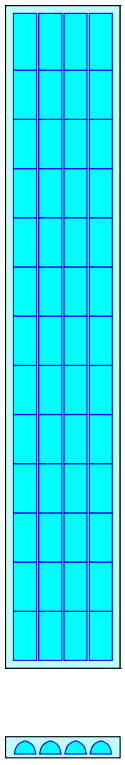
13 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 83.29' Row Length +12.0" End Stone x 2 = 85.29' Base Length
4 Rows x 36.0" Wide + 3.0" Spacing x 3 + 12.0" Side Stone x 2 = 14.75' Base Width
6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

52 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 4 Rows = 1,145.9 cf Chamber Storage

3,407.2 cf Field - 1,145.9 cf Chambers = 2,261.3 cf Stone x 40.0% Voids = 904.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,050.4 cf = 0.047 af
Overall Storage Efficiency = 60.2%
Overall System Size = 85.29' x 14.75' x 2.71'

52 Chambers
126.2 cy Field
83.8 cy Stone



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APPENDIX B – Storm Water Worksheets

Required Recharge Volume and Drawdown Worksheet
TSS Removal Worksheet
Cascade Separator Documentation
Mounding Analysis
DEP Stormwater Checklist

Required Recharge Volume Worksheet

PROJECT LOCATION: **10 Commerce Blvd Wrentham**
DATE: March, 2023
PROJECT NUMBER: 21-0219

Lot 1

SCS Soil Type Hydrologic Group	*Target Depth Factor (in)*	*Total Impervious Area (acre)*	*Required Volume to Recharge (ac-ft)*
HSG A - Building & Parking	0.60	0.86	0.0429
		TOTAL:	**0.0429**

Volume Recharged		
Infiltration Basin Lot 2 Volume before discharge	3.29	ac-ft
Lot 1 Infiltration System Volume before discharge	0.047	ac-ft
Total volume available before discharge	3.337	ac-ft

Drawdown RRV Within 72 hours		
Soil Type:	Sand	
RAWLS Rate (in/hr):	8.27	Sand
Infiltration Area (sf):	1,258	Bottom Lot 1 infiltration system
Drawdown Time (hours):	2.2	

TSS Removal Worksheet

PROJECT LOCATION: **10 Commerce Boulevard Wrentham**
DATE: March, 2023
PROJECT NUMBER: 21-0219

Cascade Stream

Impervious Area =	0.77	acres
Runoff depth to be treated =	1.77	inches (2" storm)
Runoff volume to be treated =	0.1136	ac-ft

BMP	*TSS Removal Rate*	*Starting TSS Load*	*Amount Removed*	*Remaining Load*
Deep Sump and Hooded CB	0.25	1.00	0.25	0.75
Cascade CS-8	0.5	0.75	0.38	0.38
Infiltration Basin (Lot 2)	0.8	0.38	0.30	0.08
TOTAL TSS REMOVED =				**93 %**

Standard Method to Convert Required WQV to a Discharge Rate

PROJECT LOCATION:	10 Commerce Boulevard Wrentham	
DATE:	03/17/23	
PROJECT NUMBER:	21-0219	
Within or Near a Critical Area:	Yes	
WQV:	1.0	inch
Structure Location:	DMH#4	
Impervious Area =	0.001203	square miles
Runoff Curve Number - CN =	98	
Time of Concentration - Tc =	0.1	hrs
Unit Peak Discharge - qu =	774	csm/inch see Table in Figure 4
Computed Flow Rate (1.0" of Runoff) $Q_{1.0}$ =	0.9	cfs

Reference: Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices, MassDEP 9/10/2013

Rational Method Flow Rate for 2-year event = 2.52 cfs

Transient Water-Table Rise Beneath a Rectangular Recharge Area
Groundwater Mounding Solution by Hantush (1967)

Aquifer Properties:

Hydraulic conductivity, K = 16.54 ft/day
Specific yield, Sy = 0.25
Initial saturated thickness, h(0) = 25 ft

Recharge Area Properties:

Recharge rate, w = 1.1 ft/day
Simulation time, t = 1 day
Time when recharge stops, t(0) = 0.0833 day
X coordinate at center of recharge area, X = 0 ft
Y coordinate at center of recharge area, Y = 0 ft
Length in x direction, l = 85.29 ft
Length in y direction, a = 14.75 ft

Water-Table Rise at Center of Recharge Area:

t (day)	h (ft)
0.1	0.157057
0.2	0.0875722
0.3	0.062672
0.4	0.0488679
0.5	0.0400525
0.6	0.0339308
0.7	0.0294325
0.8	0.0259868
0.9	0.0232631
1	0.021056

Note: recovery begins after 0.0833 day.

Report generated by AQTESOLV v4.50.002 (www.aqtesolv.com) on 03/17/23 at 15:09:29.

Mounding Analysis

PROJECT LOCATION:	**10 Commerce Blvd Wrentham**
DATE:	17-Mar-23
PROJECT NUMBER:	21-0219

Infiltration Basin

Aquifer Properties:

Hydraulic Conductivity (K-ft/day):	16.54	RAWLS Rate for Sand
Specific Yield (Sy):	0.25	Medium gravel (USGS Water Supply Paper 1662-D)
Initial Saturated Thickness (ft):	25	Hydrogeological Study Report Wrentham Business Park Wrentham, MA May 22, 2000 by Carr Research Laboratory, Inc.

Recharge Area Properties:

Required Recharge Volume (Rv-ft3):	1,350	2-inch storm volume generated to basin
Depth to Estimated High Groundwater (ft):	193.00	Hydrogeological Study Report Wrentham Business Park Wrentham, MA May 22, 2000 by Carr Research Laboratory, Inc.
Bottom of Recharge System (ft):	212.50	Bottom basin el-212.5'
Bottom Area (ft2):	1,258	Bottom basin el-212.5'

Application Rate Calculation:

$$\frac{\text{Rv (ft3)}}{\text{Bottom Area (ft2)}}$$

$$\frac{1{,}350}{1{,}258} = 1.1 \text{ ft/day}$$

Length of Time to Generate Rv (days):	0.0833	assume Rv generated during a 2 hour period - see DEP Stormwater Handbook, Vol.3, Ch.1, p.20

Groundwater Mounding Solution by Hantush (1967)

Maximum Water Table Rise in Center of Recharge Area (ft)	0.2	See output run using AQTESOLV V4.50.002
Depth From Top of Mound to Bottom of Recharge Area (ft):	19.3	Mound does not breach bottom of system

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.

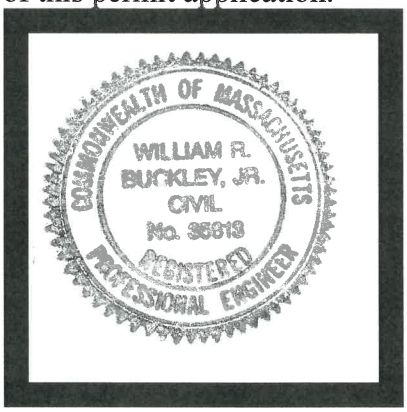
Stormwater Checklist and Certification

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

9/21/2021

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 Separate roof runoff from other drainage

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 and Long Term Pollution Prevention Plan for Storm Water BMPs

Appendix C: OPERATION AND MAINTENANCE PLAN FOR STORMWATER BMPs

	During Construction	Post-construction
BMP Owner:	**Edgewood Development Co.**	**Lot Owner**
Party of Plan Responsibility:	**Edgewood Development Co.**	**Lot Owner**

References:

- Definitive Plan of "Commerce Way Wrentham, MA" by Bay Colony Group, Inc.
- Site Development Plan 10 Commerce Boulevard dated April 19, 2023 to last revision
- Stormwater Pollution Prevention Plan for Construction Activities – Wrentham Business Park

Operation and Maintenance – During Construction

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 where possible **5 ft** from the property line.

