PERMANENT STORMWATER SYSTEM
OPERATION AND MAINTENANCE PROGRAM
FOR PROPOSED PARKING LOT AND DRIVE THRU IMPROVEMENTS
160 COUNTY STREET
NEW BEDFORD, MA

PREPARED FOR:

FALL RIVER FIVE CENTS SAVING BANK dba BANKFIVE
79 N. MAIN STREET
FALL RIVER, MA 02720

PREPARED BY:

PRIME ENGINEERING, INC.
P.O. BOX 1088
LAKEVILLE, MA

JANUARY 22, 2018

LONG TERM POLLUTION PREVENTION PLAN
(PERMANENT STORMWATER SYSTEM OPERATION AND MAINTENANCE PROGRAM)

1.0 INTRODUCTION

The plans for the operation of a bank at 160 County Street, New Bedford have been designed to protect stormwater quality. In order for this to continue in the long term, it is necessary to implement the following long term Operation and Maintenance Program.

2.0 RESPONSIBLE PARTY

Responsible Party:	Fall River Five Cents Savings Bank dba BankFive 79 N. Main Street Fall River, MA 02720
Attention:	Russell Bergeron (774-888-6389)

3.0 SOURCE CONTROL MEASURES

The most effective means of providing clean runoff is to prevent pollutants from coming into contact with the stormwater in the first place. This involves the following:

- Keeping fertilizers, stockpiles, etc. covered at all times. All such products shall be stored off-site.
- All landscaping, fertilization, and other grounds maintenance, if necessary, shall be performed by personnel who are trained at how to maintain the grounds.
- Periodic removal of windblown debris and litter from the site.

4.0 MAINTENANCE OF STORM SYSTEM

This section presents the periodic maintenance that must be completed:

- The lawn shall be mowed as needed.
- The Stormcepter unit shall be inspected annually. It shall be cleaned when there is a 6 inch depth of sediment.
- The infiltration units shall be inspected annually. The inspections shall be performed during or immediately following a measured rainfall event of ½ inch depth or greater so that the depth of water in the infiltrator can be compared with the depth of rainfall.

5.0 SPILL PREVENTION AND RESPONSE PLAN

The project consists of a bank that does not emit any significant pollutants. The only potential source of pollution is the grass cutting equipment and automobiles. The equipment will be fueled off site, therefore, there is little chance of a spill.

The responsible parties shall train maintenance personnel in the proper handling and cleanup of spilled hazardous substances or oil. No spilled hazardous substances or oil shall be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge shall be

contained on site until appropriate measures, in compliance with state and federal regulations, are taken to dispose such contaminated stormwater. The responsible party shall train personnel in spill prevention and cleanup procedures.

In order to prevent or minimize the potential for a spill of hazardous substances or oil to come into contact with stormwater, the following steps shall be implemented:

- A spill control and containment kit (containing, for example, absorbent materials, rags, gloves, plastic and metal trash containers, etc.) shall be readily available.
- Manufacturer's recommended methods for spill cleanup shall be known and maintenance personnel shall be trained regarding these procedures and the location of the information and cleanup supplies.
- The responsible party shall ensure that all hazardous waste discovered or generated at the site is disposed properly by a licensed hazardous material disposal company. The responsible party shall not exceed hazardous waste storage requirements mandated by the EPA or state and local authorities.

In the event of a spill of hazardous substances or oil, the following procedures must be followed:

- All measures must be taken to contain and abate the spill and to prevent the discharge of the hazardous substance or oil to stormwater or off-site.
- For spills of less than a quarter gallon of material, proceed with source control and containment, clean-up with absorbent materials or other applicable means unless an imminent hazard or other circumstances dictate that the spill should be treated by a professional emergency response contractor.
- For spills greater than a quarter gallon of material, immediately contact Richard J. Rheaume, LSP, Prime Engineering, Inc., P.O. Box 1088, Lakeville, MA 02347 at (508) 947-0050. Provide information on the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill and proceed with prevention, containment and/or clean-up.
- Spills of amounts that exceed reportable quantities of certain substances specifically mentioned in federal regulations 40 CFR 110, 40 CFR 117, and 40 CFR 302 must be immediately reported to the EPA National Response Center at (800) 242-8802.
- The department head shall be the spill prevention and response coordinator. He/she shall designate the individuals who shall receive spill prevention and response training. These individuals shall become responsible for a particular phase of prevention and response. The names of these personnel should be posted in the material storage area and in the property office.

Any spill that occurs shall be documented on a Blank Spill Report that is enclosed as Attachment C-1.

6.0 SNOW AND ICE REMOVAL

Snow and ice shall be removed by mechanical equipment. Sand and salt shall only be applied when the safety of the public is at stake.

ATTACHMENT C-1

BLANK SPILL REPORT

SPILL REPORT

SITE ADDRESS:_____

NAME OF PERSON COMPLETING THIS FORM:_____

DATE:_____

TYPE OF MATERIAL:_____ QUANTITY:_____

DESCRIPTION OF RELEASE:_____

_____

_____

_____

CIRCUMSTANCES LEADING TO RELEASE:_____

_____

_____

_____

_____

LOCATION OF SPILL:_____

_____

_____

_____

RESPONSE ACTIONS:_____

_____

_____

_____

PERSONNEL:_____

_____

ATTACH DOCUMENTATION OF NOTIFICATIONS AND CORRECTIVE MEASURES IMPLEMENTED TO PREVENT REOCCURRENCE

(COPY AS NEEDED)

APPENDIX D

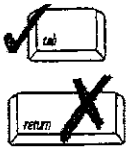
CHECKLIST FOR STORMWATER REPORT

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.

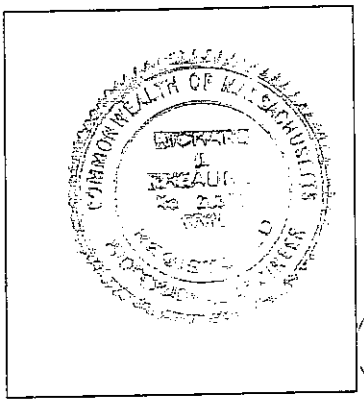
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

- [x] 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): Stormwater treatment

Standard 1: No New Untreated Discharges

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

(Previously submitted)

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.

APPENDIX E

INTERIM ILLICIT DISCHARGE STATEMENT

INTERIM ILLICIT DISCHARGE STATEMENT

1.0 INTRODUCTION

The following is an interim illicit discharge statement based on existing conditions and design conditions. Once construction is complete, a final illicit discharge statement shall be issued to the New Bedford Planning Board based on as-built conditions.

2.0 EXISTING CONDITIONS

The existing site is the former Luzo Community Bank which is connected to municipal water and sewer. There are no known illicit connections in this area. No sources of illicit discharges were uncovered when this system was recently surveyed. Based on this investigation, to the best of my knowledge, there are no current illicit discharges to the storm drainage system. If during construction, an illicit discharge is discovered, it shall be removed immediately

3.0 PROPOSED DESIGN

The proposed design calls for piped storm flow. There are no points in the proposed storm drainage system where illicit discharges are likely to occur.

Certain types of discharges are allowable under the U.S. Environmental Protection Agency Construction General Permit, and it is the intent of the site's Long Term Pollution Prevention Plan to allow such discharges. These types of discharges shall be allowed under the conditions that no pollutants shall be allowed to come in contact with the water prior to or after its discharge. The control measures which have been outlined in the Long Term Pollution Prevention Plan shall be strictly followed to ensure that no contamination of these non-stormwater discharges takes place.

I hereby certify that the preceding is accurate.

Richard J. Rheaume, P.E., LSP
Prime Engineering, Inc.

APPENDIX F

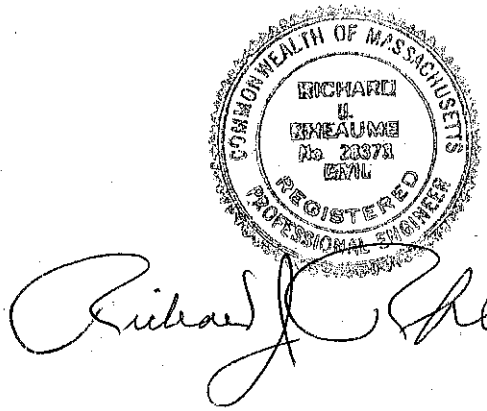
FLOOD PLAIN CONSIDERATIONS

FLOOD PLAIN CONSIDERATIONS
160 COUNTY STREET, NEW BEDFORD

The site is at elevation 10, therefore, there is no floodplain issue.

