

EXISTING GRADE, INC.

Land Surveyors - Civil Engineers

Storm Water Drainage Report for *Wildwood Lane- Lot 61* *Bourne, Massachusetts*

Prepared for:

Ocean Dunes, LLC
498 Newtown Road
Littleton, Massachusetts 01460

Prepared by:

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January 03, 2024
EGI Project No. 1292



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Checklist for Stormwater Report

A. Introduction

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



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

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

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

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

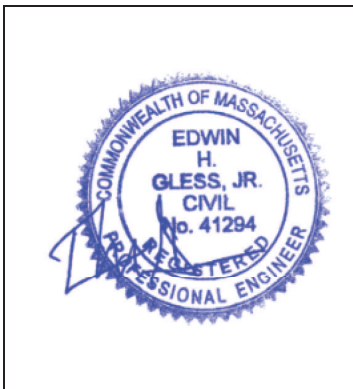
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Edwin Gless 01/03/2024

Signature and Date

Checklist

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

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

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



Checklist for Stormwater Report

Checklist (continued)

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

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

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

2. Introduction

Project Summary

The proponent, Ocean Dunes, LLC, proposes to construct 7 townhouse style buildings (Lot 61 on the proposed site plans) for the property located at 61 Wildwood Lane, Bourne MA. The proposed project will include the construction of 7 new multifamily style townhouse buildings, one new pass through parking lot consisting of: bituminous concrete surface, asphalt sloped curbing, storm water management infrastructures inclusive of catch basins, drain manholes, pipe conveyance systems, and drywells as shown on the design plans. All of the proposed buildings will be tied into a total of 6 proposed septic systems with connections to town water via new mains through the property. The proposed project will be conducted per the Massachusetts Department of Environmental Protection requirements, Local Town and State bylaws, as well as using best management practices.

The property is listed by the Town of Bourne Assessor's Department as Lot 62, Parcel 99 on Assessors Map 7 and historically laid within the Residential 20 (R-20) zoning district at the time of original permitting based upon a review of records on file at the Town of Bourne Planning and Zoning Offices. The property is located within the FEMA Flood Zone X Area (area outside mapped flood plain) based upon a review of FIRM Map 25001C0316K, Panel 316 of 550, last revised July 06, 2021. Currently there is municipal water as well as underground electric telephone/ cable to service the property.

The property's address is recorded as 61 Wildwood Lane, Bourne MA and abuts Ocean Pines Road to the West, Wildwood Lane to the South, and dedicated open space parcels and private residential properties to the North and East. Access to the site is via proposed pass through driveway along Wildwood Lane to the South and Ocean Pines Road to the West. The existing site is comprised a cleared storage lot which was permitted under the original historic site plan approval.

The Barnstable County Soil Survey, issued by the US Department of Agriculture was referenced to determine the type and hydrologic group of the soils located on the property. The property is comprised of mostly hydrologic soil group A type soils, as confirmed via numerous percolation and soil tests for the property.

Pre- and Post-Development Analysis

The pre- and post-development conditions were analyzed utilizing Hydrocad, a storm water modeling program, to model the hydrologic impacts of the proposed development on adjacent properties. The modeling program is based upon Soil Conservation Service's (SCS) Technical Release 55 (TR-55) and TR-20, programs to estimate the runoff and peak rates for small watersheds. As part of this analysis, two (2) separate models; one for the pre-development conditions, and one

for post-development conditions were created and three (3) points of comparison, or Design Points, were analyzed. The Design Points as well as the Watershed areas and associated time of concentration paths (Tc), are shown on the pre and post-development watershed plans, which are located in this report.

The pre- and post development conditions were analyzed for the 2, 10, 25 and 100-year Type III 24 hour storm events. The rainfall intensities used for each storm event were obtained from the latest NOAA Precipitation Frequency Data Server (PFDS) for the project location, and are shown in the table below.

<i>Storm Event</i>	<i>Intensity (24-hr Duration (in))</i>
2-year	3.41
10-year	4.98
25-year	5.95
100-year	7.46

The Barnstable County Soil Survey, issued by the US Department of Agriculture was referenced to determine the type and hydrologic group of the soils located on the property.

3. Compliance with Storm Water Management Standards

Standard 1: No New Untreated Discharges

The development is designed so that no new storm water conveyances do not discharge *untreated* pavement runoff into or cause erosion to wetland resource areas.

Standard 2: Peak Rate Attenuation

Pre- and Post Development storm water analysis calculations were performed for the 2, 10, 25 and 100-year Type III 24 hour storm events and a comparison of the peak rates at the design points for each storm event, under pre- and post-development conditions are summarized in the tables below:

<i>Design Point “Wildwood”</i>		
<i>Storm Event</i>	<i>Pre-Development</i>	<i>Post-Development</i>
2-year	0.47 cfs	0.00 cfs
10-year	0.92 cfs	0.01 cfs
25-year	1.22 cfs	0.05 cfs
100-year	1.70 cfs	0.20 cfs

<i>Design Point “Northern Runoff”</i>		
<i>Storm Event</i>	<i>Pre-Development</i>	<i>Post-Development</i>
2-year	2.38 cfs	1.16 cfs
10-year	5.02 cfs	1.79 cfs
25-year	6.79 cfs	2.41 cfs
100-year	9.66 cfs	3.19 cfs

<i>Design Point “Ocean Pines”</i>		
<i>Storm Event</i>	<i>Pre-Development</i>	<i>Post-Development</i>
2-year	0.22 cfs	0.00 cfs
10-year	0.75 cfs	0.00 cfs
25-year	1.16 cfs	0.04 cfs
100-year	1.86 cfs	0.16 cfs

As shown in the tables above, the peak rates of storm water runoff generated under post-development conditions will be less than the peak rates generated under pre-development conditions and meet the requirements provided by the State of Massachusetts Stormwater Management Standards.

Complete runoff calculations for the 2, 10, 25 and 100-year Type III storm events including cover, soils types, area listings, and time of concentration paths for the pre-development conditions and post-development conditions are provided in Appendices A and B, respectively.

Standard 3: Groundwater Recharge

The groundwater recharge volume required for the development will be achieved through the proposed infiltration basin. Refer to Appendix C for all Groundwater Recharge Calculations and drywell sizing.

Standard 4: Water Quality

The storm water management system was designed with a treatment train consisting of street sweeping, deep sump catch basins, drywell pits, and cultec chambers to facilitate the required removal of 80% Total Suspended Solids (TSS) as shown in Appendix C.

Standard 5: Land Uses with higher Potential Pollutant Loads (LUHPPLs)

The proposed development is not a LUHPPL and therefore Standard 5 is not applicable.

Standard 6: Critical Areas

The proposed development does not discharge to a critical area and therefore Standard 6 is not applicable.

Standard 7: Redevelopment and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

The proposed development is not a redevelopment and therefore Standard 7 is not applicable.

Standard 8: Constr. Period Pollution Prevention and Erosion & Sedimentation Control

A Construction Period Pollution Prevention, including an Erosion and Sedimentation Control Plan is provided in Appendix D.

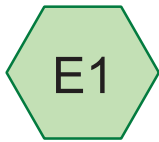
Standard 9: Operation and Maintenance Plan

The Operation and Maintenance Plan is provided in Appendix E.

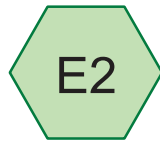
Standard 10: Prohibition of Illicit Discharges

There are no illicit discharges anticipated for the proposed development however measures to prevent illicit discharges will be included within the Long-Term Pollution Prevention Plan. Also, as required, an Illicit Discharge Compliance Statement will be submitted prior to the discharge of any storm water to the post-construction storm water Best Management Practices (BMPs).

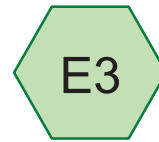
APPENDIX A



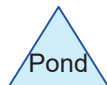
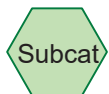
WILDWOOD FLOW



NORTHERN FLOW



OCEAN PINES FLOW



1292_LOT 61 EXCON

Prepared by Existing Grade, Inc
HydroCAD® 10.00-22 s/n 04588 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.840	77	Newly graded area, HSG A (E1, E2, E3)
0.313	30	Woods, Good, HSG A (E1, E2, E3)
2.152	70	TOTAL AREA

1292_LOT 61 EXCON

Prepared by Existing Grade, Inc
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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.152	HSG A	E1, E2, E3
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.152		TOTAL AREA

1292_LOT 61 EXCON

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.840	0.000	0.000	0.000	0.000	1.840	Newly graded area	E1, E2, E3
0.313	0.000	0.000	0.000	0.000	0.313	Woods, Good	E1, E2, E3
2.152	0.000	0.000	0.000	0.000	2.152	TOTAL AREA	

1292_LOT 61 EXCON

Prepared by Existing Grade, Inc

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

Page 5

Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: WILDWOODFLOW

Runoff Area=12,921 sf 0.00% Impervious Runoff Depth>1.29"
Flow Length=171' Tc=16.3 min CN=76 Runoff=0.47 cfs 0.032 af

Subcatchment E2: NORTHERNFLOW

Runoff Area=62,611 sf 0.00% Impervious Runoff Depth>1.06"
Flow Length=266' Tc=8.6 min CN=72 Runoff=2.38 cfs 0.127 af

Subcatchment E3: OCEANPINESFLOW

Runoff Area=18,229 sf 0.00% Impervious Runoff Depth>0.45"
Flow Length=186' Tc=8.9 min CN=59 Runoff=0.22 cfs 0.016 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.175 af Average Runoff Depth = 0.97"
100.00% Pervious = 2.152 ac 0.00% Impervious = 0.000 ac

1292_LOT 61 EXCON

Prepared by Existing Grade, Inc

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Subcatchment E1: WILDWOOD FLOW

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.032 af, Depth> 1.29"

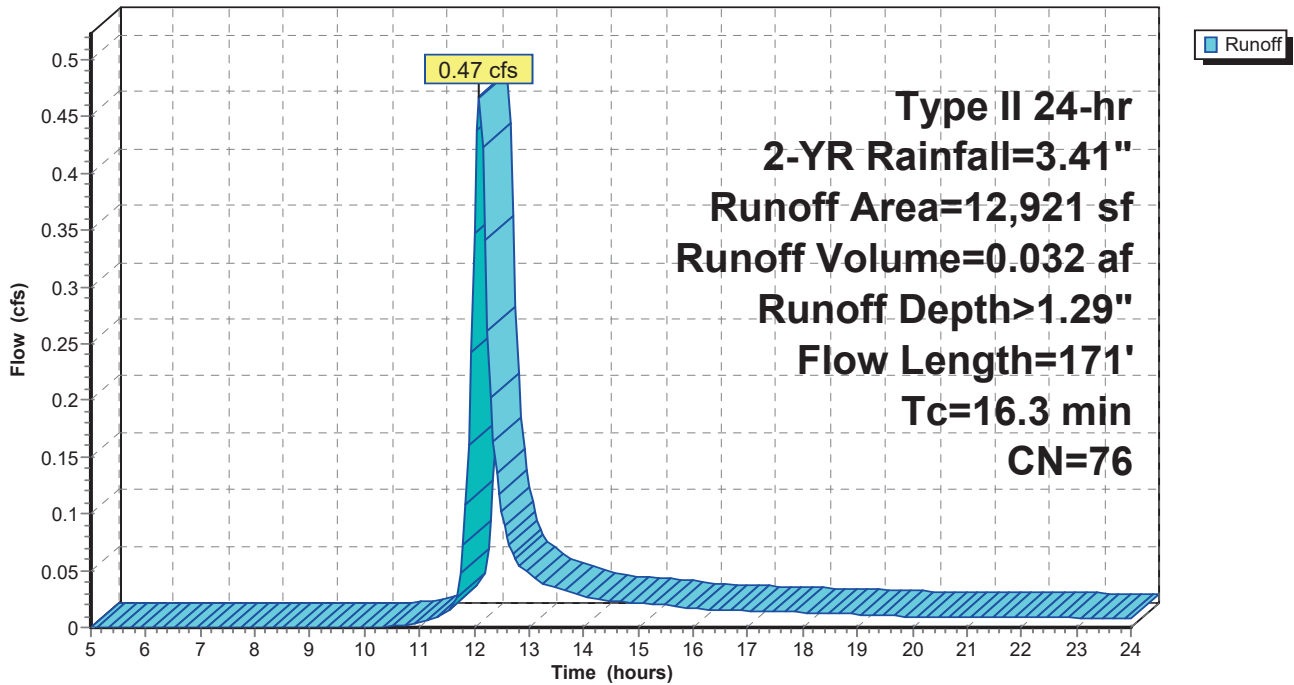
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
12,697	77	Newly graded area, HSG A
224	30	Woods, Good, HSG A
12,921	76	Weighted Average
12,921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	121	0.0741	4.38		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
16.3	171	Total			

Subcatchment E1: WILDWOOD FLOW

Hydrograph



1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

Summary for Subcatchment E2: NORTHERN FLOW

Runoff = 2.38 cfs @ 12.01 hrs, Volume= 0.127 af, Depth> 1.06"

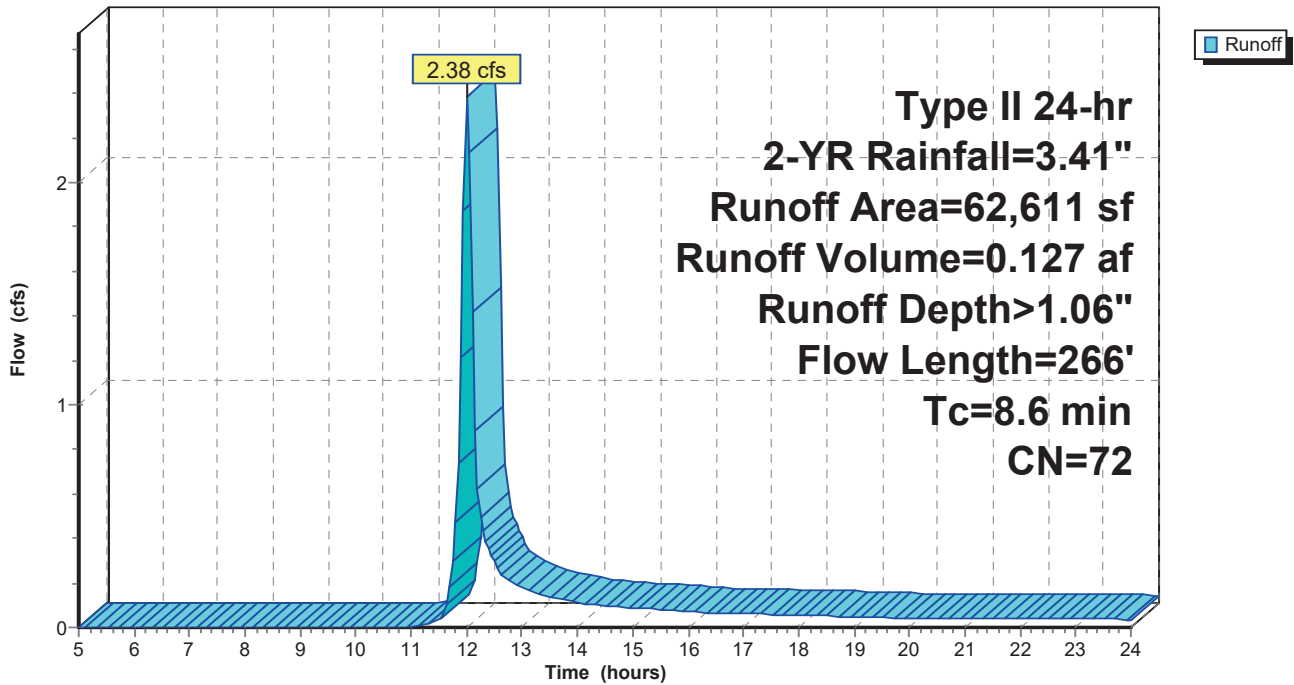
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
56,005	77	Newly graded area, HSG A
6,606	30	Woods, Good, HSG A
62,611	72	Weighted Average
62,611		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.9	216	0.0613	3.99		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
8.6	266	Total			

Subcatchment E2: NORTHERN FLOW

Hydrograph



1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

Summary for Subcatchment E3: OCEAN PINES FLOW

Runoff = 0.22 cfs @ 12.04 hrs, Volume= 0.016 af, Depth> 0.45"

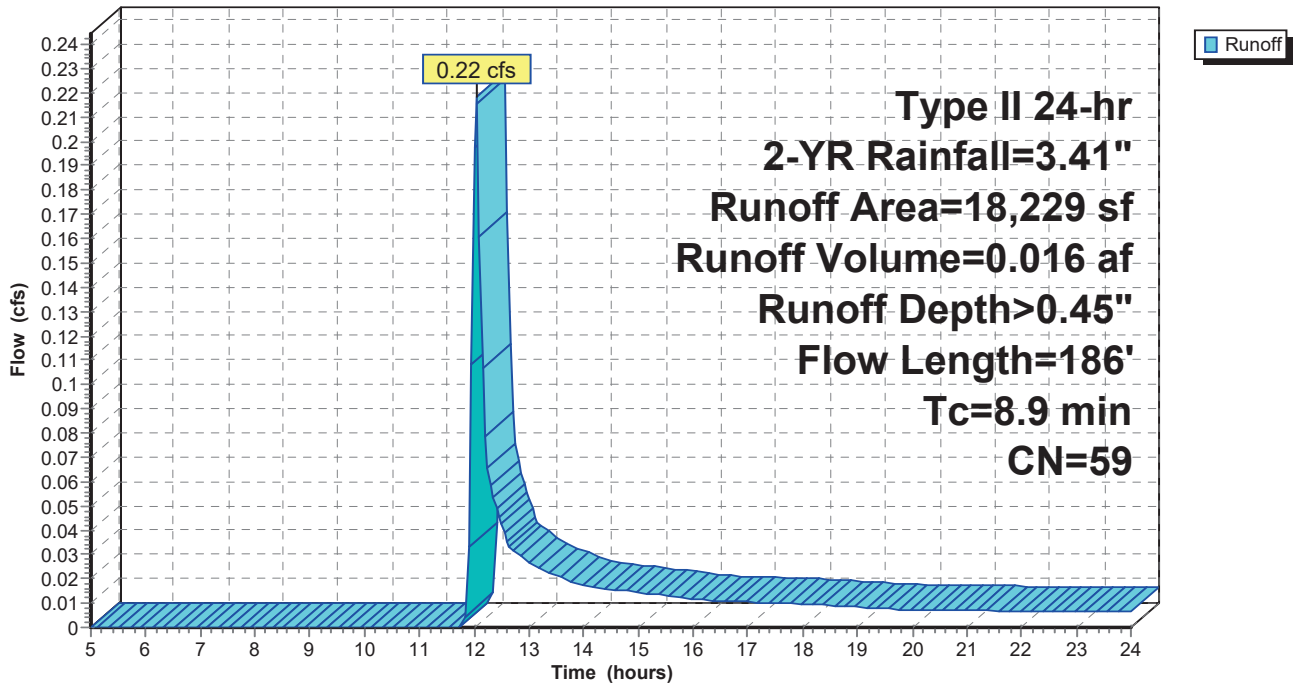
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
11,435	77	Newly graded area, HSG A
6,794	30	Woods, Good, HSG A
18,229	59	Weighted Average
18,229		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.6	136	0.0511	3.64		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
8.9	186	Total			

Subcatchment E3: OCEAN PINES FLOW

Hydrograph



1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: WILDWOODFLOW

Runoff Area=12,921 sf 0.00% Impervious Runoff Depth>2.51"
Flow Length=171' Tc=16.3 min CN=76 Runoff=0.92 cfs 0.062 af

Subcatchment E2: NORTHERNFLOW

Runoff Area=62,611 sf 0.00% Impervious Runoff Depth>2.18"
Flow Length=266' Tc=8.6 min CN=72 Runoff=5.02 cfs 0.261 af

Subcatchment E3: OCEANPINESFLOW

Runoff Area=18,229 sf 0.00% Impervious Runoff Depth>1.22"
Flow Length=186' Tc=8.9 min CN=59 Runoff=0.75 cfs 0.043 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.365 af Average Runoff Depth = 2.04"
100.00% Pervious = 2.152 ac 0.00% Impervious = 0.000 ac

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

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Summary for Subcatchment E1: WILDWOOD FLOW

Runoff = 0.92 cfs @ 12.09 hrs, Volume= 0.062 af, Depth> 2.51"

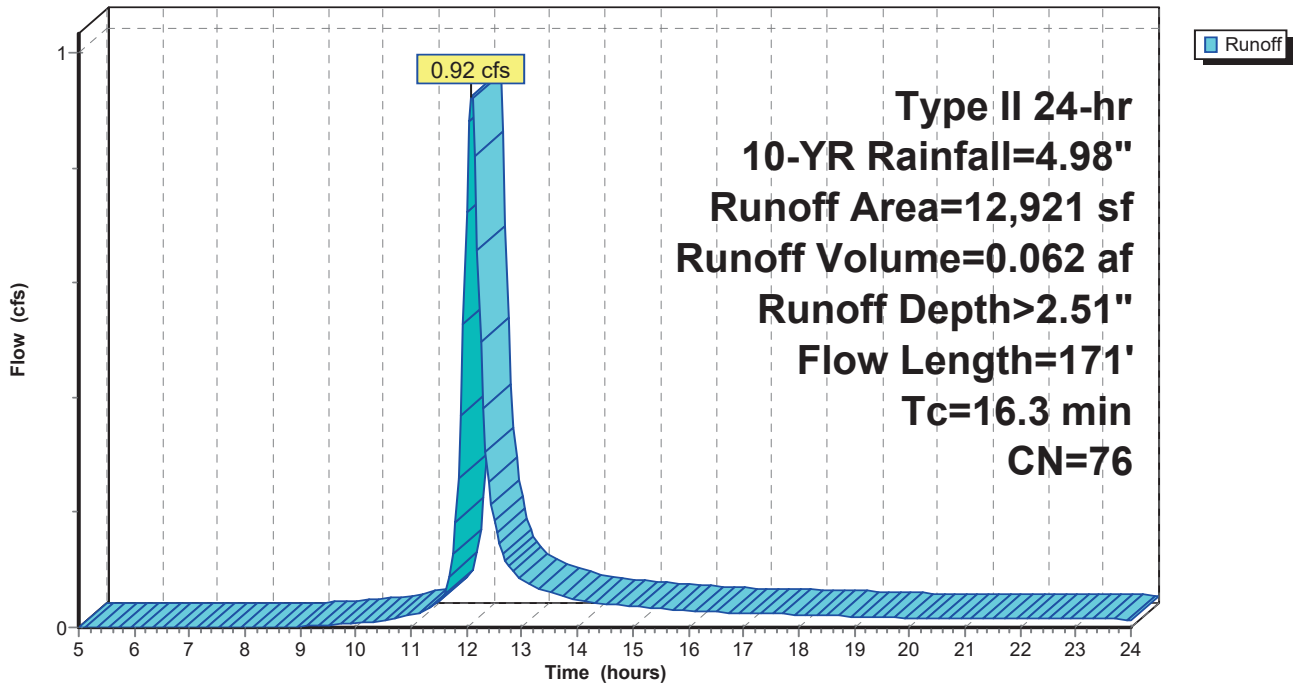
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
12,697	77	Newly graded area, HSG A
224	30	Woods, Good, HSG A
12,921	76	Weighted Average
12,921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	121	0.0741	4.38		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
16.3	171	Total			

Subcatchment E1: WILDWOOD FLOW

Hydrograph



1292_LOT 61 EXCON

Prepared by Existing Grade, Inc

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Summary for Subcatchment E2: NORTHERN FLOW

Runoff = 5.02 cfs @ 12.00 hrs, Volume= 0.261 af, Depth> 2.18"

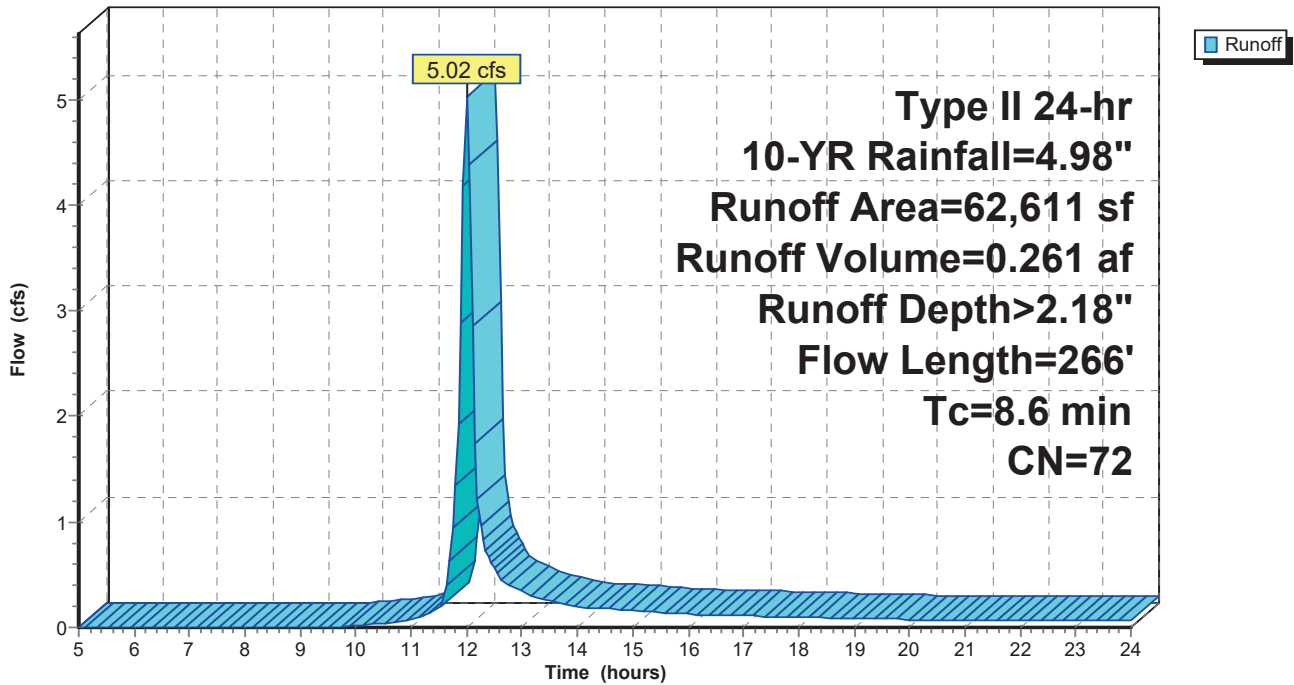
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
56,005	77	Newly graded area, HSG A
6,606	30	Woods, Good, HSG A
62,611	72	Weighted Average
62,611		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.9	216	0.0613	3.99		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
8.6	266	Total			

Subcatchment E2: NORTHERN FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Summary for Subcatchment E3: OCEAN PINES FLOW

Runoff = 0.75 cfs @ 12.02 hrs, Volume= 0.043 af, Depth> 1.22"

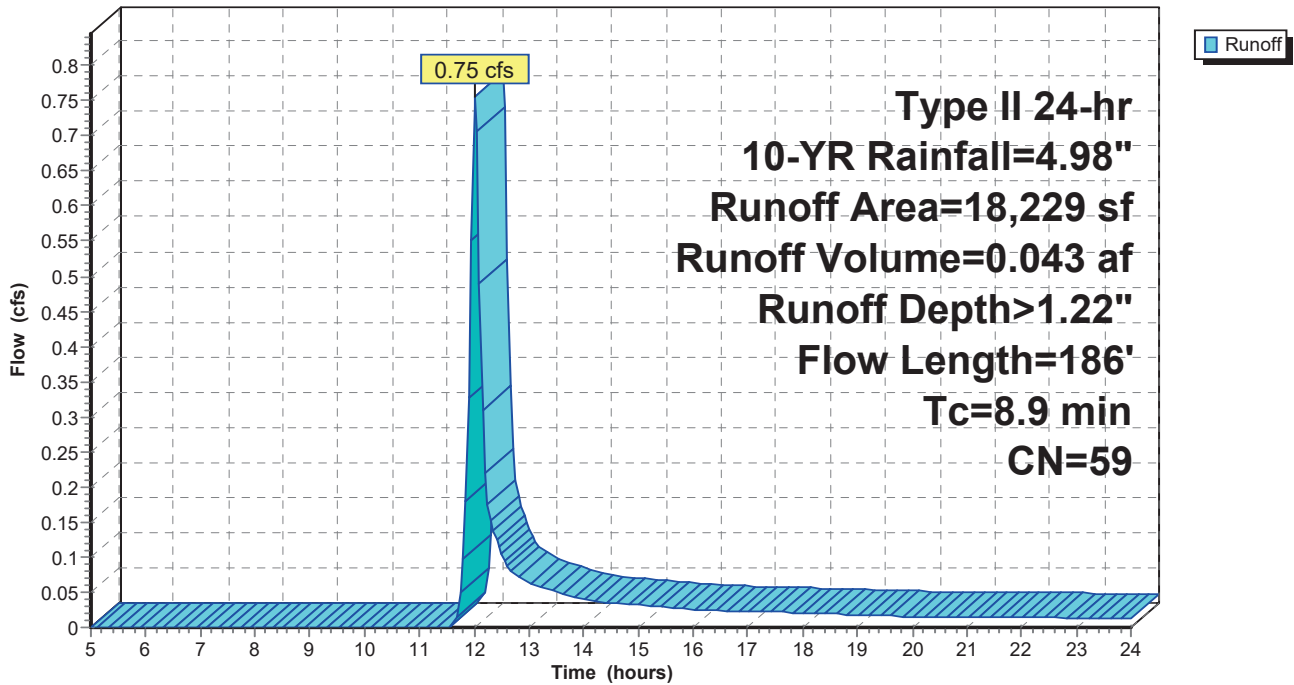
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
11,435	77	Newly graded area, HSG A
6,794	30	Woods, Good, HSG A
18,229	59	Weighted Average
18,229		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.6	136	0.0511	3.64		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
8.9	186	Total			

Subcatchment E3: OCEAN PINES FLOW

Hydrograph



1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: WILDWOODFLOW

Runoff Area=12,921 sf 0.00% Impervious Runoff Depth>3.32"
Flow Length=171' Tc=16.3 min CN=76 Runoff=1.22 cfs 0.082 af

Subcatchment E2: NORTHERNFLOW

Runoff Area=62,611 sf 0.00% Impervious Runoff Depth>2.95"
Flow Length=266' Tc=8.6 min CN=72 Runoff=6.79 cfs 0.353 af

Subcatchment E3: OCEANPINESFLOW

Runoff Area=18,229 sf 0.00% Impervious Runoff Depth>1.80"
Flow Length=186' Tc=8.9 min CN=59 Runoff=1.16 cfs 0.063 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.498 af Average Runoff Depth = 2.78"
100.00% Pervious = 2.152 ac 0.00% Impervious = 0.000 ac

