Pre and Post Development Drainage Analysis
For

Site Improvements

Located At

57 Mendon Street

Bellingham, MA

Prepared for

Hiawatha Properties LTD

57 Mendon Street
Bellingham, MA 02019

May 10, 2019

Prepared by

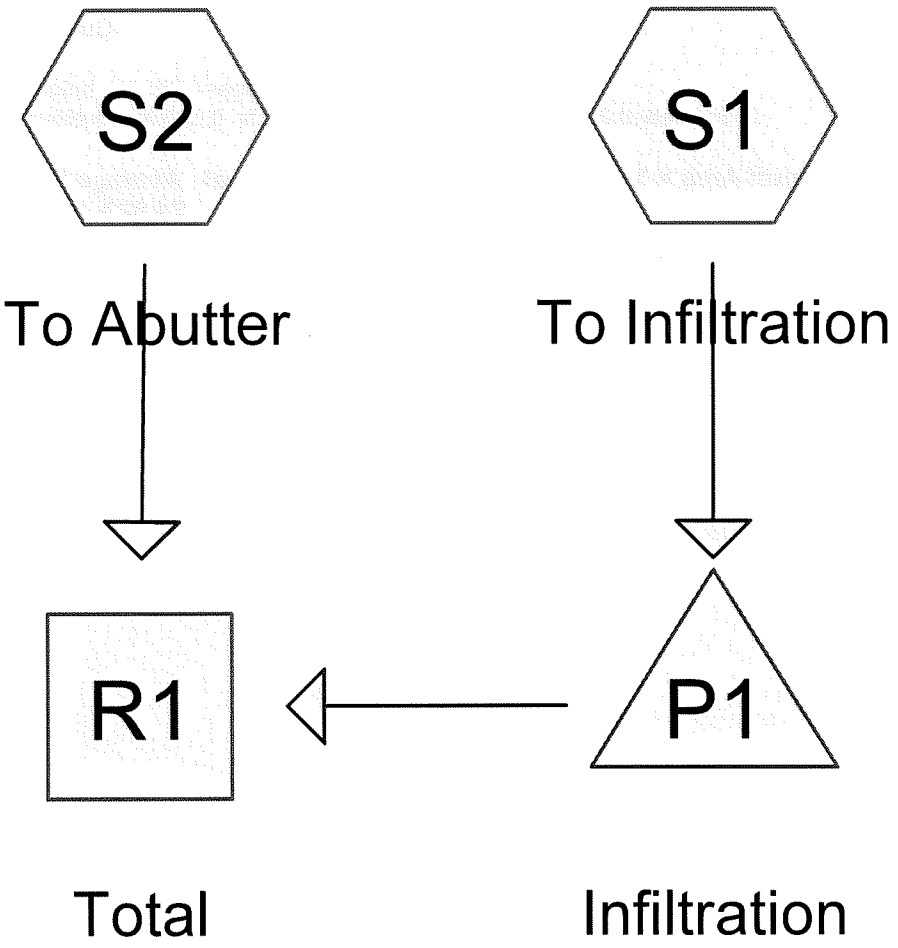
LAND PLANNING, INC.

167 Hartford Ave.
Bellingham, MA 02019

CONCLUSIONS:

The proposed site improvements will not result in any increase in peak runoff rates for all storms up to and including the 100 year storm.

Pre Development



Subcat Reach Pond Link

Routing Diagram for pre development
Prepared by {enter your company name here}, Printed 8/10/2017

Summary for Subcatchment S1: To Infiltration

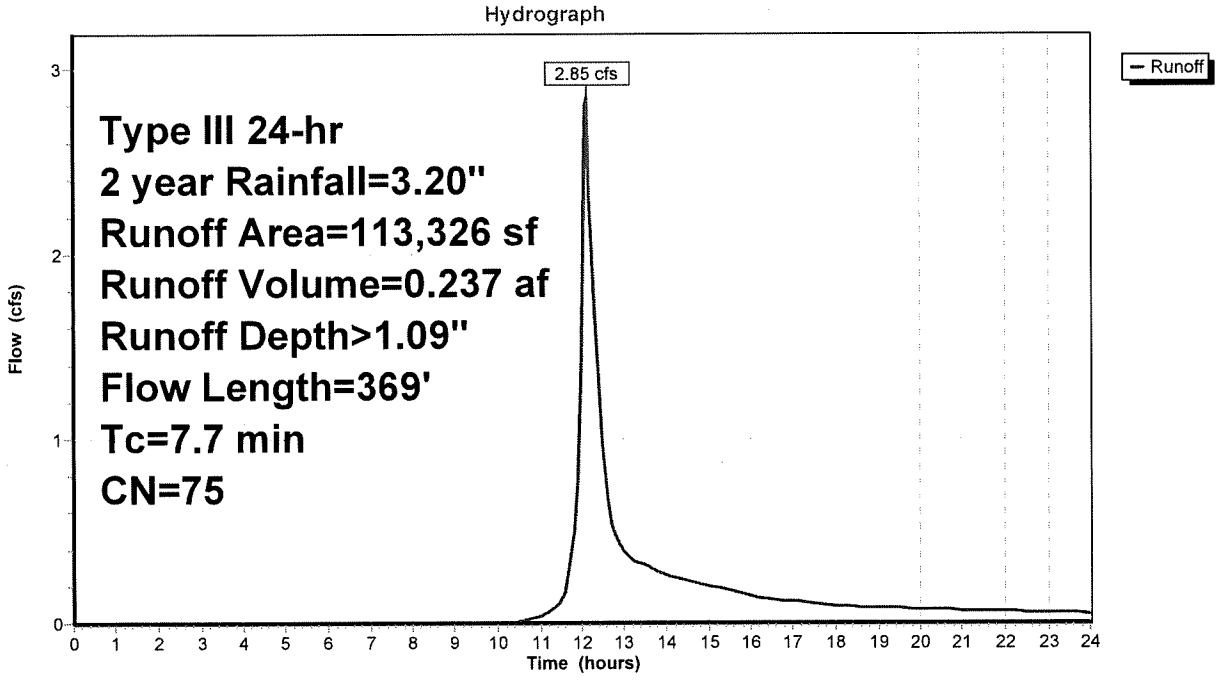
Runoff = 2.85 cfs @ 12.12 hrs, Volume= 0.237 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 2 year Rainfall=3.20"

	Area (sf)	CN	Description
	20,659	55	Woods, Good, HSG B
	37,300	61	>75% Grass cover, Good, HSG B
*	22,183	85	Gravel surface, HSG B
	33,184	98	Paved parking, HSG B
	113,326	75	Weighted Average
	80,142		70.72% Pervious Area
	33,184		29.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	57	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.9	144	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	168	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.7	369	Total			