Item 2: The catch basins **within the project site** 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, these basins shall be cleaned out with an orange peel bucket or some other means. Silt sacks shall be installed within the catch basins to ensure that siltation does not enter the catch basin. Any debris in basins should be cleaned out. The roadway will be swept as necessary.

Item 3: Do not allow unfiltered runoff to enter the storm water basin or it will clog. If it becomes clogged, it is the contractor's responsibility for restoring it.

Item 4: Inspect storm water basin after every major storm (1.0 inches in 24 hours) and, if necessary, take corrective action.

Item 5: Sediment basins shall be inspected after every storm and weekly. Clean out sediment when it reaches half of the depth of the basin. Scarify basin bottom after each clean out. Repair any damage to the sides and rip-rap outlet structure.

Operation and Maintenance – Post Construction

Item 1: The catch basins shall be inspected four times a year: beginning of summer, after leaf fall, before the arrival of hurricane season, and in the early or mid-spring after the snow melt and road sweeping. Any debris in basins should be cleaned out. The roadway will be swept twice a year: once after leaf fall, the other in the spring after snow melt.

Item 2: Inspect the subsurface infiltration basin at least twice per year for the following:

- Water within the basin 72 hours after a rain event
- Remove any debris that might clog the system

Item 3: Contech Cascade Separator:
Inspect Cascade structure in accordance with the latest manufacturer's maintenance manual, which can be found at Contech Engineered Solutions Technical Guides (conteches.com)

Item 4: Estimated Operations and Maintenance Budget: The following is an estimate of the O&M Budget, post construction.

Inspections – infiltration basin, Cascade, catch basins (3 times per year): $420
Cleaning catch basins (4 times per year): $1,500
Inspecting/cleaning subsurface basin (2 times per year): $320
Lot Sweeping (2 times per year): $800

Long Term Pollution Prevention Plan

Item 1 - Good housekeeping practices: The site is to be kept clean of trash and debris. No trash or uncovered materials is to be left outside.
Item 2 - Provisions for storing materials and waste products inside or under cover: All waste materials will be stored in enclosed dumpsters and removed by a licensed solid waste company. No waste products will be stored outside the facility unless in dumpsters.
Item 3 - Vehicle washing controls: Vehicles will not be washed on this site.
Item 4 - Requirements for routine inspections and maintenance of stormwater BMPs: Refer to the maintenance schedule provided in the Operation and Maintenance Plan – Post Construction. .
Item 5 - Spill prevention and response plans: A spill prevention and response plan will be developed and implemented by the building occupant. A draft plan is attached that may be modified once the tenant has been identified.
Item 6 - Provisions for maintenance of planters, gardens, parks and other landscaped areas: Owner will maintain surrounding landscaped area with the purpose of retaining the landscaped as designed.
Item 7 - Requirements for storage and use of fertilizers, herbicides, and pesticides: If present, fertilizers, herbicides and pesticides shall be stored in their appropriate containers within the building. They shall be handled and used in accordance with the manufacturer's recommendations. It is anticipated that a landscape contractor with have the responsibility of maintaining the property and these materials will be stored off site.
Item 8 - Pet waste management provisions: Outdoor trash receptacles will be placed in convenient areas for vehicle owners to dispose of pet waste.
Item 9 - Provisions for solid waste management: Solid waste material shall be placed in outdoor enclosed containers until emptied by licensed waste management company.
Item 10 - Snow disposal and plowing plans: A snow removal plan will be developed and implemented by the tenant and Owner. A draft plan is attached.
Item 11 - Winter Road Salt/or Sand Use and Storage restriction: See item above.
Item 12 - Sweeping schedules: See Operations and Maintenance Plan – Post Construction.
Item 13 - Training for staff or personnel involved with the implementing Long Term Pollution Prevention Plan: The facility Operations Manager will be responsible for training necessary staff or subcontractors to the implement the plan.
Item 14 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan: TBD