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

Summary for Subcatchment E1: WILDWOOD FLOW

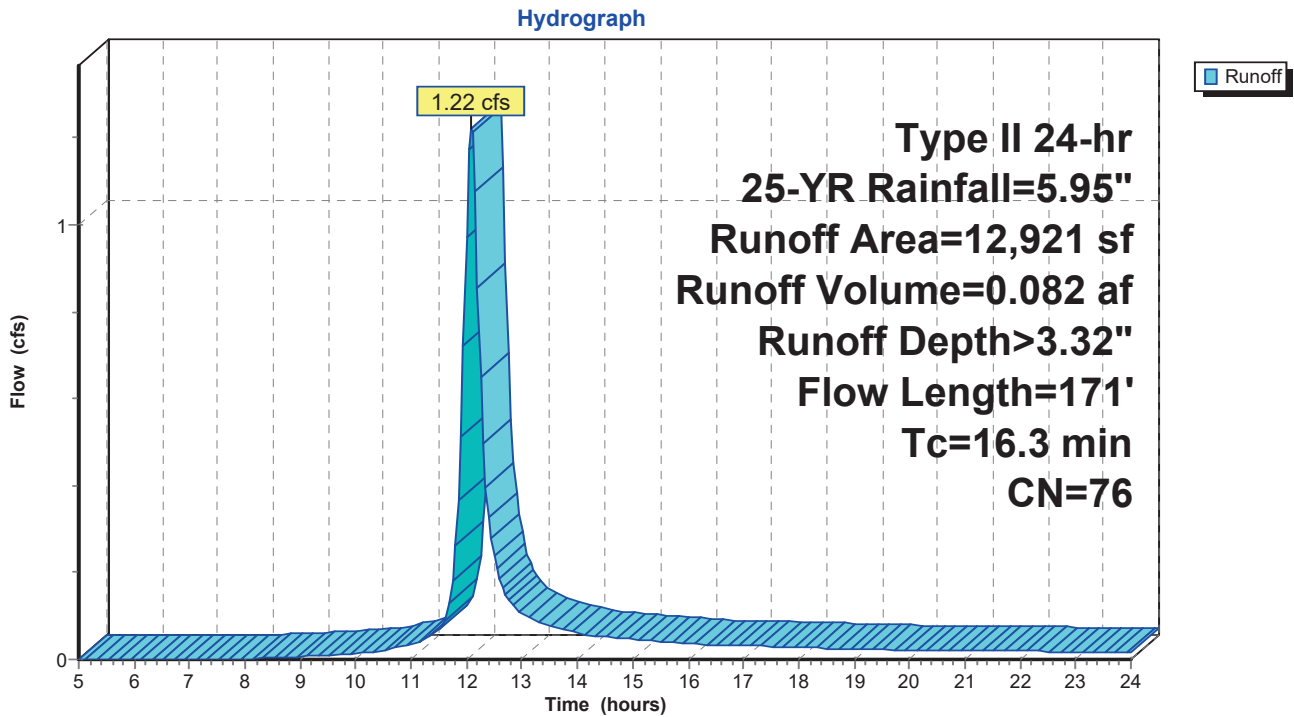
Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.082 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
12,697	77	Newly graded area, HSG A
224	30	Woods, Good, HSG A
12,921	76	Weighted Average
12,921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	121	0.0741	4.38		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
16.3	171	Total			

Subcatchment E1: WILDWOOD FLOW



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Summary for Subcatchment E2: NORTHERN FLOW

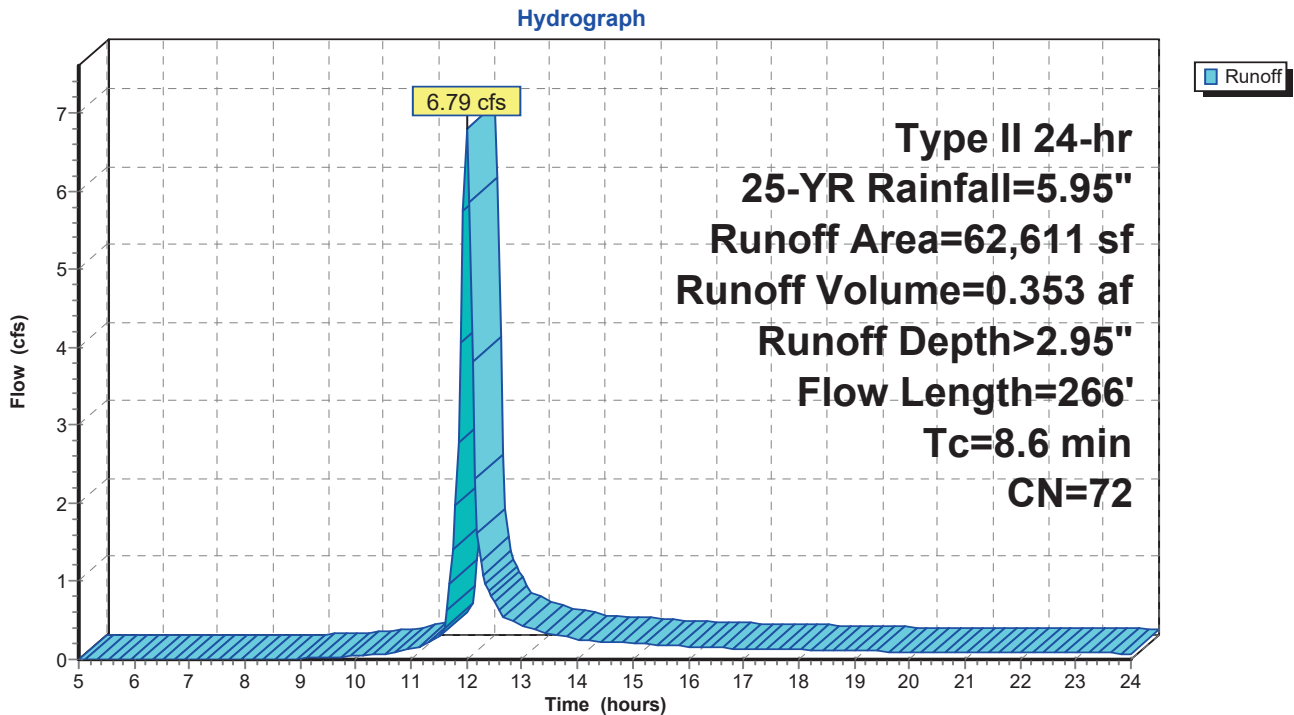
Runoff = 6.79 cfs @ 12.00 hrs, Volume= 0.353 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
56,005	77	Newly graded area, HSG A
6,606	30	Woods, Good, HSG A
62,611	72	Weighted Average
62,611		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.9	216	0.0613	3.99		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
8.6	266	Total			

Subcatchment E2: NORTHERN FLOW



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

Summary for Subcatchment E3: OCEAN PINES FLOW

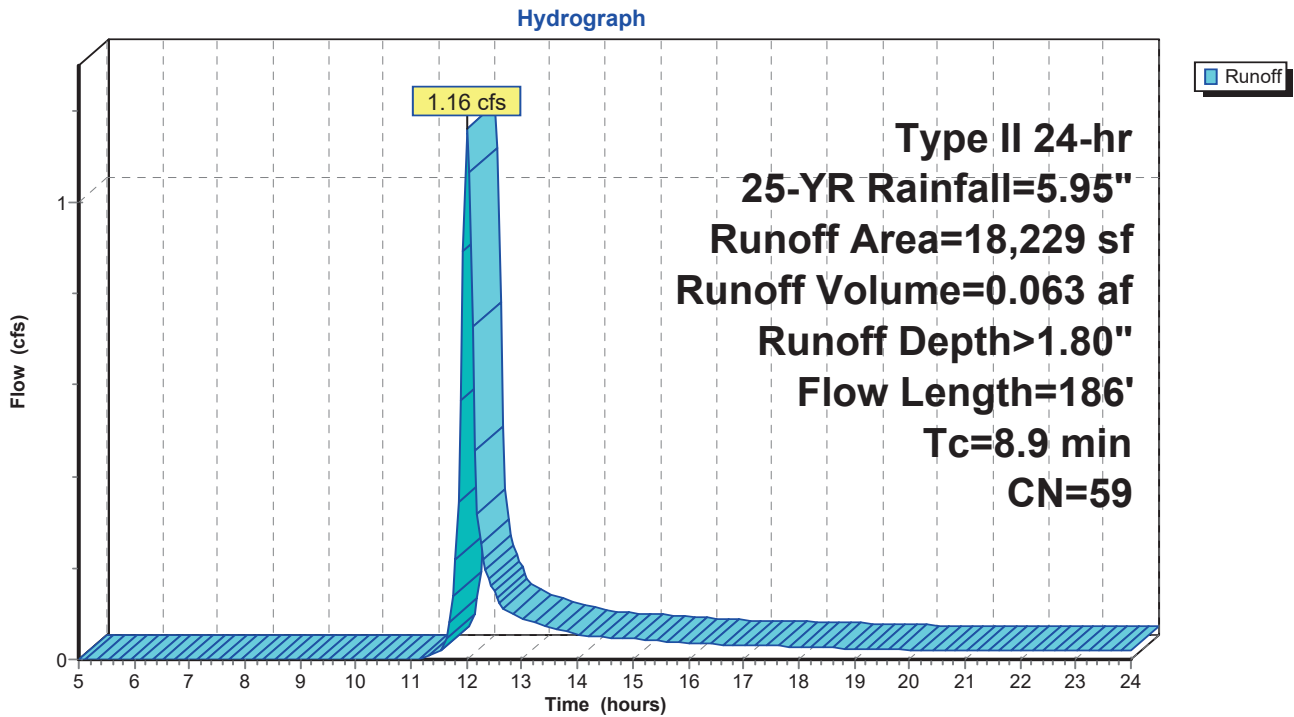
Runoff = 1.16 cfs @ 12.01 hrs, Volume= 0.063 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
11,435	77	Newly graded area, HSG A
6,794	30	Woods, Good, HSG A
18,229	59	Weighted Average
18,229		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.41"
0.6	136	0.0511	3.64		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
8.9	186	Total			

Subcatchment E3: OCEAN PINES FLOW



1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: WILDWOODFLOW

Runoff Area=12,921 sf 0.00% Impervious Runoff Depth>4.65"
Flow Length=171' Tc=16.3 min CN=76 Runoff=1.70 cfs 0.115 af

Subcatchment E2: NORTHERNFLOW

Runoff Area=62,611 sf 0.00% Impervious Runoff Depth>4.22"
Flow Length=266' Tc=8.6 min CN=72 Runoff=9.66 cfs 0.505 af

Subcatchment E3: OCEANPINESFLOW

Runoff Area=18,229 sf 0.00% Impervious Runoff Depth>2.82"
Flow Length=186' Tc=8.9 min CN=59 Runoff=1.86 cfs 0.098 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.718 af Average Runoff Depth = 4.01"
100.00% Pervious = 2.152 ac 0.00% Impervious = 0.000 ac

1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
 Type II 24-hr 100-YR Rainfall=7.46"

Summary for Subcatchment E1: WILDWOOD FLOW

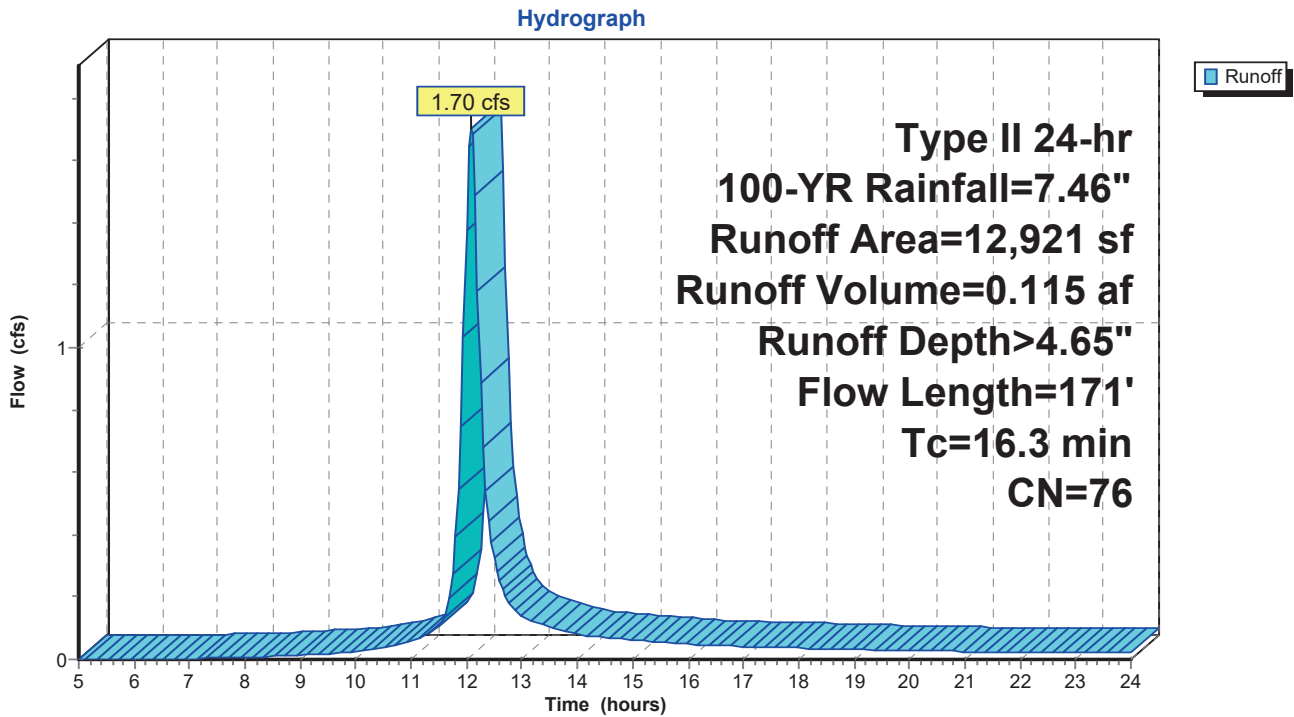
Runoff = 1.70 cfs @ 12.08 hrs, Volume= 0.115 af, Depth> 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
12,697	77	Newly graded area, HSG A
224	30	Woods, Good, HSG A
12,921	76	Weighted Average
12,921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	50	0.0100	0.05		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	121	0.0741	4.38		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
16.3	171	Total			

Subcatchment E1: WILDWOOD FLOW



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Bourne_Wildwood Lane - Lot 61
 Type II 24-hr 100-YR Rainfall=7.46"

Summary for Subcatchment E2: NORTHERN FLOW

Runoff = 9.66 cfs @ 12.00 hrs, Volume= 0.505 af, Depth> 4.22"

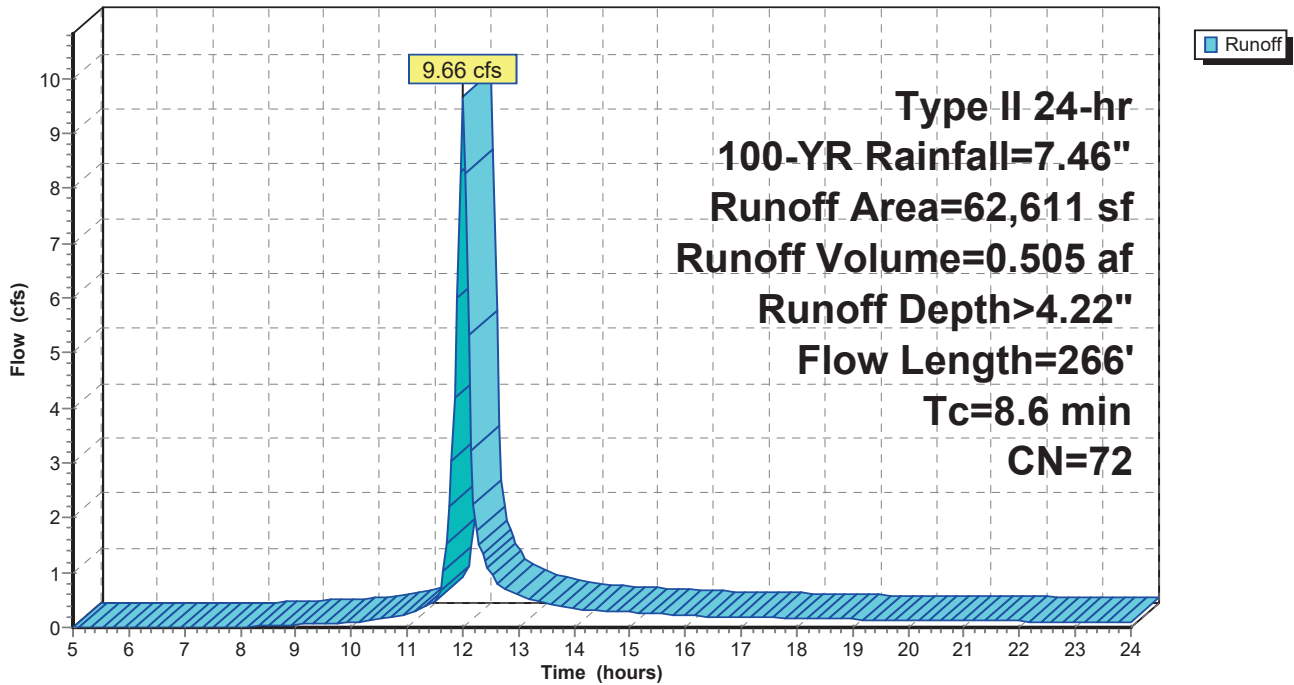
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
56,005	77	Newly graded area, HSG A
6,606	30	Woods, Good, HSG A
62,611	72	Weighted Average
62,611		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	50	0.0600	0.11		Sheet Flow, A-B
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.9	216	0.0613	3.99		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
8.6	266	Total			

Subcatchment E2: NORTHERN FLOW

Hydrograph



1292_LOT 61 EXCON

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Summary for Subcatchment E3: OCEAN PINES FLOW

Runoff = 1.86 cfs @ 12.01 hrs, Volume= 0.098 af, Depth> 2.82"

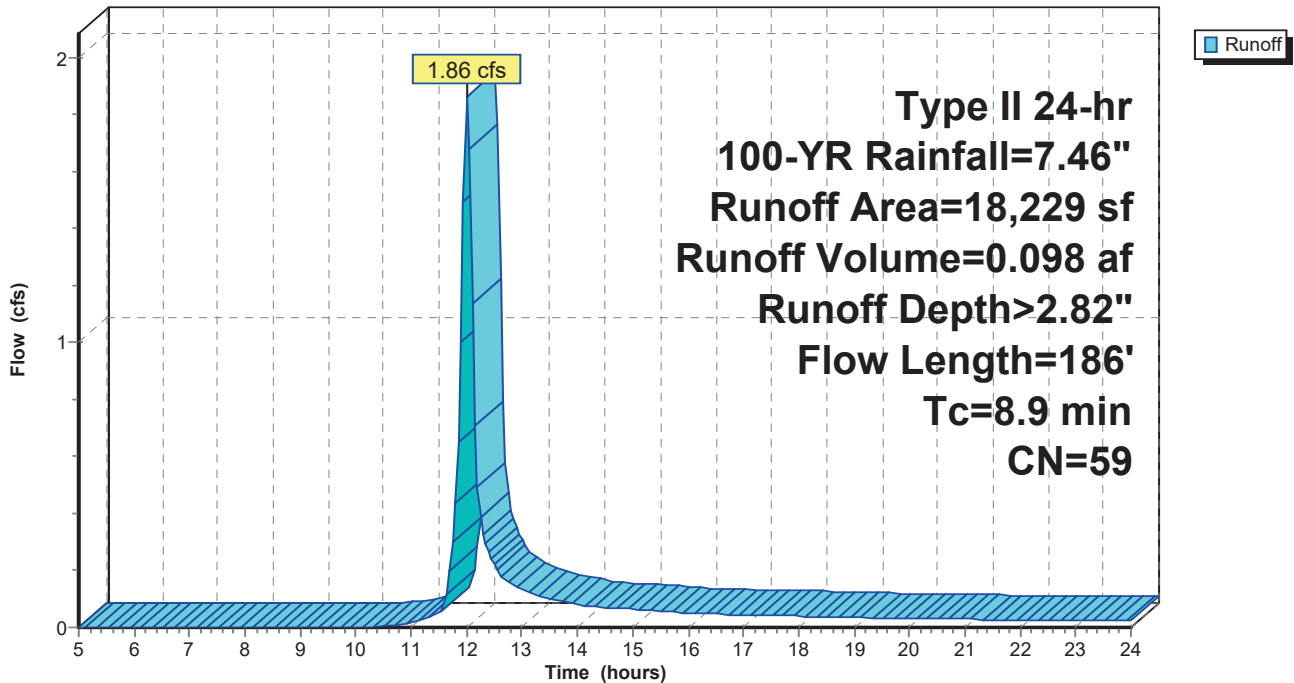
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
11,435	77	Newly graded area, HSG A
6,794	30	Woods, Good, HSG A
18,229	59	Weighted Average
18,229		100.00% Pervious Area

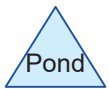
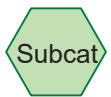
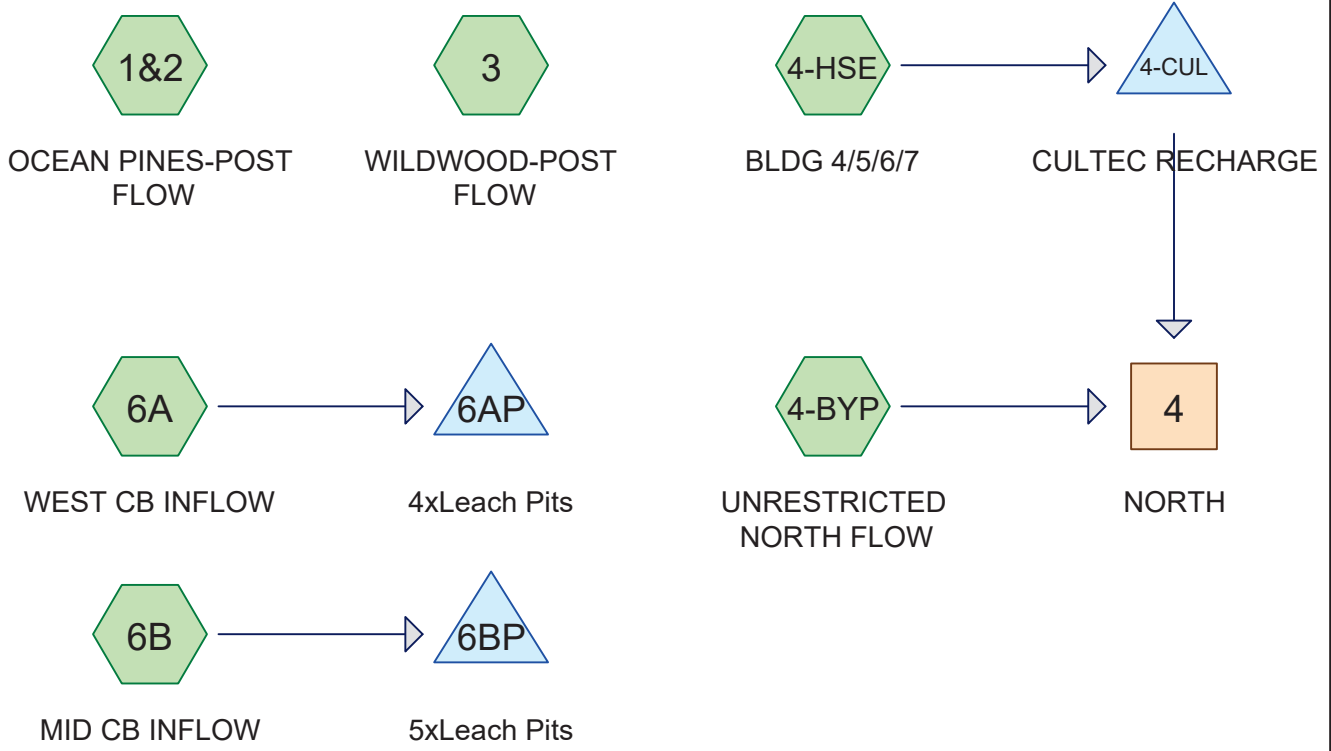
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0500	0.10		Sheet Flow, A-B
0.6	136	0.0511	3.64		Woods: Light underbrush n= 0.400 P2= 3.41" Shallow Concentrated Flow, B-C
8.9	186	Total			Unpaved Kv= 16.1 fps

Subcatchment E3: OCEAN PINES FLOW

Hydrograph



APPENDIX B



Routing Diagram for 1292_LOT 61 POST
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1292_LOT 61 POST

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.181	39	>75% Grass cover, Good, HSG A (1&2, 3, 4-BYP, 6A, 6B)
0.490	98	Paved parking, HSG A (6A, 6B)
0.481	98	Roofs, HSG A (4-HSE, 6A)
2.152	66	TOTAL AREA

1292_LOT 61 POST

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.152	HSG A	1&2, 3, 4-BYP, 4-HSE, 6A, 6B
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.152		TOTAL AREA

1292_LOT 61 POST

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.181	0.000	0.000	0.000	0.000	1.181	>75% Grass cover, Good	1&2, 3, 4-BYP, 6A, 6B
0.490	0.000	0.000	0.000	0.000	0.490	Paved parking	6A, 6B
0.481	0.000	0.000	0.000	0.000	0.481	Roofs	4-HSE, 6A
2.152	0.000	0.000	0.000	0.000	2.152	TOTAL AREA	

1292_LOT 61 POST

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	4-CUL	82.00	81.00	25.0	0.0400	0.010	6.0	0.0	0.0

1292_LOT 61 POST

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1&2: OCEANPINES-POSTFLOW Runoff Area=6,195 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=104' Tc=7.1 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment3: WILDWOOD-POSTFLOW Runoff Area=7,030 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=48' Slope=0.1250 '/' Tc=5.7 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment4-BYP: UNRESTRICTEDNORTH Runoff Area=24,134 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=325' Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment4-HSE: BLDG 4/5/6/7 Runoff Area=12,277 sf 100.00% Impervious Runoff Depth>3.10"
Tc=5.0 min CN=98 Runoff=1.37 cfs 0.073 af

Subcatchment6A: WESTCB INFLOW Runoff Area=16,884 sf 81.81% Impervious Runoff Depth>2.10"
Tc=5.0 min CN=87 Runoff=1.44 cfs 0.068 af

Subcatchment6B: MID CB INFLOW Runoff Area=27,241 sf 59.51% Impervious Runoff Depth>1.17"
Flow Length=374' Tc=18.2 min CN=74 Runoff=0.83 cfs 0.061 af

Reach4: NORTH Inflow=1.16 cfs 0.022 af
Outflow=1.16 cfs 0.022 af

Pond 4-CUL: CULTECRECHARGE Peak Elev=82.86' Storage=0.014 af Inflow=1.37 cfs 0.073 af
Discarded=0.07 cfs 0.051 af Primary=1.16 cfs 0.021 af Outflow=1.23 cfs 0.073 af

Pond 6AP: 4xLeachPits Peak Elev=79.14' Storage=0.026 af Inflow=1.44 cfs 0.068 af
Outflow=0.13 cfs 0.068 af

Pond 6BP: 5xLeachPits Peak Elev=81.83' Storage=0.019 af Inflow=0.83 cfs 0.061 af
Outflow=0.16 cfs 0.061 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.202 af Average Runoff Depth = 1.13"
54.88% Pervious = 1.181 ac 45.12% Impervious = 0.971 ac

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

Summary for Subcatchment 1&2: OCEAN PINES-POST FLOW

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth> 0.00"

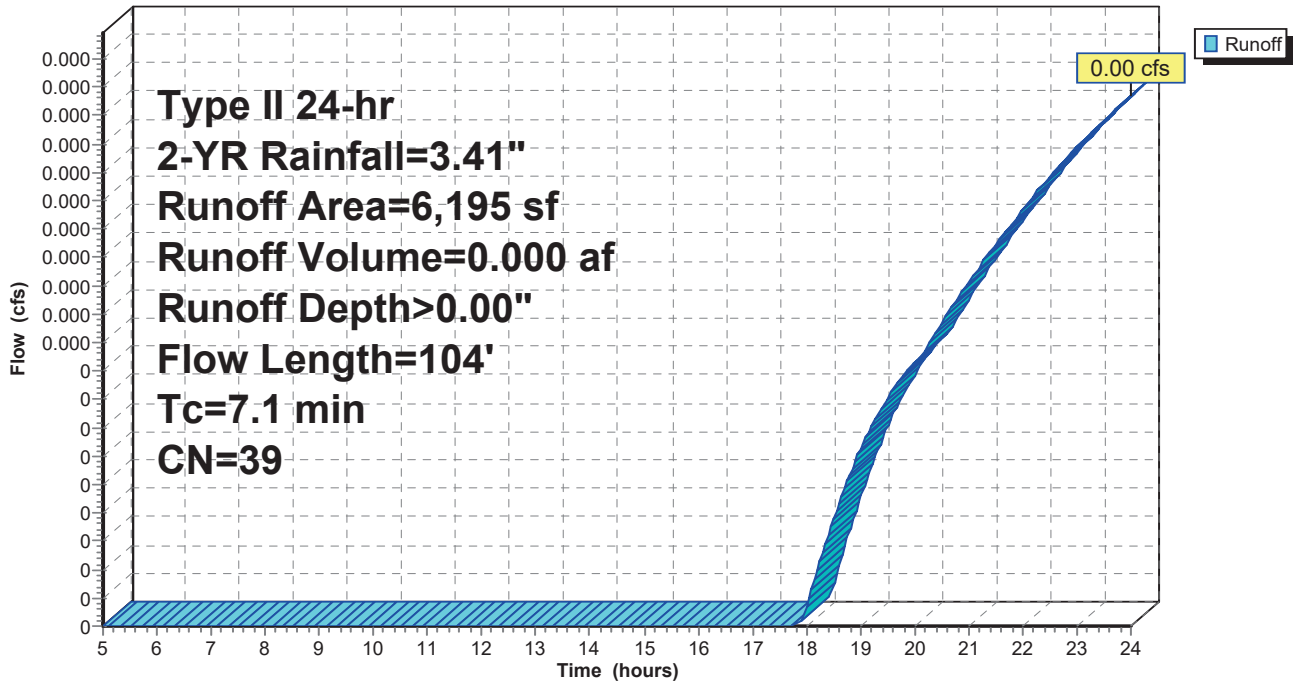
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
6,195	39	>75% Grass cover, Good, HSG A
6,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0800	0.12		Sheet Flow, A-B
					Grass: Bermuda n= 0.410 P2= 3.41"
0.1	54	0.3700	9.79		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
7.1	104	Total			

Subcatchment 1&2: OCEAN PINES-POST FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

Summary for Subcatchment 3: WILDWOOD-POST FLOW

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth> 0.00"

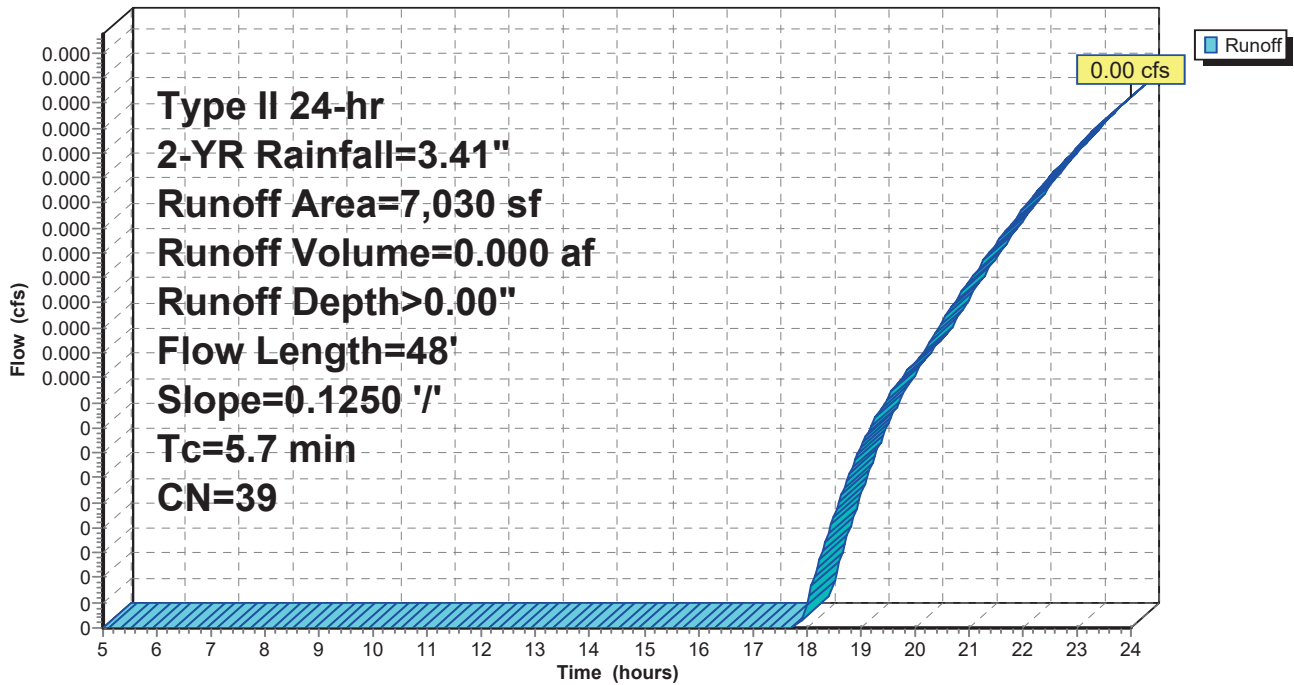
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
7,030	39	>75% Grass cover, Good, HSG A
7,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	48	0.1250	0.14		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"

