

STORMWATER MANAGEMENT REPORT

for

CLUB HOUSE
A.P. 20/2, Lots 2112, 2116 & 2170
Scituate Avenue
Cranston, RI

Applicant:

West Bay LLC
1414 Atwood Avenue
Johnston, RI

Prepared By:

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GAI Job No. 6856.00

October 18, 2022



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I. INTRODUCTION

This narrative has been prepared to outline site conditions associated with a proposed commercial development. The “Site” consists of developed parcels along Scituate Avenue (Route 12), noted as Lots 2112, 2116 and 2170 of the City of Cranston Tax Assessor’s Map 20/2. Proposed development activities include the renovation of an existing 5,480 s.f. residential home into a commercial club house building with adjacent swimming pool area, along with associated parking, landscaping, and utilities.

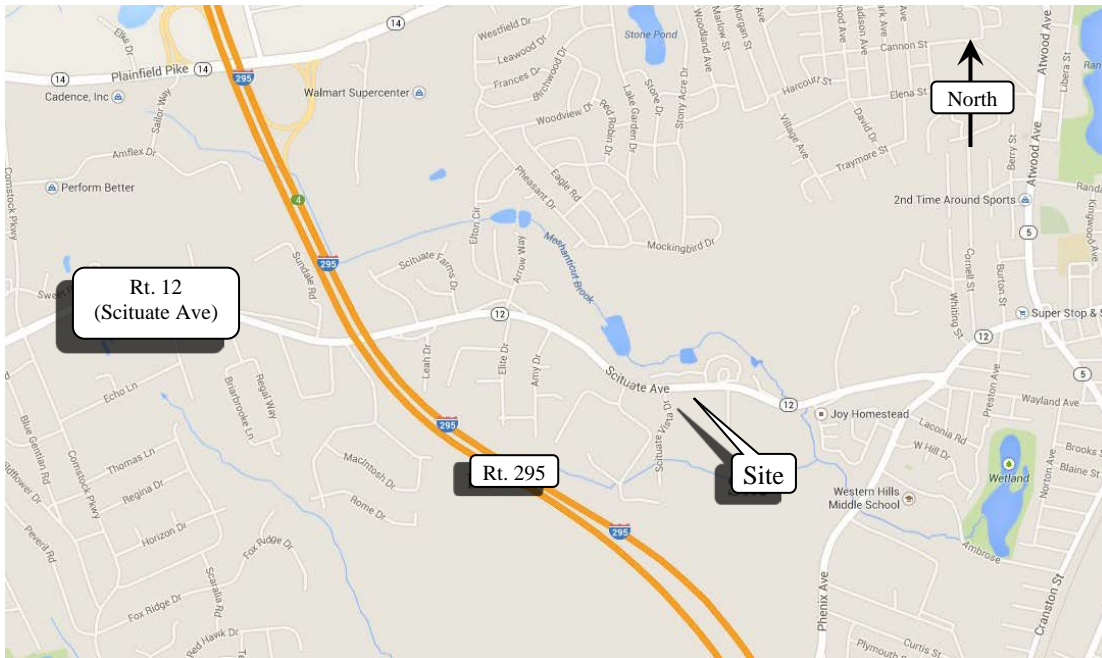


Figure 1. Locus Map



I. EXISTING CONDITIONS

2.1 Site Characteristics

The total project area within the subject lots (Lots 2112, 2116 & 2170) is approximately 0.79 acres. The site is bordered by existing multi-family developments along Scituate Avenue on its southern, eastern, and western boundaries, and by Scituate Avenue to the north.

The site currently has a single-family residential structure. The terrain slopes generally from west to east at a roughly 3% grade, toward Scituate Avenue.



Figure 2. Existing Site

2.2 Soils

According to the Soil Survey for Rhode Island, prepared by the USDA Natural Resource Conservation Service, the soils on the site consist of the following:

Map Unit Symbol	Map Unit Name	Hydrologic Soil Group
EfB	Enfield silt loam, 3-8% slopes	B

Three (3) on-site soil evaluations were conducted on November 2, 2017 by a licensed, Rhode Island, Class IV Soil Evaluator (Steven Henry, RI #D4026). Soils on the northern portion of the site (closest to Scituate Avenue) were found to consist of sandy loam, fine sand, and granular sands, while soils toward the southern portion of the site were found to consist primarily of silt, fine sandy loam, and clay sand. Seasonal high groundwater tables were found to vary from 8’-6” – 10’-0” below existing grade.



The Soil texture is defined as **Sand (SEV #3)** and will provide an infiltration rate of **8.27 in/hr** per RIDEM Stormwater Design and Installation Standards Manual, Table 5-3, Design Infiltration Rates.



Figure 3. Soils

2.3 Wetlands

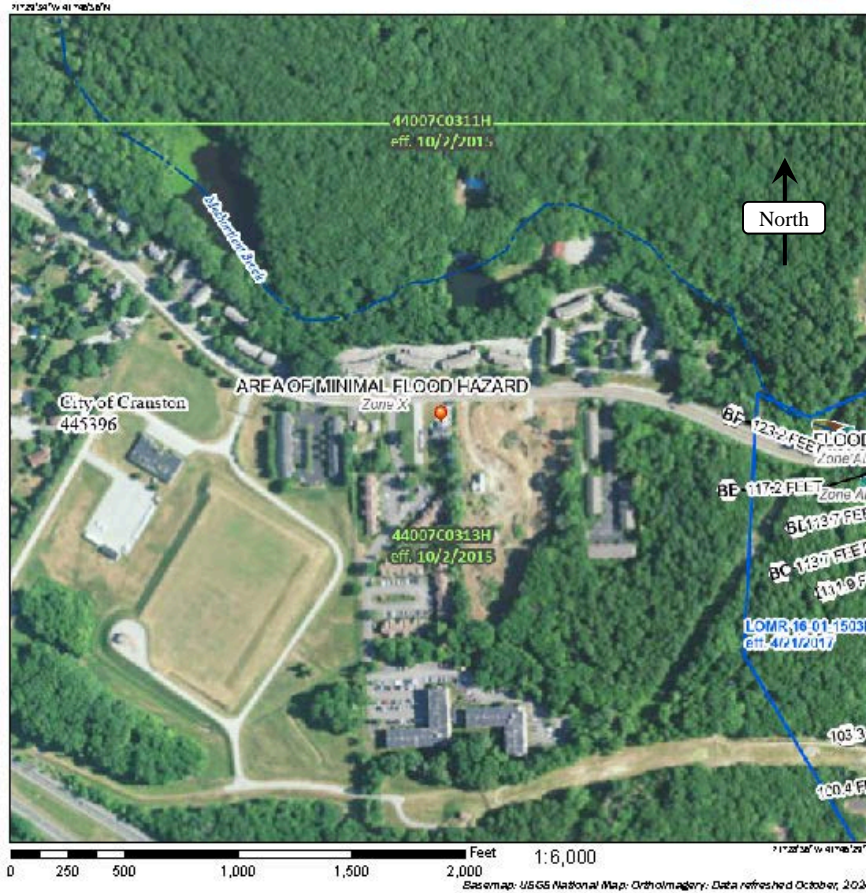
There are no wetlands at the subject site.

2.4 FEMA

The site lies within Zone “X” (defined as area outside of the 0.2% annual chance floodplain) of the National Flood Insurance Rate Maps for Providence County, Map Number 44007C0313H, effective October 2, 2015 (Refer to Appendix E, *Supporting Documentation*).



National Flood Hazard Layer FIRMette



Legend

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

SPECIAL FLOOD HAZARD AREAS

- White: Unknown Base Flood Elevation (BFE) Zone A1, A2
- Light Blue: WNF BFE Depth Zone A1, A2, A3, A4, A5, A6, A7
- Red: Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- Orange: 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile. Zone C
- Dark Orange: Future Conditions 1% Annual Chance Flood Hazard Zone C
- Light Orange: Area with Reduced Flood Risk due to Levee. See Notes, Zone F
- Yellow: Area with Flood Risk due to Levee. Zone D

OTHER AREAS

- Light Green: Area of Minimal Road Hazard Zone F
- Blue: Effective 10 WRFs
- Dark Blue: Area of Unincorporated Road Hazard Zone D

GENERAL STRUCTURES

- Black Dashed: Channel, Culvert, or Storm Sewer
- Black Dotted: Levee, Dam, or Reservoir

OTHER FEATURES

- Black: Cross Sections with 1% Annual Chance
- Green: Water Surface Elevation
- Red: Coastal Tressets
- Blue: Base Flood Elevation Line (BFE)
- Yellow: Lines of Study
- Green: Jurisdiction Boundary
- Black: Coastal Tressets, Boundaries
- Blue: Profile Baseline
- Blue: Hydrographic Feature

MAP PANELS

- Green: Digital Data Available
- Light Green: No Digital Data Available
- Yellow: Unmapped

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

This map complies with FEMA's standards for the use of digital flood maps if it is the only one available below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was captured on 10/15/2022 at 4:08 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the contents of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map coordinate data, community identifiers, FIRM panel numbers, and FIRM effective date. Map images for unmapped and unprocessed areas cannot be used for regulatory purposes.

Figure 4. FEMA Map

2.5 Natural Resource Inventory

According to Rhode Island Department of Environmental Management (RIDEM) Geographic Information System (GIS) mapping, the site is not within a Natural Heritage Area.



III. DRAINAGE ANALYSIS

3.1 Methodology

The project's stormwater management system has been designed to mitigate the impacts of stormwater runoff generated by the proposed site and comply with the development standards and performance criteria of the City of Cranston and the RISDISM using low-impact development (LID) techniques and best management practices (BMP's). The runoff from the proposed development has been reviewed for impact using Scituate Avenue as the design point. A comparative pre-development vs. post-development hydrologic analysis was performed for the 1-, 2-, 10-, 25- and 100-year storm events utilizing HydroCAD software.

3.2 Existing Conditions

The existing conditions analysis for the project includes one (1) sub-watershed area to account for all stormwater flow generated by the existing site.

EWS-1: This existing sub-watershed includes the entirety of the subject site and is approximately 39-percent impervious. Stormwater generally flows north across the site over mild grades toward Scituate Avenue where it is collected by the closed drainage system within the roadway.

3.3 Proposed Conditions

The project will maintain existing drainage patterns while addressing the requirements of the RISDISM. Specifically, the developed site will address water quality treatment and peak flow attenuation by directing stormwater flow into a surface infiltration basin BMP. The proposed site conditions have been analyzed using two (2) sub-watersheds for a complete accounting of stormwater flow leaving the proposed development.

PWS-1A: This sub-watershed includes the clubhouse parking field along with the southern portion of the pool area. This sub-watershed contains approximately 48-percent impervious surface coverage under proposed conditions and will be collected and treated for water quality within the proposed infiltration basin south of the clubhouse parking field (BMP-1).

PWS-1B: This sub-watershed is approximately 16-percent impervious, and includes the clubhouse, the northern half of the proposed pool area and landscaping areas north of the



clubhouse. Stormwater from this area sheet flows north over mild to moderate grades and into the Scituate Avenue closed drainage system.

3.4 Runoff Summary

The following is a comparison summary of the peak discharge rates and total discharge volumes for the existing and proposed site. Runoff rates from the property toward the Scituate Avenue design Point (Design Point 1) have been reduced during the 1-, 2-, 10-, 25- and 100-year storm events. See *Appendix A Checklist: Table 5-1 'Hydraulic Analysis Summary'* (Appendix D).

		Peak Discharge Rate (cfs)				
		1 yr	2 yr	10 yr	25 yr	100 yr
Design Point 1						
	Existing Runoff	0.60	0.96	2.06	2.96	4.99
	Proposed Runoff	0.53	0.79	1.54	2.12	3.42
	ΔQ	-0.07	-0.17	-0.52	-0.84	-1.57
		Total Discharge Volume (ac-ft)				
		1 yr	2 yr	10 yr	25 yr	100 yr
Design Point 1						
	Existing Runoff	0.047	0.072	0.150	0.214	0.364
	Proposed Runoff	0.027	0.058	0.111	0.155	0.253
	ΔQ	-0.020	-0.014	-0.039	-0.059	-0.111

Table 1. Watershed Runoff Summary

3.5 Water Quality

The design proposes a surface infiltration basin (BMP-1) to meet the water quality treatment requirements of the development standard. BMP-1 has been designed to receive stormwater flow generated by the proposed parking field and southern portion of the clubhouse pool area. Further this stormwater management practice has been selected to provide the required pollutant removal capabilities necessary to address the impairments of The Meshanticut Brook, which is documented on the 303(d) list as being impaired for Enterococcus. See Appendix C for HydroCAD analysis and Appendix E for the RIDEM Water Quality Volume Calculation Worksheet.



3.6 Pre-treatment

Pre-treatment for the lined surface sand filter is provided within a sediment forebay.

<u>Proposed Subwatershed</u>	<u>Pre-Treatment Required</u>	<u>Pre-Treatment Provided</u>
PWS-1A	273 CF	308 CF



IV. STORMWATER STANDARDS:

The proposed development has been designed meet all of the minimum standards identified in the Rhode Island Stormwater Design and Installation Standards Manual by incorporating low impact development techniques including maintenance planning and infiltration.

4.1 Standard 1: LID Planning and Design Strategies

LID site planning and design strategies must be used to the maximum extent practicable.

Standard Met

LID site planning and strategies have been employed to the maximum extent possible. Proposed drainage patterns will closely emulate those of existing conditions, including reduction of pre-development peak runoff rates and volumes.

4.2 Standard 2: Groundwater Recharge

Stormwater must be recharged within the same sub-watershed to maintain base flow at pre-development recharge levels to the maximum extent practicable.

Standard Met – Recharge will be provided on-site through the proposed infiltration basin (BMP-1). The project has a soil recharge factor of 0.35 (Hydrologic Soil Group ‘B’)

Design Point 1

Impervious Coverage:	13,068 SF (Total Proposed Site Coverage)
Required Recharge Volume:	$(13,068 \text{ SF} \times 0.35 / 12 \text{ in./ft}) = 382 \text{ CF}$
BMP-1 Provided Recharge:	6,626 CF > 382 CF

(See Appendix C for groundwater recharge volumes provided within BMP-1)

4.3 Standard 3: Water Quality

Stormwater runoff must be treated prior to discharge.

Standard Met – Water quality treatment will be provided on site through the proposed infiltration basin (BMP-1).

Design Point 1

Required Treatment Area:	0.30 Acres
Required Water Quality Treatment Volume:	$(13,068 \text{ SF} / 12 \text{ in./ft}) = 1,089 \text{ CF}$
BMP-1 Provided Water Quality Volume:	6,626 CF > 1,089 CF



(See Appendix E for RIDEM Water Quality Volume Calculation Worksheet)

4.4 Standard 4: Conveyance and Natural Channel Protection

This standard is designed to prevent erosive flow within natural channels and drainage ways.

Standard is not applicable – ‘The CPv criterion can be waived for small facilities with impervious cover less than or equal to 1-acre’, (RISDISM, Section 3.3.4).

4.5 Standard 5: Overbank Flood Protection

Downstream overbank flood protection must be provided by attenuating the post development peak discharge rate to the pre-development levels for the 10-year and 100-year, Type III design storm events

Standard Met – Post-development peak discharge rates have been mitigated within the proposed surface infiltration basin (BMP-1) and brought below pre-development levels during the 10-year and 100-year Type III storm events (see Table-1 Watershed Runoff Summary).

4.6 Standard 6: Redevelopment and Infill Projects

For redevelopment sites with 40% or more existing impervious surface coverage and infill sites, only Standards 2, 3, and 7-11 must be addressed.

Standard Not Met – Total existing impervious surface coverage is < 40% of the site size.

(See Appendix E)

4.7 Standard 7: Pollution Prevention

All development sites require the use of source control and pollution prevention measures to minimize the impact that the land use may have on stormwater runoff quality.

Standard Met – A Soil Erosion and Sediment Control (SESC) Plan has been prepared for the project and stormwater measures are proposed that comply with the Standard.

4.8 Standard 8: Land Uses with Higher Potential Pollutant Loads

Stormwater discharges from land uses with higher potential pollutant loads (LUHPPLs) require the use of specific source control and pollution prevention measures and the specific stormwater BMPs approved for such use.



Standard is not applicable – No LUHPPLs on site.

4.9 Standard 9: Illicit Discharges

All illicit discharges to stormwater management systems are prohibited, including discharges from OWTS, sub-drains and French drains near any OWTS that does not meet the State’s OWTS Rules.

Standard Met – There are no known illicit discharges at the site and none are proposed as part of this project.

4.10 Standard 10: Construction and Erosion Sedimentation Control

Erosion and sedimentation control practices must be utilized during the construction phase as well as during any land disturbing activities

Standard Met - Soil Erosion and Sediment Control Practices will be employed to avoid and minimize impacts to the existing stormwater systems. Detailed notes are included in the plans as well as within an Erosion and Sediment Control Report to ensure effective implementation of erosion and sedimentation controls.

4.11 Standard 11: Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, must have an operation and maintenance plan to ensure that it continues to function as designed.

Standard Met - A long-term Stormwater Operation and Maintenance Plan has been prepared for the development in accordance with the Manual, and is provided as a separate document.



V. CONCLUSION

This project has been designed to mitigate the water quality impacts and runoff control from the proposed development. Water quality treatment for all proposed development areas is provided in accordance with the development standards of the *State of Rhode Island Stormwater Design and Installation Standards Manual*. Additionally, the proposed infiltration basin (BMP-1) provides the required pollutant removal capabilities necessary to address the impairments of The Meshanticut Brook. Best Management Practices will be employed to control temporary discharges associated with construction activities in accordance with the standards outlined in the *Rhode Island Soil and Erosion Sediment Control Handbook*.



Appendix A Watershed Mapping



**EXISTING AND PROPOSED
WATERSHED
PERMITTING PLANS**
FOR
CHAMPLIN HILLS MEDICAL
SITUATED ON
A.P. 20/2, LOTS 2112 & 2116
SCITUATE AVENUE
CRANSTON, RI
PREPARED FOR
WEST BAY, LLC.

NO.	REVISION	BY	DATE

GAROFALO
GAROFALO & ASSOCIATES, INC.
CIVIL & STRUCTURAL ENGINEERS/SURVEYORS
LAND PLANNERS/ENVIRONMENTAL SCIENTISTS

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consent of this owner or one of its
directors.

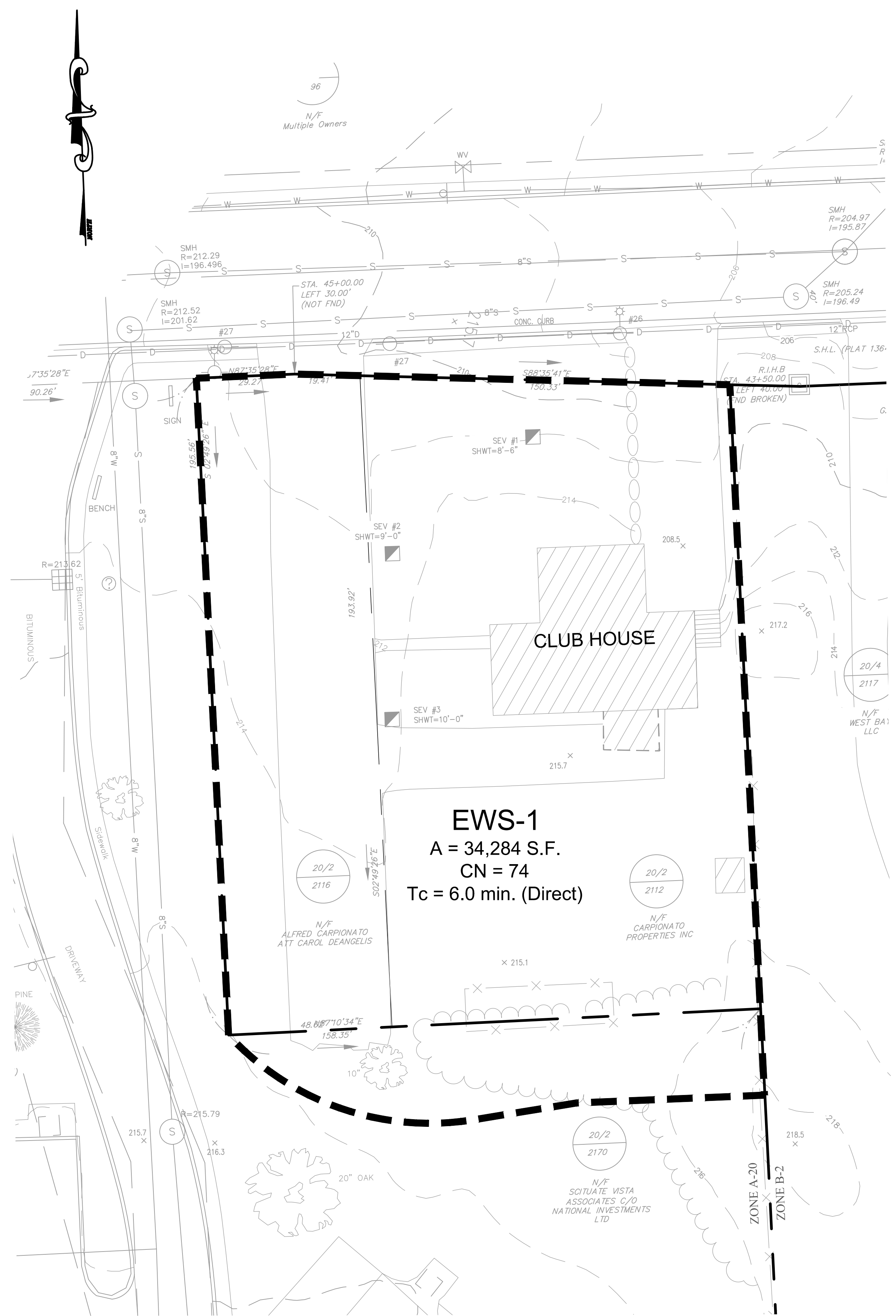
85 CORLISS STREET
P.O. BOX 6145
PROVIDENCE, R.I. 02940
TEL. 401-273-6000

JOB NO. 6856-00	DRAWN BY K.Y.Y.
DWG. NO. 6856-BASE	CHECKED R.J.B.
SCALE: AS SHOWN	APPROVED S.B.G.
DATE: DECEMBER 2017	

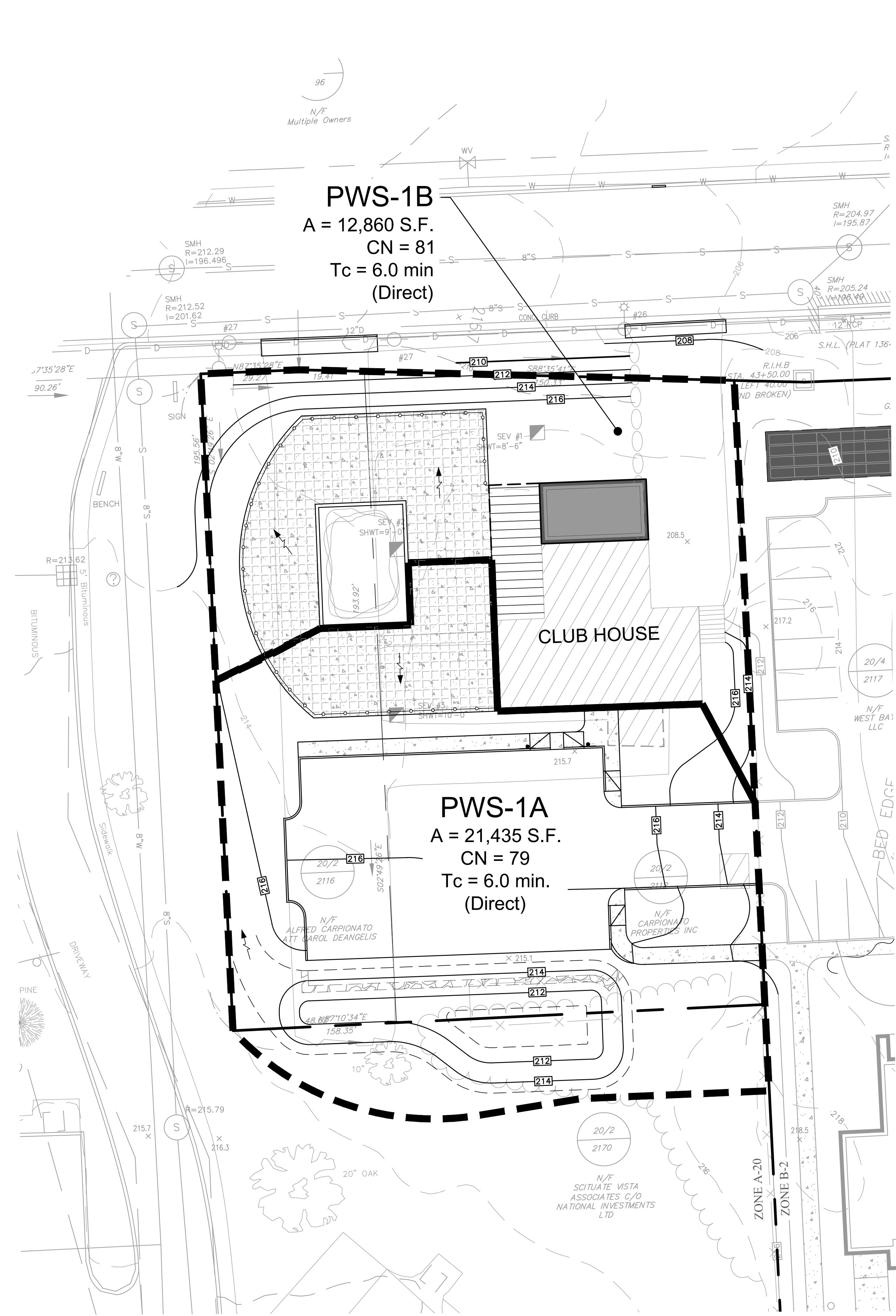
SHEET

WS

1 OF 1 SHEETS



EXISTING WATERSHED

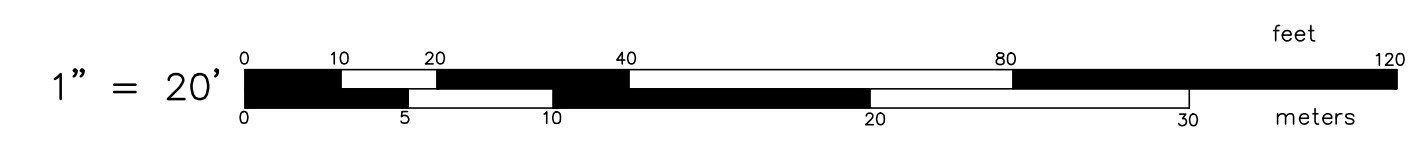


PROPOSED WATERSHED

PWS-1B
A = 12,860 S.F.
CN = 81
Tc = 6.0 min
(Direct)