APPENDIX D - Closed Drainage System Design

Closed Drainage System Analysis
10 Commerce Blvd Wrentham, MA

Upstream Node	Downstream Node	Section Size	Length (ft)	Constructed Slope (ft/ft)	Total Flow (cfs)	Capacity Free Flow (cfs)	Rational Coefficient	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#4	DMH#2(EXIST)	12 inch	24	0.021	3.9	5.6	N/A	7.7	210.50	204.70	205.54	210.00	204.20	204.20
DMH#3	DMH#4	12 inch	70	0.051	3.9	10.5	N/A	12.4	214.30	208.30	209.14	210.50	204.70	205.54
CB#3B	DMH#3	12 inch	34	0.006	0.3	3.0	0.7	2.5	212.50	208.50	209.36	214.30	208.30	209.23
DMH#2	DMH#3	12 inch	58	0.009	2.4	3.6	N/A	4.9	215.50	208.80	209.46	214.30	208.30	209.23
DMH#1	DMH#2	12 inch	93	0.010	2.4	3.8	N/A	5.1	214.30	209.70	210.36	215.50	208.80	209.50
CB#1B	DMH#1	12 inch	38	0.008	0.6	3.4	0.7	3.3	214.00	210.00	210.38	214.30	209.70	210.40
CB#3A	DMH#3	12 inch	23	0.100	1.3	12.2	0.7	10.1	214.60	210.60	211.08	214.30	208.30	209.23
CB#1A	DMH#1	12 inch	65	0.020	1.8	5.5	0.7	6.2	215.00	211.00	211.57	214.30	209.70	210.40
CANOPY	Infiltration System	6 inch	240	0.005	0.4	0.4	0.7	2.5	216.00	214.20	214.57	216.00	213.00	213.00
ROOF	Infiltration System	6 inch	122	0.014	0.4	0.7	0.7	3.8	216.75	214.75	215.07	216.00	213.00	213.00

Design Storm is 25-year event as shown on TP40 Boston, MA

CB#1B
0.17ac

CB#1A
0.51ac

CB#3B
0.11ac

CB#3A
0.36ac

CANOPY

ROOF

n/f
ANDREW & GAYLE GORDON
HARVEY & KAREN GORDON

COMMERCE BLVD

BIT SIDEWALK

BIT PARKING LOT

BIT DRIVE

EXIST 6" WATER SERV

EXIST 8" CI WATER LINE

12"CPT DRAIN

6" CONC. DRAIN

4" PVC DRAIN

CON. PAD

VGC

SWL

SGC

DYZ

WG

NAD83

20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

PROJECT:
10 Commerce Blvd
Wrentham,
Massachusetts

OWNER:
WBH, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762

APPLICANT:
EDGEWOOD
DEVELOPMENT
COMPANY, LLC
3 BELCHER STREET
PLAINVILLE, MA 02762

EDGEWOOD
Development Company, LLC

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

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

REFERENCES

STAMP

DRAWING TITLE

DRAINAGE
SUBAREAS

SCALE: 1"=20'

MARCH 13, 2023

21-0219A

SHEET NUMBER
CB

APPENDIX E – Draft Storm Water Pollution Prevention Plan

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

10 Commerce Boulevard
Wrentham, MA
Telephone: TBD

SWPPP Prepared For:

Edgewood Development Co., Inc.
320 South Street
Plainville, MA 02762
508.643.2920

SWPPP Prepared By:

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

SWPPP Preparation Date:

April, 2023

Estimated Project Dates:

Project Start Date: Spring, 2024
Project Completion Date: Fall, 2024

Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Operator(s):

A. TBD

General Contractor

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):

[Repeat as necessary.]

