STORMWATER REPORT

SECTION 1 - Project Title

Applicant: Sampson Pond LLC
P.O. Box 5
Medway MA 02053

Project Name: Evergeen Village
Project Address: 22 Evergreen Street, Medway MA
Engineer: Ronald Tiberi P.E.
9 Massachusetts Ave
Natick MA 01760

SECTION 2 - Project Introduction & Description:

The project consists of the construction of a new multifamily 7-unit townhouse structures with parking garages. The site is currently developed with a 1800 sf two family home and barn, which was recently razed for the project, and parking areas. The lot slopes front to back and is landscaped and sparsely wooded.

The proposed roof surface runoff will be directed to a drainage infiltration structures for compensatory storage provided by infiltration units within the green area in the back and front of the property. The driveway area runoff will be discharged toward deep sump catch-basins and directed to a StormCeptor treatment unit prior to infiltration structures for compensatory storage provided by infiltration units for percolation into the ground. Most the surface runoff will be directed through the rear of the property these areas.

Based on the subsurface exploration and the percolation tests soil conditions vary from sand to loamy sands for the recharge target depth hydrological soil is soil type A (see soil evaluator's testpit logs attached). The infiltration rates used for this material range from 8.27 to 2.41 inches/hour.

SECTION 3 – Stormwater checklist:

See attached.

SECTION 4 – LID Measures & Drainage Summary:

Pre-development conditions-

The improvements include razing the existing structure, constructing 7-two-unit townhouse structures with parking, re-grading and driveway and open landscaped area in the southerly portion of the property with free draining soils. A landscape area containing trees and shrubs is proposed along the open areas and property boundaries of the

proposed lawn. The area around the perimeter of the re-graded area will be stabilized with natural grasses, trees, fences and vegetation away from the property line. Erosion control barriers are proposed to protect abutting properties during construction. (See Plan). The area drainage catchment of some 62534 sf represents the entire lot. This area will be predominately directed to the center driveway and drainage structures rear of the property. Overall drainage patterns will remain unchanged and with the slope reductions, along with proposed lawn surfaces, volumes of the runoff after development will remain essentially unchanged and/or reduced. See Figure 1 of existing catchment areas.

The Natural Resources Conservation Service (NRCS) has the site designated with varying soils which are predominately in the Hydrologic B Soil Group. However field results are designated as a loamy sand at recharge depths. See attached figure in appendices.

A subsurface exploration program was conducted, soil evaluations and percolation tests were conducted Gregory Bunavicz, SE#2712- Soil evaluator. The logs for this program are attached. Test Pits identified the areas as sand to Loamy Sand, Hydrologic A Soil Group. The existing site drainage predominately flows from North to South draining to the rear of the property.

Watershed modeling was conducted using HydroCAD software that combines SCS runoff methodology with standard hydraulic calculations.

TABLE 1 EXISTING CONDITIONS

Catchment	Area (sf)	Tc (min)	2yr (cfs)	10yr (cfs)	100yr (cfs)
EX-1	62534	7.7	0.84	2.47	7.41

Post-Development Conditions-

The post-development conditions are defined by the areas altered by the proposed Plan. The proposed conditions have been designed to meet the Massachusetts Department of Environmental Protection (MassDEP) Wetland and Stormwater requirements of TSS removal.

The stormwater management system has been designed that post-development rates to match or decrease peak pre-development runoff rates for the entire site, for storm events. Computations provided are for the 2, 10, and 100-year, 24-hour storm events.

The area drainage catchments of some 62534 sf represent the entire lot area. This majority of the area will be directed to treatment system then an impoundment area. Overall drainage patterns will remain unchanged and with the slope reductions, direct roof infiltration systems, along with proposed lawn surface, volumes of the runoff after

development will remain essentially unchanged and/or reduced. See Figure 2 for the re-aligned drainage catchments, and Table 2 to for the associated runoff rates.

TABLE 2 PROPOSED CONDITIONS

Catchment	Area (sf)	Tc (min)	2yr (cfs)	10yr (cfs)	100yr (cfs)
9R	62534	6	0.50	1.55	6.35

Most the surface runoff will be directed through the center of the property, then directed to Infiltration/storage basins before discharge at the property line.

The area is compensated for changes in flow rates and overall impacted from development has no adverse drainage effect from the property as demonstrated in the attached Hydrocad reports.

SECTION 5 – Stormwater Standards:

Standard 1: No New Untreated Discharges

There will be no untreated discharges. Existing overland flow is on essentially bare ground. The proposed conditioned will be on a vegetated surface with native growth grass/plant. The sheet flow discharge energy from the road/parking areas will be dissipated by a washed stone pads and swales, and rain gardens.

Standard 2: Peak Rate Attenuation

Roof/parking leaching systems with a 2.41 in per hour infiltration rate the roof storage basin can accommodate the run off for a 2, 10, and 100 year 24-hour storm events (See calculations attached). Site the attached summary Table 3.

TABLE 3 PRE/POST RUNOFF SUMMARY

Post Analysis Point		**2 Year**	**10 Year**	**100 Year**
AP-9R		0.50	1.55	6.35
Pre-Analysis Point		**2 Year**	**10 Year**	**100 Year**
AP-EX1		0.84	2.47	7.41

NET % Change		**2 Year**	**10 Year**	**100 Year**
AP-P1		-40%	-37%	-16.6%

Standard 3: Stormwater Recharge

Based on the soil explorations, percolation tests, and observations at the site of nearly bare ground the hydrological soil is soil type B.

The required recharge volume calculation is provided in the drainage calculations. The static method was used for sizing the infiltration.

_ STANDARD #3: The pre-development annual recharge for the site has been approximated in the post-developed condition, and as illustrated below will more than satisfy the minimum requirements. The Recharge Volume is based on the Static Method per the MassDEP Stormwater Management Standards, Volume 3, Chapter 1.
For purposes of the analysis and demonstrate compliance with Standard #3, the recharge volume calculation assumes the site is a Hydrologic Soil Group "B" (HSG-B). The BMP requires 0.35 inches over the impervious surface for a class B soil to be recharged

Impervious Area = 18174 square feet

Recharge Volume (Rv) = (F) x (Impervious Area)
Where:
Rv = Required Recharge Volume, expressed in cubic feet
F = Target Depth Factor associated with each Hydrologic Soil Group
Impervious Area = proposed pavement, rooftops in square feet

Recharge Volume (Rv) = (F) x (Impervious Area)
= (0.35 inches)*(1/12 inches/ft)* (18174 square feet)
= (0.03 feet)*(18174 square feet)
= 545.2 ft3

Recharge Provided Storage StormTec Areas total storage = 2086 ft3
2086 > 545.2 ft3 Required

The recharge of the roof runoff leaching systems include all storm events. The rooftop recharge units provide some 465+ cf of storage each.

Standard 4: Water Quality

_ STANDARD #4: The proposed stormwater management system has been designed so that for each drainage area and outfall the 80% TSS removal standard has been met.

Water Quality Volume (VWQ) = (DWQ/12 inches/foot)*(AIMP * 18174 s.f./acre)
VWQ = Required Water Quality Volume in cubic feet

DWQ = Water Quality Depth
_ one inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a land use with higher potential pollutant loading (LUHPPL), or exfiltration to soils with infiltration rate

greater than 2.4 inches/hour.
_ ½-inch for discharges to other areas.

AIMP = Impervious Area (in acres)

= (0.5 inches)*(1/12 inches/ft)* (0.41)
= (0.083 feet)*(0.41 Acre)
= 0.03 ft3

See the attached TSS removal work sheets.

The BMPs are sized for the 1/2-inch water quality volume.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)
Not Applicable

Standard 6: Critical Areas

No Critical areas are not to be adversely impacted.

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

Not Applicable

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

The applicant will use filter sock/straw wattles. Silt sacks will be used in Catch basins within 100 of construction limits. Project limits are noted on the plan and coincide with Erosion control systems.

The Applicant: Sampson Pond LLC, P.O. Box 5, Medway MA 02053, will be ultimately responsible for compliance, until a Homeowners Association is established.

A filter sock/straw wattles will be placed along the downstream boundary of the disturbed material. The fence will be installed at onset of construction and will be removed on the establishment of the vegetation. See the plans for the landscaping planning and the site development. The project's resident inspector will be responsible for monitoring the controls.

This project site is greater than the one acre initiating an NPDES permit requirement.

Standard 9: Operation and Maintenance Plan

A Long-Term Operation and Maintenance (O&M) Plan has been developed for the proposed stormwater management system as a separate document attached.

Standard 10: Prohibition of Illicit Discharges

There are no expected illicit discharges to the stormwater management system from applicants use of its property. The applicant will submit the Illicit Discharge Compliance Statement prior to the discharge of stormwater runoff to the post-construction stormwater best management practices and prior to the issuance of a Certificate of Compliance.

SECTION 6 – Operation & Maintenance Plan:

A Stormwater Pollution Prevention Plan (SWPPP) has been designed for the construction and operation of the proposed development (see previous section). The SWPPP provides Best Management Practices (BMP's) that include temporary erosion control devices and a permanent stormwater management system. The erosion control devices will serve to minimize construction impacts to wetland resource areas and impacts to undisturbed areas. The stormwater management system is designed to minimize impacts to wetland areas and to maintain compliance with Massachusetts Surface Water Quality Standards during the operation of the proposed development.

MAINTENANCE RESPONSIBILITY

The enforcement of the Post-Development Operation and Maintenance Plan will be the responsibility of the homeowner's association.

The following is a list of permanent structural erosion control devices that are included within the Stormwater Pollution Prevention Plan:

Permanent: embankment stability and vegetation cover,
street sweeping,
StormCeptor Maintenance
Infiltration system Inspection & Maintenance
outlet protection, rip-rap outlet protection
snow management.

The following is a brief description of the installation, operation, and maintenance of the BMP's. All erosion control and drainage systems on site will be the responsibility of the Owner to maintain.

GOOD HOUSEKEEPING PRACTICES

The site is always to be kept clean of trash and debris. Trash, junk, etc. is not to be left outside and will be subject to removal at the owner's expense.

EMBANKMENT STABILITY AND VEGETATION COVER

The low embankment along the entry roadway shall be reviewed semi annually for evidence of erosion or poor vegetation. Any areas of erosion or poor vegetation shall be promptly repaired by addition of topsoil, reseeding or fertilizing to ensure that the embankment remains stable.

RIP-RAP OUTLET PROTECTION

The outlet protection should be checked at least annually and after every major storm. If the rip-rap has been displaced, undermined or damaged, it should be repaired immediately. The channel immediately below the outlet should be checked to see that erosion is not occurring. The downstream channel should be kept clear of obstructions such as fallen trees, debris, and sediment that could change flow patterns and/or tailwater depths on the pipes. Repairs must be carried out immediately to avoid additional damage to the outlet protection apron.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

Road salt and sand is prohibited from being stored outside.

STREET SWEEPING

Street sweeping of parking lots, driveways and streets will occur following the winter snowmelt and during the late spring, summer, and early fall months to ensure that sand and litter is removed from the catchment area and does not enter the stormwater collection system. There will be a minimum of two street sweepings per year.

Effective sweeping requires access to the areas to be swept. It is essential that applicants or those responsible for stormwater maintenance can impose parking regulations to facilitate proper seeping, particularly in densely populated or heavily traveled areas, so that sweepers can get as close to curbs as possible. Residents are to be notified prior to street sweeping operations so that paved areas can be clear of vehicles and any other items.

The street sweeping and sediment shall be by a private contractor who shall operate within applicable regulations (I.E. solid waste regulations).

SNOW MANAGEMENT

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance that are acceptable to the Massachusetts Department of Environmental Protection (MassDEP). For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious upland areas away from wetlands as designated on the Site Plans. There are adequate snow storage areas located within parking lot islands and edges of paved areas away from the wetland resource areas for small frequent snowfall

events. For larger snowfall events or for additional snow storage space, snowfall will be required to be hauled offsite to a snow stockpile area meeting MassDEP requirements.

Snow disposal shall be limited to along the side of road as is typical of roadways and designated areas for parking lot. Avoid disposing of snow on top of or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage, causing localized flooding. Wooden snow bounds are recommended along the limits of the new road to minimize over plowing and possible damage to the shoulder.

VEHICLE WASHING CONTROLS

The following BMP's, or equivalent measures, methods of practices are required if you are engaged in private (lot owner) vehicle washing and/or steam cleaning:

Minimize rinse down the body or a vehicle, including the bed of a truck, with just water.
Use enviro-friendly soaps/detergents. Do not wash the engine compartment or the Underside of vehicles take the vehicles to a commercial vehicle wash.

SWPPP TO BE PART OF CONDO/HOMEOWNER'S AGREEMENT

This SWPPP shall be part of the homeowner's agreement.

REQUIREMENTS FOR ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BEST MANAGEMENT PRACTICES

All stormwater Best Management Practices (BPP's) are to be inspected and maintained as follows:

StormCeptor
Outlet/RipRap

The outlet protection should be checked at least annually and after every major storm. If the unit has been displaced, undermined or damaged, it should be repaired immediately. The area immediately below the outlet should be checked to see that erosion is not occurring. The downstream channel should be kept clear of obstructions such as fallen trees, debris, and sediment that could change flow patterns. Repairs must be carried out immediately to avoid additional damage to the outlet protection apron.

The infiltration systems should be inspected every 3 months and cleaned of sediment when buildup occurs.

LIST OF EMERGENCY CONTACTS FOR IMPLEMENTING LONG-TERM POLLUTION PREVENTION PLAN

The Owner will be required to maintain an updated list of Emergency Contacts for the site.

OPERATIONS AND MAINTENTANCE LOG

Each maintenance action shall be logged in a form like that shown below:

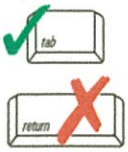
Task Quarterly Site Observation	*Date*	*Action*	*Comment*
Street Sweep			
Catchbasin Cleaning			
Repairs Required			
Observe Rooftop recharge systems for evidence of surcharge during significant rainfall events			
StormCeptor Inspection			

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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 8[2]
- 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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

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): STORMCEPTOR UNIT

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 Field[1]

☒ 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.

ATTACHMENTS

Figure 1 Existing Drainage Catchments
Figure 2 Post Development Catchments

Stormwater Checklist
HydroCad Analysis
Soils Report
Soil Testing Reports
TSS Removal Calculation Sheet

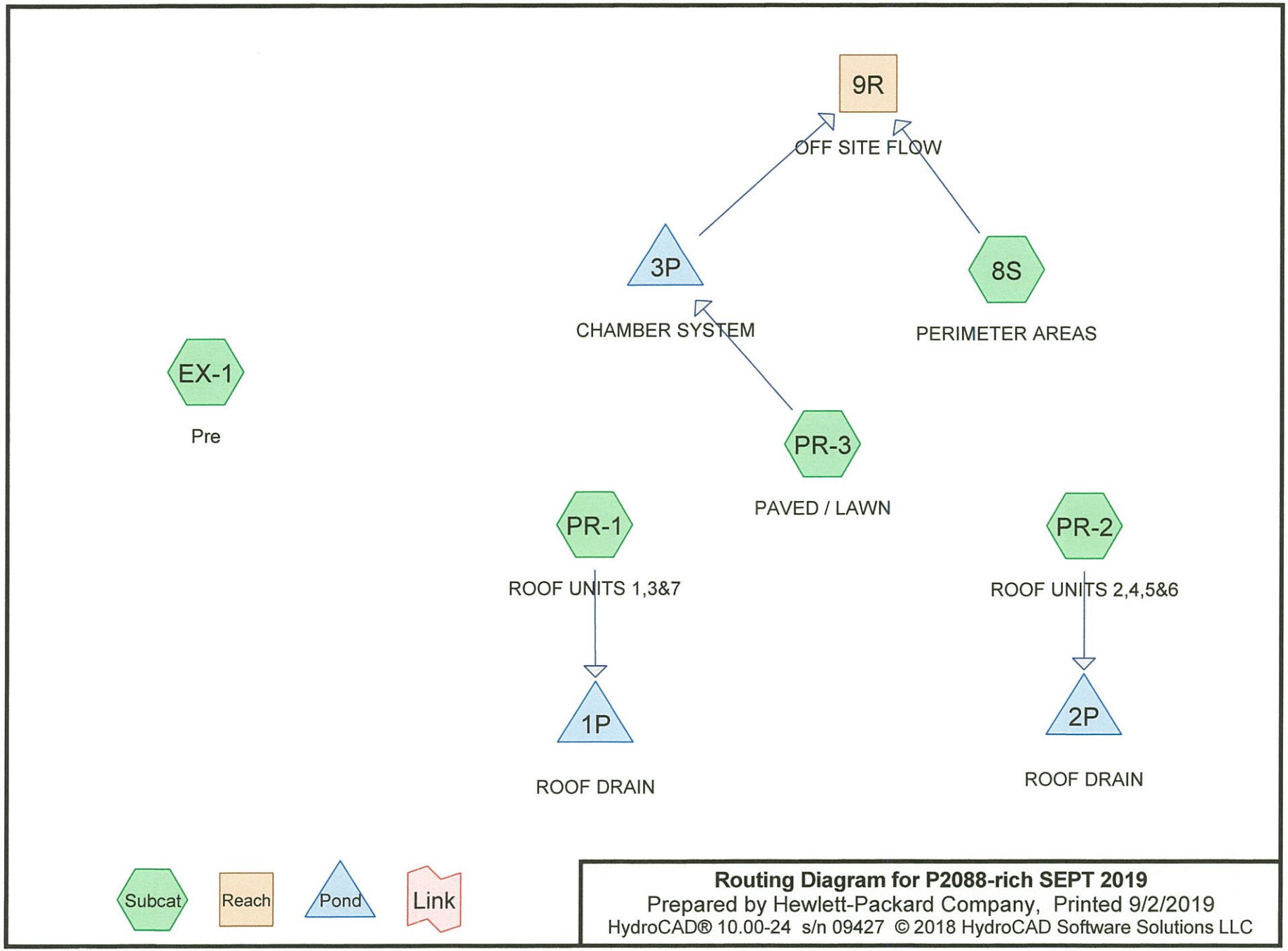
Stormwater BMP Inspection and Maintenance Log

Facility Name Evergreen Village	
Address 22 Evergreen Street	
Begin Date	End Date

Date	BMP ID#	BMP Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken
	PR-1	StormTec Infiltrators				
	PR-2	StormTec Infiltrators				
	PR-3	StormTec Infiltrators				
	ST1	StormCeptor Unit				
	Wier	Outlet Control Structure				
	Outfall	Outlet & Rip Rap				

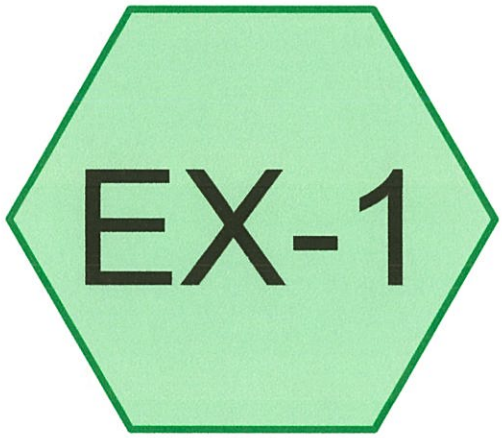
Instructions: Record all inspections and maintenance for all treatment BMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary. Submit a copy of the completed log with the annual independent inspectors' report to the municipality, and start a new log at that time.

- BMP ID# — Always use ID# from the Operation and Maintenance Manual.
- Inspected by — Note all inspections and maintenance on this form, including the required independent annual inspection.
- Cause for inspection — Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.
- Exceptions noted — Note any condition that requires correction or indicates a need for maintenance.
- Comments and actions taken — Describe any maintenance done and need for follow-up.



Routing Diagram for P2088-rich SEPT 2019

Prepared by Hewlett-Packard Company, Printed 9/2/2019



Pre

Subcat Reach Pond Link

Routing Diagram for P2088-rich SEPT 2019
Prepared by Hewlett-Packard Company, Printed 9/2/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.554	61	>75% Grass cover, Good, HSG B (EX-1)
0.033	98	Paved parking, HSG B (EX-1)
0.069	98	Unconnected roofs, HSG B (EX-1)
0.779	66	Woods, Poor, HSG B (EX-1)

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.436	HSG B	EX-1
0.000	HSG C	
0.000	HSG D	
0.000	Other	

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.554	0.000	0.000	0.000	0.554	>75% Grass cover, Good	EX-1
0.000	0.033	0.000	0.000	0.000	0.033	Paved parking	EX-1
0.000	0.069	0.000	0.000	0.000	0.069	Unconnected roofs	EX-1
0.000	0.779	0.000	0.000	0.000	0.779	Woods, Poor	EX-1

Summary for Subcatchment EX-1: Pre

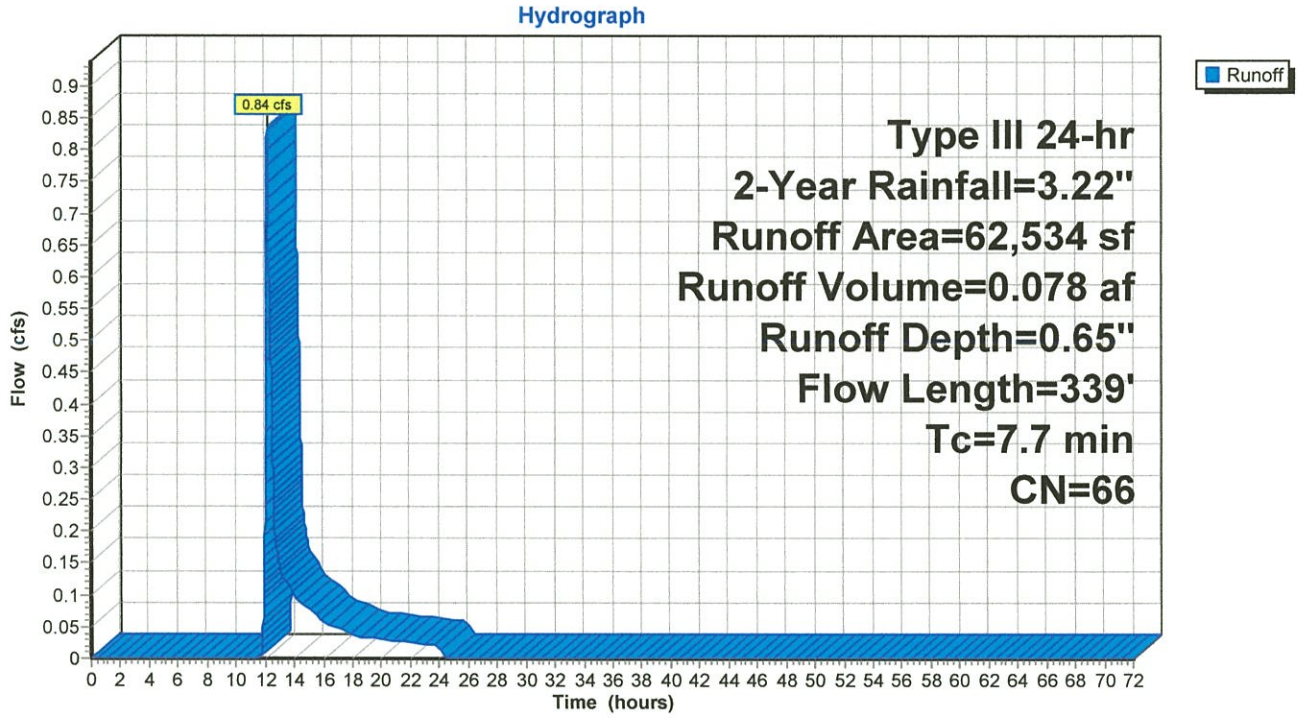
Runoff = 0.84 cfs @ 12.13 hrs, Volume= 0.078 af, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

Area (sf)	CN	Description
33,955	66	Woods, Poor, HSG B
24,147	61	>75% Grass cover, Good, HSG B
3,000	98	Unconnected roofs, HSG B
1,432	98	Paved parking, HSG B
62,534	66	Weighted Average
58,102		92.91% Pervious Area
4,432		7.09% Impervious Area
3,000		67.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0400	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.70"
0.7	155	0.0600	3.67		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.4	134	0.0340	0.92		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
7.7	339	Total			

Subcatchment EX-1: Pre



Summary for Subcatchment EX-1: Pre

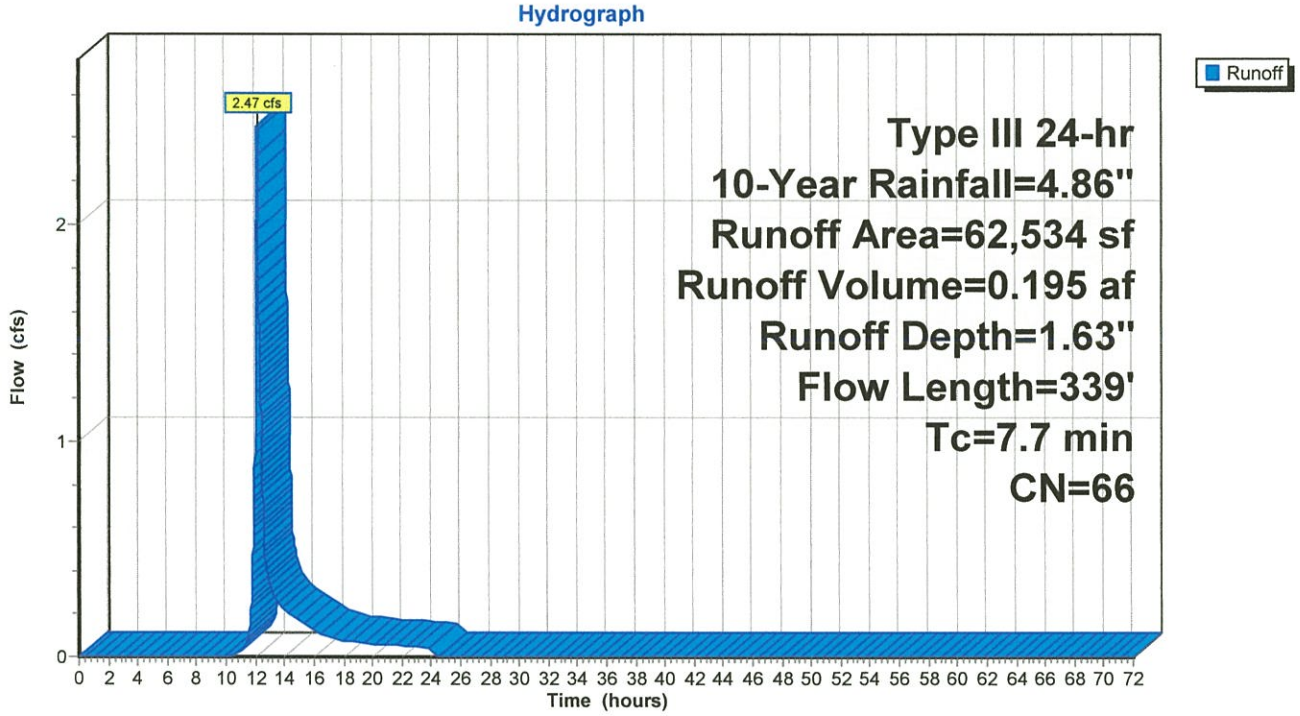
Runoff = 2.47 cfs @ 12.12 hrs, Volume= 0.195 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
33,955	66	Woods, Poor, HSG B
24,147	61	>75% Grass cover, Good, HSG B
3,000	98	Unconnected roofs, HSG B
1,432	98	Paved parking, HSG B
62,534	66	Weighted Average
58,102		92.91% Pervious Area
4,432		7.09% Impervious Area
3,000		67.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0400	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.70"
0.7	155	0.0600	3.67		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.4	134	0.0340	0.92		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
7.7	339	Total			