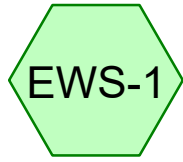
EWS-1
A = 34,284 S.F.
CN = 74
Tc = 6.0 min. (Direct)

PWS-1A
A = 21,435 S.F.
CN = 79
Tc = 6.0 min.
(Direct)

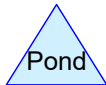
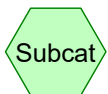


Appendix B
Existing Conditions
HydroCAD Analysis





Scituate Ave



Routing Diagram for 6856-00 Clubhouse HydroCAD Analysis
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6856-00 Clubhouse HydroCAD Analysis

Prepared by Garofalo & Associates, Inc

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Type III 24-hr 1.2-Inch Rainfall=1.20"

Printed 10/18/2022

Page 2

Summary for Subcatchment EWS-1:

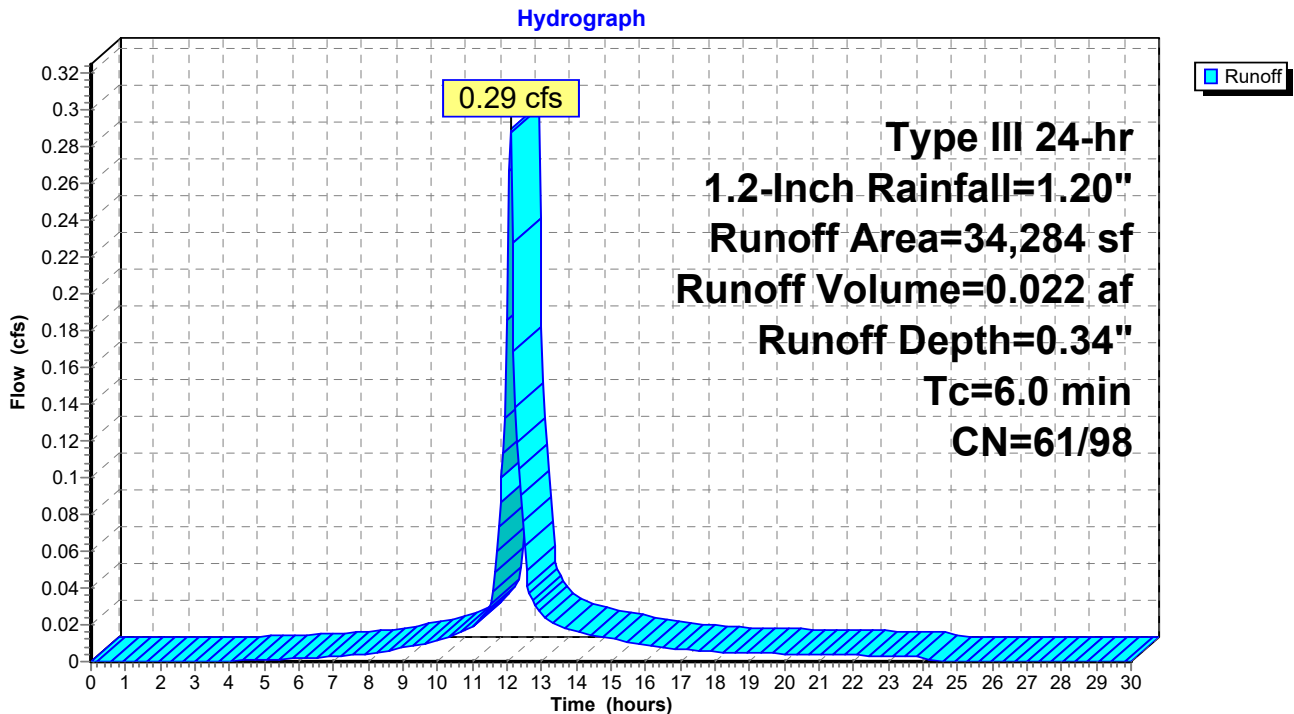
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 0.34"
Routed to Link EX-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1.2-Inch Rainfall=1.20"

Area (sf)	CN	Description
2,468	98	Roofs, HSG B
9,349	98	Paved parking, HSG B
22,467	61	>75% Grass cover, Good, HSG B
34,284	74	Weighted Average
22,467	61	65.53% Pervious Area
11,817	98	34.47% Impervious Area

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

Subcatchment EWS-1:

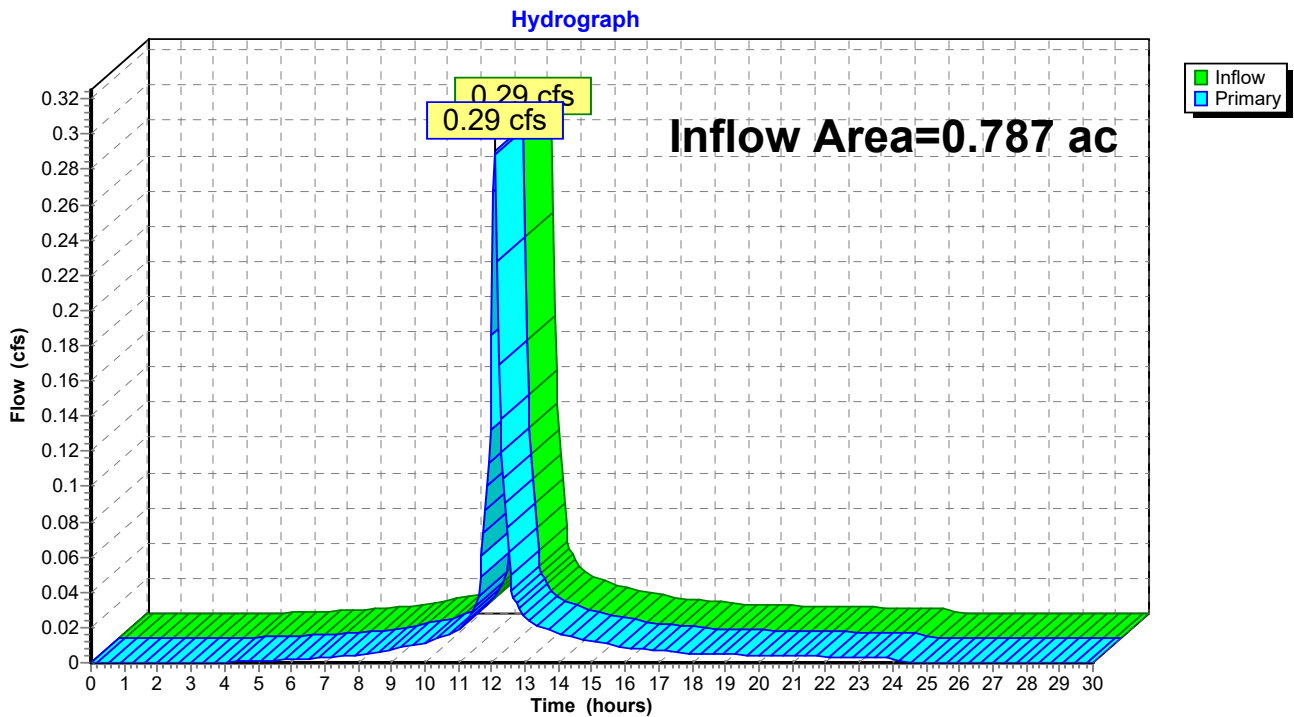


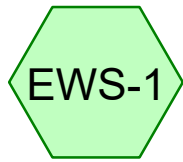
Summary for Link EX-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 34.47% Impervious, Inflow Depth = 0.34" for 1.2-Inch event
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Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

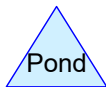
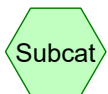
Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link EX-DP-1: Scituate Ave





Scituate Ave



Routing Diagram for 6856-00 Clubhouse HydroCAD Analysis
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6856-00 Clubhouse HydroCAD Analysis

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type III 24-hr		Default	24.00	1	2.70	2
2	2-Year	Type III 24-hr		Default	24.00	1	3.30	2
3	10-Year	Type III 24-hr		Default	24.00	1	4.90	2
4	25-Year	Type III 24-hr		Default	24.00	1	6.10	2
5	100-Year	Type III 24-hr		Default	24.00	1	8.70	2

6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 1-Year Rainfall=2.70"

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Page 3

Summary for Subcatchment EWS-1:

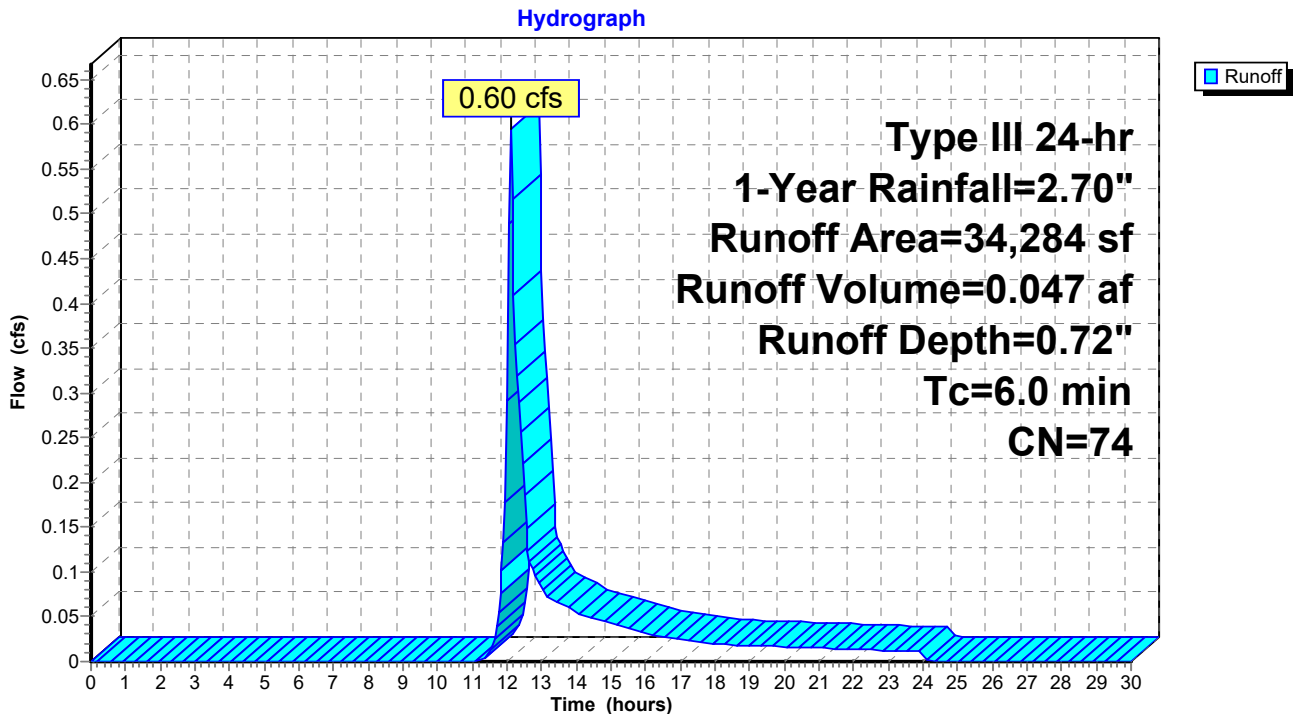
Runoff = 0.60 cfs @ 12.10 hrs, Volume= 0.047 af, Depth= 0.72"
Routed to Link EX-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
2,468	98	Roofs, HSG B
9,349	98	Paved parking, HSG B
22,467	61	>75% Grass cover, Good, HSG B
34,284	74	Weighted Average
22,467	61	65.53% Pervious Area
11,817	98	34.47% Impervious Area

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

Subcatchment EWS-1:



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 1-Year Rainfall=2.70"

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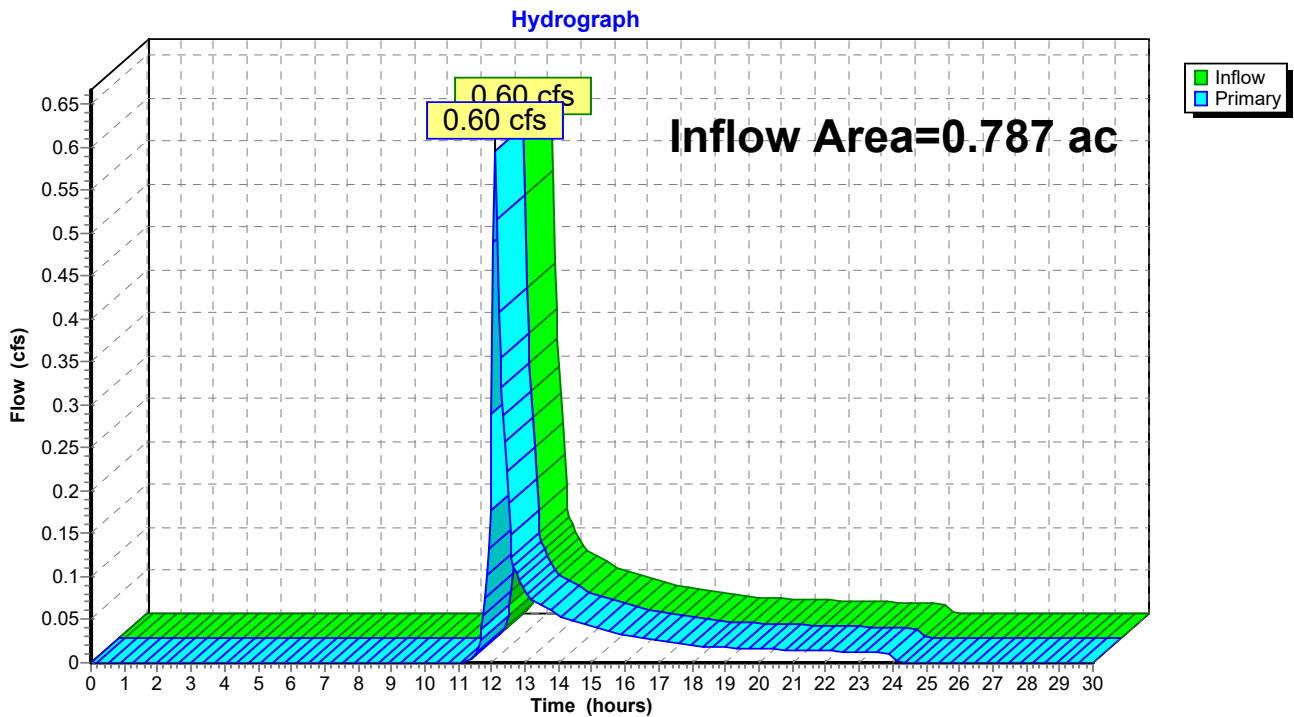
Page 4

Summary for Link EX-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 34.47% Impervious, Inflow Depth = 0.72" for 1-Year event
Inflow = 0.60 cfs @ 12.10 hrs, Volume= 0.047 af
Primary = 0.60 cfs @ 12.10 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link EX-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment EWS-1:

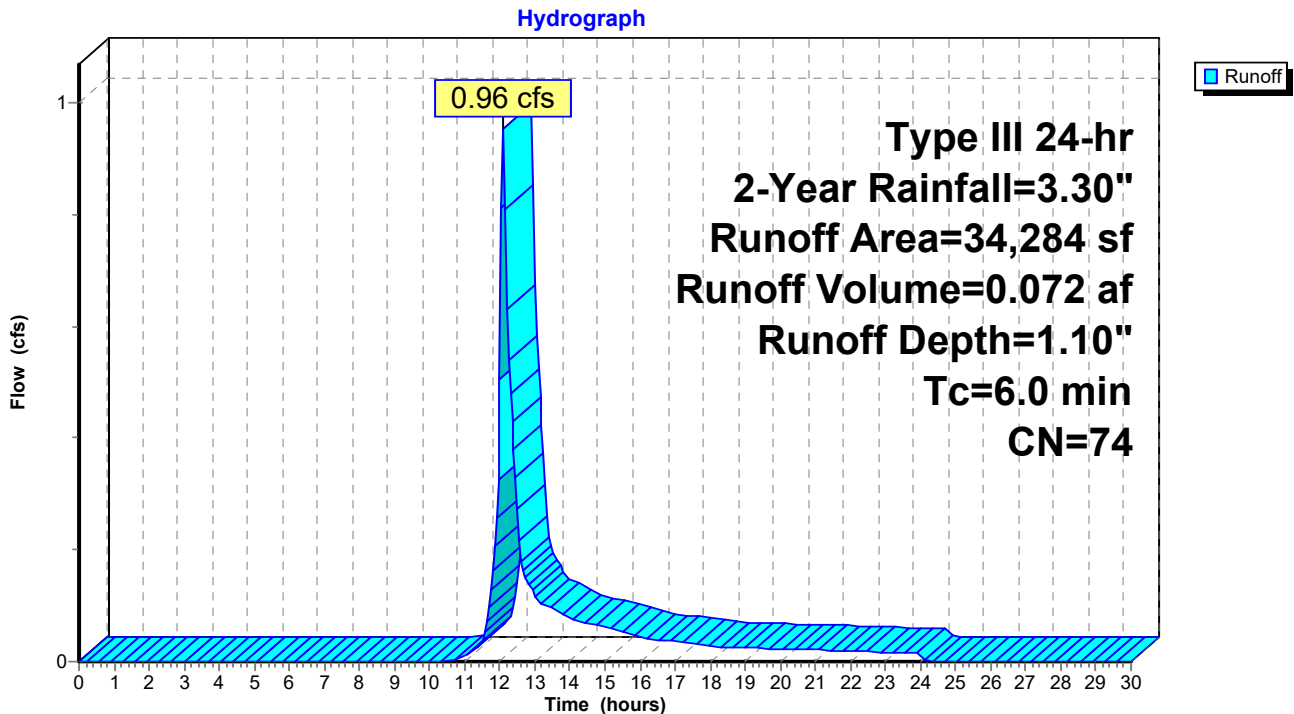
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
2,468	98	Roofs, HSG B
9,349	98	Paved parking, HSG B
22,467	61	>75% Grass cover, Good, HSG B
34,284	74	Weighted Average
22,467	61	65.53% Pervious Area
11,817	98	34.47% Impervious Area

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

Subcatchment EWS-1:

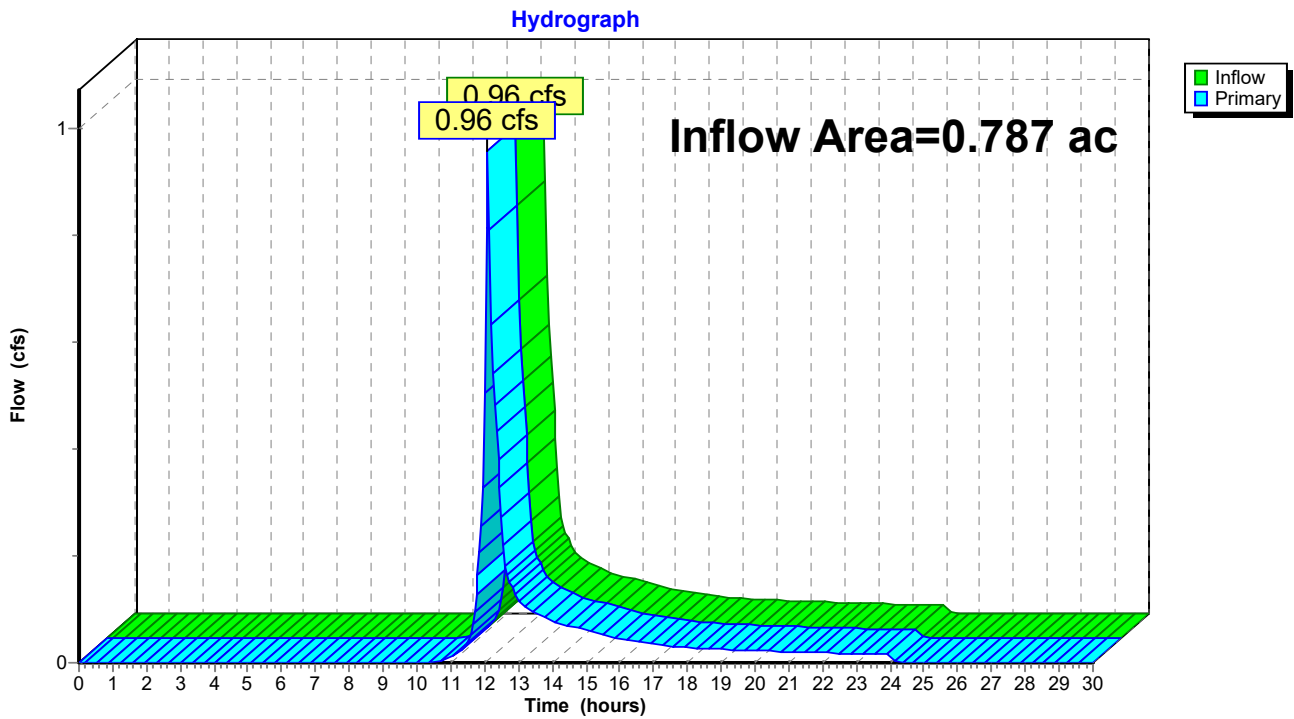


Summary for Link EX-DP-1: Scituate Ave

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Primary = 0.96 cfs @ 12.10 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link EX-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 10-Year Rainfall=4.90"

Prepared by Garofalo & Associates, Inc

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Summary for Subcatchment EWS-1:

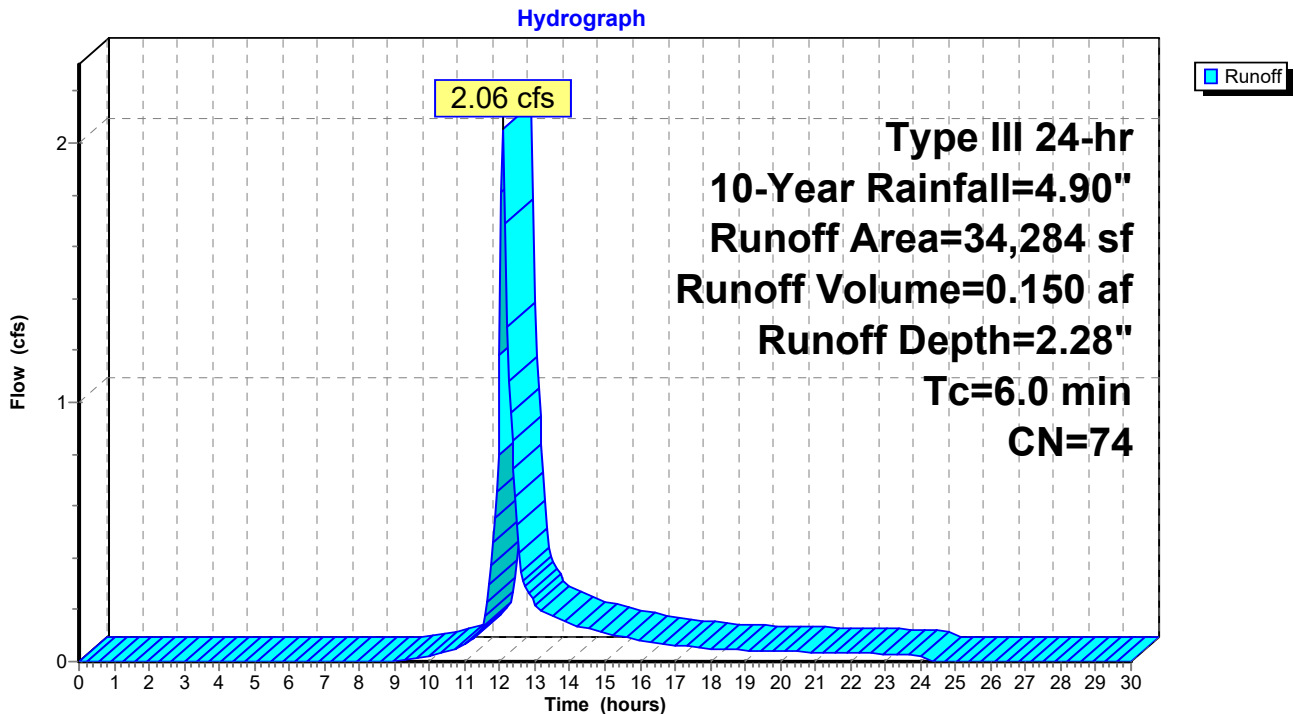
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
2,468	98	Roofs, HSG B
9,349	98	Paved parking, HSG B
22,467	61	>75% Grass cover, Good, HSG B
34,284	74	Weighted Average
22,467	61	65.53% Pervious Area
11,817	98	34.47% Impervious Area

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

Subcatchment EWS-1:

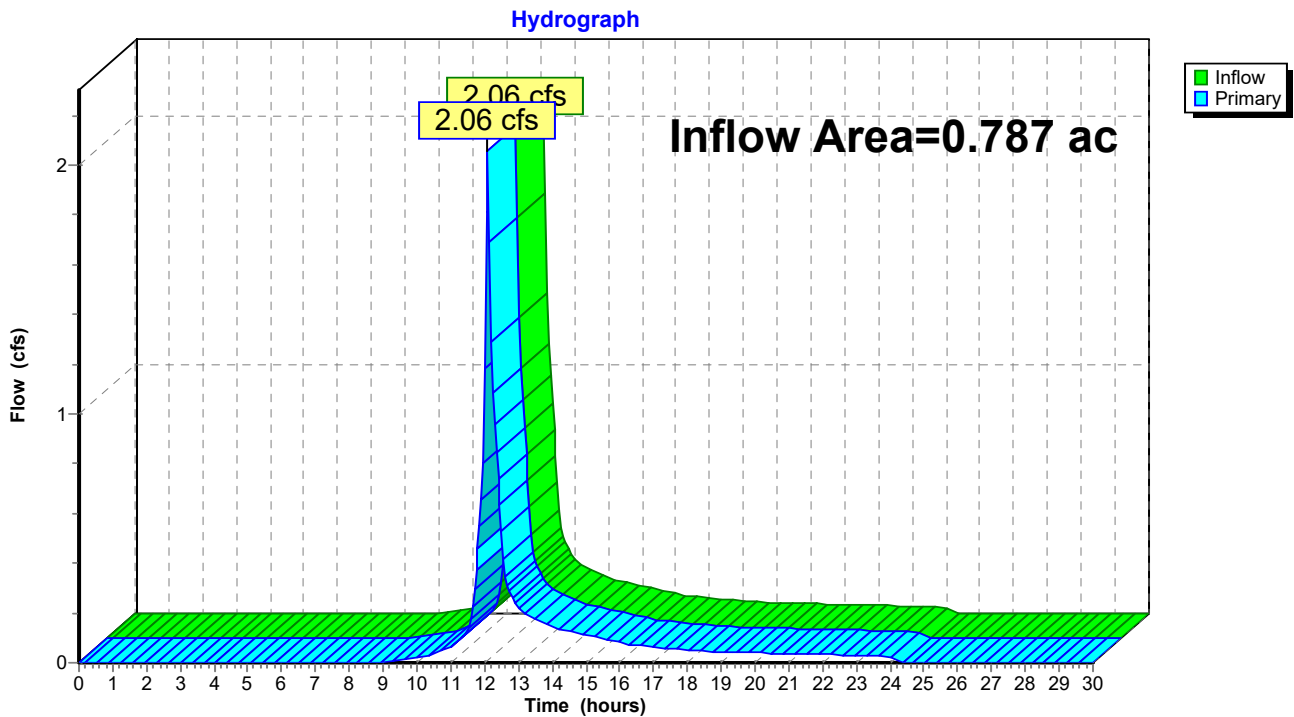


Summary for Link EX-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 34.47% Impervious, Inflow Depth = 2.28" for 10-Year event
Inflow = 2.06 cfs @ 12.10 hrs, Volume= 0.150 af
Primary = 2.06 cfs @ 12.10 hrs, Volume= 0.150 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link EX-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment EWS-1:

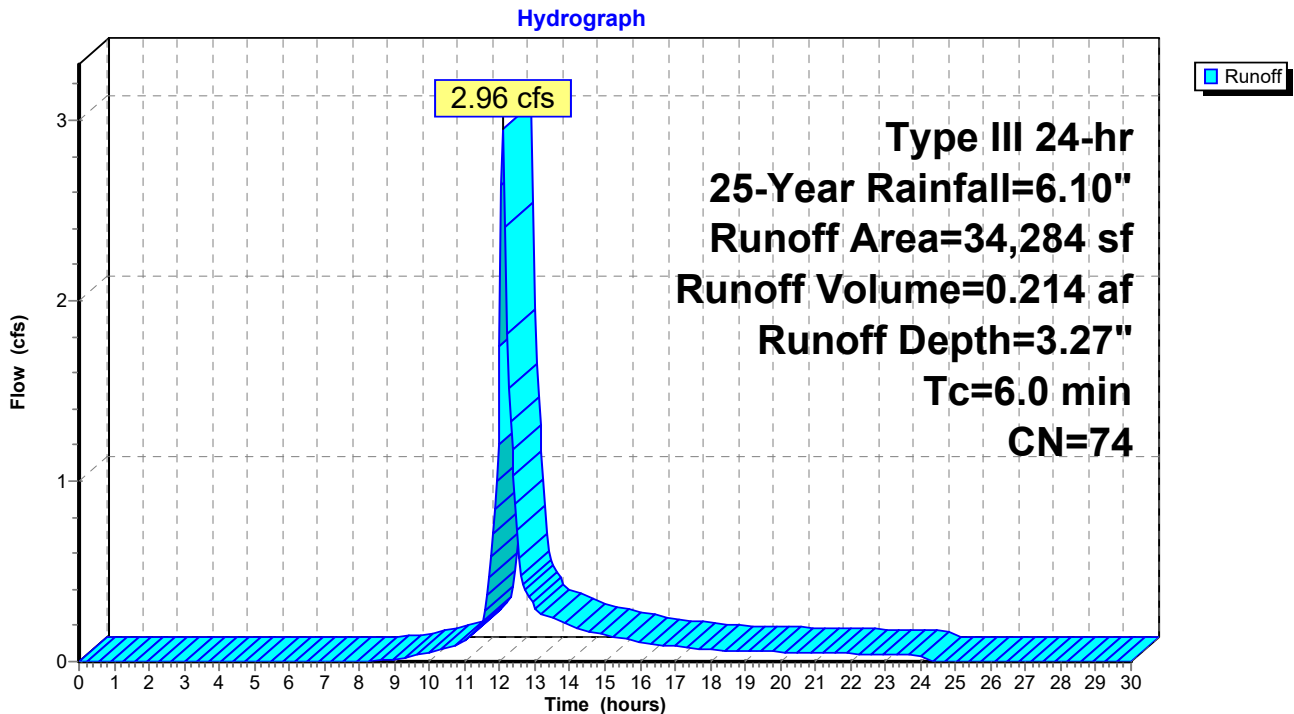
Runoff = 2.96 cfs @ 12.09 hrs, Volume= 0.214 af, Depth= 3.27"
 Routed to Link EX-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
2,468	98	Roofs, HSG B
9,349	98	Paved parking, HSG B
22,467	61	>75% Grass cover, Good, HSG B
34,284	74	Weighted Average
22,467	61	65.53% Pervious Area
11,817	98	34.47% Impervious Area

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

Subcatchment EWS-1:

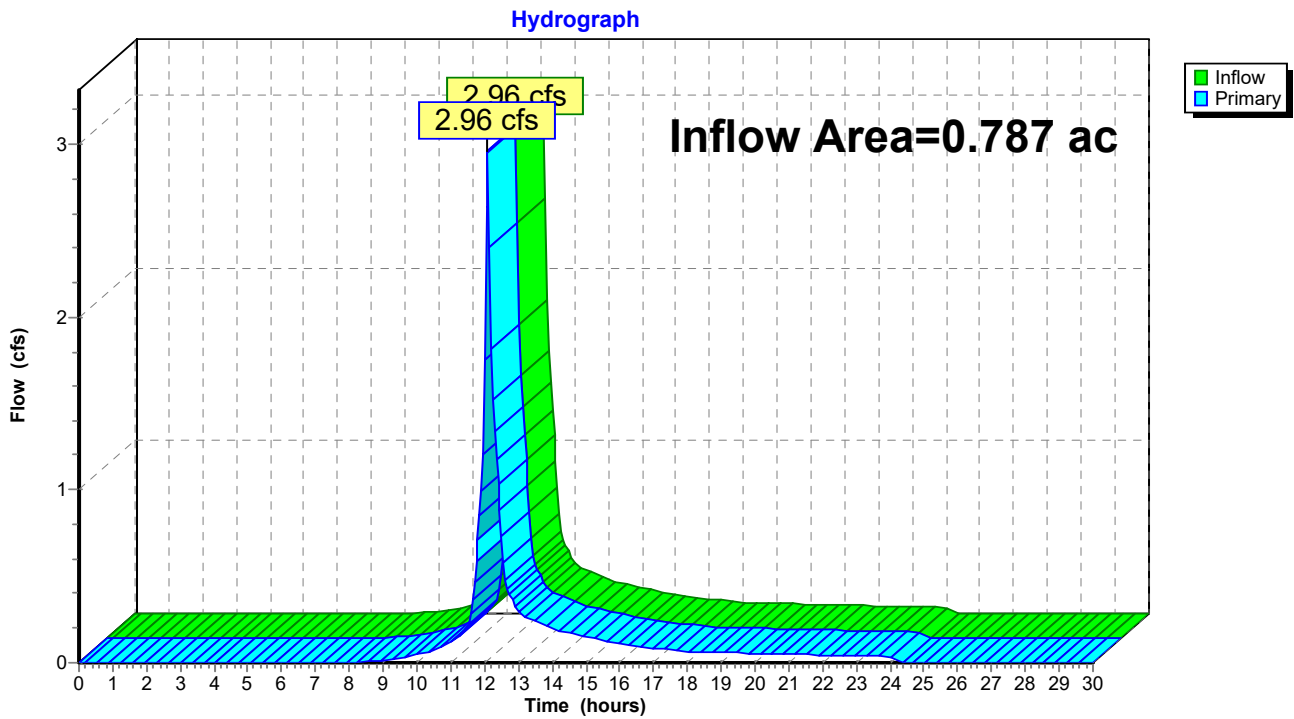


Summary for Link EX-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 34.47% Impervious, Inflow Depth = 3.27" for 25-Year event
Inflow = 2.96 cfs @ 12.09 hrs, Volume= 0.214 af
Primary = 2.96 cfs @ 12.09 hrs, Volume= 0.214 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link EX-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Subcatchment EWS-1:

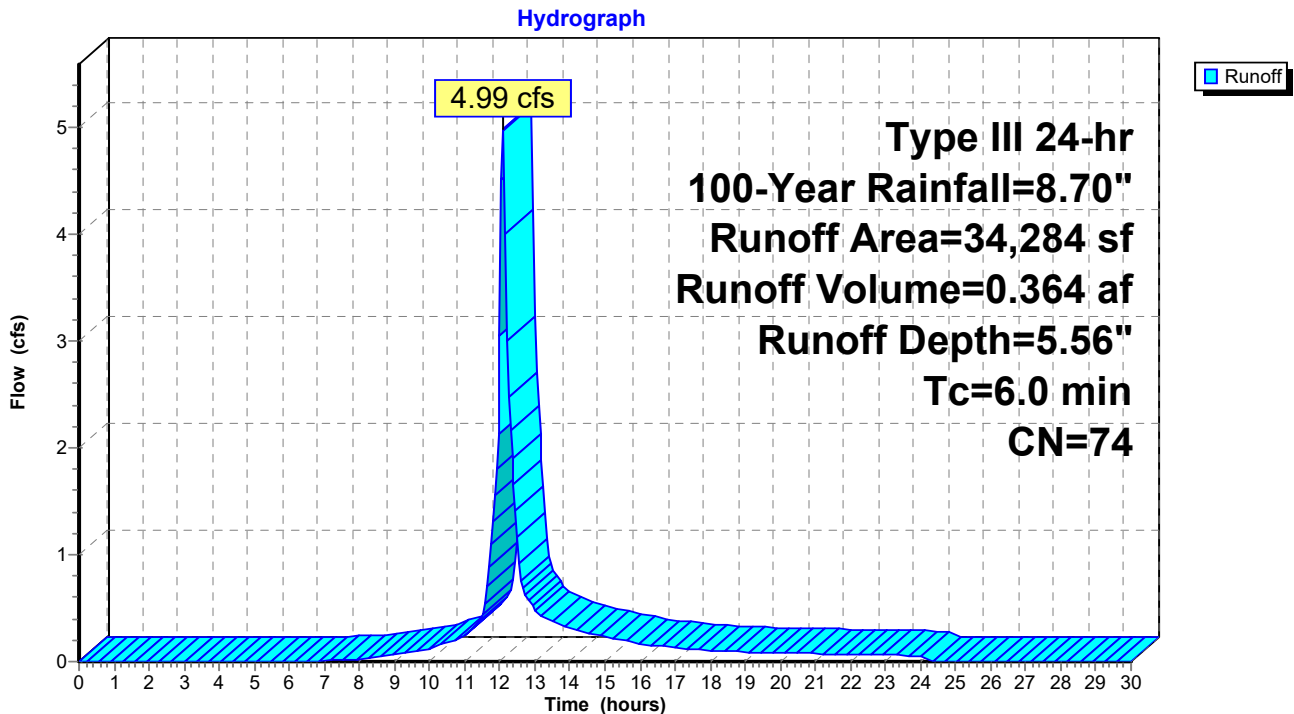
Runoff = 4.99 cfs @ 12.09 hrs, Volume= 0.364 af, Depth= 5.56"
 Routed to Link EX-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
2,468	98	Roofs, HSG B
9,349	98	Paved parking, HSG B
22,467	61	>75% Grass cover, Good, HSG B
34,284	74	Weighted Average
22,467	61	65.53% Pervious Area
11,817	98	34.47% Impervious Area

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

Subcatchment EWS-1:

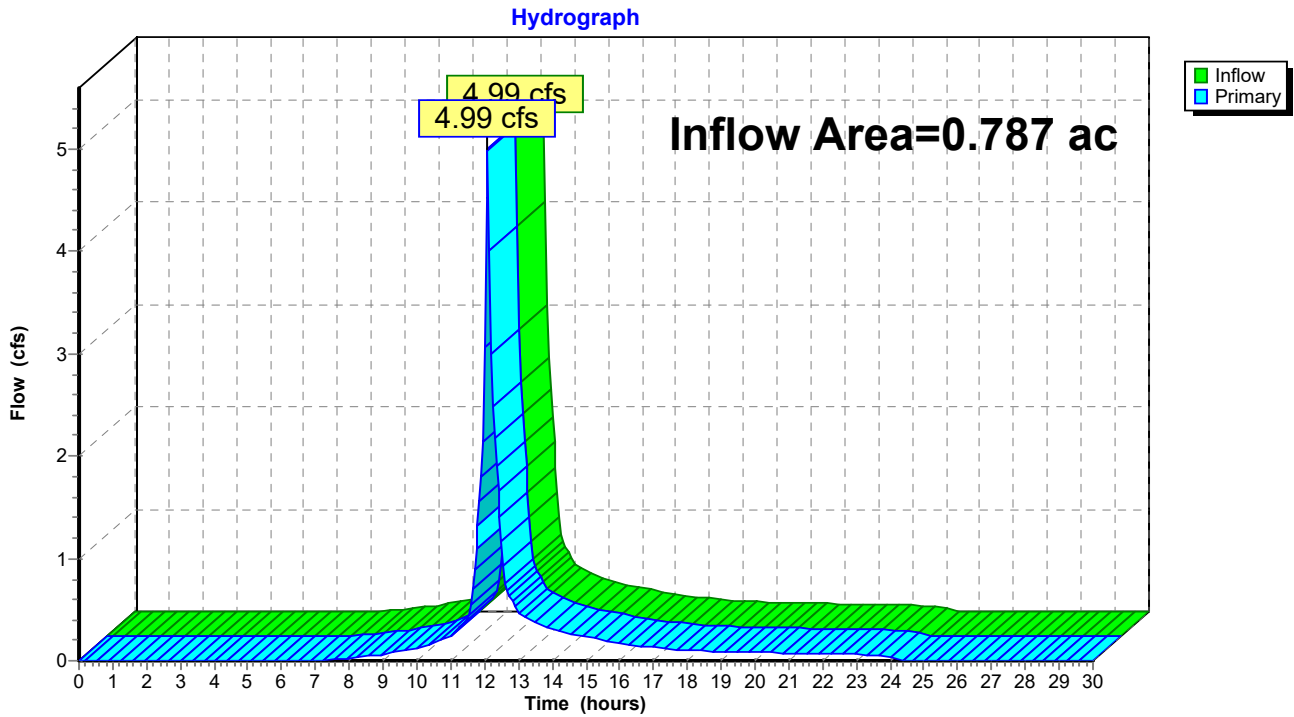


Summary for Link EX-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 34.47% Impervious, Inflow Depth = 5.56" for 100-Year event
Inflow = 4.99 cfs @ 12.09 hrs, Volume= 0.364 af
Primary = 4.99 cfs @ 12.09 hrs, Volume= 0.364 af, Atten= 0%, Lag= 0.0 min

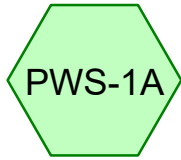
Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link EX-DP-1: Scituate Ave

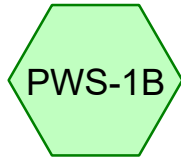


Appendix C
Proposed Conditions
HydroCAD Analysis

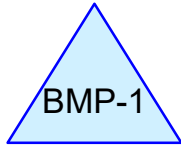




Clubhouse, Pool & Parking



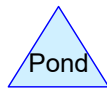
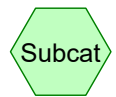
Bypass



Infiltration Basin



Scituate Ave



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6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 1.2-Inch Rainfall=1.20"

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Summary for Subcatchment PWS-1A: Clubhouse, Pool & Parking

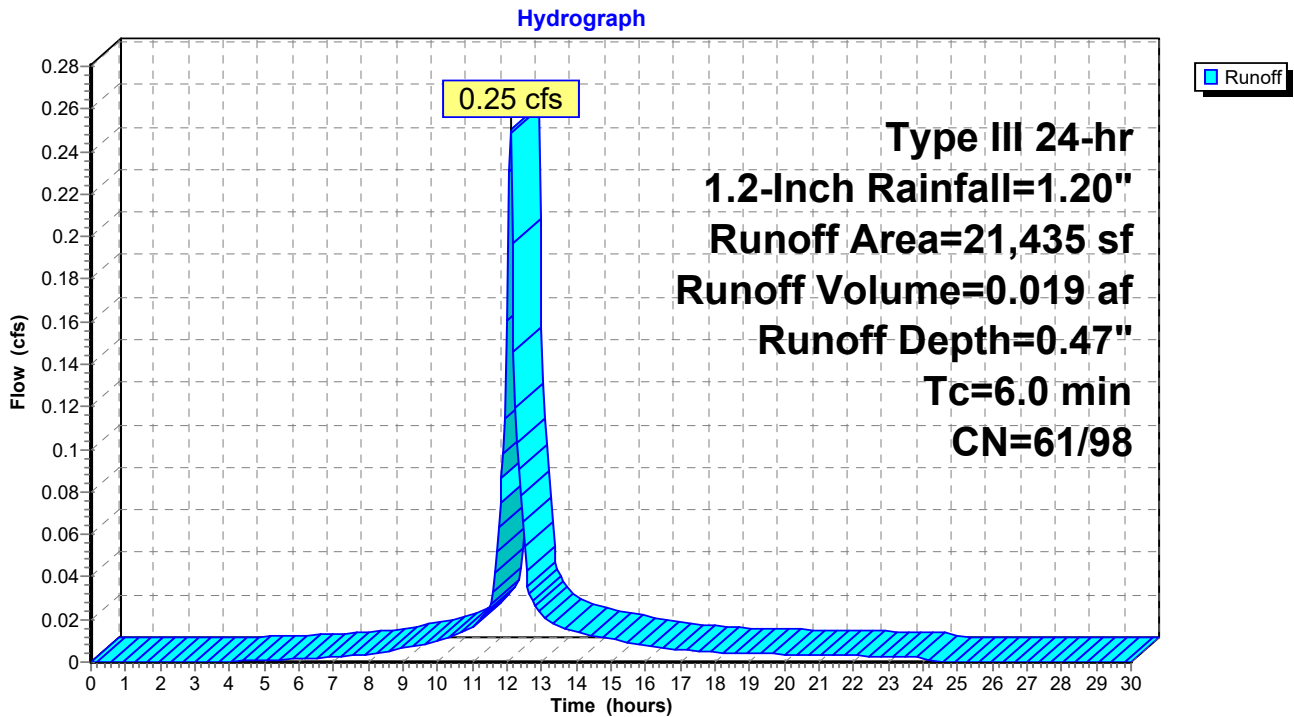
Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 0.47"
 Routed to Pond BMP-1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1.2-Inch Rainfall=1.20"

Area (sf)	CN	Description
10,207	98	Paved parking, HSG B
11,228	61	>75% Grass cover, Good, HSG B
21,435	79	Weighted Average
11,228	61	52.38% Pervious Area
10,207	98	47.62% Impervious Area

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

Subcatchment PWS-1A: Clubhouse, Pool & Parking



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 1.2-Inch Rainfall=1.20"

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Summary for Subcatchment PWS-1B: Bypass

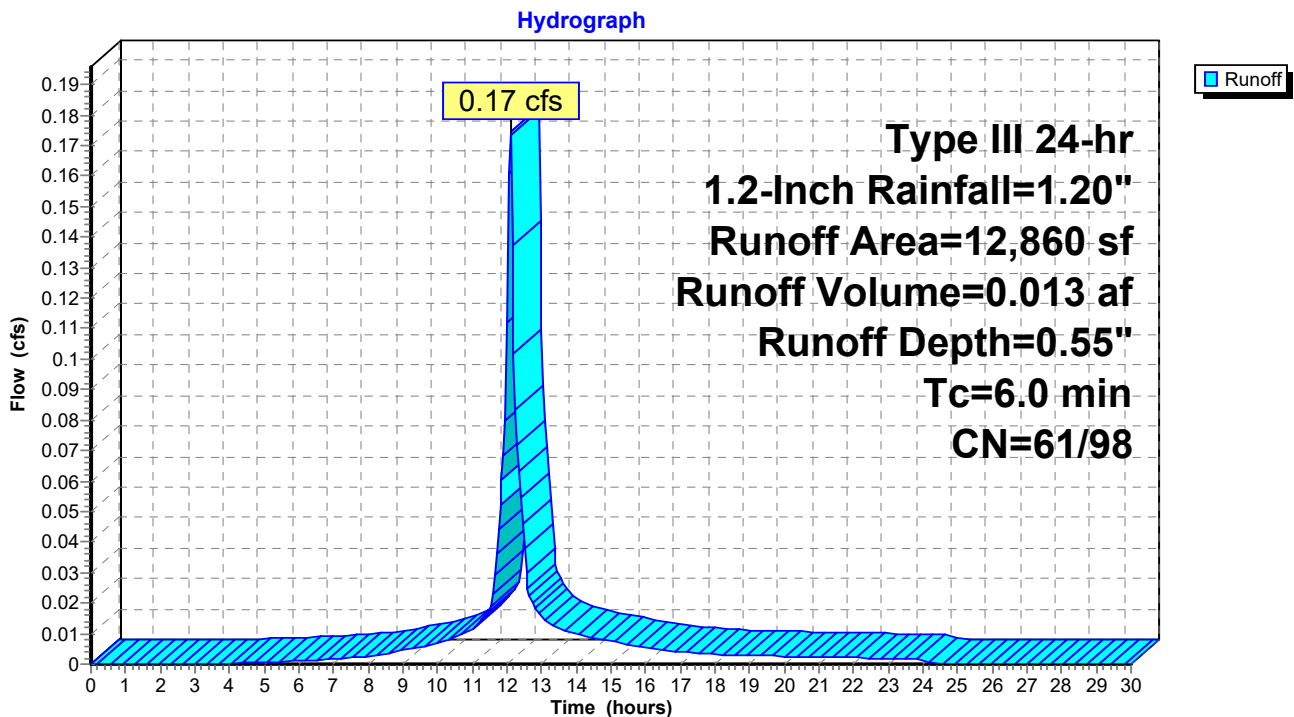
Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 0.55"
 Routed to Link PR-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1.2-Inch Rainfall=1.20"

Area (sf)	CN	Description
3,561	98	Roofs, HSG B
875	98	Water Surface, HSG B
2,682	98	Paved parking, HSG B
5,742	61	>75% Grass cover, Good, HSG B
12,860	81	Weighted Average
5,742	61	44.65% Pervious Area
7,118	98	55.35% Impervious Area

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

Subcatchment PWS-1B: Bypass



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 1.2-Inch Rainfall=1.20"

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Summary for Pond BMP-1: Infiltration Basin

Inflow Area = 0.492 ac, 47.62% Impervious, Inflow Depth = 0.47" for 1.2-Inch event
 Inflow = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af
 Outflow = 0.04 cfs @ 12.57 hrs, Volume= 0.019 af, Atten= 84%, Lag= 28.8 min
 Discarded = 0.04 cfs @ 12.57 hrs, Volume= 0.019 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link PR-DP-1 : Scituate Ave

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 210.96' @ 12.57 hrs Surf.Area= 728 sf Storage= 275 cf

Plug-Flow detention time= 53.5 min calculated for 0.019 af (100% of inflow)
 Center-of-Mass det. time= 53.5 min (835.5 - 782.0)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	308 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
#2	210.50'	7,954 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,261 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	0	0	0
215.00	410	308	308

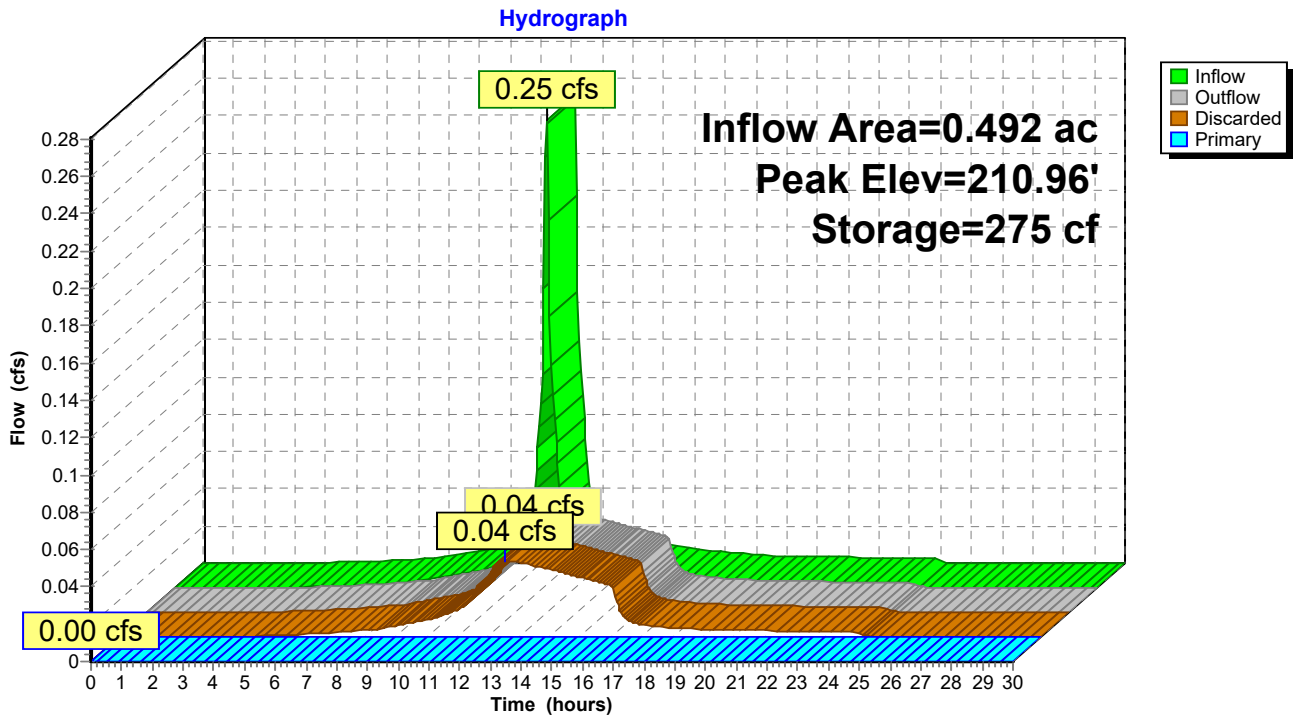
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.50	460	0	0
215.00	3,075	7,954	7,954

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	214.50'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.04 cfs @ 12.57 hrs HW=210.96' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BMP-1: Infiltration Basin



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 1.2-Inch Rainfall=1.20"

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Stage-Area-Storage for Pond BMP-1: Infiltration Basin