Subcatchment S1: To Infiltration

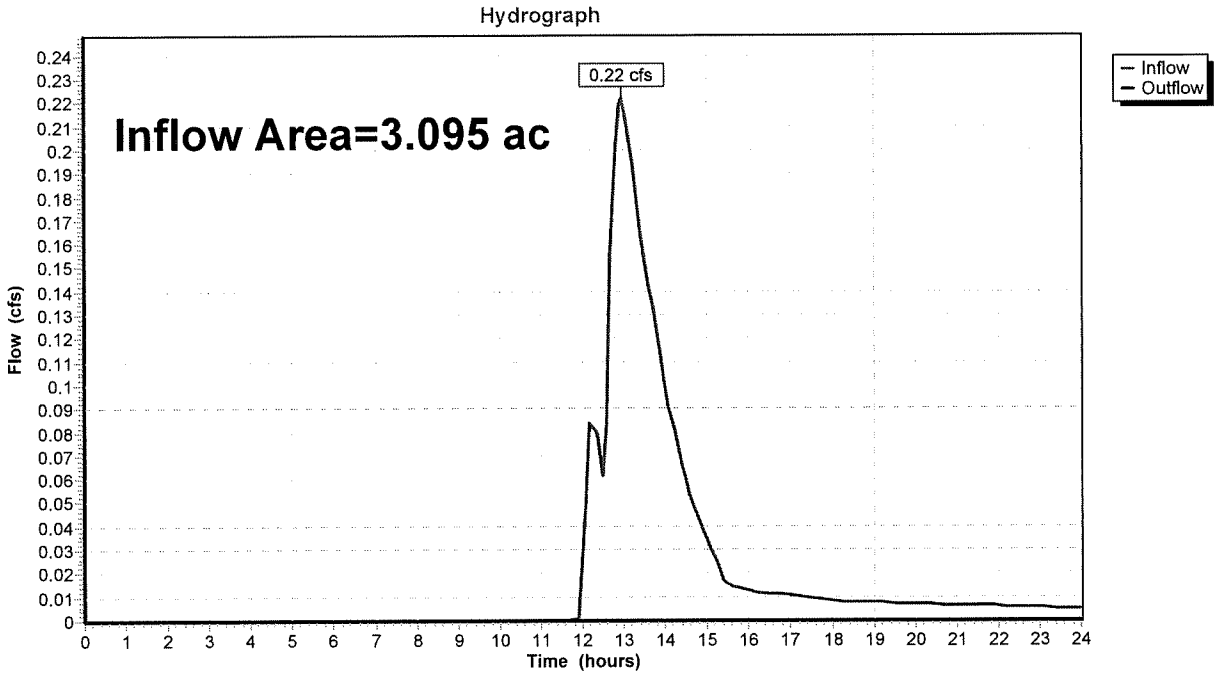


Summary for Reach R1: Total

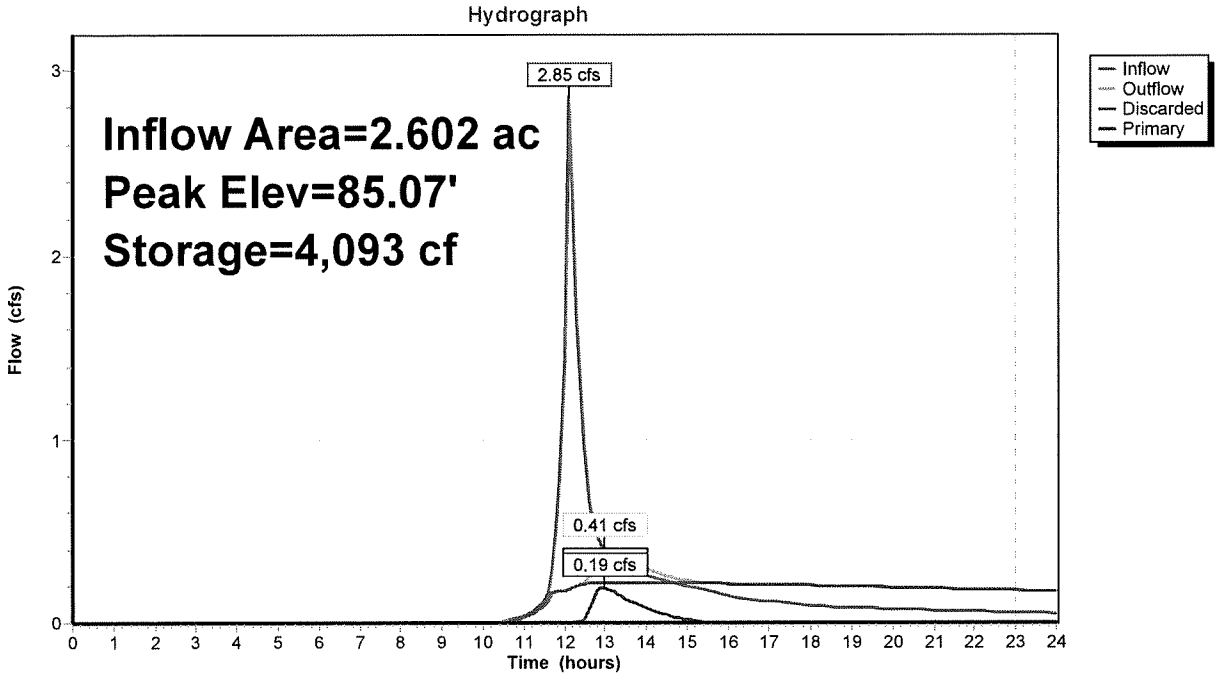
Inflow Area = 3.095 ac, 24.62% Impervious, Inflow Depth > 0.13" for 2 year event
Inflow = 0.22 cfs @ 12.96 hrs, Volume= 0.034 af
Outflow = 0.22 cfs @ 12.96 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach R1: Total



Pond P1: Infiltration



Summary for Subcatchment S1: To Infiltration

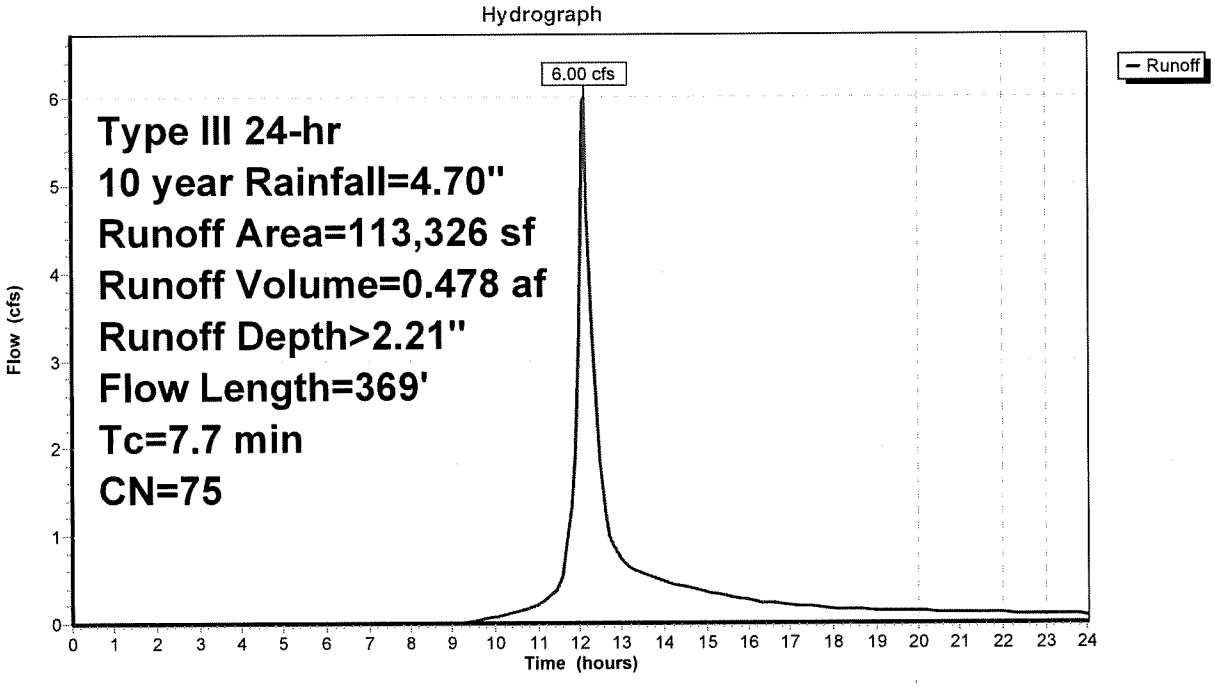
Runoff = 6.00 cfs @ 12.12 hrs, Volume= 0.478 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
	20,659	55	Woods, Good, HSG B
	37,300	61	>75% Grass cover, Good, HSG B
*	22,183	85	Gravel surface, HSG B
	33,184	98	Paved parking, HSG B
	113,326	75	Weighted Average
	80,142		70.72% Pervious Area
	33,184		29.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	57	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.9	144	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	168	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.7	369	Total			