DRAINAGE ANALYSIS

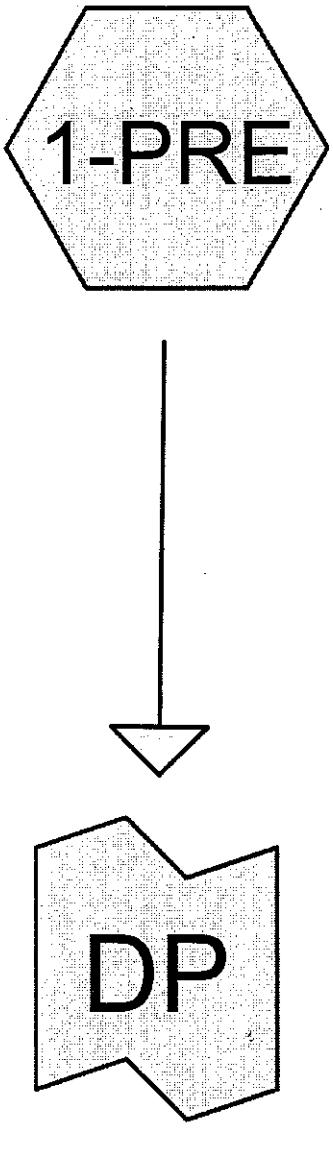
FOR BANKFIVE
160 COUNTY STREET
NEW BEDFORD, MA



APRIL 2, 2018

Currently, the drainage from the site flows in sheet flow into the gutters of County, Rivet and Purchase Streets. It is proposed to collect the flow on site with catch basins and infiltrate the majority into the ground. For the 1 year, 2 year and 5 year design storms, there will be no flow into the City's storm system. For the 10 year and 25 year design storms, there will be significantly less than currently occurs. Even the 50 year and 100 year design storms will contribute significantly less peak flow and volume than under pre-existing conditions.

Design Storm (year)	**Pre (CFS)**	**Post**
1	.71	0
2	1.12	0
5	1.53	0
10	1.75	.50
25	2.12	1.10
50	2.44	1.55
100	2.75	2.24



DESIGN POINT

Subcat Reach Pond Link

Routing Diagram for 160 COUNTY PRE
Prepared by {enter your company name here}, Printed 4/5/2018

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-PRE: Runoff Area=19,567 sf 57.28% Impervious Runoff Depth>2.04"
Tc=6.0 min CN=88 Runoff=1.12 cfs 0.076 af

Link DP: DESIGN POINT Inflow=1.12 cfs 0.076 af
Primary=1.12 cfs 0.076 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.076 af Average Runoff Depth = 2.04"
42.72% Pervious = 0.192 ac 57.28% Impervious = 0.257 ac

Summary for Subcatchment 1-PRE:

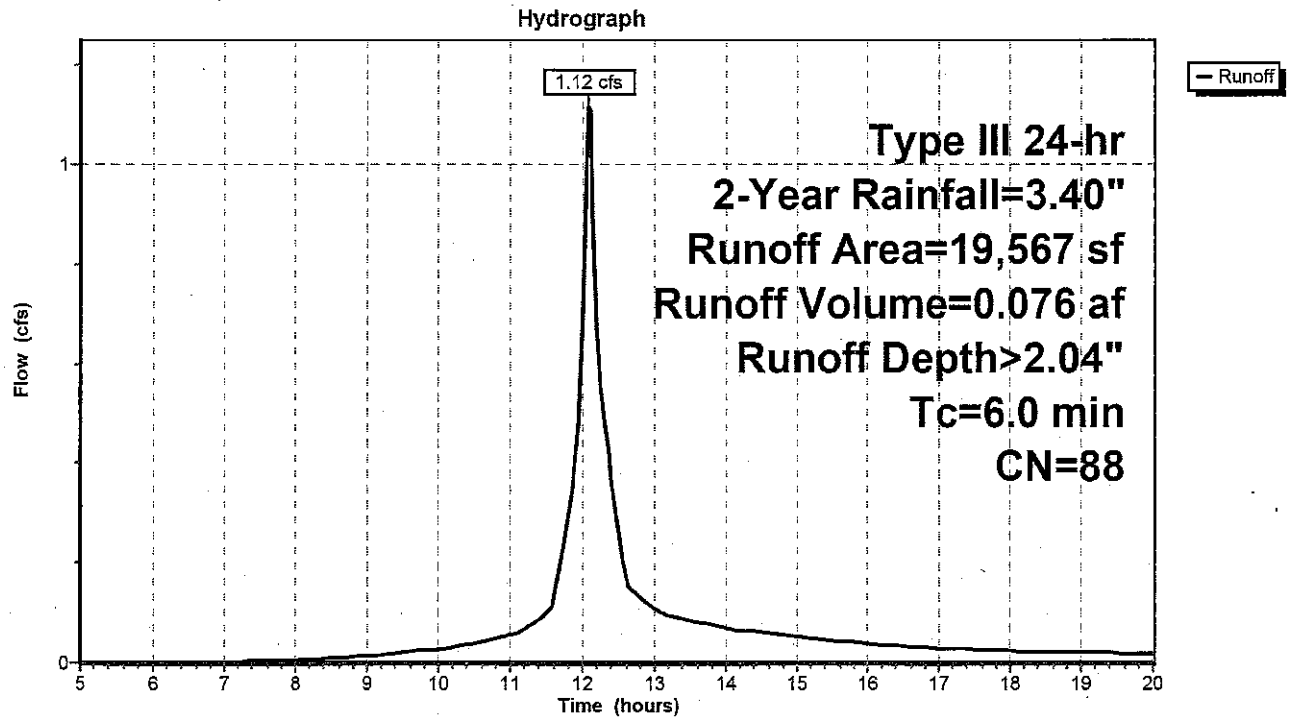
Runoff = 1.12 cfs @ 12.09 hrs, Volume= 0.076 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	11,207	98	Pavement and roofs
	8,360	74	>75% Grass cover, Good, HSG C
	19,567	88	Weighted Average
	8,360		42.72% Pervious Area
	11,207		57.28% Impervious Area

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

Subcatchment 1-PRE:

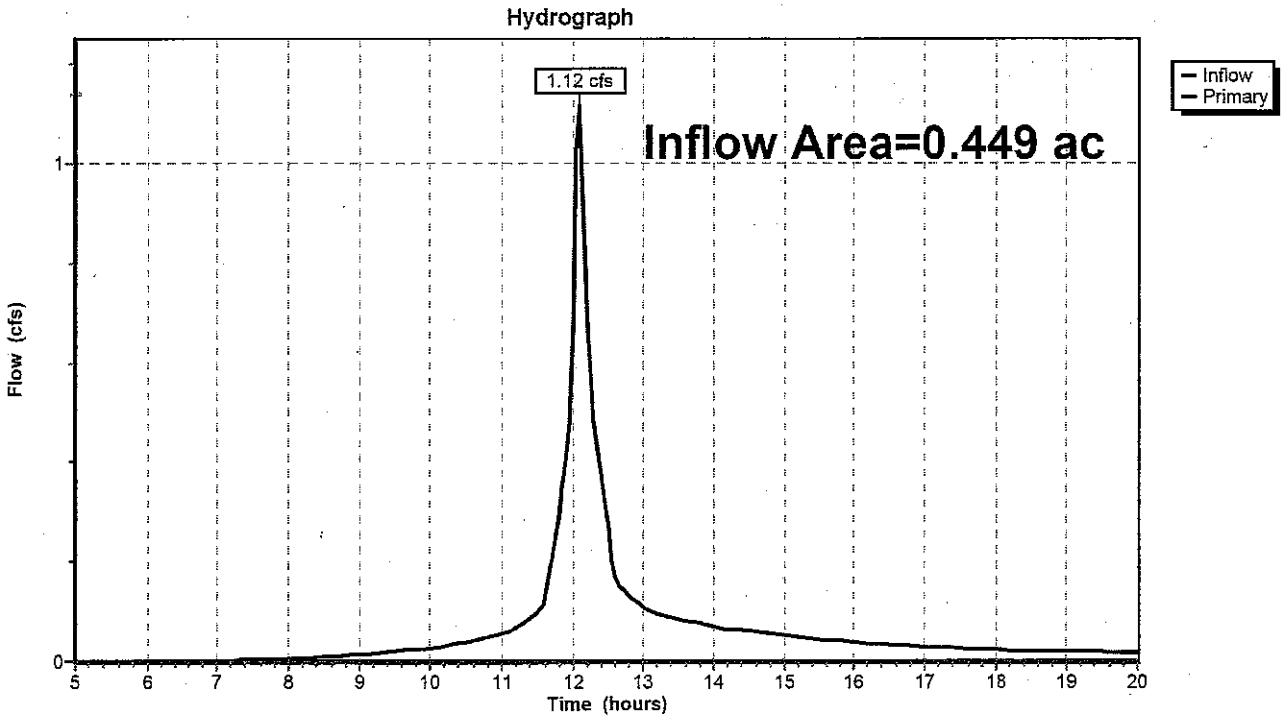


Summary for Link DP: DESIGN POINT

Inflow Area = 0.449 ac, 57.28% Impervious, Inflow Depth > 2.04" for 2-Year event
Inflow = 1.12 cfs @ 12.09 hrs, Volume= 0.076 af
Primary = 1.12 cfs @ 12.09 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP: DESIGN POINT



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-PRE: Runoff Area=19,567 sf 57.28% Impervious Runoff Depth>3.28"
Tc=6.0 min CN=88 Runoff=1.75 cfs 0.123 af