Subcatchment EX-1: Pre



Summary for Subcatchment EX-1: Pre

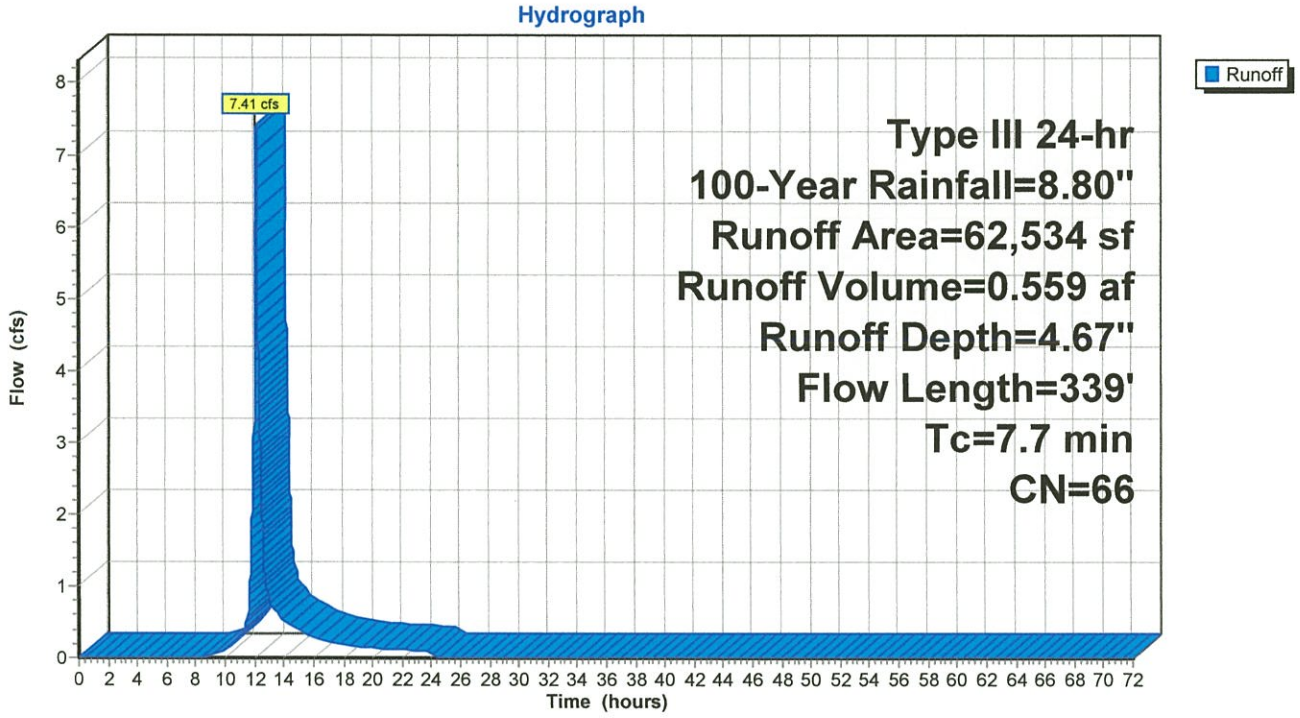
Runoff = 7.41 cfs @ 12.11 hrs, Volume= 0.559 af, Depth= 4.67"

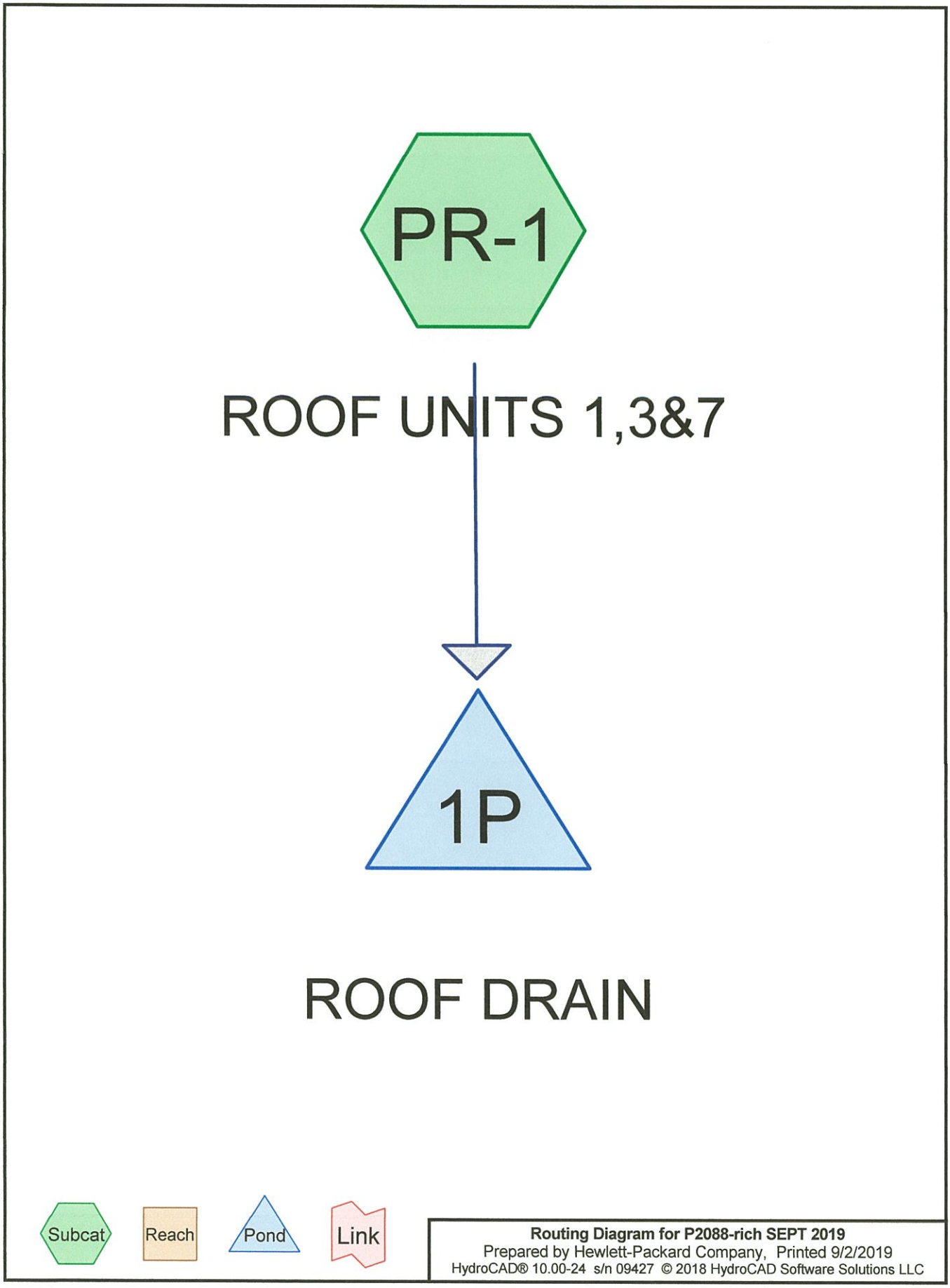
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.80"

Area (sf)	CN	Description
33,955	66	Woods, Poor, HSG B
24,147	61	>75% Grass cover, Good, HSG B
3,000	98	Unconnected roofs, HSG B
1,432	98	Paved parking, HSG B
62,534	66	Weighted Average
58,102		92.91% Pervious Area
4,432		7.09% Impervious Area
3,000		67.69% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0400	0.18		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.70"
0.7	155	0.0600	3.67		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.4	134	0.0340	0.92		**Shallow Concentrated Flow, Woodland** Woodland Kv= 5.0 fps
7.7	339	Total			

Subcatchment EX-1: Pre





Routing Diagram for P2088-rich SEPT 2019
Prepared by Hewlett-Packard Company, Printed 9/2/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.103	98	(PR-1)

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.103	Other	PR-1

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.103	0.103		PR-1

Summary for Subcatchment PR-1: ROOF UNITS 1,3&7

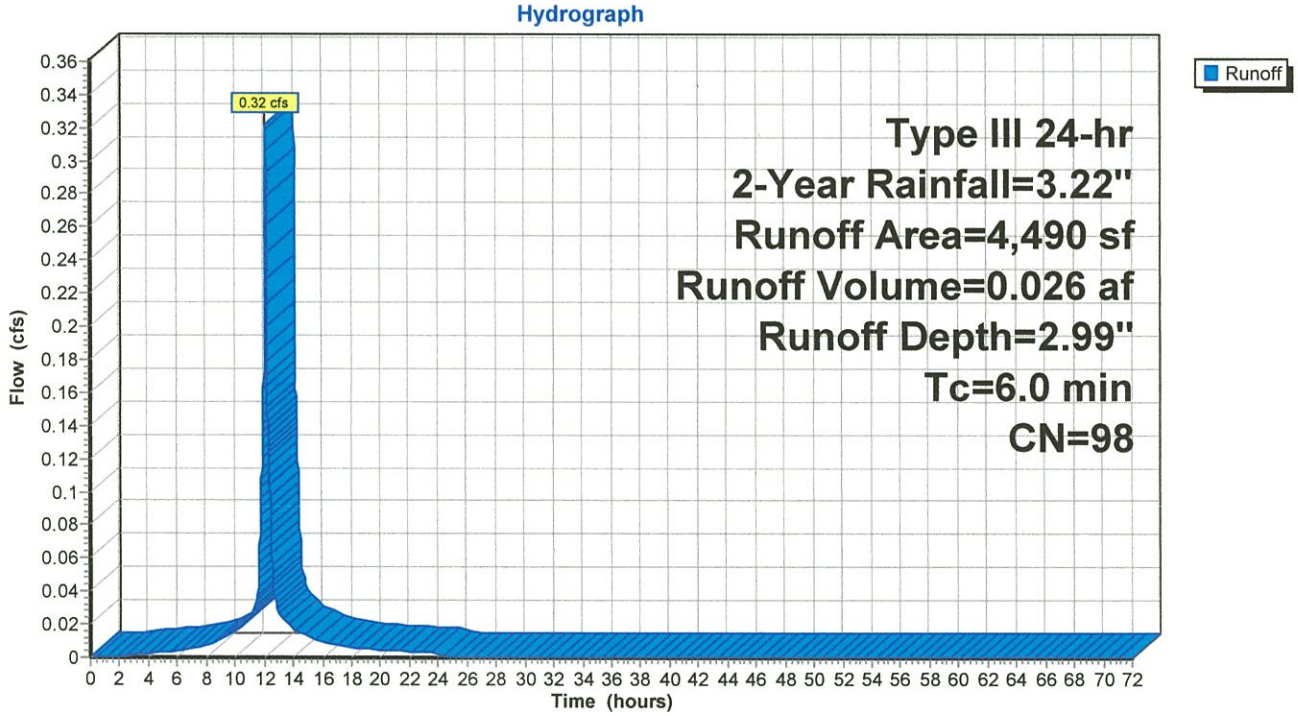
Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
*	4,490	98	
	4,490		100.00% Impervious Area

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

Subcatchment PR-1: ROOF UNITS 1,3&7



Summary for Pond 1P: ROOF DRAIN

Inflow Area = 0.103 ac,100.00% Impervious, Inflow Depth = 2.99" for 2-Year event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.10 cfs @ 12.39 hrs, Volume= 0.026 af, Atten= 69%, Lag= 18.1 min
Discarded = 0.10 cfs @ 12.39 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 204.07' @ 12.39 hrs Surf.Area= 418 sf Storage= 190 cf

Plug-Flow detention time= 9.6 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 9.6 min (765.9 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	567 cf	**11.00'W x 38.04'L x 4.50'H Field A** 1,883 cf Overall - 465 cf Embedded = 1,418 cf x 40.0% Voids
#2A	204.00'	465 cf	**ADS_StormTech SC-740** x 10 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,032 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.02'

Discarded OutFlow Max=0.10 cfs @ 12.39 hrs HW=204.07' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Pond 1P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

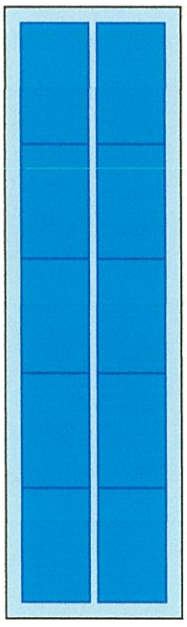
5 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 36.04' Row Length +12.0" End Stone x 2 = 38.04' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
12.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.50' Field Height

10 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 465.1 cf Chamber Storage

1,883.0 cf Field - 465.1 cf Chambers = 1,417.9 cf Stone x 40.0% Voids = 567.2 cf Stone Storage

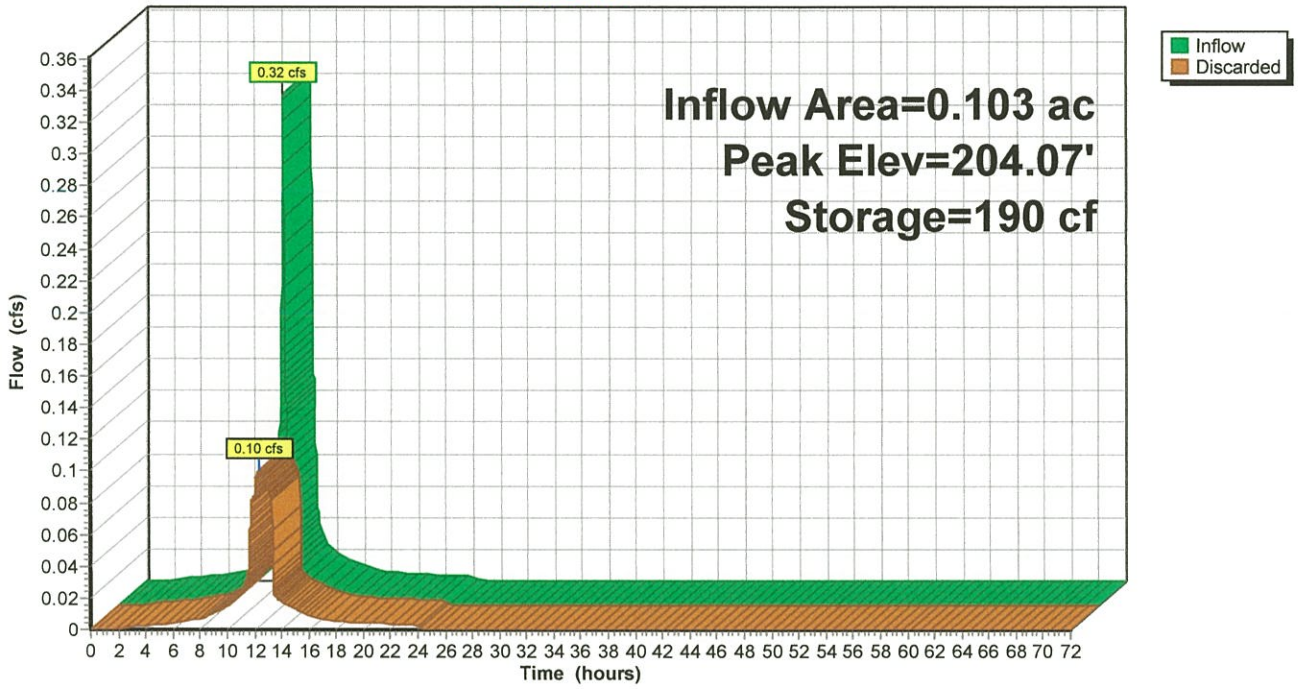
Chamber Storage + Stone Storage = 1,032.2 cf = 0.024 af
Overall Storage Efficiency = 54.8%
Overall System Size = 38.04' x 11.00' x 4.50'

10 Chambers
69.7 cy Field
52.5 cy Stone



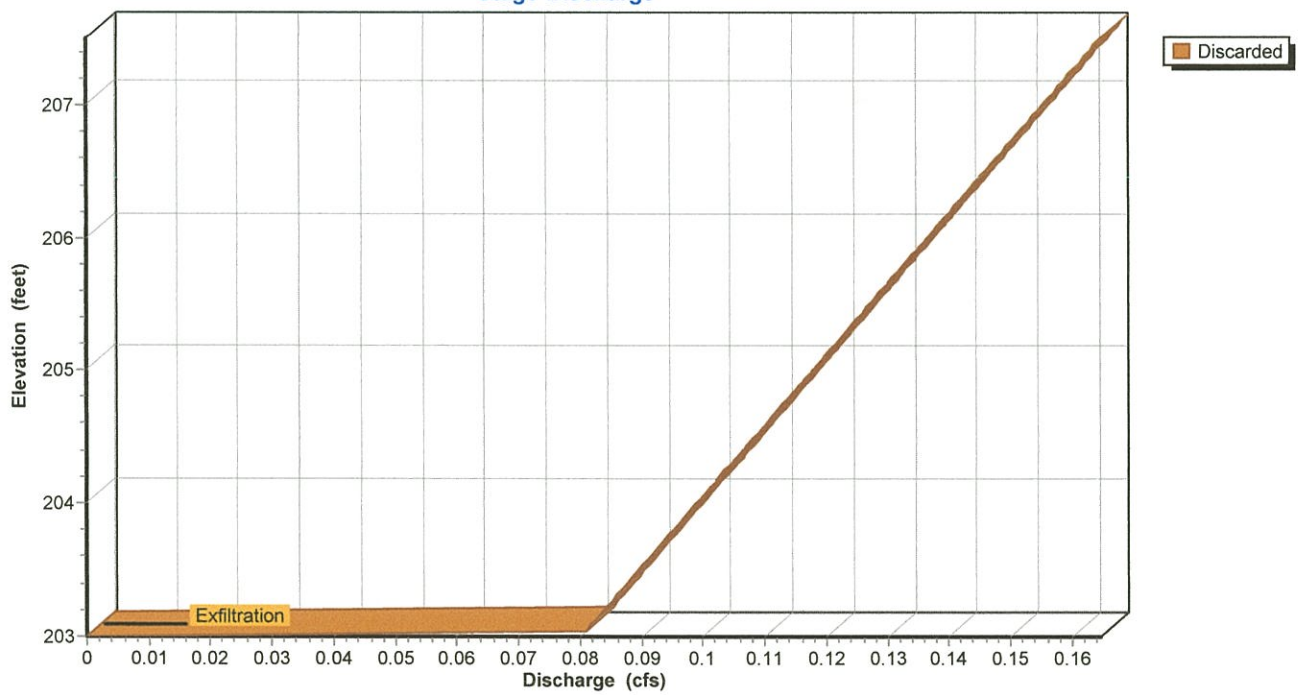
Pond 1P: ROOF DRAIN

Hydrograph

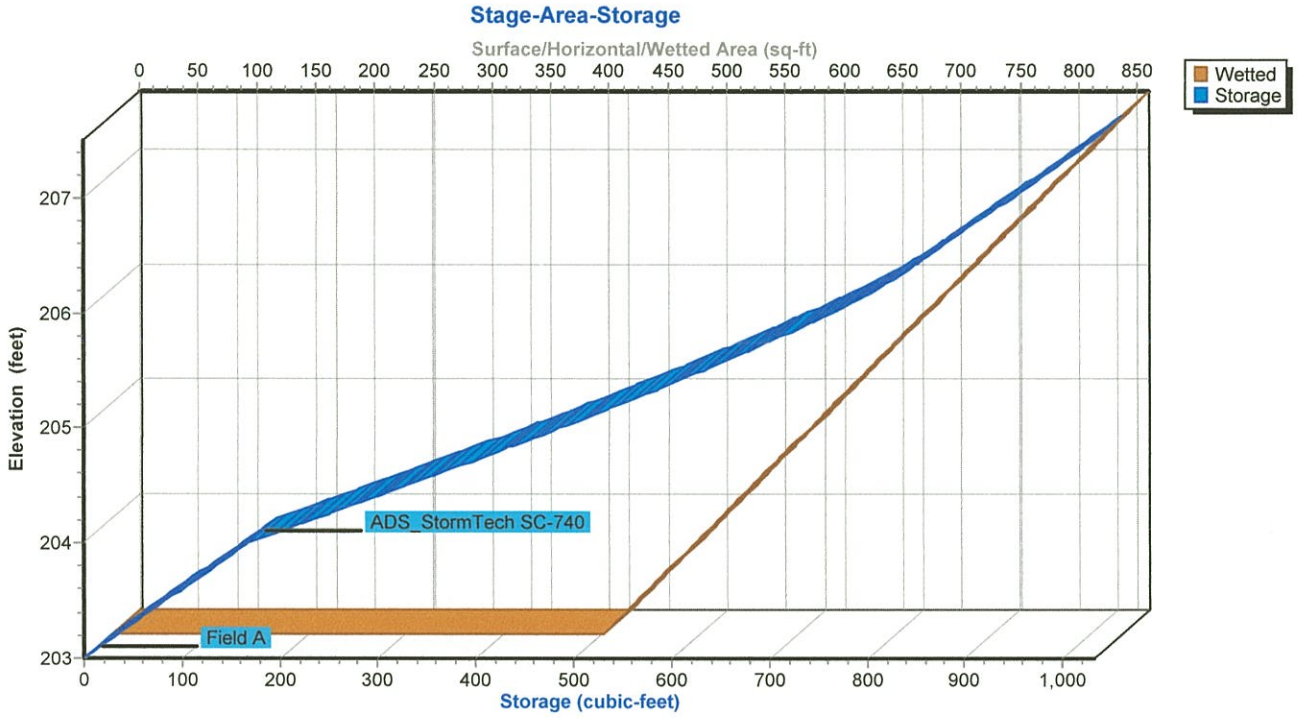


Pond 1P: ROOF DRAIN

Stage-Discharge



Pond 1P: ROOF DRAIN



Summary for Subcatchment PR-1: ROOF UNITS 1,3&7

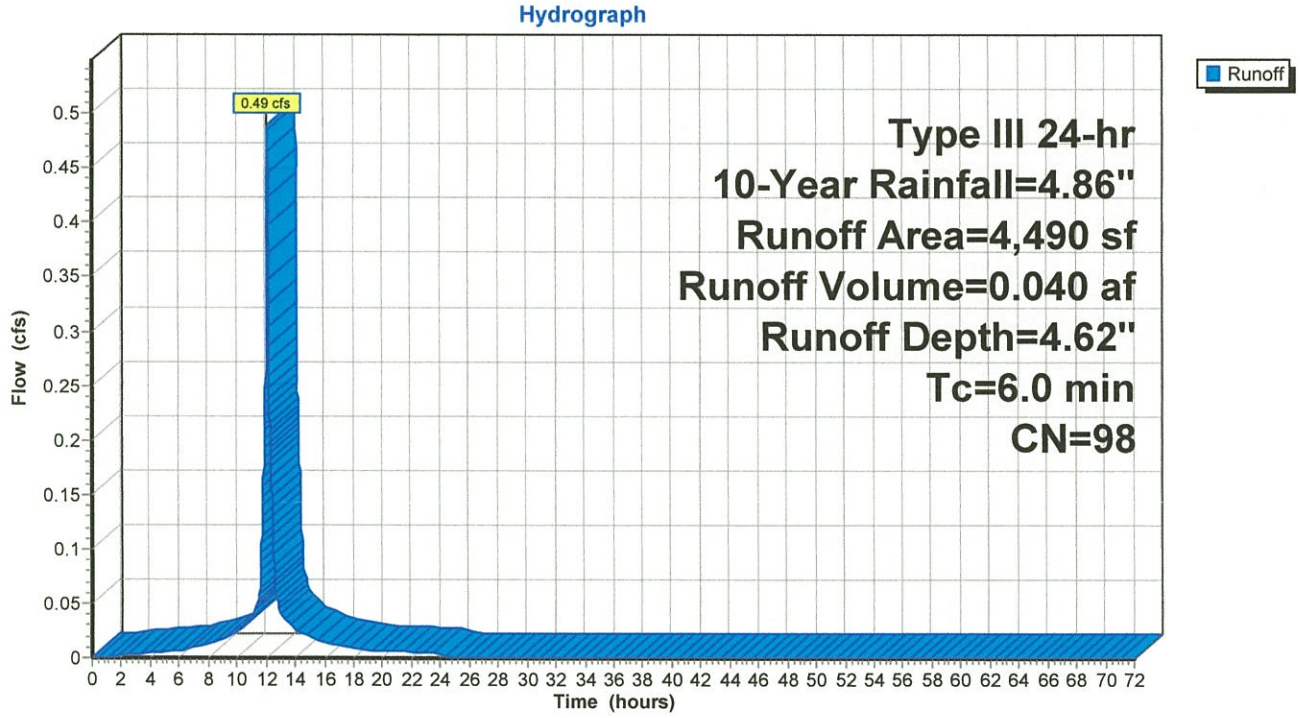
Runoff = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	4,490	98	
	4,490		100.00% Impervious Area

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

Subcatchment PR-1: ROOF UNITS 1,3&7



Summary for Pond 1P: ROOF DRAIN

Inflow Area = 0.103 ac,100.00% Impervious, Inflow Depth = 4.62" for 10-Year event
Inflow = 0.49 cfs @ 12.08 hrs, Volume= 0.040 af
Outflow = 0.11 cfs @ 12.48 hrs, Volume= 0.040 af, Atten= 77%, Lag= 23.5 min
Discarded = 0.11 cfs @ 12.48 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 204.70' @ 12.48 hrs Surf.Area= 418 sf Storage= 393 cf

Plug-Flow detention time= 19.2 min calculated for 0.040 af (100% of inflow)
Center-of-Mass det. time= 19.2 min (767.7 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	567 cf	**11.00'W x 38.04'L x 4.50'H Field A** 1,883 cf Overall - 465 cf Embedded = 1,418 cf x 40.0% Voids
#2A	204.00'	465 cf	**ADS_StormTech SC-740** x 10 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,032 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.02'

Discarded OutFlow Max=0.11 cfs @ 12.48 hrs HW=204.70' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 1P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

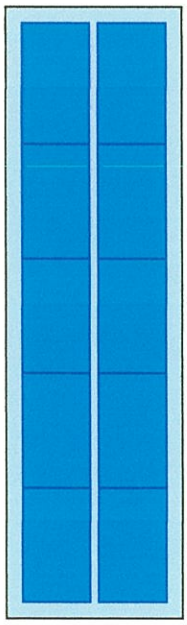
5 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 36.04' Row Length +12.0" End Stone x 2 = 38.04' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
12.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.50' Field Height

10 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 465.1 cf Chamber Storage

1,883.0 cf Field - 465.1 cf Chambers = 1,417.9 cf Stone x 40.0% Voids = 567.2 cf Stone Storage

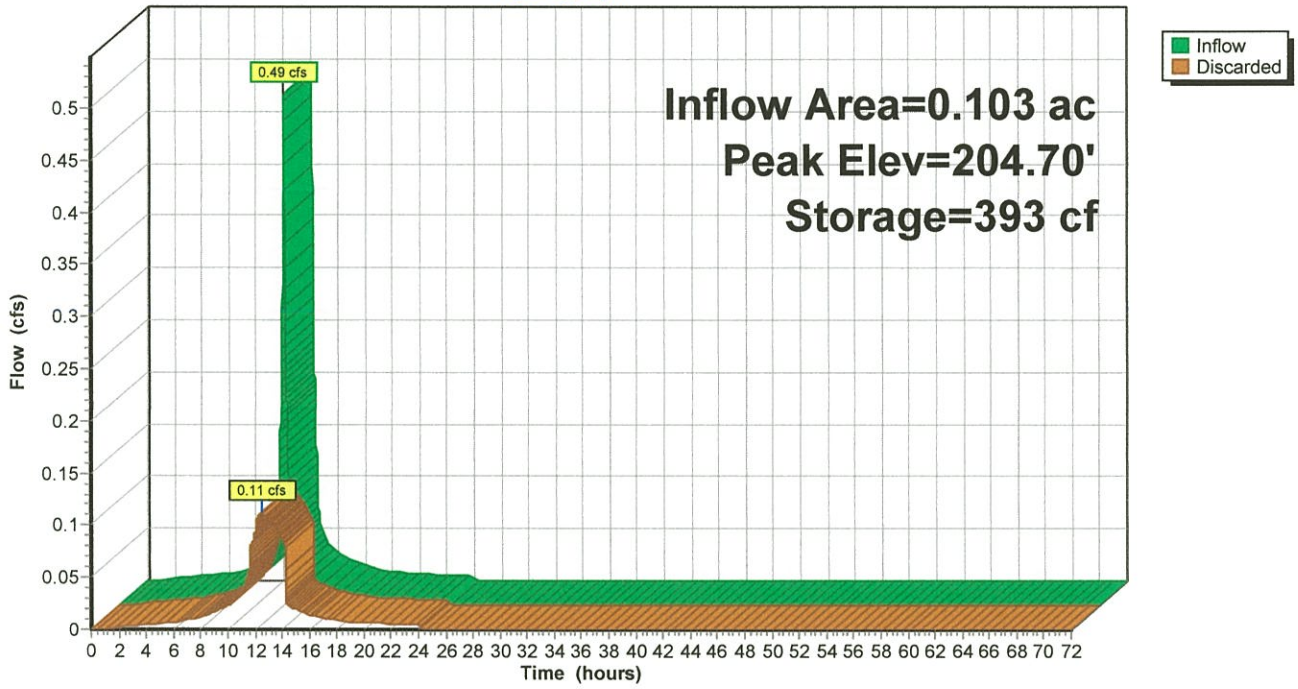
Chamber Storage + Stone Storage = 1,032.2 cf = 0.024 af
Overall Storage Efficiency = 54.8%
Overall System Size = 38.04' x 11.00' x 4.50'