Subcatchment 3: WILDWOOD-POST FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth> 0.00"

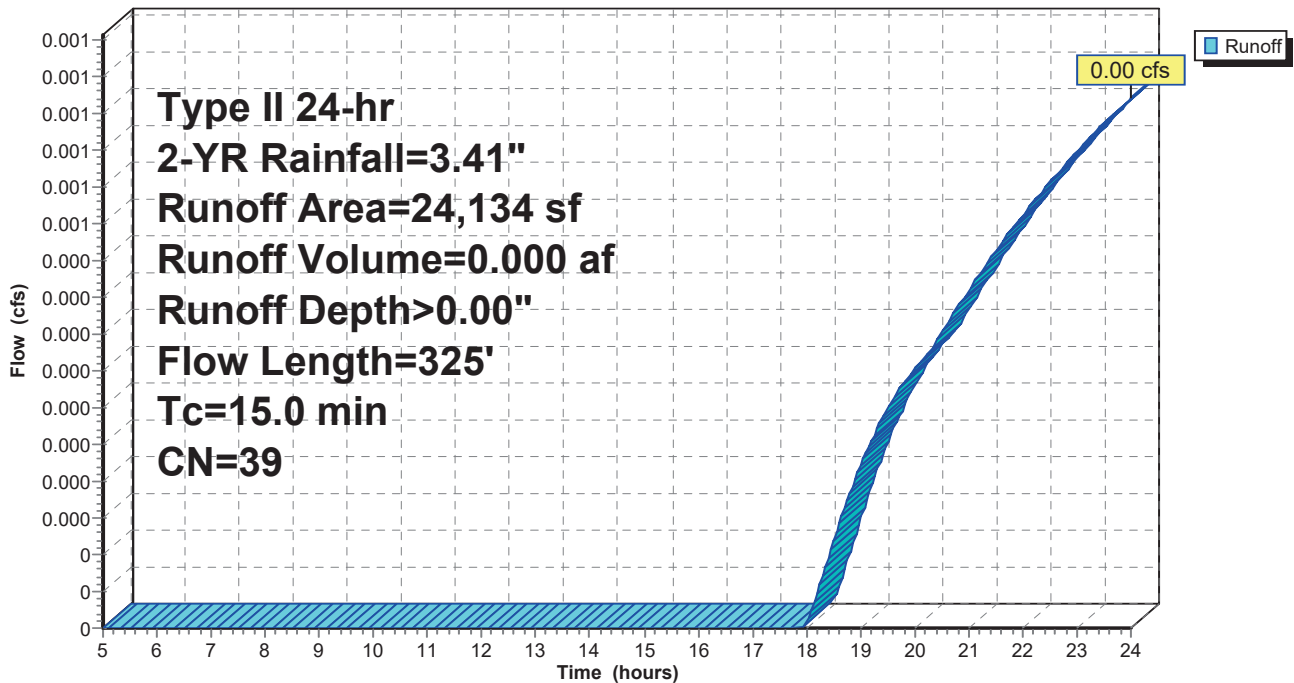
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
24,134	39	>75% Grass cover, Good, HSG A
24,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0150	0.06		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
1.3	275	0.0518	3.66		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
15.0	325	Total			

Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Subcatchment 4-HSE: BLDG 4/5/6/7

Runoff = 1.37 cfs @ 11.95 hrs, Volume= 0.073 af, Depth> 3.10"

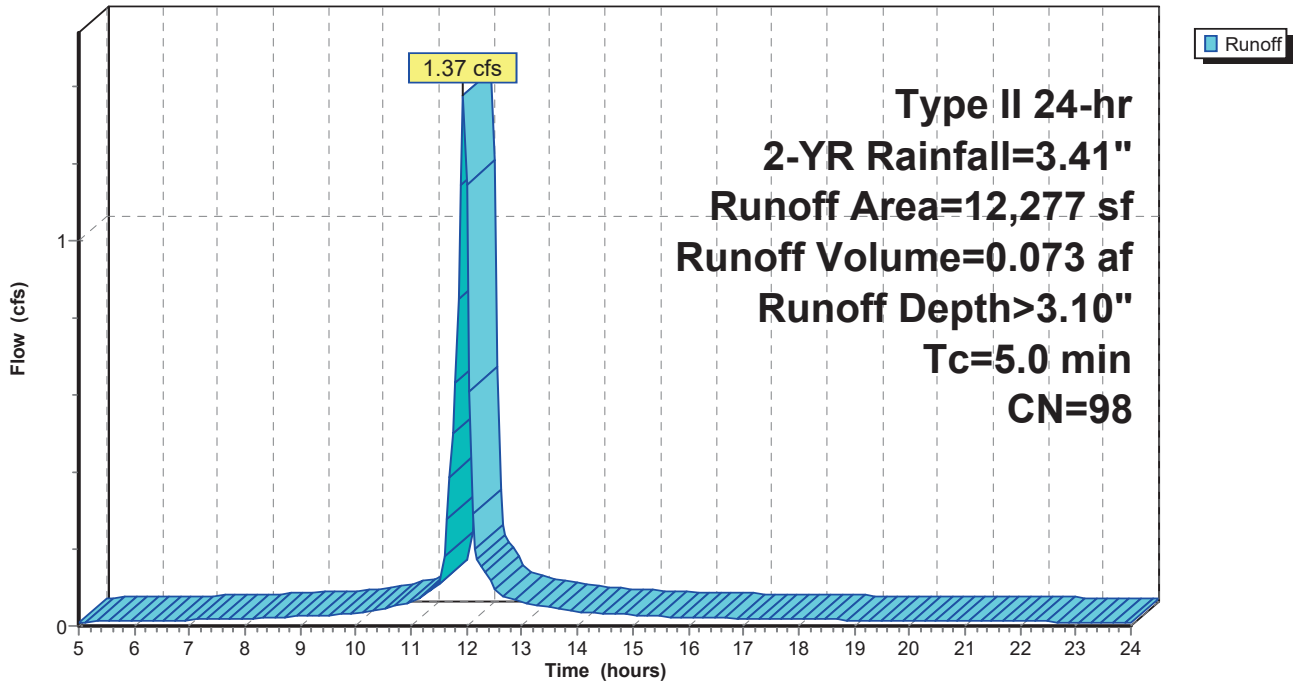
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
12,277	98	Roofs, HSG A
12,277		100.00% Impervious Area

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

Subcatchment 4-HSE: BLDG 4/5/6/7

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Subcatchment 6A: WEST CB INFLOW

Runoff = 1.44 cfs @ 11.96 hrs, Volume= 0.068 af, Depth> 2.10"

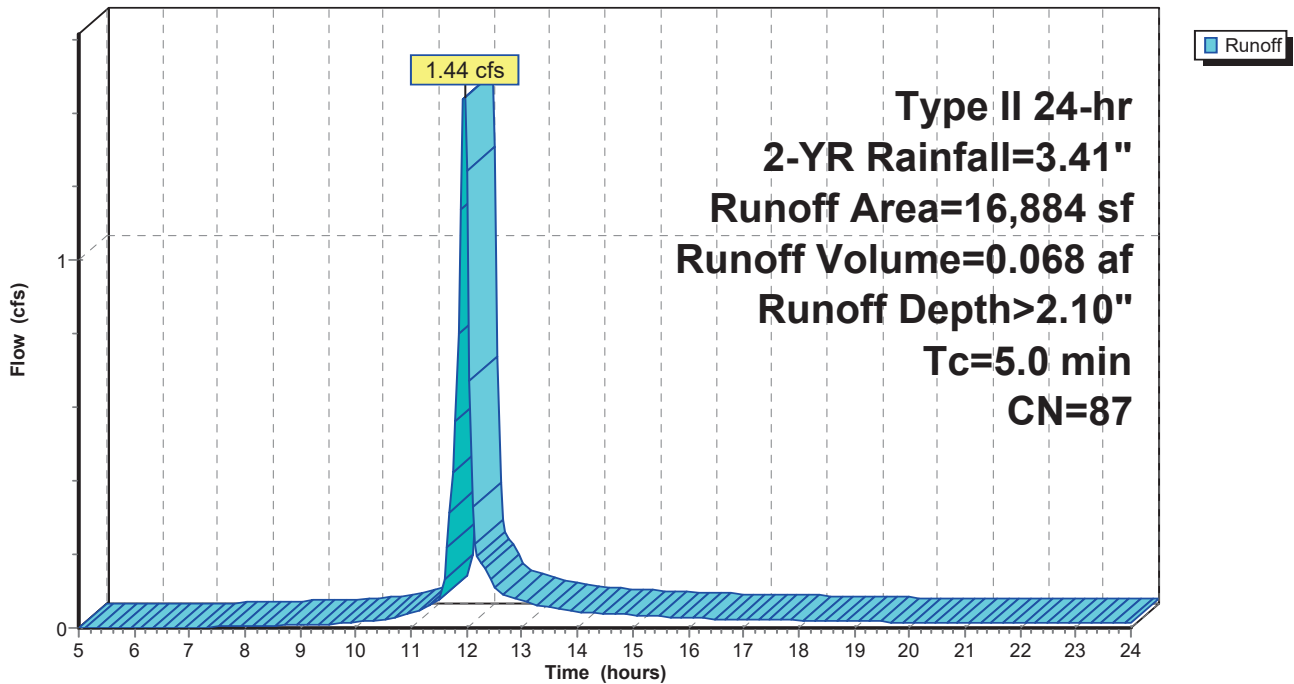
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
5,147	98	Paved parking, HSG A
3,071	39	>75% Grass cover, Good, HSG A
8,666	98	Roofs, HSG A
16,884	87	Weighted Average
3,071		18.19% Pervious Area
13,813		81.81% Impervious Area

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

Subcatchment 6A: WEST CB INFLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Subcatchment 6B: MID CB INFLOW

Runoff = 0.83 cfs @ 12.12 hrs, Volume= 0.061 af, Depth> 1.17"

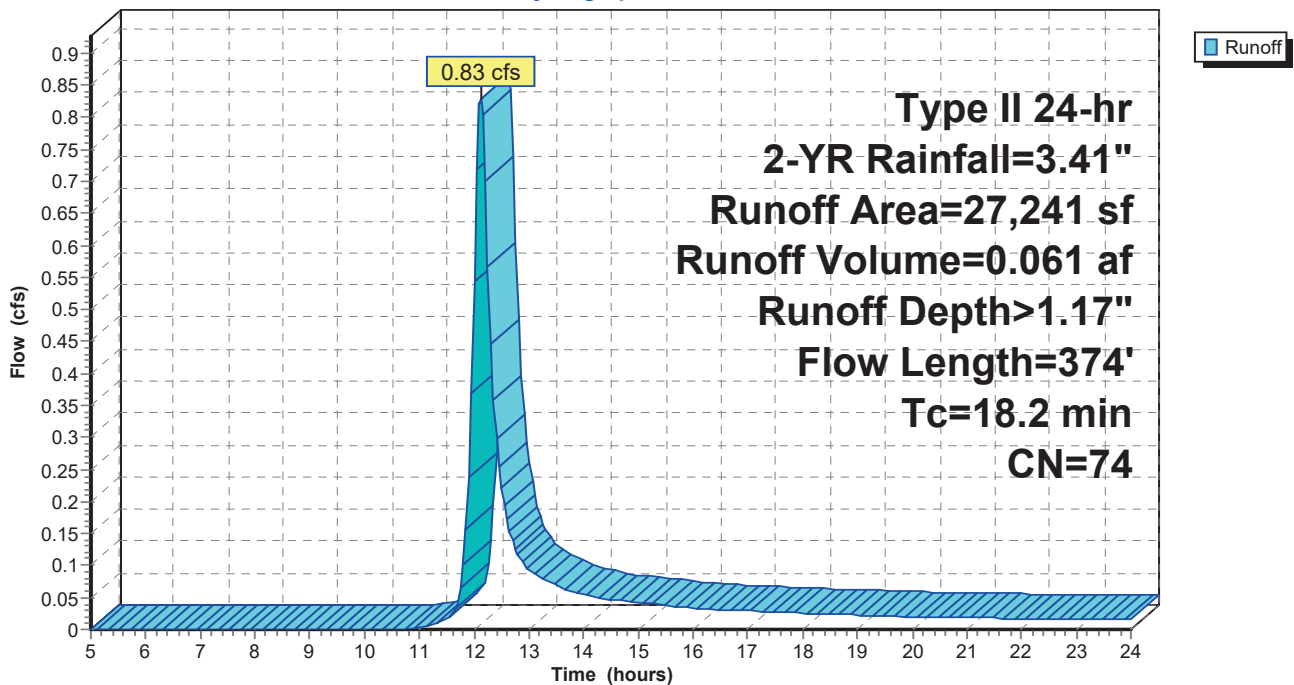
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
16,212	98	Paved parking, HSG A
11,029	39	>75% Grass cover, Good, HSG A
27,241	74	Weighted Average
11,029		40.49% Pervious Area
16,212		59.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
0.1	27	0.1850	6.92		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.0	297	0.0155	2.53		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
18.2	374	Total			

Subcatchment 6B: MID CB INFLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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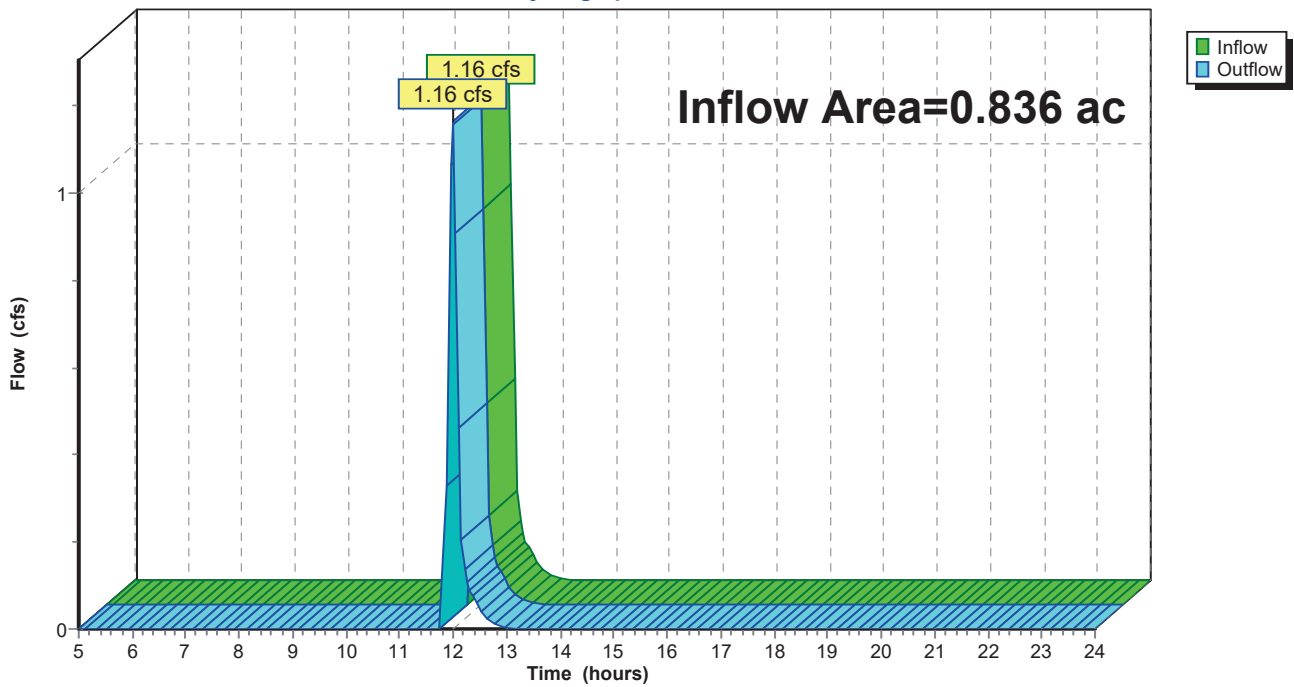
Summary for Reach 4: NORTH

Inflow Area = 0.836 ac, 33.72% Impervious, Inflow Depth > 0.31" for 2-YR event
Inflow = 1.16 cfs @ 11.99 hrs, Volume= 0.022 af
Outflow = 1.16 cfs @ 11.99 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Reach 4: NORTH

Hydrograph



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Summary for Pond 4-CUL: CULTEC RECHARGE

Inflow Area = 0.282 ac, 100.00% Impervious, Inflow Depth > 3.10" for 2-YR event
 Inflow = 1.37 cfs @ 11.95 hrs, Volume= 0.073 af
 Outflow = 1.23 cfs @ 11.99 hrs, Volume= 0.073 af, Atten= 10%, Lag= 2.3 min
 Discarded = 0.07 cfs @ 11.99 hrs, Volume= 0.051 af
 Primary = 1.16 cfs @ 11.99 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 82.86' @ 11.99 hrs Surf.Area= 0.008 ac Storage= 0.014 af

Plug-Flow detention time=29.7 min calculated for 0.073 af (100% of inflow)
 Center-of-Mass det. time=29.2 min (792.1 - 762.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	0.007 af	6.33'W x 52.50'L x 3.54'H Field A 0.027 af Overall - 0.009 af Embedded= 0.018 af x 40.0% Voids
#2A	80.50'	0.009 af	Cultec R-330XLHDx 7 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.016 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'
#2	Primary	82.00'	6.0" Round Culvert X 2.00L= 25.0' Ke= 0.900 Inlet / Outlet Invert= 82.00' / 81.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.07 cfs @ 11.99 hrs HW=82.83' (Free Discharge)
 ↑1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=1.13 cfs @ 11.99 hrs HW=82.83' (Free Discharge)
 ↑2=Culvert (Inlet Controls 1.13 cfs @ 2.89 fps)

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Pond 4-CUL: CULTEC RECHARGE - Chamber Wizard Field A

ChamberModel= CultecR-330XLHD(CultecRecharger@330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

7 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 50.50' Row Length +12.0" End Stone x 2 = 52.50'
Base Length

1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

7 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 376.3 cf Chamber Storage

1,177.6 cf Field - 376.3 cf Chambers = 801.3 cf Stone x 40.0% Voids = 320.5 cf Stone Storage

Chamber Storage + Stone Storage = 696.8 cf = 0.016 af

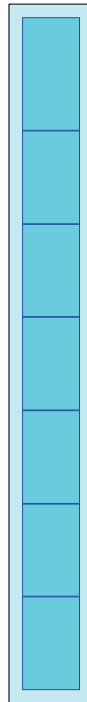
Overall Storage Efficiency = 59.2%

Overall System Size = 52.50' x 6.33' x 3.54'

7 Chambers

43.6 cy Field

29.7 cy Stone



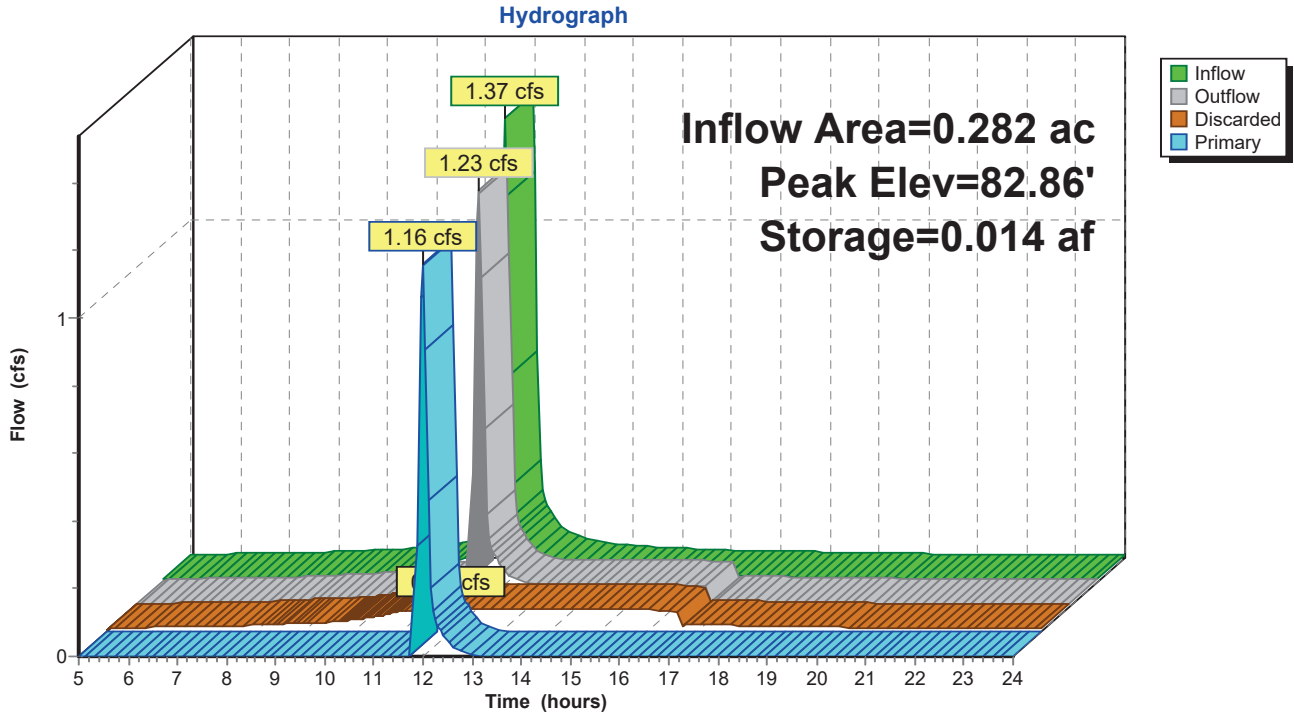
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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

Pond 4-CUL: CULTEC RECHARGE



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Pond 6AP: 4xLeach Pits

Inflow Area = 0.388 ac, 81.81% Impervious, Inflow Depth > 2.10" for 2-YR event
 Inflow = 1.44 cfs @ 11.96 hrs, Volume= 0.068 af
 Outflow = 0.13 cfs @ 12.44 hrs, Volume= 0.068 af, Atten= 91%, Lag= 28.9 min
 Discarded = 0.13 cfs @ 12.44 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 79.14' @ 12.44 hrs Surf.Area= 0.014 ac Storage= 0.026 af

Plug-Flow detention time=66.3 min calculated for 0.068 af (100% of inflow)
 Center-of-Mass det. time=65.3 min (876.9 - 811.7)

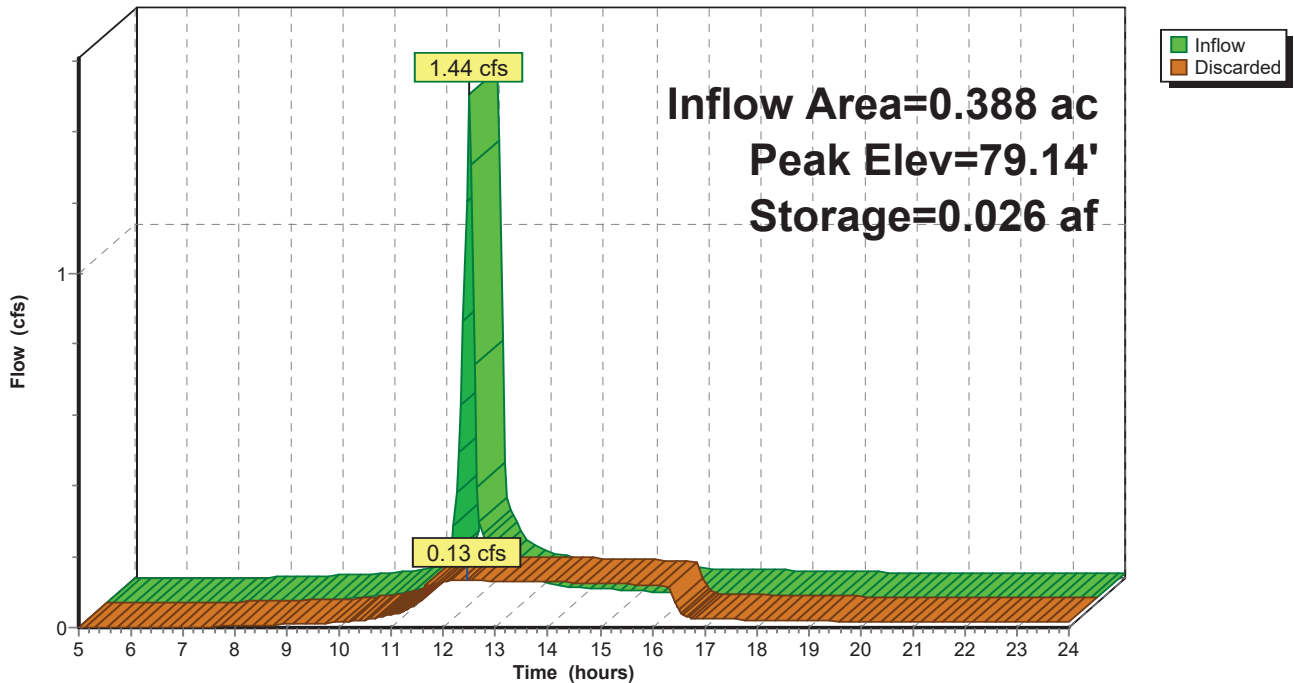
Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	0.069 af	14.00'D x 12.00'H 4' Stone Surround 4 0.170 af Overall - 0.031 af Embedded= 0.138 af x 50.0% Voids
#2	76.00'	0.031 af	6.00'D x 12.00'H Vertical Cone/Cylinder 4 Inside #1
		0.100 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.13 cfs @ 12.44 hrs HW=79.14' (Free Discharge)
 ↑1=Exfiltration (Controls 0.13 cfs)

Pond 6AP: 4xLeach Pits

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 2-YR Rainfall=3.41"

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Summary for Pond 6BP: 5xLeach Pits

Inflow Area = 0.625 ac, 59.51% Impervious, Inflow Depth > 1.17" for 2-YR event
 Inflow = 0.83 cfs @ 12.12 hrs, Volume= 0.061 af
 Outflow = 0.16 cfs @ 12.64 hrs, Volume= 0.061 af, Atten= 81%, Lag= 31.5 min
 Discarded = 0.16 cfs @ 12.64 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 81.83' @ 12.64 hrs Surf.Area= 0.018 ac Storage= 0.019 af

Plug-Flow detention time=39.6 min calculated for 0.061 af (100% of inflow)
 Center-of-Mass det. time=38.3 min (901.1 - 862.8)

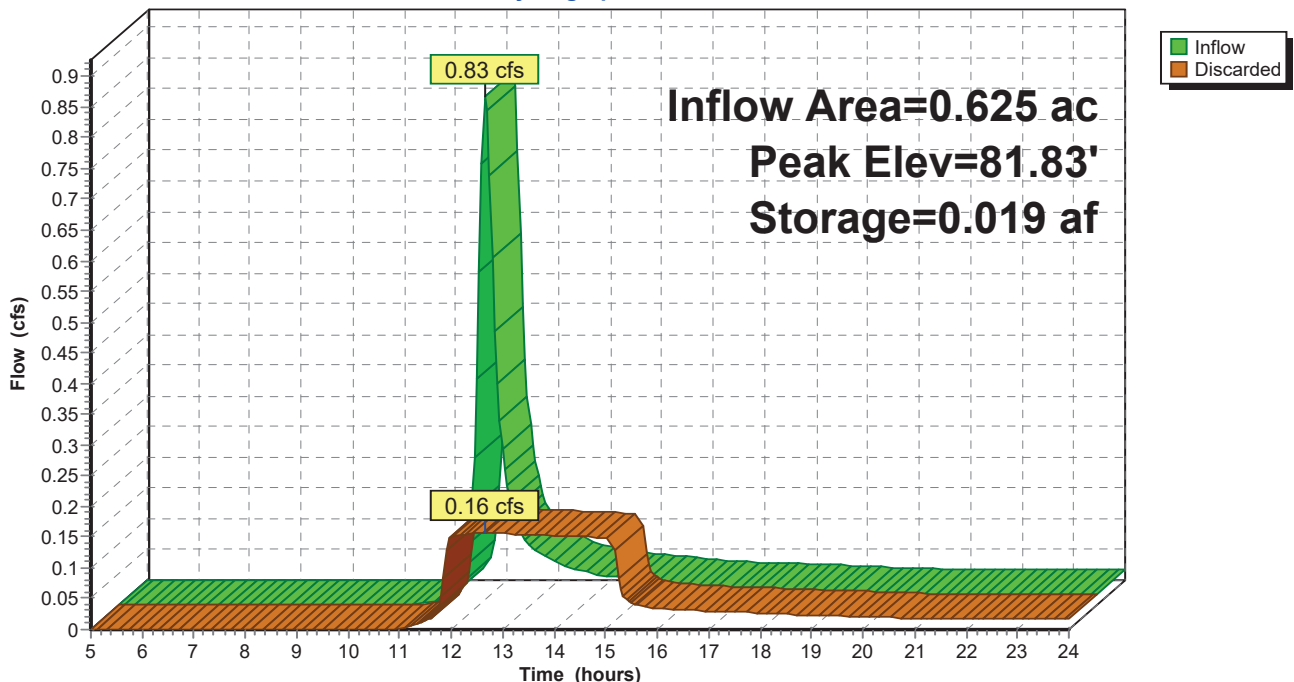
Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	0.087 af	14.00'D x 12.00'H 4' Stone Surround 5 0.212 af Overall - 0.039 af Embedded= 0.173 af x 50.0% Voids
#2	80.00'	0.039 af	6.00'D x 12.00'H Vertical Cone/Cylinder 5 Inside #1
		0.125 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.16 cfs @ 12.64 hrs HW=81.83' (Free Discharge)
 ↑1=Exfiltration (Controls 0.16 cfs)

Pond 6BP: 5xLeach Pits

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1&2: OCEANPINES-POSTFLOW Runoff Area=6,195 sf 0.00% Impervious Runoff Depth>0.20"
Flow Length=104' Tc=7.1 min CN=39 Runoff=0.00 cfs 0.002 af

Subcatchment3: WILDWOOD-POSTFLOW Runoff Area=7,030 sf 0.00% Impervious Runoff Depth>0.20"
Flow Length=48' Slope=0.1250 '/' Tc=5.7 min CN=39 Runoff=0.01 cfs 0.003 af

Subcatchment4-BYP: UNRESTRICTEDNORTH Runoff Area=24,134 sf 0.00% Impervious Runoff Depth>0.19"
Flow Length=325' Tc=15.0 min CN=39 Runoff=0.02 cfs 0.009 af

Subcatchment4-HSE: BLDG 4/5/6/7 Runoff Area=12,277 sf 100.00% Impervious Runoff Depth>4.59"
Tc=5.0 min CN=98 Runoff=2.02 cfs 0.108 af

Subcatchment6A: WESTCB INFLOW Runoff Area=16,884 sf 81.81% Impervious Runoff Depth>3.55"
Tc=5.0 min CN=87 Runoff=2.37 cfs 0.115 af

Subcatchment6B: MID CB INFLOW Runoff Area=27,241 sf 59.51% Impervious Runoff Depth>2.34"
Flow Length=374' Tc=18.2 min CN=74 Runoff=1.71 cfs 0.122 af

Reach4: NORTH Inflow=1.79 cfs 0.051 af
Outflow=1.79 cfs 0.051 af

Pond 4-CUL: CULTECRECHARGE Peak Elev=83.68' Storage=0.016 af Inflow=2.02 cfs 0.108 af
Discarded=0.07 cfs 0.065 af Primary=1.79 cfs 0.043 af Outflow=1.86 cfs 0.108 af

Pond 6AP: 4xLeachPits Peak Elev=81.98' Storage=0.050 af Inflow=2.37 cfs 0.115 af
Outflow=0.14 cfs 0.114 af