Link DP: DESIGN POINT Inflow=1.75 cfs 0.123 af
Primary=1.75 cfs 0.123 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.123 af Average Runoff Depth = 3.28"
42.72% Pervious = 0.192 ac 57.28% Impervious = 0.257 ac

Summary for Subcatchment 1-PRE:

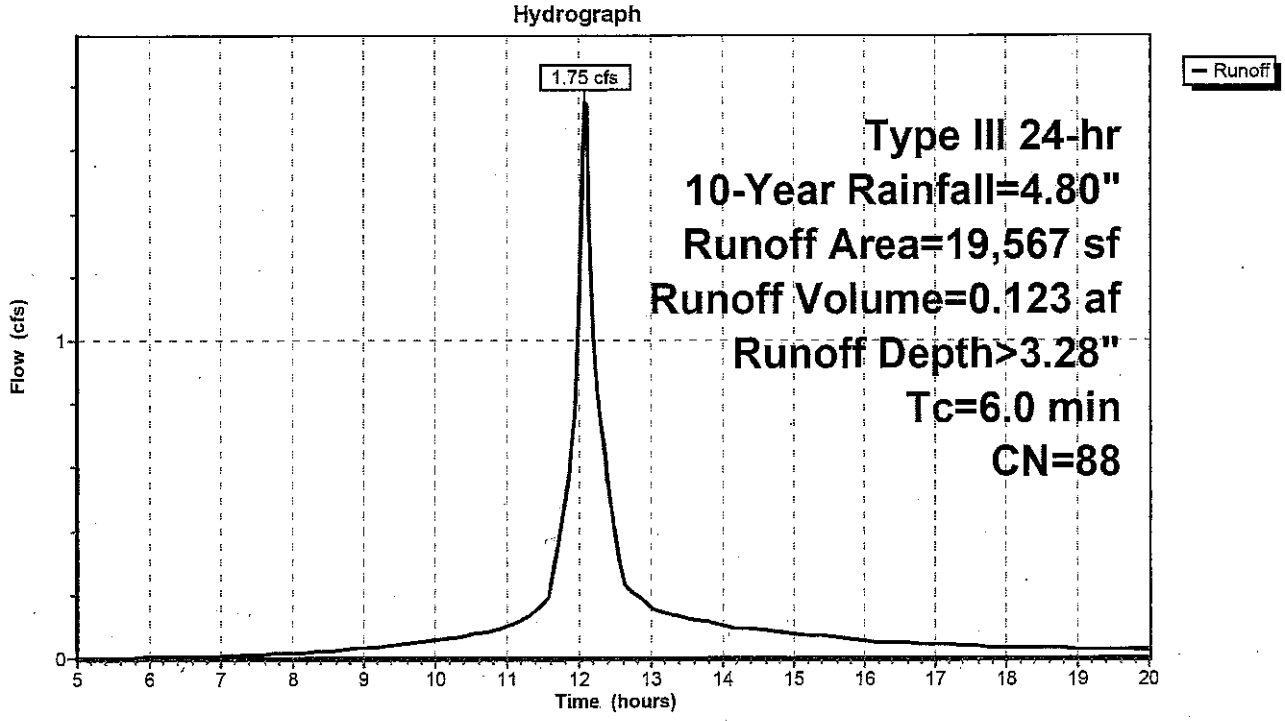
Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.123 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
*	11,207	98	Pavement and roofs
	8,360	74	>75% Grass cover, Good, HSG C
	19,567	88	Weighted Average
	8,360		42.72% Pervious Area
	11,207		57.28% Impervious Area

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

Subcatchment 1-PRE:

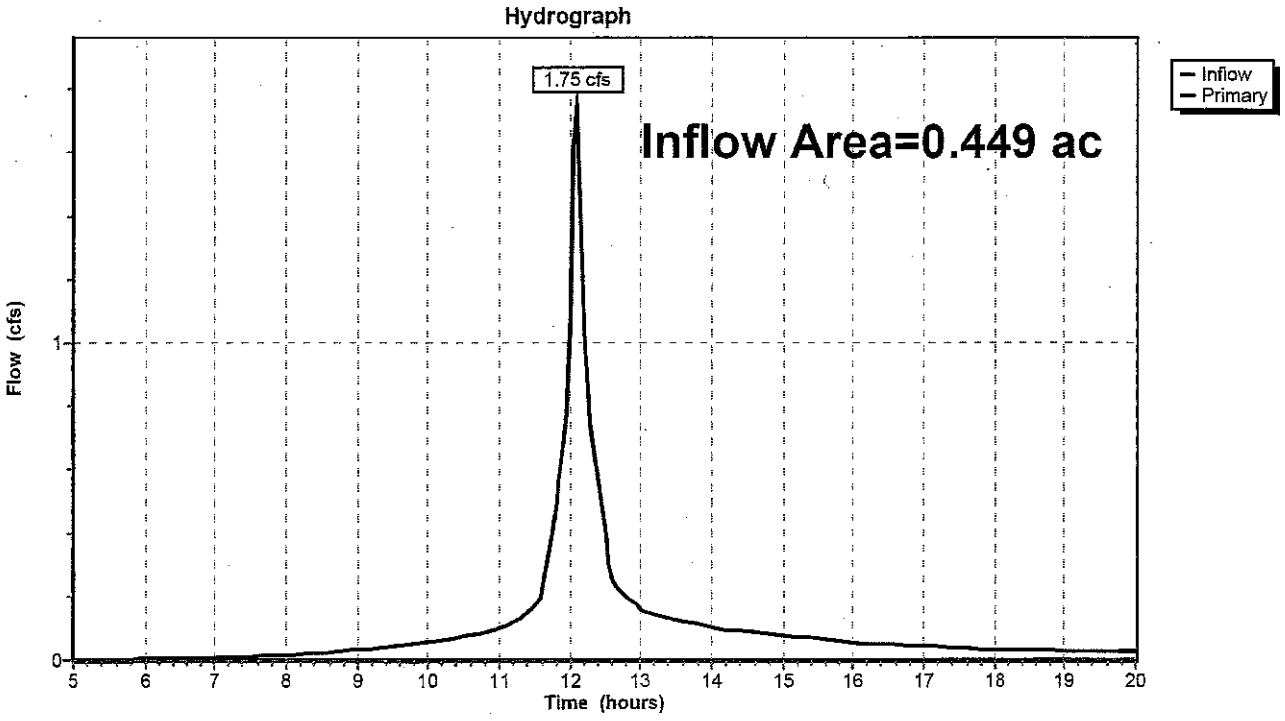


Summary for Link DP: DESIGN POINT

Inflow Area = 0.449 ac, 57.28% Impervious, Inflow Depth > 3.28" for 10-Year event
Inflow = 1.75 cfs @ 12.09 hrs, Volume= 0.123 af
Primary = 1.75 cfs @ 12.09 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP: DESIGN POINT



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-PRE: Runoff Area=19,567 sf 57.28% Impervious Runoff Depth>5.29"
Tc=6.0 min CN=88 Runoff=2.75 cfs 0.198 af

Link DP: DESIGN POINT Inflow=2.75 cfs 0.198 af
Primary=2.75 cfs 0.198 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.198 af Average Runoff Depth = 5.29"
42.72% Pervious = 0.192 ac 57.28% Impervious = 0.257 ac

Summary for Subcatchment 1-PRE:

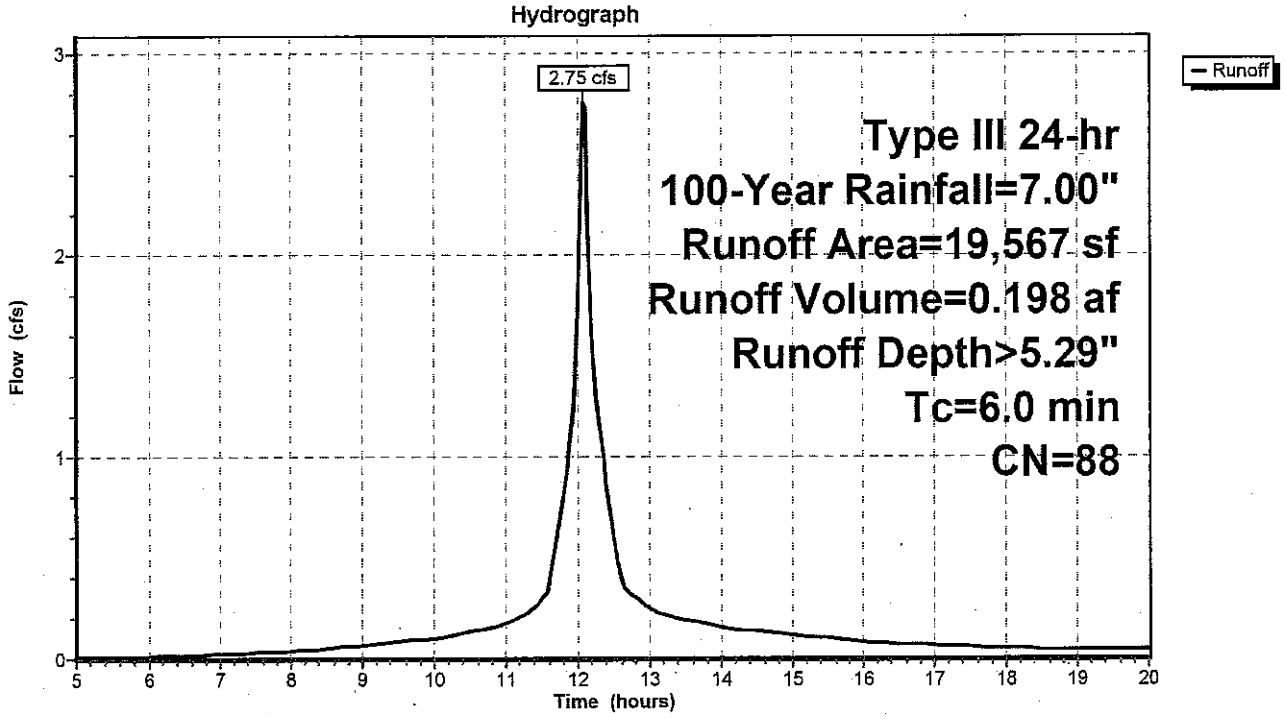
Runoff = 2.75 cfs @ 12.09 hrs, Volume= 0.198 af, Depth> 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	11,207	98	Pavement and roofs
	8,360	74	>75% Grass cover, Good, HSG C
	19,567	88	Weighted Average
	8,360		42.72% Pervious Area
	11,207		57.28% Impervious Area