10 Chambers
69.7 cy Field
52.5 cy Stone



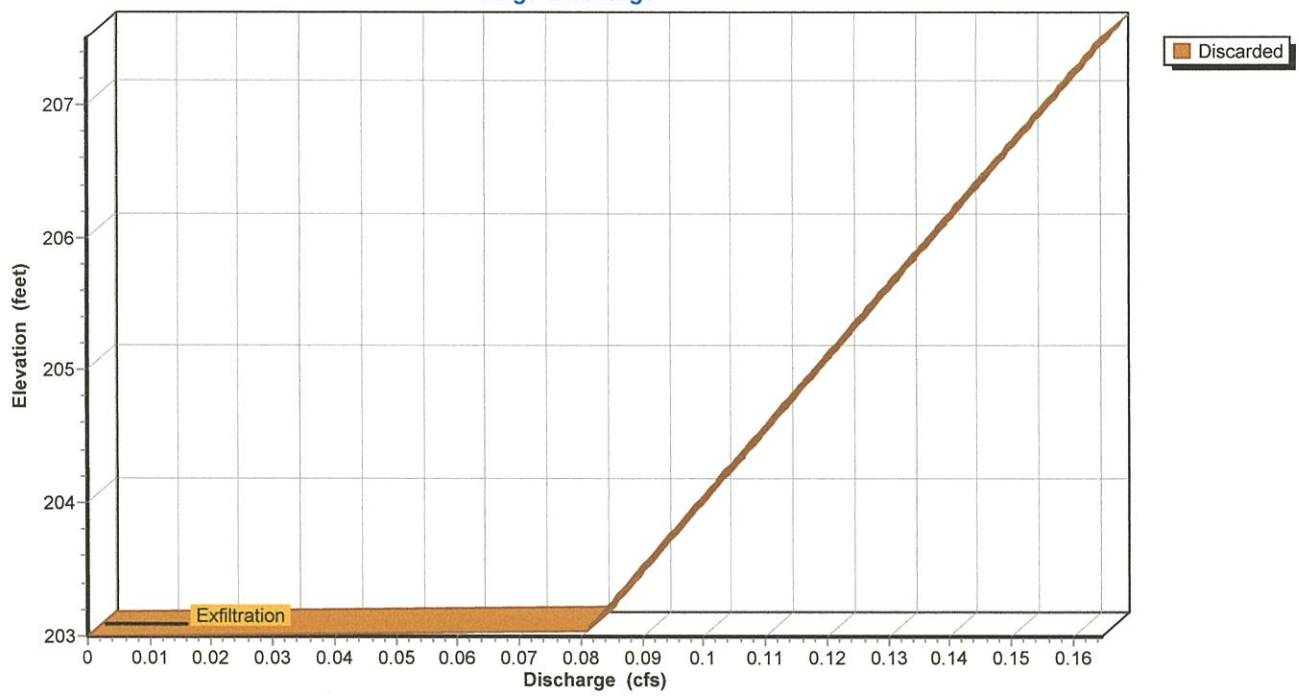
Pond 1P: ROOF DRAIN

Hydrograph

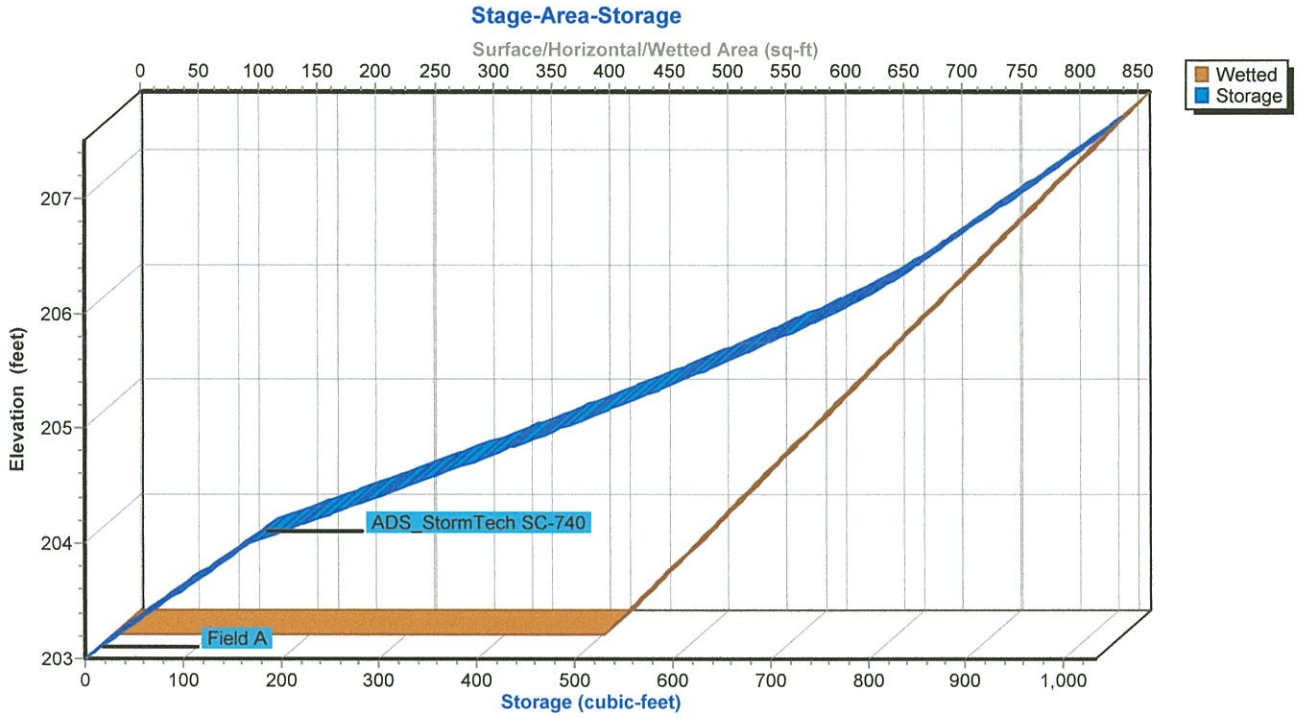


Pond 1P: ROOF DRAIN

Stage-Discharge



Pond 1P: ROOF DRAIN



Summary for Subcatchment PR-1: ROOF UNITS 1,3&7

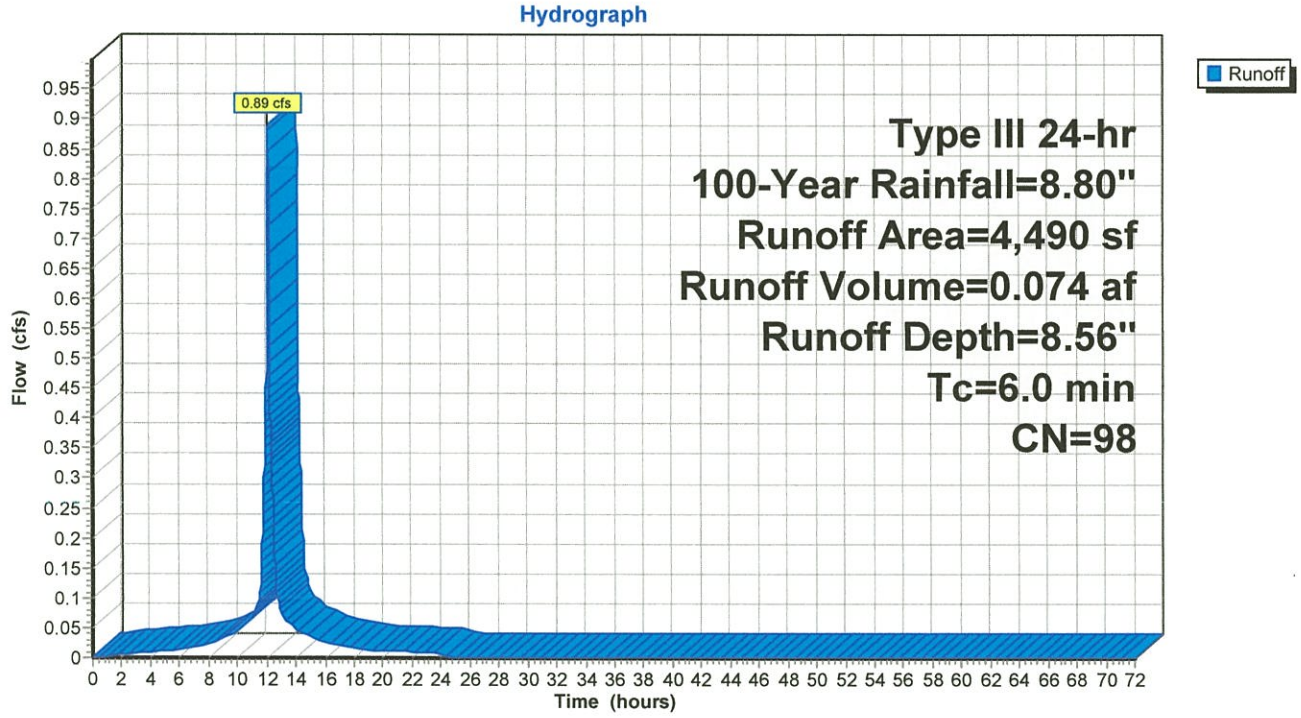
Runoff = 0.89 cfs @ 12.08 hrs, Volume= 0.074 af, Depth= 8.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
*	4,490	98	
	4,490		100.00% Impervious Area

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

Subcatchment PR-1: ROOF UNITS 1,3&7



Summary for Pond 1P: ROOF DRAIN

Inflow Area = 0.103 ac,100.00% Impervious, Inflow Depth = 8.56" for 100-Year event
Inflow = 0.89 cfs @ 12.08 hrs, Volume= 0.074 af
Outflow = 0.15 cfs @ 12.54 hrs, Volume= 0.074 af, Atten= 83%, Lag= 27.4 min
Discarded = 0.15 cfs @ 12.54 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 206.83' @ 12.54 hrs Surf.Area= 418 sf Storage= 921 cf

Plug-Flow detention time= 41.5 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 41.5 min (781.5 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	567 cf	**11.00'W x 38.04'L x 4.50'H Field A** 1,883 cf Overall - 465 cf Embedded = 1,418 cf x 40.0% Voids
#2A	204.00'	465 cf	**ADS_StormTech SC-740** x 10 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,032 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area** Phase-In= 0.02'

Discarded OutFlow Max=0.15 cfs @ 12.54 hrs HW=206.83' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Pond 1P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

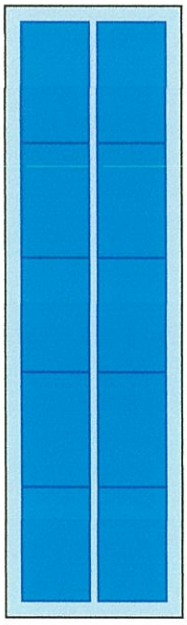
5 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 36.04' Row Length +12.0" End Stone x 2 = 38.04' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
12.0" Base + 30.0" Chamber Height + 12.0" Cover = 4.50' Field Height

10 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 465.1 cf Chamber Storage

1,883.0 cf Field - 465.1 cf Chambers = 1,417.9 cf Stone x 40.0% Voids = 567.2 cf Stone Storage

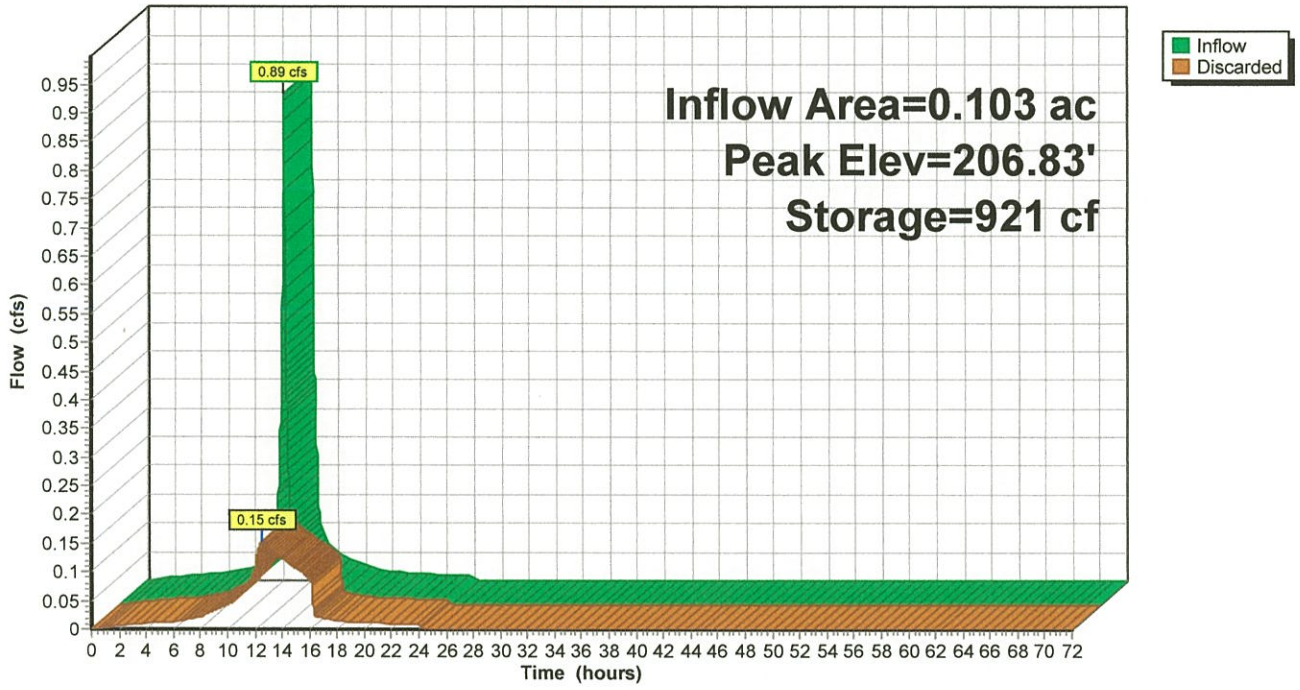
Chamber Storage + Stone Storage = 1,032.2 cf = 0.024 af
Overall Storage Efficiency = 54.8%
Overall System Size = 38.04' x 11.00' x 4.50'

10 Chambers
69.7 cy Field
52.5 cy Stone



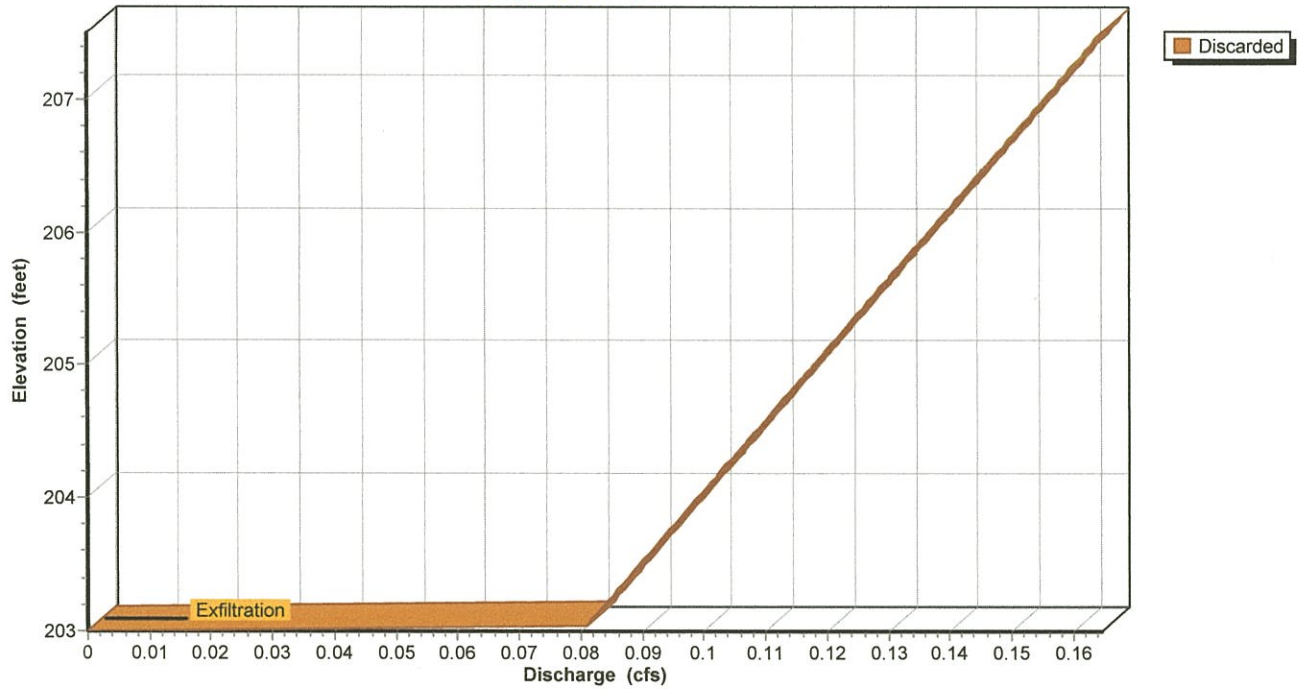
Pond 1P: ROOF DRAIN

Hydrograph

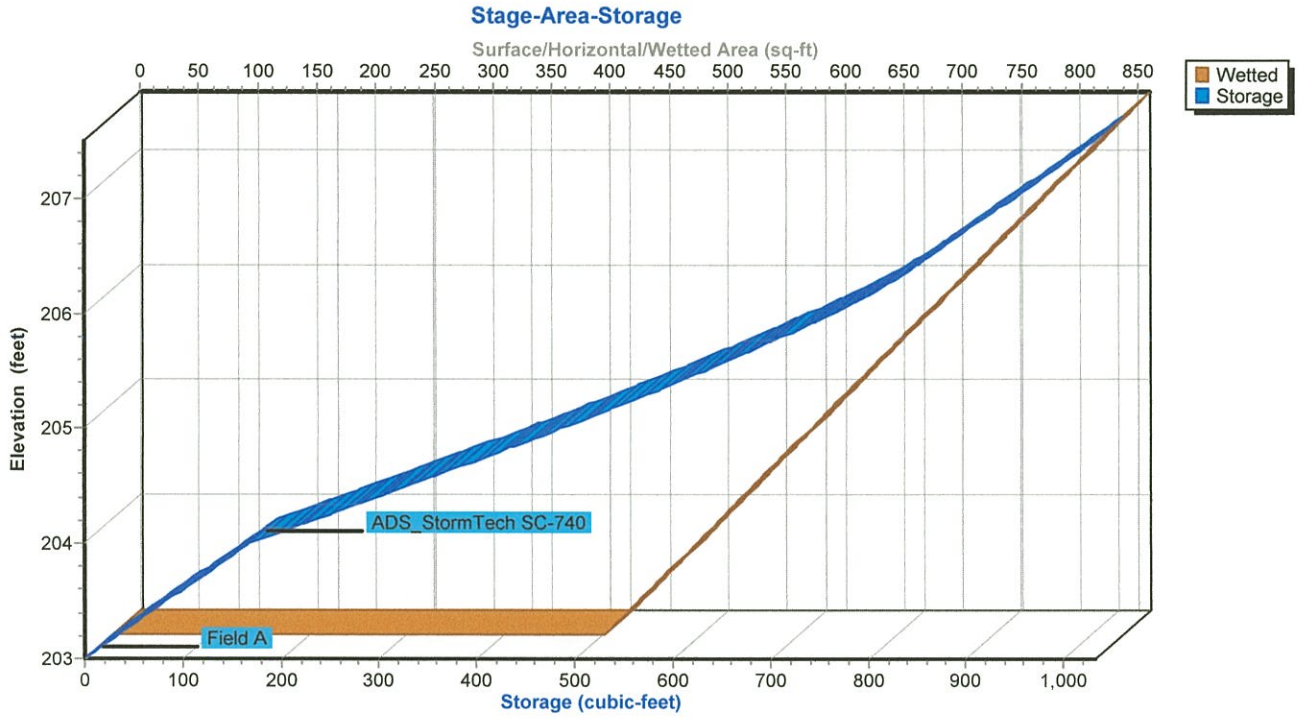


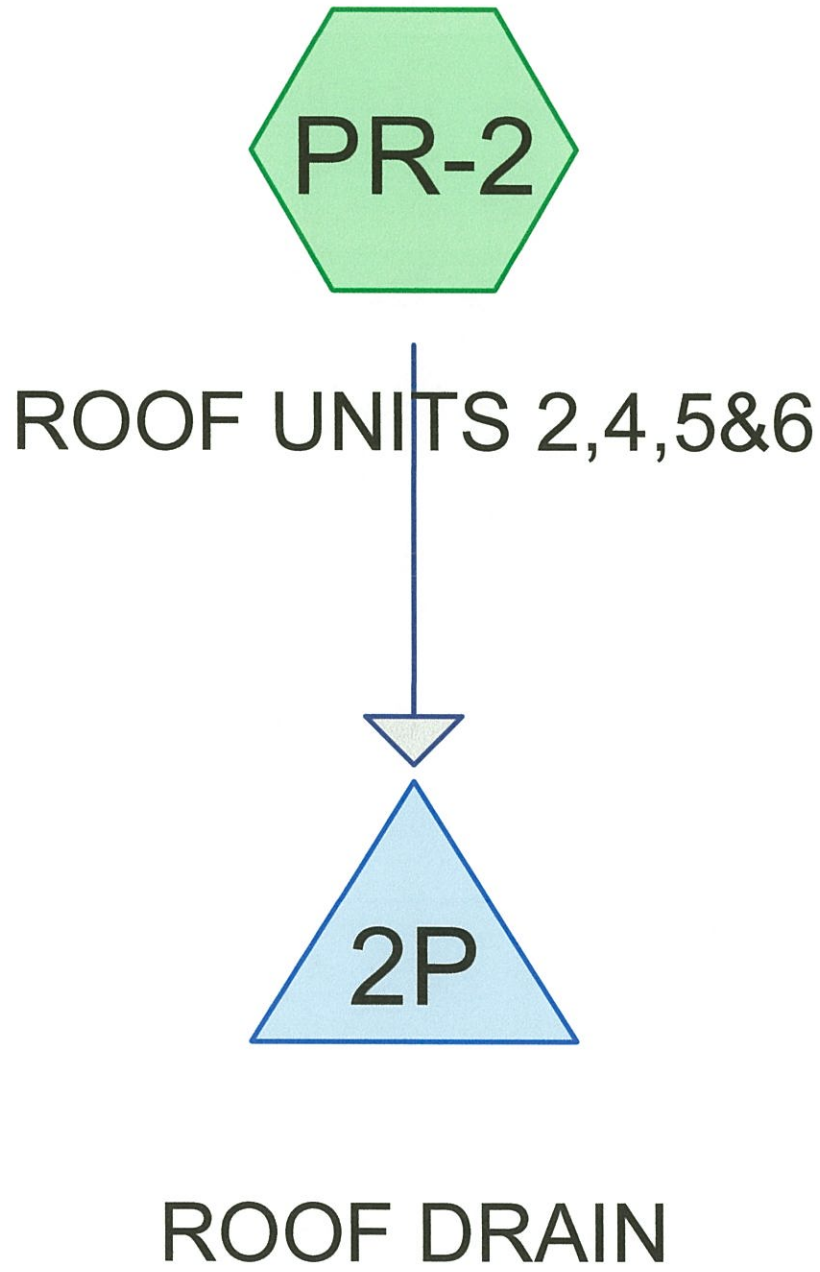
Pond 1P: ROOF DRAIN

Stage-Discharge



Pond 1P: ROOF DRAIN





Subcat Reach Pond Link

Routing Diagram for P2088-rich SEPT 2019
Prepared by Hewlett-Packard Company, Printed 9/2/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.132	98	(PR-2)

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.132	Other	PR-2

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.132	0.132		PR-2

Summary for Subcatchment PR-2: ROOF UNITS 2,4,5&6

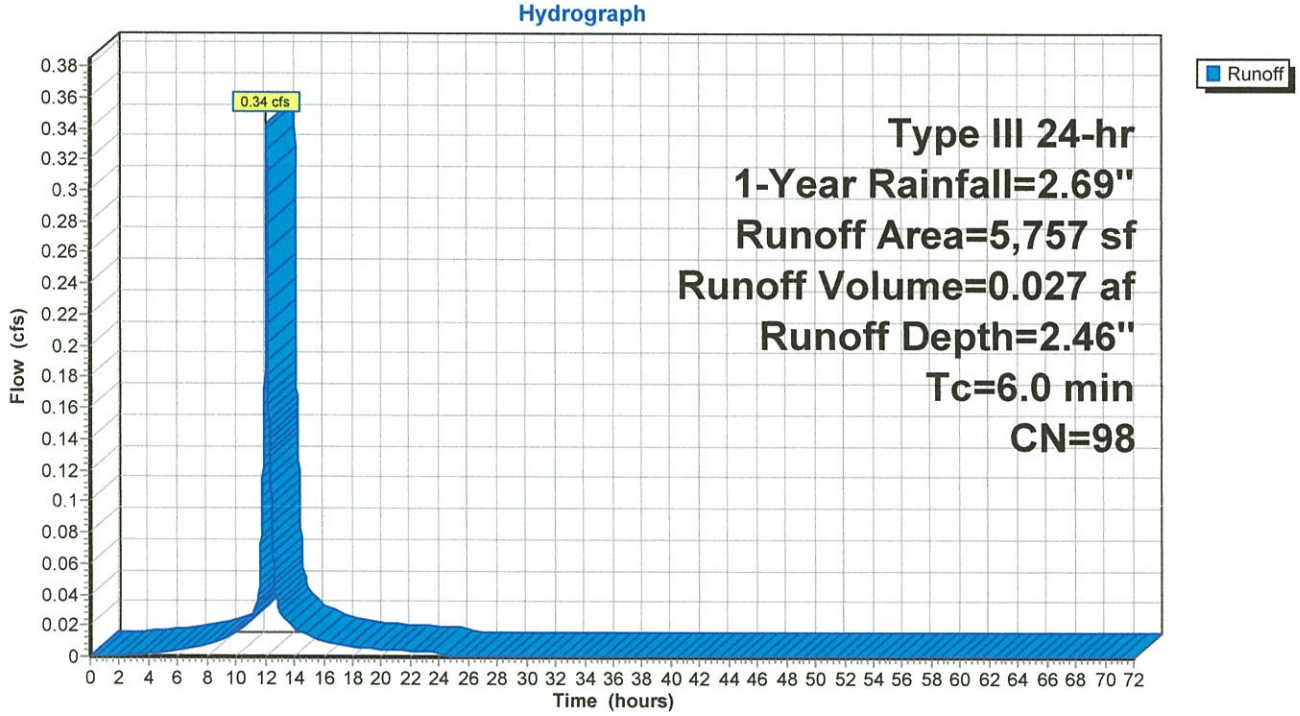
Runoff = 0.34 cfs @ 12.08 hrs, Volume= 0.027 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	5,757	98	
	5,757		100.00% Impervious Area

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

Subcatchment PR-2: ROOF UNITS 2,4,5&6



Summary for Pond 2P: ROOF DRAIN

Inflow Area = 0.132 ac,100.00% Impervious, Inflow Depth = 2.46" for 1-Year event
Inflow = 0.34 cfs @ 12.08 hrs, Volume= 0.027 af
Outflow = 0.12 cfs @ 12.33 hrs, Volume= 0.027 af, Atten= 64%, Lag= 14.9 min
Discarded = 0.12 cfs @ 12.33 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 203.60' @ 12.33 hrs Surf.Area= 575 sf Storage= 159 cf