Subcatchment S1: To Infiltration

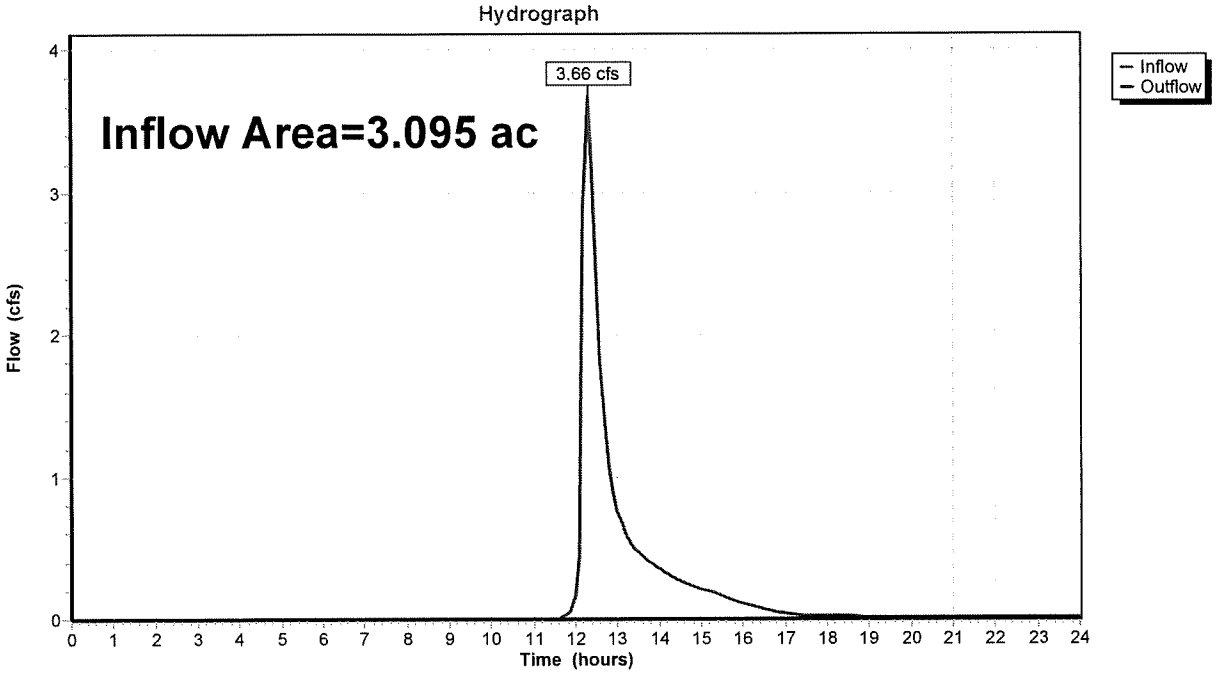


Summary for Reach R1: Total

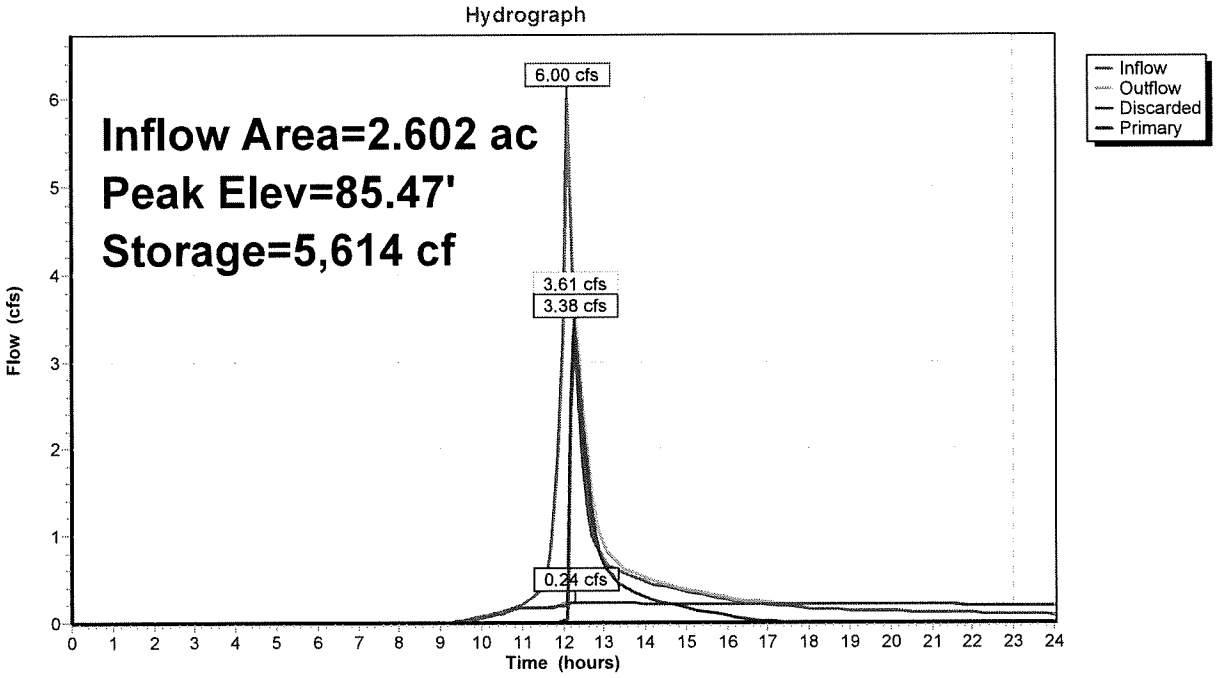
Inflow Area = 3.095 ac, 24.62% Impervious, Inflow Depth > 0.94" for 10 year event
Inflow = 3.66 cfs @ 12.31 hrs, Volume= 0.243 af
Outflow = 3.66 cfs @ 12.31 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach R1: Total