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

Subcatchment 1-PRE:

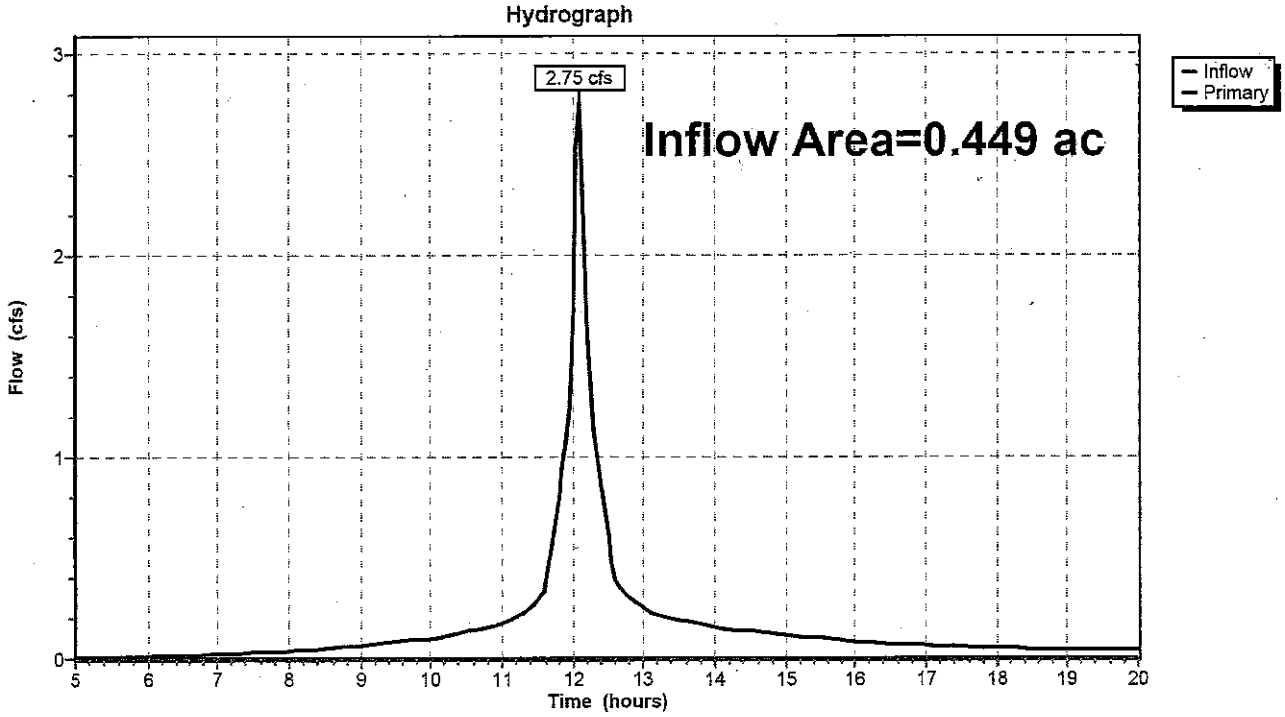


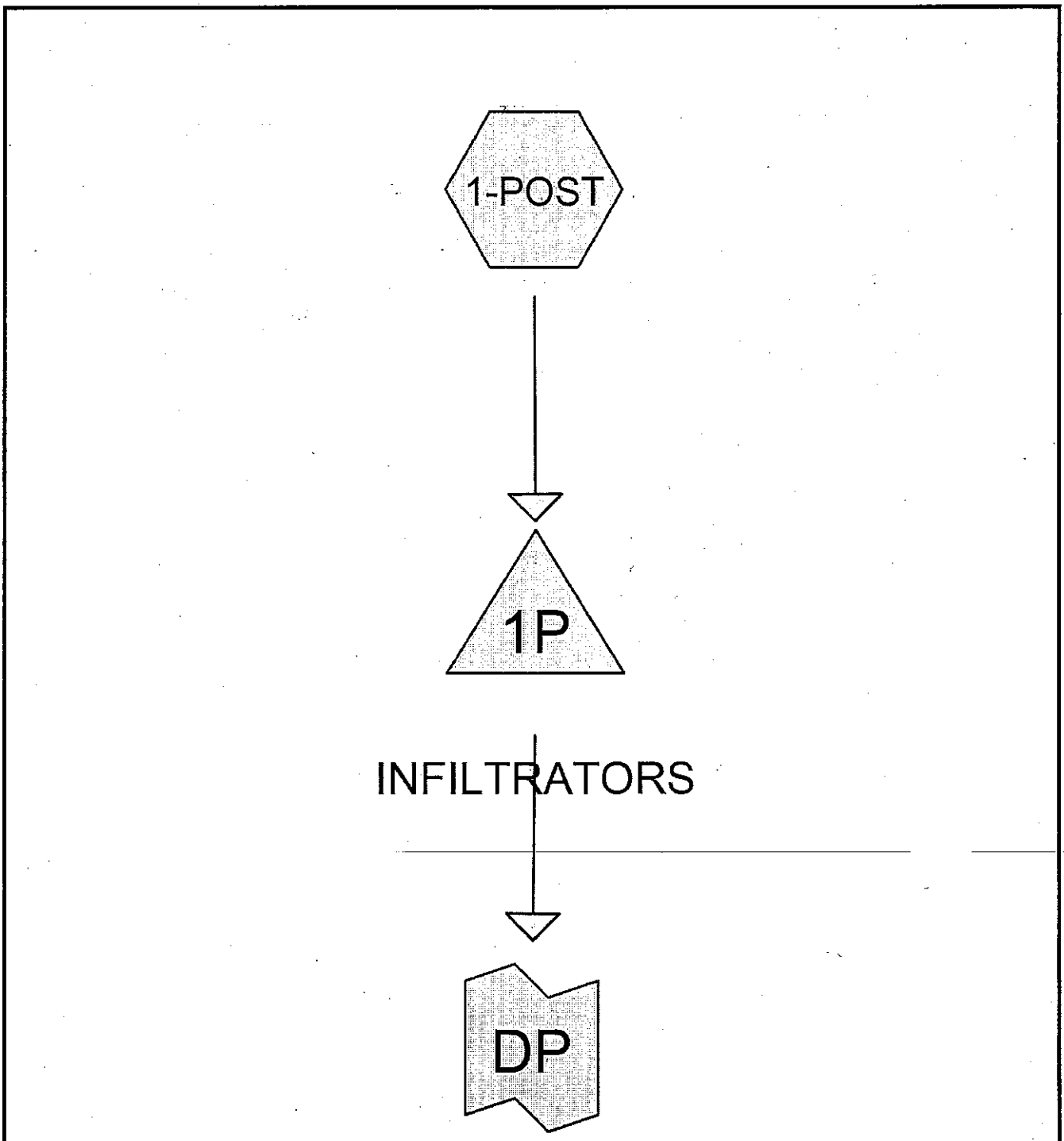
Summary for Link DP: DESIGN POINT

Inflow Area = 0.449 ac, 57.28% Impervious, Inflow Depth > 5.29" for 100-Year event
Inflow = 2.75 cfs @ 12.09 hrs, Volume= 0.198 af
Primary = 2.75 cfs @ 12.09 hrs, Volume= 0.198 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP: DESIGN POINT





Subcat Reach Pond Link

Routing Diagram for 160 COUNTY POST
Prepared by {enter your company name here}, Printed 4/5/2018

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-POST: Runoff Area=19,567 sf 63.88% Impervious Runoff Depth>2.13"
Tc=6.0 min CN=89 Runoff=1.16 cfs 0.080 af

Pond 1P: INFILTRATORS Peak Elev=94.37' Storage=0.028 af Inflow=1.16 cfs 0.080 af
Discarded=0.14 cfs 0.080 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.080 af