Plug-Flow detention time= 6.0 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 6.0 min (766.2 - 760.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	546 cf	**11.00'W x 52.28'L x 3.50'H Field A** 2,013 cf Overall - 649 cf Embedded = 1,364 cf x 40.0% Voids
#2A	203.50'	649 cf	**ADS_StormTech SC-740** x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,194 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.12 cfs @ 12.33 hrs HW=203.60' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Pond 2P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

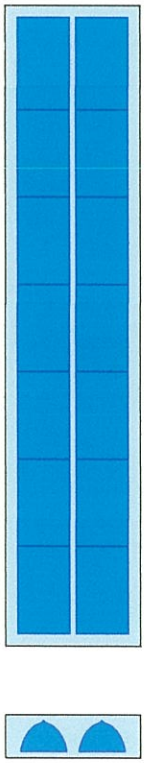
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 648.8 cf Chamber Storage

2,012.8 cf Field - 648.8 cf Chambers = 1,363.9 cf Stone x 40.0% Voids = 545.6 cf Stone Storage

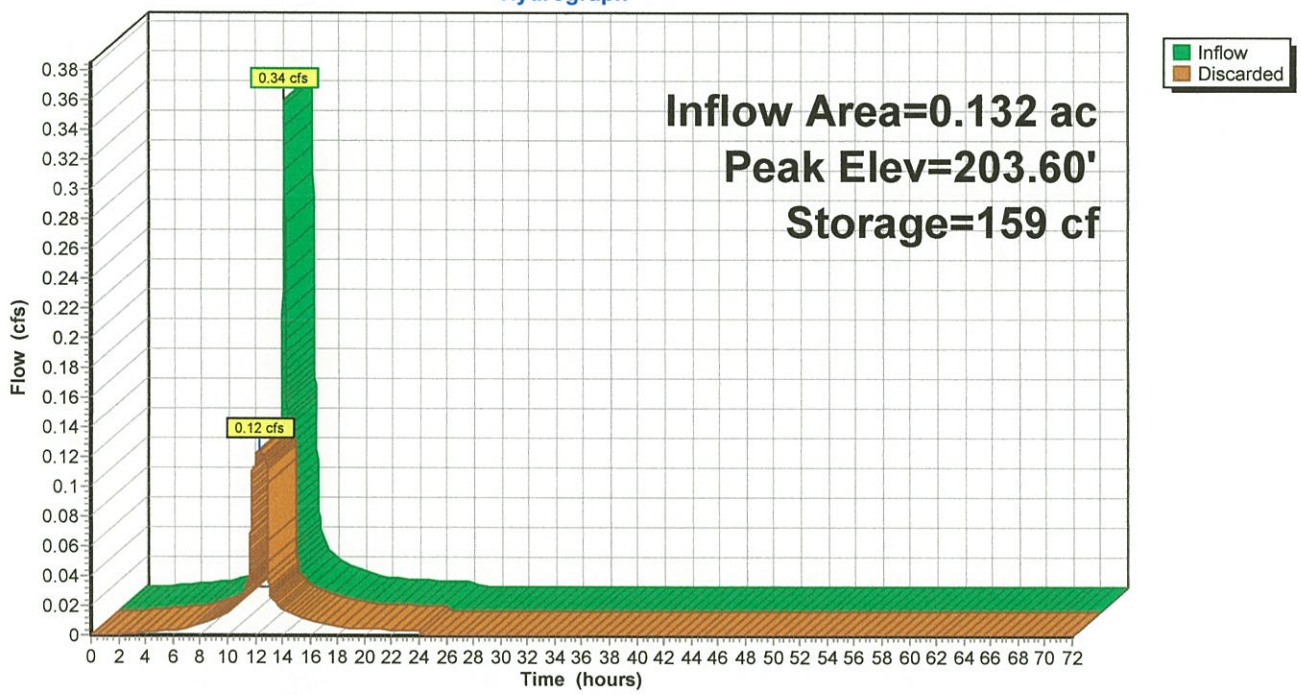
Chamber Storage + Stone Storage = 1,194.4 cf = 0.027 af
Overall Storage Efficiency = 59.3%
Overall System Size = 52.28' x 11.00' x 3.50'

14 Chambers
74.5 cy Field
50.5 cy Stone



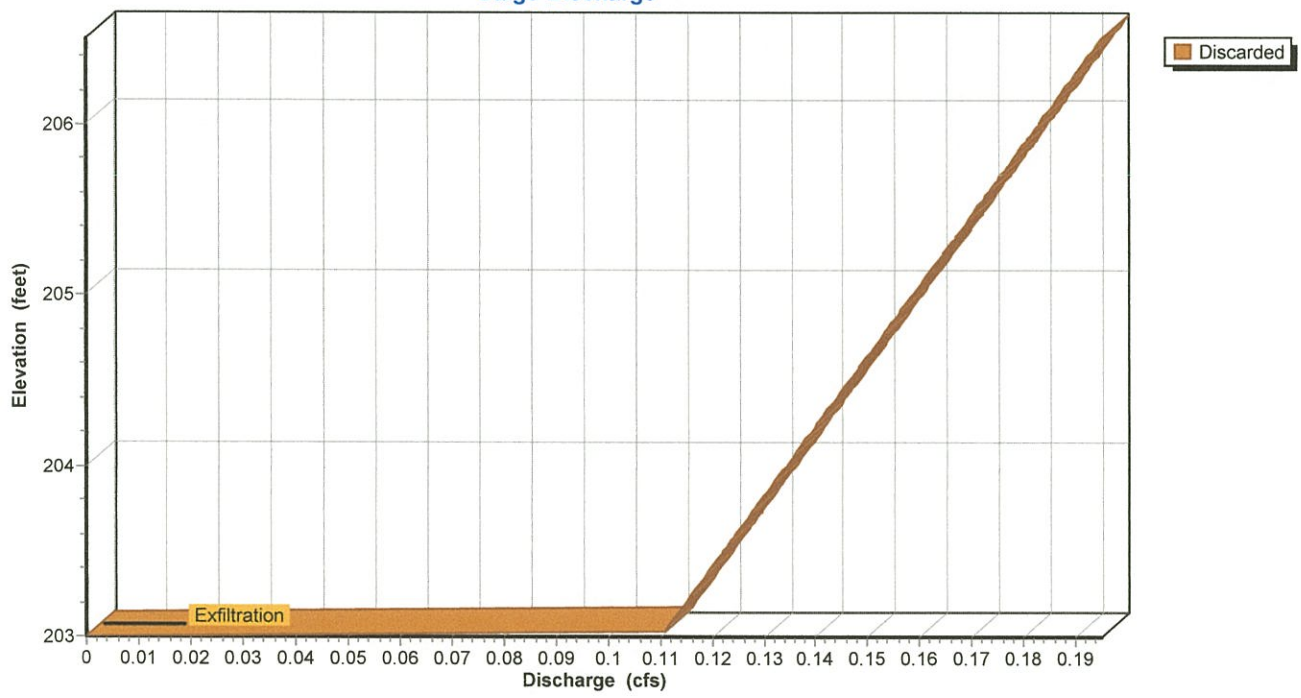
Pond 2P: ROOF DRAIN

Hydrograph

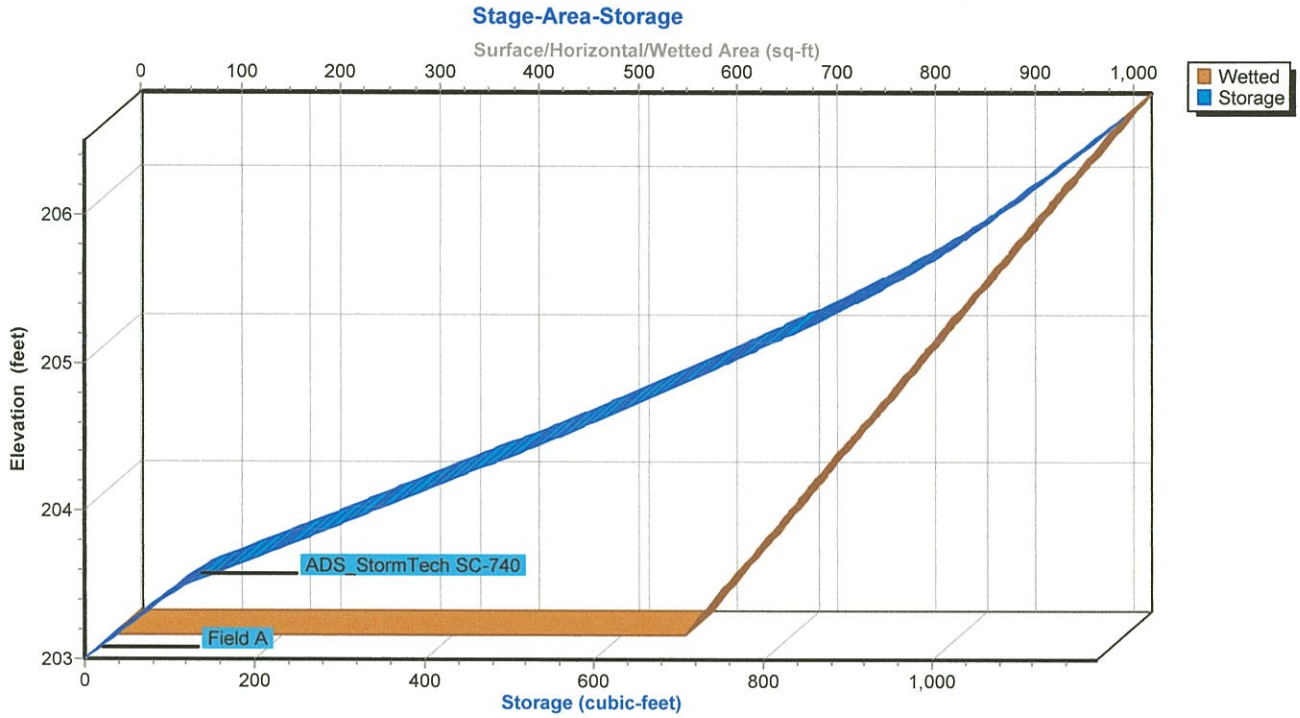


Pond 2P: ROOF DRAIN

Stage-Discharge



Pond 2P: ROOF DRAIN



Summary for Subcatchment PR-2: ROOF UNITS 2,4,5&6

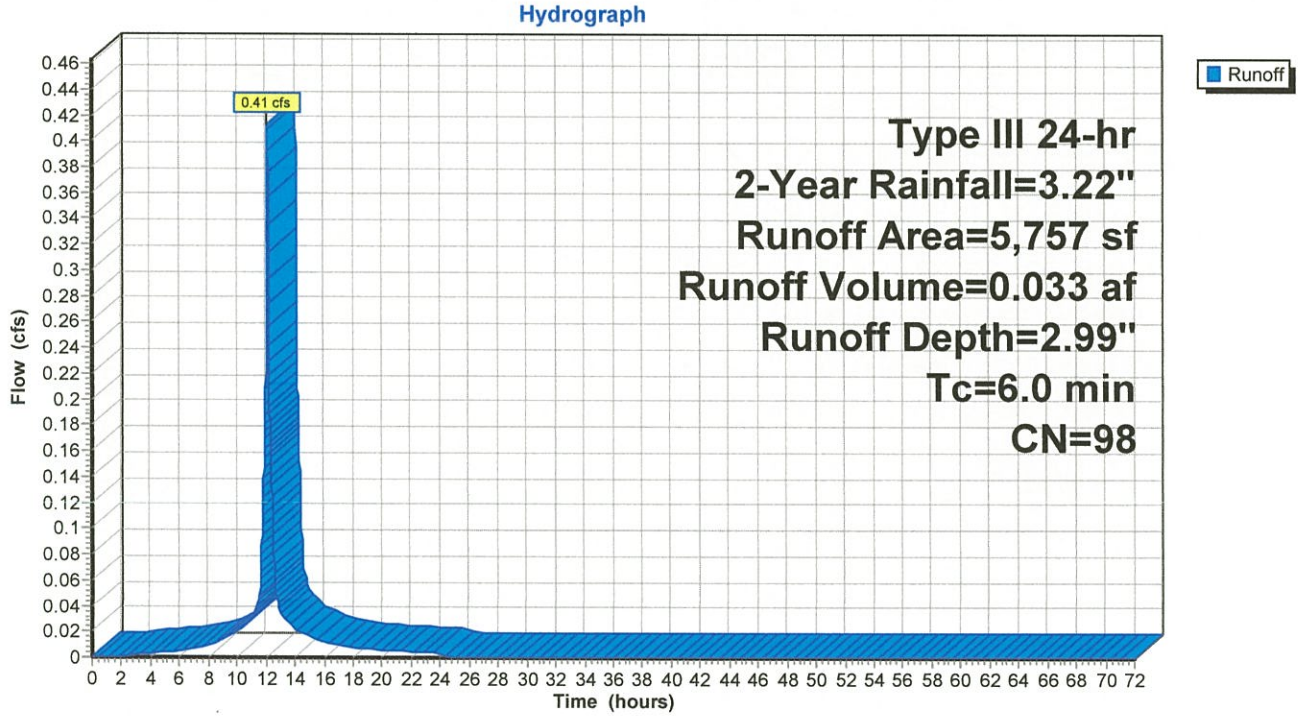
Runoff = 0.41 cfs @ 12.08 hrs, Volume= 0.033 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
*	5,757	98	
	5,757		100.00% Impervious Area

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

Subcatchment PR-2: ROOF UNITS 2,4,5&6



Summary for Pond 2P: ROOF DRAIN

Inflow Area = 0.132 ac,100.00% Impervious, Inflow Depth = 2.99" for 2-Year event
Inflow = 0.41 cfs @ 12.08 hrs, Volume= 0.033 af
Outflow = 0.13 cfs @ 12.39 hrs, Volume= 0.033 af, Atten= 69%, Lag= 18.1 min
Discarded = 0.13 cfs @ 12.39 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 203.76' @ 12.39 hrs Surf.Area= 575 sf Storage= 234 cf

Plug-Flow detention time= 8.7 min calculated for 0.033 af (100% of inflow)
Center-of-Mass det. time= 8.7 min (765.0 - 756.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	546 cf	**11.00'W x 52.28'L x 3.50'H Field A** 2,013 cf Overall - 649 cf Embedded = 1,364 cf x 40.0% Voids
#2A	203.50'	649 cf	**ADS_StormTech SC-740** x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,194 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.13 cfs @ 12.39 hrs HW=203.76' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.13 cfs)

Pond 2P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

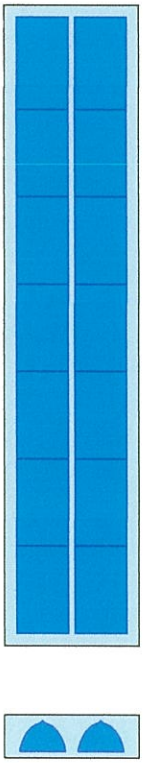
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 648.8 cf Chamber Storage

2,012.8 cf Field - 648.8 cf Chambers = 1,363.9 cf Stone x 40.0% Voids = 545.6 cf Stone Storage

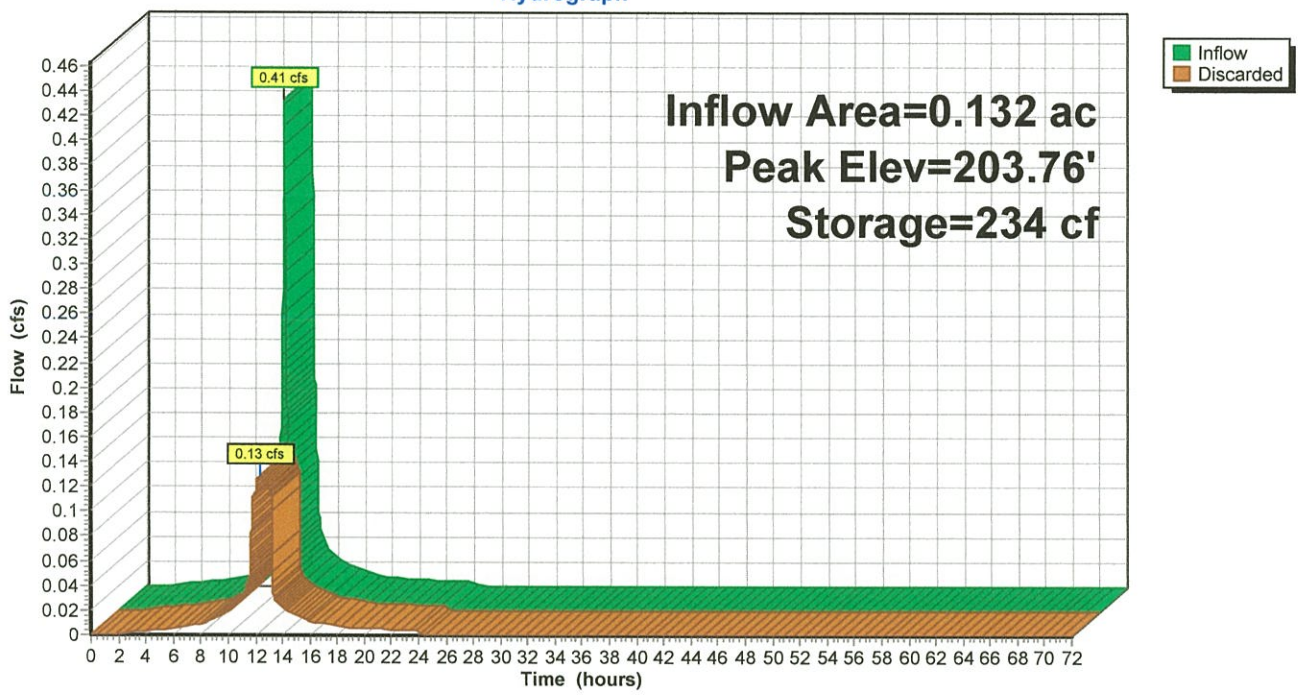
Chamber Storage + Stone Storage = 1,194.4 cf = 0.027 af
Overall Storage Efficiency = 59.3%
Overall System Size = 52.28' x 11.00' x 3.50'

14 Chambers
74.5 cy Field
50.5 cy Stone



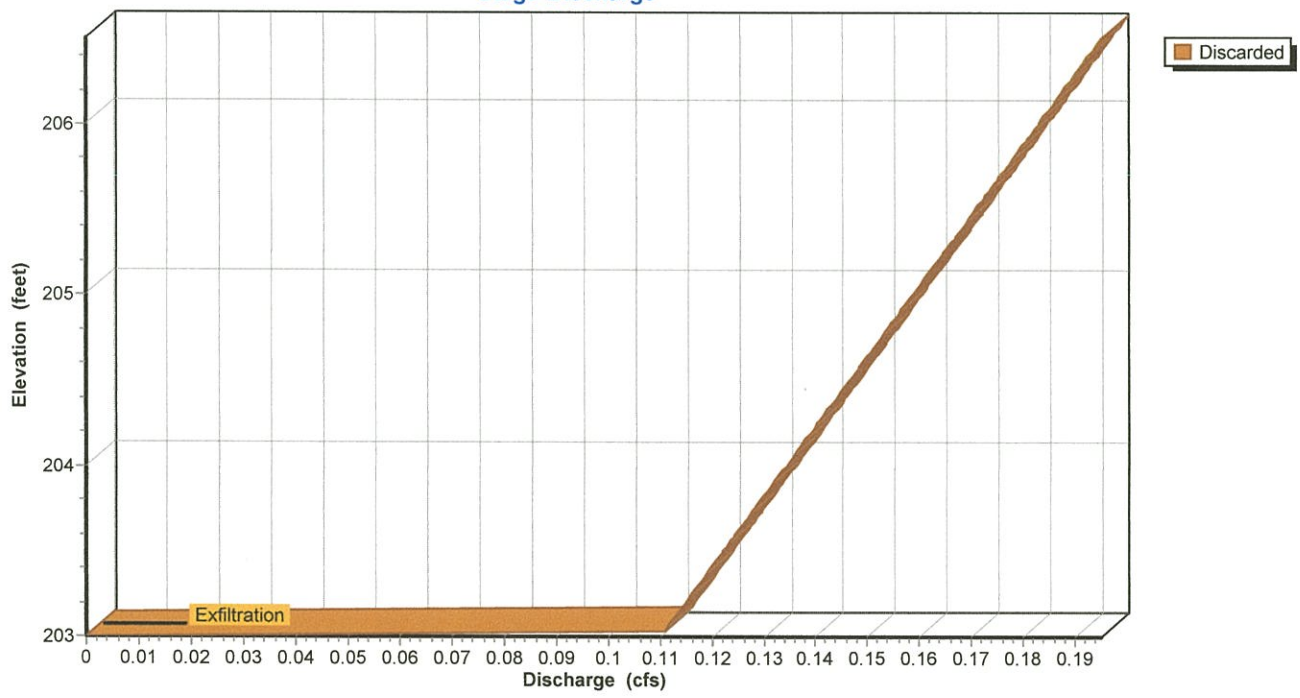
Pond 2P: ROOF DRAIN

Hydrograph

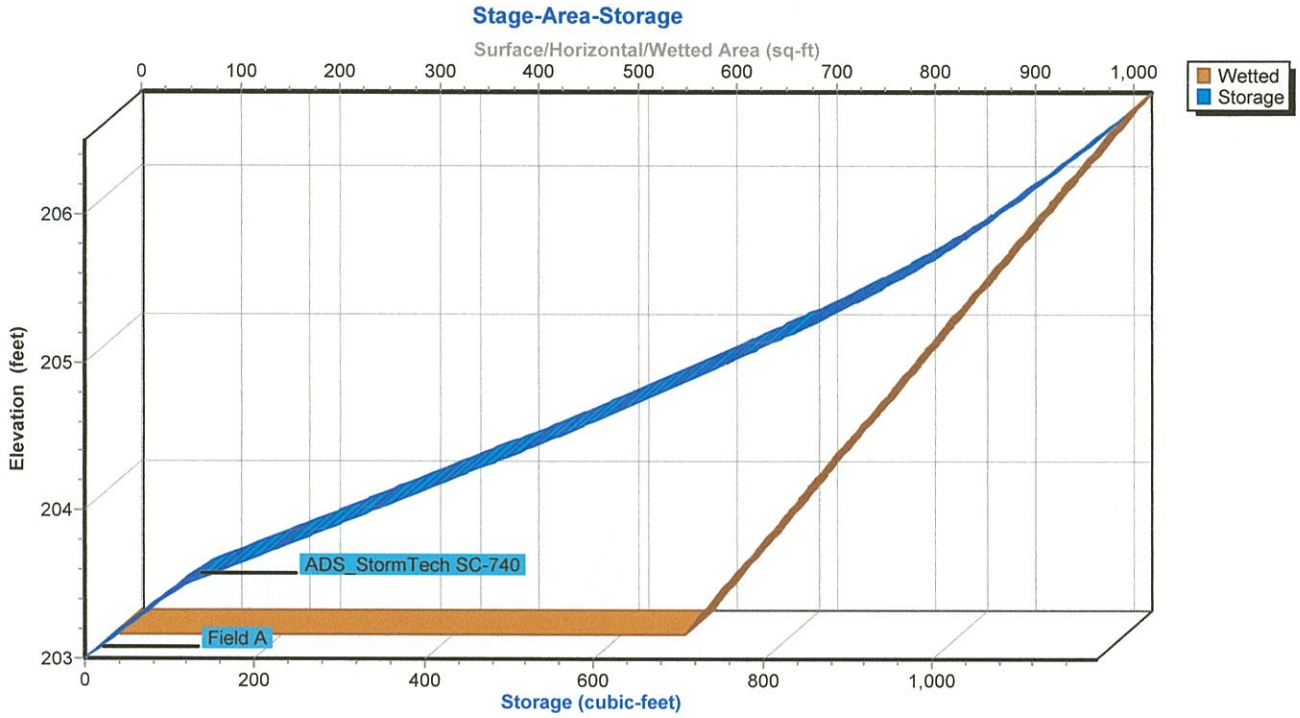


Pond 2P: ROOF DRAIN

Stage-Discharge



Pond 2P: ROOF DRAIN



Summary for Subcatchment PR-2: ROOF UNITS 2,4,5&6

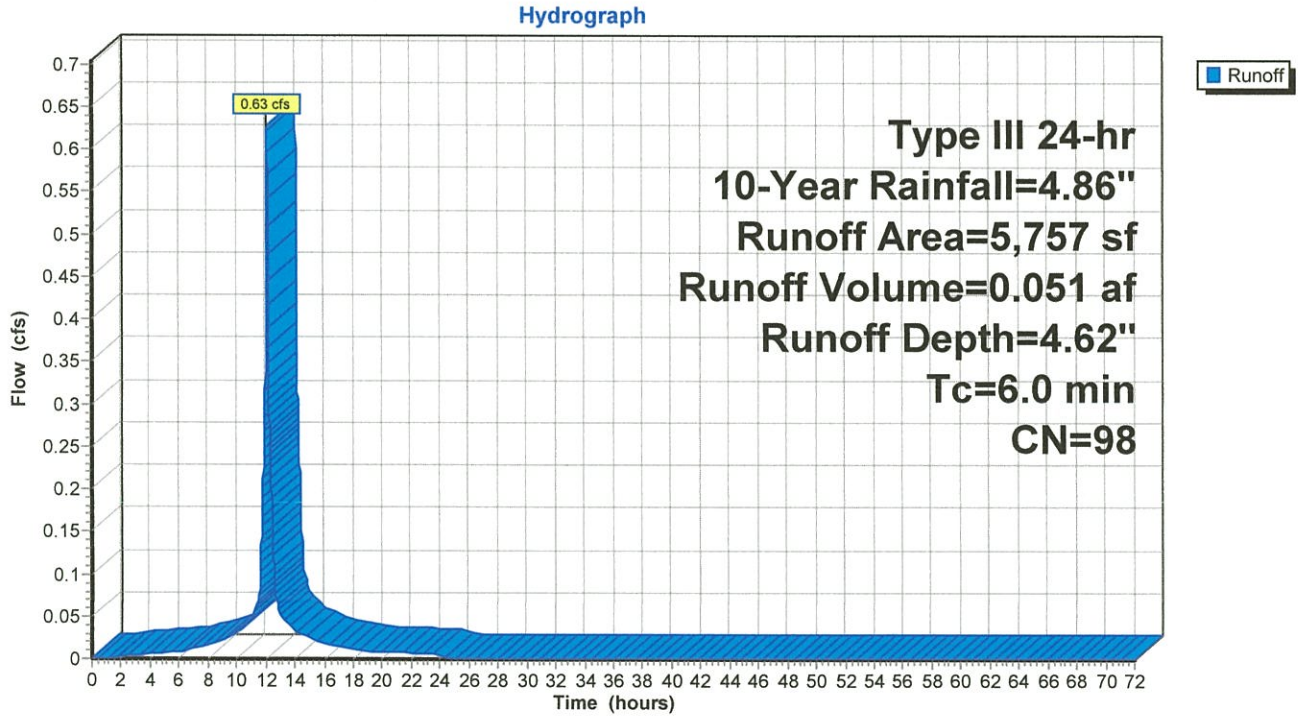
Runoff = 0.63 cfs @ 12.08 hrs, Volume= 0.051 af, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
*	5,757	98	
	5,757		100.00% Impervious Area

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

Subcatchment PR-2: ROOF UNITS 2,4,5&6



Summary for Pond 2P: ROOF DRAIN

Inflow Area = 0.132 ac,100.00% Impervious, Inflow Depth = 4.62" for 10-Year event
Inflow = 0.63 cfs @ 12.08 hrs, Volume= 0.051 af
Outflow = 0.14 cfs @ 12.48 hrs, Volume= 0.051 af, Atten= 77%, Lag= 23.6 min
Discarded = 0.14 cfs @ 12.48 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 204.35' @ 12.48 hrs Surf.Area= 575 sf Storage= 494 cf