Pond 6BP: 5xLeachPits Peak Elev=84.92' Storage=0.051 af Inflow=1.71 cfs 0.122 af
Outflow=0.17 cfs 0.122 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.358 af Average Runoff Depth = 2.00"
54.88% Pervious = 1.181 ac 45.12% Impervious = 0.971 ac

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Summary for Subcatchment 1&2: OCEAN PINES-POST FLOW

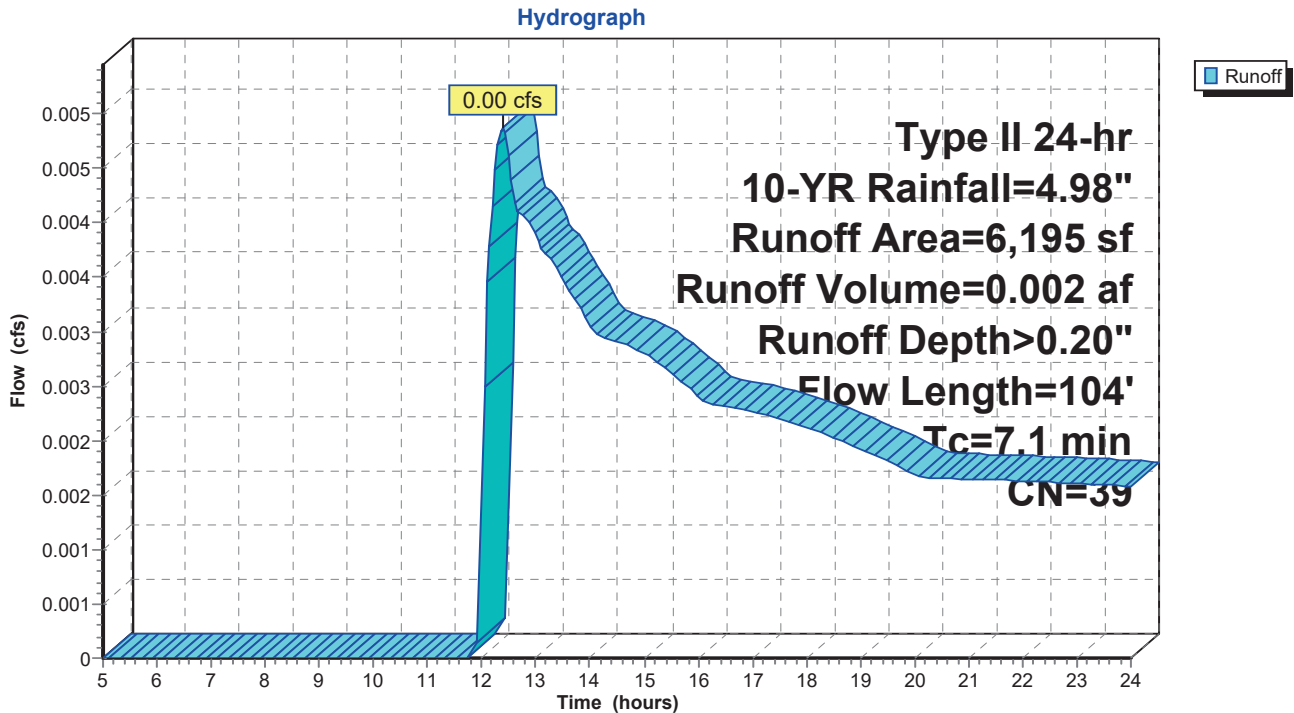
Runoff = 0.00 cfs @ 12.38 hrs, Volume= 0.002 af, Depth> 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
6,195	39	>75% Grass cover, Good, HSG A
6,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0800	0.12		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
0.1	54	0.3700	9.79		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
7.1	104	Total			

Subcatchment 1&2: OCEAN PINES-POST FLOW



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

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Summary for Subcatchment 3: WILDWOOD-POST FLOW

Runoff = 0.01 cfs @ 12.36 hrs, Volume= 0.003 af, Depth> 0.20"

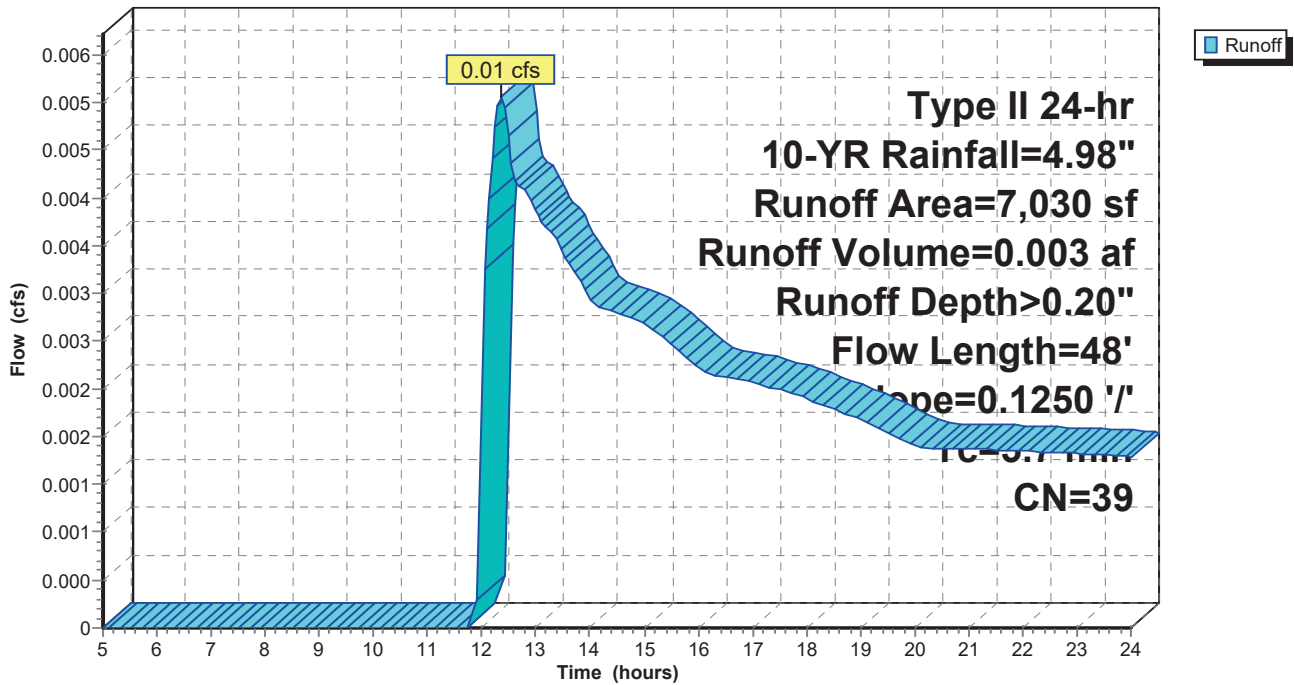
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
7,030	39	>75% Grass cover, Good, HSG A
7,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	48	0.1250	0.14		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"

Subcatchment 3: WILDWOOD-POST FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Summary for Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

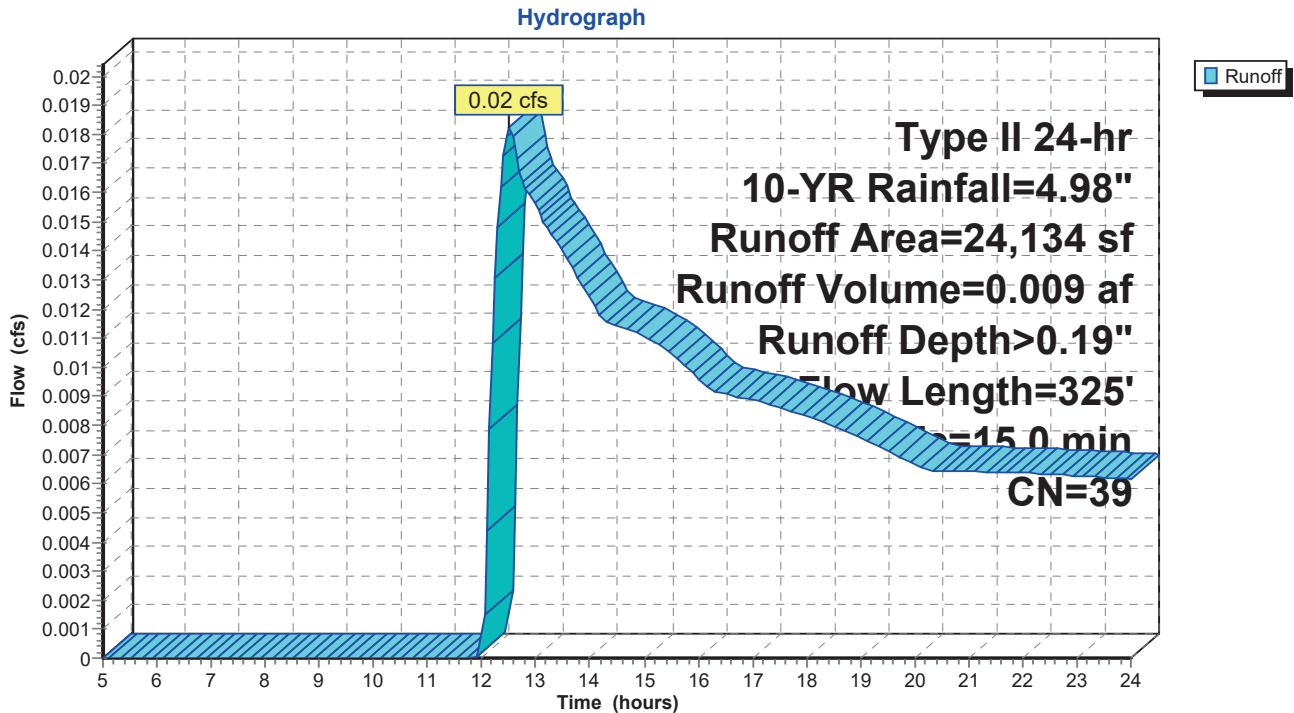
Runoff = 0.02 cfs @ 12.51 hrs, Volume= 0.009 af, Depth> 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
24,134	39	>75% Grass cover, Good, HSG A
24,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0150	0.06		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
1.3	275	0.0518	3.66		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
15.0	325	Total			

Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Page 23

Summary for Subcatchment 4-HSE: BLDG 4/5/6/7

Runoff = 2.02 cfs @ 11.95 hrs, Volume= 0.108 af, Depth> 4.59"

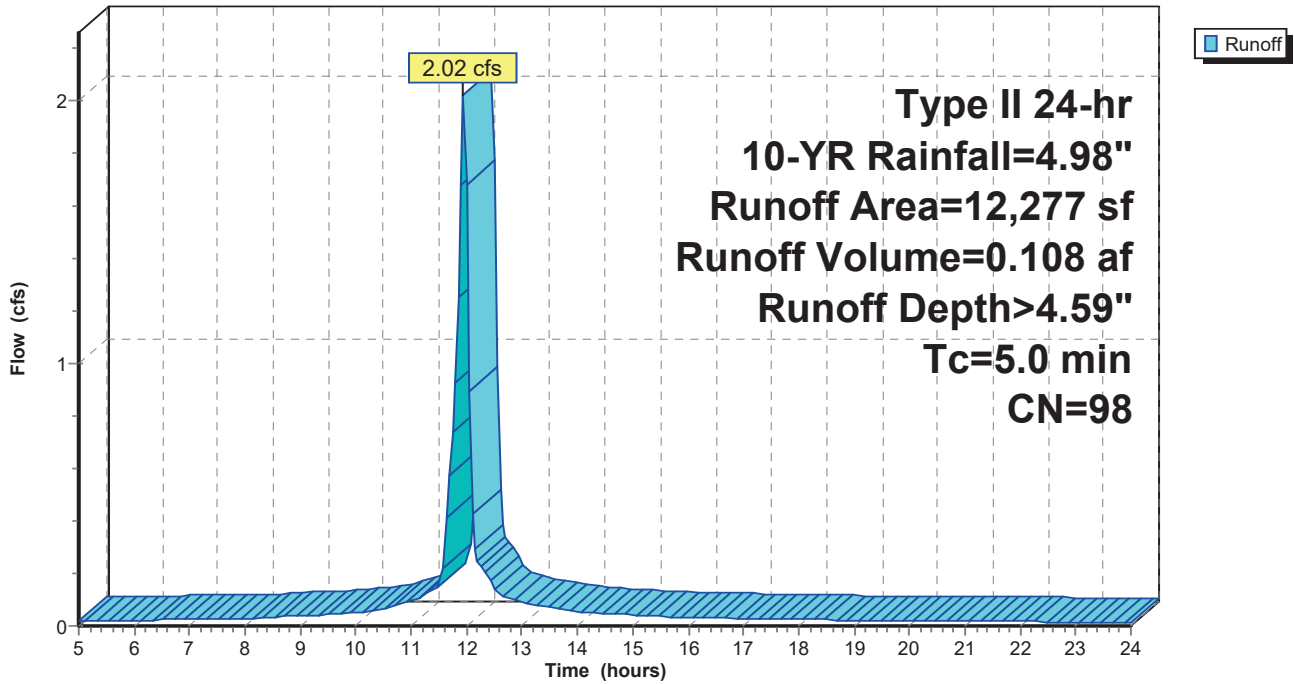
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
12,277	98	Roofs, HSG A
12,277		100.00% Impervious Area

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

Subcatchment 4-HSE: BLDG 4/5/6/7

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Summary for Subcatchment 6A: WEST CB INFLOW

Runoff = 2.37 cfs @ 11.95 hrs, Volume= 0.115 af, Depth> 3.55"

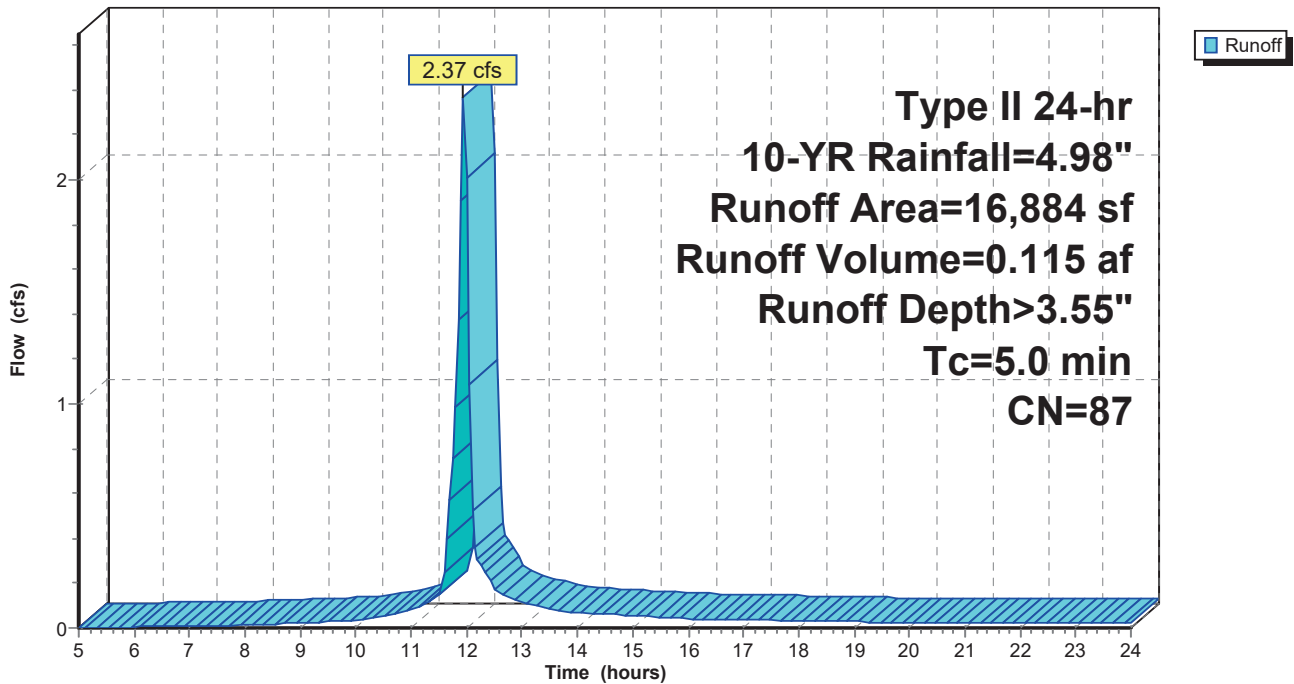
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
5,147	98	Paved parking, HSG A
3,071	39	>75% Grass cover, Good, HSG A
8,666	98	Roofs, HSG A
16,884	87	Weighted Average
3,071		18.19% Pervious Area
13,813		81.81% Impervious Area

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

Subcatchment 6A: WEST CB INFLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

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Summary for Subcatchment 6B: MID CB INFLOW

Runoff = 1.71 cfs @ 12.11 hrs, Volume= 0.122 af, Depth> 2.34"

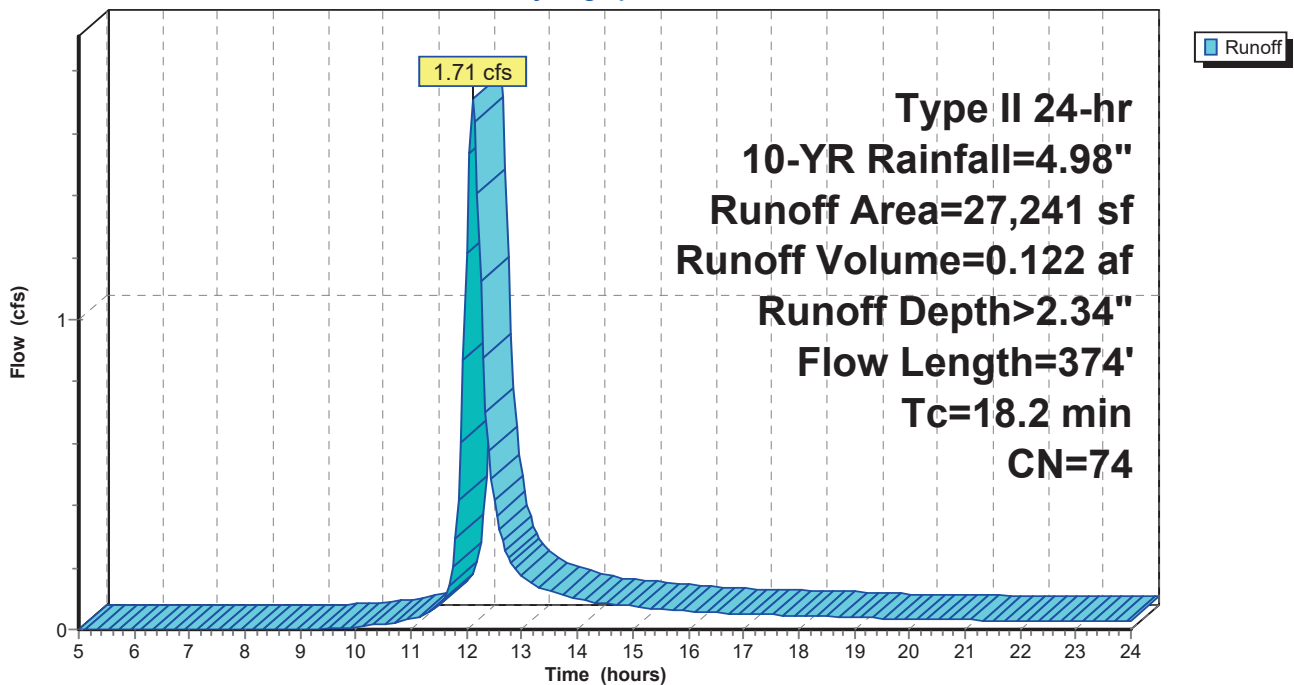
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.98"

Area (sf)	CN	Description
16,212	98	Paved parking, HSG A
11,029	39	>75% Grass cover, Good, HSG A
27,241	74	Weighted Average
11,029		40.49% Pervious Area
16,212		59.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
0.1	27	0.1850	6.92		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.0	297	0.0155	2.53		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
18.2	374	Total			

Subcatchment 6B: MID CB INFLOW

Hydrograph



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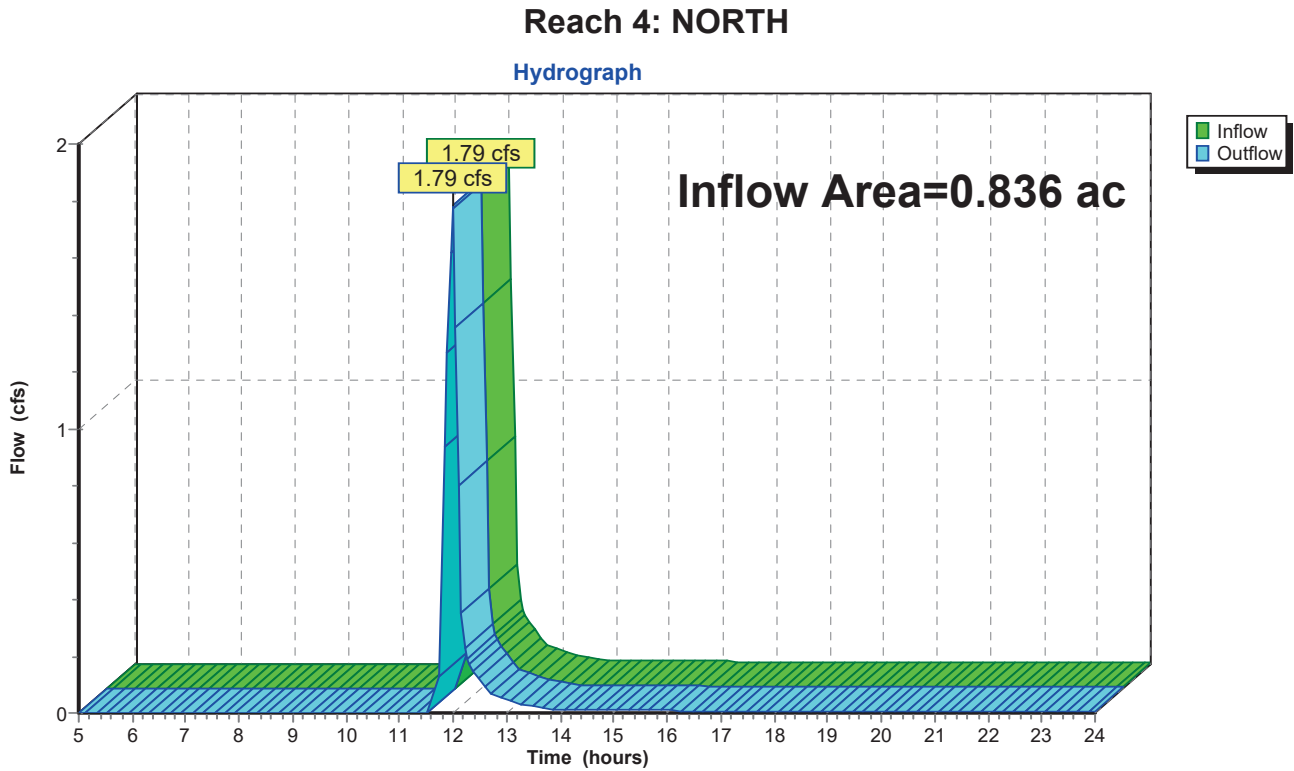
Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Page 26

Summary for Reach 4: NORTH

Inflow Area = 0.836 ac, 33.72% Impervious, Inflow Depth > 0.74" for 10-YR event
Inflow = 1.79 cfs @ 11.99 hrs, Volume= 0.051 af
Outflow = 1.79 cfs @ 11.99 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs



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Summary for Pond 4-CUL: CULTEC RECHARGE

Inflow Area = 0.282 ac, 100.00% Impervious, Inflow Depth > 4.59" for 10-YR event
 Inflow = 2.02 cfs @ 11.95 hrs, Volume= 0.108 af
 Outflow = 1.86 cfs @ 11.99 hrs, Volume= 0.108 af, Atten= 8%, Lag= 2.3 min
 Discarded = 0.07 cfs @ 11.99 hrs, Volume= 0.065 af
 Primary = 1.79 cfs @ 11.99 hrs, Volume= 0.043 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 83.68' @ 11.99 hrs Surf.Area= 0.008 ac Storage= 0.016 af

Plug-Flow detention time=27.7 min calculated for 0.108 af (100% of inflow)
 Center-of-Mass det. time=27.4 min (787.4 - 760.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	0.007 af	6.33'W x 52.50'L x 3.54'H Field A 0.027 af Overall - 0.009 af Embedded= 0.018 af x 40.0% Voids
#2A	80.50'	0.009 af	Cultec R-330XLHDx 7 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.016 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'
#2	Primary	82.00'	6.0" Round Culvert X 2.00L= 25.0' Ke= 0.900 Inlet / Outlet Invert= 82.00' / 81.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.07 cfs @ 11.99 hrs HW=83.61' (Free Discharge)
 ↑1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=1.74 cfs @ 11.99 hrs HW=83.60' (Free Discharge)
 ↑2=Culvert (Inlet Controls 1.74 cfs @ 4.42 fps)

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Pond 4-CUL: CULTEC RECHARGE - Chamber Wizard Field A

ChamberModel= CultecR-330XLHD(CultecRecharger@330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

7 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 50.50' Row Length +12.0" End Stone x 2 = 52.50'
Base Length

1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

7 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 376.3 cf Chamber Storage

1,177.6 cf Field - 376.3 cf Chambers = 801.3 cf Stone x 40.0% Voids = 320.5 cf Stone Storage

Chamber Storage + Stone Storage = 696.8 cf = 0.016 af

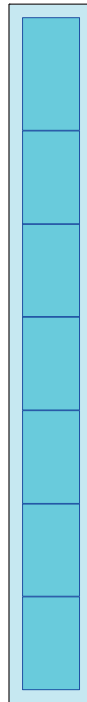
Overall Storage Efficiency = 59.2%

Overall System Size = 52.50' x 6.33' x 3.54'

7 Chambers

43.6 cy Field

29.7 cy Stone



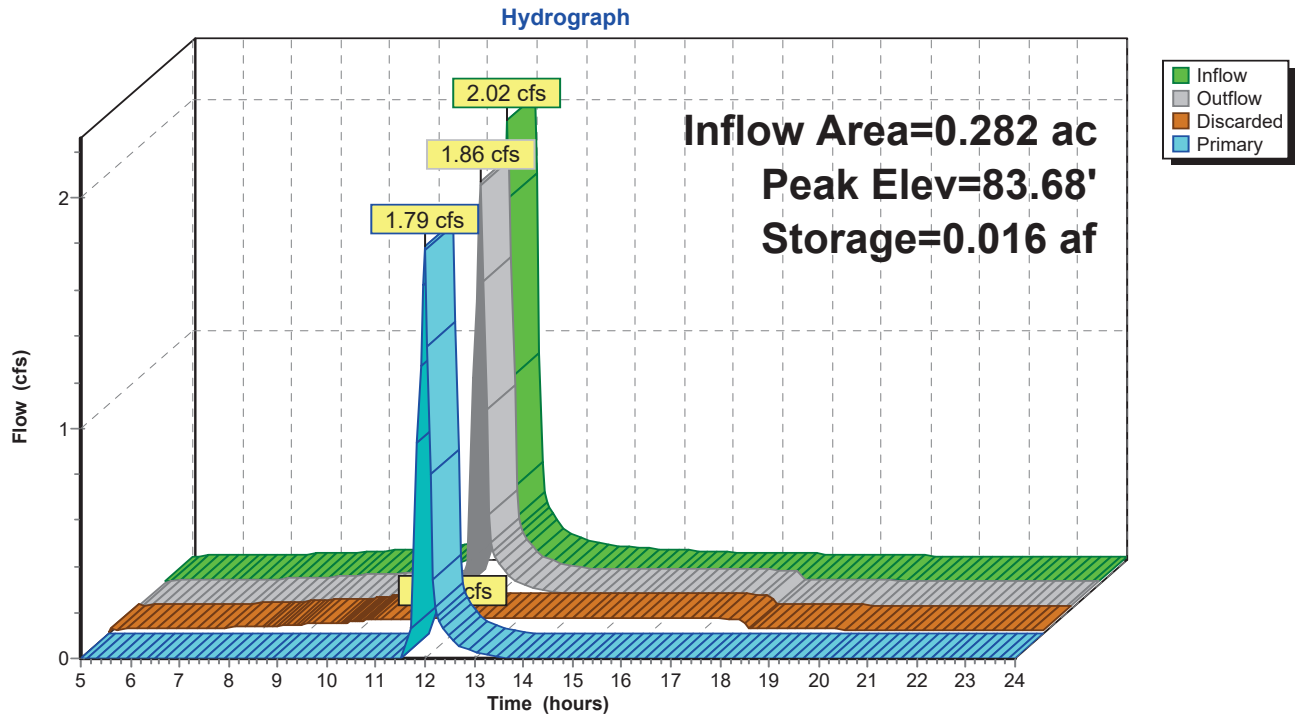
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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

Pond 4-CUL: CULTEC RECHARGE



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Summary for Pond 6AP: 4xLeach Pits

Inflow Area = 0.388 ac, 81.81% Impervious, Inflow Depth > 3.55" for 10-YR event
 Inflow = 2.37 cfs @ 11.95 hrs, Volume= 0.115 af
 Outflow = 0.14 cfs @ 12.67 hrs, Volume= 0.114 af, Atten= 94%, Lag= 43.3 min
 Discarded = 0.14 cfs @ 12.67 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 81.98' @ 12.67 hrs Surf.Area= 0.014 ac Storage= 0.050 af

Plug-Flow detention time=127.9 min calculated for 0.114 af (100% of inflow)
 Center-of-Mass det. time=126.9 min (923.8 - 796.8)

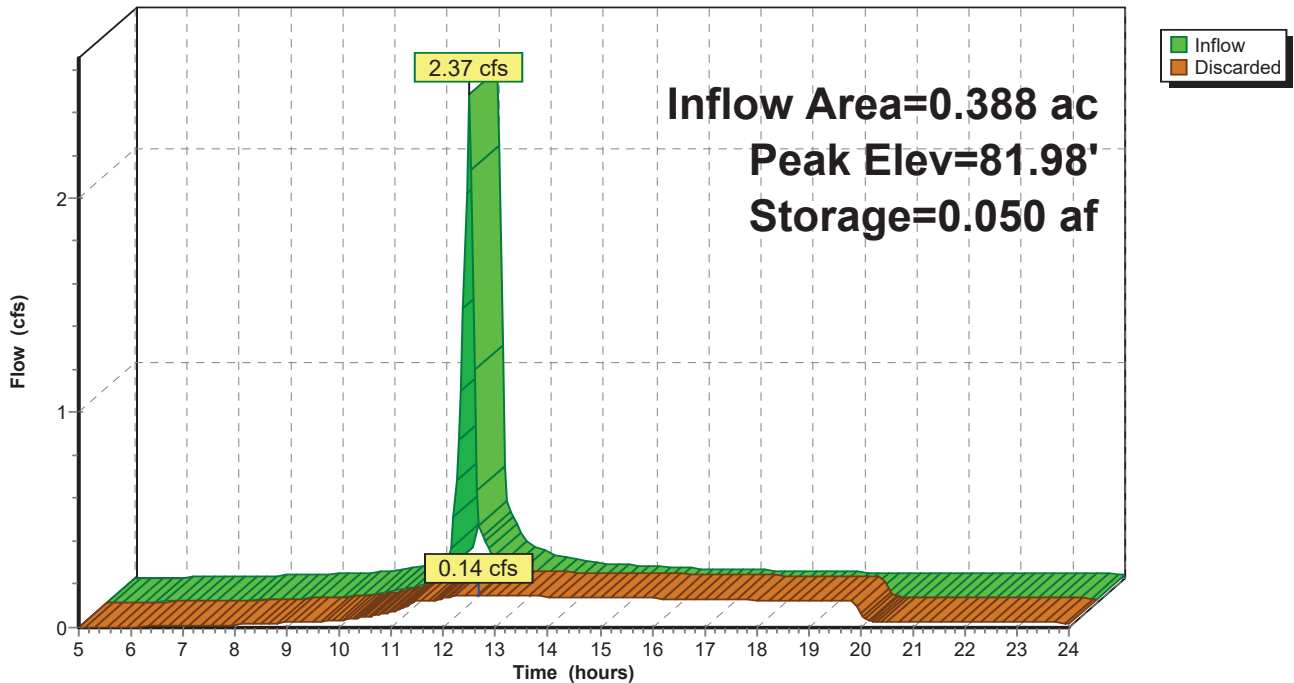
Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	0.069 af	14.00'D x 12.00'H 4' Stone Surround 4 0.170 af Overall - 0.031 af Embedded= 0.138 af x 50.0% Voids
#2	76.00'	0.031 af	6.00'D x 12.00'H Vertical Cone/Cylinder 4 Inside #1
		0.100 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.14 cfs @ 12.67 hrs HW=81.98' (Free Discharge)
 ↑1=Exfiltration (Controls 0.14 cfs)