Link DP: DESIGN POINT Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.080 af Average Runoff Depth = 2.13"
36.12% Pervious = 0.162 ac 63.88% Impervious = 0.287 ac

Summary for Subcatchment 1-POST:

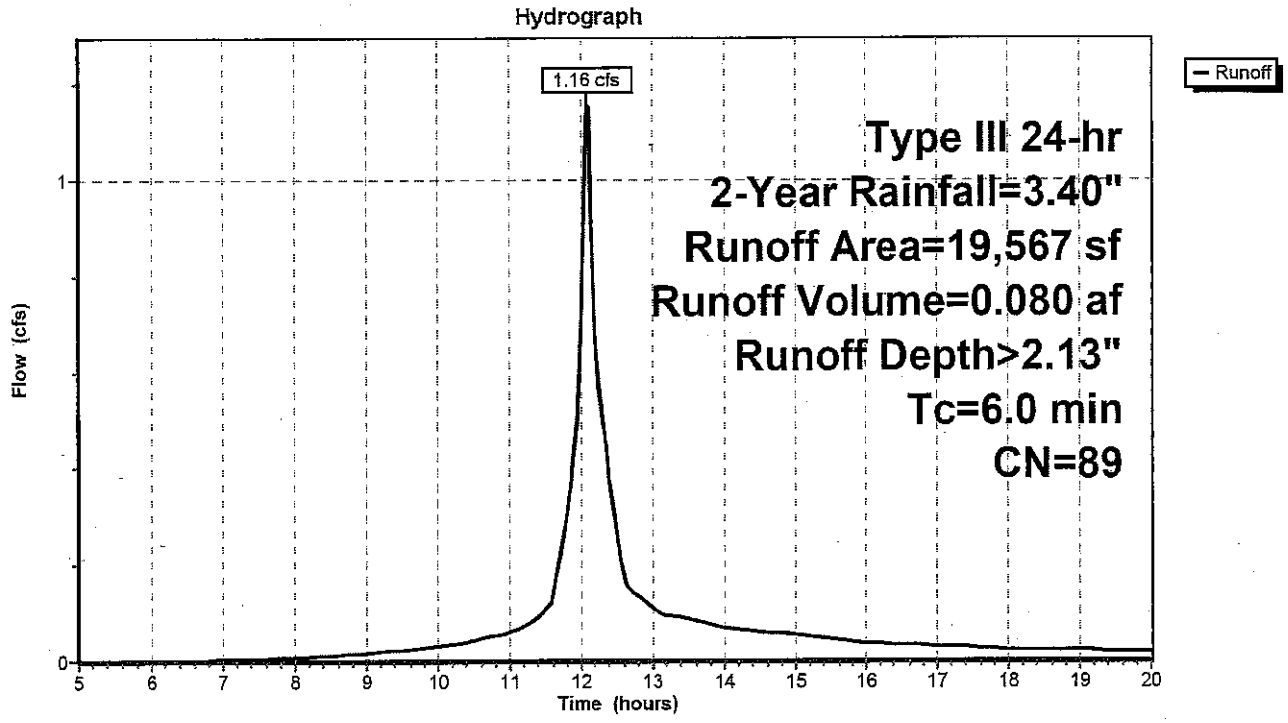
Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.080 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	12,500	98	
	7,067	74	>75% Grass cover, Good, HSG C
	19,567	89	Weighted Average
	7,067		36.12% Pervious Area
	12,500		63.88% Impervious Area

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

Subcatchment 1-POST:



Summary for Pond 1P: INFILTRATORS

Inflow Area = 0.449 ac, 63.88% Impervious, Inflow Depth > 2.13" for 2-Year event
Inflow = 1.16 cfs @ 12.09 hrs, Volume= 0.080 af
Outflow = 0.14 cfs @ 11.65 hrs, Volume= 0.080 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.14 cfs @ 11.65 hrs, Volume= 0.080 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 94.37' @ 12.74 hrs Surf.Area= 0.023 ac Storage= 0.028 af

Plug-Flow detention time= 67.6 min calculated for 0.080 af (100% of inflow)
Center-of-Mass det. time= 67.4 min (843.5 - 776.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	92.50'	0.014 af	**6.33'W x 101.50'L x 3.54'H Field A** 0.052 af Overall - 0.017 af Embedded = 0.035 af x 40.0% Voids
#2A	93.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
#3B	92.50'	0.008 af	**6.33'W x 59.50'L x 3.54'H Field B** 0.031 af Overall - 0.010 af Embedded = 0.021 af x 40.0% Voids
#4B	93.00'	0.010 af	**Cultec R-330XLHD** x 8 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.049 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.50'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	95.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.00' / 94.95' S= 0.0050 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 11.65 hrs HW=92.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.50' (Free Discharge)
↑**2=Culvert** (Controls 0.00 cfs)
↑**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: INFILTRATORS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

14 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 99.50' Row Length +12.0" End Stone x 2 = 101.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

14 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 741.4 cf Chamber Storage

2,276.7 cf Field - 741.4 cf Chambers = 1,535.3 cf Stone x 40.0% Voids = 614.1 cf Stone Storage

Chamber Storage + Stone Storage = 1,355.5 cf = 0.031 af
Overall Storage Efficiency = 59.5%

14 Chambers
84.3 cy Field
56.9 cy Stone

Pond 1P: INFILTRATORS - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

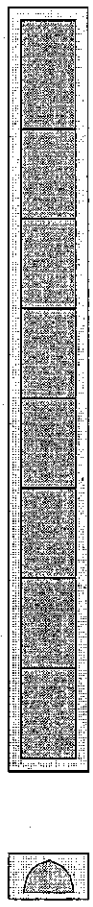
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

8 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 428.4 cf Chamber Storage

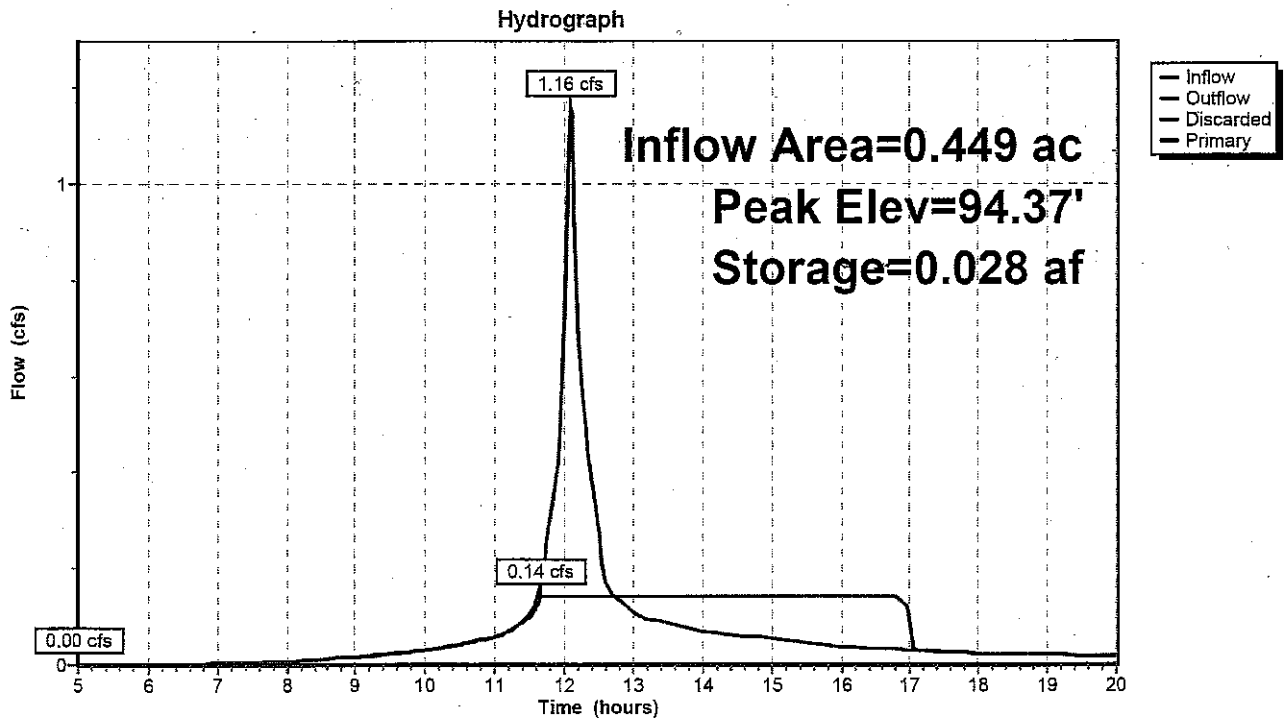
1,334.6 cf Field - 428.4 cf Chambers = 906.2 cf Stone x 40.0% Voids = 362.5 cf Stone Storage

Chamber Storage + Stone Storage = 790.9 cf = 0.018 af
Overall Storage Efficiency = 59.3%