Pond P1: Infiltration



Summary for Subcatchment S1: To Infiltration

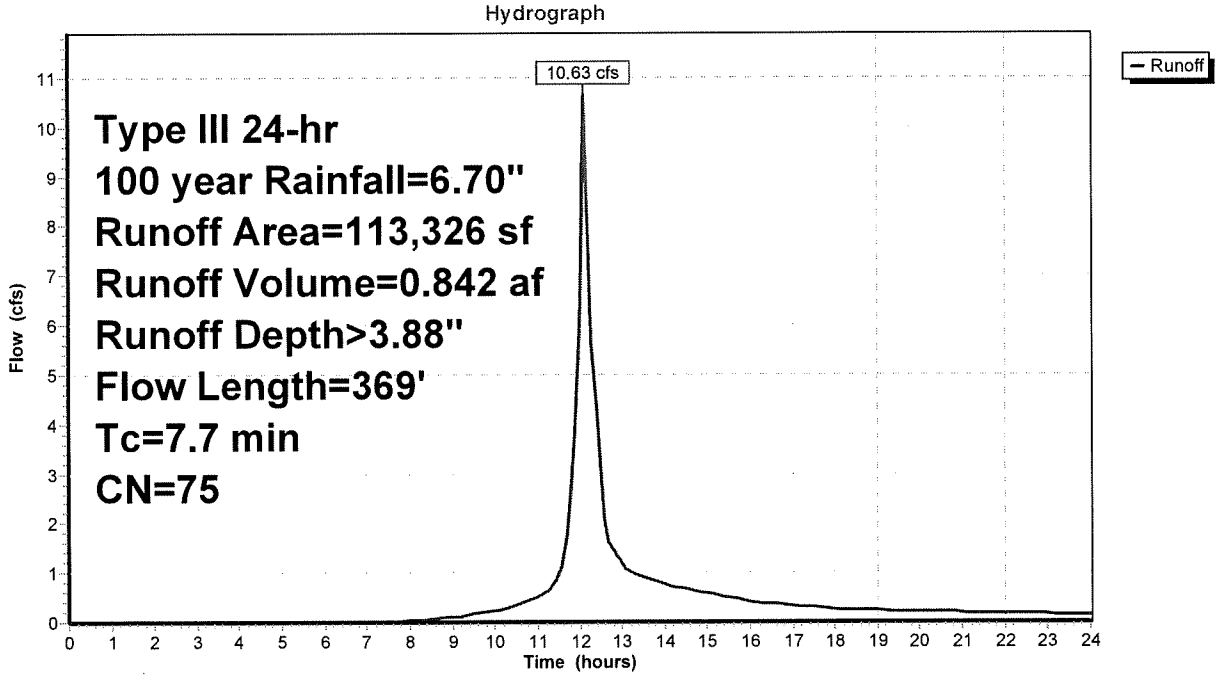
Runoff = 10.63 cfs @ 12.11 hrs, Volume= 0.842 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 year Rainfall=6.70"

	Area (sf)	CN	Description
	20,659	55	Woods, Good, HSG B
	37,300	61	>75% Grass cover, Good, HSG B
*	22,183	85	Gravel surface, HSG B
	33,184	98	Paved parking, HSG B
	113,326	75	Weighted Average
	80,142		70.72% Pervious Area
	33,184		29.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	57	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.9	144	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	168	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.7	369	Total			

Subcatchment S1: To Infiltration

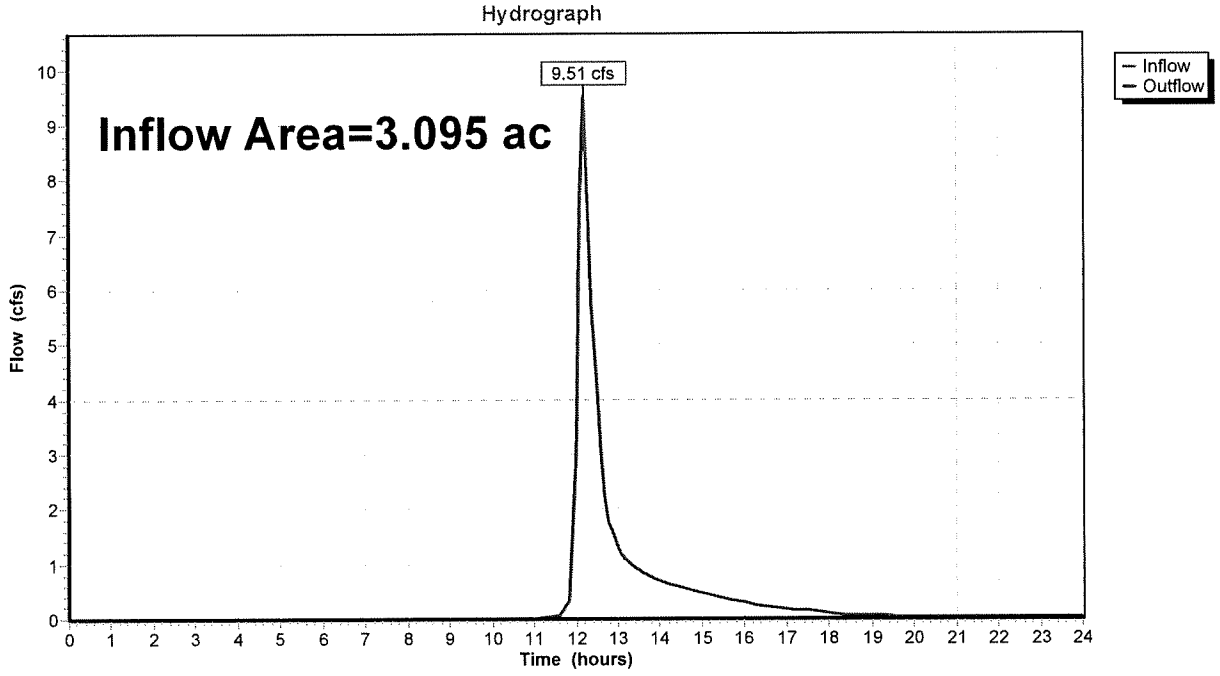


Summary for Reach R1: Total

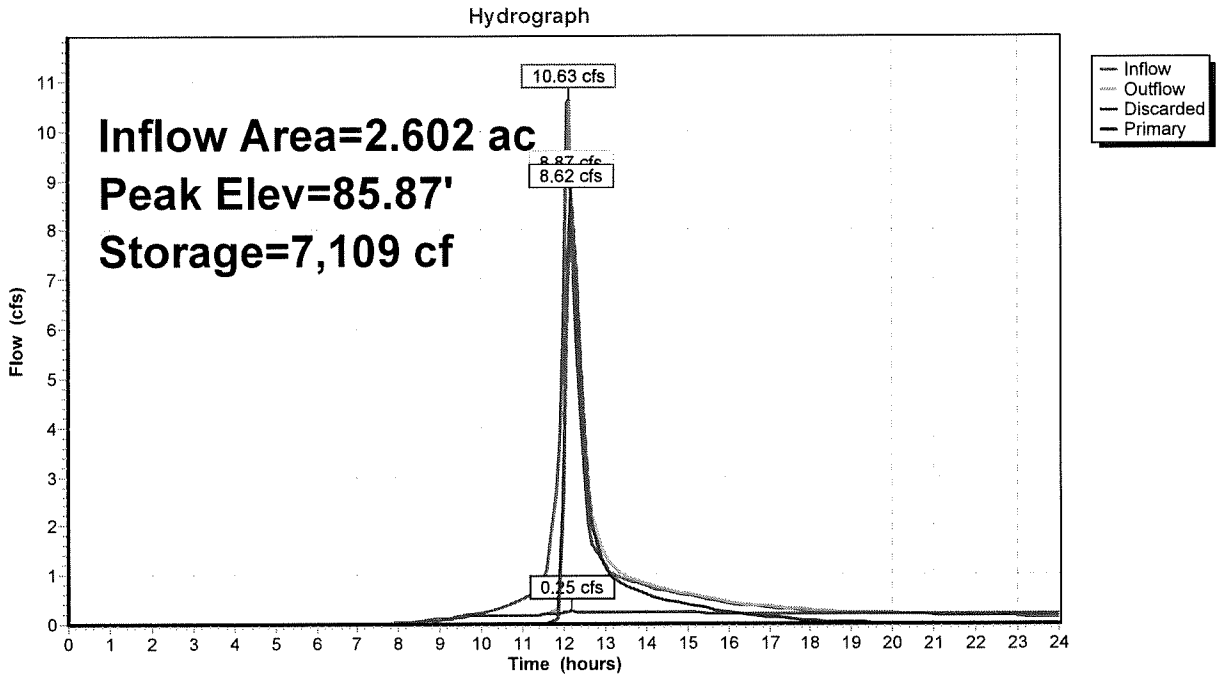
Inflow Area = 3.095 ac, 24.62% Impervious, Inflow Depth > 2.33" for 100 year event
Inflow = 9.51 cfs @ 12.20 hrs, Volume= 0.600 af
Outflow = 9.51 cfs @ 12.20 hrs, Volume= 0.600 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Reach R1: Total