Pond 6AP: 4xLeach Pits

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 10-YR Rainfall=4.98"

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Summary for Pond 6BP: 5xLeach Pits

Inflow Area = 0.625 ac, 59.51% Impervious, Inflow Depth > 2.34" for 10-YR event
 Inflow = 1.71 cfs @ 12.11 hrs, Volume= 0.122 af
 Outflow = 0.17 cfs @ 13.01 hrs, Volume= 0.122 af, Atten= 90%, Lag= 53.8 min
 Discarded = 0.17 cfs @ 13.01 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 84.92' @ 13.01 hrs Surf.Area= 0.018 ac Storage= 0.051 af

Plug-Flow detention time=117.3 min calculated for 0.122 af (100% of inflow)
 Center-of-Mass det. time=116.2 min (958.9 - 842.8)

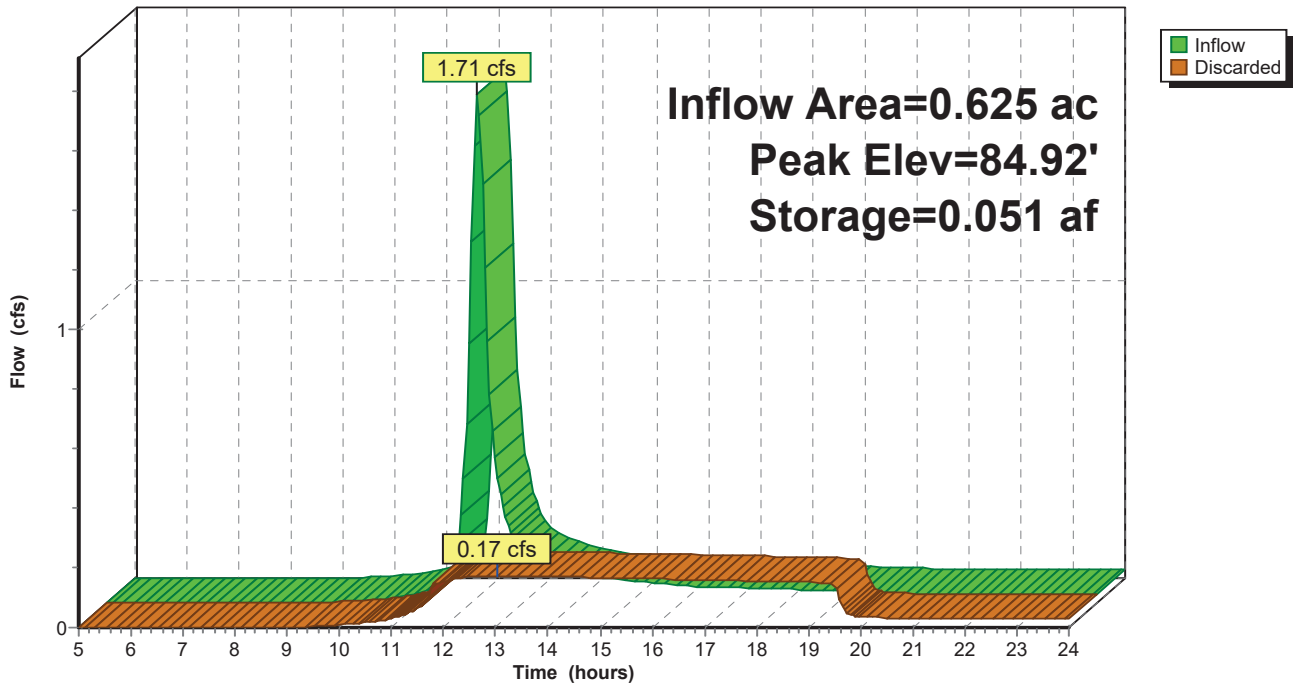
Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	0.087 af	14.00'D x 12.00'H 4' Stone Surround 5 0.212 af Overall - 0.039 af Embedded= 0.173 af x 50.0% Voids
#2	80.00'	0.039 af	6.00'D x 12.00'H Vertical Cone/Cylinder 5 Inside #1
		0.125 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.17 cfs @ 13.01 hrs HW=84.92' (Free Discharge)
 ↑1=Exfiltration (Controls 0.17 cfs)

Pond 6BP: 5xLeach Pits

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1&2: OCEANPINES-POSTFLOW Runoff Area=6,195 sf 0.00% Impervious Runoff Depth>0.43"
Flow Length=104' Tc=7.1 min CN=39 Runoff=0.04 cfs 0.005 af

Subcatchment3: WILDWOOD-POSTFLOW Runoff Area=7,030 sf 0.00% Impervious Runoff Depth>0.43"
Flow Length=48' Slope=0.1250 '/' Tc=5.7 min CN=39 Runoff=0.05 cfs 0.006 af

Subcatchment4-BYP: UNRESTRICTEDNORTH Runoff Area=24,134 sf 0.00% Impervious Runoff Depth>0.43"
Flow Length=325' Tc=15.0 min CN=39 Runoff=0.11 cfs 0.020 af

Subcatchment4-HSE: BLDG 4/5/6/7 Runoff Area=12,277 sf 100.00% Impervious Runoff Depth>5.51"
Tc=5.0 min CN=98 Runoff=2.42 cfs 0.129 af

Subcatchment6A: WESTCB INFLOW Runoff Area=16,884 sf 81.81% Impervious Runoff Depth>4.46"
Tc=5.0 min CN=87 Runoff=2.94 cfs 0.144 af

Subcatchment6B: MID CB INFLOW Runoff Area=27,241 sf 59.51% Impervious Runoff Depth>3.13"
Flow Length=374' Tc=18.2 min CN=74 Runoff=2.29 cfs 0.163 af

Reach4: NORTH Inflow=2.41 cfs 0.076 af
Outflow=2.41 cfs 0.076 af

Pond 4-CUL: CULTECRECHARGE Peak Elev=84.84' Storage=0.016 af Inflow=2.42 cfs 0.129 af
Discarded=0.07 cfs 0.073 af Primary=2.41 cfs 0.057 af Outflow=2.48 cfs 0.129 af

Pond 6AP: 4xLeachPits Peak Elev=83.90' Storage=0.066 af Inflow=2.94 cfs 0.144 af
Outflow=0.15 cfs 0.144 af

Pond 6BP: 5xLeachPits Peak Elev=87.16' Storage=0.075 af Inflow=2.29 cfs 0.163 af
Outflow=0.18 cfs 0.163 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.467 af Average Runoff Depth = 2.60"
54.88% Pervious = 1.181 ac 45.12% Impervious = 0.971 ac

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

Summary for Subcatchment 1&2: OCEAN PINES-POST FLOW

Runoff = 0.04 cfs @ 12.04 hrs, Volume= 0.005 af, Depth> 0.43"

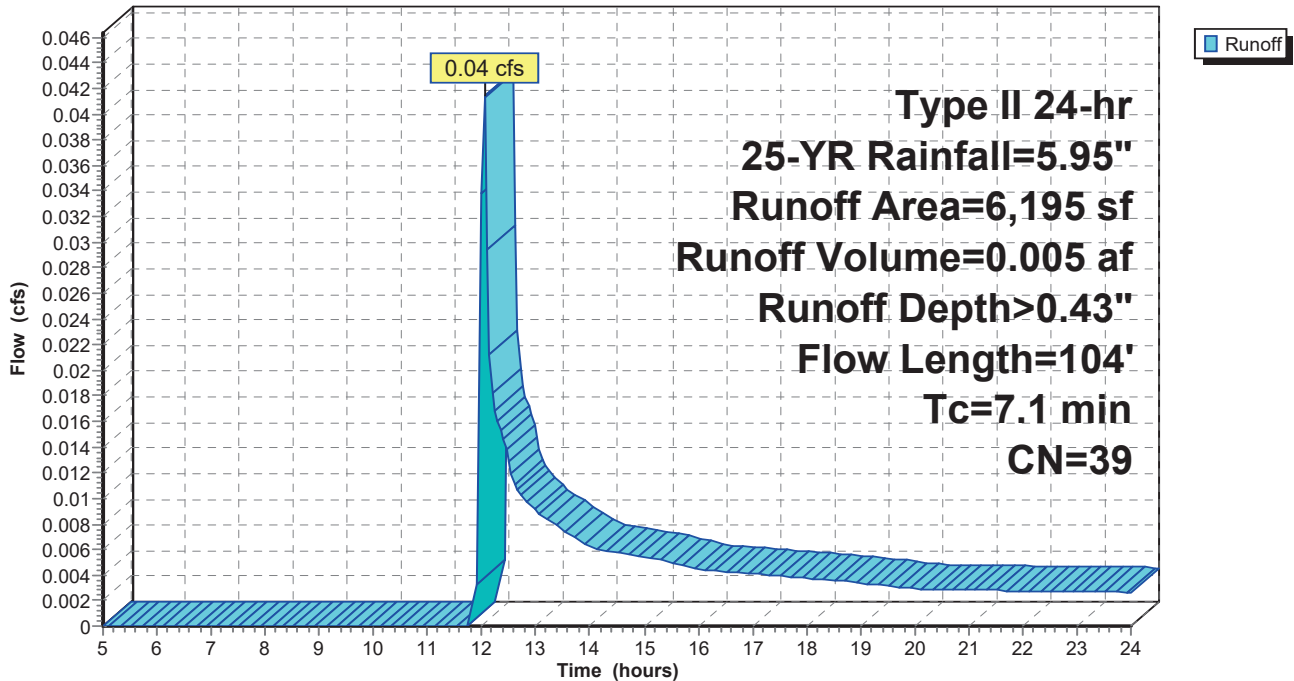
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
6,195	39	>75% Grass cover, Good, HSG A
6,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0800	0.12		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
0.1	54	0.3700	9.79		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
7.1	104	Total			

Subcatchment 1&2: OCEAN PINES-POST FLOW

Hydrograph



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Summary for Subcatchment 3: WILDWOOD-POST FLOW

Runoff = 0.05 cfs @ 12.02 hrs, Volume= 0.006 af, Depth> 0.43"

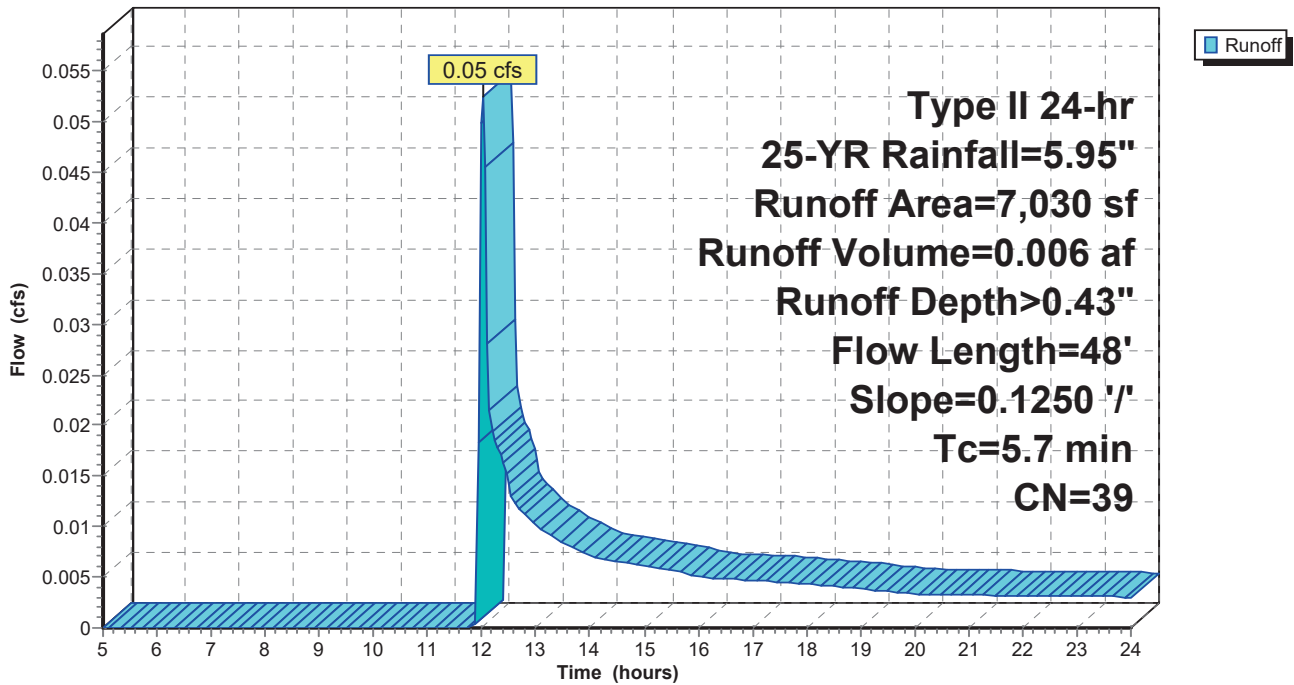
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
7,030	39	>75% Grass cover, Good, HSG A
7,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	48	0.1250	0.14		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"

Subcatchment 3: WILDWOOD-POST FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Summary for Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

Runoff = 0.11 cfs @ 12.16 hrs, Volume= 0.020 af, Depth> 0.43"

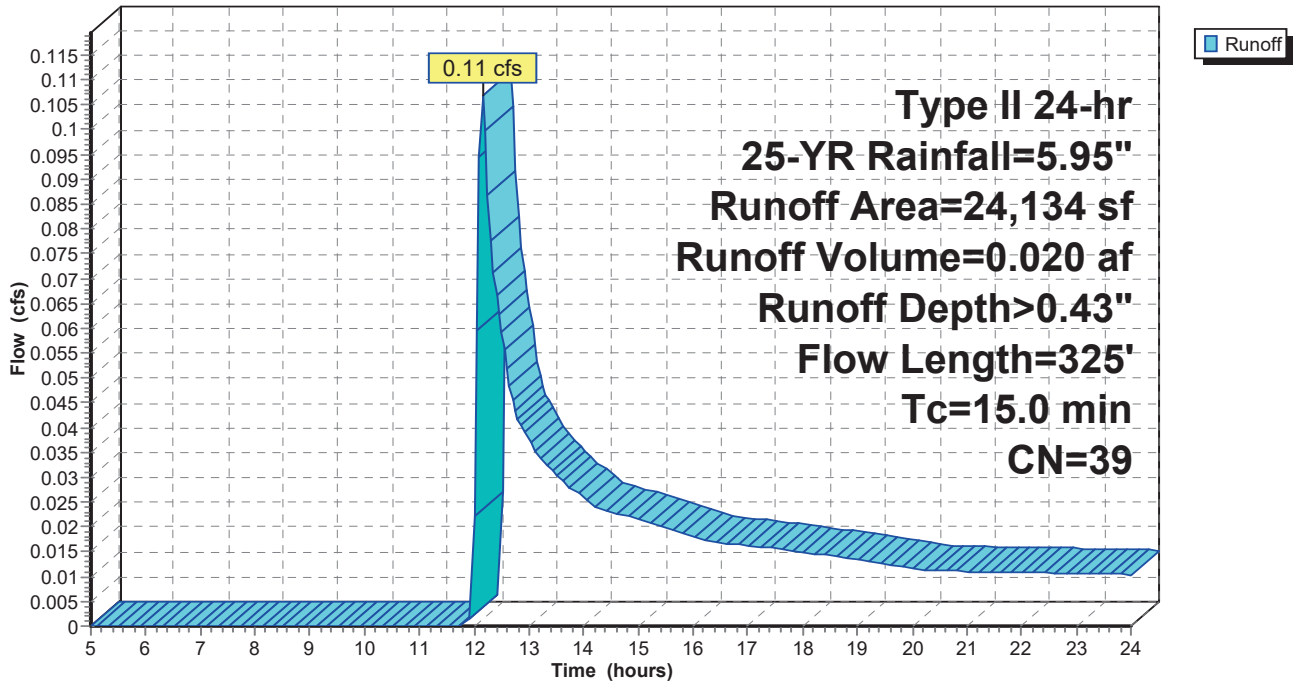
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
24,134	39	>75% Grass cover, Good, HSG A
24,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0150	0.06		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
1.3	275	0.0518	3.66		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
15.0	325	Total			

Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Summary for Subcatchment 4-HSE: BLDG 4/5/6/7

Runoff = 2.42 cfs @ 11.95 hrs, Volume= 0.129 af, Depth> 5.51"

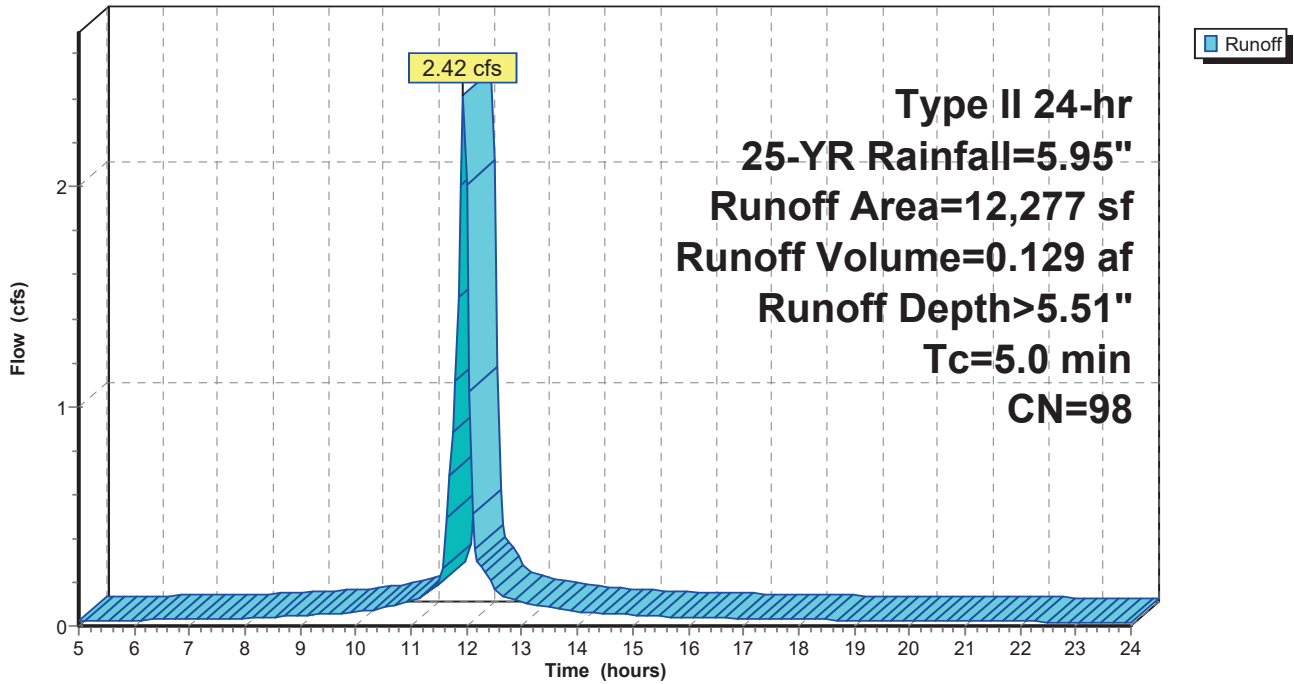
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
12,277	98	Roofs, HSG A
12,277		100.00% Impervious Area

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

Subcatchment 4-HSE: BLDG 4/5/6/7

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Summary for Subcatchment 6A: WEST CB INFLOW

Runoff = 2.94 cfs @ 11.95 hrs, Volume= 0.144 af, Depth> 4.46"

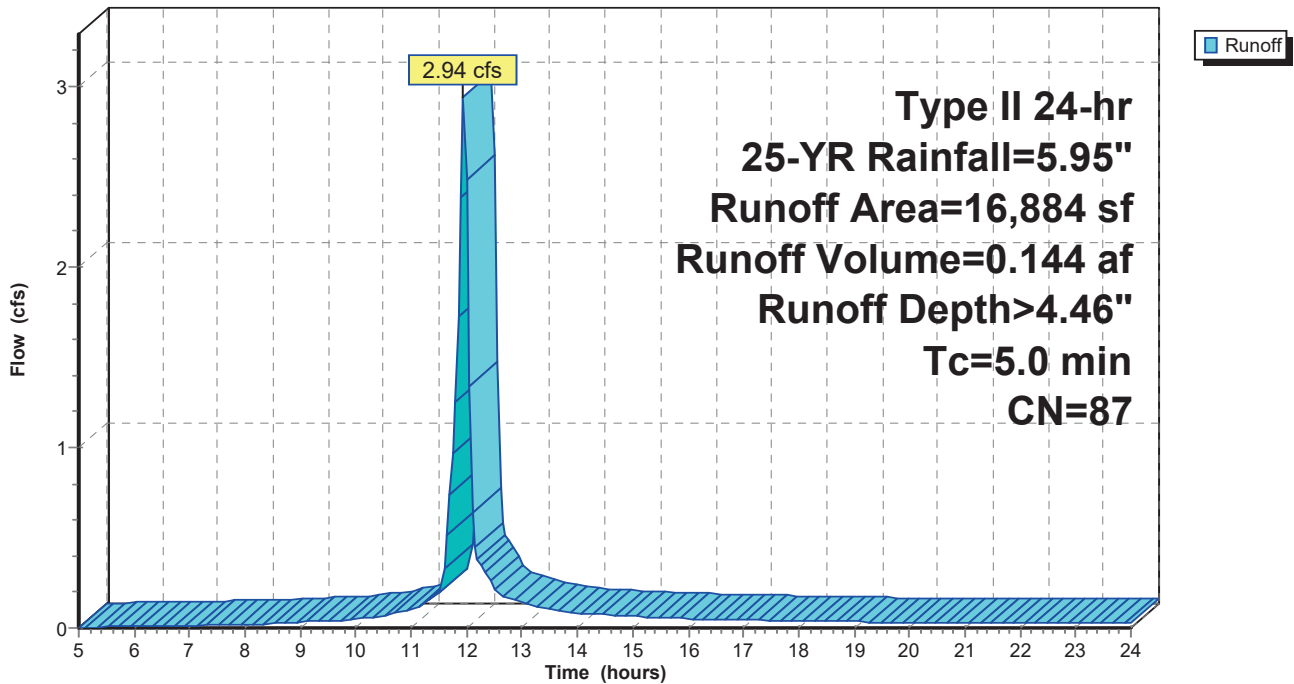
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
5,147	98	Paved parking, HSG A
3,071	39	>75% Grass cover, Good, HSG A
8,666	98	Roofs, HSG A
16,884	87	Weighted Average
3,071		18.19% Pervious Area
13,813		81.81% Impervious Area

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

Subcatchment 6A: WEST CB INFLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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Summary for Subcatchment 6B: MID CB INFLOW

Runoff = 2.29 cfs @ 12.11 hrs, Volume= 0.163 af, Depth> 3.13"

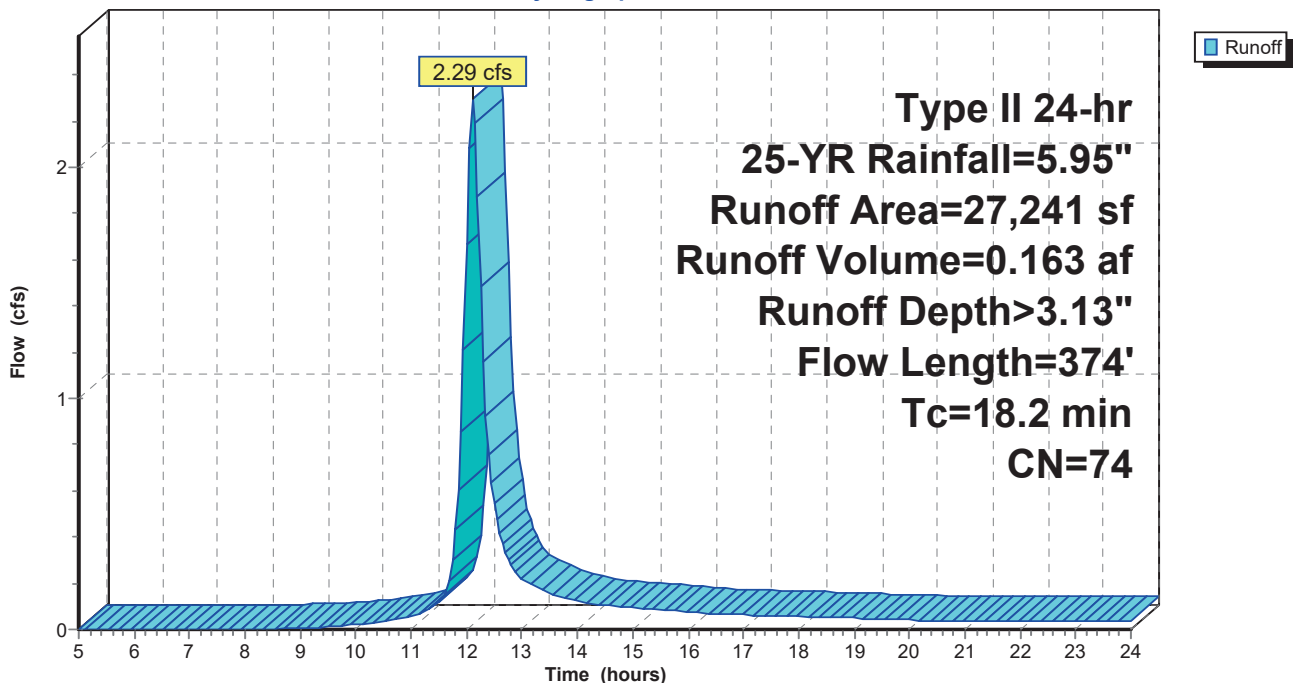
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR Rainfall=5.95"

Area (sf)	CN	Description
16,212	98	Paved parking, HSG A
11,029	39	>75% Grass cover, Good, HSG A
27,241	74	Weighted Average
11,029		40.49% Pervious Area
16,212		59.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		Sheet Flow, A-B
					Grass: Bermuda n= 0.410 P2= 3.41"
0.1	27	0.1850	6.92		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
2.0	297	0.0155	2.53		Shallow Concentrated Flow, C-D
					Paved Kv= 20.3 fps
18.2	374	Total			

Subcatchment 6B: MID CB INFLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

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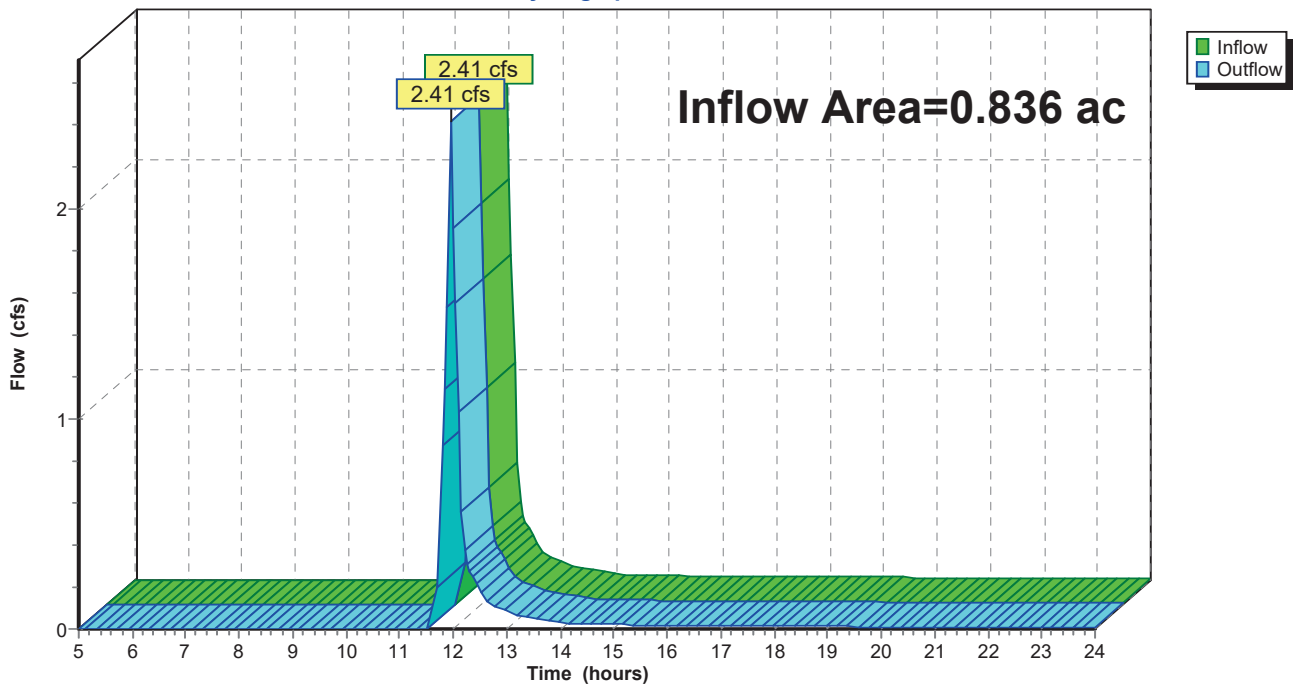
Summary for Reach 4: NORTH

Inflow Area = 0.836 ac, 33.72% Impervious, Inflow Depth > 1.10" for 25-YR event
Inflow = 2.41 cfs @ 11.96 hrs, Volume= 0.076 af
Outflow = 2.41 cfs @ 11.96 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Reach 4: NORTH

Hydrograph



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Summary for Pond 4-CUL: CULTEC RECHARGE

Inflow Area = 0.282 ac, 100.00% Impervious, Inflow Depth > 5.51" for 25-YR event
 Inflow = 2.42 cfs @ 11.95 hrs, Volume= 0.129 af
 Outflow = 2.48 cfs @ 11.96 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.4 min
 Discarded = 0.07 cfs @ 11.96 hrs, Volume= 0.073 af
 Primary = 2.41 cfs @ 11.96 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 84.84' @ 11.96 hrs Surf.Area= 0.008 ac Storage= 0.016 af

Plug-Flow detention time=27.5 min calculated for 0.129 af (100% of inflow)
 Center-of-Mass det. time=27.0 min (786.2 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	0.007 af	6.33'W x 52.50'L x 3.54'H Field A 0.027 af Overall - 0.009 af Embedded= 0.018 af x 40.0% Voids
#2A	80.50'	0.009 af	Cultec R-330XLHDx 7 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.016 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'
#2	Primary	82.00'	6.0" Round Culvert X 2.00L= 25.0' Ke= 0.900 Inlet / Outlet Invert= 82.00' / 81.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.07 cfs @ 11.96 hrs HW=84.72' (Free Discharge)
 ↑1=Exfiltration (Controls 0.07 cfs)

Primary OutFlow Max=2.34 cfs @ 11.96 hrs HW=84.70' (Free Discharge)
 ↑2=Culvert (Inlet Controls 2.34 cfs @ 5.95 fps)

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Pond 4-CUL: CULTEC RECHARGE - Chamber Wizard Field A

ChamberModel= CultecR-330XLHD(CultecRecharger@330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

7 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 50.50' Row Length +12.0" End Stone x 2 = 52.50'
Base Length

1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

7 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 376.3 cf Chamber Storage

1,177.6 cf Field - 376.3 cf Chambers = 801.3 cf Stone x 40.0% Voids = 320.5 cf Stone Storage