8 Chambers
49.4 cy Field
33.6 cy Stone



Pond 1P: INFILTRATORS

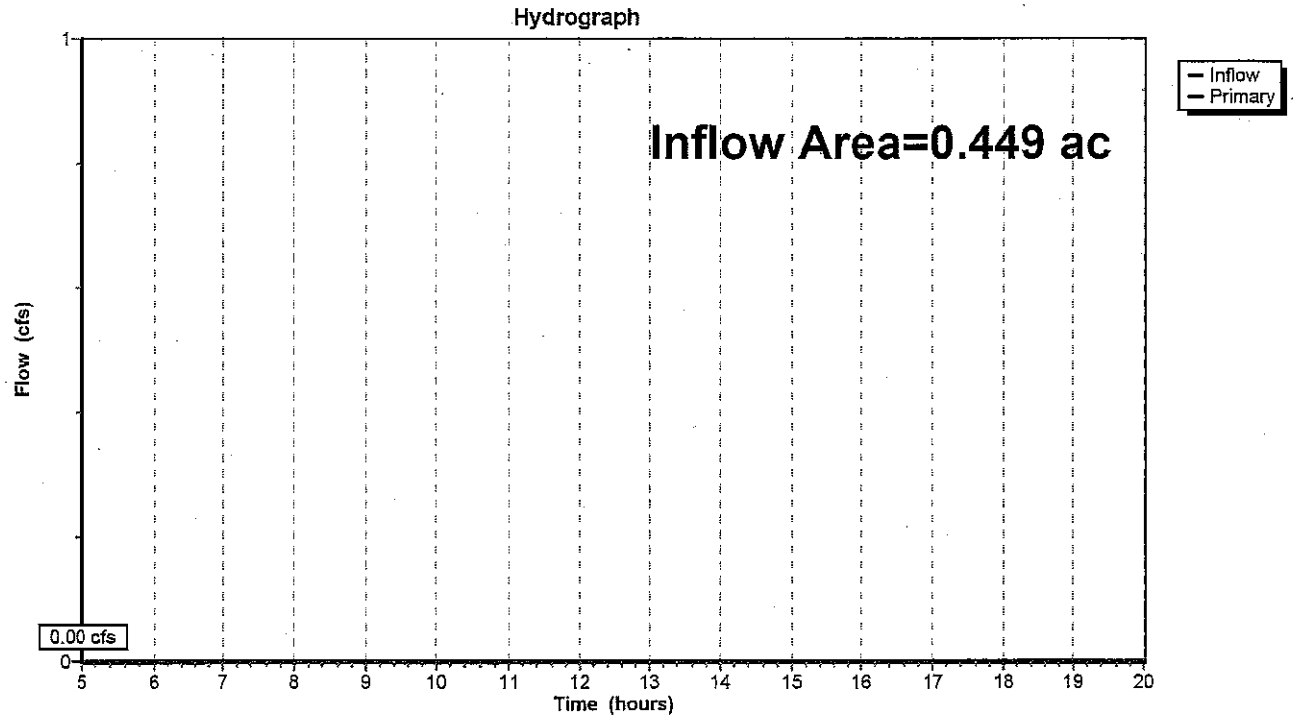


Summary for Link DP: DESIGN POINT

Inflow Area = 0.449 ac, 63.88% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP: DESIGN POINT



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-POST: Runoff Area=19,567 sf 63.88% Impervious Runoff Depth>3.38"
Tc=6.0 min CN=89 Runoff=1.80 cfs 0.127 af

Pond 1P: INFILTRATORS Peak Elev=95.63' Storage=0.045 af Inflow=1.80 cfs 0.127 af
Discarded=0.14 cfs 0.117 af Primary=0.50 cfs 0.009 af Outflow=0.64 cfs 0.126 af

Link DP: DESIGN POINT Inflow=0.50 cfs 0.009 af
Primary=0.50 cfs 0.009 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.127 af Average Runoff Depth = 3.38"
36.12% Pervious = 0.162 ac 63.88% Impervious = 0.287 ac

Summary for Subcatchment 1-POST:

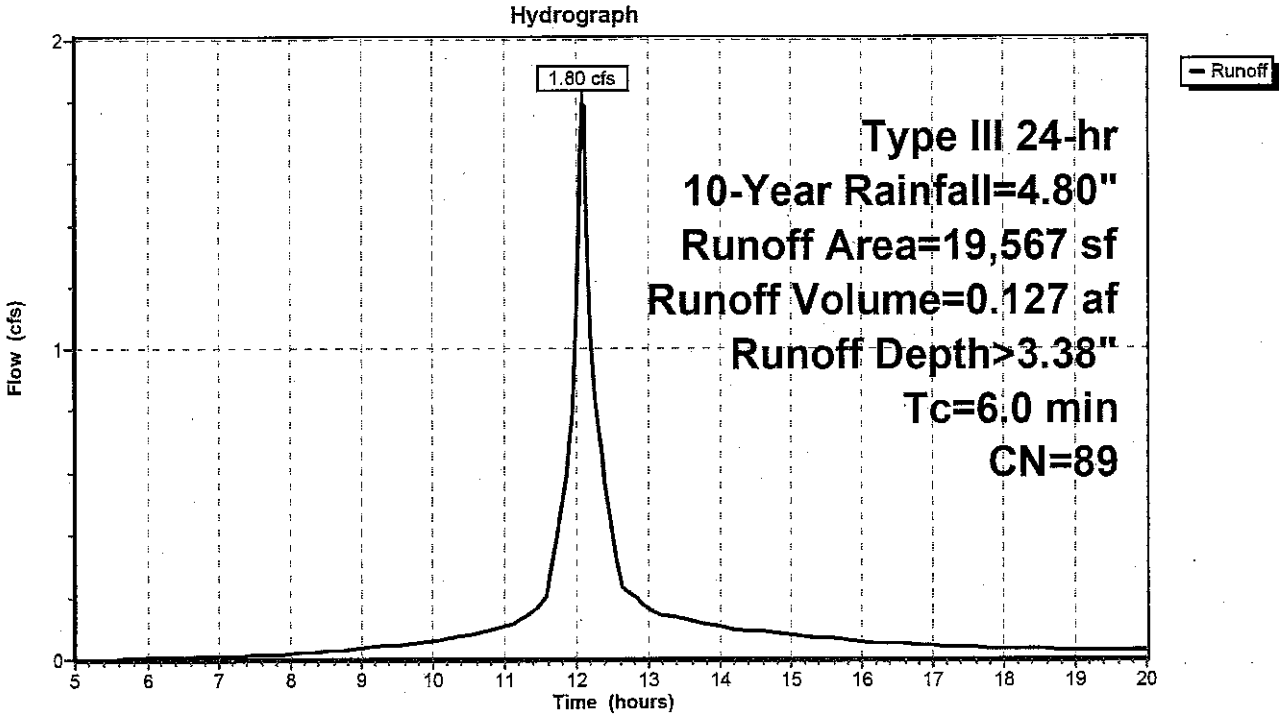
Runoff = 1.80 cfs @ 12.09 hrs, Volume= 0.127 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
*	12,500	98	
	7,067	74	>75% Grass cover, Good, HSG C
	19,567	89	Weighted Average
	7,067		36.12% Pervious Area
	12,500		63.88% Impervious Area

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

Subcatchment 1-POST:



Summary for Pond 1P: INFILTRATORS

Inflow Area = 0.449 ac, 63.88% Impervious, Inflow Depth > 3.38" for 10-Year event
Inflow = 1.80 cfs @ 12.09 hrs, Volume= 0.127 af
Outflow = 0.64 cfs @ 12.41 hrs, Volume= 0.126 af, Atten= 65%, Lag= 19.5 min
Discarded = 0.14 cfs @ 11.35 hrs, Volume= 0.117 af
Primary = 0.50 cfs @ 12.41 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 95.63' @ 12.42 hrs Surf.Area= 0.023 ac Storage= 0.045 af

Plug-Flow detention time= 108.6 min calculated for 0.126 af (100% of inflow)
Center-of-Mass det. time= 108.4 min (873.4 - 765.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	92.50'	0.014 af	**6.33'W x 101.50'L x 3.54'H Field A** 0.052 af Overall - 0.017 af Embedded = 0.035 af x 40.0% Voids
#2A	93.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
#3B	92.50'	0.008 af	**6.33'W x 59.50'L x 3.54'H Field B** 0.031 af Overall - 0.010 af Embedded = 0.021 af x 40.0% Voids
#4B	93.00'	0.010 af	**Cultec R-330XLHD** x 8 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.049 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.50'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	95.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.00' / 94.95' S= 0.0050 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 11.35 hrs HW=92.54' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.44 cfs @ 12.41 hrs HW=95.62' (Free Discharge)
↑—**2=Culvert** (Passes 0.44 cfs of 0.99 cfs potential flow)
↑—**3=Orifice/Grate** (Weir Controls 0.44 cfs @ 1.15 fps)

Pond 1P: INFILTRATORS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

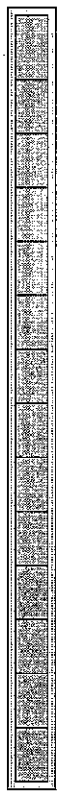
14 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 99.50' Row Length +12.0" End Stone x 2 = 101.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

14 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 741.4 cf Chamber Storage