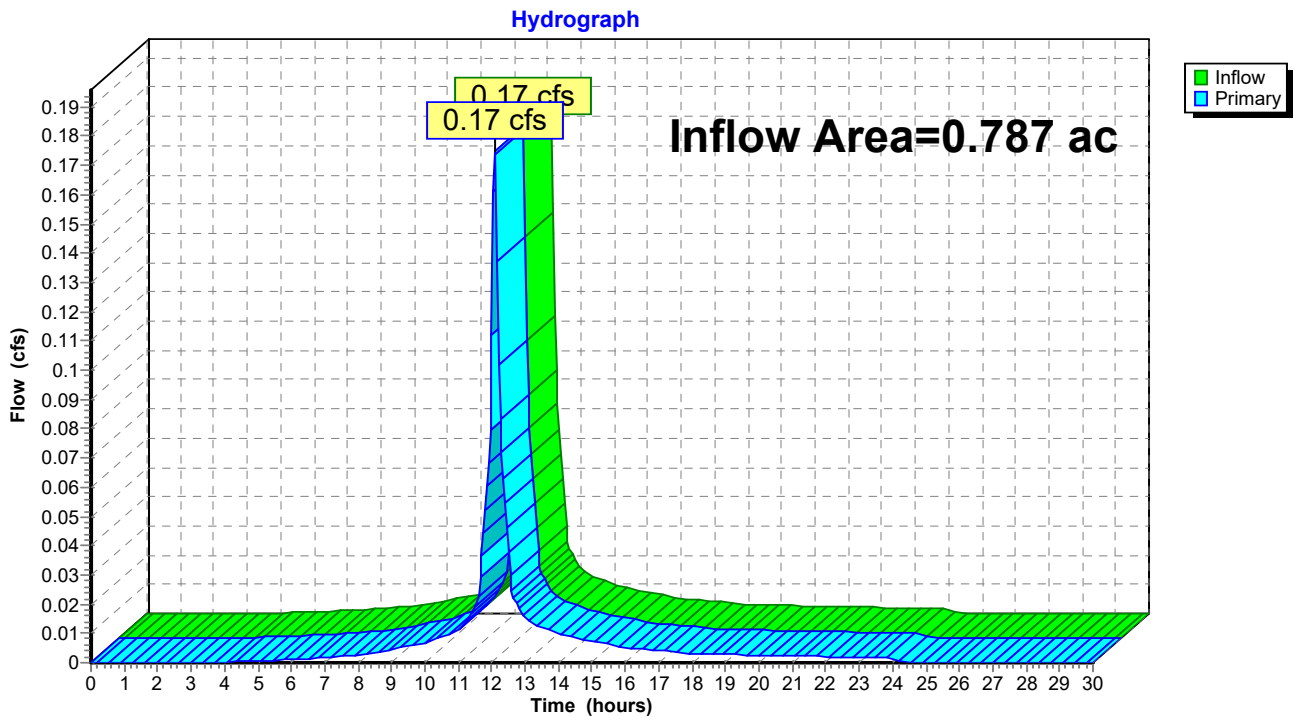
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.50	460	0	213.15	2,000	3,259
210.55	489	24	213.20	2,029	3,360
210.60	518	49	213.25	2,058	3,462
210.65	547	76	213.30	2,087	3,566
210.70	576	104	213.35	2,116	3,671
210.75	605	133	213.40	2,145	3,778
210.80	634	164	213.45	2,174	3,886
210.85	663	197	213.50	2,203	3,995
210.90	692	230	213.55	2,232	4,106
210.95	721	266	213.60	2,261	4,220
211.00	751	303	213.65	2,291	4,335
211.05	780	341	213.70	2,320	4,453
211.10	809	381	213.75	2,349	4,573
211.15	838	422	213.80	2,378	4,694
211.20	867	464	213.85	2,407	4,819
211.25	896	508	213.90	2,436	4,945
211.30	925	554	213.95	2,465	5,073
211.35	954	601	214.00	2,494	5,203
211.40	983	649	214.05	2,523	5,336
211.45	1,012	699	214.10	2,552	5,471
211.50	1,041	751	214.15	2,581	5,608
211.55	1,070	803	214.20	2,610	5,747
211.60	1,099	858	214.25	2,639	5,888
211.65	1,128	913	214.30	2,668	6,031
211.70	1,157	970	214.35	2,697	6,177
211.75	1,186	1,029	214.40	2,726	6,324
211.80	1,215	1,089	214.45	2,755	6,474
211.85	1,244	1,151	214.50	2,784	6,626
211.90	1,274	1,213	214.55	2,814	6,780
211.95	1,303	1,278	214.60	2,843	6,936
212.00	1,332	1,344	214.65	2,872	7,094
212.05	1,361	1,411	214.70	2,901	7,254
212.10	1,390	1,480	214.75	2,930	7,417
212.15	1,419	1,550	214.80	2,959	7,581
212.20	1,448	1,622	214.85	2,988	7,748
212.25	1,477	1,695	214.90	3,017	7,917
212.30	1,506	1,769	214.95	3,046	8,088
212.35	1,535	1,845	215.00	3,075	8,261
212.40	1,564	1,923			
212.45	1,593	2,002			
212.50	1,622	2,082			
212.55	1,651	2,164			
212.60	1,680	2,247			
212.65	1,709	2,332			
212.70	1,738	2,418			
212.75	1,768	2,506			
212.80	1,797	2,595			
212.85	1,826	2,686			
212.90	1,855	2,778			
212.95	1,884	2,871			
213.00	1,913	2,966			
213.05	1,942	3,062			
213.10	1,971	3,160			

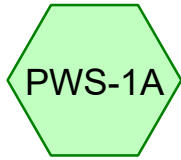
Summary for Link PR-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 50.52% Impervious, Inflow Depth = 0.20" for 1.2-Inch event
Inflow = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af
Primary = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

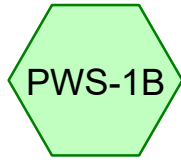
Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link PR-DP-1: Scituate Ave

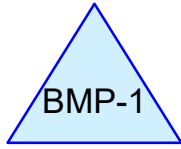




Clubhouse, Pool & Parking



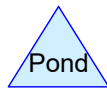
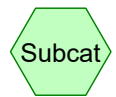
Bypass



Infiltration Basin



Scituate Ave



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6856-00 Clubhouse HydroCAD Analysis

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type III 24-hr		Default	24.00	1	2.70	2
2	2-Year	Type III 24-hr		Default	24.00	1	3.30	2
3	10-Year	Type III 24-hr		Default	24.00	1	4.90	2
4	25-Year	Type III 24-hr		Default	24.00	1	6.10	2
5	100-Year	Type III 24-hr		Default	24.00	1	8.70	2

6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 1-Year Rainfall=2.70"

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Summary for Subcatchment PWS-1A: Clubhouse, Pool & Parking

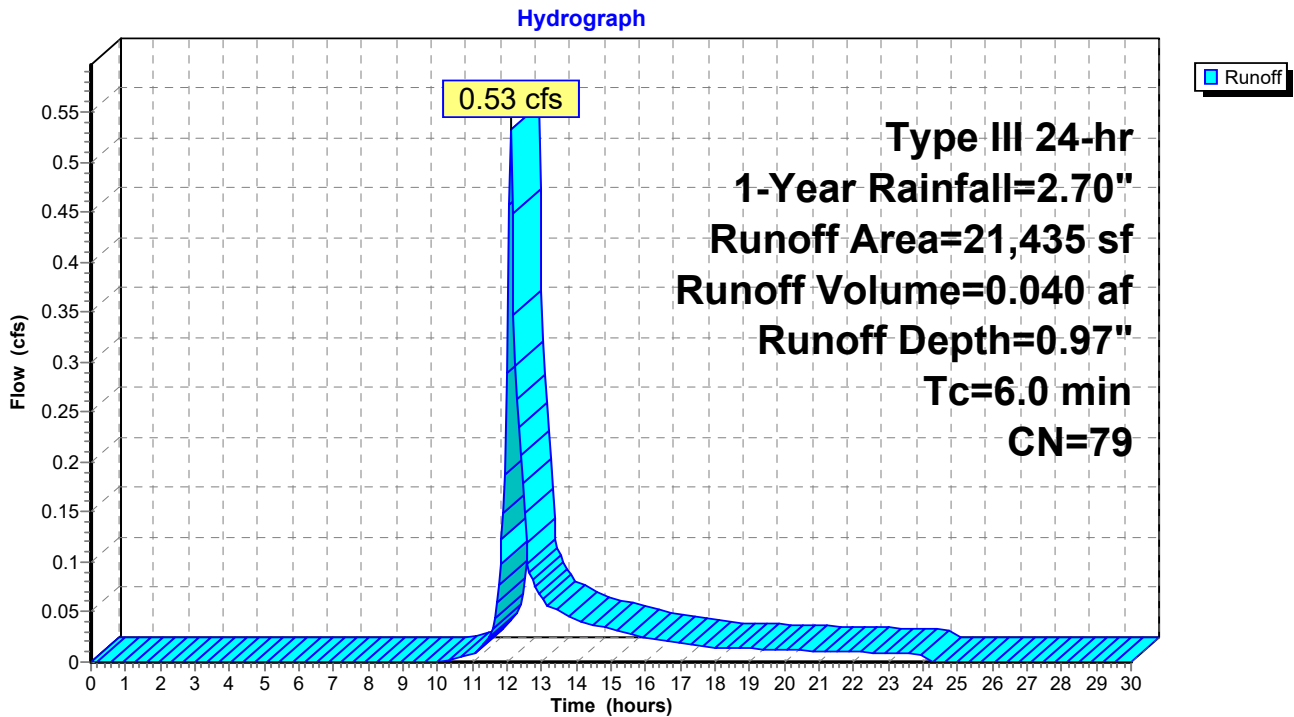
Runoff = 0.53 cfs @ 12.10 hrs, Volume= 0.040 af, Depth= 0.97"
 Routed to Pond BMP-1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
10,207	98	Paved parking, HSG B
11,228	61	>75% Grass cover, Good, HSG B
21,435	79	Weighted Average
11,228	61	52.38% Pervious Area
10,207	98	47.62% Impervious Area

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

Subcatchment PWS-1A: Clubhouse, Pool & Parking



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 1-Year Rainfall=2.70"

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Summary for Subcatchment PWS-1B: Bypass

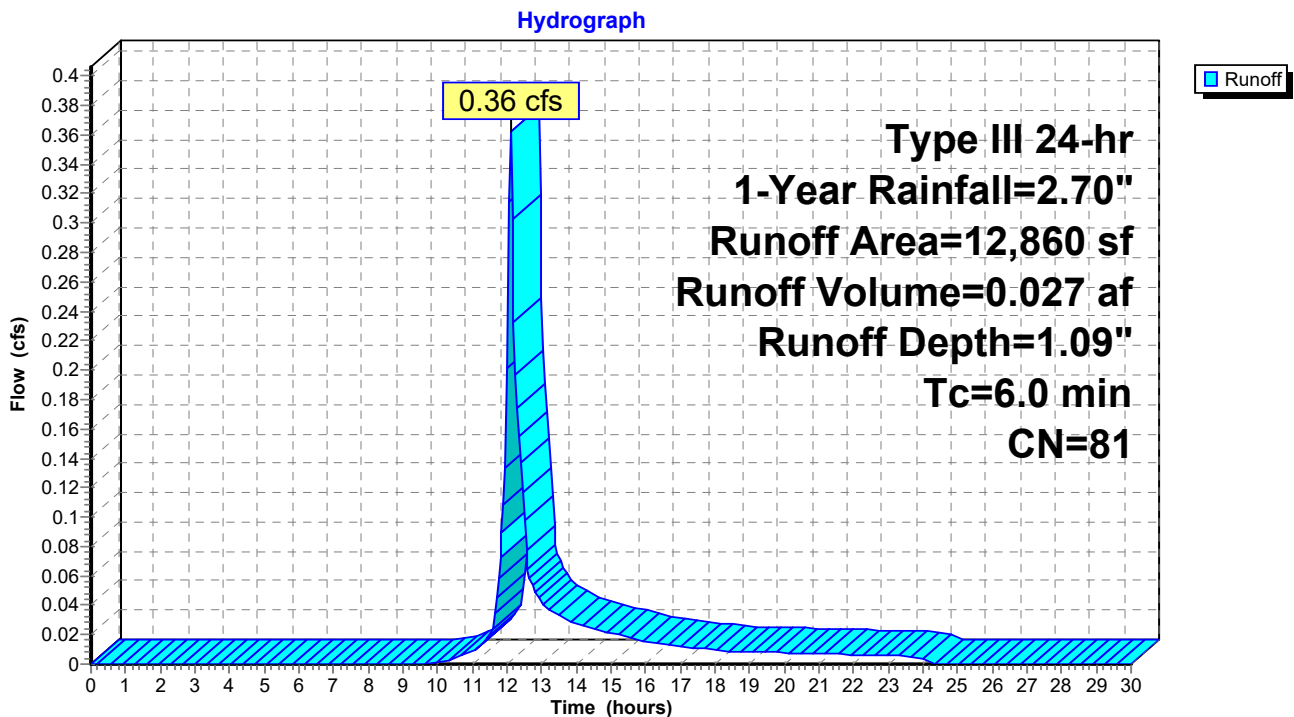
Runoff = 0.36 cfs @ 12.10 hrs, Volume= 0.027 af, Depth= 1.09"
Routed to Link PR-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.70"

Area (sf)	CN	Description
3,561	98	Roofs, HSG B
875	98	Water Surface, HSG B
2,682	98	Paved parking, HSG B
5,742	61	>75% Grass cover, Good, HSG B
12,860	81	Weighted Average
5,742	61	44.65% Pervious Area
7,118	98	55.35% Impervious Area

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

Subcatchment PWS-1B: Bypass



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 1-Year Rainfall=2.70"

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Summary for Pond BMP-1: Infiltration Basin

Inflow Area = 0.492 ac, 47.62% Impervious, Inflow Depth = 0.97" for 1-Year event
 Inflow = 0.53 cfs @ 12.10 hrs, Volume= 0.040 af
 Outflow = 0.06 cfs @ 13.21 hrs, Volume= 0.040 af, Atten= 90%, Lag= 66.5 min
 Discarded = 0.06 cfs @ 13.21 hrs, Volume= 0.040 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link PR-DP-1 : Scituate Ave

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 211.44' @ 13.21 hrs Surf.Area= 1,004 sf Storage= 685 cf

Plug-Flow detention time= 135.2 min calculated for 0.040 af (100% of inflow)
 Center-of-Mass det. time= 135.0 min (990.5 - 855.4)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	308 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
#2	210.50'	7,954 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,261 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	0	0	0
215.00	410	308	308

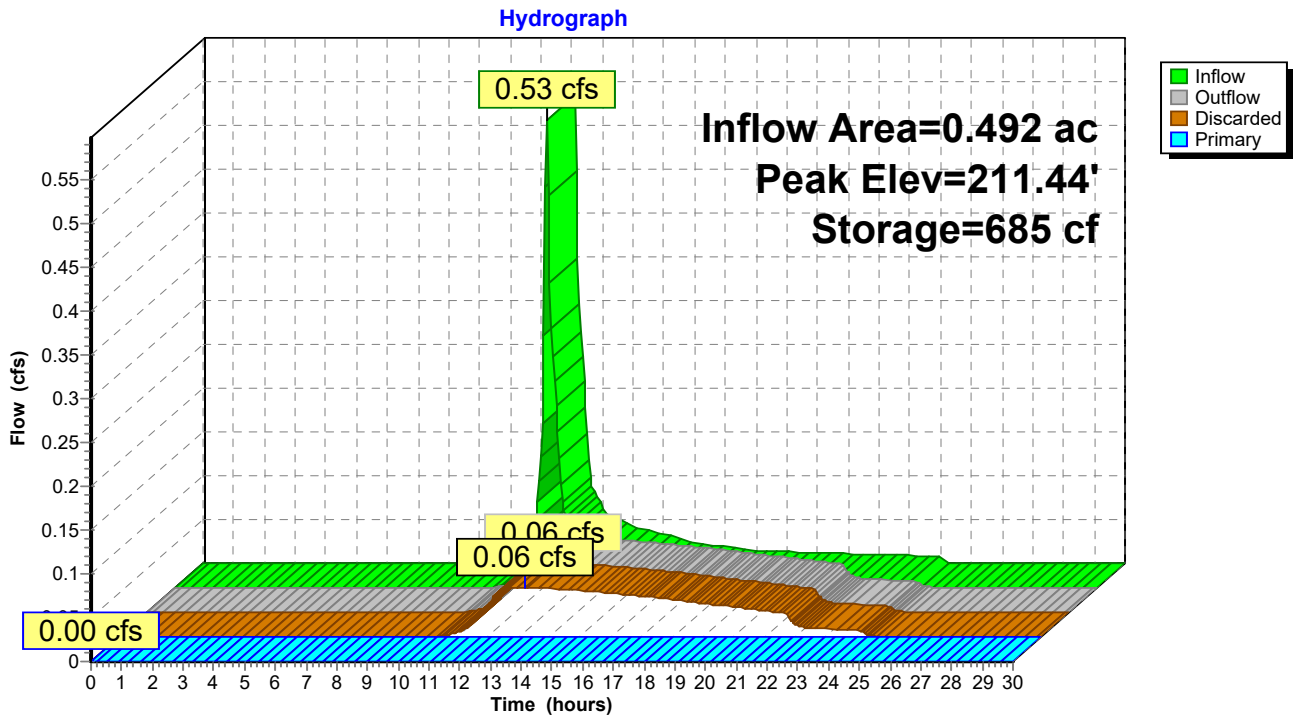
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.50	460	0	0
215.00	3,075	7,954	7,954

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	214.50'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.06 cfs @ 13.21 hrs HW=211.44' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BMP-1: Infiltration Basin



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 1-Year Rainfall=2.70"

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Stage-Area-Storage for Pond BMP-1: Infiltration Basin

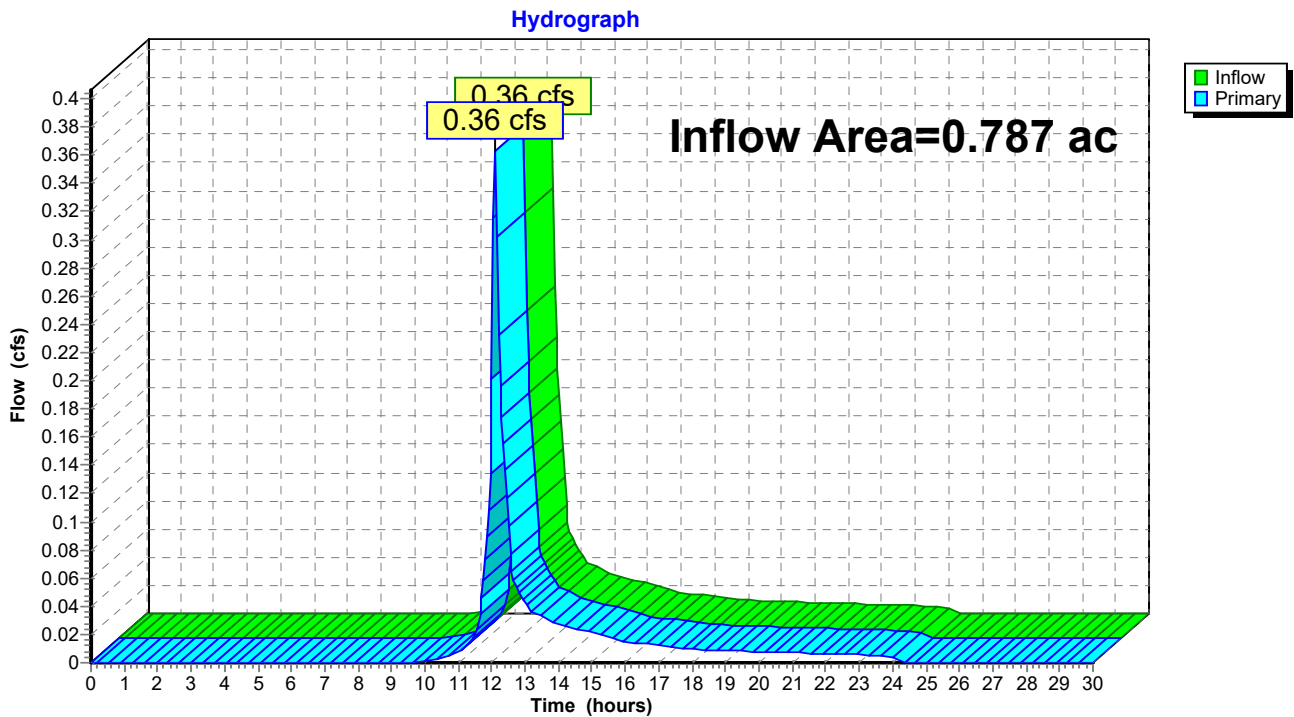
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.50	460	0	213.15	2,000	3,259
210.55	489	24	213.20	2,029	3,360
210.60	518	49	213.25	2,058	3,462
210.65	547	76	213.30	2,087	3,566
210.70	576	104	213.35	2,116	3,671
210.75	605	133	213.40	2,145	3,778
210.80	634	164	213.45	2,174	3,886
210.85	663	197	213.50	2,203	3,995
210.90	692	230	213.55	2,232	4,106
210.95	721	266	213.60	2,261	4,220
211.00	751	303	213.65	2,291	4,335
211.05	780	341	213.70	2,320	4,453
211.10	809	381	213.75	2,349	4,573
211.15	838	422	213.80	2,378	4,694
211.20	867	464	213.85	2,407	4,819
211.25	896	508	213.90	2,436	4,945
211.30	925	554	213.95	2,465	5,073
211.35	954	601	214.00	2,494	5,203
211.40	983	649	214.05	2,523	5,336
211.45	1,012	699	214.10	2,552	5,471
211.50	1,041	751	214.15	2,581	5,608
211.55	1,070	803	214.20	2,610	5,747
211.60	1,099	858	214.25	2,639	5,888
211.65	1,128	913	214.30	2,668	6,031
211.70	1,157	970	214.35	2,697	6,177
211.75	1,186	1,029	214.40	2,726	6,324
211.80	1,215	1,089	214.45	2,755	6,474
211.85	1,244	1,151	214.50	2,784	6,626
211.90	1,274	1,213	214.55	2,814	6,780
211.95	1,303	1,278	214.60	2,843	6,936
212.00	1,332	1,344	214.65	2,872	7,094
212.05	1,361	1,411	214.70	2,901	7,254
212.10	1,390	1,480	214.75	2,930	7,417
212.15	1,419	1,550	214.80	2,959	7,581
212.20	1,448	1,622	214.85	2,988	7,748
212.25	1,477	1,695	214.90	3,017	7,917
212.30	1,506	1,769	214.95	3,046	8,088
212.35	1,535	1,845	215.00	3,075	8,261
212.40	1,564	1,923			
212.45	1,593	2,002			
212.50	1,622	2,082			
212.55	1,651	2,164			
212.60	1,680	2,247			
212.65	1,709	2,332			
212.70	1,738	2,418			
212.75	1,768	2,506			
212.80	1,797	2,595			
212.85	1,826	2,686			
212.90	1,855	2,778			
212.95	1,884	2,871			
213.00	1,913	2,966			
213.05	1,942	3,062			
213.10	1,971	3,160			

Summary for Link PR-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 50.52% Impervious, Inflow Depth = 0.41" for 1-Year event
Inflow = 0.36 cfs @ 12.10 hrs, Volume= 0.027 af
Primary = 0.36 cfs @ 12.10 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link PR-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment PWS-1A: Clubhouse, Pool & Parking

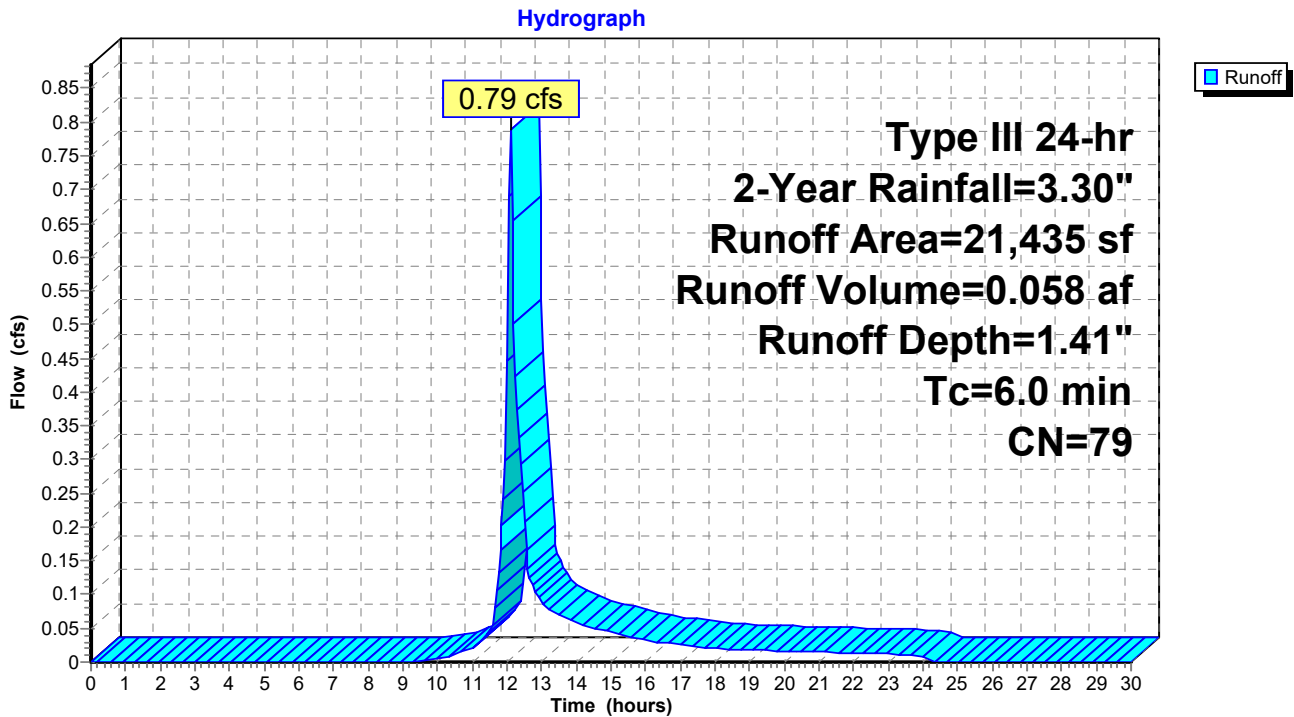
Runoff = 0.79 cfs @ 12.10 hrs, Volume= 0.058 af, Depth= 1.41"
 Routed to Pond BMP-1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
10,207	98	Paved parking, HSG B
11,228	61	>75% Grass cover, Good, HSG B
21,435	79	Weighted Average
11,228	61	52.38% Pervious Area
10,207	98	47.62% Impervious Area