Chamber Storage + Stone Storage = 696.8 cf = 0.016 af

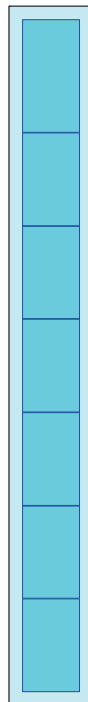
Overall Storage Efficiency = 59.2%

Overall System Size = 52.50' x 6.33' x 3.54'

7 Chambers

43.6 cy Field

29.7 cy Stone



1292_LOT 61 POST

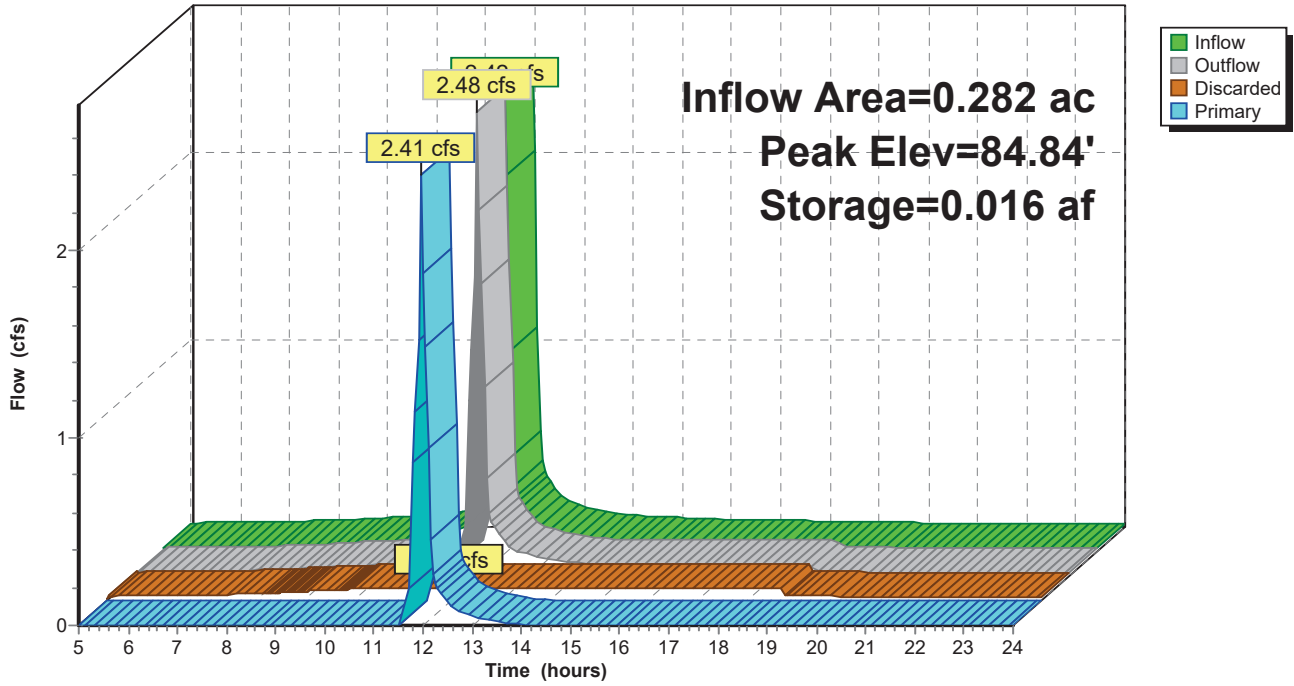
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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 25-YR Rainfall=5.95"

Pond 4-CUL: CULTEC RECHARGE

Hydrograph



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Summary for Pond 6AP: 4xLeach Pits

Inflow Area = 0.388 ac, 81.81% Impervious, Inflow Depth > 4.46" for 25-YR event
 Inflow = 2.94 cfs @ 11.95 hrs, Volume= 0.144 af
 Outflow = 0.15 cfs @ 12.89 hrs, Volume= 0.144 af, Atten= 95%, Lag= 56.0 min
 Discarded = 0.15 cfs @ 12.89 hrs, Volume= 0.144 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 83.90' @ 12.89 hrs Surf.Area= 0.014 ac Storage= 0.066 af

Plug-Flow detention time=167.4 min calculated for 0.144 af (100% of inflow)
 Center-of-Mass det. time=166.4 min (957.1 - 790.7)

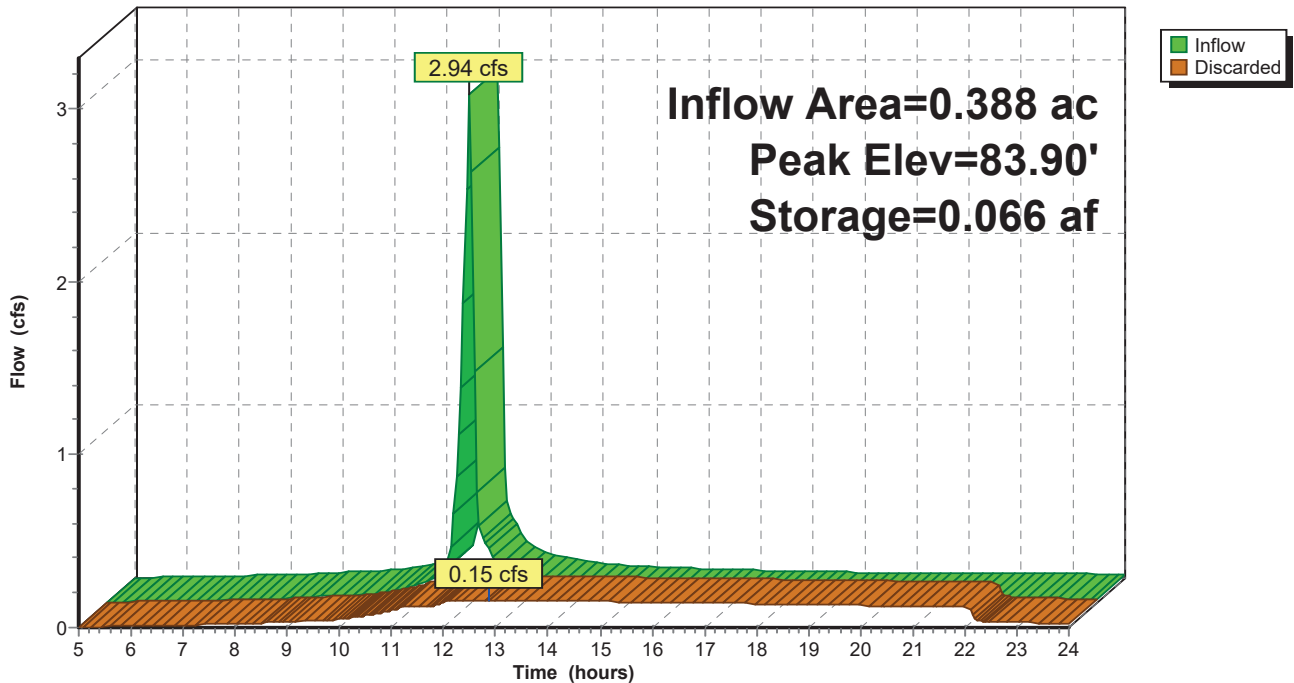
Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	0.069 af	14.00'D x 12.00'H 4' Stone Surround 4 0.170 af Overall - 0.031 af Embedded= 0.138 af x 50.0% Voids
#2	76.00'	0.031 af	6.00'D x 12.00'H Vertical Cone/Cylinder 4 Inside #1
		0.100 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.15 cfs @ 12.89 hrs HW=83.90' (Free Discharge)
 ↑1=Exfiltration (Controls 0.15 cfs)

Pond 6AP: 4xLeach Pits

Hydrograph



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Summary for Pond 6BP: 5xLeach Pits

Inflow Area = 0.625 ac, 59.51% Impervious, Inflow Depth > 3.13" for 25-YR event
 Inflow = 2.29 cfs @ 12.11 hrs, Volume= 0.163 af
 Outflow = 0.18 cfs @ 13.27 hrs, Volume= 0.163 af, Atten= 92%, Lag= 69.6 min
 Discarded = 0.18 cfs @ 13.27 hrs, Volume= 0.163 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.16' @ 13.27 hrs Surf.Area= 0.018 ac Storage= 0.075 af

Plug-Flow detention time=172.3 min calculated for 0.163 af (100% of inflow)
 Center-of-Mass det. time=171.2 min (1,005.7 - 834.6)

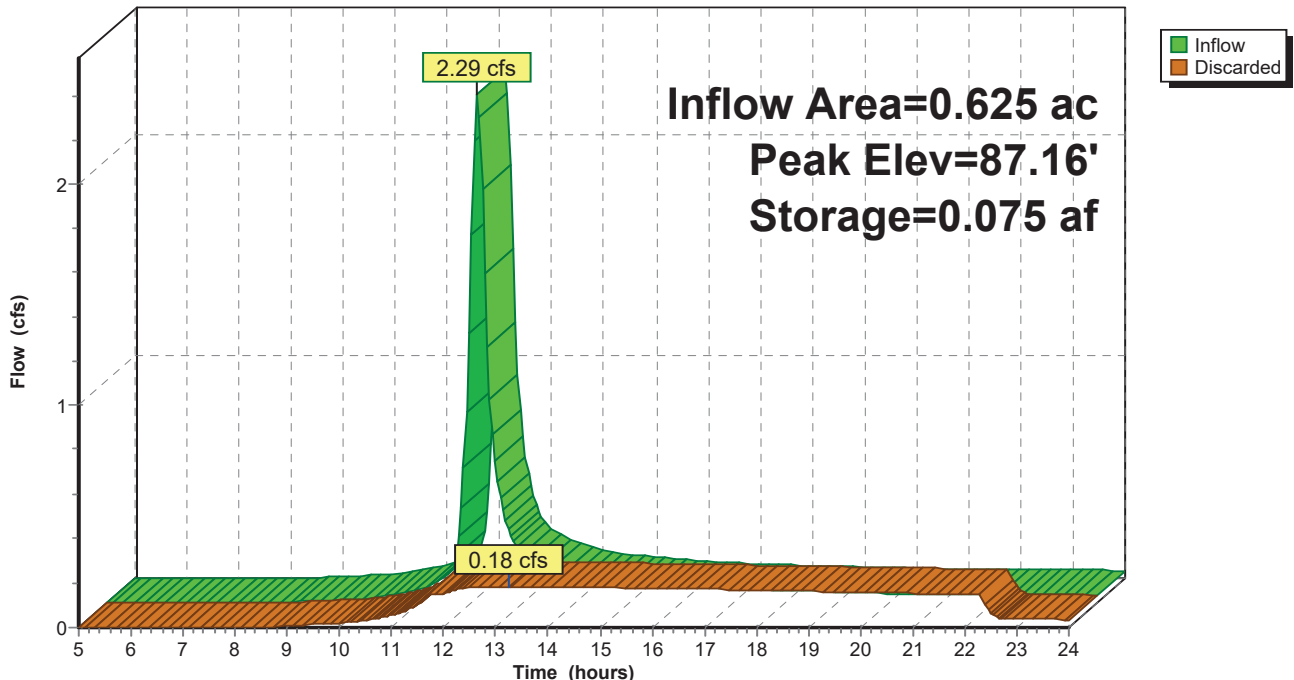
Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	0.087 af	14.00'D x 12.00'H 4' Stone Surround 5 0.212 af Overall - 0.039 af Embedded= 0.173 af x 50.0% Voids
#2	80.00'	0.039 af	6.00'D x 12.00'H Vertical Cone/Cylinder 5 Inside #1
		0.125 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.18 cfs @ 13.27 hrs HW=87.16' (Free Discharge)
 ↑1=Exfiltration (Controls 0.18 cfs)

Pond 6BP: 5xLeach Pits

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Time span=5.00-24.00 hrs, dt=0.05 hrs, 381 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1&2: OCEANPINES-POSTFLOW Runoff Area=6,195 sf 0.00% Impervious Runoff Depth>0.94"
Flow Length=104' Tc=7.1 min CN=39 Runoff=0.16 cfs 0.011 af

Subcatchment3: WILDWOOD-POSTFLOW Runoff Area=7,030 sf 0.00% Impervious Runoff Depth>0.94"
Flow Length=48' Slope=0.1250 '/' Tc=5.7 min CN=39 Runoff=0.20 cfs 0.013 af

Subcatchment4-BYP: UNRESTRICTEDNORTH Runoff Area=24,134 sf 0.00% Impervious Runoff Depth>0.93"
Flow Length=325' Tc=15.0 min CN=39 Runoff=0.43 cfs 0.043 af

Subcatchment4-HSE: BLDG 4/5/6/7 Runoff Area=12,277 sf 100.00% Impervious Runoff Depth>6.94"
Tc=5.0 min CN=98 Runoff=3.03 cfs 0.163 af

Subcatchment6A: WESTCB INFLOW Runoff Area=16,884 sf 81.81% Impervious Runoff Depth>5.91"
Tc=5.0 min CN=87 Runoff=3.83 cfs 0.191 af

Subcatchment6B: MID CB INFLOW Runoff Area=27,241 sf 59.51% Impervious Runoff Depth>4.43"
Flow Length=374' Tc=18.2 min CN=74 Runoff=3.24 cfs 0.231 af

Reach4: NORTH Inflow=3.19 cfs 0.123 af
Outflow=3.19 cfs 0.123 af

Pond 4-CUL: CULTECRECHARGE Peak Elev=86.60' Storage=0.016 af Inflow=3.03 cfs 0.163 af
Discarded=0.08 cfs 0.083 af Primary=3.11 cfs 0.080 af Outflow=3.19 cfs 0.163 af

Pond 6AP: 4xLeachPits Peak Elev=87.06' Storage=0.093 af Inflow=3.83 cfs 0.191 af
Outflow=0.17 cfs 0.179 af

Pond 6BP: 5xLeachPits Peak Elev=91.01' Storage=0.115 af Inflow=3.24 cfs 0.231 af
Outflow=0.20 cfs 0.204 af

Total Runoff Area = 2.152 ac Runoff Volume = 0.651 af Average Runoff Depth = 3.63"
54.88% Pervious = 1.181 ac 45.12% Impervious = 0.971 ac

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

Summary for Subcatchment 1&2: OCEAN PINES-POST FLOW

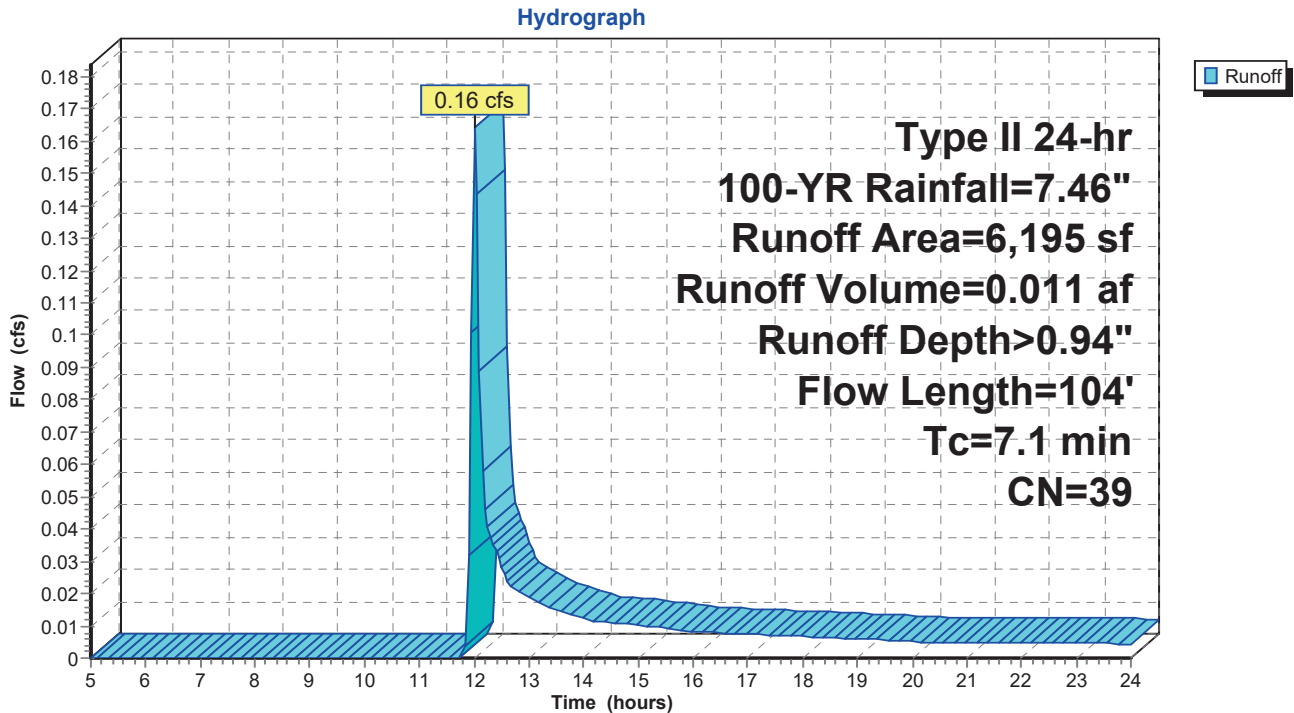
Runoff = 0.16 cfs @ 12.01 hrs, Volume= 0.011 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
6,195	39	>75% Grass cover, Good, HSG A
6,195		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0800	0.12		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
0.1	54	0.3700	9.79		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
7.1	104	Total			

Subcatchment 1&2: OCEAN PINES-POST FLOW



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Summary for Subcatchment 3: WILDWOOD-POST FLOW

Runoff = 0.20 cfs @ 12.00 hrs, Volume= 0.013 af, Depth> 0.94"

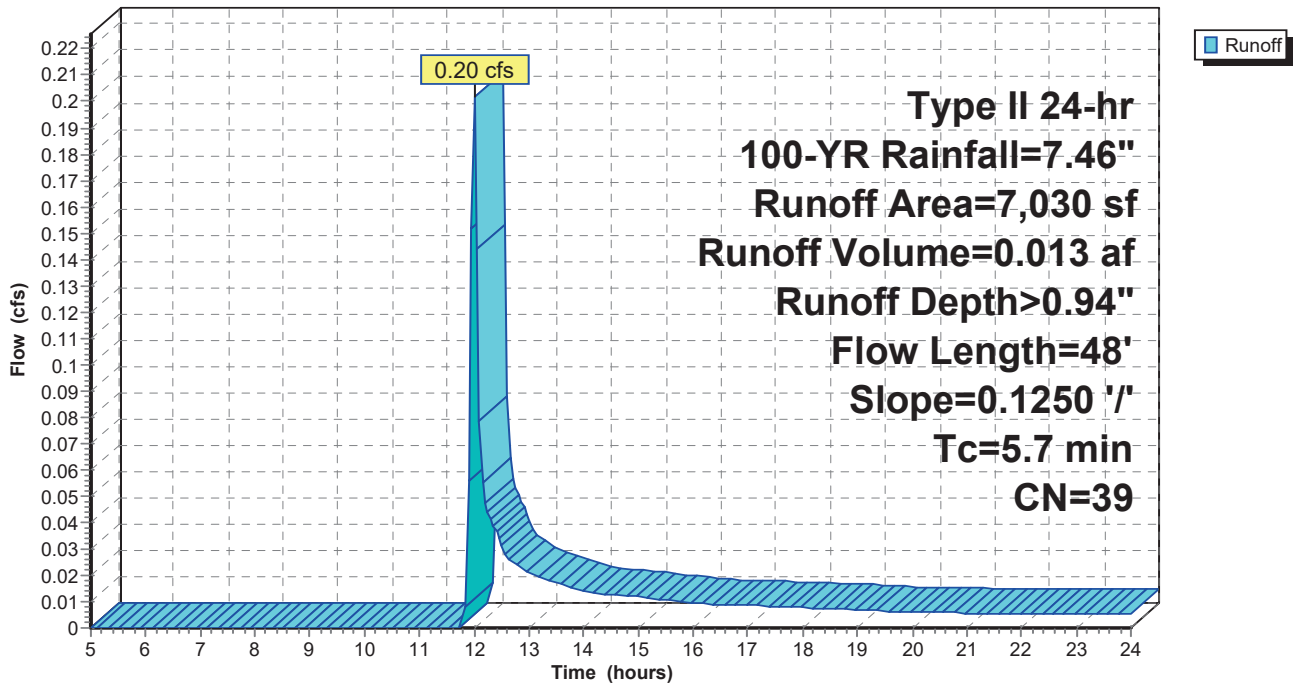
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
7,030	39	>75% Grass cover, Good, HSG A
7,030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	48	0.1250	0.14		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"

Subcatchment 3: WILDWOOD-POST FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
 Type II 24-hr 100-YR Rainfall=7.46"

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Summary for Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

Runoff = 0.43 cfs @ 12.12 hrs, Volume= 0.043 af, Depth> 0.93"

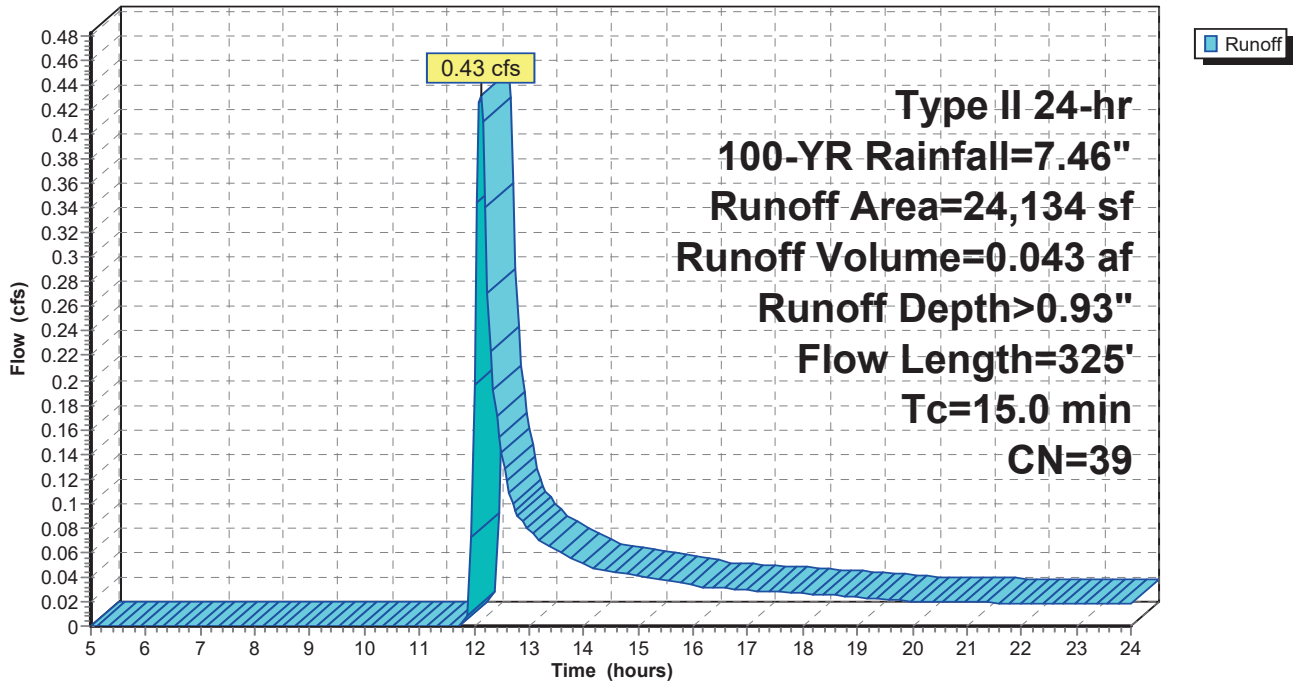
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
24,134	39	>75% Grass cover, Good, HSG A
24,134		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	50	0.0150	0.06		Sheet Flow, A-B
					Grass: Bermuda n= 0.410 P2= 3.41"
1.3	275	0.0518	3.66		Shallow Concentrated Flow, B-C
					Unpaved Kv= 16.1 fps
15.0	325	Total			

Subcatchment 4-BYP: UNRESTRICTED NORTH FLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Summary for Subcatchment 4-HSE: BLDG 4/5/6/7

Runoff = 3.03 cfs @ 11.95 hrs, Volume= 0.163 af, Depth> 6.94"

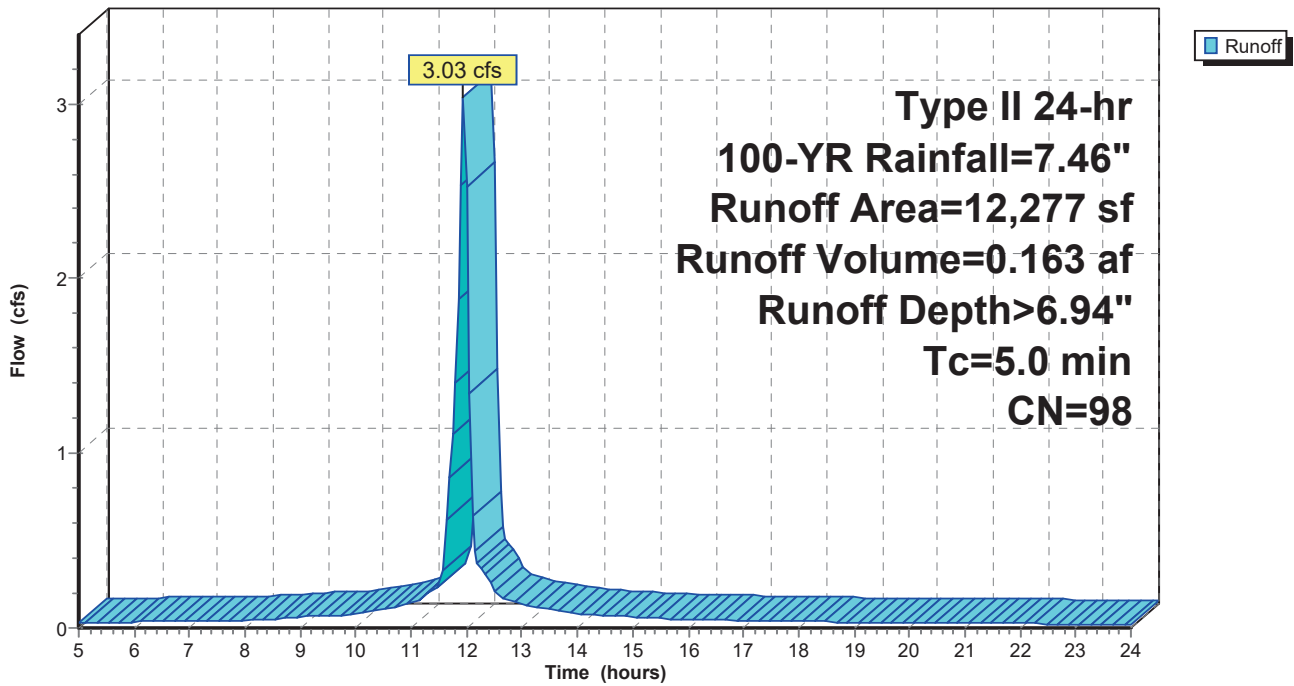
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
12,277	98	Roofs, HSG A
12,277		100.00% Impervious Area

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

Subcatchment 4-HSE: BLDG 4/5/6/7

Hydrograph



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Bourne_Wildwood Lane - Lot 61
 Type II 24-hr 100-YR Rainfall=7.46"

Summary for Subcatchment 6A: WEST CB INFLOW

Runoff = 3.83 cfs @ 11.95 hrs, Volume= 0.191 af, Depth> 5.91"

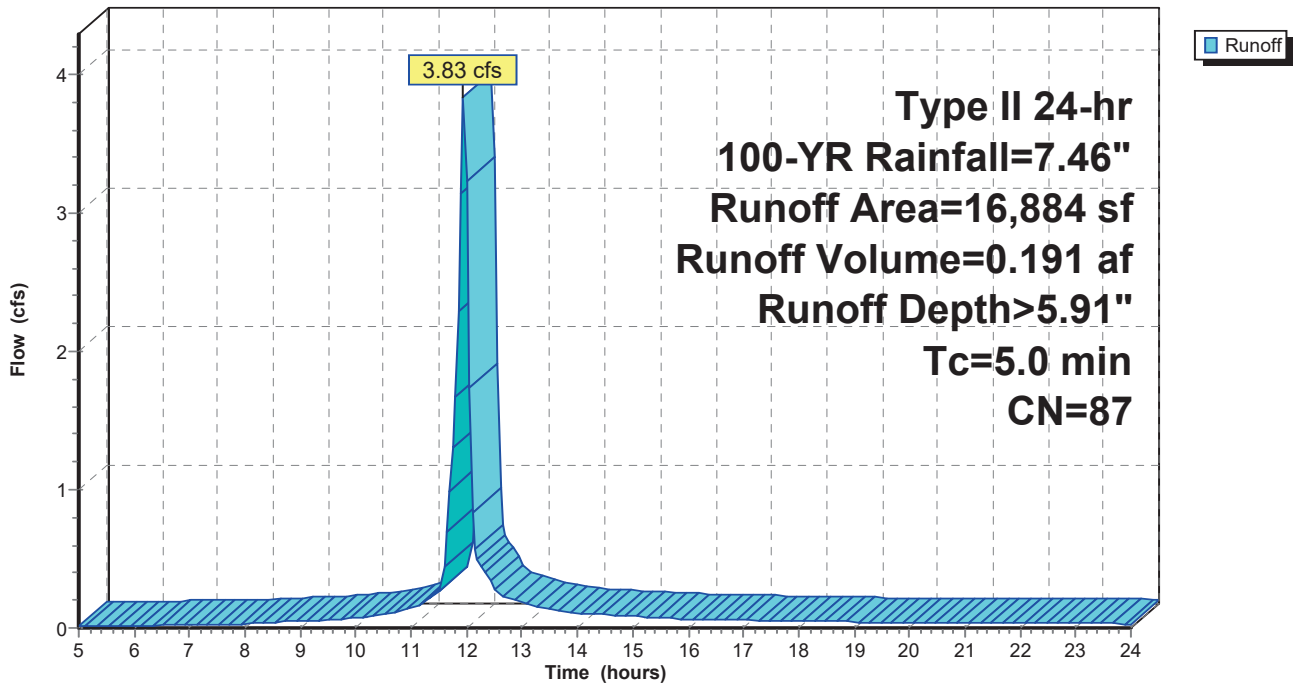
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
5,147	98	Paved parking, HSG A
3,071	39	>75% Grass cover, Good, HSG A
8,666	98	Roofs, HSG A
16,884	87	Weighted Average
3,071		18.19% Pervious Area
13,813		81.81% Impervious Area

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

Subcatchment 6A: WEST CB INFLOW

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

Summary for Subcatchment 6B: MID CB INFLOW

Runoff = 3.24 cfs @ 12.11 hrs, Volume= 0.231 af, Depth> 4.43"