Plug-Flow detention time= 18.3 min calculated for 0.051 af (100% of inflow)
Center-of-Mass det. time= 18.3 min (766.8 - 748.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	546 cf	**11.00'W x 52.28'L x 3.50'H Field A** 2,013 cf Overall - 649 cf Embedded = 1,364 cf x 40.0% Voids
#2A	203.50'	649 cf	**ADS_StormTech SC-740** x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,194 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.14 cfs @ 12.48 hrs HW=204.35' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Pond 2P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

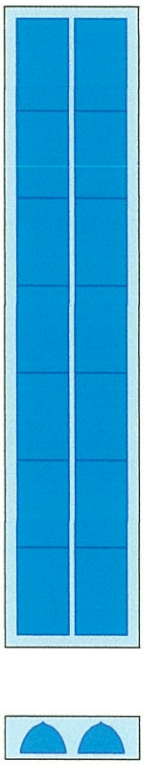
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 648.8 cf Chamber Storage

2,012.8 cf Field - 648.8 cf Chambers = 1,363.9 cf Stone x 40.0% Voids = 545.6 cf Stone Storage

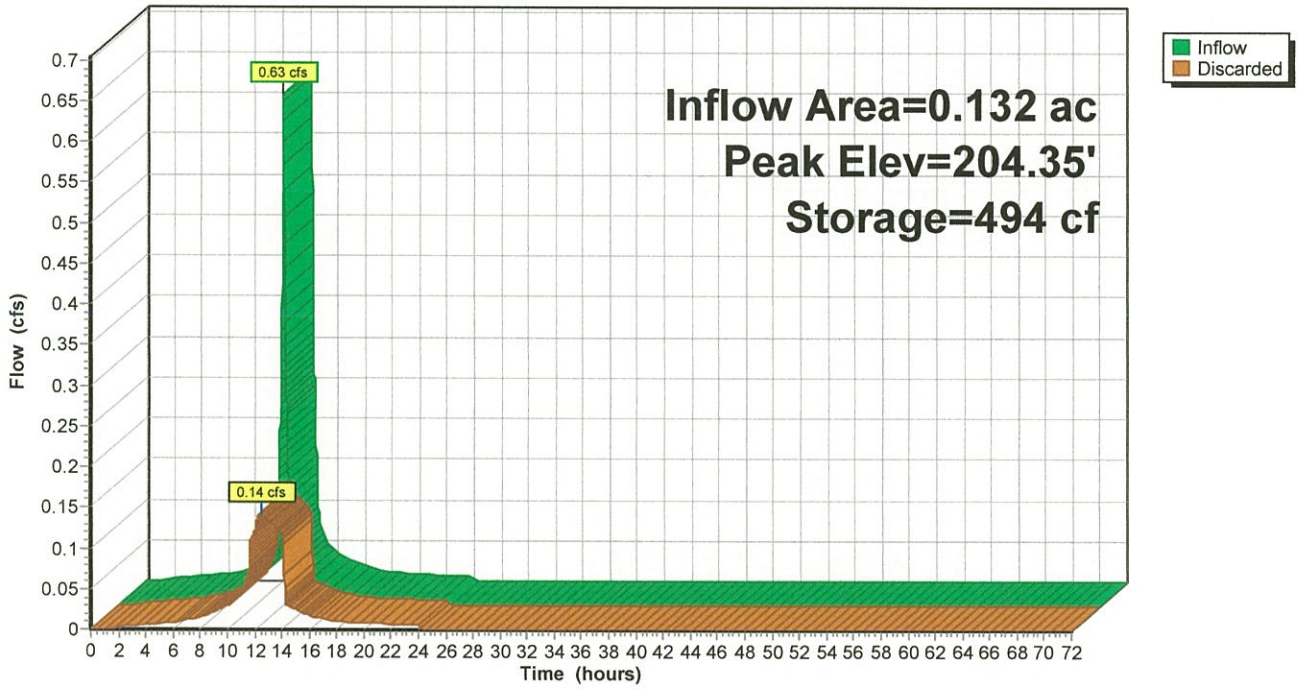
Chamber Storage + Stone Storage = 1,194.4 cf = 0.027 af
Overall Storage Efficiency = 59.3%
Overall System Size = 52.28' x 11.00' x 3.50'

14 Chambers
74.5 cy Field
50.5 cy Stone



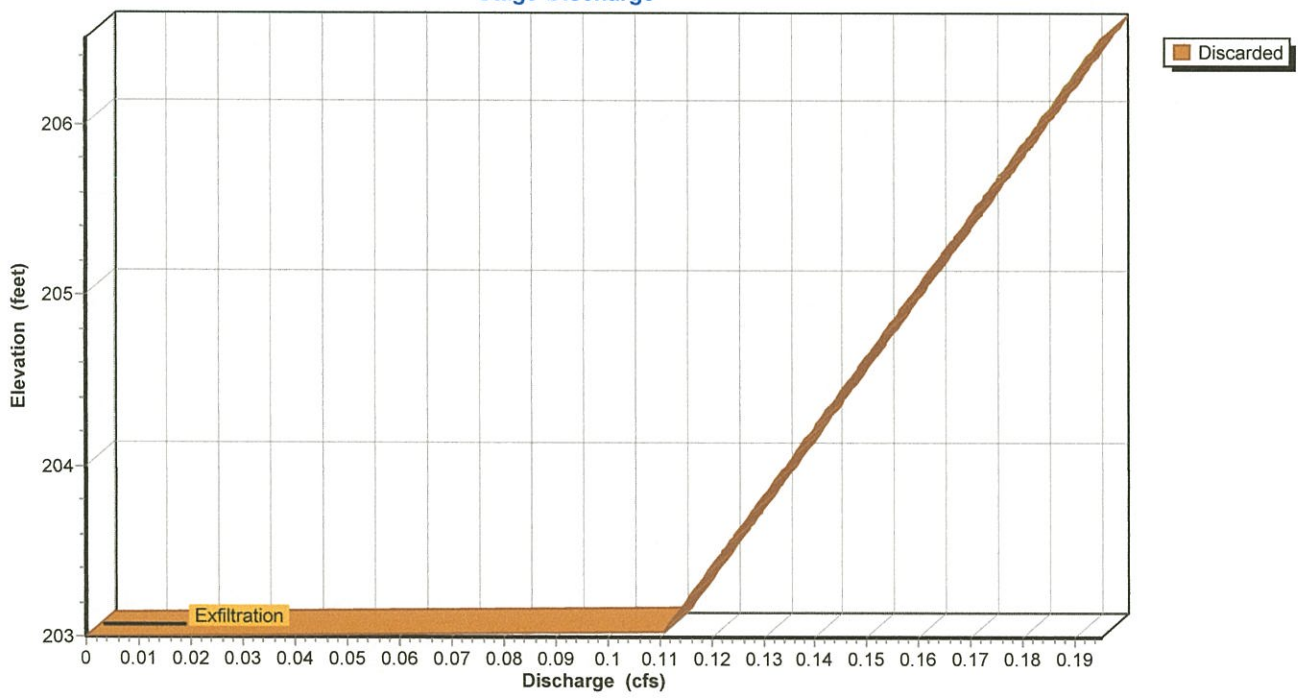
Pond 2P: ROOF DRAIN

Hydrograph

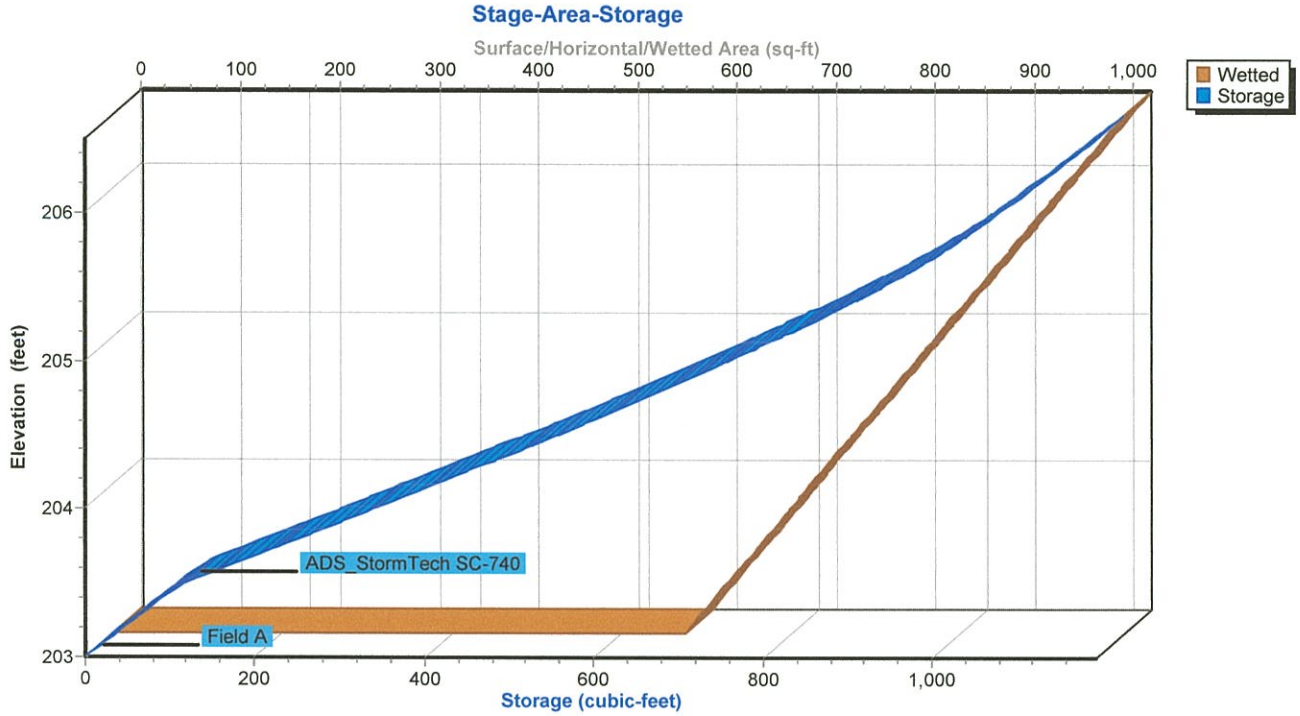


Pond 2P: ROOF DRAIN

Stage-Discharge



Pond 2P: ROOF DRAIN



Summary for Subcatchment PR-2: ROOF UNITS 2,4,5&6

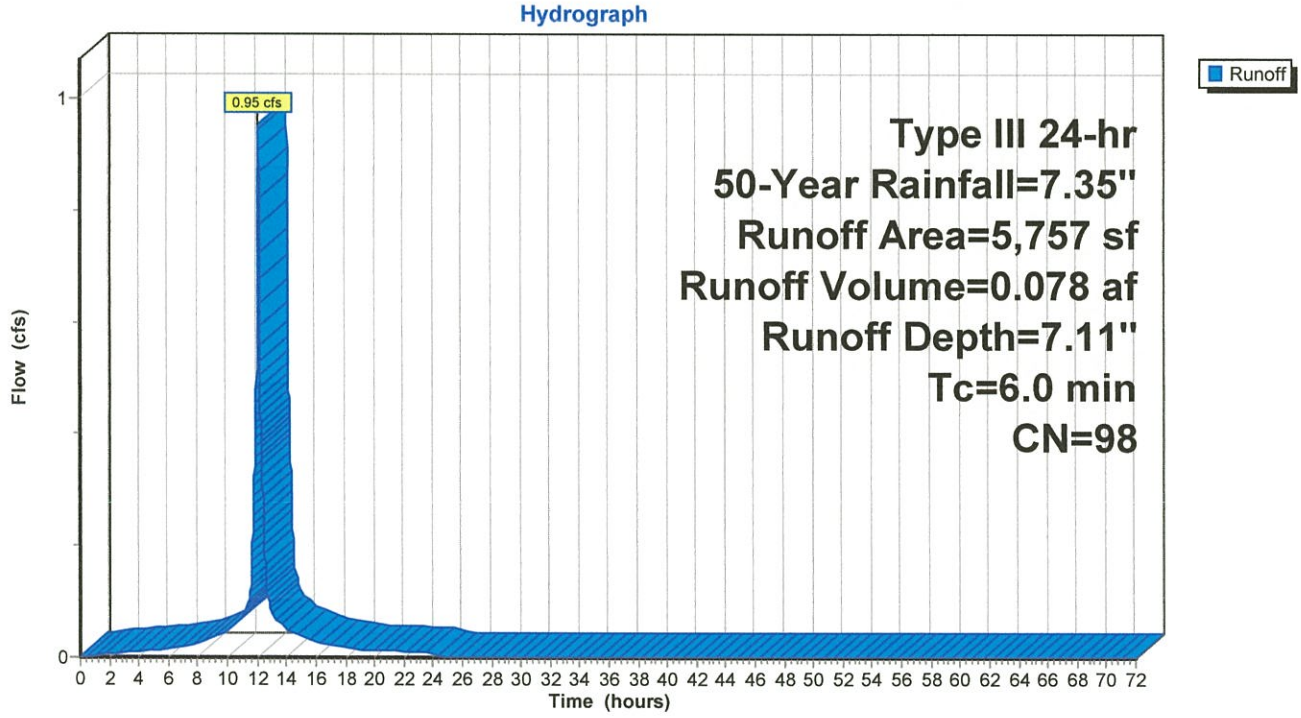
Runoff = 0.95 cfs @ 12.08 hrs, Volume= 0.078 af, Depth= 7.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 50-Year Rainfall=7.35"

	Area (sf)	CN	Description
*	5,757	98	
	5,757		100.00% Impervious Area

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

Subcatchment PR-2: ROOF UNITS 2,4,5&6



Summary for Pond 2P: ROOF DRAIN

Inflow Area = 0.132 ac,100.00% Impervious, Inflow Depth = 7.11" for 50-Year event
Inflow = 0.95 cfs @ 12.08 hrs, Volume= 0.078 af
Outflow = 0.17 cfs @ 12.53 hrs, Volume= 0.078 af, Atten= 82%, Lag= 26.9 min
Discarded = 0.17 cfs @ 12.53 hrs, Volume= 0.078 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 205.43' @ 12.53 hrs Surf.Area= 575 sf Storage= 918 cf

Plug-Flow detention time= 33.3 min calculated for 0.078 af (100% of inflow)
Center-of-Mass det. time= 33.3 min (775.6 - 742.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	546 cf	**11.00'W x 52.28'L x 3.50'H Field A** 2,013 cf Overall - 649 cf Embedded = 1,364 cf x 40.0% Voids
#2A	203.50'	649 cf	**ADS_StormTech SC-740** x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,194 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.17 cfs @ 12.53 hrs HW=205.43' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Pond 2P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

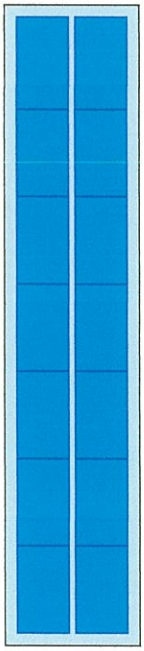
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 648.8 cf Chamber Storage

2,012.8 cf Field - 648.8 cf Chambers = 1,363.9 cf Stone x 40.0% Voids = 545.6 cf Stone Storage

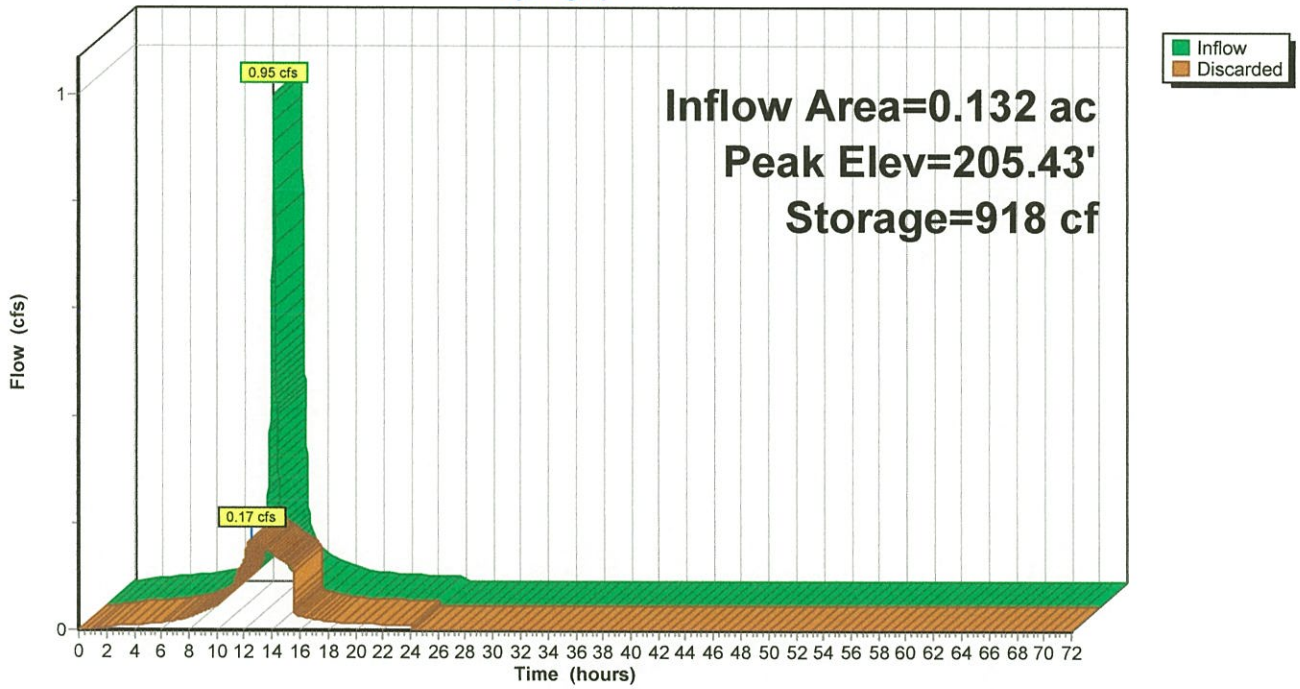
Chamber Storage + Stone Storage = 1,194.4 cf = 0.027 af
Overall Storage Efficiency = 59.3%
Overall System Size = 52.28' x 11.00' x 3.50'

14 Chambers
74.5 cy Field
50.5 cy Stone



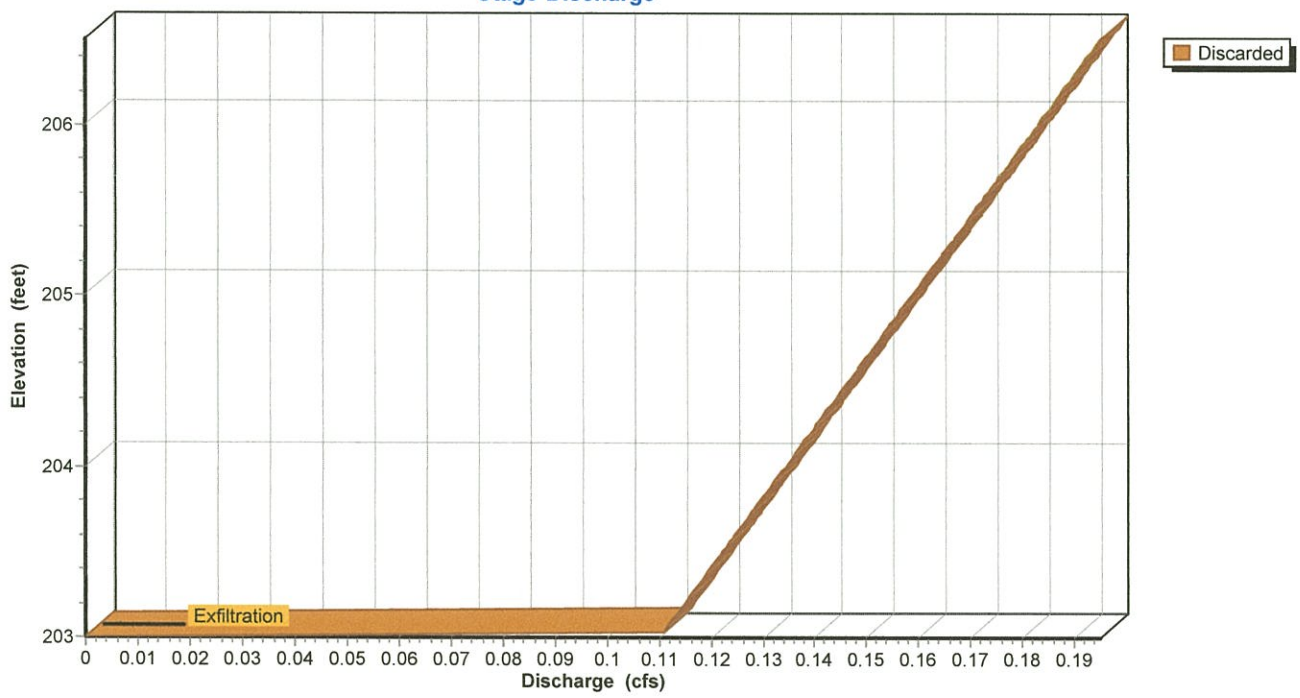
Pond 2P: ROOF DRAIN

Hydrograph

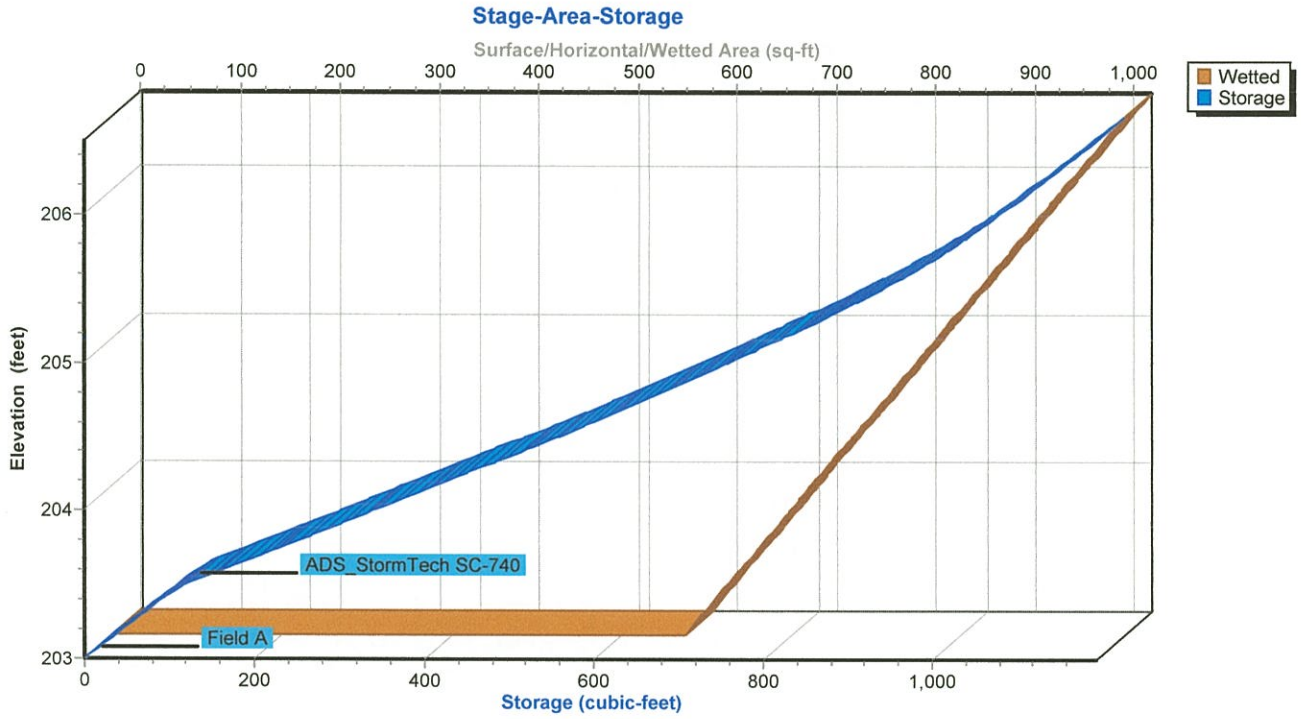


Pond 2P: ROOF DRAIN

Stage-Discharge



Pond 2P: ROOF DRAIN



Summary for Subcatchment PR-2: ROOF UNITS 2,4,5&6

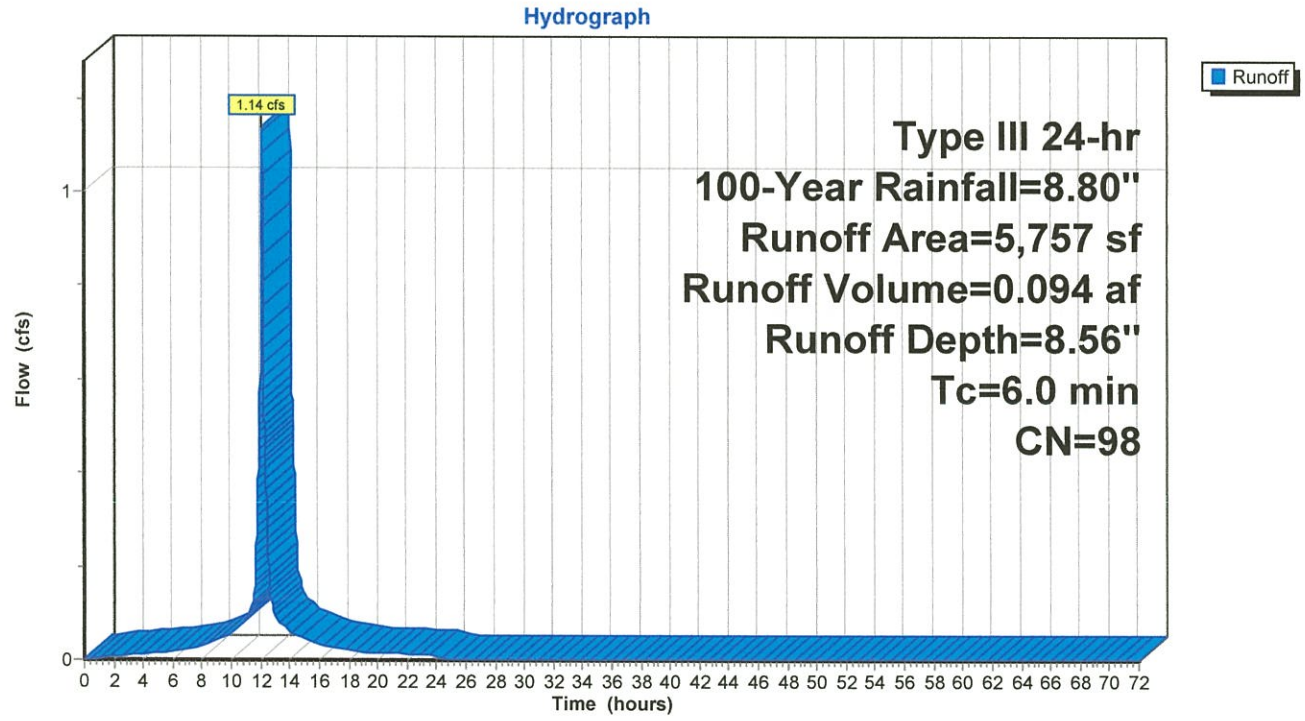
Runoff = 1.14 cfs @ 12.08 hrs, Volume= 0.094 af, Depth= 8.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
*	5,757	98	
	5,757		100.00% Impervious Area

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

Subcatchment PR-2: ROOF UNITS 2,4,5&6



Summary for Pond 2P: ROOF DRAIN

Inflow Area = 0.132 ac,100.00% Impervious, Inflow Depth = 8.56" for 100-Year event
Inflow = 1.14 cfs @ 12.08 hrs, Volume= 0.094 af
Outflow = 0.19 cfs @ 12.54 hrs, Volume= 0.094 af, Atten= 83%, Lag= 27.5 min
Discarded = 0.19 cfs @ 12.54 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 206.40' @ 12.54 hrs Surf.Area= 575 sf Storage= 1,171 cf