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

Subcatchment PWS-1A: Clubhouse, Pool & Parking



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Subcatchment PWS-1B: Bypass

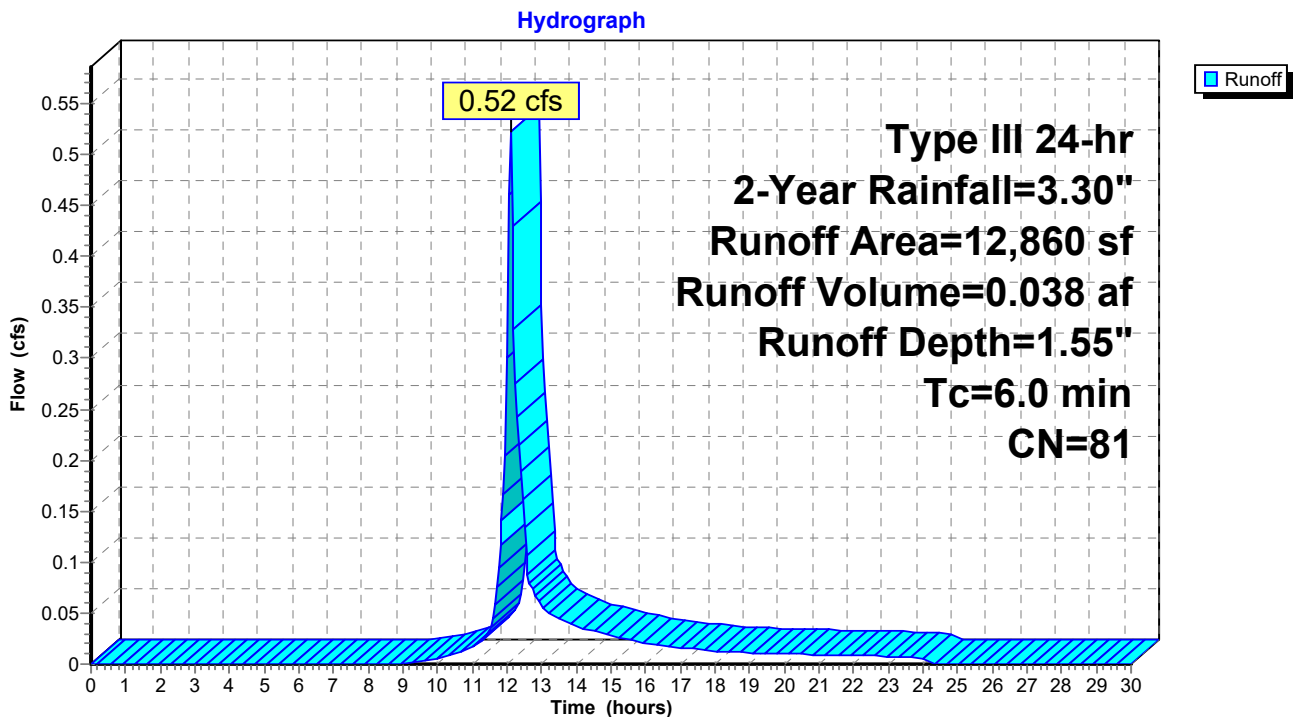
Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 1.55"
 Routed to Link PR-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.30"

Area (sf)	CN	Description
3,561	98	Roofs, HSG B
875	98	Water Surface, HSG B
2,682	98	Paved parking, HSG B
5,742	61	>75% Grass cover, Good, HSG B
12,860	81	Weighted Average
5,742	61	44.65% Pervious Area
7,118	98	55.35% Impervious Area

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

Subcatchment PWS-1B: Bypass



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 2-Year Rainfall=3.30"

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Summary for Pond BMP-1: Infiltration Basin

Inflow Area = 0.492 ac, 47.62% Impervious, Inflow Depth = 1.41" for 2-Year event
 Inflow = 0.79 cfs @ 12.10 hrs, Volume= 0.058 af
 Outflow = 0.07 cfs @ 13.59 hrs, Volume= 0.058 af, Atten= 91%, Lag= 89.6 min
 Discarded = 0.07 cfs @ 13.59 hrs, Volume= 0.058 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link PR-DP-1 : Scituate Ave

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 211.81' @ 13.59 hrs Surf.Area= 1,222 sf Storage= 1,103 cf

Plug-Flow detention time= 188.0 min calculated for 0.058 af (100% of inflow)
 Center-of-Mass det. time= 187.8 min (1,032.1 - 844.4)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	308 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
#2	210.50'	7,954 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,261 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	0	0	0
215.00	410	308	308

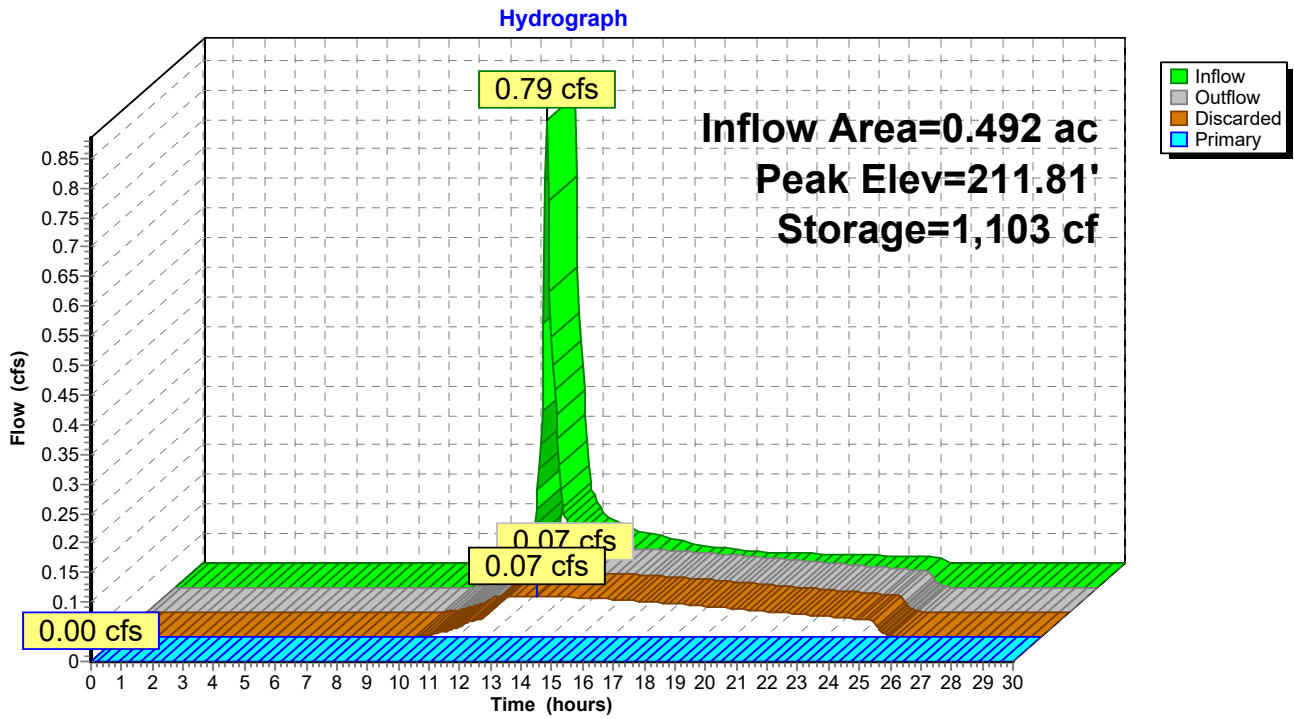
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.50	460	0	0
215.00	3,075	7,954	7,954

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	214.50'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.07 cfs @ 13.59 hrs HW=211.81' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BMP-1: Infiltration Basin



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 2-Year Rainfall=3.30"

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Stage-Area-Storage for Pond BMP-1: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.50	460	0	213.15	2,000	3,259
210.55	489	24	213.20	2,029	3,360
210.60	518	49	213.25	2,058	3,462
210.65	547	76	213.30	2,087	3,566
210.70	576	104	213.35	2,116	3,671
210.75	605	133	213.40	2,145	3,778
210.80	634	164	213.45	2,174	3,886
210.85	663	197	213.50	2,203	3,995
210.90	692	230	213.55	2,232	4,106
210.95	721	266	213.60	2,261	4,220
211.00	751	303	213.65	2,291	4,335
211.05	780	341	213.70	2,320	4,453
211.10	809	381	213.75	2,349	4,573
211.15	838	422	213.80	2,378	4,694
211.20	867	464	213.85	2,407	4,819
211.25	896	508	213.90	2,436	4,945
211.30	925	554	213.95	2,465	5,073
211.35	954	601	214.00	2,494	5,203
211.40	983	649	214.05	2,523	5,336
211.45	1,012	699	214.10	2,552	5,471
211.50	1,041	751	214.15	2,581	5,608
211.55	1,070	803	214.20	2,610	5,747
211.60	1,099	858	214.25	2,639	5,888
211.65	1,128	913	214.30	2,668	6,031
211.70	1,157	970	214.35	2,697	6,177
211.75	1,186	1,029	214.40	2,726	6,324
211.80	1,215	1,089	214.45	2,755	6,474
211.85	1,244	1,151	214.50	2,784	6,626
211.90	1,274	1,213	214.55	2,814	6,780
211.95	1,303	1,278	214.60	2,843	6,936
212.00	1,332	1,344	214.65	2,872	7,094
212.05	1,361	1,411	214.70	2,901	7,254
212.10	1,390	1,480	214.75	2,930	7,417
212.15	1,419	1,550	214.80	2,959	7,581
212.20	1,448	1,622	214.85	2,988	7,748
212.25	1,477	1,695	214.90	3,017	7,917
212.30	1,506	1,769	214.95	3,046	8,088
212.35	1,535	1,845	215.00	3,075	8,261
212.40	1,564	1,923			
212.45	1,593	2,002			
212.50	1,622	2,082			
212.55	1,651	2,164			
212.60	1,680	2,247			
212.65	1,709	2,332			
212.70	1,738	2,418			
212.75	1,768	2,506			
212.80	1,797	2,595			
212.85	1,826	2,686			
212.90	1,855	2,778			
212.95	1,884	2,871			
213.00	1,913	2,966			
213.05	1,942	3,062			
213.10	1,971	3,160			

6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 2-Year Rainfall=3.30"

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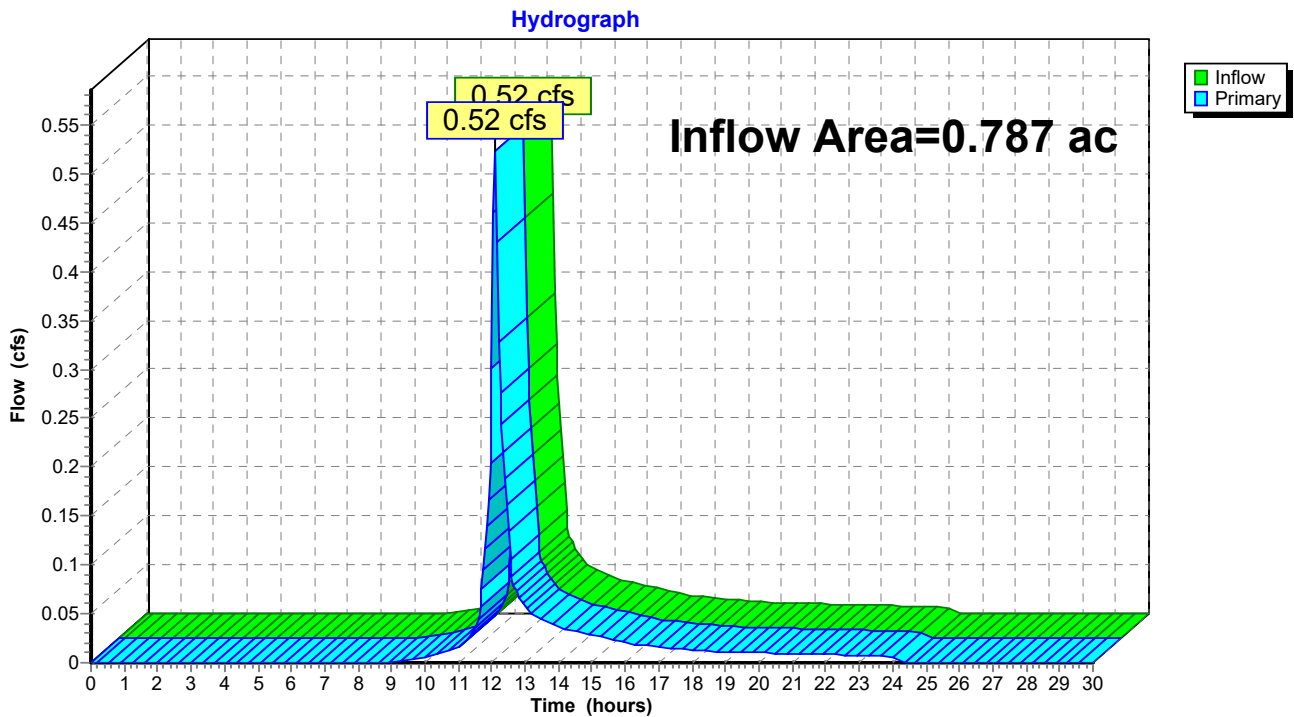
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Summary for Link PR-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 50.52% Impervious, Inflow Depth = 0.58" for 2-Year event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 0.038 af
Primary = 0.52 cfs @ 12.09 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link PR-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Subcatchment PWS-1A: Clubhouse, Pool & Parking

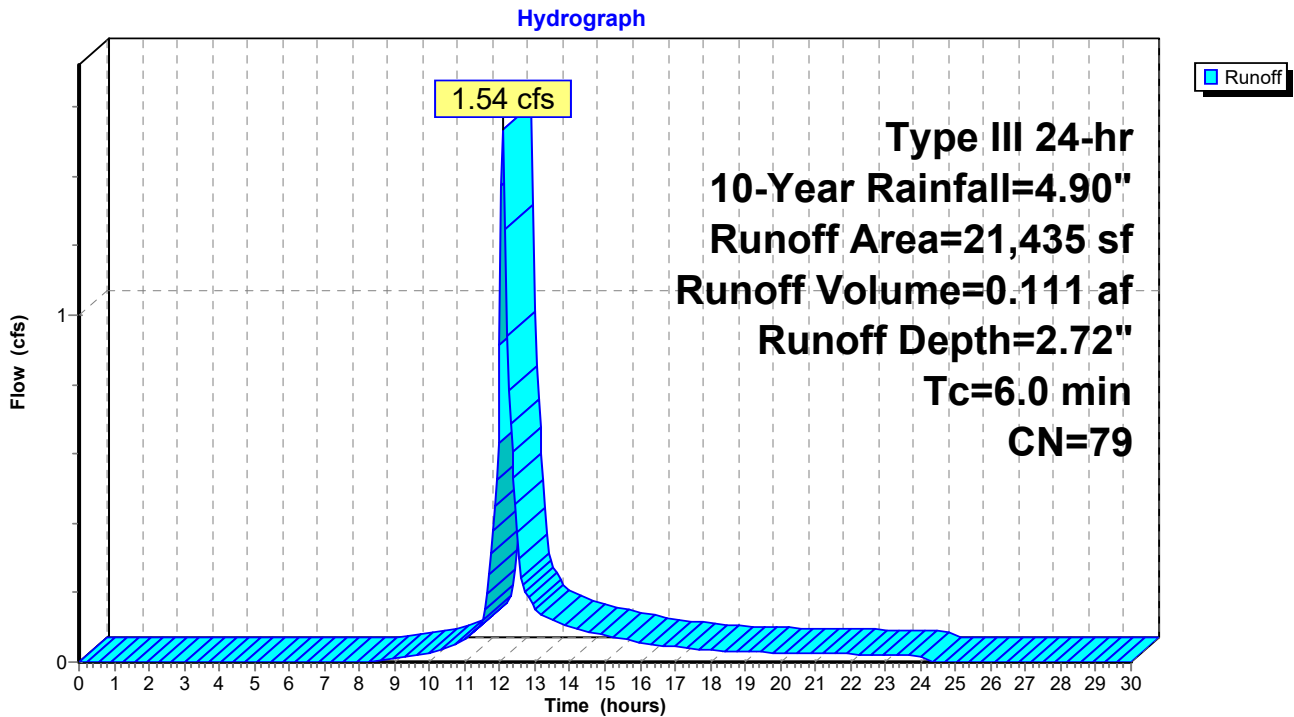
Runoff = 1.54 cfs @ 12.09 hrs, Volume= 0.111 af, Depth= 2.72"
 Routed to Pond BMP-1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
10,207	98	Paved parking, HSG B
11,228	61	>75% Grass cover, Good, HSG B
21,435	79	Weighted Average
11,228	61	52.38% Pervious Area
10,207	98	47.62% Impervious Area

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

Subcatchment PWS-1A: Clubhouse, Pool & Parking



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Subcatchment PWS-1B: Bypass

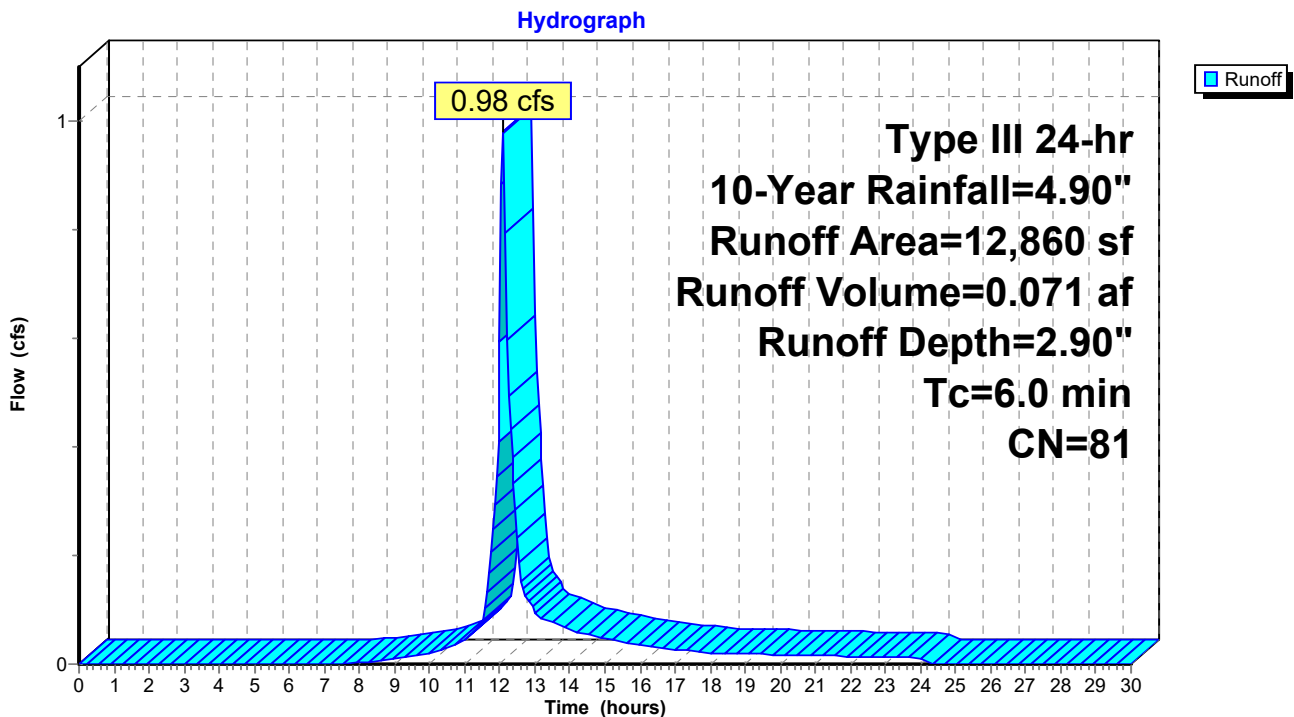
Runoff = 0.98 cfs @ 12.09 hrs, Volume= 0.071 af, Depth= 2.90"
 Routed to Link PR-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.90"

Area (sf)	CN	Description
3,561	98	Roofs, HSG B
875	98	Water Surface, HSG B
2,682	98	Paved parking, HSG B
5,742	61	>75% Grass cover, Good, HSG B
12,860	81	Weighted Average
5,742	61	44.65% Pervious Area
7,118	98	55.35% Impervious Area

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

Subcatchment PWS-1B: Bypass



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 10-Year Rainfall=4.90"

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Summary for Pond BMP-1: Infiltration Basin

Inflow Area = 0.492 ac, 47.62% Impervious, Inflow Depth = 2.72" for 10-Year event
 Inflow = 1.54 cfs @ 12.09 hrs, Volume= 0.111 af
 Outflow = 0.10 cfs @ 14.07 hrs, Volume= 0.111 af, Atten= 94%, Lag= 118.4 min
 Discarded = 0.10 cfs @ 14.07 hrs, Volume= 0.111 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link PR-DP-1 : Scituate Ave

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 212.73' @ 14.07 hrs Surf.Area= 1,756 sf Storage= 2,472 cf

Plug-Flow detention time= 302.7 min calculated for 0.111 af (100% of inflow)
 Center-of-Mass det. time= 302.6 min (1,128.0 - 825.4)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	308 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
#2	210.50'	7,954 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,261 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	0	0	0
215.00	410	308	308

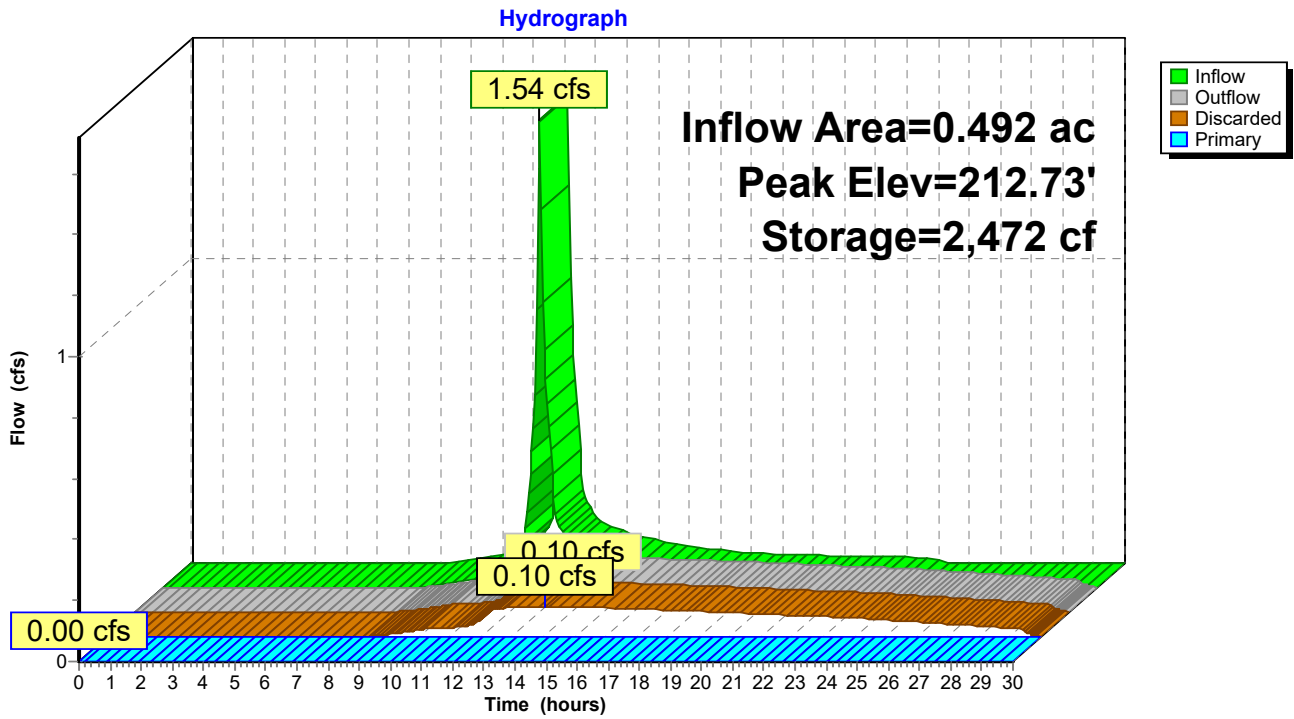
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.50	460	0	0
215.00	3,075	7,954	7,954

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	214.50'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.10 cfs @ 14.07 hrs HW=212.73' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BMP-1: Infiltration Basin



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 10-Year Rainfall=4.90"

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Stage-Area-Storage for Pond BMP-1: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.50	460	0	213.15	2,000	3,259
210.55	489	24	213.20	2,029	3,360
210.60	518	49	213.25	2,058	3,462
210.65	547	76	213.30	2,087	3,566
210.70	576	104	213.35	2,116	3,671
210.75	605	133	213.40	2,145	3,778
210.80	634	164	213.45	2,174	3,886
210.85	663	197	213.50	2,203	3,995
210.90	692	230	213.55	2,232	4,106
210.95	721	266	213.60	2,261	4,220
211.00	751	303	213.65	2,291	4,335
211.05	780	341	213.70	2,320	4,453
211.10	809	381	213.75	2,349	4,573
211.15	838	422	213.80	2,378	4,694
211.20	867	464	213.85	2,407	4,819
211.25	896	508	213.90	2,436	4,945
211.30	925	554	213.95	2,465	5,073
211.35	954	601	214.00	2,494	5,203
211.40	983	649	214.05	2,523	5,336
211.45	1,012	699	214.10	2,552	5,471
211.50	1,041	751	214.15	2,581	5,608
211.55	1,070	803	214.20	2,610	5,747
211.60	1,099	858	214.25	2,639	5,888
211.65	1,128	913	214.30	2,668	6,031
211.70	1,157	970	214.35	2,697	6,177
211.75	1,186	1,029	214.40	2,726	6,324
211.80	1,215	1,089	214.45	2,755	6,474
211.85	1,244	1,151	214.50	2,784	6,626
211.90	1,274	1,213	214.55	2,814	6,780
211.95	1,303	1,278	214.60	2,843	6,936
212.00	1,332	1,344	214.65	2,872	7,094
212.05	1,361	1,411	214.70	2,901	7,254
212.10	1,390	1,480	214.75	2,930	7,417
212.15	1,419	1,550	214.80	2,959	7,581
212.20	1,448	1,622	214.85	2,988	7,748
212.25	1,477	1,695	214.90	3,017	7,917
212.30	1,506	1,769	214.95	3,046	8,088
212.35	1,535	1,845	215.00	3,075	8,261
212.40	1,564	1,923			
212.45	1,593	2,002			
212.50	1,622	2,082			
212.55	1,651	2,164			
212.60	1,680	2,247			
212.65	1,709	2,332			
212.70	1,738	2,418			
212.75	1,768	2,506			
212.80	1,797	2,595			
212.85	1,826	2,686			
212.90	1,855	2,778			
212.95	1,884	2,871			
213.00	1,913	2,966			
213.05	1,942	3,062			
213.10	1,971	3,160			