Pond P1: Infiltration



Time span=5.00-20.00 hrs, dt=0.10 hrs, 151 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 S1: To Infiltration Runoff Area=117,694 sf 28.18% Impervious Runoff Depth>1.00"
Flow Length=478' Tc=8.8 min CN=75 Runoff=2.82 cfs 0.225 af

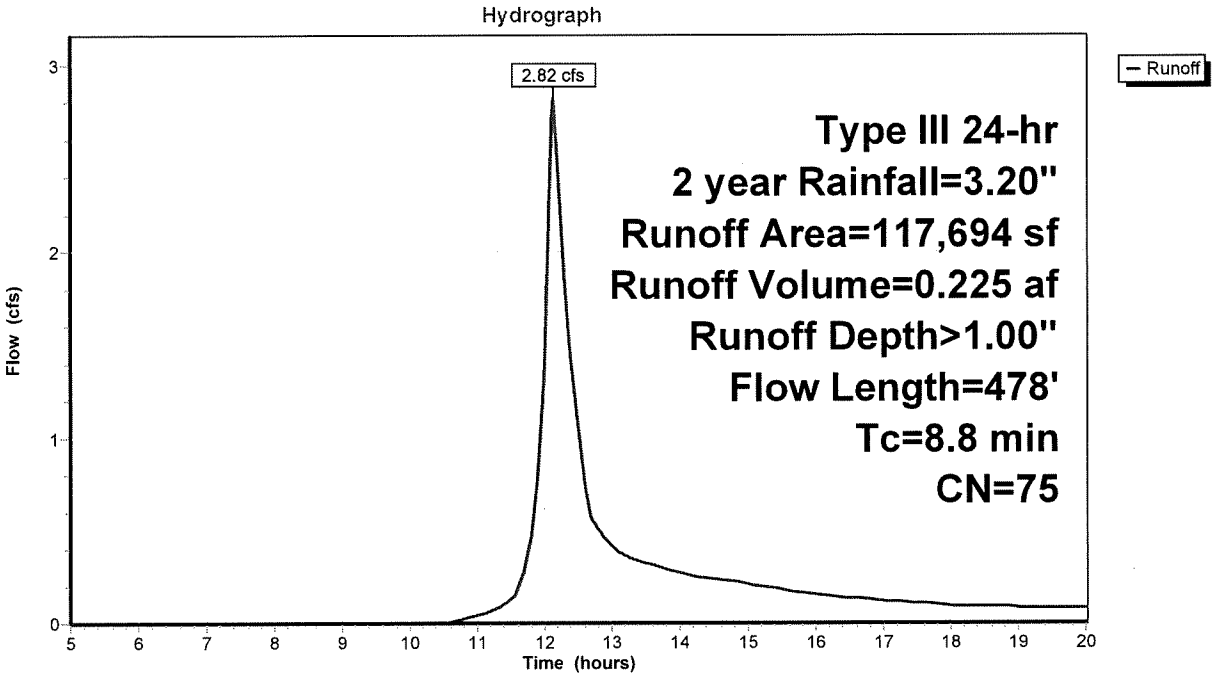
Subcatchment S2: To Abutter Runoff Area=17,106 sf 0.00% Impervious Runoff Depth>0.24"
Flow Length=251' Tc=7.9 min CN=56 Runoff=0.05 cfs 0.008 af

Reach R1: Total Inflow=0.22 cfs 0.098 af
Outflow=0.22 cfs 0.098 af

Pond 1P: Detention Basin Peak Elev=83.53' Storage=5,095 cf Inflow=2.82 cfs 0.225 af
Discarded=0.10 cfs 0.057 af Primary=0.20 cfs 0.091 af Outflow=0.30 cfs 0.147 af

Total Runoff Area = 3.095 ac Runoff Volume = 0.233 af Average Runoff Depth = 0.90"
75.39% Pervious = 2.333 ac 24.61% Impervious = 0.762 ac

Subcatchment S1: To Infiltration

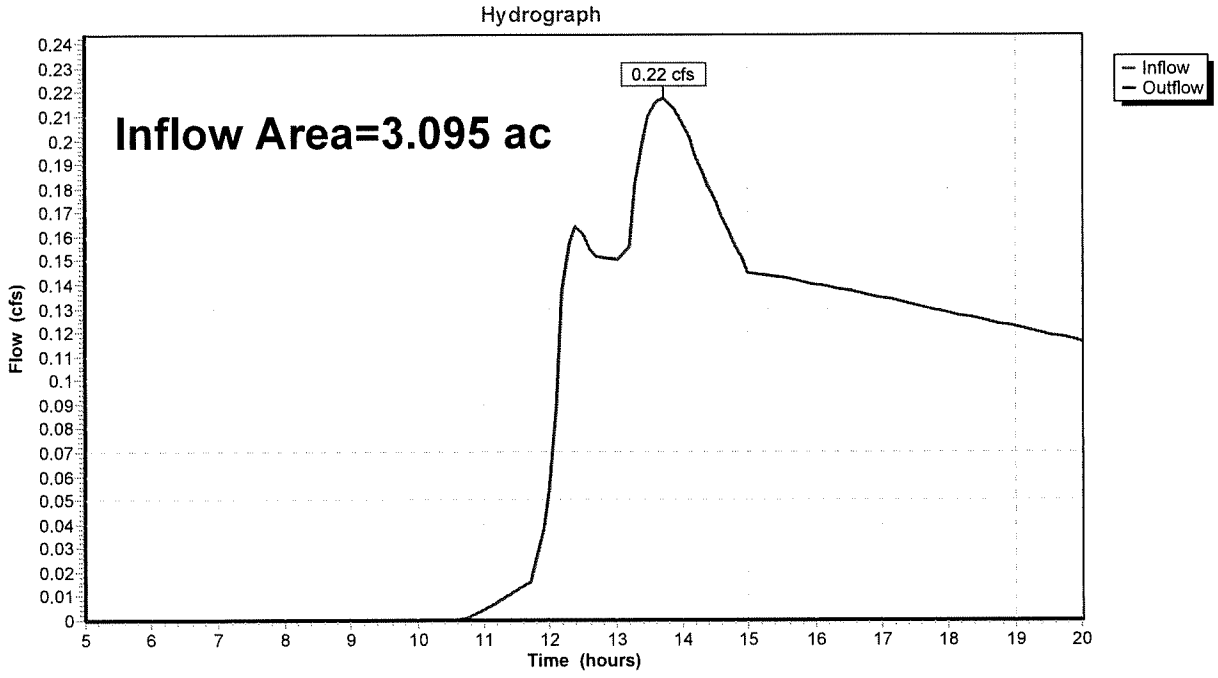


Summary for Reach R1: Total

Inflow Area = 3.095 ac, 24.61% Impervious, Inflow Depth > 0.38" for 2 year event
Inflow = 0.22 cfs @ 13.71 hrs, Volume= 0.098 af
Outflow = 0.22 cfs @ 13.71 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.10 hrs