Emergency 24-Hour Contact:

A. Insert name address, telephone number

1.2 Stormwater Team

Insert Role or Responsibility: **Project Manager**
Insert Position: **Project Manager**
Insert Name: **Name**
Insert Telephone Number: **number**
Insert Email: **email**

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:

[Repeat as necessary.]

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Project Name and Address

Project/Site Name: **10 Commerce Boulevard**
Project Street/Location: **10 Commerce Boulevard**
City: **Wrentham**
State: **MA**
ZIP Code: **02093**
County or Similar Subdivision: **Norfolk**

Project Latitude/Longitude

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

Latitude:	Longitude:
1. **42 ° 02 ' 44" N** (degrees, minutes, seconds)	1. **71 ° 18 ' 08" 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. Rabbit Hill Brook
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 MassDEP 2014 Integrated List of Waters. Rabbit Hill Stream is listed as Category 3 – No TMDL Not Evaluated

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 a 4,500 convenience store w/ fueling facilities with associated utilities, septic system and storm water system.

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 – 2.6+/- acres

INSERT TOTAL AREA OF CONSTRUCTION DISTURBANCES – 2+/- acres

INSERT MAXIMUM AREA TO BE DISTURBED AT ANY ONE TIME – 2+/- acres

[Repeat as necessary for individual project phases.]

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)

[Repeat as necessary.]

2.4 Sequence and Estimated Dates of Construction Activities

Phase I

Clearing of building site and storm water basins, installation of erosion controls, and grubbing of wooded areas, and storm water basins.

- 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 building and parking to subbase elevation. Construction of storm water basins. Installation of drainage and water mains within site.

- 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 parking and construction of building.

- 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 landscaping, finish building, place finished course of pavement. 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
-

[Repeat as needed.]

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

See Site Development Plan of 10 Commerce Boulevard by Bay Colony Group, Inc.

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.**

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 Board of Health and Planning Board.**

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 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 perimeter of the site where the proposed work is could impact wetlands through runoff to the storm drain system will contain a silt sock barrier that will capture siltation and runoff.**

Specific Perimeter Controls

Perimeter Control # 1

Perimeter Control Description

- **Silt sock barrier**
- **See SWPP Plan – Appendix A and Site 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 entrances at points where they meet existing Commerce Blvd pavement**
- **See SWPP Plan – Appendix A and Site Plan**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Monitor and maintain the Stabilized Construction Entrance shown on the SWPPP Plan to ensure that it is cleaned and functioning correctly to prevent tracking of sediment by construction that exit the Site.**
- **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 and construction fence in accordance with detail on Sheet 6.2**

Specific Stockpile Controls

Stockpile Control # 1

Stockpiled Sediment/Soil Control Description

- **Silt sock and construction fence will be placed around the perimeter of the stockpiled material.**
- **A tarp or mulch or temporary seeding may also be used to cover stockpiles.**
- **See SWPP Plan – Appendix A and Site 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 no steep slopes on the project site.**

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 definitive plans – Appendix A**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Storm water basins 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 Town of Wrentham Construction Standards and Specifications and Site Plan**

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 used as necessary during construction. Once construction is completed they will be revegetated as necessary to bring them in compliance with the permit.**

Specific Sediment Basin Controls

Sediment Basin Control # 1
Sediment Basin Control Description
- **Sediment basins will be used as necessary during construction. Once construction is completed they will be revegetated as necessary to bring them in compliance with the permit.**

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**

Specific Dewatering Practices

Dewatering Practice # 1
Dewatering Practice Description

- **Installation of a sump pipe with trash pump in the area of the 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 Permanent 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 Commerce Boulevard

[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 Wrentham 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 waste from the commercial building construction.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description
- **Dumpsters will be used for materials waste for building construction. The location of the dumpsters will be determined on a case by case basis as the building is 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
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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 2017 CGP