6856-00 Clubhouse HydroCAD Analysis

Prepared by Garofalo & Associates, Inc

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Type III 24-hr 10-Year Rainfall=4.90"

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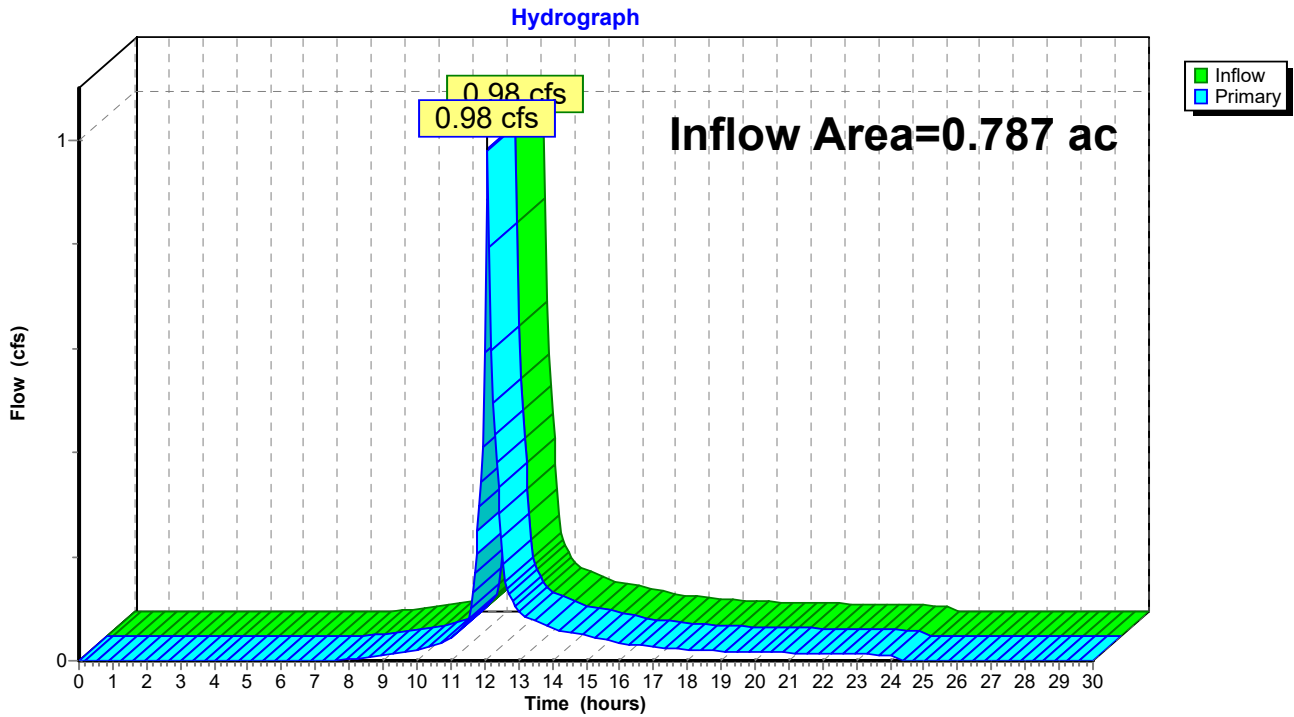
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Summary for Link PR-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 50.52% Impervious, Inflow Depth = 1.09" for 10-Year event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.071 af
Primary = 0.98 cfs @ 12.09 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link PR-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment PWS-1A: Clubhouse, Pool & Parking

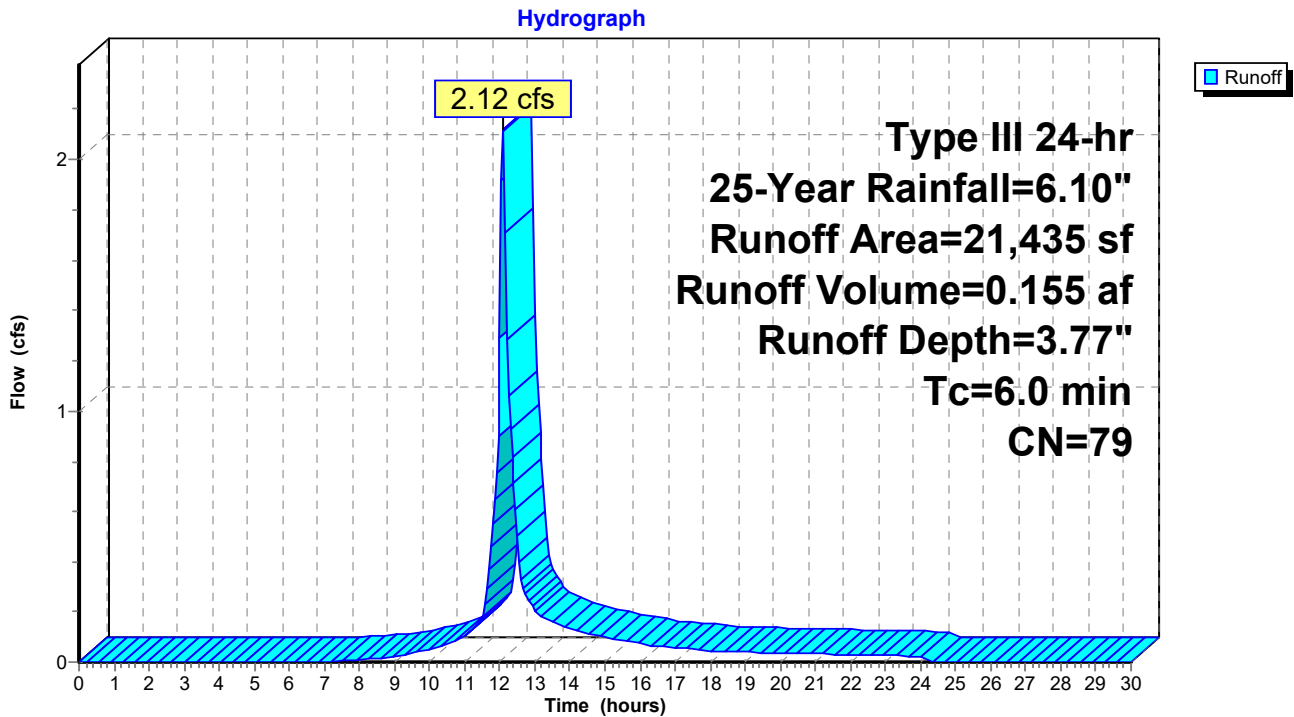
Runoff = 2.12 cfs @ 12.09 hrs, Volume= 0.155 af, Depth= 3.77"
 Routed to Pond BMP-1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
10,207	98	Paved parking, HSG B
11,228	61	>75% Grass cover, Good, HSG B
21,435	79	Weighted Average
11,228	61	52.38% Pervious Area
10,207	98	47.62% Impervious Area

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

Subcatchment PWS-1A: Clubhouse, Pool & Parking



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Subcatchment PWS-1B: Bypass

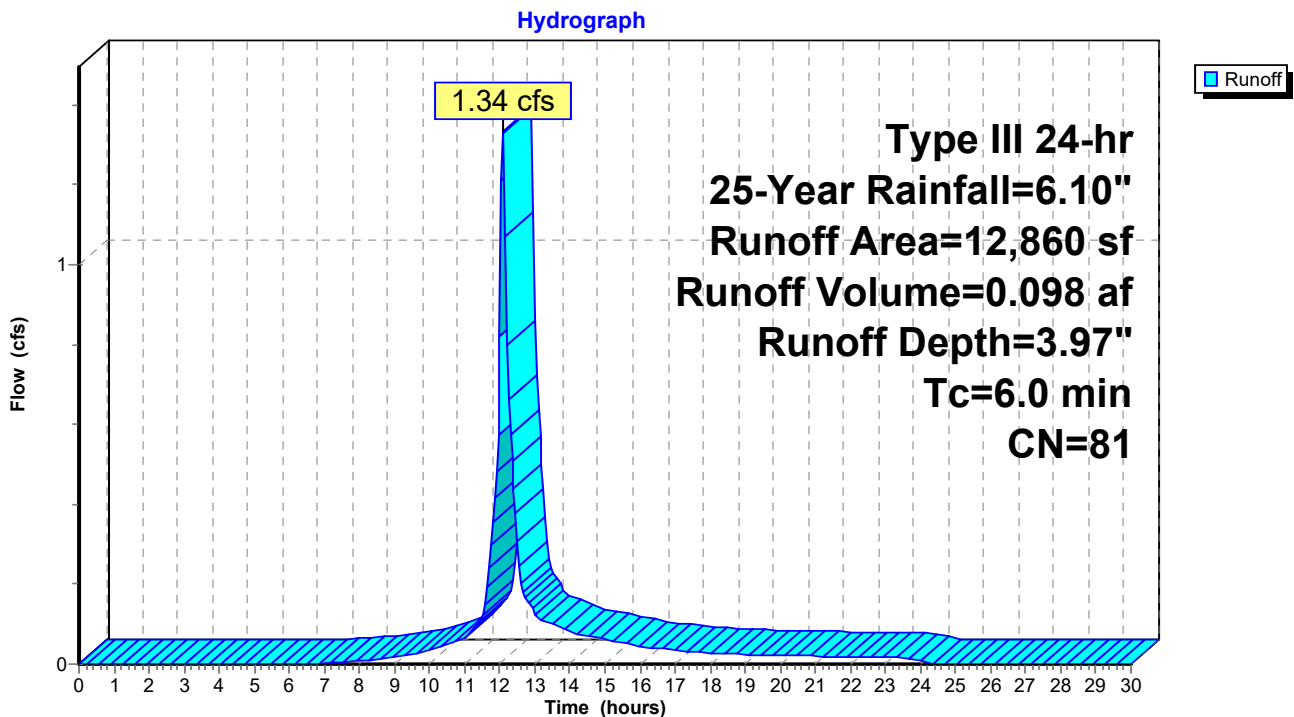
Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.098 af, Depth= 3.97"
 Routed to Link PR-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Year Rainfall=6.10"

Area (sf)	CN	Description
3,561	98	Roofs, HSG B
875	98	Water Surface, HSG B
2,682	98	Paved parking, HSG B
5,742	61	>75% Grass cover, Good, HSG B
12,860	81	Weighted Average
5,742	61	44.65% Pervious Area
7,118	98	55.35% Impervious Area

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

Subcatchment PWS-1B: Bypass



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 25-Year Rainfall=6.10"

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Summary for Pond BMP-1: Infiltration Basin

Inflow Area = 0.492 ac, 47.62% Impervious, Inflow Depth = 3.77" for 25-Year event
 Inflow = 2.12 cfs @ 12.09 hrs, Volume= 0.155 af
 Outflow = 0.12 cfs @ 14.43 hrs, Volume= 0.146 af, Atten= 94%, Lag= 140.1 min
 Discarded = 0.12 cfs @ 14.43 hrs, Volume= 0.146 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link PR-DP-1 : Scituate Ave

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 213.35' @ 14.43 hrs Surf.Area= 2,114 sf Storage= 3,662 cf

Plug-Flow detention time= 364.5 min calculated for 0.146 af (95% of inflow)
 Center-of-Mass det. time= 335.0 min (1,151.0 - 816.0)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	308 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
#2	210.50'	7,954 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,261 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	0	0	0
215.00	410	308	308

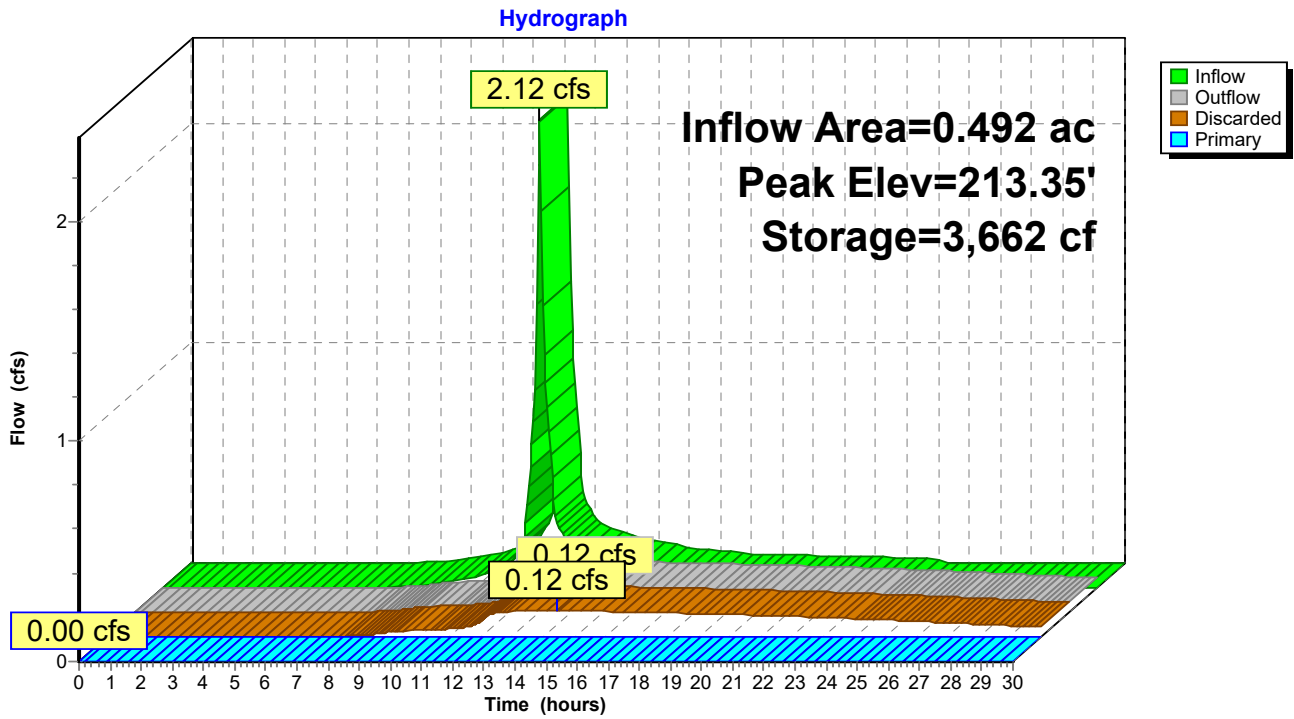
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.50	460	0	0
215.00	3,075	7,954	7,954

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	214.50'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.12 cfs @ 14.43 hrs HW=213.35' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BMP-1: Infiltration Basin



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 25-Year Rainfall=6.10"

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Stage-Area-Storage for Pond BMP-1: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.50	460	0	213.15	2,000	3,259
210.55	489	24	213.20	2,029	3,360
210.60	518	49	213.25	2,058	3,462
210.65	547	76	213.30	2,087	3,566
210.70	576	104	213.35	2,116	3,671
210.75	605	133	213.40	2,145	3,778
210.80	634	164	213.45	2,174	3,886
210.85	663	197	213.50	2,203	3,995
210.90	692	230	213.55	2,232	4,106
210.95	721	266	213.60	2,261	4,220
211.00	751	303	213.65	2,291	4,335
211.05	780	341	213.70	2,320	4,453
211.10	809	381	213.75	2,349	4,573
211.15	838	422	213.80	2,378	4,694
211.20	867	464	213.85	2,407	4,819
211.25	896	508	213.90	2,436	4,945
211.30	925	554	213.95	2,465	5,073
211.35	954	601	214.00	2,494	5,203
211.40	983	649	214.05	2,523	5,336
211.45	1,012	699	214.10	2,552	5,471
211.50	1,041	751	214.15	2,581	5,608
211.55	1,070	803	214.20	2,610	5,747
211.60	1,099	858	214.25	2,639	5,888
211.65	1,128	913	214.30	2,668	6,031
211.70	1,157	970	214.35	2,697	6,177
211.75	1,186	1,029	214.40	2,726	6,324
211.80	1,215	1,089	214.45	2,755	6,474
211.85	1,244	1,151	214.50	2,784	6,626
211.90	1,274	1,213	214.55	2,814	6,780
211.95	1,303	1,278	214.60	2,843	6,936
212.00	1,332	1,344	214.65	2,872	7,094
212.05	1,361	1,411	214.70	2,901	7,254
212.10	1,390	1,480	214.75	2,930	7,417
212.15	1,419	1,550	214.80	2,959	7,581
212.20	1,448	1,622	214.85	2,988	7,748
212.25	1,477	1,695	214.90	3,017	7,917
212.30	1,506	1,769	214.95	3,046	8,088
212.35	1,535	1,845	215.00	3,075	8,261
212.40	1,564	1,923			
212.45	1,593	2,002			
212.50	1,622	2,082			
212.55	1,651	2,164			
212.60	1,680	2,247			
212.65	1,709	2,332			
212.70	1,738	2,418			
212.75	1,768	2,506			
212.80	1,797	2,595			
212.85	1,826	2,686			
212.90	1,855	2,778			
212.95	1,884	2,871			
213.00	1,913	2,966			
213.05	1,942	3,062			
213.10	1,971	3,160			

6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 25-Year Rainfall=6.10"

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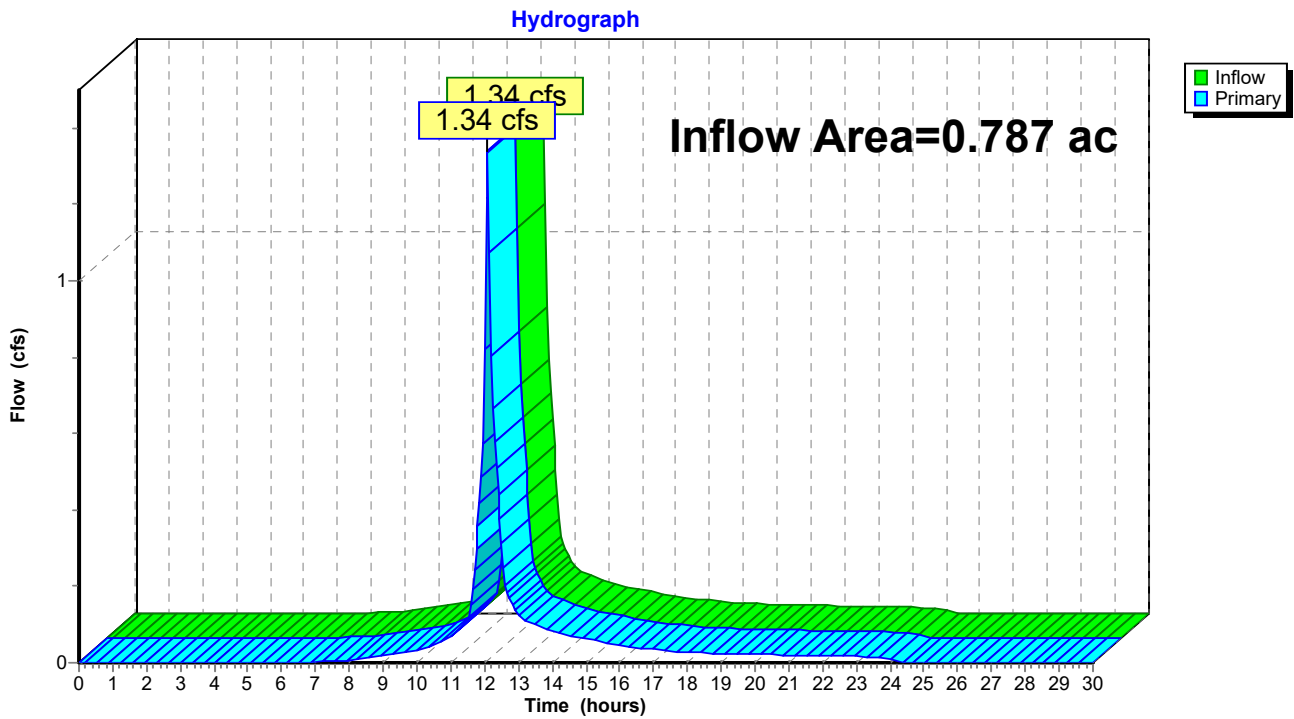
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Summary for Link PR-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 50.52% Impervious, Inflow Depth = 1.49" for 25-Year event
Inflow = 1.34 cfs @ 12.09 hrs, Volume= 0.098 af
Primary = 1.34 cfs @ 12.09 hrs, Volume= 0.098 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link PR-DP-1: Scituate Ave



6856-00 Clubhouse HydroCAD Analysis

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Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Subcatchment PWS-1A: Clubhouse, Pool & Parking

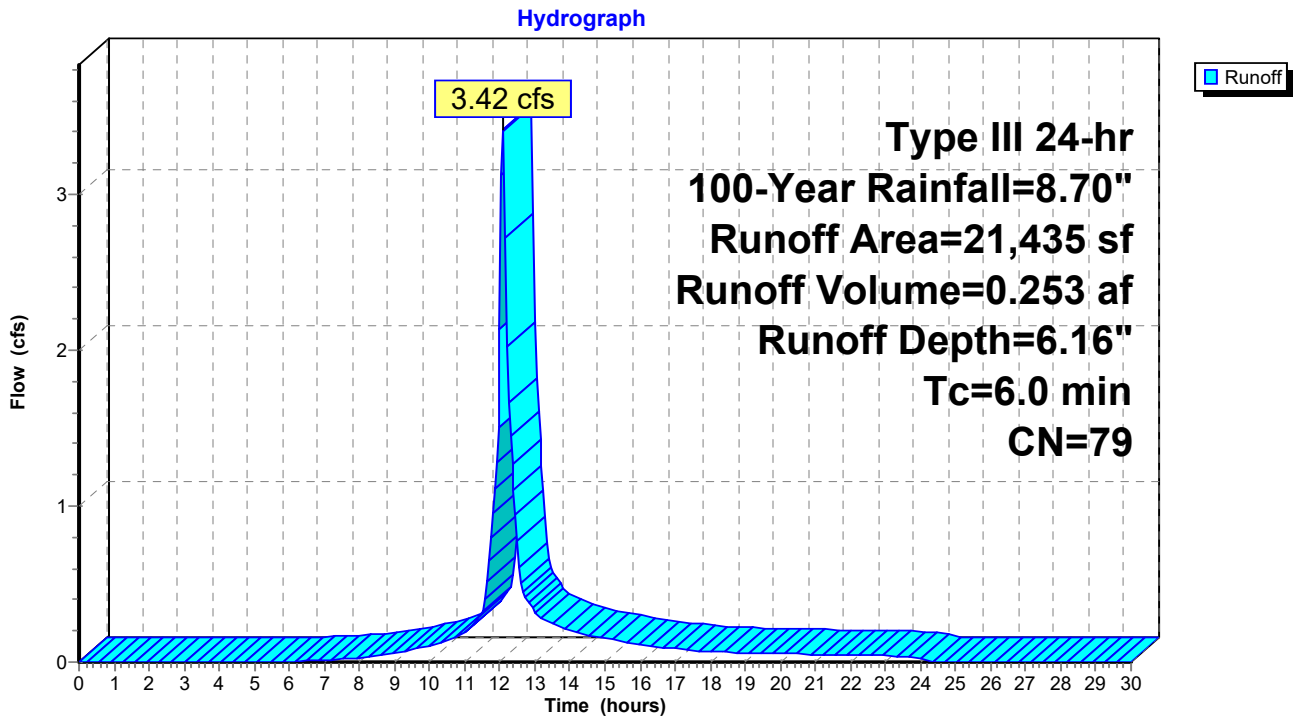
Runoff = 3.42 cfs @ 12.09 hrs, Volume= 0.253 af, Depth= 6.16"
Routed to Pond BMP-1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
10,207	98	Paved parking, HSG B
11,228	61	>75% Grass cover, Good, HSG B
21,435	79	Weighted Average
11,228	61	52.38% Pervious Area
10,207	98	47.62% Impervious Area

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

Subcatchment PWS-1A: Clubhouse, Pool & Parking



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Subcatchment PWS-1B: Bypass

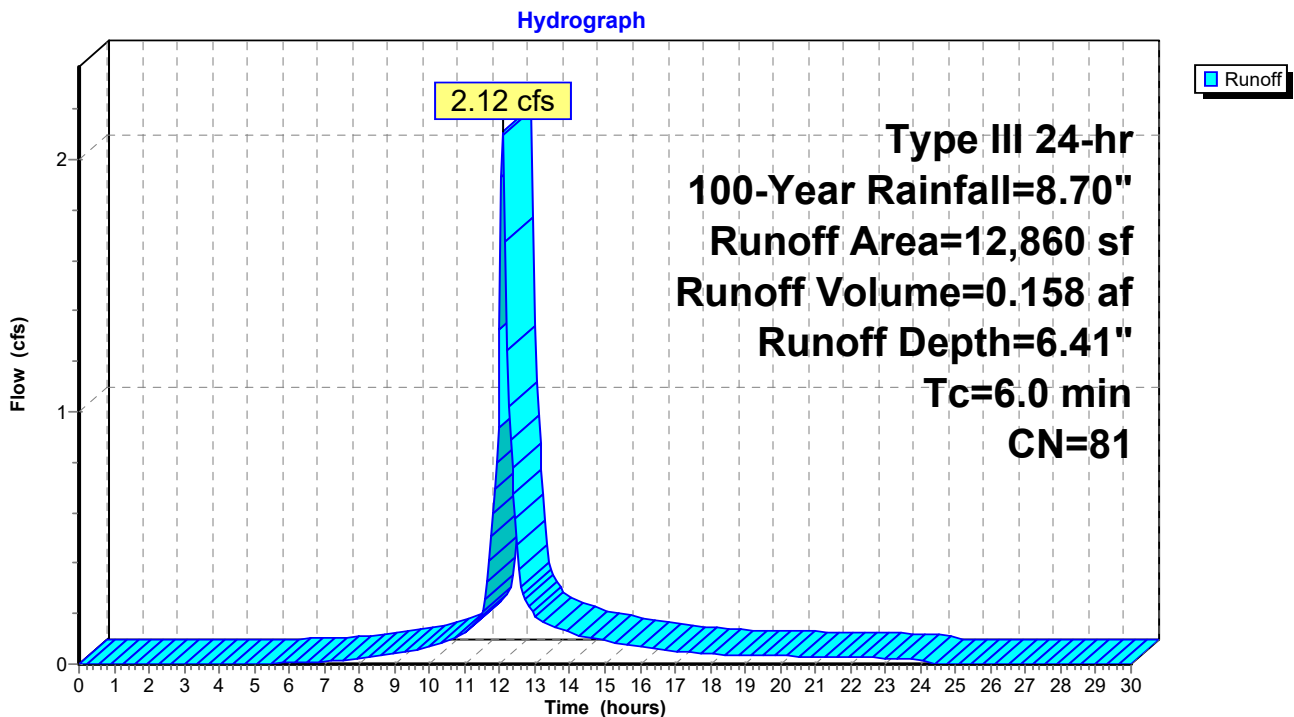
Runoff = 2.12 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 6.41"
 Routed to Link PR-DP-1 : Scituate Ave