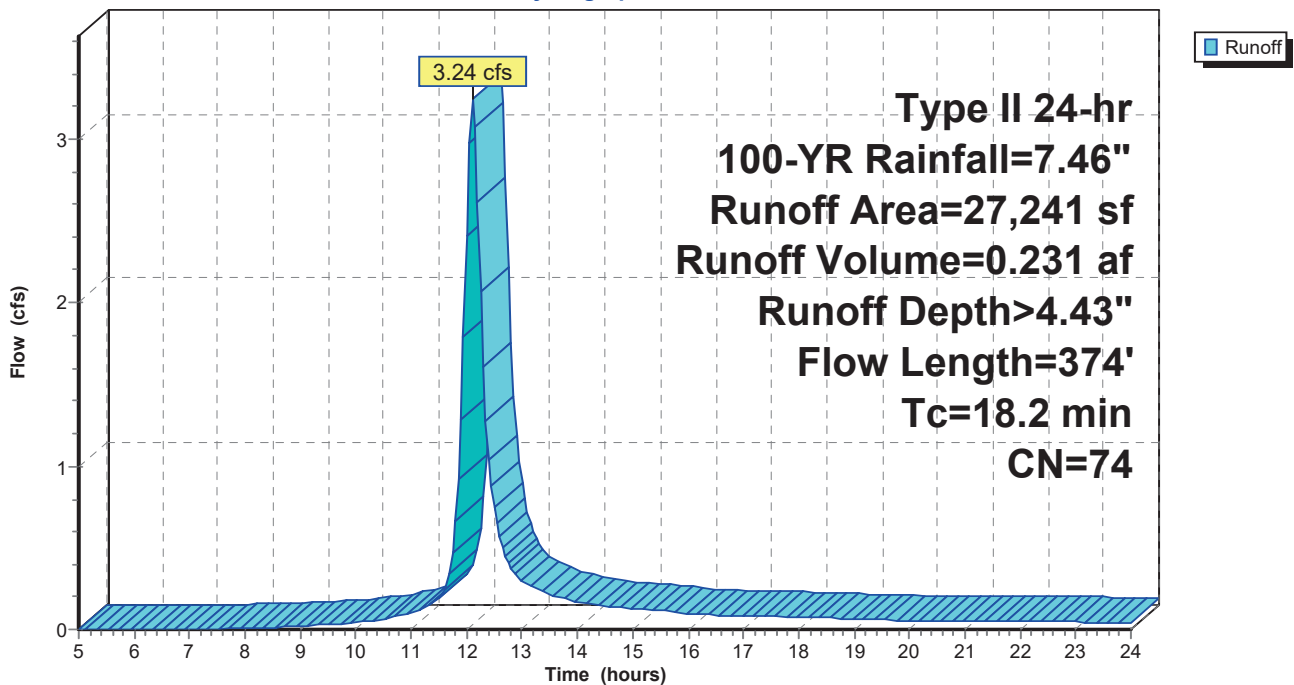
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.46"

Area (sf)	CN	Description
16,212	98	Paved parking, HSG A
11,029	39	>75% Grass cover, Good, HSG A
27,241	74	Weighted Average
11,029		40.49% Pervious Area
16,212		59.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	50	0.0100	0.05		Sheet Flow, A-B Grass: Bermuda n= 0.410 P2= 3.41"
0.1	27	0.1850	6.92		Shallow Concentrated Flow, B-C Unpaved Kv= 16.1 fps
2.0	297	0.0155	2.53		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
18.2	374	Total			

Subcatchment 6B: MID CB INFLOW

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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

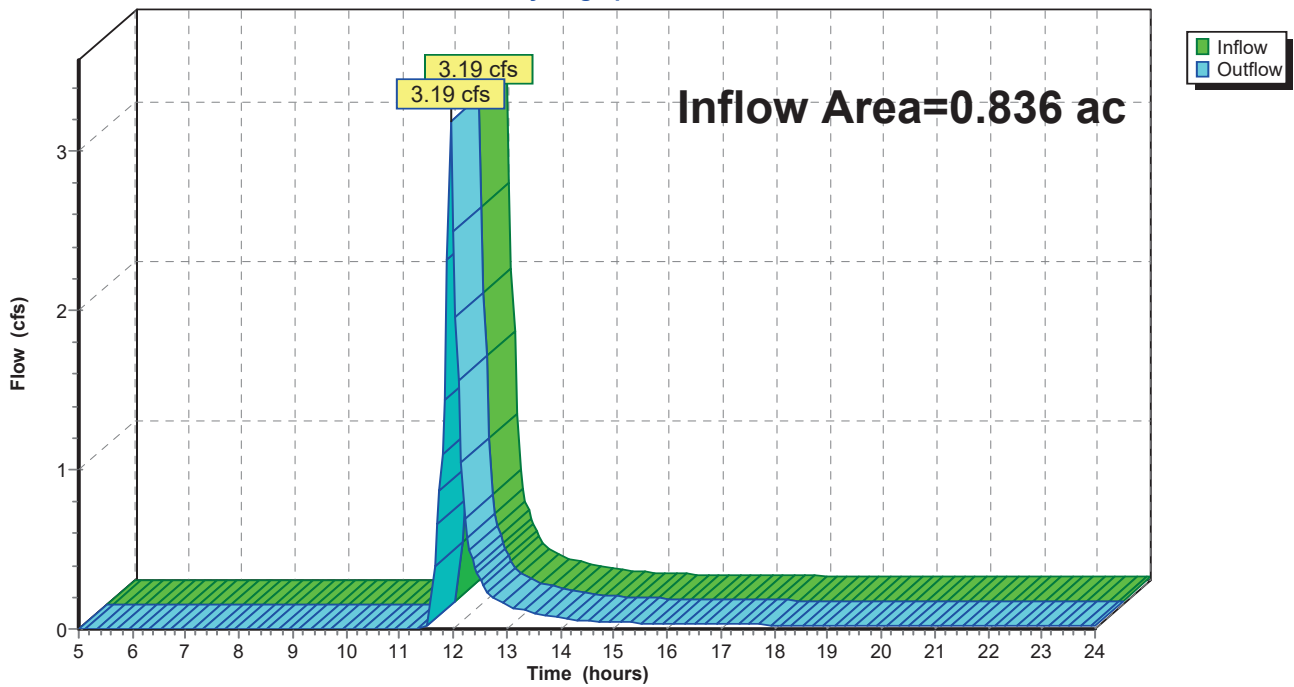
Summary for Reach 4: NORTH

Inflow Area = 0.836 ac, 33.72% Impervious, Inflow Depth > 1.77" for 100-YR event
Inflow = 3.19 cfs @ 11.95 hrs, Volume= 0.123 af
Outflow = 3.19 cfs @ 11.95 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs

Reach 4: NORTH

Hydrograph



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Summary for Pond 4-CUL: CULTEC RECHARGE

Inflow Area = 0.282 ac, 100.00% Impervious, Inflow Depth > 6.94" for 100-YR event
 Inflow = 3.03 cfs @ 11.95 hrs, Volume= 0.163 af
 Outflow = 3.19 cfs @ 11.95 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.08 cfs @ 11.95 hrs, Volume= 0.083 af
 Primary = 3.11 cfs @ 11.95 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 86.60' @ 11.95 hrs Surf.Area= 0.008 ac Storage= 0.016 af

Plug-Flow detention time=27.5 min calculated for 0.163 af (100% of inflow)
 Center-of-Mass det. time=27.1 min (785.4 - 758.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	80.00'	0.007 af	6.33'W x 52.50'L x 3.54'H Field A 0.027 af Overall - 0.009 af Embedded= 0.018 af x 40.0% Voids
#2A	80.50'	0.009 af	Cultec R-330XLHDx 7 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.016 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'
#2	Primary	82.00'	6.0" Round Culvert X 2.00L= 25.0' Ke= 0.900 Inlet / Outlet Invert= 82.00' / 81.00' S= 0.0400 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.08 cfs @ 11.95 hrs HW=86.59' (Free Discharge)
 ↑1=Exfiltration (Controls 0.08 cfs)

Primary OutFlow Max=3.11 cfs @ 11.95 hrs HW=86.59' (Free Discharge)
 ↑2=Culvert (Inlet Controls 3.11 cfs @ 7.92 fps)

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Pond 4-CUL: CULTEC RECHARGE - Chamber Wizard Field A

ChamberModel= CultecR-330XLHD(CultecRecharger@330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

7 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 50.50' Row Length +12.0" End Stone x 2 = 52.50'
Base Length

1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width

6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

7 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 376.3 cf Chamber Storage

1,177.6 cf Field - 376.3 cf Chambers = 801.3 cf Stone x 40.0% Voids = 320.5 cf Stone Storage

Chamber Storage + Stone Storage = 696.8 cf = 0.016 af

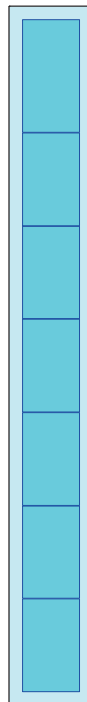
Overall Storage Efficiency = 59.2%

Overall System Size = 52.50' x 6.33' x 3.54'

7 Chambers

43.6 cy Field

29.7 cy Stone



1292_LOT 61 POST

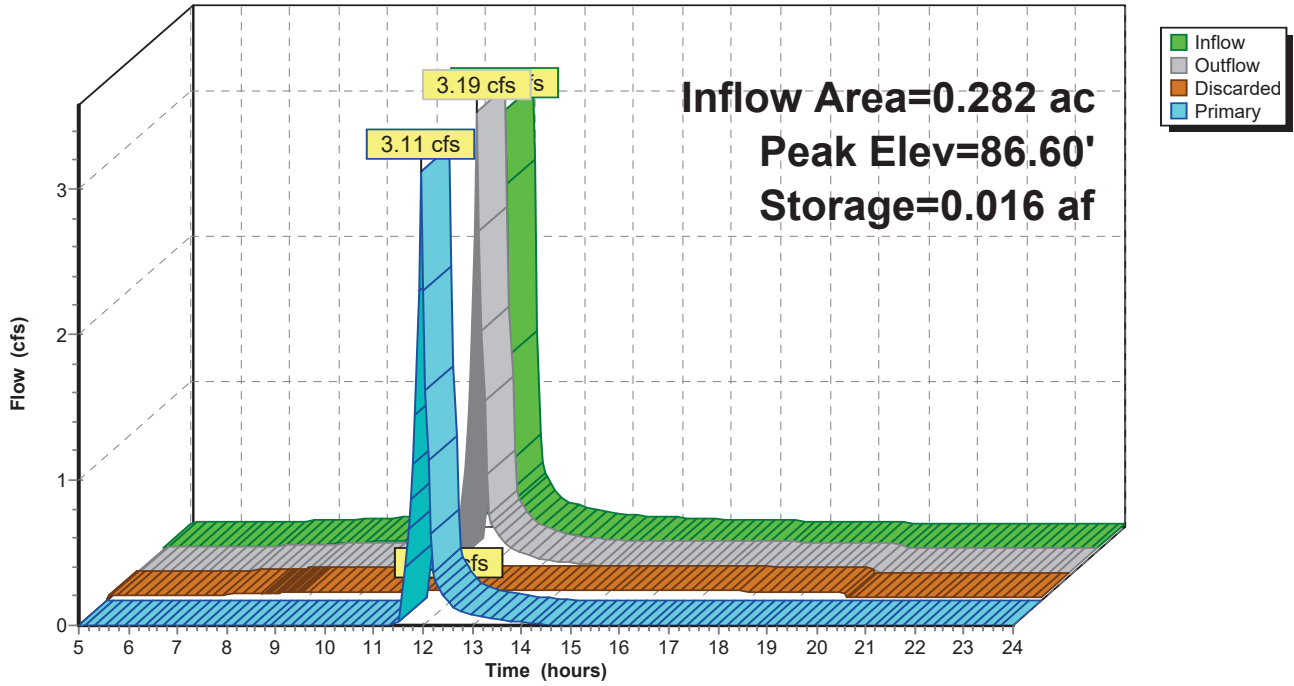
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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

Pond 4-CUL: CULTEC RECHARGE

Hydrograph



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Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Summary for Pond 6AP: 4xLeach Pits

Inflow Area = 0.388 ac, 81.81% Impervious, Inflow Depth > 5.91" for 100-YR event
 Inflow = 3.83 cfs @ 11.95 hrs, Volume= 0.191 af
 Outflow = 0.17 cfs @ 13.11 hrs, Volume= 0.179 af, Atten= 96%, Lag= 69.3 min
 Discarded = 0.17 cfs @ 13.11 hrs, Volume= 0.179 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 87.06' @ 13.11 hrs Surf.Area= 0.014 ac Storage= 0.093 af

Plug-Flow detention time=232.2 min calculated for 0.179 af (94% of inflow)
 Center-of-Mass det. time=198.2 min (982.1 - 783.9)

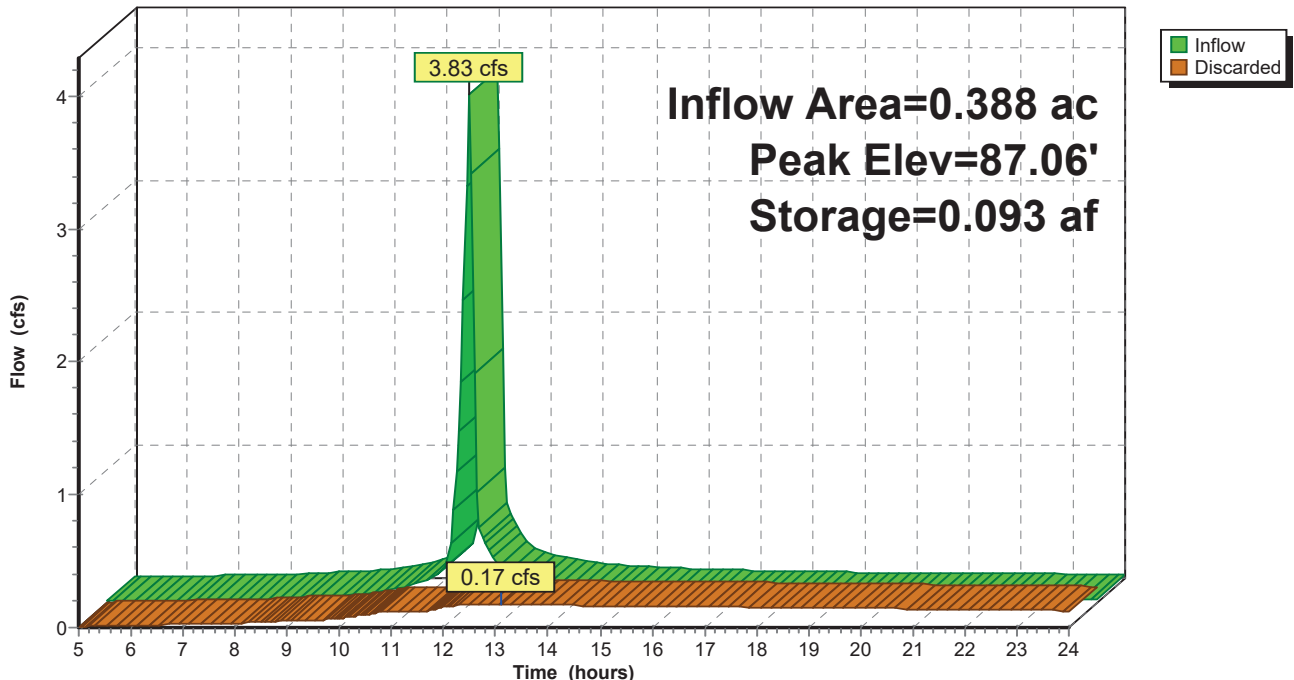
Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	0.069 af	14.00'D x 12.00'H 4' Stone Surround 4 0.170 af Overall - 0.031 af Embedded= 0.138 af x 50.0% Voids
#2	76.00'	0.031 af	6.00'D x 12.00'H Vertical Cone/Cylinder 4 Inside #1
		0.100 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	76.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.17 cfs @ 13.11 hrs HW=87.06' (Free Discharge)
 ↑1=Exfiltration (Controls 0.17 cfs)

Pond 6AP: 4xLeach Pits

Hydrograph



1292_LOT 61 POST

Prepared by Existing Grade, Inc

HydroCAD® 10.00-22 s/n 04588 © 2018 HydroCAD Software Solutions LLC

Bourne_Wildwood Lane - Lot 61
Type II 24-hr 100-YR Rainfall=7.46"

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Summary for Pond 6BP: 5xLeach Pits

Inflow Area = 0.625 ac, 59.51% Impervious, Inflow Depth > 4.43" for 100-YR event
 Inflow = 3.24 cfs @ 12.11 hrs, Volume= 0.231 af
 Outflow = 0.20 cfs @ 13.64 hrs, Volume= 0.204 af, Atten= 94%, Lag= 91.9 min
 Discarded = 0.20 cfs @ 13.64 hrs, Volume= 0.204 af

Routing by Stor-Ind method, Time Span= 5.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 91.01' @ 13.64 hrs Surf.Area= 0.018 ac Storage= 0.115 af

Plug-Flow detention time=257.0 min calculated for 0.204 af (88% of inflow)
 Center-of-Mass det. time=200.9 min (1,025.7 - 824.8)

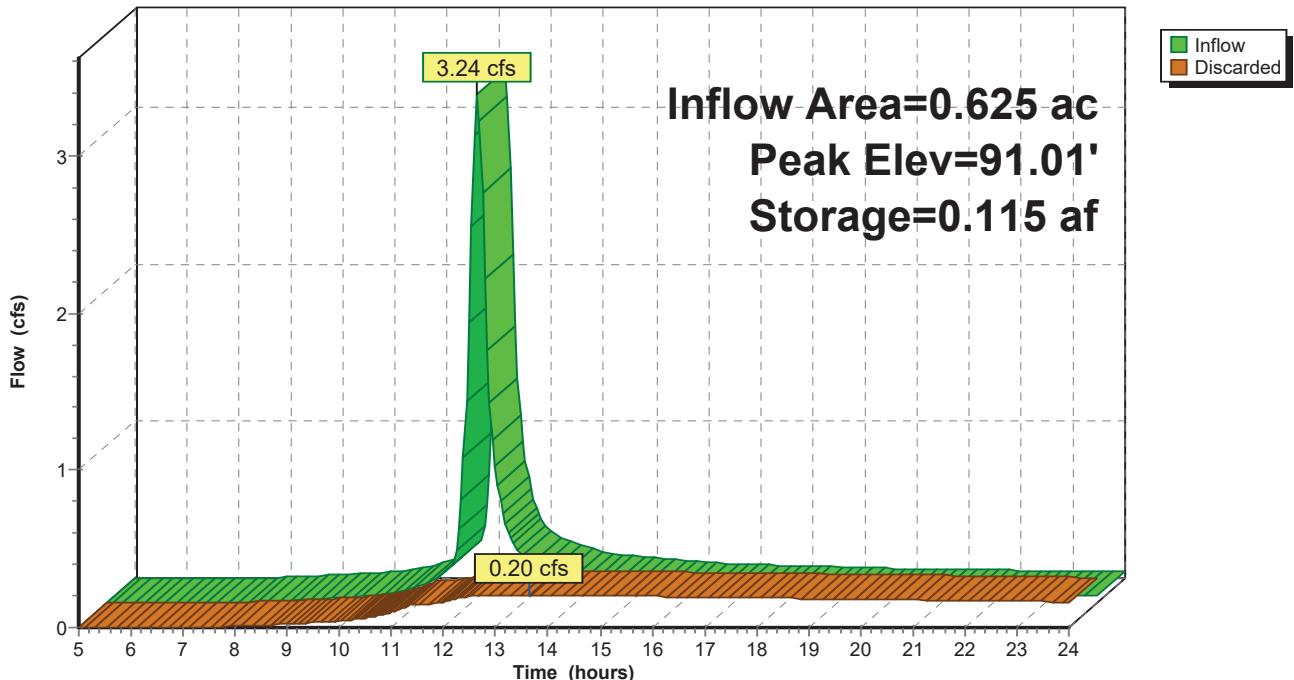
Volume	Invert	Avail.Storage	Storage Description
#1	80.00'	0.087 af	14.00'D x 12.00'H 4' Stone Surround 5 0.212 af Overall - 0.039 af Embedded= 0.173 af x 50.0% Voids
#2	80.00'	0.039 af	6.00'D x 12.00'H Vertical Cone/Cylinder 5 Inside #1
		0.125 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	80.00'	8.270 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 50.00'

Discarded OutFlow Max=0.20 cfs @ 13.64 hrs HW=91.01' (Free Discharge)
 ↑1=Exfiltration (Controls 0.20 cfs)

Pond 6BP: 5xLeach Pits

Hydrograph



APPENDIX C

Stormwater Recharge Volume Calculations

Subcatchment 4

Area Impervious = $A_I = 12,277$ sf (0.282 ac)
Roofs: 0.282 Acres
TOTAL: 0.282 Acres

All development within HSG A = 0.60"

$Re_{Vol} = 0.60" \times A_I = 0.60" \times 1\text{ft}/12" \times 12,277$ sf = 613.85 cf

$Re_{V\text{ Req'd}} = \mathbf{614}$ cf

Recharge Volume Provided = **696 cf (cultec)**

$Re_V \mathbf{696}$ cf > $Re_{V\text{ Req's}} \mathbf{614}$ cf : OK

Subcatchment 6A

Area Impervious = $A_I = 13,813$ sf (0.317 ac)
Roofs: 0.199 Acres
Parking: 0.118 Acres
TOTAL: 0.317 Acres

All development within HSG A = 0.60"

$Re_{Vol} = 0.60" \times A_I = 0.60" \times 1\text{ft}/12" \times 13,813$ sf = 690.65 cf

$Re_{V\text{ Req'd}} = \mathbf{691}$ cf

Recharge Volume Provided = **4,356 cf (drywells)**

$Re_V \mathbf{4,356}$ cf > $Re_{V\text{ Req's}} \mathbf{691}$ cf : OK

Subcatchment 6B

Area Impervious = $A_I = 16,212$ sf (0.372 ac)
Parking: 0.372 Acres
TOTAL: 0.372 Acres

All development within HSG A = 0.60"

$Re_{Vol} = 0.60" \times A_I = 0.60" \times 1\text{ft}/12" \times 16,212$ sf = 810.60 cf

$Re_{V\text{ Req'd}} = \mathbf{811}$ cf

Recharge Volume Provided = **5,445 cf (drywells)**

$Re_V \mathbf{5,445}$ cf > $Re_{V\text{ Req's}} \mathbf{811}$ cf : OK

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

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

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Street Sweeping - 10%	0.10	1.00	0.10	0.90
	Deep Sump and Hooded Catch Basin	0.25	0.90	0.23	0.68
	Dry Well	0.80	0.68	0.54	0.14
		0.00	0.14	0.00	0.14
		0.00	0.14	0.00	0.14

Total TSS Removal =

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

Project:
 Prepared By:
 Date:

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



NOAA Atlas 14, Volume 10, Version 3
Location name: Sagamore Beach, Massachusetts, USA*
Latitude: 41.7895°, Longitude: -70.5398°
Elevation: 98.46 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite
 NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

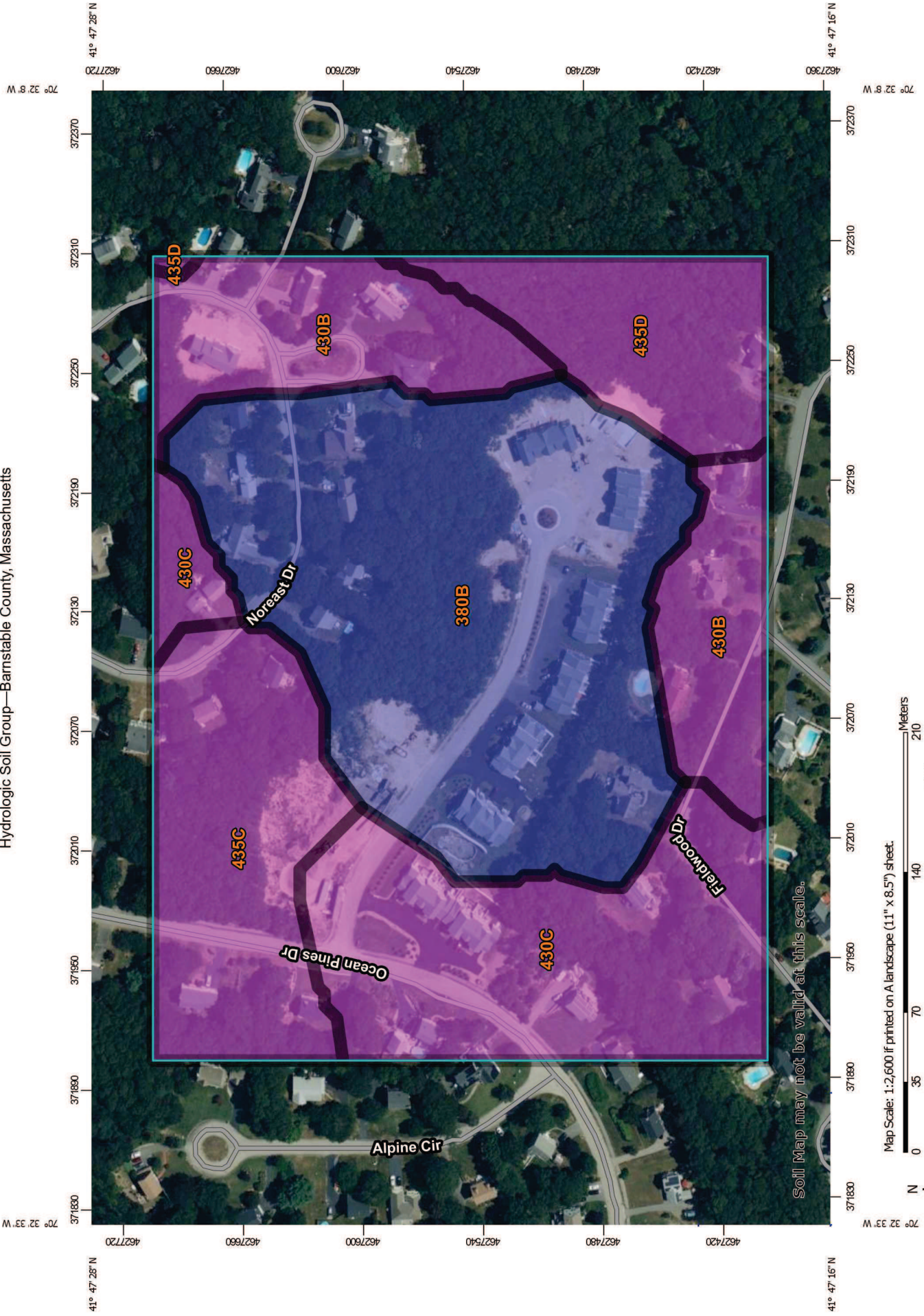
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.289 (0.235-0.352)	0.360 (0.293-0.440)	0.477 (0.387-0.584)	0.574 (0.463-0.706)	0.708 (0.552-0.906)	0.807 (0.616-1.05)	0.913 (0.678-1.23)	1.04 (0.722-1.41)	1.23 (0.820-1.72)	1.39 (0.904-1.97)
10-min	0.409 (0.334-0.499)	0.511 (0.416-0.623)	0.677 (0.549-0.828)	0.814 (0.657-1.00)	1.00 (0.782-1.28)	1.14 (0.873-1.49)	1.29 (0.961-1.75)	1.47 (1.02-2.00)	1.74 (1.16-2.43)	1.97 (1.28-2.79)
15-min	0.482 (0.392-0.587)	0.601 (0.489-0.733)	0.795 (0.645-0.974)	0.957 (0.771-1.18)	1.18 (0.920-1.51)	1.34 (1.03-1.75)	1.52 (1.13-2.06)	1.73 (1.20-2.35)	2.05 (1.37-2.86)	2.32 (1.51-3.29)
30-min	0.693 (0.565-0.846)	0.863 (0.703-1.05)	1.14 (0.925-1.40)	1.37 (1.11-1.69)	1.69 (1.32-2.16)	1.93 (1.47-2.51)	2.18 (1.62-2.94)	2.48 (1.72-3.37)	2.93 (1.96-4.10)	3.32 (2.16-4.71)
60-min	0.905 (0.738-1.10)	1.13 (0.916-1.37)	1.49 (1.21-1.82)	1.79 (1.44-2.20)	2.20 (1.71-2.81)	2.50 (1.91-3.27)	2.83 (2.11-3.83)	3.23 (2.24-4.38)	3.82 (2.55-5.33)	4.32 (2.81-6.13)
2-hr	1.22 (1.00-1.48)	1.52 (1.25-1.84)	2.01 (1.64-2.44)	2.42 (1.96-2.95)	2.97 (2.34-3.78)	3.39 (2.61-4.39)	3.83 (2.88-5.15)	4.38 (3.07-5.89)	5.20 (3.50-7.19)	5.91 (3.89-8.30)
3-hr	1.44 (1.19-1.74)	1.79 (1.47-2.16)	2.35 (1.93-2.85)	2.82 (2.30-3.43)	3.46 (2.74-4.38)	3.94 (3.05-5.08)	4.46 (3.37-5.95)	5.08 (3.59-6.80)	6.03 (4.09-8.29)	6.85 (4.54-9.56)
6-hr	1.88 (1.56-2.26)	2.30 (1.90-2.75)	2.97 (2.46-3.57)	3.54 (2.90-4.26)	4.31 (3.43-5.40)	4.88 (3.81-6.22)	5.50 (4.18-7.24)	6.23 (4.44-8.25)	7.33 (5.02-9.97)	8.26 (5.53-11.4)
12-hr	2.39 (2.00-2.85)	2.86 (2.38-3.40)	3.62 (3.01-4.32)	4.25 (3.51-5.09)	5.12 (4.10-6.34)	5.77 (4.53-7.26)	6.45 (4.92-8.36)	7.24 (5.22-9.48)	8.37 (5.81-11.3)	9.31 (6.31-12.7)
24-hr	2.89 (2.43-3.41)	3.41 (2.87-4.03)	4.26 (3.57-5.05)	4.98 (4.14-5.92)	5.95 (4.80-7.30)	6.69 (5.29-8.33)	7.46 (5.72-9.53)	8.31 (6.05-10.8)	9.50 (6.66-12.6)	10.5 (7.16-14.1)
2-day	3.33 (2.82-3.90)	3.93 (3.33-4.61)	4.91 (4.15-5.78)	5.73 (4.81-6.76)	6.85 (5.57-8.32)	7.70 (6.13-9.49)	8.58 (6.63-10.8)	9.54 (7.03-12.2)	10.9 (7.72-14.3)	12.0 (8.29-16.0)
3-day	3.65 (3.11-4.26)	4.28 (3.64-5.00)	5.31 (4.50-6.21)	6.16 (5.19-7.24)	7.33 (5.99-8.87)	8.22 (6.58-10.1)	9.14 (7.10-11.5)	10.1 (7.51-12.9)	11.5 (8.23-15.1)	12.6 (8.80-16.7)
4-day	3.93 (3.36-4.58)	4.57 (3.90-5.33)	5.62 (4.78-6.56)	6.49 (5.49-7.60)	7.69 (6.30-9.26)	8.60 (6.90-10.5)	9.53 (7.43-11.9)	10.5 (7.84-13.4)	11.9 (8.55-15.5)	13.0 (9.12-17.2)
7-day	4.67 (4.01-5.40)	5.33 (4.58-6.17)	6.42 (5.49-7.45)	7.32 (6.23-8.52)	8.56 (7.06-10.2)	9.52 (7.68-11.5)	10.5 (8.20-12.9)	11.5 (8.62-14.5)	12.8 (9.28-16.5)	13.8 (9.79-18.1)
10-day	5.35 (4.61-6.16)	6.04 (5.20-6.96)	7.17 (6.15-8.28)	8.10 (6.92-9.40)	9.39 (7.77-11.1)	10.4 (8.42-12.5)	11.4 (8.94-13.9)	12.4 (9.36-15.5)	13.7 (9.99-17.6)	14.7 (10.5-19.1)
20-day	7.36 (6.40-8.42)	8.15 (7.07-9.33)	9.43 (8.16-10.8)	10.5 (9.04-12.1)	12.0 (9.98-14.1)	13.1 (10.7-15.6)	14.2 (11.2-17.2)	15.3 (11.7-19.0)	16.6 (12.3-21.1)	17.6 (12.7-22.6)
30-day	9.06 (7.91-10.3)	9.93 (8.66-11.3)	11.4 (9.87-13.0)	12.5 (10.8-14.4)	14.2 (11.9-16.5)	15.4 (12.7-18.2)	16.7 (13.2-20.0)	17.8 (13.7-21.9)	19.2 (14.3-24.1)	20.1 (14.6-25.7)
45-day	11.2 (9.83-12.7)	12.2 (10.7-13.8)	13.8 (12.0-15.7)	15.1 (13.1-17.2)	16.9 (14.2-19.6)	18.4 (15.1-21.5)	19.7 (15.7-23.4)	20.9 (16.2-25.6)	22.3 (16.7-27.9)	23.3 (17.0-29.5)
60-day	13.0 (11.5-14.8)	14.1 (12.4-16.0)	15.8 (13.9-17.9)	17.3 (15.0-19.6)	19.2 (16.3-22.2)	20.8 (17.2-24.3)	22.3 (17.8-26.3)	23.5 (18.3-28.7)	25.0 (18.8-31.1)	25.9 (19.1-32.7)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

Hydrologic Soil Group—Barnstable County, Massachusetts











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 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Barnstable County, Massachusetts
 Survey Area Data: Version 19, Sep 9, 2022

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

Date(s) aerial images were photographed: Sep 5, 2020—Sep 7, 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
380B	Nantucket sandy loam, 3 to 8 percent slopes	B	11.8	38.3%
430B	Barnstable sandy loam, 3 to 8 percent slopes	A	5.1	16.4%
430C	Barnstable sandy loam, 8 to 15 percent slopes	A	6.6	21.5%
435C	Plymouth loamy coarse sand, 8 to 15 percent slopes	A	4.5	14.6%
435D	Plymouth loamy coarse sand, 15 to 35 percent slopes	A	2.8	9.2%
Totals for Area of Interest			30.8	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

APPENDIX D

***Construction Period Pollution Prevention
and
Erosion and Sedimentation Control Plan
for
Wildwood Lane- Lot 61
Bourne, Massachusetts***

Prepared for:

Ocean Dunes, LLC
498 Newtown Road
Littleton, Massachusetts 01460

Prepared by:

Existing Grade, Inc.
62 Riedell Road
Douglas, Massachusetts 01516

January 03, 2024
EGI Project No. 1292

TABLE OF CONTENTS

- 1. Introduction**
- 2. Project Narrative**
- 3. Erosion and Sedimentation Control Best Management Practices (BMPs)**
- 4. Construction Sequencing Plan**

1. Introduction

The erosion and sediment produced by the construction of the proposed development will be controlled on the property utilizing Erosion and Sedimentation Control Best Management Practices (BMPs). These practices are shown in detail on the Proposed Site Plans prepared by Existing Grade, Inc. These plans shall be hereinafter referred to as the "Site Plans".