Appendix C – NOI and EPA Authorization Email

Appendix D – Inspection Forms
- ***Stormwater Construction Site Inspection Report***
- ***Checklist for Catch Basin***
- ***Checklist for Cascade***

Appendix E – Corrective Action Form

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 2017 CGP

INSERT COPY OF 2017 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

Stormwater Construction Site Inspection Report

General Information			
Project Name	Wrentham Business Park Wrentham, MA		
NPDES Tracking No.		**Location**	10 Commerce Way Wrentham, MA
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
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	Stabilized Construction Entrances	❑Yes ❑No	❑Yes ❑No	
2	Silt socks	❑Yes ❑No	❑Yes ❑No	
3	Silt sacks – Catch Basins	❑Yes ❑No	❑Yes ❑No	
4	Sediment Basins	❑Yes ❑No	❑Yes ❑No	
5	Soil Stabilization	❑Yes ❑No	❑Yes ❑No	
6	Material Piles	❑Yes ❑No	❑Yes ❑No	
7	General Housekeeping	❑Yes ❑No	❑Yes ❑No	
9		❑Yes ❑No	❑Yes ❑No	
10		❑Yes ❑No	❑Yes ❑No	
11		❑Yes ❑No	❑Yes ❑No	
12		❑Yes ❑No	❑Yes ❑No	
13		❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
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 and phases of construction. Use Project SWPPP (Sheets 6.0 & 61) for inspection.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
5	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2,3	Are future infiltration basin area protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
2,3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are sediment basins functioning properly?	❑Yes ❑No	❑Yes ❑No	
3	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
1	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	
7	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
6	Are material piles covered or seeded and surrounded by sediment control barrier?	❑Yes ❑No	❑Yes ❑No	
		❑Yes ❑No	❑Yes ❑No	
		❑Yes ❑No	❑Yes ❑No	
		❑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:**_____

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 CASCADE			
Location:			
Inspector:			
Date/Time:			
Weather:			
Date of Last Rainfall:			
Amount of Last Rainfall:			
Inspection Items:	**Satisfactory (S) or Unsatisfactory (U)**		**Comments/ Corrective Actions**
Blockage or obstruction in inlet chamber, flume, outlet	S	U	
Check for presence of hydrocarbons	S	U	
Depth of Sediment	S	U	
Other issue	S	U	
Corrective Action Needed			**Due Date**
1			
2			
3			
4			
5			

Note: Inspection and maintenance shall be in accordance with the most recent Cascades Inspection and Maintenance information which can be found at https://www.conteches.com/technical-guides/search?filter=W0ME2011K1. 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

Appendix F –SWPPP Amendment Log

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 Soil Report Extract

No. 20-0219 Date: April 27, 2022

Commonwealth of Massachusetts

Wrentham , Massachusetts

Soil Suitability Assessment for On-Site Sewage Disposal

Performed By: Richard Leslie Date: April 27, 2022

Witnessed By: Wade Saucier

Location Address or Lot #:	Owner's Name, Address, and , Telephone #:
10 Commerce Boulevard Wrentham, Ma 02093 New Construction: ☑ Repair ☐	Edgewood Development Company, LLC 320 South Street, Suite 202 Plainville, MA 02762 508.643.2920

Office Review

Published Soil Survey Available: No ☐ Yes ☑

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

Drainage Class A Soil Limitations Bedrock

Surficial Geology Report Available: No ☐ Yes ☑

Year Published 1992 Publication Scale 1:250,000

Geologic Material (Map Unit) Coarse Deposits

Landform Glacial Outwash Plain

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 March, 2022

Range: Above Normal ☐ Normal ☑ Below Normal ☐

Other References Reviewed: _____

Location Address or Lot No. 10 Commerce Boulevard

On-site Review

Deep Hole Number: 2022-1 Date: 4/26/2022 Time: 0830 Weather: 40°/Cloudy

Location (identify on site plan) See site plan

Land Use Parking Area Slope (%) 1% Surface Stones None

Vegetation None

Landform Glacial Outwash Plain

Position on landscape (sketch on back) See site plan

Distances from:

Open Water Body	>200'	Drainageway	>100'
Possible Wet Area	>100'	Property Line	25'+/-
Drinking Water Well	>100'	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)
0" - 168"	C	Loamy Sand	2.5Y5/4		No A or B layer Gravelly, Cobbly, Coarse

*MINIMUM OF TWO HOLES REQUIRED AT EVERY DISPOSAL AREA

Parent Material (geologic) Glacial outwash Depth to Bedrock:

Depth to Groundwater Standing Water in Hole: Weeping from Pit Face:

Estimated Seasonal High Groundwater:

Location Address or Lot No. 10 Commerce Boulevard

On-site Review

Deep Hole Number: 2022-2 Date: 4/26/2022 Time: 0900 Weather: 40°/Cloudy

Location (identify on site plan) See site plan

Land Use Parking Area Slope (%) 1% Surface Stones None

Vegetation None

Landform Glacial Outwash Plain

Position on landscape (sketch on back) See site plan

Distances from:

Open Water Body	>200'	Drainageway	>100'
Possible Wet Area	>100'	Property Line	25'+/-
Drinking Water Well	>100'	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)
0" - 48"	Fill				
48" - 80"	A+B	Sandy Loam			
80" - 176"	C	Loamy Sand	2.5Y5/4		Gravelly, Cobbly, Coarse, Pockets of fine sand

*MINIMUM OF TWO HOLES REQUIRED AT EVERY DISPOSAL AREA

Parent Material (geologic) Glacial outwash Depth to Bedrock:

Depth to Groundwater Standing Water in Hole: Weeping from Pit Face:

Estimated Seasonal High Groundwater:

Location Address or Lot No. 10 Commerce Boulevard

On-site Review

Deep Hole Number: 2022-3 Date: 4/26/2022 Time: 0930 Weather: 40°/Cloudy

Location (identify on site plan) See site plan

Land Use Parking Area Slope (%) 1% Surface Stones None

Vegetation None

Landform Glacial Outwash Plain

Position on landscape (sketch on back) See site plan

Distances from:

Open Water Body	>200'	Drainageway	>100'
Possible Wet Area	>100'	Property Line	25'+/-
Drinking Water Well	>100'	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)
0" - 48"	Fill				
48" - 80"	A+B	Sandy Loam			
80" - 168"	C	Loamy Sand	2.5Y5/4		Gravelly, Cobbly, Coarse

*MINIMUM OF TWO HOLES REQUIRED AT EVERY DISPOSAL AREA

Parent Material (geologic) Glacial outwash Depth to Bedrock:

Depth to Groundwater Standing Water in Hole: Weeping from Pit Face:

Estimated Seasonal High Groundwater:

Location Address or Lot No. 10 Commerce Boulevard

Commonwealth of Massachusetts

Wrentham , Massachusetts

Percolation Test*		
Date: April 27, 2022	Time: 1130	
Observation Hole #	2022-1	2022-2
Depth of Perc	36"	80"
Start Pre-soak	1151	1132
End Pre-soak	1206	1147
Time at 12”	1206	1147
Time at 9”	1208	1156
Time at 6”	1211	1210
Time (9” – 6”)	3	14
Rate Min./Inch	2	5

* Minimum of 1 percolation test must be performed in both the primary area AND reserve area.

Site Passed ☑ Site Failed ☐

Performed By: Richard Leslie

Witnessed By: Wade Saucier

Comments:

Location Address or Lot No. 10 Commerce Boulevard

Commonwealth of Massachusetts

Wrentham , Massachusetts

Percolation Test*		
Date: April 27, 2022	Time: 1120	
Observation Hole #	2022-3	
Depth of Perc	80"	
Start Pre-soak	1125	
End Pre-soak	1140	
Time at 12”	1140	
Time at 9”	1142	
Time at 6”	1145	
Time (9” – 6”)	3	
Rate Min./Inch	2	

* Minimum of 1 percolation test must be performed in both the primary area AND reserve area.