Plug-Flow detention time= 41.0 min calculated for 0.094 af (100% of inflow)
Center-of-Mass det. time= 41.0 min (781.1 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	203.00'	546 cf	**11.00'W x 52.28'L x 3.50'H Field A** 2,013 cf Overall - 649 cf Embedded = 1,364 cf x 40.0% Voids
#2A	203.50'	649 cf	**ADS_StormTech SC-740** x 14 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 2 rows
		1,194 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	203.00'	**8.270 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.19 cfs @ 12.54 hrs HW=206.40' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.19 cfs)

Pond 2P: ROOF DRAIN - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 2 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

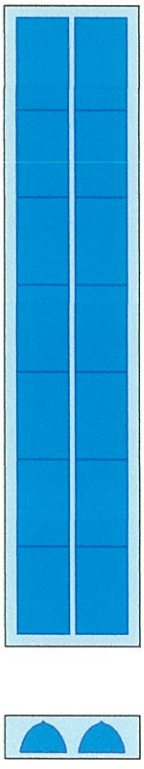
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

14 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 2 Rows = 648.8 cf Chamber Storage

2,012.8 cf Field - 648.8 cf Chambers = 1,363.9 cf Stone x 40.0% Voids = 545.6 cf Stone Storage

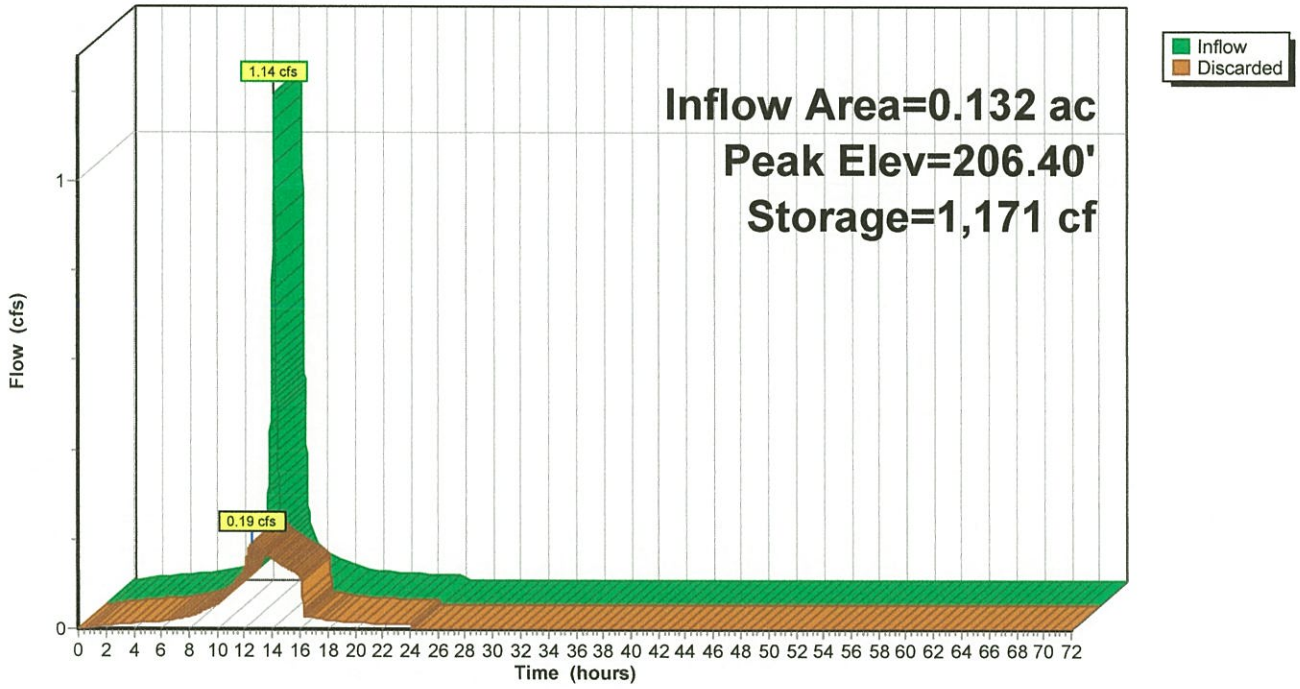
Chamber Storage + Stone Storage = 1,194.4 cf = 0.027 af
Overall Storage Efficiency = 59.3%
Overall System Size = 52.28' x 11.00' x 3.50'

14 Chambers
74.5 cy Field
50.5 cy Stone



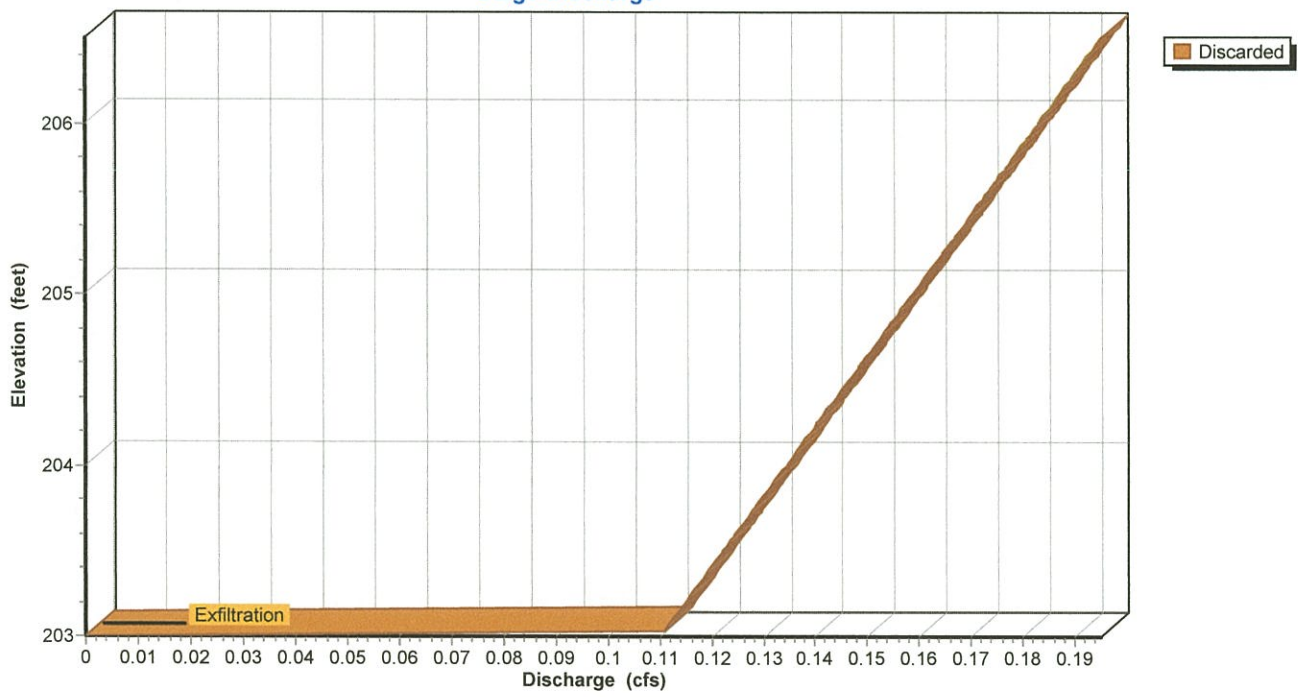
Pond 2P: ROOF DRAIN

Hydrograph

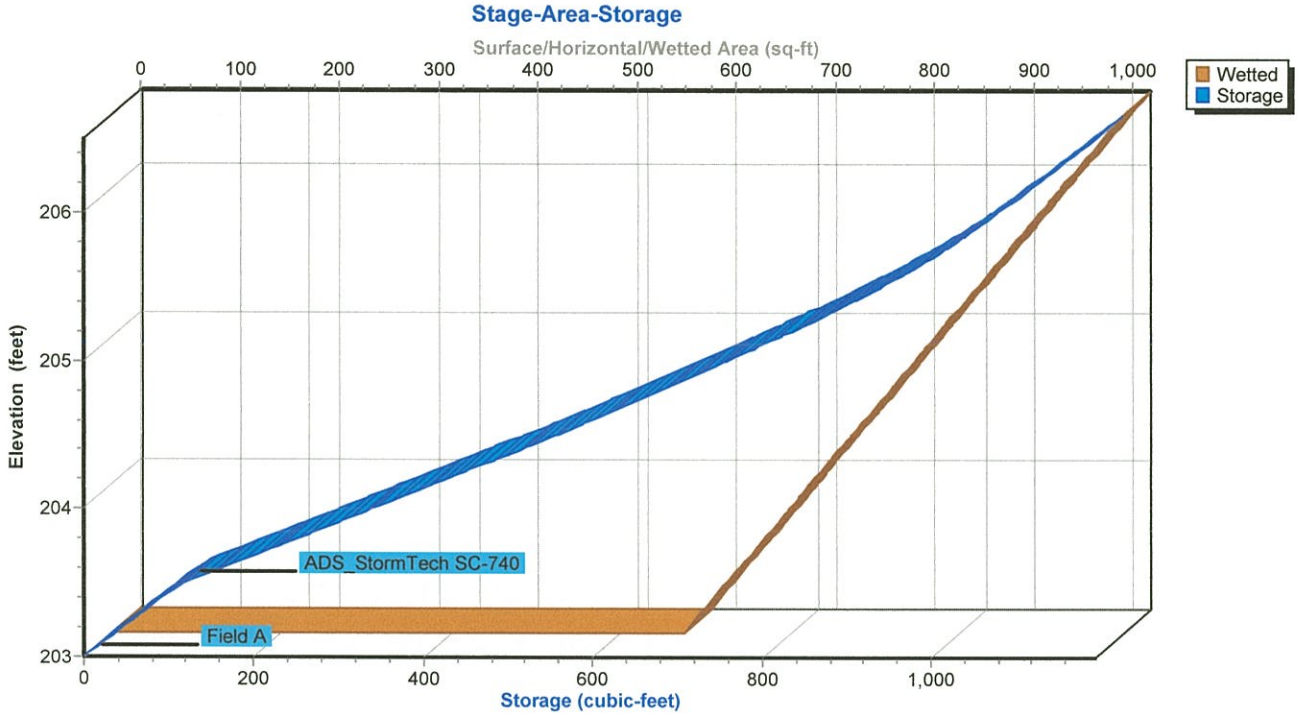


Pond 2P: ROOF DRAIN

Stage-Discharge



Pond 2P: ROOF DRAIN



Kenneth Barron <ken@ksbarron.com> 8/31/2019 5:41 PM

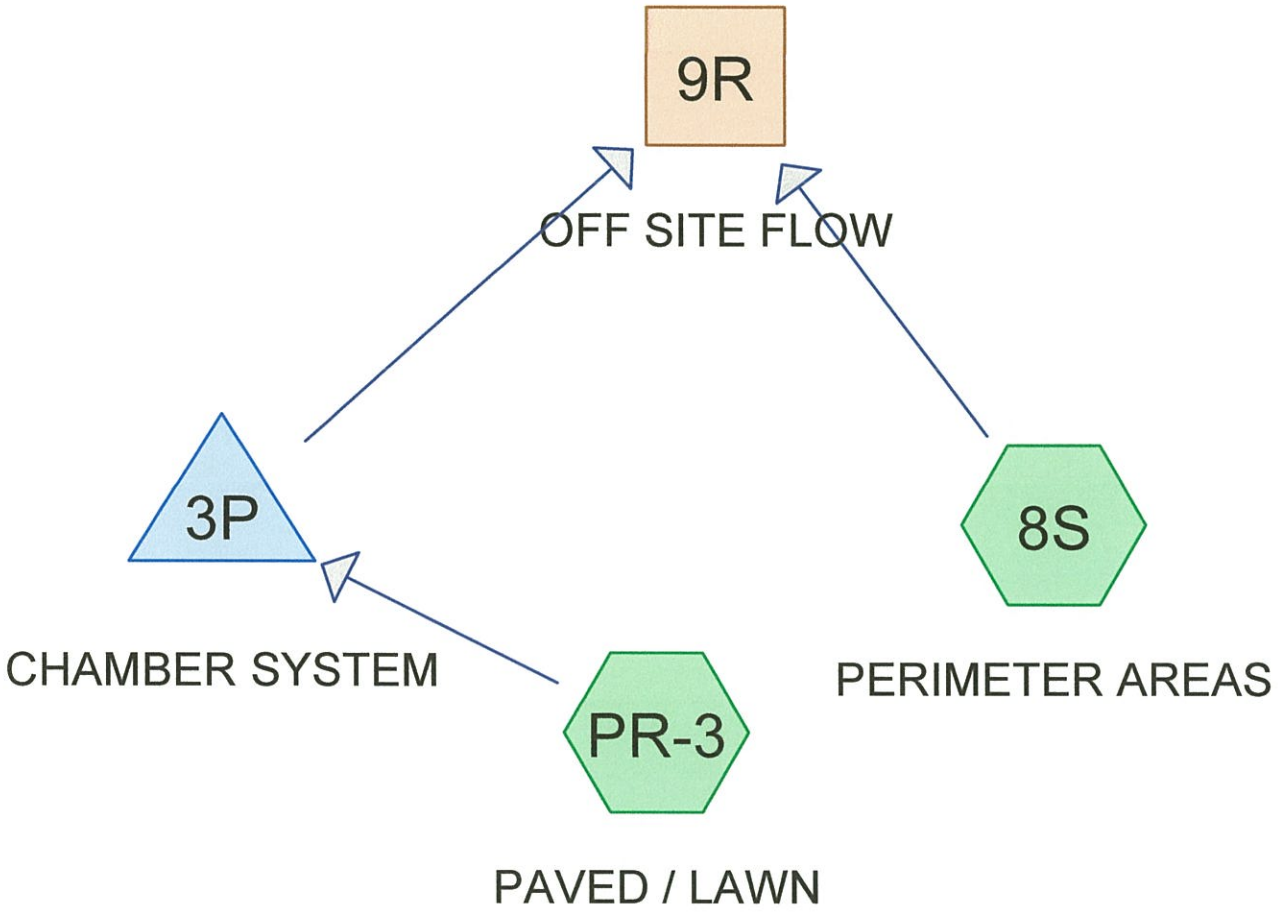
Re: Concord Clinic 56 Winthrop Street Concord MA

To Ronald TIBERI <rtib@comcast.net>

Better is we do a second visit. Need need to manage The Drs expectation or he will have a heart attack

On Aug 31, 2019, at 3:47 PM, Ronald TIBERI < rtib@comcast.net> wrote:

> Will have HVAC cost next week, framing cost may prompt a second visit, or we do a T&M
> Ron
>
> > On August 31, 2019 at 9:13 AM Kenneth Barron < ken@ksbarron.com> wrote:
> >
> > Ron:
> >
> > Now that the summer is over, the cool fall temperatures are almost upon us. I wanted to check in with you from our last rendezvous. Want to stay on top of this as it would be great to get this project undertaken in Sept/Oct.
> >
> > Enjoy your weekend. Look forward to hearing from you.
> >
> > Kenneth S Barron
> > +1.617.212.0559 mobile
> > ken@ksbarron.com



Subcat Reach Pond Link

Routing Diagram for P2088-rich SEPT 2019
Prepared by Hewlett-Packard Company, Printed 9/2/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.375	61	>75% Grass cover, Good, HSG B (8S, PR-3)
0.026	98	Patios, HSG B (8S, PR-3)
0.155	98	Paved parking, HSG B (PR-3)
0.665	66	Woods, Poor, HSG B (8S)

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.221	HSG B	8S, PR-3
0.000	HSG C	
0.000	HSG D	
0.000	Other	

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.375	0.000	0.000	0.000	0.375	>75% Grass cover, Good	8S, PR-3
0.000	0.026	0.000	0.000	0.000	0.026	Patios	8S, PR-3
0.000	0.155	0.000	0.000	0.000	0.155	Paved parking	PR-3
0.000	0.665	0.000	0.000	0.000	0.665	Woods, Poor	8S

Summary for Subcatchment 8S: PERIMETER AREAS

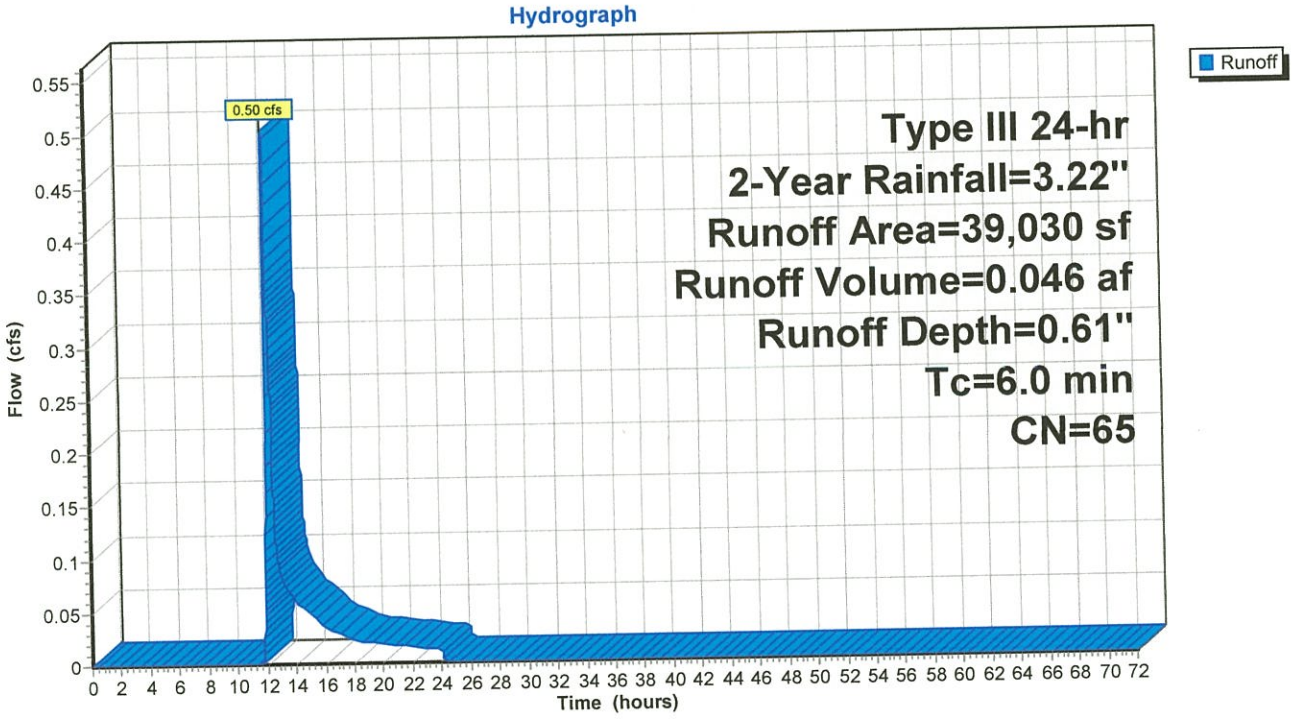
Runoff = 0.50 cfs @ 12.11 hrs, Volume= 0.046 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
	28,971	66	Woods, Poor, HSG B
	9,419	61	>75% Grass cover, Good, HSG B
*	640	98	Patios, HSG B
	39,030	65	Weighted Average
	38,390		98.36% Pervious Area
	640		1.64% Impervious Area

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

Subcatchment 8S: PERIMETER AREAS



Summary for Subcatchment PR-3: PAVED / LAWN

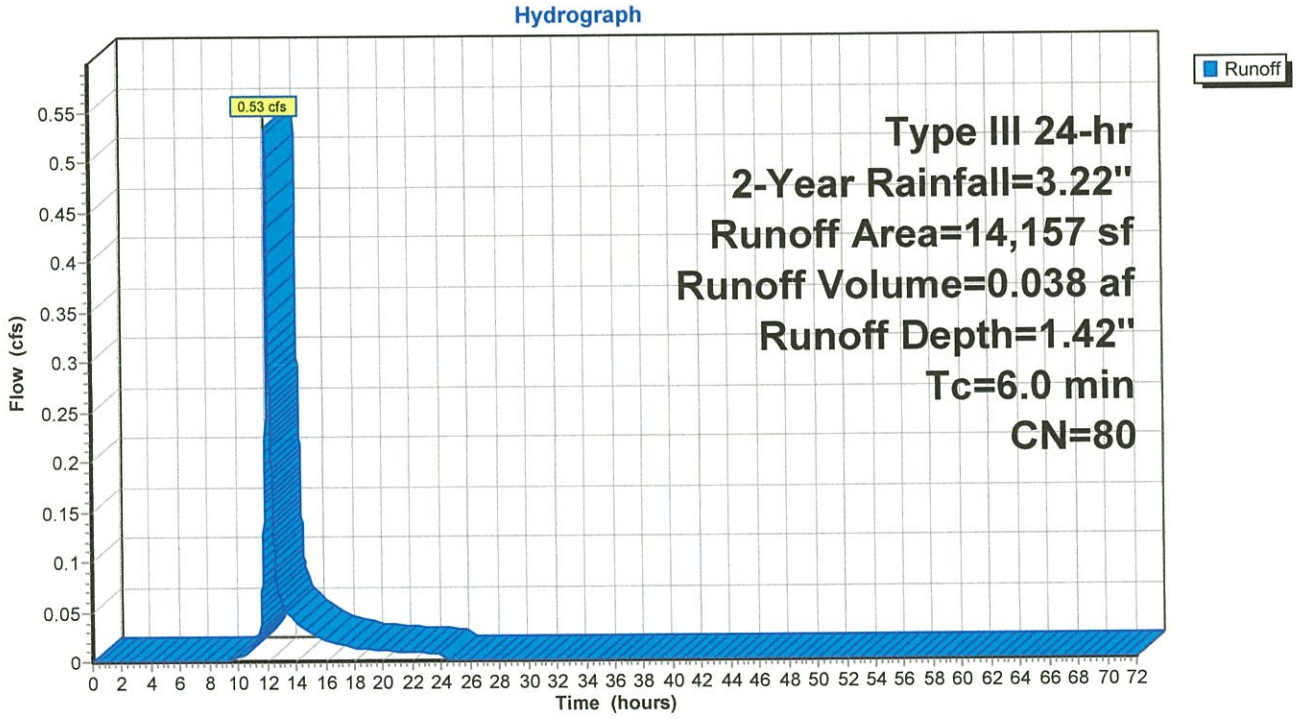
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.22"

	Area (sf)	CN	Description
	6,765	98	Paved parking, HSG B
	6,912	61	>75% Grass cover, Good, HSG B
*	480	98	Patios, HSG B
	14,157	80	Weighted Average
	6,912		48.82% Pervious Area
	7,245		51.18% Impervious Area

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

Subcatchment PR-3: PAVED / LAWN

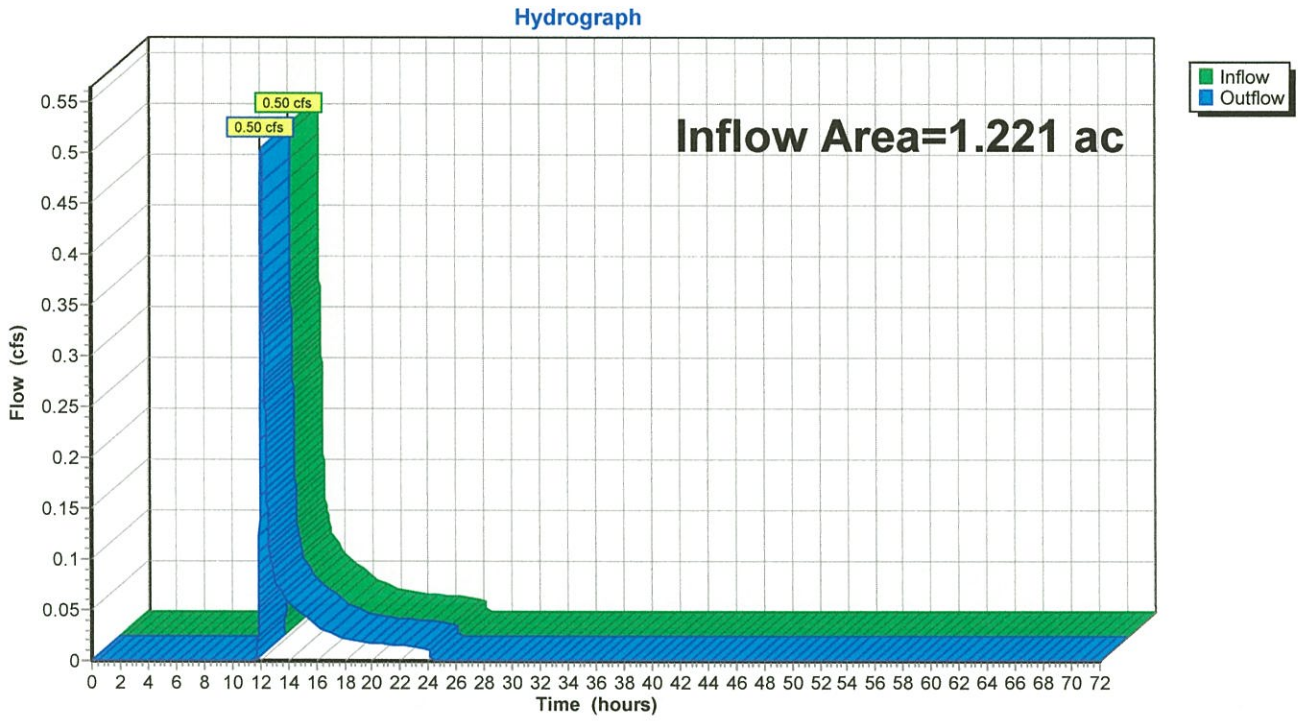


Summary for Reach 9R: OFF SITE FLOW

Inflow Area = 1.221 ac, 14.83% Impervious, Inflow Depth = 0.45" for 2-Year event
Inflow = 0.50 cfs @ 12.11 hrs, Volume= 0.046 af
Outflow = 0.50 cfs @ 12.11 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: OFF SITE FLOW



Summary for Pond 3P: CHAMBER SYSTEM

Inflow Area = 0.325 ac, 51.18% Impervious, Inflow Depth = 1.42" for 2-Year event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.038 af
Outflow = 0.06 cfs @ 13.05 hrs, Volume= 0.038 af, Atten= 90%, Lag= 57.5 min
Discarded = 0.06 cfs @ 13.05 hrs, Volume= 0.038 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 199.20' @ 13.05 hrs Surf.Area= 823 sf Storage= 625 cf

Plug-Flow detention time= 103.7 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 103.7 min (946.1 - 842.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.00'	763 cf	**15.75'W x 52.28'L x 3.50'H Field A** 2,882 cf Overall - 973 cf Embedded = 1,909 cf x 40.0% Voids
#2A	198.50'	973 cf	**ADS_StormTech SC-740** x 21 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 3 rows
		1,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	200.00'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.06 cfs @ 13.05 hrs HW=199.20' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=198.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: CHAMBER SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

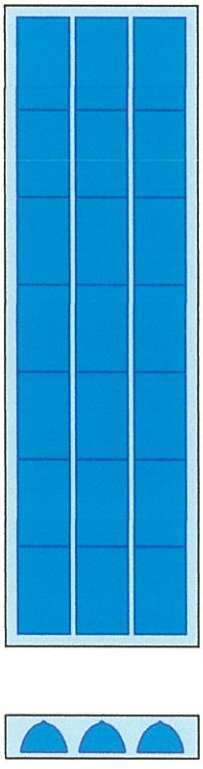
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

21 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 973.3 cf Chamber Storage