2,276.7 cf Field - 741.4 cf Chambers = 1,535.3 cf Stone x 40.0% Voids = 614.1 cf Stone Storage

Chamber Storage + Stone Storage = 1,355.5 cf = 0.031 af
Overall Storage Efficiency = 59.5%

14 Chambers
84.3 cy Field
56.9 cy Stone



Pond 1P: INFILTRATORS - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

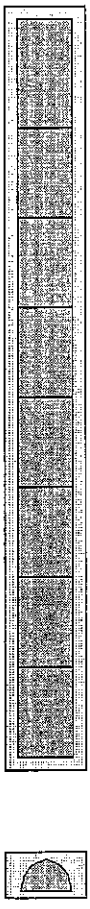
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

8 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 428.4 cf Chamber Storage

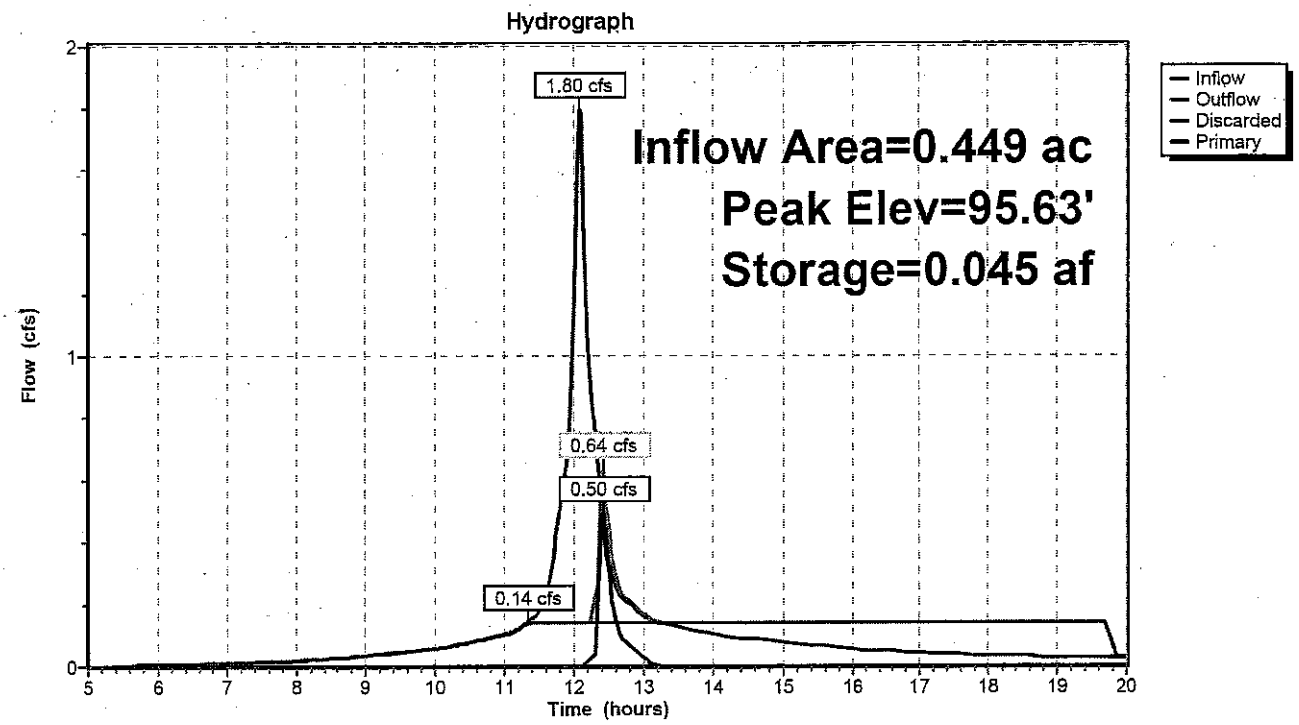
1,334.6 cf Field - 428.4 cf Chambers = 906.2 cf Stone x 40.0% Voids = 362.5 cf Stone Storage

Chamber Storage + Stone Storage = 790.9 cf = 0.018 af
Overall Storage Efficiency = 59.3%

8 Chambers
49.4 cy Field
33.6 cy Stone



Pond 1P: INFILTRATORS

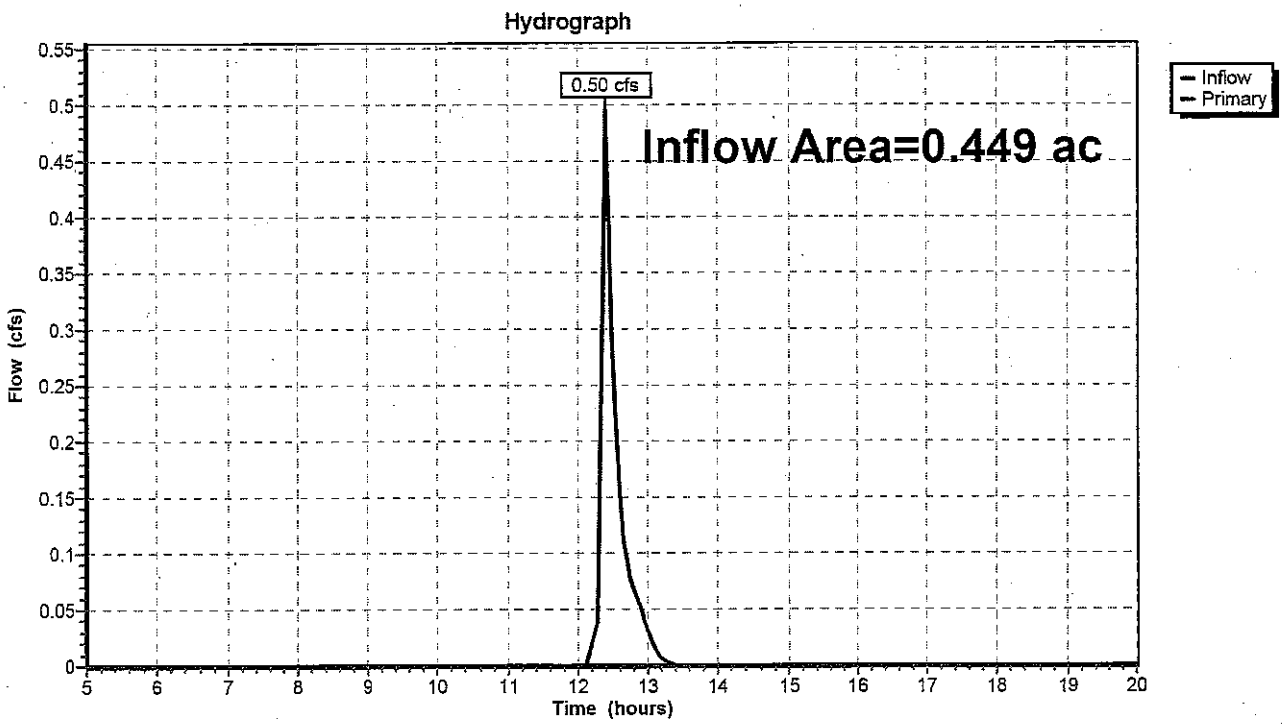


Summary for Link DP: DESIGN POINT

Inflow Area = 0.449 ac, 63.88% Impervious, Inflow Depth = 0.25" for 10-Year event
Inflow = 0.50 cfs @ 12.41 hrs, Volume= 0.009 af
Primary = 0.50 cfs @ 12.41 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP: DESIGN POINT



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1-POST: Runoff Area=19,567 sf 63.88% Impervious Runoff Depth>5.39"
Tc=6.0 min CN=89 Runoff=2.79 cfs 0.202 af

Pond 1P: INFILTRATORS Peak Elev=96.03' Storage=0.049 af Inflow=2.79 cfs 0.202 af
Discarded=0.14 cfs 0.134 af Primary=2.24 cfs 0.057 af Outflow=2.38 cfs 0.190 af

Link DP: DESIGN POINT Inflow=2.24 cfs 0.057 af
Primary=2.24 cfs 0.057 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.202 af Average Runoff Depth = 5.39"
36.12% Pervious = 0.162 ac 63.88% Impervious = 0.287 ac

Summary for Subcatchment 1-POST:

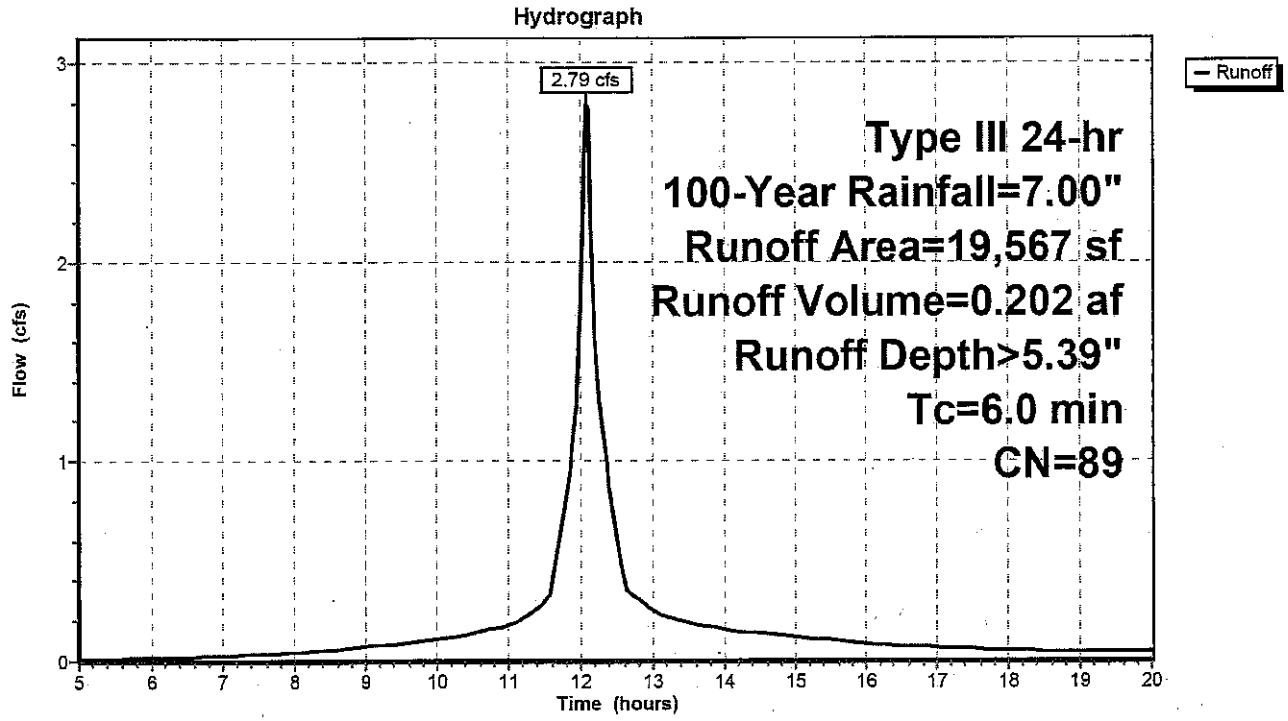
Runoff = 2.79 cfs @ 12.09 hrs, Volume= 0.202 af, Depth> 5.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.00"

	Area (sf)	CN	Description
*	12,500	98	
	7,067	74	>75% Grass cover, Good, HSG C
	19,567	89	Weighted Average
	7,067		36.12% Pervious Area
	12,500		63.88% Impervious Area

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

Subcatchment 1-POST:



Summary for Pond 1P: INFILTRATORS

Inflow Area = 0.449 ac, 63.88% Impervious, Inflow Depth > 5.39" for 100-Year event
Inflow = 2.79 cfs @ 12.09 hrs, Volume= 0.202 af
Outflow = 2.38 cfs @ 12.16 hrs, Volume= 0.190 af, Atten= 15%, Lag= 4.4 min
Discarded = 0.14 cfs @ 10.60 hrs, Volume= 0.134 af
Primary = 2.24 cfs @ 12.16 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 96.03' @ 12.16 hrs Surf.Area= 0.023 ac Storage= 0.049 af

Plug-Flow detention time= 86.8 min calculated for 0.190 af (94% of inflow)
Center-of-Mass det. time= 65.2 min (820.2 - 755.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	92.50'	0.014 af	**6.33'W x 101.50'L x 3.54'H Field A** 0.052 af Overall - 0.017 af Embedded = 0.035 af x 40.0% Voids
#2A	93.00'	0.017 af	**Cultec R-330XLHD** x 14 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
#3B	92.50'	0.008 af	**6.33'W x 59.50'L x 3.54'H Field B** 0.031 af Overall - 0.010 af Embedded = 0.021 af x 40.0% Voids
#4B	93.00'	0.010 af	**Cultec R-330XLHD** x 8 Inside #3 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		0.049 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.50'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	95.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 95.00' / 94.95' S= 0.0050 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#3	Device 2	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 10.60 hrs HW=92.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=2.12 cfs @ 12.16 hrs HW=95.99' (Free Discharge)
↑**2=Culvert** (Barrel Controls 2.12 cfs @ 3.38 fps)
↑**3=Orifice/Grate** (Passes 2.12 cfs of 2.65 cfs potential flow)

Pond 1P: INFILTRATORS - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

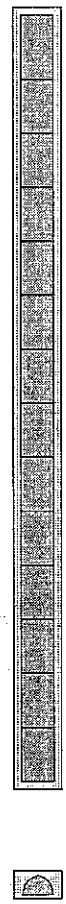
14 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 99.50' Row Length +12.0" End Stone x 2 = 101.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

14 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 741.4 cf Chamber Storage

2,276.7 cf Field - 741.4 cf Chambers = 1,535.3 cf Stone x 40.0% Voids = 614.1 cf Stone Storage

Chamber Storage + Stone Storage = 1,355.5 cf = 0.031 af
Overall Storage Efficiency = 59.5%

14 Chambers
84.3 cy Field
56.9 cy Stone



Pond 1P: INFILTRATORS - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger®330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

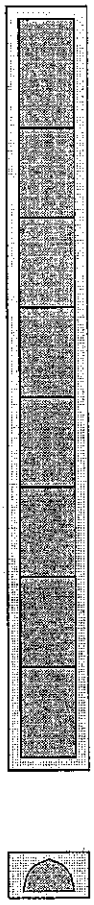
8 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 57.50' Row Length +12.0" End Stone x 2 = 59.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

8 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 428.4 cf Chamber Storage

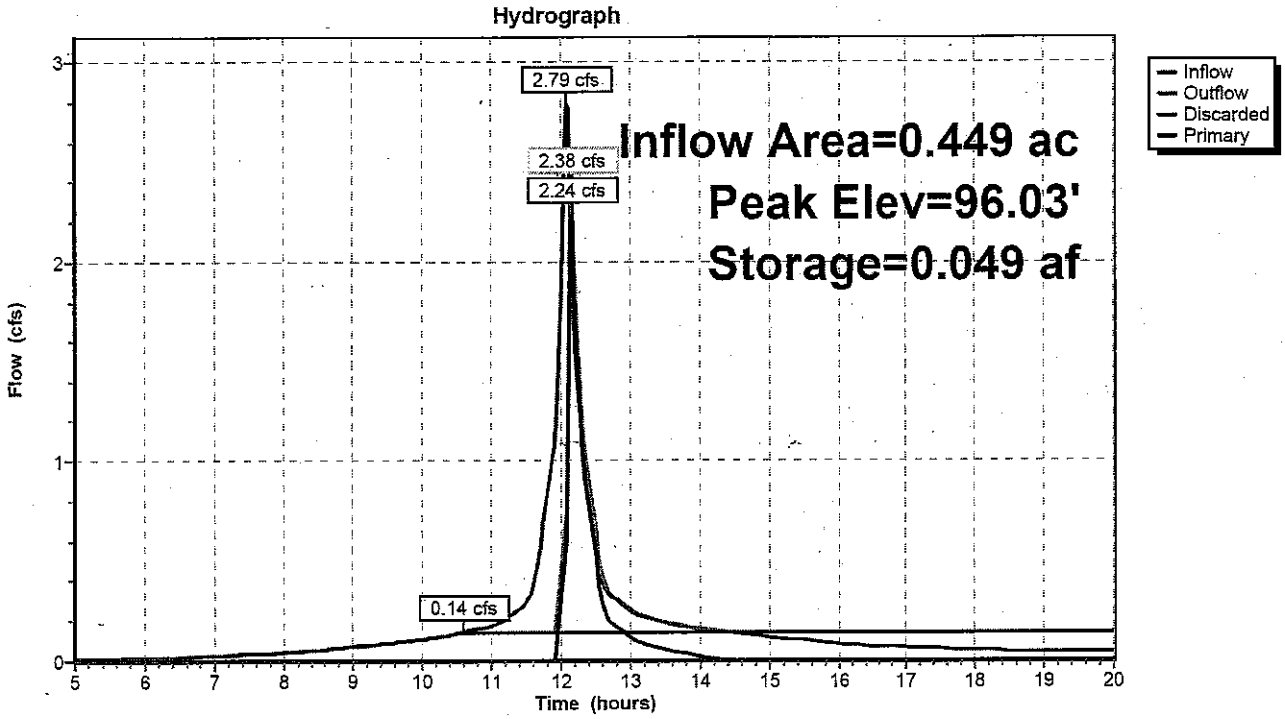
1,334.6 cf Field - 428.4 cf Chambers = 906.2 cf Stone x 40.0% Voids = 362.5 cf Stone Storage

Chamber Storage + Stone Storage = 790.9 cf = 0.018 af
Overall Storage Efficiency = 59.3%

8 Chambers
49.4 cy Field
33.6 cy Stone



Pond 1P: INFILTRATORS



Summary for Link DP: DESIGN POINT

Inflow Area = 0.449 ac, 63.88% Impervious, Inflow Depth = 1.52" for 100-Year event
Inflow = 2.24 cfs @ 12.16 hrs, Volume= 0.057 af
Primary = 2.24 cfs @ 12.16 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link DP: DESIGN POINT