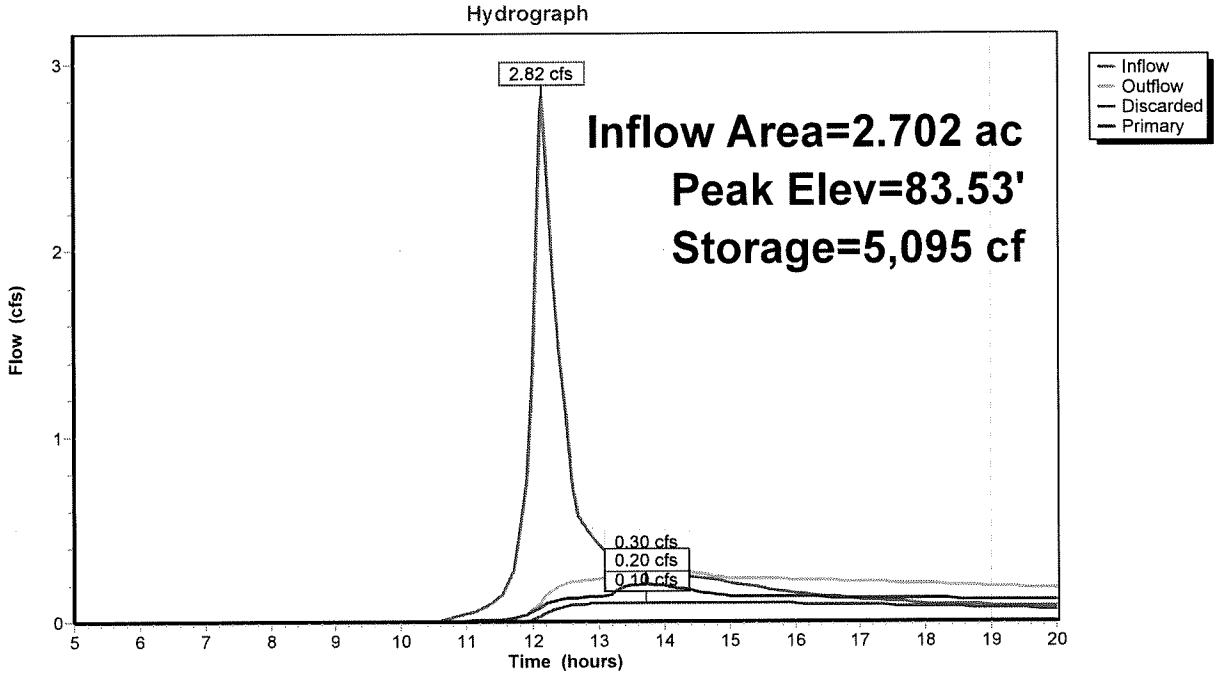
Reach R1: Total



Discarded OutFlow Max=0.10 cfs @ 13.73 hrs HW=83.53' (Free Discharge)
└─**6=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=0.18 cfs @ 13.73 hrs HW=83.53' (Free Discharge)
├─**1=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.61 fps)
├─**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 6.81 fps)
├─**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 5.90 fps)
├─**4=Orifice/Grate** (Orifice Controls 0.03 cfs @ 4.81 fps)
├─**5=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.55 fps)
├─**7=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.47 fps)
├─**8=Orifice/Grate** (Controls 0.00 cfs)
└─**9=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Summary for Subcatchment S1: To Infiltration

Runoff = 5.95 cfs @ 12.13 hrs, Volume= 0.460 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.10 hrs
Type III 24-hr 10 year Rainfall=4.70"

	Area (sf)	CN	Description
	21,626	55	Woods, Good, HSG B
	40,695	61	>75% Grass cover, Good, HSG B
*	22,202	85	Gravel surface, HSG B
	33,171	98	Paved parking, HSG B
	117,694	75	Weighted Average
	84,523		71.82% Pervious Area
	33,171		28.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	57	0.0500	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.9	144	0.0280	2.69		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.5	168	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	109	0.0100	1.61		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.8	478	Total			

Summary for Subcatchment S2: To Abutter

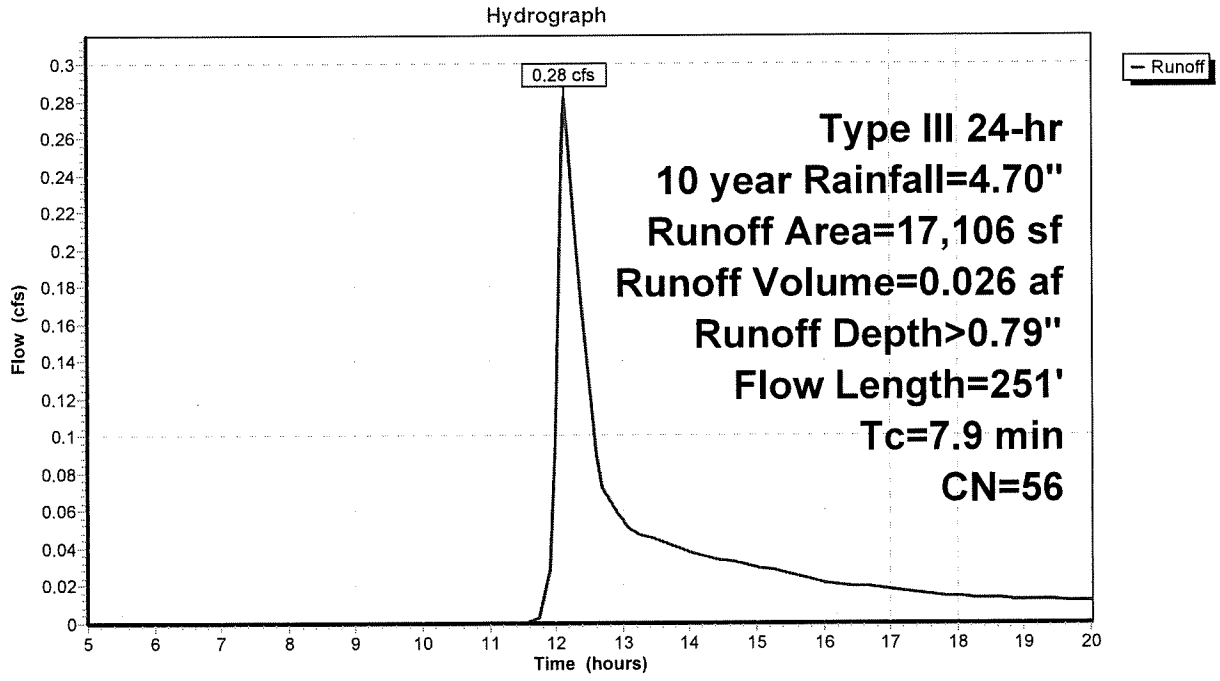
Runoff = 0.28 cfs @ 12.15 hrs, Volume= 0.026 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.10 hrs
Type III 24-hr 10 year Rainfall=4.70"

Area (sf)	CN	Description
12,942	55	Woods, Good, HSG B
4,164	61	>75% Grass cover, Good, HSG B
17,106	56	Weighted Average
17,106		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	30	0.0600	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.6	221	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.9	251	Total			

Subcatchment S2: To Abutter



Summary for Pond 1P: Detention Basin

Inflow Area = 2.702 ac, 28.18% Impervious, Inflow Depth > 2.04" for 10 year event
Inflow = 5.95 cfs @ 12.13 hrs, Volume= 0.460 af
Outflow = 3.43 cfs @ 12.35 hrs, Volume= 0.361 af, Atten= 42%, Lag= 13.0 min
Discarded = 0.14 cfs @ 12.35 hrs, Volume= 0.068 af
Primary = 3.29 cfs @ 12.35 hrs, Volume= 0.293 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.10 hrs
Peak Elev= 84.10' @ 12.35 hrs Surf.Area= 4,410 sf Storage= 6,889 cf

Plug-Flow detention time= 107.0 min calculated for 0.358 af (78% of inflow)
Center-of-Mass det. time= 52.2 min (854.5 - 802.3)