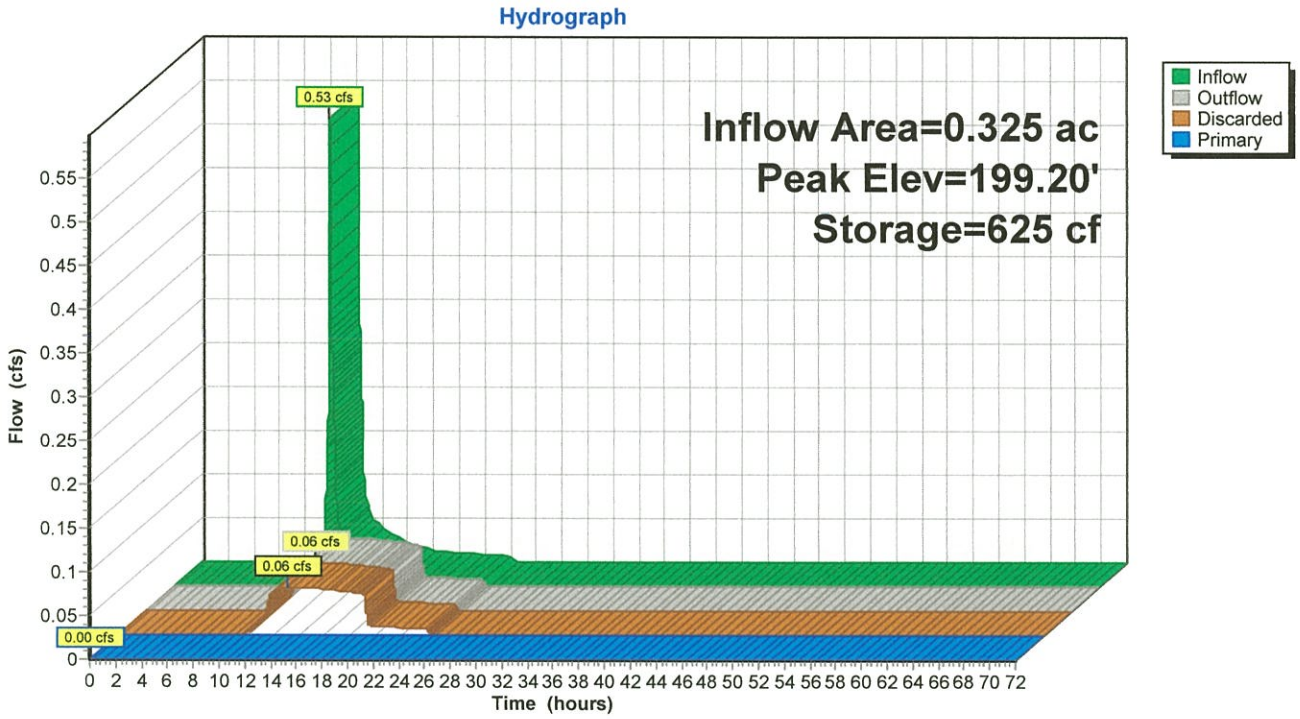
2,881.9 cf Field - 973.3 cf Chambers = 1,908.7 cf Stone x 40.0% Voids = 763.5 cf Stone Storage

Chamber Storage + Stone Storage = 1,736.7 cf = 0.040 af
Overall Storage Efficiency = 60.3%
Overall System Size = 52.28' x 15.75' x 3.50'

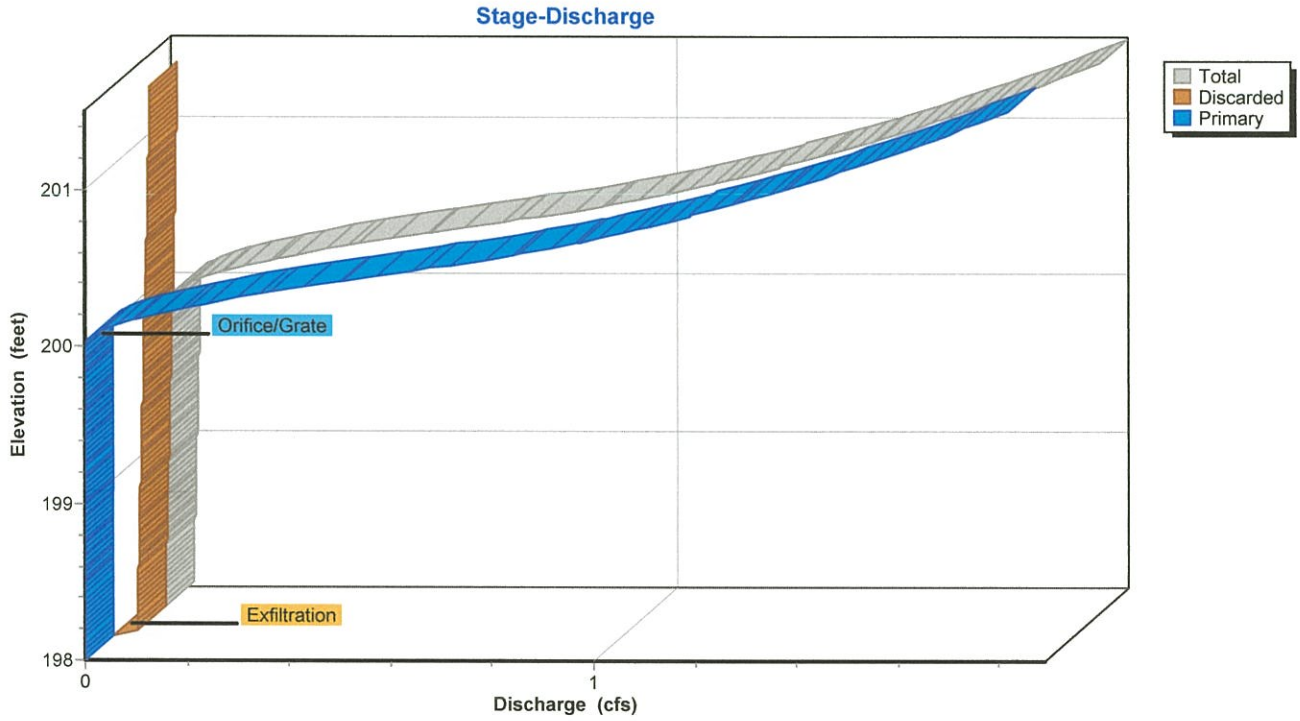
21 Chambers
106.7 cy Field
70.7 cy Stone



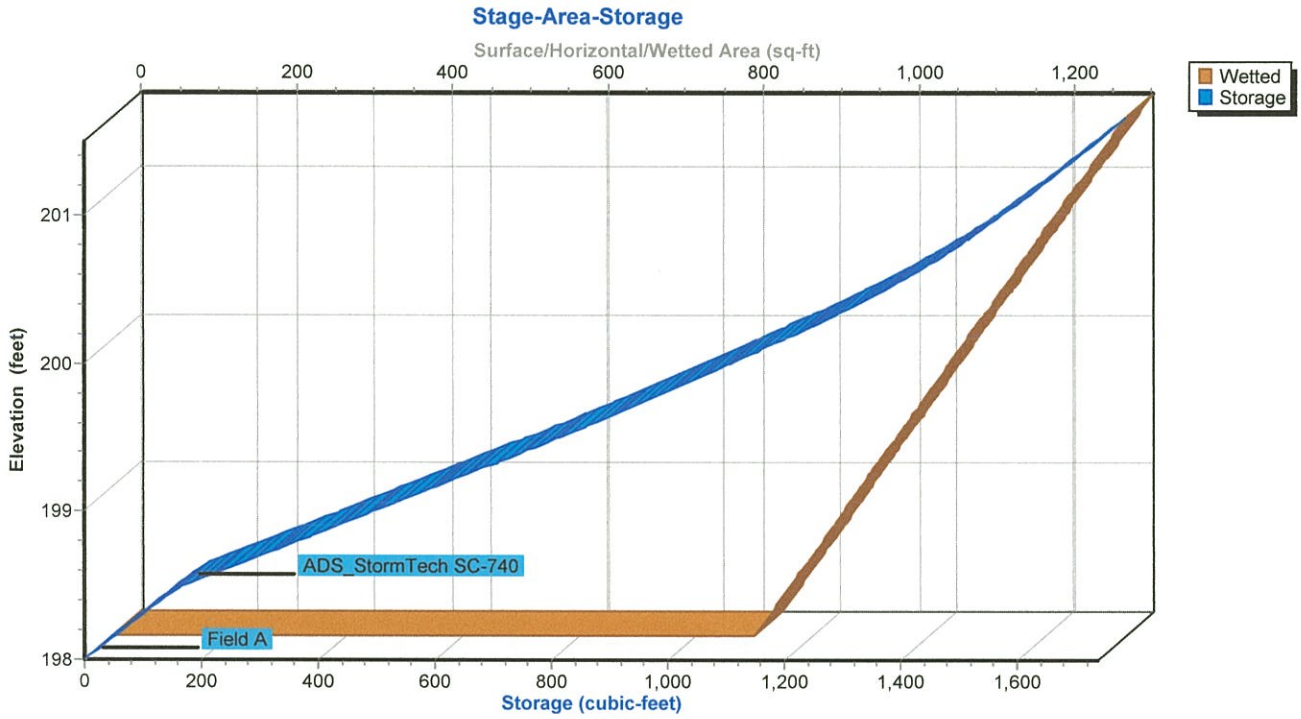
Pond 3P: CHAMBER SYSTEM



Pond 3P: CHAMBER SYSTEM



Pond 3P: CHAMBER SYSTEM



Summary for Subcatchment 8S: PERIMETER AREAS

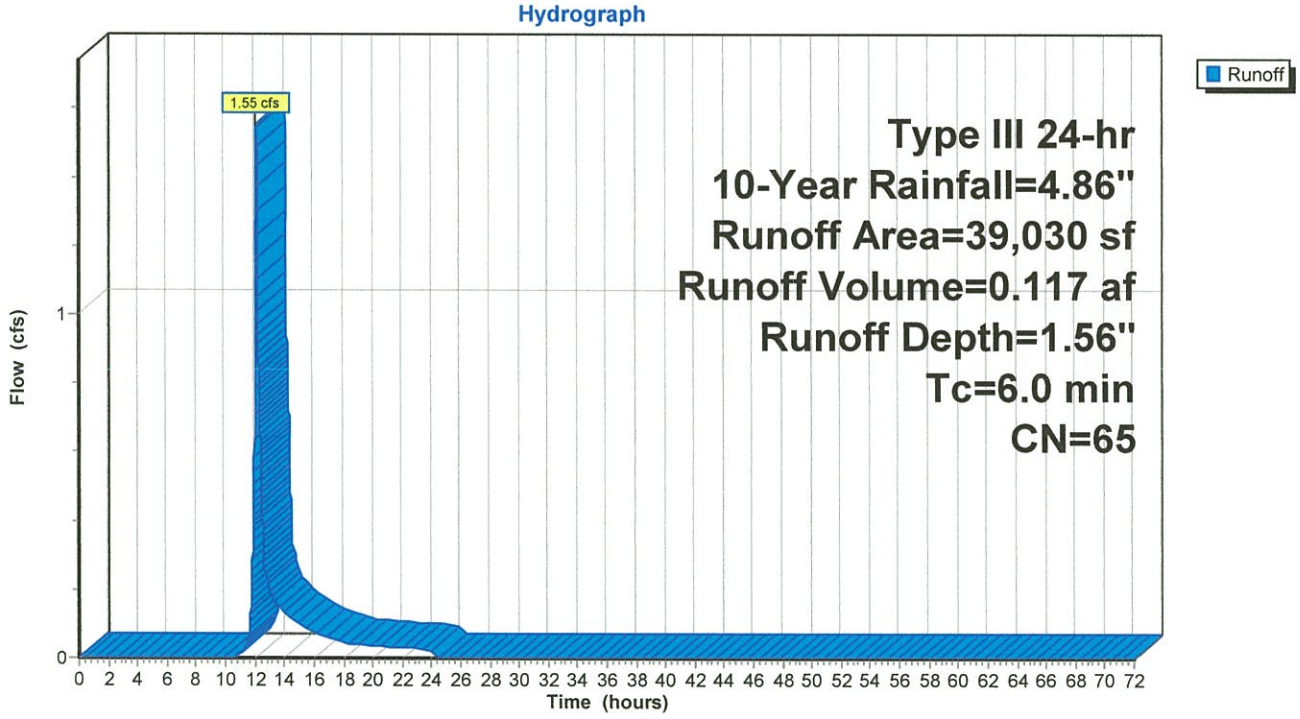
Runoff = 1.55 cfs @ 12.10 hrs, Volume= 0.117 af, Depth= 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	28,971	66	Woods, Poor, HSG B
	9,419	61	>75% Grass cover, Good, HSG B
*	640	98	Patios, HSG B
	39,030	65	Weighted Average
	38,390		98.36% Pervious Area
	640		1.64% Impervious Area

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

Subcatchment 8S: PERIMETER AREAS



Summary for Subcatchment PR-3: PAVED / LAWN

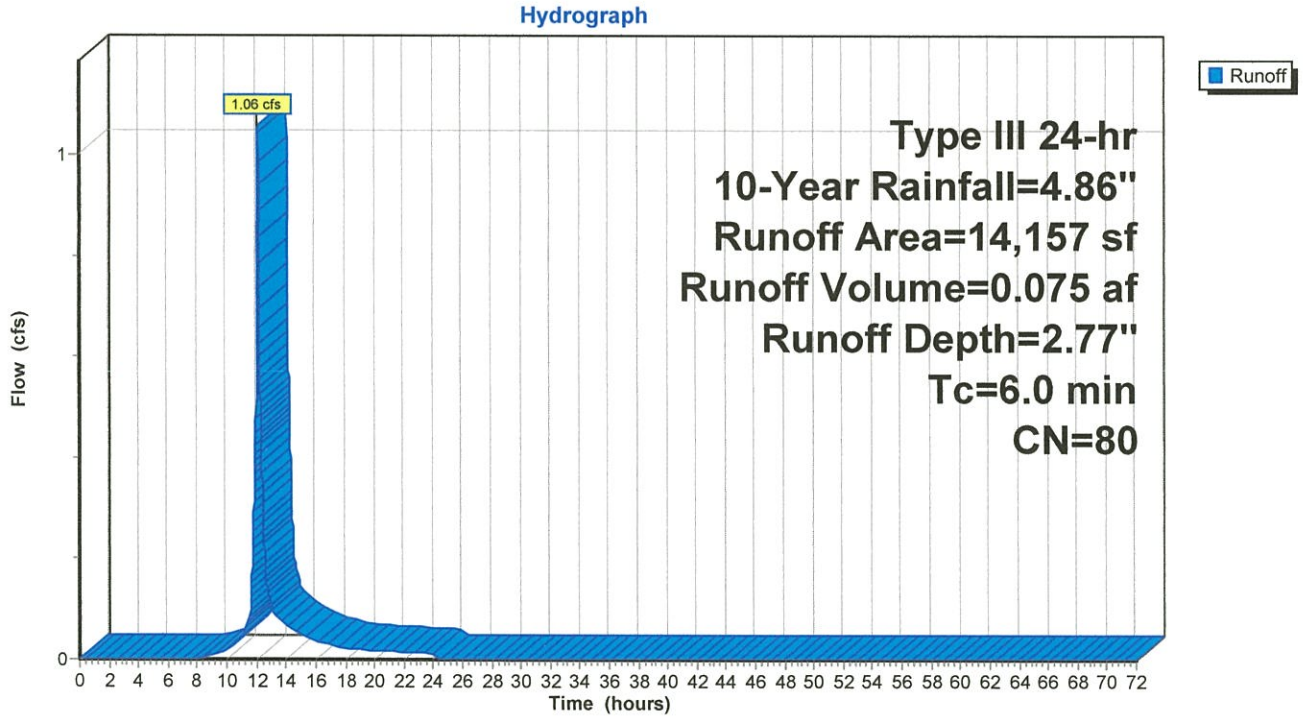
Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	6,765	98	Paved parking, HSG B
	6,912	61	>75% Grass cover, Good, HSG B
*	480	98	Patios, HSG B
	14,157	80	Weighted Average
	6,912		48.82% Pervious Area
	7,245		51.18% Impervious Area

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

Subcatchment PR-3: PAVED / LAWN

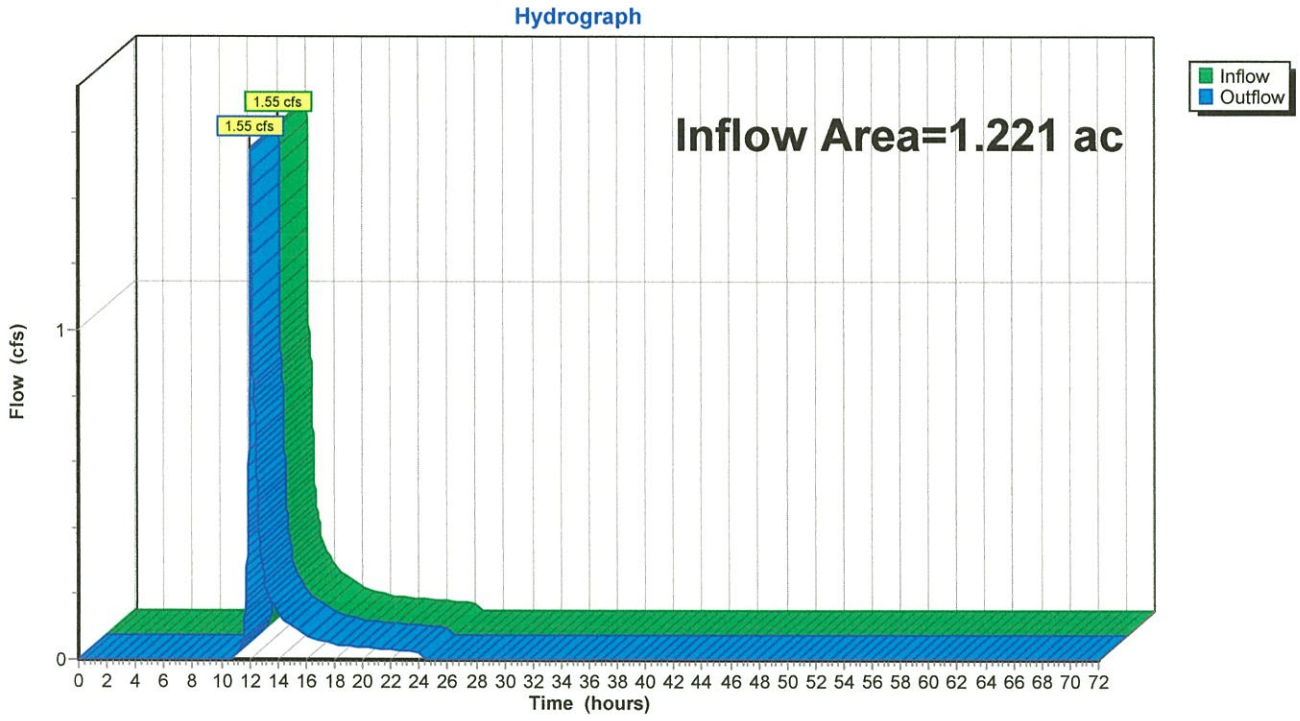


Summary for Reach 9R: OFF SITE FLOW

Inflow Area = 1.221 ac, 14.83% Impervious, Inflow Depth = 1.24" for 10-Year event
Inflow = 1.55 cfs @ 12.10 hrs, Volume= 0.127 af
Outflow = 1.55 cfs @ 12.10 hrs, Volume= 0.127 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: OFF SITE FLOW



Summary for Pond 3P: CHAMBER SYSTEM

Inflow Area = 0.325 ac, 51.18% Impervious, Inflow Depth = 2.77" for 10-Year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 0.27 cfs @ 12.49 hrs, Volume= 0.075 af, Atten= 75%, Lag= 23.8 min
Discarded = 0.06 cfs @ 12.49 hrs, Volume= 0.065 af
Primary = 0.20 cfs @ 12.49 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 200.25' @ 12.49 hrs Surf.Area= 823 sf Storage= 1,243 cf

Plug-Flow detention time= 166.9 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 166.9 min (989.9 - 823.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.00'	763 cf	**15.75'W x 52.28'L x 3.50'H Field A** 2,882 cf Overall - 973 cf Embedded = 1,909 cf x 40.0% Voids
#2A	198.50'	973 cf	**ADS_StormTech SC-740** x 21 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 3 rows
		1,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	200.00'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.06 cfs @ 12.49 hrs HW=200.25' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.20 cfs @ 12.49 hrs HW=200.25' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 1.70 fps)

Pond 3P: CHAMBER SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

21 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 973.3 cf Chamber Storage

2,881.9 cf Field - 973.3 cf Chambers = 1,908.7 cf Stone x 40.0% Voids = 763.5 cf Stone Storage

Chamber Storage + Stone Storage = 1,736.7 cf = 0.040 af
Overall Storage Efficiency = 60.3%
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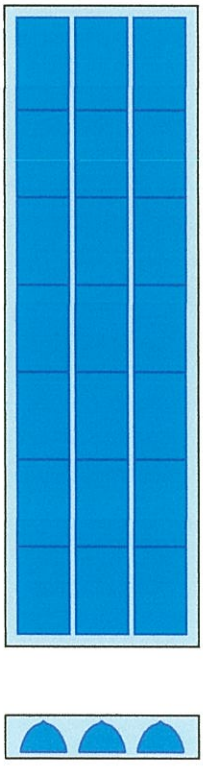
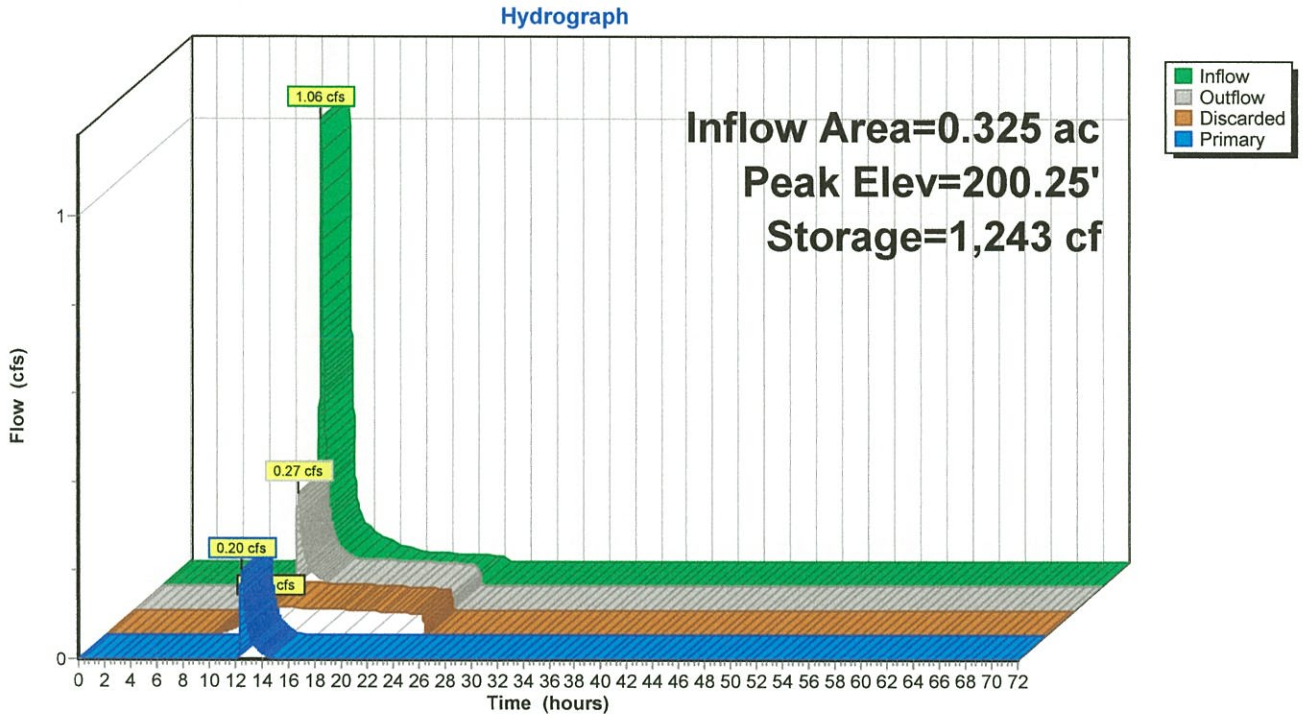
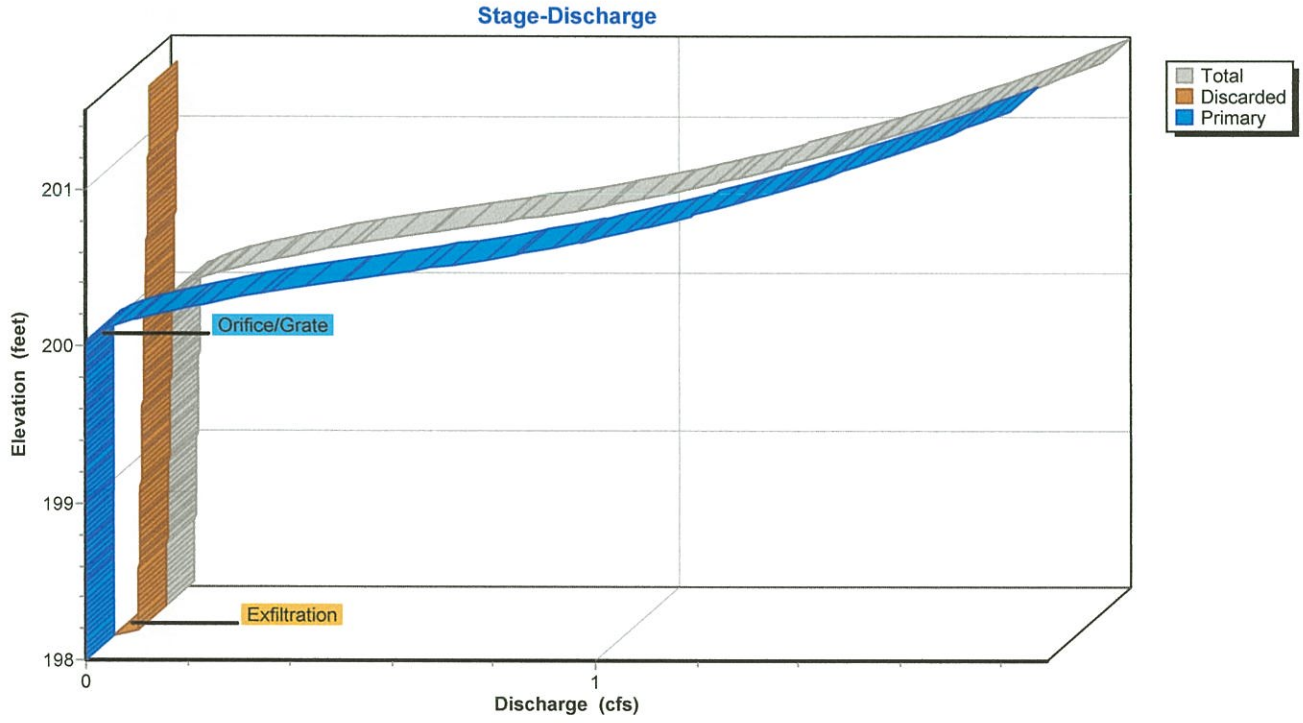
21 Chambers
106.7 cy Field
70.7 cy Stone