Site Passed ☑ Site Failed ☐

Performed By: Richard Leslie

Witnessed By: Wade Saucier

Comments:

Location Address or Lot No. 10 Commerce Boulevard

Determination for Seasonal High Water Table

Method Used:

- [x] Depth observed standing in observation hole >176" inches
- [ ] Depth weeping from side of observation hole _____ inches
- [ ] Depth to soil mottles _____ inches
- [ ] Ground water adjustment _____ feet

Index Well Number _____ Reading Date _____ Index well level _____

Adjustment factor _____ Adjusted groundwater level

Depth of Naturally Occurring Pervious Material

Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes

If not, what is the depth of naturally occurring pervious material? _____

Certification

I certify that on April, 1997 (date) I have passed the soil evaluator examination approved by the Department of Environmental Protection and that the above analysis was performed by me consistent with the required training expertise and experience described in 310 CMR 15.017.

Signature _____ Date _____

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

Wrentham Business Park
Wrentham, MA

August 10, 2017

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,790 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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 12, Sep 15, 2016

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

Date(s) aerial images were photographed: May 14, 2010—Apr 1, 2017

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

Norfolk and Suffolk Counties, Massachusetts (MA616)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	2.5	7.6%
52	Freetown muck, 0 to 1 percent slopes	0.1	0.3%
245C	Hinckley loamy sand, 8 to 15 percent slopes	5.4	16.5%
253D	Hinckley loamy sand, 15 to 35 percent slopes	7.6	23.3%
600	Pits, sand and gravel	0.1	0.3%
653	Udorthents, sandy	17.1	52.1%
Totals for Area of Interest		**32.7**	**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
Natural 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 storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
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
Natural 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 storage in profile: Very high (about 12.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
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

52—Freetown muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2q9
Elevation: 0 to 1,110 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 unique importance

Map Unit Composition

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

Description of Freetown

Setting

Landform: Bogs, depressions, depressions, kettles, marshes, swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Whitman

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

Scarboro

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip

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

Swansea

Percent of map unit: 5 percent
Landform: Bogs, depressions, depressions, kettles, marshes, swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
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: Not prime farmland

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: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Shoulder, toeslope, footslope, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Convex, concave, linear
Across-slope shape: Concave, linear, convex
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
Natural 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
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 5 percent
Landform: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Convex, concave, linear
Across-slope shape: Concave, linear, convex
Hydric soil rating: No

Sudbury

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

Merrimac

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

253D—Hinckley loamy sand, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2svmd
Elevation: 0 to 860 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Crest, nose slope, side slope, head slope, riser
Down-slope shape: Linear, convex, concave
Across-slope shape: Linear, concave, convex
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: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural 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
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 10 percent
Landform: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Crest, nose slope, side slope, head slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Linear, concave, convex
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Eskers, kames, kame terraces, outwash plains, outwash terraces, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope, nose slope, crest, riser
Down-slope shape: Convex, linear, concave
Across-slope shape: Linear, convex, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Kame terraces, outwash plains, outwash terraces, moraines, outwash deltas
Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

600—Pits, sand and gravel

Map Unit Setting

National map unit symbol: vkxc
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting
Parent material: Loose, excavated sandy and gravelly glaciofluvial deposits

653—Udorthents, sandy

Map Unit Setting
National map unit symbol: vky8
Elevation: 0 to 3,000 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
Udorthents and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Riser, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Excavated and filled sandy glaciofluvial deposits

Typical profile
H1 - 0 to 6 inches: variable
H2 - 6 to 60 inches: variable

Properties and qualities
Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 8 percent
Hydric soil rating: Unranked

Urban land

Percent of map unit: 5 percent
Hydric soil rating: Unranked

Swansea

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

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