Volume	Invert	Avail.Storage	Storage Description
#1	81.00'	9,017 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)
#2A	82.00'	1,668 cf	**27.50'W x 84.75'L x 2.54'H Field A** 5,924 cf Overall - 1,754 cf Embedded = 4,170 cf x 40.0% Voids
#3A	82.50'	1,754 cf	**Cultec R-150XLHD** x 64 Inside #2 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 8 rows
		12,439 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
81.00	535	0	0
82.00	931	733	733
84.00	2,015	2,946	3,679
86.00	3,323	5,338	9,017

Device	Routing	Invert	Outlet Devices
#1	Primary	81.00'	**0.7" Vert. Orifice/Grate X 2.00** C= 0.600
#2	Primary	81.50'	**0.7" Vert. Orifice/Grate X 2.00** C= 0.600
#3	Primary	82.00'	**0.7" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Primary	82.50'	**0.7" Vert. Orifice/Grate X 2.00** C= 0.600
#5	Primary	83.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Discarded	82.00'	**4.700 in/hr Exfiltration over Surface area above 82.00'** Conductivity to Groundwater Elevation = 75.55' Excluded Surface area = 3,262 sf
#7	Primary	83.50'	**1.7' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#8	Primary	84.75'	**48.0" W x 48.0" H Vert. Orifice/Grate** C= 0.600
#9	Primary	85.00'	**4.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Pond 1P: Detention Basin - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 8 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

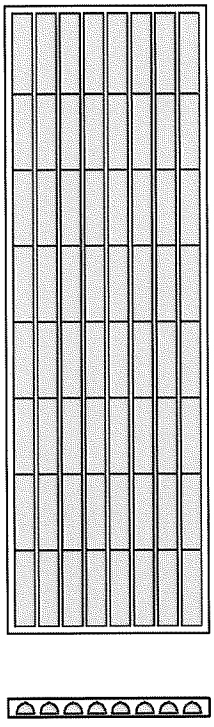
8 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 82.75' Row Length +12.0" End Stone x 2 = 84.75' Base Length
8 Rows x 33.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 27.50' Base Width
6.0" Base + 18.5" Chamber Height + 6.0" Cover = 2.54' Field Height

64 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 8 Rows = 1,753.6 cf Chamber Storage

5,923.7 cf Field - 1,753.6 cf Chambers = 4,170.0 cf Stone x 40.0% Voids = 1,668.0 cf Stone Storage

Chamber Storage + Stone Storage = 3,421.7 cf = 0.079 af
Overall Storage Efficiency = 57.8%
Overall System Size = 84.75' x 27.50' x 2.54'

64 Chambers
219.4 cy Field
154.4 cy Stone



Time span=5.00-20.00 hrs, dt=0.10 hrs, 151 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 S1: To Infiltration Runoff Area=117,694 sf 28.18% Impervious Runoff Depth>3.63"
Flow Length=478' Tc=8.8 min CN=75 Runoff=10.57 cfs 0.817 af

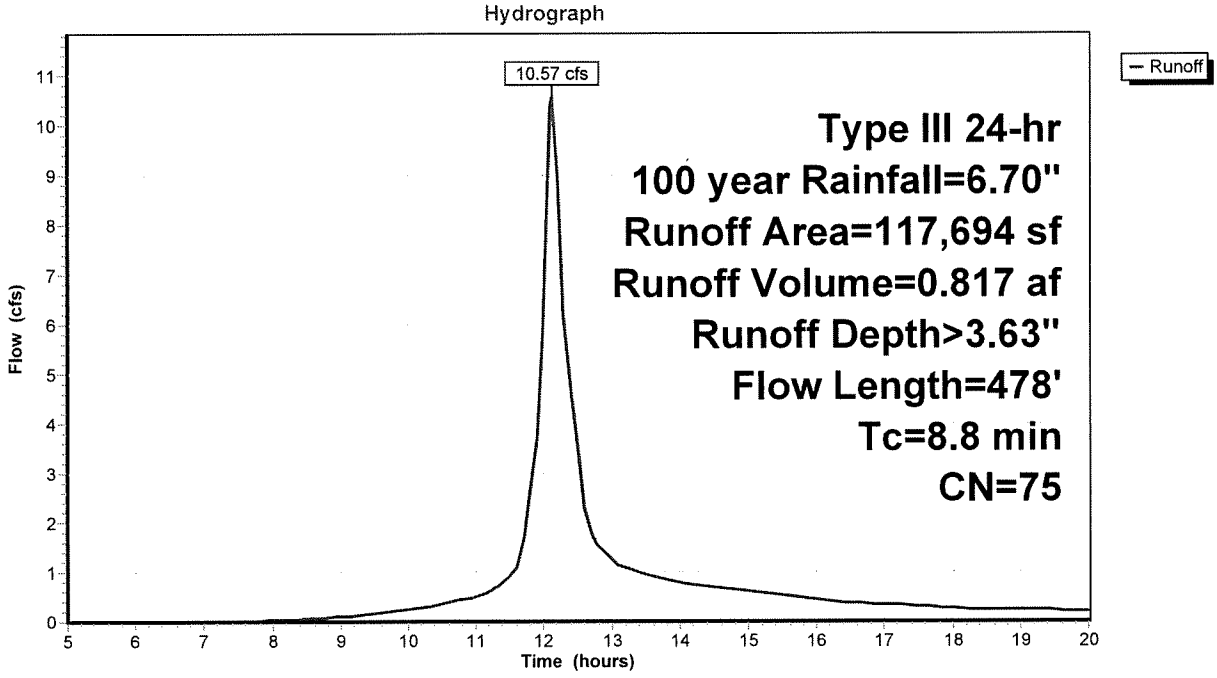
Subcatchment S2: To Abutter Runoff Area=17,106 sf 0.00% Impervious Runoff Depth>1.84"
Flow Length=251' Tc=7.9 min CN=56 Runoff=0.77 cfs 0.060 af

Reach R1: Total Inflow=9.23 cfs 0.685 af
Outflow=9.23 cfs 0.685 af

Pond 1P: Detention Basin Peak Elev=84.70' Storage=8,670 cf Inflow=10.57 cfs 0.817 af
Discarded=0.20 cfs 0.079 af Primary=8.61 cfs 0.625 af Outflow=8.81 cfs 0.703 af

Total Runoff Area = 3.095 ac Runoff Volume = 0.877 af Average Runoff Depth = 3.40"
75.39% Pervious = 2.333 ac 24.61% Impervious = 0.762 ac