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.70"

Area (sf)	CN	Description
3,561	98	Roofs, HSG B
875	98	Water Surface, HSG B
2,682	98	Paved parking, HSG B
5,742	61	>75% Grass cover, Good, HSG B
12,860	81	Weighted Average
5,742	61	44.65% Pervious Area
7,118	98	55.35% Impervious Area

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

Subcatchment PWS-1B: Bypass



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 100-Year Rainfall=8.70"

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Summary for Pond BMP-1: Infiltration Basin

Inflow Area = 0.492 ac, 47.62% Impervious, Inflow Depth = 6.16" for 100-Year event
 Inflow = 3.42 cfs @ 12.09 hrs, Volume= 0.253 af
 Outflow = 0.15 cfs @ 14.98 hrs, Volume= 0.211 af, Atten= 95%, Lag= 173.5 min
 Discarded = 0.15 cfs @ 14.98 hrs, Volume= 0.211 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link PR-DP-1 : Scituate Ave

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 214.47' @ 14.98 hrs Surf.Area= 2,767 sf Storage= 6,534 cf

Plug-Flow detention time= 432.3 min calculated for 0.211 af (83% of inflow)
 Center-of-Mass det. time= 365.0 min (1,167.1 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	308 cf	Custom Stage Data (Prismatic) Listed below (Recalc) -Impervious
#2	210.50'	7,954 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
		8,261 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	0	0	0
215.00	410	308	308

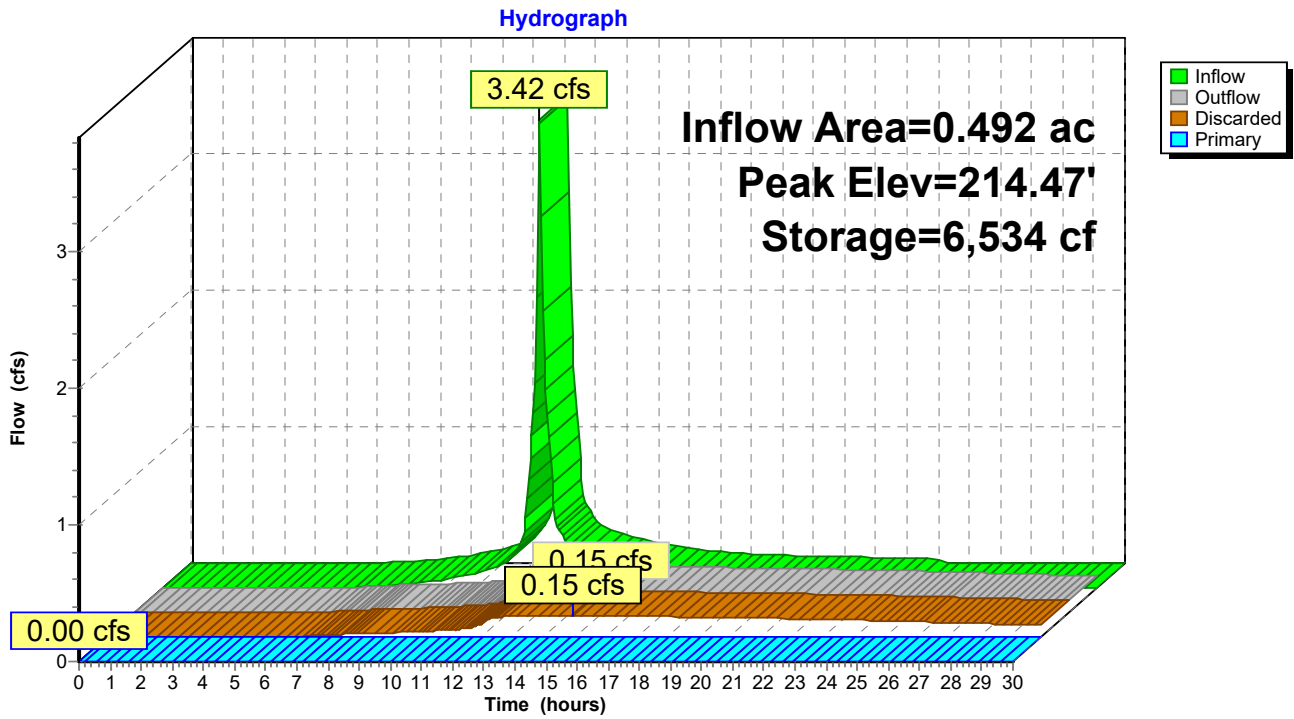
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
210.50	460	0	0
215.00	3,075	7,954	7,954

Device	Routing	Invert	Outlet Devices
#1	Discarded	210.50'	2.410 in/hr Exfiltration over Surface area
#2	Primary	214.50'	10.0' long x 8.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.15 cfs @ 14.98 hrs HW=214.47' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=210.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BMP-1: Infiltration Basin



6856-00 Clubhouse HydroCAD Analysis

Type III 24-hr 100-Year Rainfall=8.70"

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Stage-Area-Storage for Pond BMP-1: Infiltration Basin

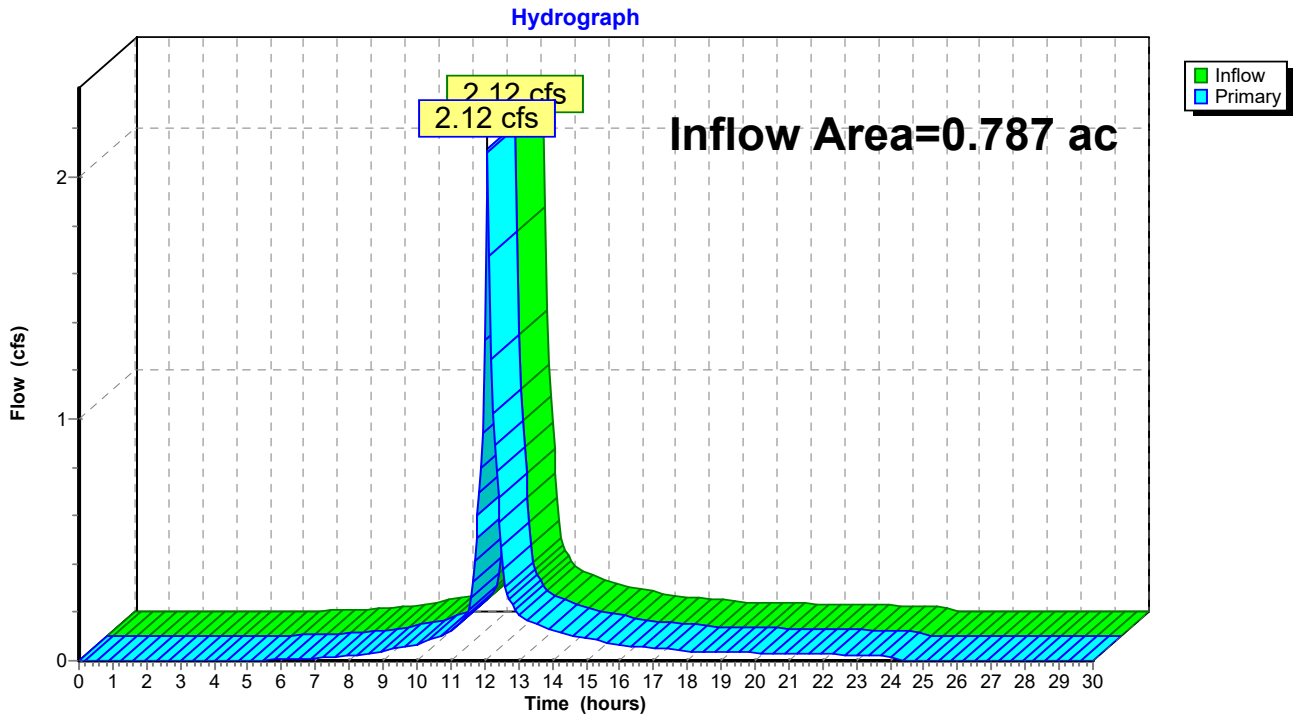
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
210.50	460	0	213.15	2,000	3,259
210.55	489	24	213.20	2,029	3,360
210.60	518	49	213.25	2,058	3,462
210.65	547	76	213.30	2,087	3,566
210.70	576	104	213.35	2,116	3,671
210.75	605	133	213.40	2,145	3,778
210.80	634	164	213.45	2,174	3,886
210.85	663	197	213.50	2,203	3,995
210.90	692	230	213.55	2,232	4,106
210.95	721	266	213.60	2,261	4,220
211.00	751	303	213.65	2,291	4,335
211.05	780	341	213.70	2,320	4,453
211.10	809	381	213.75	2,349	4,573
211.15	838	422	213.80	2,378	4,694
211.20	867	464	213.85	2,407	4,819
211.25	896	508	213.90	2,436	4,945
211.30	925	554	213.95	2,465	5,073
211.35	954	601	214.00	2,494	5,203
211.40	983	649	214.05	2,523	5,336
211.45	1,012	699	214.10	2,552	5,471
211.50	1,041	751	214.15	2,581	5,608
211.55	1,070	803	214.20	2,610	5,747
211.60	1,099	858	214.25	2,639	5,888
211.65	1,128	913	214.30	2,668	6,031
211.70	1,157	970	214.35	2,697	6,177
211.75	1,186	1,029	214.40	2,726	6,324
211.80	1,215	1,089	214.45	2,755	6,474
211.85	1,244	1,151	214.50	2,784	6,626
211.90	1,274	1,213	214.55	2,814	6,780
211.95	1,303	1,278	214.60	2,843	6,936
212.00	1,332	1,344	214.65	2,872	7,094
212.05	1,361	1,411	214.70	2,901	7,254
212.10	1,390	1,480	214.75	2,930	7,417
212.15	1,419	1,550	214.80	2,959	7,581
212.20	1,448	1,622	214.85	2,988	7,748
212.25	1,477	1,695	214.90	3,017	7,917
212.30	1,506	1,769	214.95	3,046	8,088
212.35	1,535	1,845	215.00	3,075	8,261
212.40	1,564	1,923			
212.45	1,593	2,002			
212.50	1,622	2,082			
212.55	1,651	2,164			
212.60	1,680	2,247			
212.65	1,709	2,332			
212.70	1,738	2,418			
212.75	1,768	2,506			
212.80	1,797	2,595			
212.85	1,826	2,686			
212.90	1,855	2,778			
212.95	1,884	2,871			
213.00	1,913	2,966			
213.05	1,942	3,062			
213.10	1,971	3,160			

Summary for Link PR-DP-1: Scituate Ave

Inflow Area = 0.787 ac, 50.52% Impervious, Inflow Depth = 2.40" for 100-Year event
Inflow = 2.12 cfs @ 12.09 hrs, Volume= 0.158 af
Primary = 2.12 cfs @ 12.09 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link PR-DP-1: Scituate Ave



Appendix D
RIDEM Stormwater Management Checklist



APPENDIX A: STORMWATER MANAGEMENT PLAN CHECKLIST AND LID PLANNING REPORT – STORMWATER DESIGN SUMMARY

CLUB HOUSE	(RIDEM USE ONLY)
CRANSTON, RI	STW/WQC File #:
The development proposes renovation of an existing 5,480 s.f. residential home into a commercial club house building with an adjacent swimming pool area, along with associated parking facilities, landscaping and other site amenities.	Date Received:

Stormwater Management Plan (SMP) Elements – Minimum Standards

When submitting a SMP,¹ submit **four separately bound** documents: Appendix A Checklist; Stormwater Site Planning, Analysis and Design Report with Plan Set/Drawings; Soil Erosion and Sediment Control (SESC) Plan, and Post Construction Operations and Maintenance (O&M) Plan. Please refer to [Suggestions to Promote Brevity](#).

Note: All stormwater construction projects must create a Stormwater Management Plan (SMP). However, not every element listed below is required per the [RIDEM Stormwater Rules](#) and the [RIPDES Construction General Permit \(CGP\)](#). This checklist will help identify the required elements to be submitted with an Application for Stormwater Construction Permit & Water Quality Certification.

PART 1. PROJECT AND SITE INFORMATION

PROJECT TYPE (Check all that apply)

<input type="checkbox"/> Residential	<input checked="" type="checkbox"/> Commercial	<input type="checkbox"/> Federal	<input type="checkbox"/> Retrofit	<input type="checkbox"/> Restoration
<input type="checkbox"/> Road	<input type="checkbox"/> Utility	<input type="checkbox"/> Fill	<input type="checkbox"/> Dredge	<input type="checkbox"/> Mine
<input type="checkbox"/> Other (specify):				

SITE INFORMATION

Vicinity Map

INITIAL DISCHARGE LOCATION(S): The WQv discharges to: (You may choose more than one answer if several discharge points are associated with the project.)

<input checked="" type="checkbox"/> Groundwater	<input checked="" type="checkbox"/> Surface Water	<input type="checkbox"/> MS4
<input type="checkbox"/> GAA	<input type="checkbox"/> Isolated Wetland	<input type="checkbox"/> RIDOT
<input checked="" type="checkbox"/> GA	<input type="checkbox"/> Named Waterbody	<input type="checkbox"/> RIDOT Alteration Permit is Approved
<input type="checkbox"/> GB	<input type="checkbox"/> Unnamed Waterbody Connected to Named Waterbody	<input type="checkbox"/> Town
<input type="checkbox"/> Other (specify):		

ULTIMATE RECEIVING WATERBODY LOCATION(S): Include pertinent information that applies to both WQ_v and flow from larger storm events including overflows. Choose all that apply, and repeat table for each waterbody.

<input type="checkbox"/> Groundwater or Disconnected Wetland	<input type="checkbox"/> SRWP
<input checked="" type="checkbox"/> Waterbody Name: Meshanticut Brook	<input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater <input type="checkbox"/> Unassessed
<input checked="" type="checkbox"/> Waterbody ID: RI0006017R-02	<input type="checkbox"/> 4 th order stream of pond 50 acres or more
<input type="checkbox"/> TMDL for:	<input type="checkbox"/> Watershed of flood prone river (e.g., Pocasset River)
<input type="checkbox"/> Contributes to a priority outfall listed in the TMDL	<input type="checkbox"/> Contributes stormwater to a public beach
<input type="checkbox"/> 303(d) list – Impairment(s) for: Enterococcus	<input type="checkbox"/> Contributes to shellfishing grounds

¹ Applications for a Construction General Permit that do not require any other permits from RIDEM and will disturb less than 5 acres over the entire course of the project do not need to submit a SMP. The Appendix A checklist must still be submitted.

PROJECT HISTORY		
<input type="checkbox"/> RIDEM Pre- Application Meeting	Meeting Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Municipal Master Plan Approval	Approval Date:	<input type="checkbox"/> Minutes Attached
<input type="checkbox"/> Subdivision Suitability Required	Approval #:	
<input type="checkbox"/> Previous Enforcement Action has been taken on the property	Enforcement #:	
FLOODPLAIN & FLOODWAY See Guidance Pertaining to Floodplain and Floodways		
<input type="checkbox"/> Riverine 100-year floodplain: FEMA FLOODPLAIN FIRMETTE has been reviewed and the 100-year floodplain is on site		
<input type="checkbox"/> Delineated from FEMA Maps		
NOTE: Per Rule 250-RICR-150-10-8-1.1(B)(5)(d)(3), provide volumetric floodplain compensation calculations for cut and fill/displacement calculated by qualified professional		
<input type="checkbox"/> Calculated by Professional Engineer		
<input type="checkbox"/> Calculations are provided for cut vs. fill/displacement volumes proposed within the 100-year floodplain	Amount of Fill (CY):	
	Amount of Cut (CY):	
<input type="checkbox"/> Restrictions or modifications are proposed to the flow path or velocities in a floodway		
<input type="checkbox"/> Floodplain storage capacity is impacted		
<input checked="" type="checkbox"/> Project area is not within 100-year floodplain as defined by RIDEM		

CRMC JURISDICTION
<input type="checkbox"/> CRMC Assent required
<input type="checkbox"/> Property subject to a Special Area Management Plan (SAMP). If so, specify which SAMP:
<input type="checkbox"/> Sea level rise mitigation has been designed into this project

LUHPPL IDENTIFICATION - MINIMUM STANDARD 8:		
1. OFFICE OF Land Revitalization and Sustainable Materials Management (OLRSMM)		
<input type="checkbox"/> Known or suspected releases of HAZARDOUS MATERIAL are present at the site (Hazardous Material is defined in Rule 1.4(A)(33) of 250-140-30-1 of the RIDEM Rules and Regulations for Investigation and Remediation of Hazardous Materials (the Remediation Regulations))		RIDEM CONTACT:
<input type="checkbox"/> Known or suspected releases of PETROLEUM PRODUCT are present at the site (Petroleum Product as defined in Rule 1.5(A)(84) of 250-140-25-1 of the RIDEM Rules and Regulations for Underground Storage Facilities Used for Regulated Substances and Hazardous Materials)		
<input type="checkbox"/> This site is identified on the RIDEM Environmental Resources Map as one of the following regulated facilities		SITE ID#:
<input type="checkbox"/> CERCLIS/Superfund (NPL)		
<input type="checkbox"/> State Hazardous Waste Site (SHWS)		
<input type="checkbox"/> Environmental Land Usage Restriction (ELUR)		
<input type="checkbox"/> Leaking Underground Storage Tank (LUST)		
<input type="checkbox"/> Closed Landfill		
Note: If any boxes in 1 above are checked, the applicant must contact the RIDEM OLRSM Project Manager associated with the Site to determine if subsurface infiltration of stormwater is allowable for the project. Indicate if the infiltration corresponds to "Red," "Yellow" or "Green" as described in Section 3.2.8 of the RISDISM Guidance (Subsurface Contamination Guidance). Also, note and reference approval in PART 3, Minimum Standard 2: Groundwater Recharge/Infiltration.		
2. PER MINIMUM STANDARD 8 of RICR 8.14.C.1-6 "LUHPPLS," THE SITE IS/HAS:		
<input type="checkbox"/> Industrial Site with RIPDES MSGP, except where No Exposure Certification exists. http://www.dem.ri.gov/programs/water/permits/ripdes/stormwater/status.php		
<input type="checkbox"/> Auto Fueling Facility (e.g., gas station)		
<input type="checkbox"/> Exterior Vehicles Service, Maintenance, or Equipment Cleaning Area		

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input type="checkbox"/>	Road Salt Storage and Loading Areas (exposed to rainwater)	
<input type="checkbox"/>	Outdoor Storage and Loading/Unloading of Hazardous Substances	
3. STORMWATER INDUSTRIAL PERMITTING		
<input type="checkbox"/>	The site is associated with existing or proposed activities that are considered Land Uses with Higher Potential Pollutant Loads (LUHPPLS) (see RICR 8.14.C)	Activities: Sector:
<input type="checkbox"/>	Construction is proposed on a site that is subject to THE MULTI-SECTOR GENERAL PERMIT (MSGP) UNDER RULE 31(B)15 OF THE RIPDES REGULATIONS.	MSGP permit #
<input type="checkbox"/>	Additional stormwater treatment is required by the MSGP Explain:	

REDEVELOPMENT STANDARD – MINIMUM STANDARD 6		
<input checked="" type="checkbox"/> Pre Construction Impervious Area		
0.27	<input checked="" type="checkbox"/> Total Pre-Construction Impervious Area (TIA)	
0.79	<input checked="" type="checkbox"/> Total Site Area (TSA)	
	<input type="checkbox"/> Jurisdictional Wetlands (JW)	
	<input type="checkbox"/> Conservation Land (CL)	
<input checked="" type="checkbox"/> Calculate the Site Size (defined as contiguous properties under same ownership)		
0.79	<input checked="" type="checkbox"/> Site Size (SS) = (TSA) – (JW) – (CL)	
0.34	<input checked="" type="checkbox"/> (TIA) / (SS) =	<input type="checkbox"/> (TIA) / (SS) >0.4?
<input type="checkbox"/> YES, Redevelopment		

PART 2. LOW IMPACT DEVELOPMENT ASSESSMENT – MINIMUM STANDARD 1 (NOT REQUIRED FOR REDEVELOPMENT OR RETROFITS) This section may be deleted if not required.	
Note: A written description must be provided specifying why each method is not being used or is not applicable at the Site. Appropriate answers may include: <ul style="list-style-type: none"> • Town requires ... (state the specific local requirement) • Meets Town’s dimensional requirement of ... • Not practical for site because ... • Applying for waiver/variance to achieve this (pending/approved/denied) • Applying for wavier/variance to seek relief from this (pending/approved/denied) 	
A) PRESERVATION OF UNDISTURBED AREAS, BUFFERS, AND FLOODPLAINS <input checked="" type="checkbox"/> Sensitive resource areas and site constraints are identified (required) <input checked="" type="checkbox"/> Local development regulations have been reviewed (required) <input type="checkbox"/> All vegetated buffers and coastal and freshwater wetlands will be protected during and after construction <input type="checkbox"/> Conservation Development or another site design technique has been incorporated to protect open space and pre-development hydrology. Note: If Conservation Development has been used, check box and skip to Subpart C <input checked="" type="checkbox"/> As much natural vegetation and pre-development hydrology as possible has been maintained	IF NOT IMPLEMENTED, EXPLAIN HERE

<p>B) LOCATE DEVELOPMENT IN LESS SENSITIVE AREAS AND WORK WITH THE NATURAL LANDSCAPE CONDITIONS, HYDROLOGY, AND SOILS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Development sites and building envelopes have been appropriately distanced from wetlands and waterbodies <input checked="" type="checkbox"/> Development and stormwater systems have been located in areas with greatest infiltration capacity (e.g., soil groups A and B) <input type="checkbox"/> Plans show measures to prevent soil compaction in areas designated as Qualified Pervious Areas (QPA's) <input type="checkbox"/> Development sites and building envelopes have been positioned outside of floodplains <input type="checkbox"/> Site design positions buildings, roadways and parking areas in a manner that avoids impacts to surface water features <input type="checkbox"/> Development sites and building envelopes have been located to minimize impacts to steep slopes ($\geq 15\%$) <input type="checkbox"/> Other (describe): 	
<p>C) MINIMIZE CLEARING AND GRADING</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Site clearing has been restricted to <u>minimum area needed</u> for building footprints, development activities, construction access, and safety. <input checked="" type="checkbox"/> Site has been designed to position buildings, roadways, and parking areas in a manner that minimizes grading (cut and fill quantities) <input type="checkbox"/> Protection for stands of trees and individual trees and their root zones to be preserved has been specified, and such protection extends at least to the tree canopy drip line(s) <input checked="" type="checkbox"/> Plan notes specify that public trees removed or damaged during construction shall be replaced with equivalent 	
<p>D) REDUCE IMPERVIOUS COVER</p> <ul style="list-style-type: none"> <input type="checkbox"/> Reduced roadway widths (≤ 22 feet for ADT ≤ 400; ≤ 26 feet for ADT 400 - 2,000) <input type="checkbox"/> Reduced driveway areas (length minimized via reduced ROW width (≤ 45 ft.) and/or reduced (or absolute minimum) front yard setback; width minimized to ≤ 9 ft. wide one lane; ≤ 18 ft. wide two lanes; shared driveways; pervious surface) <input type="checkbox"/> Reduced building footprint: Explain approach: <input type="checkbox"/> Reduced sidewalk area (≤ 4 ft. wide; one side of the street; unpaved path; pervious surface) <input type="checkbox"/> Reduced cul-de-sacs (radius < 45 ft; vegetated island; alternative turn-around) <input type="checkbox"/> Reduced parking lot area: Explain approach <input type="checkbox"/> Use of pervious surfaces for driveways, sidewalks, parking areas/overflow parking areas, etc. <input checked="" type="checkbox"/> Minimized impervious surfaces (project meets or is less than maximum specified by Zoning Ordinance) <input type="checkbox"/> Other (describe): 	
<p>E) DISCONNECT IMPERVIOUS AREA</p> <ul style="list-style-type: none"> <input type="checkbox"/> Impervious surfaces have been disconnected, and runoff has been diverted to QPAs to the maximum extent possible <input type="checkbox"/> Residential street edges allow side-of-the-road drainage into vegetated open swales <input type="checkbox"/> Parking lot landscaping breaks up impervious expanse AND accepts runoff <input type="checkbox"/> Other (describe): 	
<p>F) MITIGATE RUNOFF AT THE POINT OF GENERATION</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Small-scale BMPs have been designated to treat runoff as close as possible to the source 	

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<p>G) PROVIDE LOW-MAINTENANCE NATIVE VEGETATION</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Low-maintenance landscaping has been proposed using native species and cultivars <input type="checkbox"/> Plantings of native trees and shrubs in areas previously cleared of native vegetation are shown on site plan <input type="checkbox"/> Lawn areas have been limited/minimized, and yards have been kept undisturbed to the maximum extent practicable on residential lots 	
<p>H) RESTORE STREAMS/WETLANDS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Historic drainage patterns have been restored by removing closed drainage systems, daylighting buried streams, and/or restoring degraded stream channels and/or wetlands <input type="checkbox"/> Removal of invasive species <input type="checkbox"/> Other 	

PART 3. SUMMARY OF REMAINING STANDARDS

GROUNDWATER RECHARGE – MINIMUM STANDARD 2		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project has been designed to meet the groundwater recharge standard.
<input type="checkbox"/>	<input type="checkbox"/>	If “No,” the justification for groundwater recharge criterion waiver has been explained in the Narrative (e.g., threat of groundwater contamination or physical limitation), if applicable (see RICR 8.8.D);
<input type="checkbox"/>	<input type="checkbox"/>	Your waiver request has been explained in the Narrative, if applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is this site identified as a Regulated Facility in Part 1, Minimum Standard 8: LUHPPL Identification?
<input type="checkbox"/>	<input type="checkbox"/>	If “Yes,” has approval for infiltration by the OLRSM Site Project Manager, per Part 1, Minimum Standard 8, been requested?