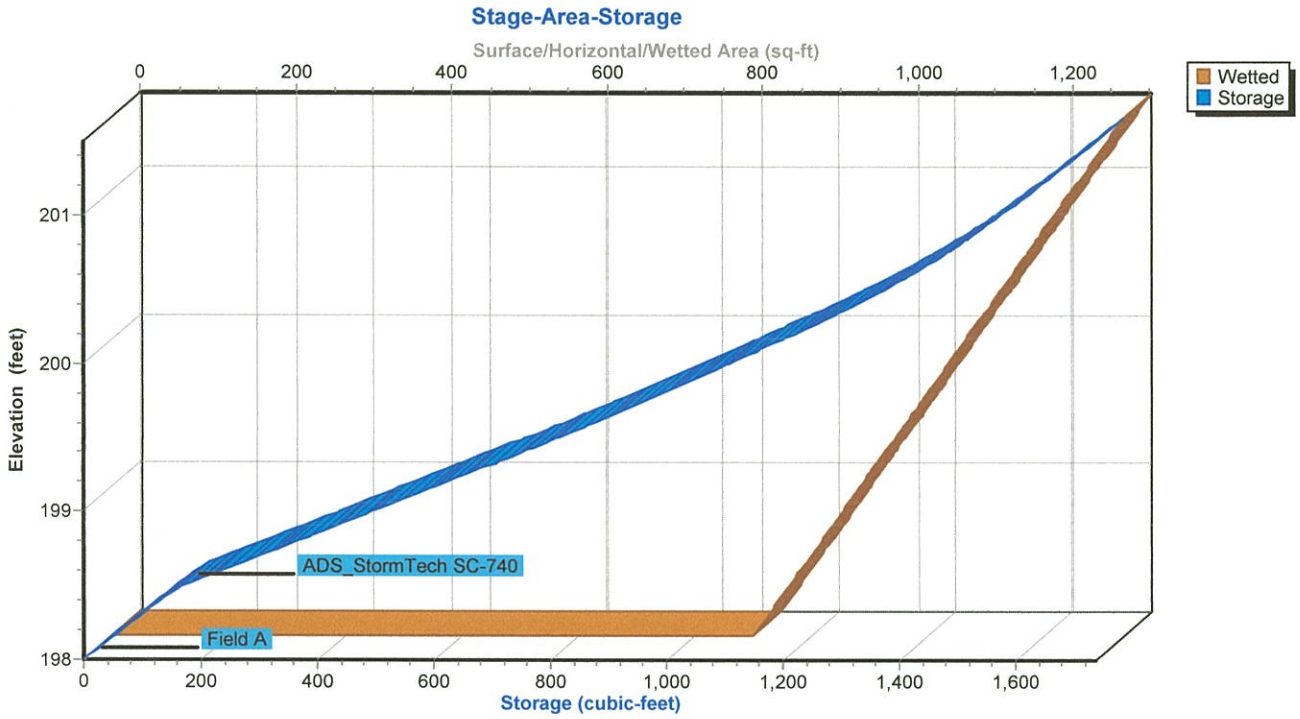
Pond 3P: CHAMBER SYSTEM



Pond 3P: CHAMBER SYSTEM



Pond 3P: CHAMBER SYSTEM



Summary for Subcatchment 8S: PERIMETER AREAS

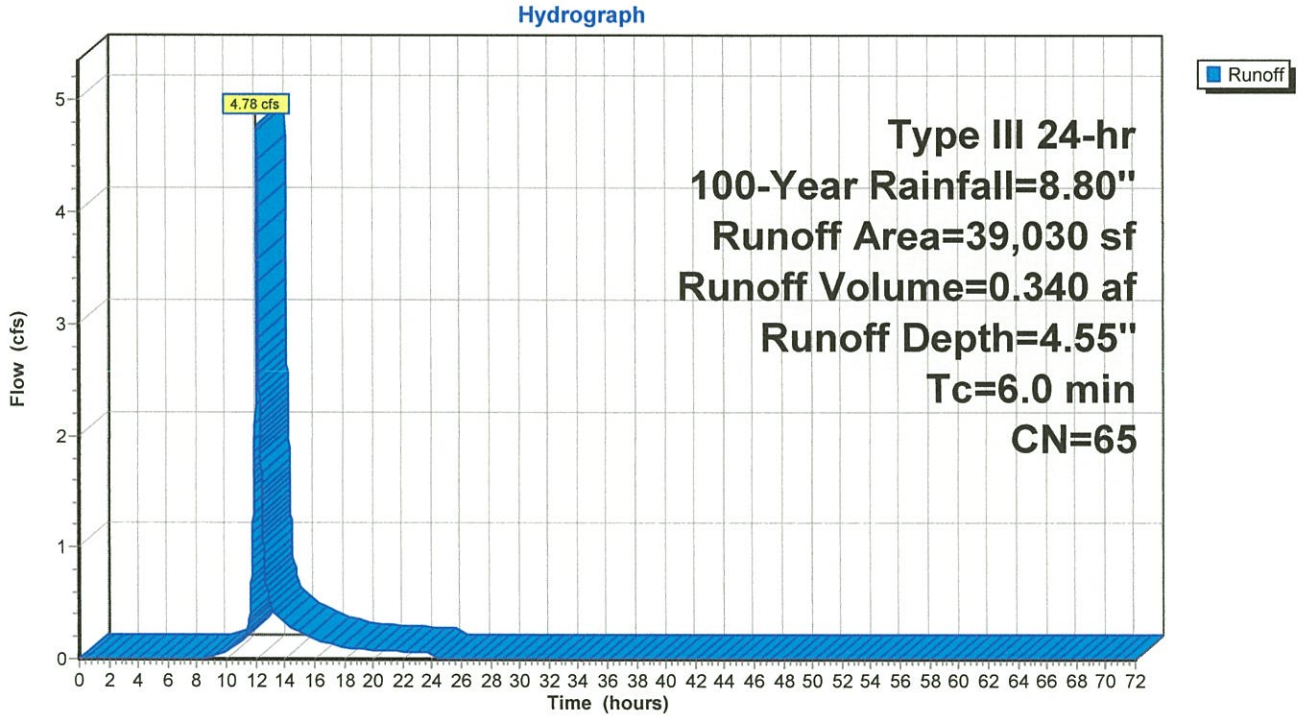
Runoff = 4.78 cfs @ 12.09 hrs, Volume= 0.340 af, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
	28,971	66	Woods, Poor, HSG B
	9,419	61	>75% Grass cover, Good, HSG B
*	640	98	Patios, HSG B
	39,030	65	Weighted Average
	38,390		98.36% Pervious Area
	640		1.64% Impervious Area

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

Subcatchment 8S: PERIMETER AREAS



Summary for Subcatchment PR-3: PAVED / LAWN

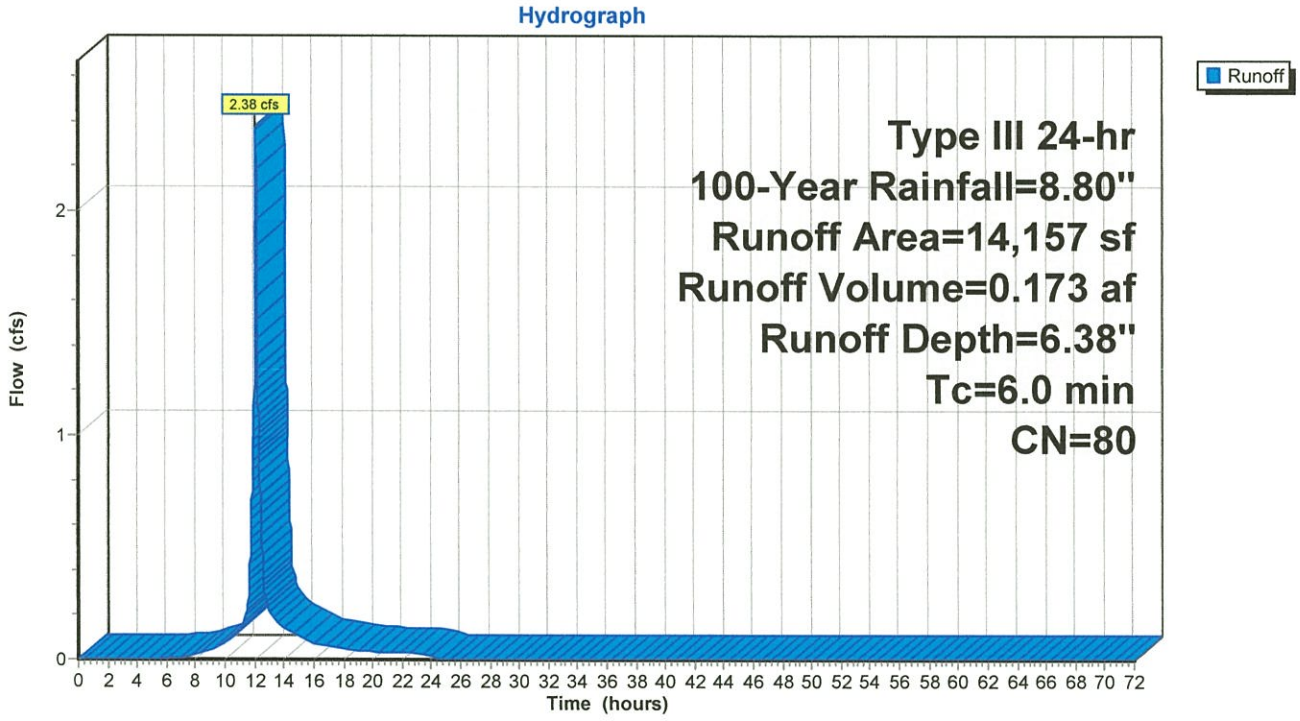
Runoff = 2.38 cfs @ 12.09 hrs, Volume= 0.173 af, Depth= 6.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.80"

	Area (sf)	CN	Description
	6,765	98	Paved parking, HSG B
	6,912	61	>75% Grass cover, Good, HSG B
*	480	98	Patios, HSG B
	14,157	80	Weighted Average
	6,912		48.82% Pervious Area
	7,245		51.18% Impervious Area

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

Subcatchment PR-3: PAVED / LAWN

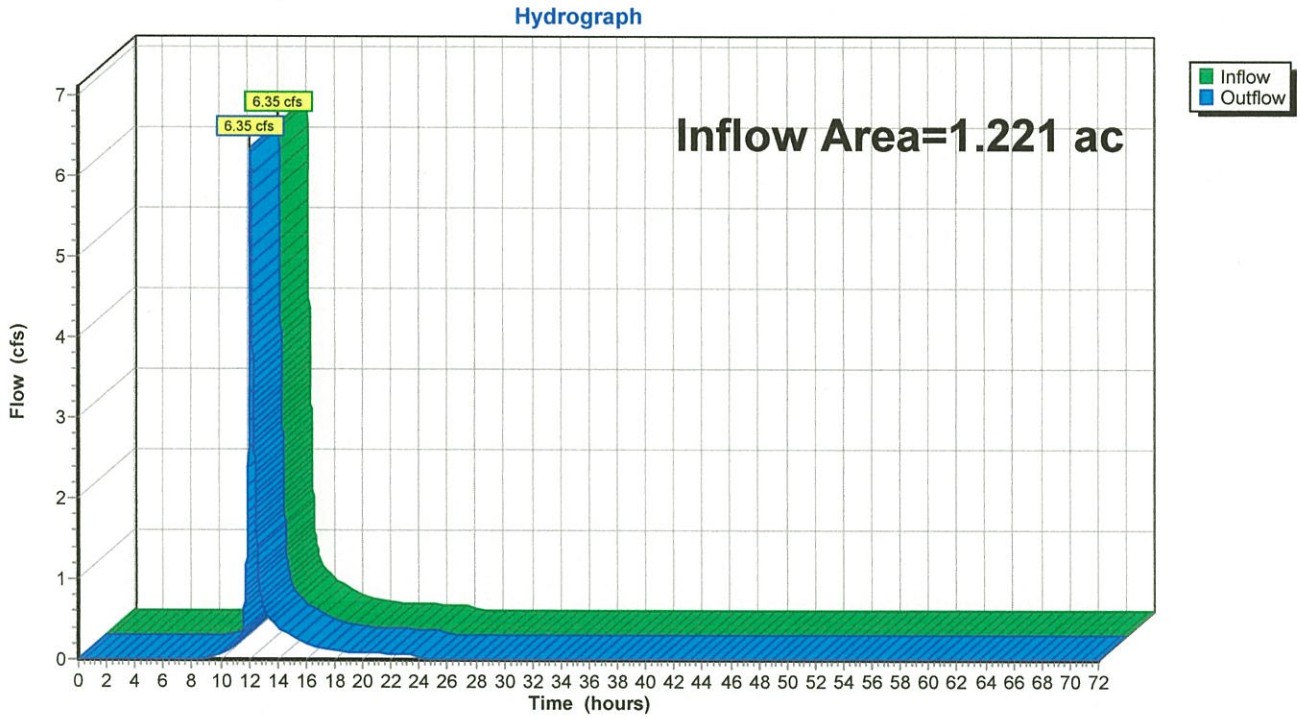


Summary for Reach 9R: OFF SITE FLOW

Inflow Area = 1.221 ac, 14.83% Impervious, Inflow Depth = 4.16" for 100-Year event
Inflow = 6.35 cfs @ 12.10 hrs, Volume= 0.423 af
Outflow = 6.35 cfs @ 12.10 hrs, Volume= 0.423 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach 9R: OFF SITE FLOW



Summary for Pond 3P: CHAMBER SYSTEM

Inflow Area = 0.325 ac, 51.18% Impervious, Inflow Depth = 6.38" for 100-Year event
Inflow = 2.38 cfs @ 12.09 hrs, Volume= 0.173 af
Outflow = 1.84 cfs @ 12.15 hrs, Volume= 0.173 af, Atten= 23%, Lag= 3.9 min
Discarded = 0.07 cfs @ 12.15 hrs, Volume= 0.089 af
Primary = 1.77 cfs @ 12.15 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 201.44' @ 12.15 hrs Surf.Area= 823 sf Storage= 1,716 cf

Plug-Flow detention time= 109.8 min calculated for 0.173 af (100% of inflow)
Center-of-Mass det. time= 109.8 min (909.2 - 799.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	198.00'	763 cf	**15.75'W x 52.28'L x 3.50'H Field A** 2,882 cf Overall - 973 cf Embedded = 1,909 cf x 40.0% Voids
#2A	198.50'	973 cf	**ADS_StormTech SC-740** x 21 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 3 rows
		1,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	198.00'	**2.410 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	200.00'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.07 cfs @ 12.15 hrs HW=201.44' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=1.77 cfs @ 12.15 hrs HW=201.44' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 1.77 cfs @ 5.06 fps)

Pond 3P: CHAMBER SYSTEM - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 (ADS StormTech® SC-740 without end caps)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 3 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

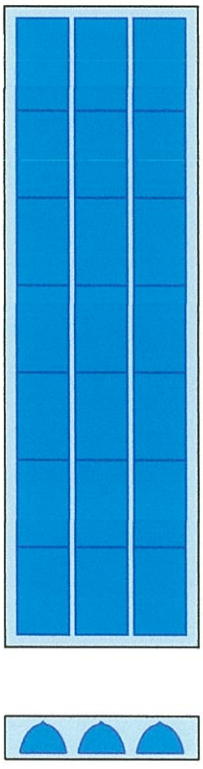
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

21 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 3 Rows = 973.3 cf Chamber Storage

2,881.9 cf Field - 973.3 cf Chambers = 1,908.7 cf Stone x 40.0% Voids = 763.5 cf Stone Storage

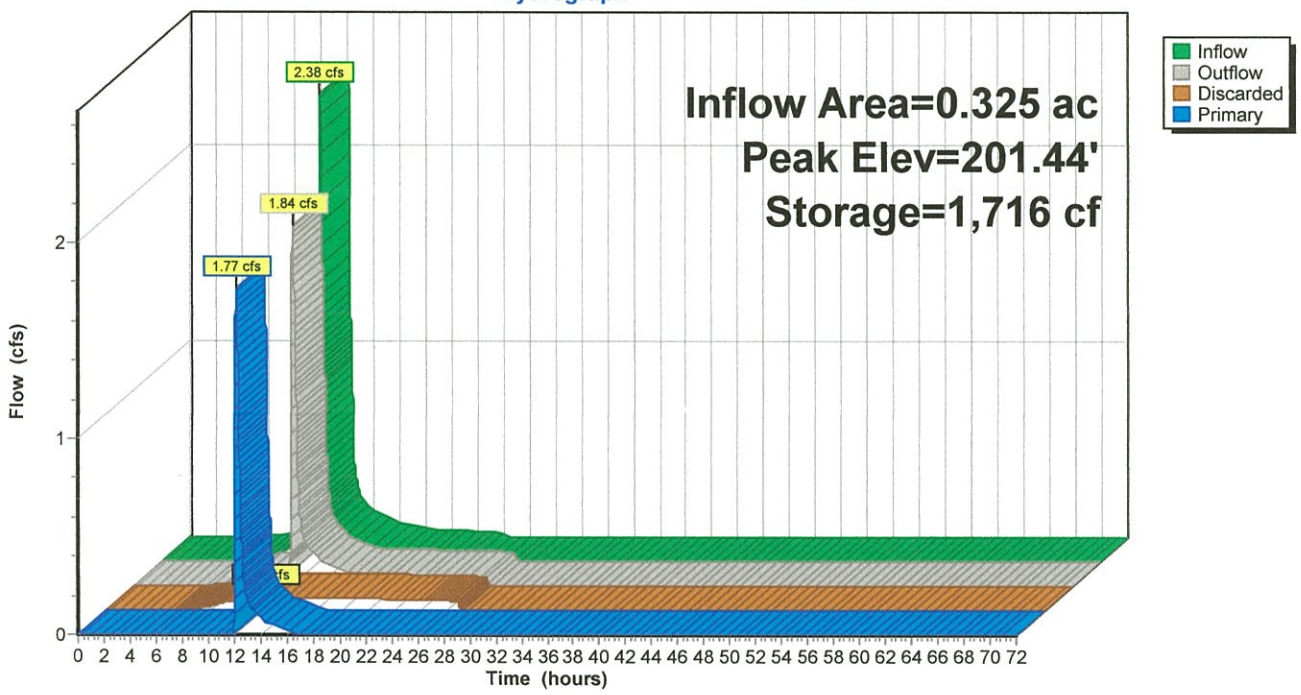
Chamber Storage + Stone Storage = 1,736.7 cf = 0.040 af
Overall Storage Efficiency = 60.3%
Overall System Size = 52.28' x 15.75' x 3.50'

21 Chambers
106.7 cy Field
70.7 cy Stone



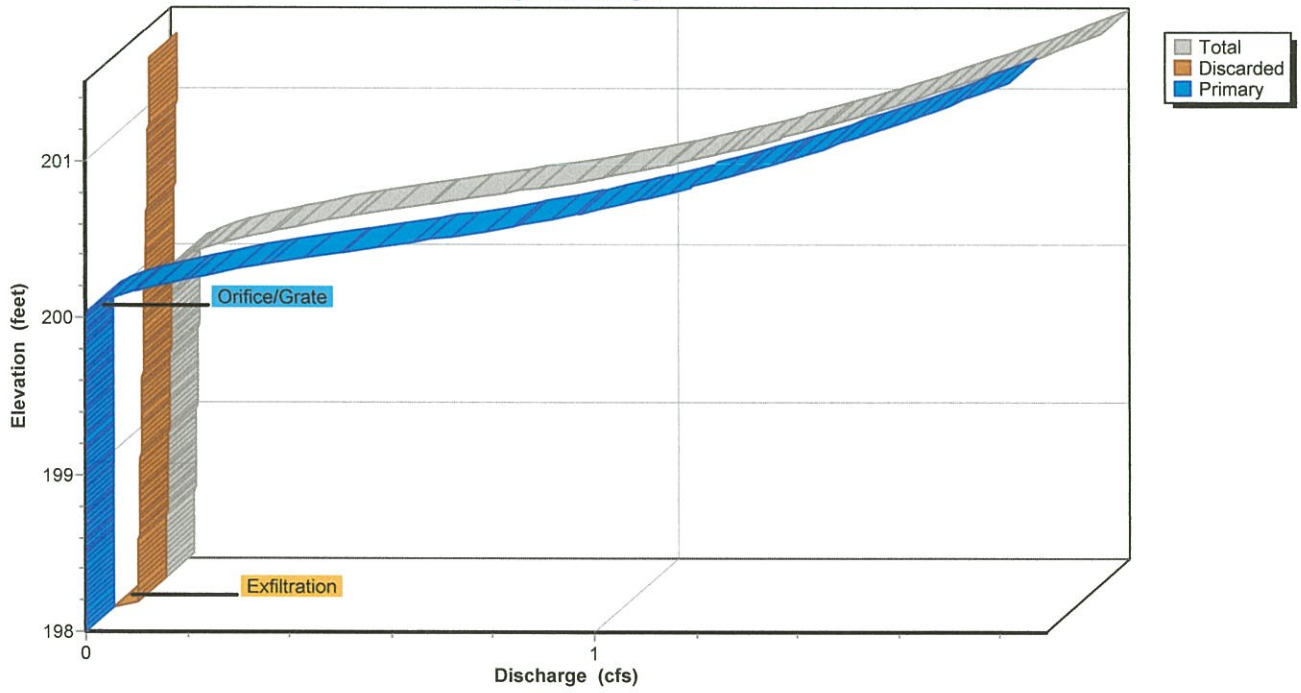
Pond 3P: CHAMBER SYSTEM

Hydrograph

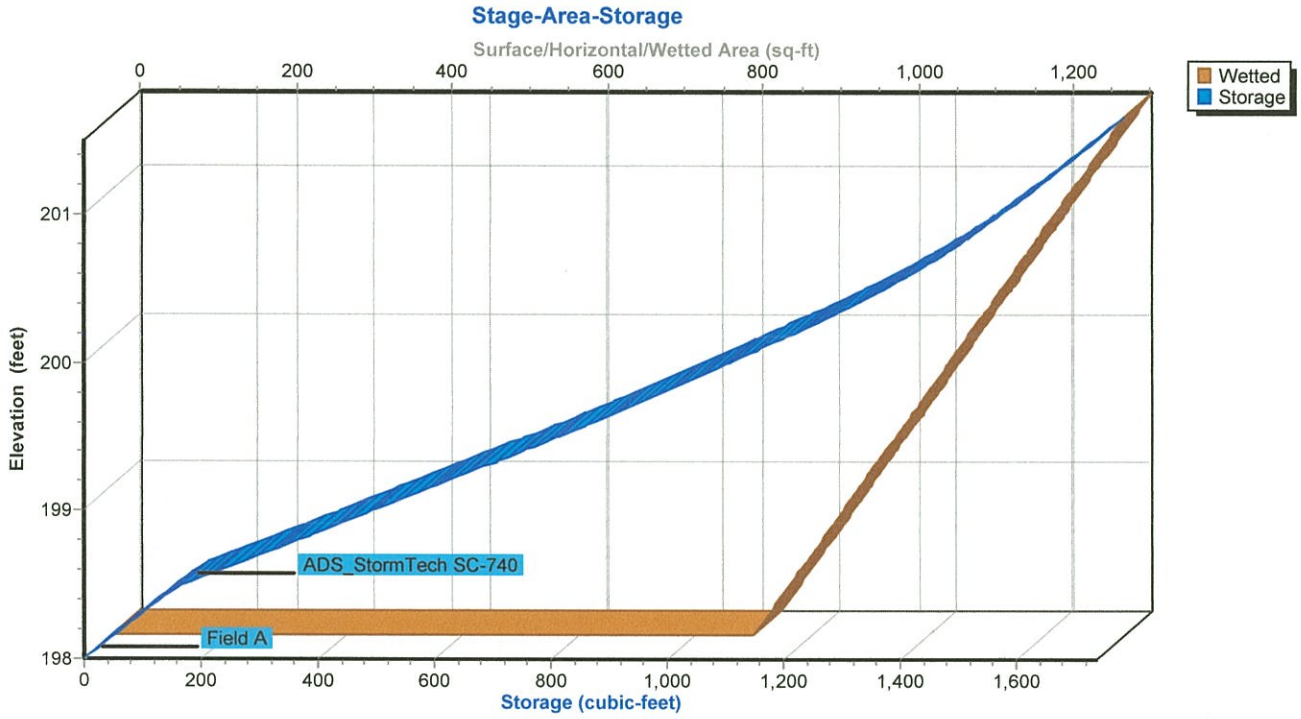


Pond 3P: CHAMBER SYSTEM

Stage-Discharge



Pond 3P: CHAMBER SYSTEM



SITE: 22 EVERGREEN STREET, MEDWAY, MA

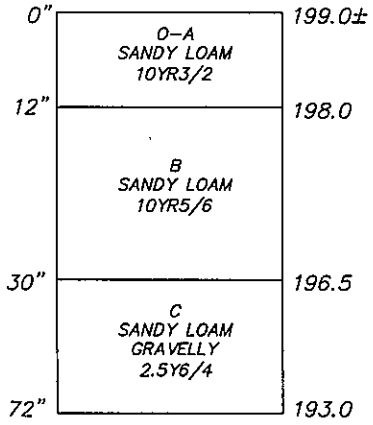
SOIL EVALUATIONS PERFORMED BY MASSACHUSETTS CERTIFIED DEP SOIL EVALUATOR ON NOV. 23, 2018.

GREGORY A. BUNAVICZ, SE ~~2712~~

COMMENTS:

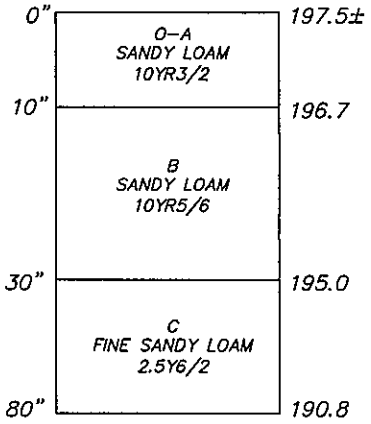
RECENT HEAVY RAIN, WET CONDITIONS, SATURATED SOIL.

TP-1
11-23-18



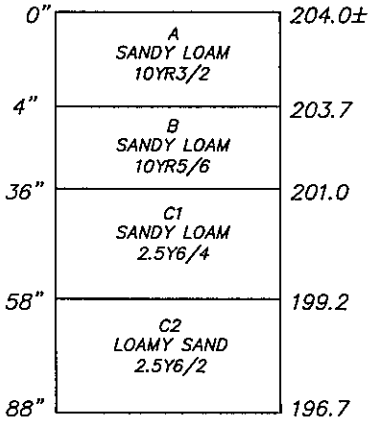
MOTTLES: 24"
WATER STANDING: 56"
WATER WEEPING: 24"

TP-2
11-23-18



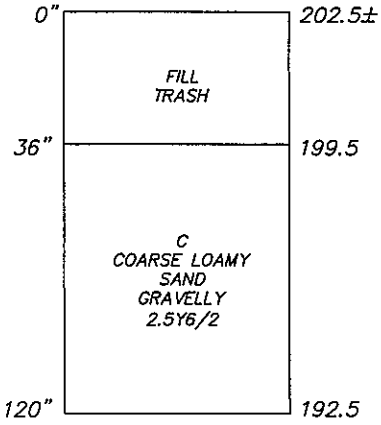
MOTTLES: 30"
WATER STANDING: 78"
WATER WEEPING: 30"

TP-3
11-23-18



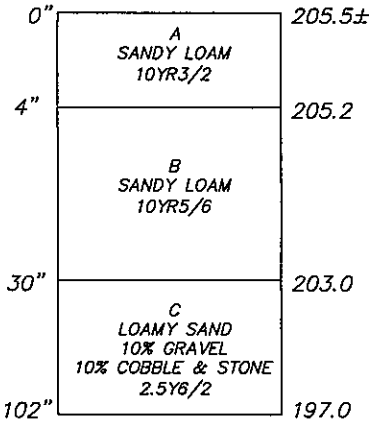
MOTTLES: 36"
WATER STANDING: 78"
WATER WEEPING: 36"

TP-4
11-23-18



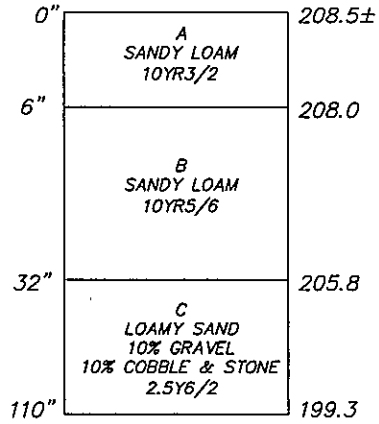
MOTTLES: 36"
WATER STANDING: 80"
WATER WEEPING: 30"

TP-5
11-23-18



MOTTLES: NONE
WATER STANDING: NONE
WATER WEEPING: NONE

TP-6
11-23-18



MOTTLES: NONE
WATER STANDING: 109"
WATER WEEPING: 102"

Soil Map—Norfolk and Suffolk Counties, Massachusetts
(Evergreen Village)

Map Scale: 1:2,030 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 50 100 200 300

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 14, Sep 12, 2018

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

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

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
70A	Ridgebury fine sandy loam, 0 to 3 percent slopes	0.2	0.9%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	5.0	25.5%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	2.8	14.2%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	8.9	45.2%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	2.8	14.1%
Totals for Area of Interest		**19.7**	**100.0%**

INSTRUCTIONS:

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.

Version 1, Automated: Mar. 4, 2008

Location: Pavements

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
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
Oil Grit Separator	0.25	0.68	0.17	0.51
Infiltration Basin	0.80	0.51	0.41	0.10
	0.00	0.10	0.00	0.10

Total TSS Removal = 90%

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

Project: Medway Greens
Prepared By: Ron T
Date: 3/2/2019

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

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1