The party responsible for the implementation, routine inspections and maintenance of the Erosion and Sedimentation Control BMPs shall be the Owner:

Ocean Dunes, LLC
498 Newtown Road
Littleton, Massachusetts

2. Project Narrative

The proponent, Ocean Dunes, LLC, proposes to construct 7 townhouse style buildings (Lot 61 on the proposed site plans) for the property located at 61 Wildwood Lane, Bourne MA. The proposed project will include the construction of 7 new multifamily style townhouse buildings, one new pass through parking lot consisting of: bituminous concrete surface, asphalt sloped curbing, storm water management infrastructures inclusive of catch basins, drain manholes, pipe conveyance systems, and drywells as shown on the design plans. All of the proposed buildings will be tied into a total of 6 proposed septic systems with connections to town water via new mains through the property. The proposed project will be conducted per the Massachusetts Department of Environmental Protection requirements, Local Town and State bylaws, as well as using best management practices.

The property is listed by the Town of Bourne Assessor's Department as Lot 62, Parcel 99 on Assessors Map 7 and historically laid within the Residential 20 (R-20) zoning district at the time of original permitting based upon a review of records on file at the Town of Bourne Planning and Zoning Offices. The property is located within the FEMA Flood Zone X Area (area outside mapped flood plain) based upon a review of FIRM Map 25001C0316K, Panel 316 of 550, last revised July 06, 2021. Currently there is municipal water as well as underground electric telephone/ cable to service the property.

The property's address is recorded as 61 Wildwood Lane, Bourne MA and abuts Ocean Pines Road to the West, Wildwood Lane to the South, and dedicated open space parcels and private residential properties to the North and East. Access to the site is via proposed pass through driveway along Wildwood Lane to the South and Ocean Pines Road to the West. The existing site is comprised a cleared storage lot which was permitted under the original historic site plan approval.

The Barnstable County Soil Survey, issued by the US Department of Agriculture was referenced to determine the type and hydrologic group of the soils located on the property. The property is comprised of mostly hydrologic soil group A type soils, as confirmed via numerous percolation and soil tests for the property.

3. *Erosion and Sedimentation Control Best Management Practices (BMPs)*

A. Sediment Fence/Straw Wattle Barrier Controls

A sediment fence/straw wattle barrier combination will be constructed along disturbed downward slopes, along the limit of work boundary and other locations as shown on the Site Plans. The sediment fence portion will be up gradient of the straw wattle. This control BMP shall be installed prior to any disturbance on the property.

Specifications

Sediment fence shall be Amoco woven polypropylene 1198 or approved equivalent.

Installation Requirements

1. Straw wattle shall be installed as directed by the owner's representative in accordance to manufacturer's Installation Guidelines, Staking Pattern Guide, and CAD details. The extent of straw wattle shall be as shown on the project drawings.
2. Straw wattle should be installed to intercept water flow and collect sediment on site. They may be placed over bare soil or on top of erosion control blankets. Straw wattles are typically installed in a 2 inch trench with the ends of the wattle facing upstream.
3. They shall be secured to the subgrade by wood stakes every four lineal feet across the length of the straw wattle. The stakes shall be driven through the center of the straw wattle only and driven into the ground a minimum of 24 inches.
4. Straw wattle installed in a swale or channel bottom shall allow the installation to continue up the slopes three feet above the anticipated high water mark and perpendicular to the flow of water.
5. The sediment fence shall be installed up gradient of the hay bale in accordance with the detail as shown on the Site Plans.
6. Spacing of straw wattle shall be such that the elevation of the bottom of the straw wattle upstream will be equal to the elevation of the top of the straw wattle downstream.

7. Straw wattle shall remain in place until fully established vegetation and root systems are present.
8. The sediment fence shall be installed to the up gradient side of the support net in a continuous length with a minimum of twelve (12) inches of the fence placed along the bottom and down gradient face of the trench. Break joints in the sediment fence shall be overlapped in accordance with the detail as shown on the Site Plans with care taken to avoid break joints in low points along the barrier line.
9. The sediment fence/straw wattle barrier shall be entrench and backfilled. The trench should be excavated to a width of the proposed straw wattle width plus six (6) inches and to a depth between four (4) to six (6) inches. After the installation of the barrier, the barrier shall be backfilled with the down gradient fill conforming to the existing ground level and the up gradient fill built up a minimum of four (4) inches against the barrier.
10. The barriers should be removed when they have served their usefulness, but not before all upslope areas have been permanently stabilized and permission to remove the barrier has been approved by the Town of Auburn Conservation Commission.

Inspection and Maintenance

1. The sediment fence/straw wattle barrier shall be inspected weekly and after every rainfall event of one (1) inch or greater and at least daily during prolonged storm events.
2. Inspect the barrier system for any signs of down gradient erosion or breakout, sediment fence tears, depth of sediment and integrity of the barrier anchor system. All deficiencies shall be repaired or replaced immediately or over burden of sediment shall be removed.
3. The sediment deposits shall be removed after every storm event to reduce pressure on the barrier system and to provide adequate storage volume for the next storm event. Care shall be taken to avoid undermining the barrier system during removal operations.

B. Construction Entrance

A stabilized construction entrance shall be installed at the proposed development entrance off of the existing parking lot. The construction entrance shall be installed immediately after any clearing/grubbing operations and all cut/fill activities, required to provide access to the proposed site, has been completed. The purpose of the construction entrance is to keep mud and sediment from being tracked off of the construction site and into the existing parking lot.

The construction entrance shall be constructed in accordance with the detail and shown on the Site Plans.

Specifications

Filter fabric shall be Mirafi 140 N or approved equivalent.

Stone shall be in accordance with the Massachusetts Highway Department Specifications.

Installation Requirements

1. Grade construction entrance to produce positive drainage toward temporary sedimentation controls on the property.
2. Stone for the construction entrance shall consist of two (2) to four (4) inch stone fill placed on the graded base.
3. The minimal length of the construction entrance should extend onto the site a minimum of fifty (50) feet and should have a width equal to the full width of the proposed roadway or twenty (20) feet, whichever is greater.
4. Place filter fabric shall be between the stone fill and the earth surface below to reduce the migration of soil particles from the underlying soil into the stone and vice versa.

Inspection and Maintenance

1. The construction entrance and sediment disposal area shall be inspected weekly and after every rainfall event of one (1) inch or greater.
2. Mud and sediment, tracked or washed onto public roads, shall be immediately removed by sweeping.
3. Provide periodic topdressing with additional stone to maintain the entrance in a condition that will prevent tracking or flowing of sediment onto public roads.

C. Temporary Sediment Basins

The Contractor shall construct temporary sediment basins where required to filter out sediment from stormwater until the permanent drainage system is functioning properly.

The temporary sediment basins shall be lined with sediment fence/straw wattle barrier controls. All stormwater runoff from disturbed areas shall be directed toward the temporary sediment basins prior to discharging from the site.

Installation Requirements

1. The sediment basins should be located as close to the sediment source as possible.
2. The sediment basins shall have a minimum length to width ratio of 2:1 and shall have minimum side slopes of 3:1.
3. The bottom of the sediment basin shall be lined with gravel/stone.
4. The sediment basin shall have a minimum storage volume of 3,600 cubic feet for each acre of disturbed drainage area.

Inspection and Maintenance

1. The sediment basins shall be inspected weekly and after every rainfall event of one (1) inch or greater.
2. Inspect the sediment basin for and settlement, seepage and erosion damage. All deficiencies shall be repaired or replaced immediately.
3. Remove and properly dispose of sediment when it accumulates to one-half ($\frac{1}{2}$) of the basin design volume. All trash and other debris shall be removed from the sediment basin on weekly basis.
4. Remove and replace gravel/stone when sediment basin does not drain properly.

D. Temporary Drainage Swales

The Contractor shall construct temporary drainage swales to transport stormwater runoff from the disturbed areas of the site to the temporary sediment basins. Check dams shall be utilized along the temporary drainage swales.

Installation Requirements

1. The temporary drainage swales cross-section shall be constructed with a top width between two (2) to four (4) feet and a minimum height of one and on-half (1½) feet. The side slopes of the swale shall be between 2:1 and 4:1.
2. The maximum channel grade shall be one and on-half (1½) percent and shall have a positive grade to the outlet.
3. The stormwater runoff shall outlet through check dams and into temporary sediment basins.

Inspection and Maintenance

1. The temporary drainage swales shall be inspected weekly and after every rainfall event of one (1) inch or greater.
2. Inspect the drainage swales for construction induced damage, settlement and erosion damage. All deficiencies shall be repaired or replaced immediately.
3. Remove and properly dispose of sediment when it accumulates into the flow area. All trash and other debris shall be removed from the drainage swale on weekly basis.

E. Temporary Check Dam

The Contractor shall install temporary check dams along the temporary drainage swales to lower the runoff velocities of stormwater flows to reduce erosion and promoting the settlement of sediments.

Installation Requirements

1. Check dams shall be constructed of anchored hay bales or other approved means with a small sump located immediately upstream of the check dam.
2. The hay bales shall be either wire or nylon bound or string-tied. String-tied bales shall be installed so that the bindings are orientated around the sides, rather than along the tops and bottoms, to prevent the deterioration of the bindings.
3. Each hay bale shall be anchored with a minimum of two (2) wood stakes or steel rebar with the first anchor driven toward the previously laid hay bale to force bales together. The anchors shall be driven deep enough into the ground to securely anchor the bales or to a minimum of eighteen (18) inches.

4. All gaps between hay bales shall be filled by wedging with straw, to prevent water from escaping between the bales, and should be done with care in order not to separate the hay bales.
5. The maximum spacing between check dams shall be that the toe of the up gradient dam is at the same elevation as the top of the down gradient dam.

Inspection and Maintenance

1. The check dams shall be inspected weekly and after every rainfall event of one (1) inch or greater.
2. Inspect the check dams for damage and erosion damage. All deficiencies shall be repaired or replaced immediately.
3. Remove and properly dispose of sediment when it accumulates to a depth of one-half the dam height. All trash and other debris shall be removed from the check dam sump on weekly basis.

F. Drainage System Inlet Protection

The Contractor shall install Siltsack or approved equivalent at catch basin grate locations to allow the drainage system to be utilized before final site stabilized as long as the infiltration basin is constructed and stabilized.

Specifications

Siltsack by ACF Environmental, Inc.

Installation Requirements

1. Siltsack should be installed at all catch basin grate locations in accordance with the manufacturer recommendations and specifications.

Inspection and Maintenance

1. Siltsacks shall be inspected weekly and after every rainfall event of one (1) inch or greater.
2. Inspect the siltsack for damage. All deficiencies shall be repaired or replaced immediately.

3. Remove and properly dispose of sediment when it accumulates to a depth of one-half the siltsack storage volume.

4. *Construction Sequencing Plan*

Anticipated Construction Schedule

1. Demarcate the proposed limit of work as well as trees and other buffer zone areas for protection.
2. Hold a pre-construction meeting a minimum of one (1) week prior to the start of construction.
3. Notify Dig-Safe to demarcate all underground utilities prior to start of construction.
4. Install sediment fence/straw wattle barrier at locations indicated on the Site Plans.
5. Construct all temporary drainage swales to collect and divert stormwater runoff from undisturbed areas of the site to bypass construction area.
6. Clear and construct temporary construction entrance.
7. Clear and grub all areas associated with the construction of the development.
8. Excavate topsoil and subsoil from cut areas, install erosion control barriers and stockpile soil on site. Consideration should be given to locating soil stockpiles on the up gradient side of disturbed areas, where possible, to act as temporary diversions.
9. Fill areas in twelve (12) inch lifts and compact to 95% standard proctor. Install slope protection or retaining walls with reinforcement, where required.
10. Rough grade the site.
11. Construct temporary drainage swales with check dams along the sides of the proposed roadway as well as all temporary sediment basins.
12. Construct fine grading of roadway.

13. Install closed drainage system and other utilities. Install Siltsack or approved equivalent at all catch basin grate locations.
14. Complete final grading of roadway with gravel sub base. Add additional erosion control measures as necessary.
15. Place the bituminous concrete binder course on roadways and sidewalk areas and permanently vegetate and landscape including the installation of trees. All slopes greater than 3:1 shall be stabilized with jute mesh.
16. Place final wearing surface of both the roadway and sidewalk.
17. After site is stabilized, remove all temporary measures and install permanent vegetation on all disturbed areas

APPENDIX E

POST-CONSTRUCTION
STORM WATER OPERATIONS
AND
MAINTENANCE PLAN

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSPECTION AND MAINTENANCE OF ALL STORMWATER AND EROSION CONTROL FACILITIES UNTIL THE PROJECT CONSTRUCTION IS COMPLETED. THE CONTRACTOR SHALL CLEAN ALL COMPONENTS OF THE STORM WATER MANAGEMENT SYSTEM AND SWEEP ALL PAVED AREAS AT THE COMPLETION OF CONSTRUCTION, IMMEDIATELY PRIOR TO TURNING OVER OPERATION AND MAINTENANCE RESPONSIBILITY TO THE OWNER.
2. UPON COMPLETION OF CONSTRUCTION, THE OPERATION AND MAINTENANCE OF ALL COMPONENTS OF THE STORMWATER MANAGEMENT SYSTEM WILL BE THE RESPONSIBILITY OF THE OWNER:

Ocean Dunes, LLC
498 Newtown Road
Littleton, Massachusetts

3. DISPOSAL OF ACCUMULATED SEDIMENT AND HYDROCARBONS TO BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL GUIDELINES AND REGULATIONS.

EROSION CONTROL BMPs

STREET SWEEPING:

ALL PAVED AREAS SHOULD BE SWEPT TWICE A MONTH DURING CONSTRUCTION AND TWO TIMES PER YEAR DURING THE EARLY SPRING AND LATE FALL SEASONS AFTER CONSTRUCTION.

INFILTRATION SYSTEMS:

INSPECT AFTER EVERY MAJOR STORM EVENT (1" OR GREATER) DURING CONSTRUCTION AND FOR TWELVE (12) MONTHS AFTER CONSTRUCTION TO ENSURE PROPER STABILIZATION AND FUNCTION. THEREAFTER, INSPECT AT

LEAST TWICE PER YEAR DURING WET WEATHER TO ENSURE THE SYSTEM IS DRAINING PROPERLY. CHECK FOR ACCUMULATION OF SEDIMENT AND PONDING WATER. IF PONDING WATER IS VISIBLE INSIDE THE SYSTEM FOR SEVERAL DAYS AFTER A STORM EVENT, NOTIFY THE ENGINEER FOR POSSIBLE REMEDIAL MEASURES. REMOVE SEDIMENT AS NECESSARY DURING CONSTRUCTION, WHILE THE SYSTEM IS DRY, AND AT LEAST ONCE EVERY FIVE YEARS AFTER CONSTRUCTION.

CULTEC UNITS (ROOF INFILTRATION):

- A. QUARTERLY INSPECTIONS DURING THE FIRST YEAR OF INSTALLATION AND ANNUALLY THEREAFTER.
- B. CHECK FOR OIL (USING A DIPSTICK TUBE).
- C. REMOVE OIL AND SEDIMENT THROUGH THE INSPECTION RISER PIPE ALTERNATIVELY, REMOVE FLOATABLES AND HYDROCARBONS THROUGH THE UNIT'S INSPECTION PORT.
- D. REMOVE ANY OIL SEPARATELY USING A SMALL PORTABLE PUMP.
- E. IF APPLICABLE, REMOVE THE SLUDGE FROM THE BOTTOM OF THE UNIT USING A VACUUM TRUCK.

DEEP SUMP CATCH BASINS:

FREQUENCY:

- INSPECTION –FOUR TIMES PER YEAR
- CLEANING – FOUR TIMES PER YEAR OR WHENEVER THE DEPTH OF DEPOSITS IS GREATER THAN OR EQUAL TO ONE HALF THE DEPTH FROM THE BOTTOM INVERT OF THE LOWEST PIPE IN THE BASIN.

DESCRIPTION: BASINS ARE TO BE CLEANED FOUR TIMES PER YEAR OR WHEN THE DEPTH OF DEPOSITS IS GREATER THAN OR EQUAL TO ONE HALF THE DEPTH FROM THE BOTTOM OF THE SUMP TO THE INVERT OF THE LOWEST PIPE IN THE BASIN. THE OWNER WILL INSPECT SUMPS POST CONSTRUCTION A MINIMUM OF FOUR TIMES PER YEAR. PRECAUTIONS SHALL TAKE PLACE TO MAINTAIN THE INTEGRITY OF THE OIL TRAPPING HOODS DURING CLEANING. THE HOODS SHALL BE INSPECTED AND REPAIRED AS NECESSARY. ACCUMULATED HYDROCARBONS SHALL BE COLLECTED SEPARATELY FROM ACCUMULATED SEDIMENT. ALL MATERIAL SHALL BE DISPOSED OF IN ACCORDANCE WITH DEP REGULATIONS.

INSPECTIONS:

- FRAME AND GRATE
- INLET AND OUTLET CONDITION

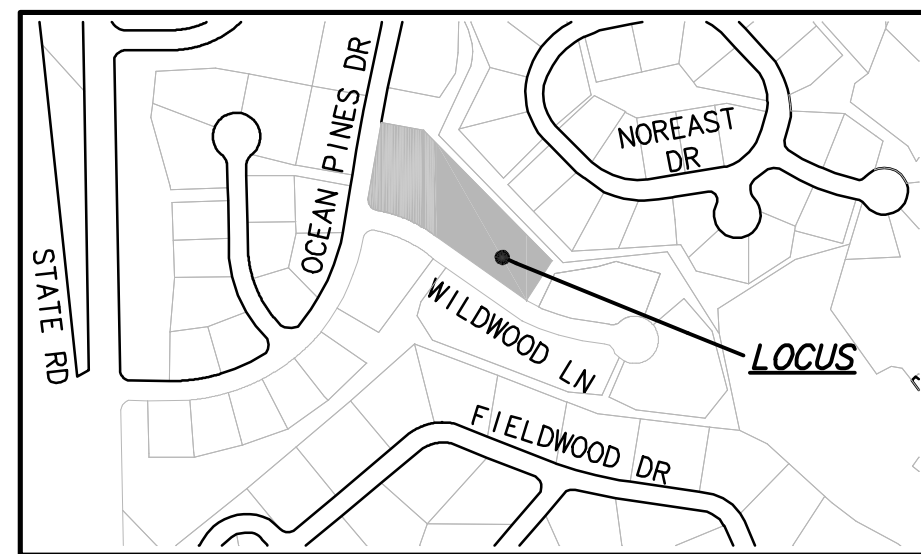
- CRACKS AND SETTLEMENT
- JOINT FAILURE
- LEAKING
- SEDIMENT ACCUMULATION
- OIL/GAS SHEEN IN WATER
- CONDITION OF TRAP HOOD
- GENERAL INSPECTION OF STRUCTURE

APPENDIX F



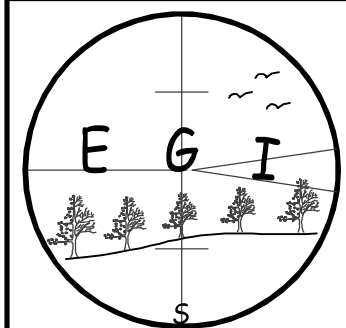
SETBACKS

BUILDING SETBACKS (MIN.)	
FRONT YARD	30'
SIDE & REAR YARD	28'/56'*/54**
*INCREASE TO TWICE BLDG HEIGHT WHEN ABUTTING BOUNDARY OF OVERALL DEVELOPMENT	
** 54' FOR BLDG 3	



GENERAL NOTES

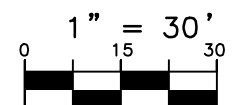
1. RECORD OWNER – OCEAN DUNES, LLC
498 NEWTOWN ROAD
LITTLETON, MA 01610
DEED BK. 35977, PAGE 148
PLAN BK. 439 PAGE 35
LOCUS ADDRESS – 61 WILDWOOD LANE
2. PROPERTY IS SHOWN AS LOT 62 PARCEL 99 ON ASSESSOR'S MAP 7 AND LIES WITH IN ZONE R-20 AT THE TIME OF SPECIAL PERMIT APPROVAL.
3. EXISTING CONDITIONS SHOWN HEREON WERE COMPILED FROM A FIELD SURVEY PERFORMED BY EXISTING GRADE INC. AND ON RECORD INFORMATION PROVIDED BY THE OWNER.
5. PARCEL LIES WITHIN FLOOD ZONE X PER BOURNE FIRM PANEL #255210 0316J, EFFECTIVE 07/16/2014.
6. ALL DIMENSIONS ARE PERPENDICULAR TO PROPERTY LINES.



Existing Grade Inc.
Surveyors & Civil Engineers
62 Riedell Road
Douglas, MA 01516
508-694-6501 Ph/Fax

LOCUS PLAN
1" = 500'±

SCALE

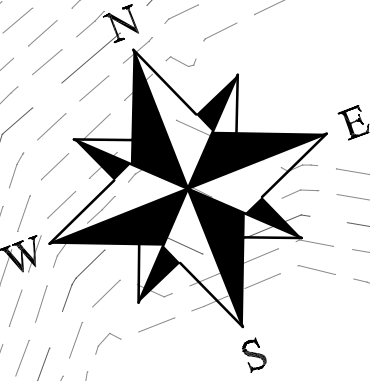
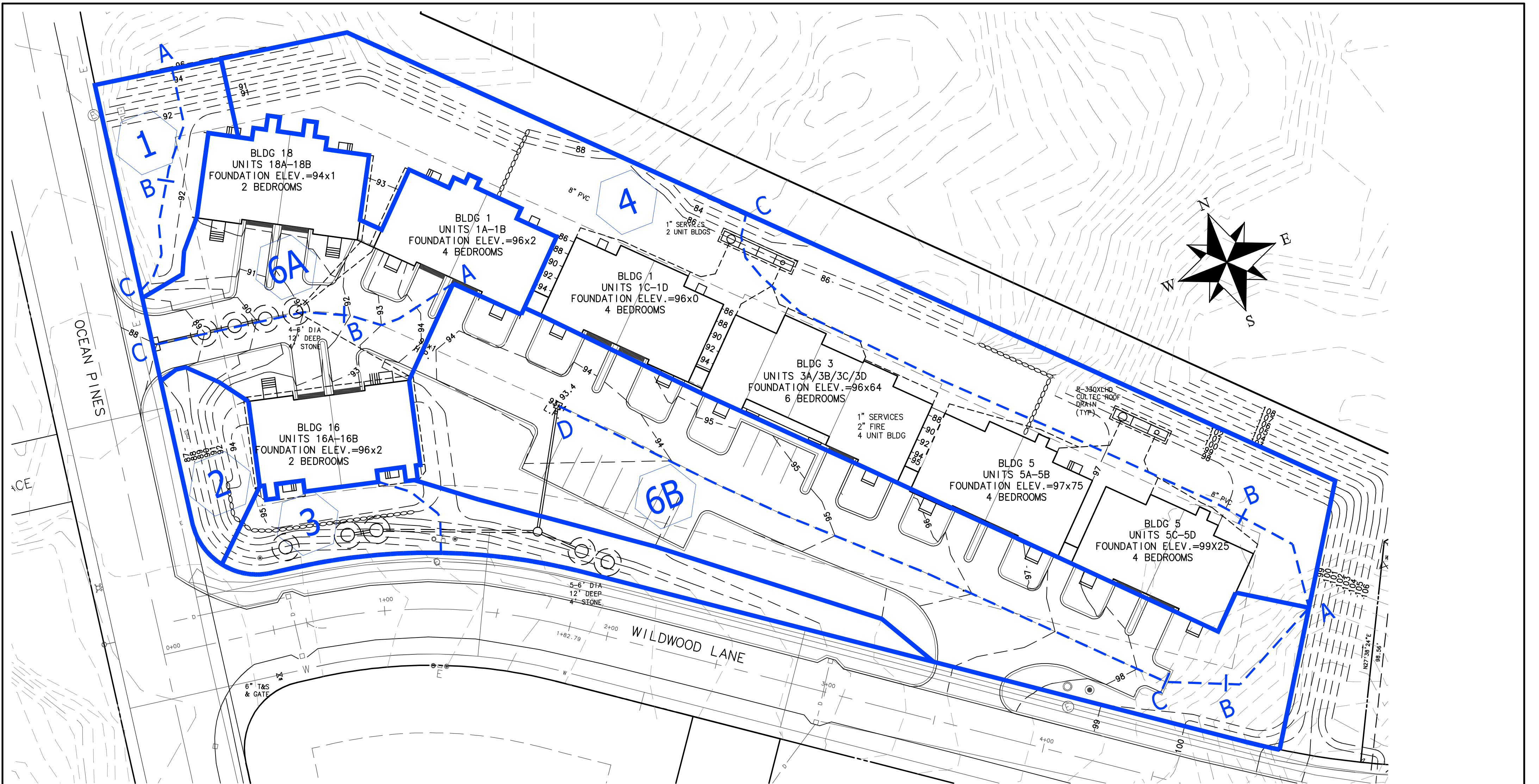


NO.	DATE	REVISIONS

CLIENT
OCEAN DUNES LLC
498 NEWTOWN ROAD
LITTLETON, MASSACHUSETTS 01460

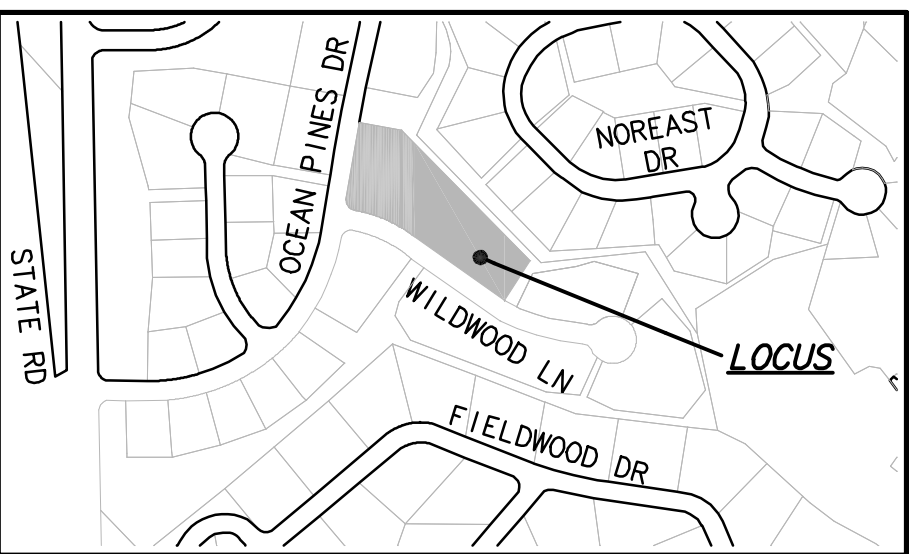
PRE-DEVELOPMENT DRAINAGE MAP
FOR
61 WILDWOOD LANE
BOURNE, MA

1292_L61-PRE
PROJECT NO. 1292
DATE: 01/03/24
SHEET NO. 1 OF 1



SETBACKS

BUILDING SETBACKS (MIN.)
 FRONT YARD 30' *
 SIDE & REAR YARD 28' / 56' * / 54' **
 * INCREASE TO TWICE BLDG HEIGHT
 WHEN ABUTTING BOUNDARY OF
 OVERALL DEVELOPMENT
 ** 54' FOR BLDG 3

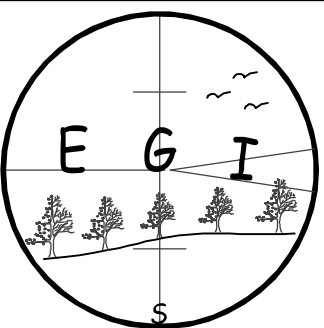


GENERAL NOTES

1. RECORD OWNER - OCEAN DUNES, LLC
 498 NEWTOWN ROAD
 LITTLETON, MA 01610
 DEED BK. 35977, PAGE 148
 PLAN BK. 439 PAGE 35
 LOCUS ADDRESS - 61 WILDWOOD LANE
2. PROPERTY IS SHOWN AS LOT 62 PARCEL 99
 ON ASSESSOR'S MAP 7 AND LIES WITH IN ZONE
 R-20 AT THE TIME OF SPECIAL PERMIT APPROVAL.
3. EXISTING CONDITIONS SHOWN HEREON WERE COMPILED FROM A
 FIELD SURVEY PERFORMED BY EXISTING GRADE INC. AND ON
 RECORD INFORMATION PROVIDED BY THE OWNER.
5. PARCEL LIES WITHIN FLOOD ZONE X PER BOURNE FIRM
 PANEL #255210 0316J, EFFECTIVE 07/16/2014.
6. ALL DIMENSIONS ARE PERPENDICULAR TO PROPERTY LINES.

POST DEVELOPMENT WATERSHED ANALYSIS:

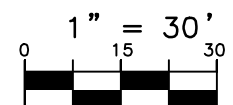
- 1&2:** 6,195 SQ.FT.
 Tc: L=104'; 7.1 MINUTES
- 3:** 7,030 SQ.FT.
 Tc: L=48'; 5.7 MINUTES
- 4:** 36,411 SQ.FT.
 Tc: L=325'; 15.0 MINUTES
- 6A:** 16,884 SQ.FT.
 Tc: L=139'; 1.3 MINUTES (USE 5.0 MIN)
- 6B:** 27,241 SQ.FT.
 Tc: L=374'; 18.2 MINUTES
- TOTAL AREA: 93,761 SQ.FT.**



Existing Grade Inc.
 Surveyors & Civil Engineers
 62 Riedell Road
 Douglas, MA 01516
 508-694-6501 Ph/Fax

LOCUS PLAN
 1" = 500' ±

SCALE



NO.	DATE	REVISIONS

CLIENT
OCEAN DUNES LLC
 498 NEWTOWN ROAD
 LITTLETON, MASSACHUSETTS 01460

POST-DEVELOPMENT DRAIN MAP
 FOR
 61 WILDWOOD LANE
 BOURNE, MA

1292_L61-PRE
 PROJECT NO.
 1292
 DATE: 01/03/24
 SHEET NO.
 1 OF 1