TABLE 2-1: Summary of Recharge (see RISDISM Section 3.3.2)					
(Add or Subtract Rows as Necessary)					
Design Point	Impervious Area Treated (sq ft)	Total Re _v Required (cu ft)	LID Stormwater Credits (see RISDISM Section 4.6.1)	Recharge Required by Remaining BMPs (cu ft)	Recharge Provided by BMPs (cu ft)
			Portion of Re _v directed to a QPA (cu ft)		
DP-1:	10,207	382	0	382	6,626
TOTALS:	10,207	382	0	382	6,626
<p><u>Notes:</u></p> <ol style="list-style-type: none"> 1. Only BMPs listed in RISDISM Table 3-5 “List of BMPs Acceptable for Recharge” may be used to meet the recharge requirement. 2. Recharge requirement must be satisfied for each waterbody ID. 					
<p><input checked="" type="checkbox"/> Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.):</p> <p align="center"><i>Project Narrative and Stormwater Management Report – Appendix C</i></p>					

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

WATER QUALITY – MINIMUM STANDARD 3		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet or exceed the required water quality volume WQv (see RICR 8.9.E-I)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the proposed final impervious cover greater than 20% of the disturbed area (see RICR 8.9.E-I)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either the Modified Curve Number Method or the Split Pervious/Impervious method in Hydro-CAD was used to calculate WQv; or,
<input checked="" type="checkbox"/>	<input type="checkbox"/>	If “Yes,” either TR-55 or TR-20 was used to calculate WQv; and,
<input type="checkbox"/>	<input type="checkbox"/>	If “No,” the project meets the minimum WQv of 0.2 watershed inches over the entire disturbed area.
<input type="checkbox"/>	<input type="checkbox"/>	Not Applicable
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet or exceed the ability to treat required water quality flow WQf (see RICR 8.9.I.1-3)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project propose an increase of impervious cover to a receiving water body with impairments? If “Yes,” please indicate below the method that was used to address the water quality requirements of no further degradation to a low-quality water. An infiltration basin has been selected for this project having pollutant removal capabilities specifically suited for the removal of the pollutants of concern (pathogens).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	RICR 8.36. A Pollutant Loading Analysis is needed and has been completed.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	The Water Quality Guidance Document (Water Quality Goals and Pollutant Loading Analysis Guidance for Discharges to Impaired Waters) has been followed as applicable.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	BMPs are proposed that are on the approved technology list . If “Yes,” please provide all required worksheets from the manufacturer.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Additional pollutant-specific requirements and/or pollutant removal efficiencies are applicable to the site as the result of a TMDL, SAMP, or other watershed-specific requirements. If “Yes,” please describe:

TABLE 3-1: Summary of Water Quality (see RICR 8.9)					
Design Point and WB ID	Impervious area treated (sq ft)	Total WQv Required (cu ft)	LID Stormwater Credits (see RICR 8.18)	Water Quality Treatment Remaining (cu ft)	Water Quality Provided by BMPs (cu ft)
			WQv directed to a QPA (cu ft)		
DP-1:	10,207	1,089	0	1,089	6,626
TOTALS:	10,207	1,089	0	1,089	6,626
Notes:					
1. Only BMPs listed in RICR 8.20 and 8.25 or the Approved Technologies List of BMPs is Acceptable for Water Quality treatment.					
2. For each Design Point, the Water Quality Volume Standard must be met for each Waterbody ID.					
<input checked="" type="checkbox"/> YES	This project has met the setback requirements for each BMP.				
<input type="checkbox"/> NO	If “No,” please explain:				
<input checked="" type="checkbox"/>	Indicate where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.): <i>Project Narrative and Stormwater Management Report – Appendix C & E</i>				

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

CONVEYANCE AND NATURAL CHANNEL PROTECTION (RICR 8.10) – MINIMUM STANDARD 4		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is this standard waived? If “Yes,” please indicate one or more of the reasons below:
		<input type="checkbox"/> The project directs discharge to a large river (i.e., 4th-order stream or larger. See RISDISM Appendix I for State-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. <input checked="" type="checkbox"/> The project is a small facility with impervious cover of less than or equal to 1 acre. <input type="checkbox"/> The project has a post-development peak discharge rate from the facility that is less than 2 cfs for the 1-year, 24-hour Type III design storm event (prior to any attenuation). (<u>Note</u> : LID design strategies can greatly reduce the peak discharge rate).
<input type="checkbox"/>	<input type="checkbox"/>	Conveyance and natural channel protection for the site have been met. If “No,” explain why:

TABLE 4-1: Summary of Channel Protection Volumes (see RICR 8.10)					
Design Point	Receiving Water Body Name	Coldwater Fishery? (Y/N)	Total CPv Required (cu ft)	Total CPv Provided (cu ft)	Average Release Rate Modeled in the 1-yr storm (cfs)
DP-1:					
TOTALS:					
<u>Note</u> : The Channel Protection Volume Standard must be met in each waterbody ID.					
<input type="checkbox"/> YES <input type="checkbox"/> NO	The CPv is released at roughly a uniform rate over a 24-hour duration (see examples of sizing calculations in Appendix D of the RISDISM).				
<input type="checkbox"/> YES <input type="checkbox"/> NO	Do additional design restrictions apply resulting from any discharge to cold-water fisheries; If “Yes,” please indicate restrictions and solutions below.				
<input type="checkbox"/> Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).					

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

OVERBANK FLOOD PROTECTION (RICR 8.11) AND OTHER POTENTIAL HIGH FLOWS – MINIMUM STANDARD 5		
YES	NO	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is this standard waived? If yes, please indicate one or more of the reasons below:
		<input type="checkbox"/> The project directs discharge to a large river (i.e., 4th-order stream or larger. See Appendix I for state-wide list and map of stream orders), bodies of water >50.0 acres in surface area (i.e., lakes, ponds, reservoirs), or tidal waters. <input type="checkbox"/> A Downstream Analysis (see RICR 8.11.D and E) indicates that peak discharge control would not be beneficial or would exacerbate peak flows in a downstream tributary of a particular site (e.g., through coincident peaks).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does the project flow to an MS4 system or subject to other stormwater requirements? If "Yes," indicate as follows:
		<input type="checkbox"/> RIDOT <input type="checkbox"/> Other (specify):
<p>Note: The project could be approved by RIDEM but not meet RIDOT or Town standards. RIDOT's regulations indicate that post-volumes must be less than pre-volumes for the 10-yr storm at the design point entering the RIDOT system. If you have not already received approval for the discharge to an MS4, please explain below your strategy to comply with RIDEM and the MS4.</p>		
		Indicate below which model was used for your analysis. <input type="checkbox"/> TR-55 <input checked="" type="checkbox"/> TR-20 <input checked="" type="checkbox"/> HydroCAD <input type="checkbox"/> Bentley/Haestad <input type="checkbox"/> Intellisolve <input type="checkbox"/> Other (Specify):
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does the drainage design demonstrate that flows from the 100-year storm event through a BMP will safely manage and convey the 100-year storm? If "No," please explain briefly below and reference where in the application further documentation can be found (i.e., name of report/document, page numbers, appendices, etc.):
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Do off-site areas contribute to the sub-watersheds and design points? If "Yes,"
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Are the areas modeled as "present condition" for both pre- and post-development analysis?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Are the off-site areas shown on the subwatershed maps?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does the drainage design confirm safe passage of the 100-year flow through the site for off-site runoff?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is a Downstream Analysis required (see RICR 8.11.E.1)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Calculate the following:
0.79		<input checked="" type="checkbox"/> Area of disturbance within the sub-watershed (acres)
0.51		<input checked="" type="checkbox"/> Impervious cover (%)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is a dam breach analysis required (earthen embankments over six (6) feet in height, or a capacity of 15 acre-feet or more, and contributes to a significant or high hazard dam)?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does this project meet the overbank flood protection standard?

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Table 5-1 Hydraulic Analysis Summary

Subwatershed (Design Point)	1.2" Peak Flow (cfs) **		1-yr Peak Flow (cfs)		10-yr Peak Flow (cfs)		100-yr Peak Flow (cfs)	
	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)	Pre (cfs)	Post (cfs)
DP-1:	0.29	0.25	0.60	0.53	2.06	1.54	4.99	3.42
TOTALS:	0.29	0.25	0.60	0.53	2.06	1.54	4.99	3.42
** Utilize modified curve number method or split pervious /impervious method in HydroCAD.								
<u>Note:</u> The hydraulic analysis must demonstrate no impact to each individual subwatershed DP unless each DP discharges to the same wetland or water resource.								
Indicate as follows where the pertinent calculations and/or information for the items above are provided						Name of report/document, page numbers, appendices, etc.		
Existing conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, and water surface elevations showing methodologies used and supporting calculations.						<i>Project Narrative and Stormwater Management Report – Appendix A & B</i>		
Proposed conditions analysis for each subwatershed, including curve numbers, times of concentration, runoff rates, volumes, water surface elevations, and routing showing the methodologies used and supporting calculations.						<i>Project Narrative and Stormwater Management Report – Appendix A & C</i>		
Final sizing calculations for structural stormwater BMPs, including contributing drainage area, storage, and outlet configuration.						<i>Project Narrative and Stormwater Management Report – Appendix C</i>		
Stage-storage, inflow and outflow hydrographs for storage facilities (e.g., detention, retention, or infiltration facilities).						<i>Project Narrative and Stormwater Management Report – Appendix C</i>		

Table 5-2 Summary of Best Management Practices

BMP ID	DP #	BMP Type (e.g., bioretention, tree filter)	BMP Functions					Bypass Type	Horizontal Setback Criteria are met per RICR 8.21.B.10, 8.22.D.11, and 8.35.B.4		
			Pre-Treatment (Y/N/NA)	Re _v	WQ _v	CP _v (Y/N/NA)	Overbank Flood Reduction (Y/N/NA)		External (E) Internal (I) or NA	Yes/ No	Technical Justification (Design Report page number)
1	1	Infiltration Basin	Y	Y	Y	N/A	Y	I	Yes	N/A	75 Ft

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Table 5.3 Summary of Soils to Evaluate Each BMP									
DP #	BMP ID	BMP Type (e.g., bioretention, tree filter)	Soils Analysis for Each BMP						
			Test Pit ID# and Ground Elevation		SHWT Elevation (ft)	Bottom of Practice Elevation* (ft)	Separation Distance Provided (ft)	Hydrologic Soil Group (A, B, C, D)	Exfiltration Rate Applied (in/hr)
			Primary	Secondary					
1	1	Infiltration Basin	3		204.0	210.5	6.5	B	2.41

* For underground infiltration systems (UICs) bottom equals bottom of stone, for surface infiltration basins bottom equals bottom of basin, for filters bottom equals interface of storage and top of filter layer

LAND USES WITH HIGHER POTENTIAL POLLUTANTS LOADS (LUHPPLs) – MINIMUM STANDARD 8			
YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Describe any LUHPPLs identified in Part 1, Minimum Standard 8, Section 2. If not applicable, continue to Minimum Standard 9.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are these activities already covered under an MSGP? If “No,” please explain if you have applied for an MSGP or intend to do so?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	List the specific BMPs that are proposed for this project that receive stormwater from LUHPPL drainage areas. These BMP types must be listed in RISDISM Table 3-3, “Acceptable BMPs for Use at LUHPPLs.” Please list BMPs:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Additional BMPs, or additional pretreatment BMP’s if any, that meet RIPDES MSGP requirements; Please list BMPs:
			Indicate below where the pertinent calculations and/or information for the above items are provided (i.e., name of report/document, page numbers, appendices, etc.).

ILLICIT DISCHARGES – MINIMUM STANDARD 9			
Illicit discharges are defined as unpermitted discharges to Waters of the State that do not consist entirely of stormwater or uncontaminated groundwater, except for certain discharges identified in the RIPDES Phase II Stormwater General Permit.			
YES	NO	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have you checked for illicit discharges?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have any been found and/or corrected? If “Yes,” please identify.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does your report explain preventative measures that keep non-stormwater discharges out of the Waters of the State (during and after construction)?

SOIL EROSION AND SEDIMENT CONTROL (SESC) – MINIMUM STANDARD 10			
YES	NO	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have you included a Soil Erosion and Sediment Control Plan Set and/or Complete Construction Plan Set?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have you provided a separately-bound document based upon the SESC Template ? If yes, proceed to Minimum Standard 11 (the following items can be assumed to be addressed).
			If “No,” include a document with your submittal that addresses the following elements of an SESC Plan:

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<input type="checkbox"/>	Soil Erosion and Sediment Control Plan Project Narrative, including a description of how the fifteen (15) Performance Criteria have been met:
<input type="checkbox"/>	Provide Natural Buffers and Maintain Existing Vegetation
<input type="checkbox"/>	Minimize Area of Disturbance
<input type="checkbox"/>	Minimize the Disturbance of Steep Slopes
<input type="checkbox"/>	Preserve Topsoil
<input type="checkbox"/>	Stabilize Soils
<input type="checkbox"/>	Protect Storm Drain Inlets
<input type="checkbox"/>	Protect Storm Drain Outlets
<input type="checkbox"/>	Establish Temporary Controls for the Protection of Post-Construction Stormwater Control Measures
<input type="checkbox"/>	Establish Perimeter Controls and Sediment Barriers
<input type="checkbox"/>	Divert or Manage Run-On from Up-Gradient Areas
<input type="checkbox"/>	Properly Design Constructed Stormwater Conveyance Channels
<input type="checkbox"/>	Retain Sediment On-Site
<input type="checkbox"/>	Control Temporary Increases in Stormwater Velocity, Volume, and Peak Flows
<input type="checkbox"/>	Apply Construction Activity Pollution Prevention Control Measures
<input type="checkbox"/>	Install, Inspect, and Maintain Control Measures and Take Corrective Actions
<input type="checkbox"/>	Qualified SESC Plan Preparer's Information and Certification
<input type="checkbox"/>	Operator's Information and Certification; if not known at the time of application, the Operator must certify the SESC Plan upon selection and prior to initiating site activities
<input type="checkbox"/>	Description of Control Measures, such as Temporary Sediment Trapping and Conveyance Practices, including design calculations and supporting documentation, as required

STORMWATER MANAGEMENT SYSTEM OPERATION, MAINTENANCE, AND POLLUTION PREVENTION PLAN – MINIMUM STANDARDS 7 AND 9

Operation and Maintenance Section

YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you minimized all sources of pollutant contact with stormwater runoff, to the maximum extent practicable?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Have you provided a separately-bound Operation and Maintenance Plan for the site and for all of the BMPs, and does it address each element of RICR 8.17 and RISDISM Appendix C and E?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lawn, Garden, and Landscape Management meet the requirements of RISDISM Section G.7? If "No," why not?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is the property owner or homeowner's association responsible for the stormwater maintenance of all BMP's? If "No," you must provide a legally binding and enforceable maintenance agreement (see RISDISM Appendix E, page 26) that identifies the entity that will be responsible for maintenance of the stormwater. Indicate where this agreement can be found in your report (i.e., name of report/document, page numbers, appendices, etc.).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Do you anticipate that you will need legal agreements related to the stormwater structures? (e.g. off-site easements, deed restrictions, covenants, or ELUR per the Remediation Regulations). If "Yes," have you obtained them? Or please explain your plan to obtain them:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is stormwater being directed from public areas to private property? If "Yes," note the following: <u>Note:</u> This is not allowed unless a funding mechanism is in place to provide the finances for the long-term maintenance of the BMP and drainage, or a funding mechanism is demonstrated that can guarantee the long-term maintenance of a stormwater BMP by an individual homeowner.

Pollution Prevention Section

<input checked="" type="checkbox"/>	<input type="checkbox"/>	Designated snow stockpile locations?
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Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

<input type="checkbox"/>	<input checked="" type="checkbox"/>	Trash racks to prevent floatables, trash, and debris from discharging to Waters of the State?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Asphalt-only based sealants?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Pet waste stations? (<u>Note</u> : If a receiving water has a bacterial impairment, and the project involves housing units, then this could be an important part of your pollution prevention plan).
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Regular sweeping? Please describe:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	De-icing specifications, in accordance with RISDISM Appendix G. (NOTE: If the groundwater is GAA, or this area contributes to a drinking water supply, then this could be an important part of your pollution prevention plan).
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A prohibition of phosphate-based fertilizers? (<u>Note</u> : If the site discharges to a phosphorus impaired waterbody, then this could be an important part of your pollution prevention plan).

PART 4. SUBWATERSHED MAPPING AND SITE-PLAN DETAILS

Existing and Proposed Subwatershed Mapping (REQUIRED)		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed drainage area delineations
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Locations of all streams and drainage swales
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Drainage flow paths, mapped according to the DEM <i>Guidance for Preparation of Drainage Area Maps</i> (included in RISDISM Appendix K)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Complete drainage area boundaries; include off-site areas in both mapping and analyses, as applicable
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped seasonal high-water-table test pit locations
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped locations of the site-specific borings and/or test pits and soils information from the test pits at the locations of the BMPs
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mapped locations of the BMPs, with the BMPs consistently identified on the Site Construction Plans
<input type="checkbox"/>	<input type="checkbox"/>	Mapped bedrock outcrops adjacent to any infiltration BMP
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Soils were logged by a:
	<input checked="" type="checkbox"/>	DEM-licensed Class IV soil evaluator Name: Steven Henry (License #D4026)
	<input type="checkbox"/>	RI-registered P.E. Name:

Subwatershed and Impervious Area Summary				
Subwatershed (area to each design point)	First Receiving Water ID or MS4	Area Disturbed (Acres)	Existing Impervious (Acres)	Proposed Impervious (Acres)
DP-1:	RI0006017R-02	0.79	0.27	0.40
TOTALS:	RI0006017R-02	0.79	0.27	0.40

Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8)

Site Construction Plans (Indicate that the following applicable specifications are provided)		
YES	NO	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed plans (scale not greater than 1" = 40') with North arrow
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Existing and proposed site topography (with 1 or 2-foot contours); 10-foot contours accepted for off-site areas
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Boundaries of existing predominant vegetation and proposed limits of clearing
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Site Location clarification
<input type="checkbox"/>	<input type="checkbox"/>	Location and field-verified boundaries of resource protection areas such as: <ul style="list-style-type: none"> ▶ freshwater and coastal wetlands, including lakes and ponds ▶ coastal shoreline features Perennial and intermittent streams, in addition to Areas Subject to Storm Flowage (ASSFs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	All required setbacks (e.g., buffers, water-supply wells, septic systems)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Representative cross-section and profile drawings, and notes and details of structural stormwater management practices and conveyances (i.e., storm drains, open channels, swales, etc.), which include: <ul style="list-style-type: none"> ▶ Location and size of the stormwater treatment practices (type of practice, depth, area). Stormwater treatment practices (BMPs) must have labels that correspond to RISDISM Table 5-2; ▶ Design water surface elevations (applicable storms); ▶ Structural details of outlet structures, embankments, spillways, stilling basins, grade-control structures, conveyance channels, etc.; ▶ Existing and proposed structural elevations (e.g., inverts of pipes, manholes, etc.); ▶ Location of floodplain and, if applicable, floodway limits and relationship of site to upstream and downstream properties or drainage that could be affected by work in the floodplain; ▶ Planting plans for structural stormwater BMPs, including species, size, planting methods, and maintenance requirements of proposed planting
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Logs of borings and/or test pit investigations along with supporting soils/geotechnical report and corresponding water tables
<input type="checkbox"/>	<input type="checkbox"/>	Mapping of any OLRSM-approv ed remedial actions/systems (including ELURs)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Location of existing and proposed roads, buildings, and other structures including limits of disturbance; <ul style="list-style-type: none"> ▶ Existing and proposed utilities (e.g., water, sewer, gas, electric) and easements; ▶ Location of existing and proposed conveyance systems, such as grass channels, swales, and storm drains, and location(s) of final discharge point(s) (wetland, waterbody, etc.); ▶ Cross sections of roadways, with edge details such as curbs and sidewalks; ▶ Location and dimensions of channel modifications, such as bridge or culvert crossings
<input type="checkbox"/>	<input type="checkbox"/>	Locations, cross sections, and profiles of all stream or wetland crossings and their method of stabilization

Appendix E
Supporting Documentation



Version: 4/2015

Project Name **Champlin Hills Clubhouse**Date **10-17-2022**

Water Quality Volume Calculation WorkSheet

This worksheet is designed to assist the project engineer with a determination of the required water quality treatment area. The worksheet leads the designer through redevelopment applicability first and then receiving water requirements. This tool is intended to compliment to the Redevelopment Criteria Guidance and the Water Quality Guidance and assist both the designer and the permit application reviewer towards consistent results. Enter information into only the **YELLOW** Boxes.

[Redevelopment Criteria Guidance](#)

[Water Quality Goals "Stormwater Compensation Method"](#)

Step 1 - Determine which office in OWR you are applying to: [Application Guidance](#)

Step 2 - Site Information value/calculation units

Total Site Area (total area of project parcels)	TSA	0.79	acres
Total Jurisdictional Wetlands and/or floodplain within the above TSA	JW1=	0.00	acres
Existing impervious also within the Jurisdictional Wetlands	-JW2=	0.00	acres
Conservation Land within the TSA	C	0.00	acres
Site Size = (TSA)-(JW1-JW2)-CL	SS=	0.79	acres

Step 3 - Redevelopment Applicability

Total Impervious Area (pre-construction)	TIA=	0.27	acres
% Impervious (if $\geq 40\%$ - redevelopment standard 3.2.6 applies)		0.34	

REPEAT IF NECESSARY Steps 4, 5 and 6 for EACH Waterbody ID (RIVER-ID as found in the GIS Map Server)

Step 4 - Receiving waterbody information

Waterbody ID or RIVER ID from GIS Map Server	
Waterbody Name from GIS Map Server	
Name the sub-watersheds (design-points) contributing to this Waterbody ID	
Is this Waterbody Impaired/TMDL for any Phosphorus, Metals or Bacteria?	YES
Is this Waterbody Impaired for Nitrogen?	NO

Step 5 - Pre-Post Construction Conditions to the Waterbody

Total Pre-Construction Impervious Surface to this Waterbody ID	0.27	acres
Total Disturbed Existing Impervious (DI)	0.18	acres
Total Post-Construction Impervious to this Waterbody ID	0.40	acres
Net Increased Impervious (NII)	0.13	acres

Step 6 - Infiltration and BMP information - Note: Increasing infiltration will likely decrease stormwater treatment area for Metals, Bacteria and Phosphorus

I am proposing to infiltrate this percentage WQv to this WBID	100%	%
I am proposing this number of BMP's	1	#

RESULTS - Select the Larger Number of the 2 numbers provided

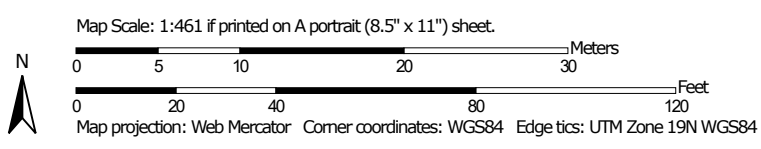
Applicable Condition	Min Water Quality Treatment Area	Min Treatment w/o WQ consideration
No Impairment or TMDL - New Development		
No Impairment or TMDL - Redevelopment		
Only Phosphorus, Metals or Bacteria Impairment - New Development	0.13	0.31
Only Phosphorus, Metals or Bacteria Impairment - Redevelopment		
Nitrogen Impairment - New Development		
Nitrogen Impairment - Redevelopment		
REQUIRED STORMWATER TREATMENT AREA	0.3	acres

* Enter the name of the STP (both type and label) which has been designed to treat this particular Rev or Rea.

Hydrologic Soil Group—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties



Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
 Survey Area Data: Version 22, Sep 12, 2022

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

Date(s) aerial images were photographed: May 24, 2020—Jul 18, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EfB	Enfield silt loam, 3 to 8 percent slopes	B	1.0	100.0%
Totals for Area of Interest			1.0	100.0%

Description

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.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program



Sht Lg2

Site Evaluation Form

Part A - Soil Profile Description

Application Number

Property Owner: WEST BAY, LLC

Property Location: 320 SCITUATE AVENUE, CRANSTON

Date of Test Hole: NOVEMBER 2, 2017

Soil Evaluator: STEVEN HENRY

License Number: D4926

Weather: 600 Clear

Shaded: Yes No Time: 8-12 noon

Table with 11 columns: TH Horizon, Depth, Horizon Boundaries (Dist, Topo), Soil Colors (Matrix, Re-Dox Features), Re-Dox (Ab., S., Contr.), Texture, Structure, Consistence, Soil Category. Contains two soil profiles (TH 1 and TH 2) with handwritten data.

TH 1 Soil Class D Total Depth 11'0" Impervious/Limiting Layer Depth (og) GW Seepage Depth none SHWT 8'6" (og)
TH Soil Class D Total Depth 10'6" Impervious/Limiting Layer Depth (og) GW Seepage Depth none SHWT 9'0" (og)

Comments: Topsoil appears to be somewhat disturbed due to previous site clearing & grading



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
 Department of Environmental Management
 Office of Water Resources
 Onsite Wastewater Treatment System Program



Sht 2 of 2

Site Evaluation Form
 Part A - Soil Profile Description

Property Owner: WEST BAY, LLC
 Property Location: 320 SCITUATE AVENUE, CRANSTON
 Date of Test Hole: NOVEMBER 2, 2017
 Soil Evaluator: STEVEN HENRY License Number: LD4926
 Weather: 60° CLEAR Shaded: Yes No Time: 9am - 12 noon

TH Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox		Texture	Structure	Consistence	Soil Category
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S. Contr.				
(FILL)	27"										w/ FEW roots & stump
A?	27"-37"	CL	W	10YR 3/4	-	-	-	SIL	WSBK	FR	
Bw	37"-60"	CL	W	10YR 4/6	-	-	-	SIL Tr Gr	Emgr WSBK	FR	compacted under fill?
2C ¹	60"-104"	AB	S	10YR 5/4	-	-	-	GRASS S	ØSG	L	1
2C ²	104"-121"			2.5Y 6/3	-	-	-	S	ØSG	L-VF	1
SIDE WALLS collapsing											

TH 3 Soil Class D Total Depth 121+ Impervious/Limiting Layer Depth - (og) GW Seepage Depth none SHWT 100" (og) * from existing ground

TH _____ Soil Class _____ Total Depth _____ Impervious/Limiting Layer Depth _____ (og) GW Seepage Depth _____ SHWT _____ (og)

Comments: Test pit may be at location of old rotted tree stump, A horizon appears slightly disturbed thru out - may be remnants of B horizon, reddish hue of Bw horizon maybe due to stump/roots decaying

National Flood Hazard Layer FIRMMette



71°29'34"W 41°46'56"N



Legend

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

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

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

OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

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

MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **10/13/2022 at 4:08 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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