Subcatchment S1: To Infiltration

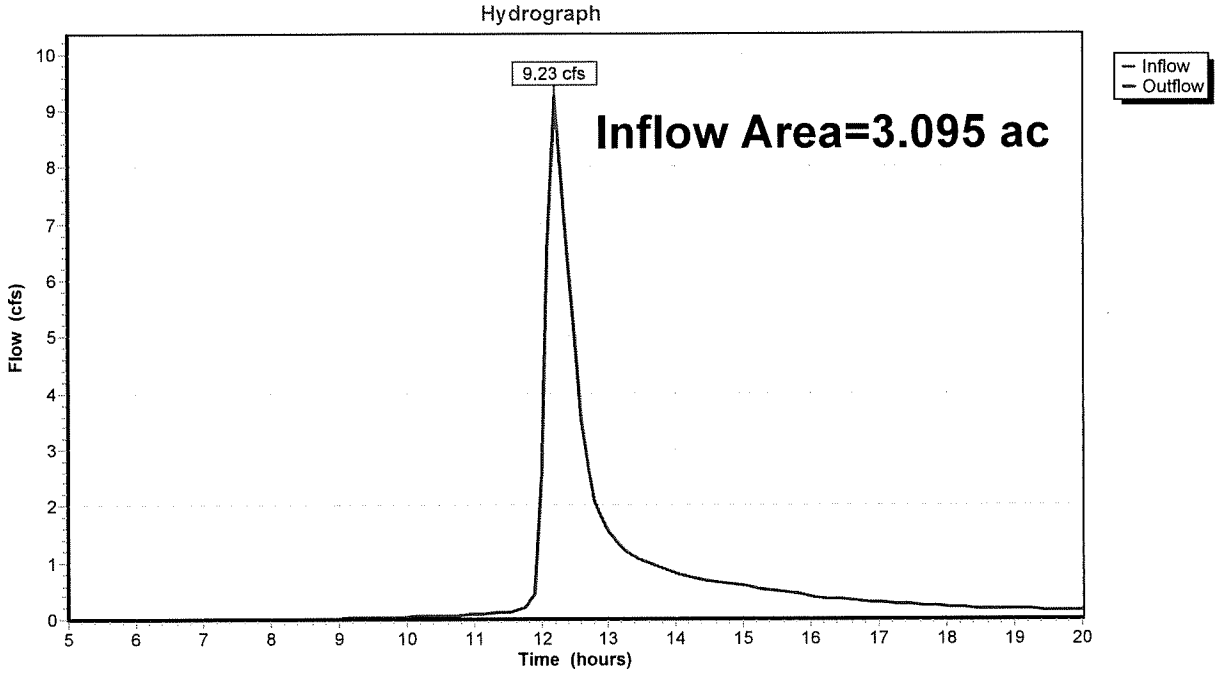


Summary for Reach R1: Total

Inflow Area = 3.095 ac, 24.61% Impervious, Inflow Depth > 2.66" for 100 year event
Inflow = 9.23 cfs @ 12.22 hrs, Volume= 0.685 af
Outflow = 9.23 cfs @ 12.22 hrs, Volume= 0.685 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.10 hrs

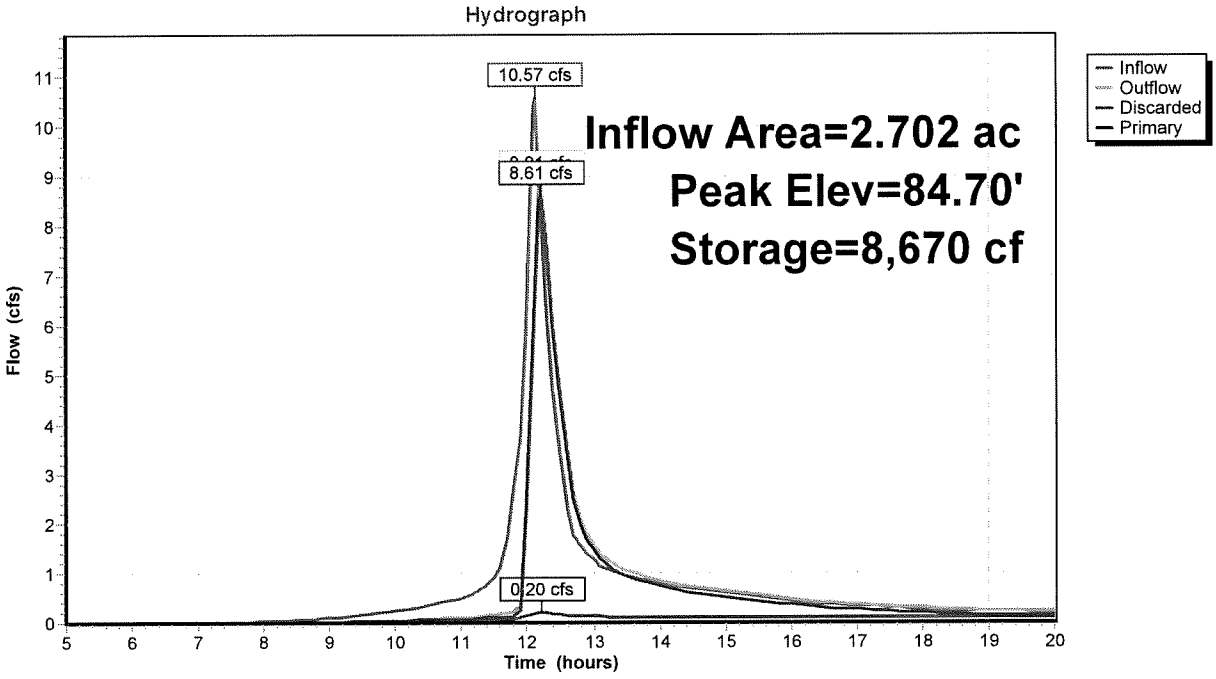
Reach R1: Total



Discarded OutFlow Max=0.19 cfs @ 12.22 hrs HW=84.66' (Free Discharge)
└**6=Exfiltration** (Controls 0.19 cfs)

Primary OutFlow Max=8.27 cfs @ 12.22 hrs HW=84.66' (Free Discharge)
├**1=Orifice/Grate** (Orifice Controls 0.05 cfs @ 9.18 fps)
├**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 8.52 fps)
├**3=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.81 fps)
├**4=Orifice/Grate** (Orifice Controls 0.04 cfs @ 7.03 fps)
├**5=Orifice/Grate** (Orifice Controls 1.02 cfs @ 5.19 fps)
├**7=Broad-Crested Rectangular Weir** (Weir Controls 7.08 cfs @ 3.58 fps)
├**8=Orifice/Grate** (Controls 0.00 cfs)
└**9=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



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

57 Mendon St., Bellingham

July 19, 2017

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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.

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: Apr 8, 2011—Apr 9, 2011

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.

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.

Walpole

Percent of map unit: 10 percent
Landform: Terraces
Hydric soil rating: Yes

Whitman

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

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

Map Unit Setting

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

Map Unit Composition

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

Description of Whitman, Extremely Stony

Setting

Landform: Depressions, drumlins, ground moraines, drainageways, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

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

Properties and qualities

Slope: 0 to 3 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

256A—Deerfield loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vktp
Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Deerfield

Setting

Landform: Outwash plains
Landform position (two-dimensional): Footslope
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: loamy sand
H2 - 9 to 19 inches: loamy sand
H3 - 19 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
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 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Hydric soil rating: No

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

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

Minor Components

Scituate, extremely stony
Percent of map unit: 6 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Footslope, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony
Percent of map unit: 6 percent
Landform: Ground moraines, ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Montauk, extremely stony
Percent of map unit: 4 percent
Landform: Drumlins, ground moraines, recessionial moraines, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea
Percent of map unit: 4 percent
Landform: Bogs, depressions, kettles, marshes, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Interpretive groups

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

Minor Components

Scituate, extremely stony

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

Montauk, extremely stony

Percent of map unit: 5 percent
Landform: Drumlins, ground moraines, recessionial moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

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

Hollis, extremely stony

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

422D—Canton fine sandy loam, 15 to 35 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w81j
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches

Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

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

Hollis, extremely stony

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Scituate, extremely stony

Percent of map unit: 4 percent
Landform: Drumlins, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

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

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Custom Soil Resource Report
Map—Hydrologic Soil Group

Map Scale: 1:2,660 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

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

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Norfolk and Suffolk Counties, Massachusetts (MA616)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
30	Raynham silt loam, 0 to 3 percent slopes	C	1.2	3.4%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	1.2	3.4%
256A	Deerfield loamy sand, 0 to 3 percent slopes	A	1.5	4.2%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	0.9	2.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	30.6	86.0%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	B	0.0	0.1%
653	Udorthents, sandy	A	0.1	0.2%
Totals for Area of Interest			**35.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher