Stormwater Report

for

Medway Medical Building

86 Holliston Street
Medway, MA

Date: April 14, 2022

Prepared By:
Guerriere & Halnon, Inc.
55 West Central Street
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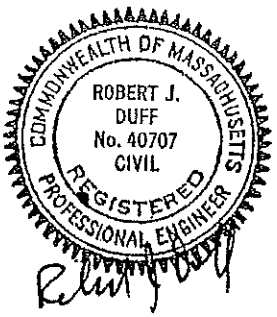

4.14.2022

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ENGINEERING & LAND SURVEYING

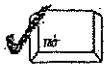
F-4516

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
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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.

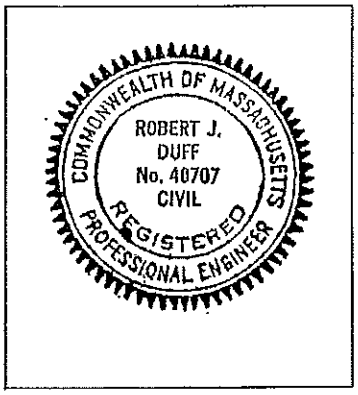
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



Robert J Duff 4-14-2022
Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic 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.

Stormwater Report
Medway Medical Building
Medway, MA

NARRATIVE

This report was prepared on behalf of the applicant Lobisser Companies. The project development area is 96,000 +/- sf. (2.20 +/-Ac.) owned by Freil Realty II, LLC and being developed by the applicant. The project area will be created from a larger parcel, which is currently used as a farm, with livestock grazing within the project area. The property is bordered by a residential neighborhood to the north, a Walgreens pharmacy store to the east, Main Street and a commercial plaza to the south, and the remaining portion of the farm to the west. The site is located within the Central Business zoning district and has frontage along Main Street. Portions of the site lie within the jurisdictional buffers of bordering vegetated wetlands, FEMA flood zone X, and the site is located within the Medway ground water protection district.

PROJECT DESCRIPTION

The Applicant is proposing to construct a 21,900 +/- sf one story medical building and associated driveways, parking lots, utilities, and grading. Drainage infrastructure associated with the new development will also be constructed. The topography consists of slopes ranging from 0% to 10% grade. A 36" culvert originating offsite outlets to a small bordering vegetated wetlands in the southwest corner of the property.

DESCRIPTION OF EXISTING DRAINAGE

The pre-developed site drains principally from north to south, with approximately 8.70 acres of residential properties, woodland, pavement, and lawn areas draining to the catch basins in the Walgreens access driveway overland, flowing across the project parcel. Additionally, 0.94 acres of contributing area from the fields and existing house west of the project area drains to the wetlands located in the southwest corner of the project parcel. The pre-development drainage area is modeled as two hydrologic areas. These hydrologic areas are shown on the Pre-Development Watershed Plan attached to this report and are denoted as EX-1 and EX-2.

DESCRIPTION OF PROPOSED DRAINAGE FACILITIES

The proposed drainage system to manage stormwater from the proposed development consists of Deep Sump Hooded Catch Basins, Contech water quality manholes, and two Cultec infiltration chamber systems. Stormwater from lawns, driveways, parking lots, and roofs is collected and conveyed by a conventional catch basin and drain manhole system to the infiltration chambers for treatment, detention, and infiltration.

In the Post-Development condition, six hydrologic areas were considered. These watershed areas consider the building, driveway, parking, lawns, and drainage facilities proposed to be constructed. These hydrologic areas are shown on the Post-Development Watershed Plan attached to this report and are denoted as PR-1 through PR-6.

This report documents design compliance with the applicable sections of the Massachusetts Stormwater Management Standards 1-10.

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Stormwater Design Parameter:

The stormwater management system was designed to control the post-development rate of peak rainfall runoff from the site by keeping it below the post-development peak rate of rainfall runoff as stated as the objective in the Massachusetts Stormwater Handbook. The calculations were performed using the HydroCAD hydraulic program, developed by applied Microcomputer System. The HydroCAD software is based upon the Soil Conservation Service, "Technical Release 55 – Urban Hydrology for Small Watersheds" and is generally accepted industry methodology.

The analysis was performed for the 2-year, 10-year, and 100-year 24-hour storm events.

The following data was required for input:

- Watershed Area: Areas of each watershed were calculated and expressed in square feet for these calculations.
- SCS Curve Number (Cn): Based on the cover type and hydrologic soil group, a weighted curve number (CN) was determined for each of the existing watersheds utilizing Table 2-2a- *Runoff Curve Numbers For Urban Areas* and *Worksheet 2, Runoff Curve Number and Runoff* from the Soil Conservation Service Technical Release 55 – Urban Hydrology for Small Watersheds.
- Time of Concentration, Tc (Minutes): The time of concentration for each watershed was determined by finding the time necessary for runoff to travel from the hydraulically most distant point in the watershed to the point of analysis. This was calculated by using a minimum time of 6 minutes for runoff to reach the most distant catch basin.
- SCS 24-Hour Storm Type: For the greater New England region, a Type III storm rainfall distribution is recommended for drainage calculations and was used for this project.
- Rainfall Precipitation: Rainfall precipitations used the NOAA Atlas-14 rainfall estimates for Norfolk County for the 2, 10, and 100 year storm events and are as follows:

2-year storm event:	3.22 inches
10-year storm event:	4.86 inches
100-year storm event:	8.80 inches

An on-site conventional storm drainage collection system is designed based on the "Rational Method" using Manning's equation to carry a minimum 25-year storm event and underground culverts to carry a minimum 50-year storm event through the site (See Pipe Sizing Attachments). The proposed drainage pipes will be Reinforced Concrete Pipe (RCP), unless otherwise noted on the plans.

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Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

All Paved area runoff from the proposed parking area will sheet flow across the pavement areas, accumulate into hooded catch basins, connect with drain pipe to a sediment forebay, which discharge to the infiltration basin. No new untreated stormwater discharges are proposed.

Standard 2: Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

To meet Standard 2, the post-development peak discharge rate must be equal to or less than pre-development rates to prevent storm damage and downstream and offsite flooding from the 2-year and the 10-year 24-hour storm events.

Peak discharge rates were calculated and evaluated at the southern and western property lines. The point of evaluation is shown on the accompanying watershed plans.

In summary of the attached drainage analysis (HydroCAD), the peak discharge rates at the point of evaluation in cubic feet per second (cfs) are as follows;

Analysis Point 1 (AP-1)

	Run off		
Storm Events	Pre (cfs)	Post (cfs)	Change (cfs)
2-year	0.01	0.01	0.0
10-year	0.15	0.15	0.0
100-year	1.83	1.83	0.0

Analysis Point 2 (AP-2)

	Run off		
Storm Events	Pre (cfs)	Post (cfs)	Change (cfs)
2-year	5.85	5.80	-0.05
10-year	14.35	13.18	-1.17
100-year	38.49	37.62	-0.87

Standard 3: Loss of annual recharge to ground water shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post- development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Soil Evaluation

Soil evaluation is broken down into two stages. Stage 1 identifies the underlying soils just beneath the surface that contribute to how much runoff is generated as stormwater falls and moves across the surface. Stage 2 evaluates the soils in direct contact with the proposed infiltration BMPs. The attachments section includes the NRCS Soil Survey used for Stage 1 while the site plan set includes

the on-site soil textural analysis in the specific locations that infiltration is proposed. The information from the NRCS Soil Survey is included on the Pre and Post Development Watershed Plans.

Recharge Volume

The required recharge volume is determined by calculating the impervious area proposed over the corresponding soil identified in the NRCS Soil Survey. Soils underlying the site are defined as map units 260B Sudbury Fine Sandy Loam (HSG B), 254B Merrimac Fine Sandy Loam (HSG A), 300B Montauk Fine Sandy Loam (HSG C), and 310B Woodbridge Fine Sandy Loam (HSG C/D).

Table 2: Required Recharge Volume Calculation

Hydrologic Group	Recharge (in/sqft)	Impervious (sqft)	Volume (cf)
A - *sand*	0.60	None	0
B - *loam*	0.35	47,524	1,386.1 cf
C - *silty loam*	0.25	12,763	265.9 cf
D - *clay*	0.10	None	0
Required Recharge Volume Total			**1,652.0 cf**

Stormwater Basin Sizing

There are three ways of determining the recharge volume provided by a storm water basin (Static, Simple Dynamic and Dynamic Field). The Static Method, used here, includes the volume of water that can be stored beneath the lowest outlet of the basin. This, the most conservative method of determining the recharge volume, doesn't account for any infiltration that takes place while the basin is filling with water and is less dependent on maintenance of the basin since the only way for the water below the lowest invert can leave the basin is though infiltration. The following table summarizes the recharge volume provided by the infiltration chambers. Detailed volume calculations for the basin are included in the attachments.

Table 3: Basin Recharge Volumes

	Recharge Volume
Basin 2 @ 208.80	14,031 cf
Total	14,031 cf

72-hour Drawdown

When using the conservative Static Method to determine infiltration volume provided, the Rawls Rate is used to represent the infiltration rate in place of a hydraulic conductivity rate. The specific rate chosen is based on the textural analysis of the in-site soil performed by a competent soil professional.

A Massachusetts Certified Soil Evaluator performed an evaluation of the soil at the proposed infiltration BMP. The soil textural analysis for the infiltration BMP is listed below with the associated Rawls Rate used in the HydroCAD calculations. Where textural analysis varied within any

single BMP, the most restrictive textural evaluation and Rawls Rate were used. Soil logs of the in situ soil evaluation are included within the Site Plan set.

Table 4: Rawls Rate

	Most Restrictive Soil Texture	Rawls Rate (in/hour)
Basin 1	Loamy Sand	2.41 in/hr

Drawdown time for the infiltration basin is modeled by HydroCAD and included in the attachments. The following table summarizes the drawdown time for the basin to show it will drawdown within the 72-hour maximum.

Table 5: Basin Drawdown

	Time for Drawdown
Basin 1	25 hours
Basin 2	30 hours

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
b) Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and
c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

The Water Quality Volume requiring 80% TSS removal, is calculated as follows:

The required water quality volume is based on 1.0" as the soil recharge rate is 2.41 in/hr, meeting the threshold rate of 2.4 in/hr or greater. The water quality volume equals 1.0 inches of runoff times the increased impervious area of the post-development site.

Existing Site Impervious Area	=	0 sf
Proposed Site Impervious Area	=	38,553 sf
Total Site Impervious Area Increase	=	38,553 sf
Impervious area to be treated	=	**38,553 sf**

Total volume to be treated:
1.0" x 1'/12" x 38,553 sf = 3212.8 **cf Water Quality Volume Required**

Provided Water Quality Volume:

Treatment volume (infiltration basin) = 14,031 cf @ el. 208.80 Weir Elevation

See TSS Removal Calculations in Attachment Section.

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Stormwater Bylaw Section 26.5.8.3 Compliance:

To ensure the project is compliant with the Town of Medway's stormwater bylaw, the site was evaluated to determine if the 1" runoff retention requirement specified in section 26.5.8.3.b.(7)(a) is met by the proposed stormwater system. The total site impervious area, including roofs, for the project is 60,416.2 square feet. The equivalent 1" of runoff from these surfaces is 5,034.7 cubic feet. As shown above, the total storage volume provided below basin #2's lowest inverts is 14,031 cu.ft. The proposed stormwater system retains the stormwater volume required by the towns stormwater bylaw.

Standard 4: requires the development and implementation of suitable practices for source control and pollution prevention. These measures must be identified in a long-term pollution prevention plan.

The long-term pollution prevention plan is incorporated into the Operation and Maintenance Plan required by Standard 9.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The proposed project is not a use with higher potential pollutant loads.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The subject property discharges stormwater within the Medway Groundwater Protection District. Due to rapid recharge rates present in the infiltration basin, the Water Quality Volume is calculated using the required 1.0" rule, and 44% TSS removal is achieved prior to discharge to the infiltration basin. See Standard 4 for computations. The design utilizes stormwater BMPs designated as suitable for critical areas within the Massachusetts Stormwater Handbook.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable:

This project is not a redevelopment project and meets all applicable stormwater standards.

Stormwater Report
Medway Medical Building
Medway, MA

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

During land disturbance and construction activities, project proponents must implement controls that prevent erosion, control sediment movement, and stabilize exposed soils to prevent pollutants from moving offsite or entering wetlands or waters. Land disturbance activities include demolition, construction, clearing, excavation, grading, filling, and reconstruction.

Construction Period Pollution Prevention Plan and Erosion and Sedimentation Control.
EPA NPDES – Storm Water Pollution Prevention Plan (SWPPP)

A. Names of Persons or Entities Responsible for Plan Compliance

Kevin Lobisser
Lobisser Companies
1 Charlesview Road
Hopedale, MA 01747
Tel: 508-478-6235

B. Construction Period Pollution Prevention Measures

1. Inventory materials to be present on site during construction.
2. Train employees and subcontractors in prevention and clean up procedures.
3. All materials stored on site will be stored in their appropriate containers and if possible under a roof or covered.
4. Follow manufacturer's recommendation for disposal of used containers.
5. Store only enough products on site to do the job.
6. On site equipment, fueling and maintenance measures:
   a. Inspect on-site vehicles and equipment daily for leaks.
   b. Conduct all vehicle and equipment maintenance and refueling outside of 100' wetland buffer, away from storm drains.
   c. Perform major repairs and maintenance off site.
   d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
   e. Collect spent fuels and remove from site, per Local and State regulations.
   f. Maintain a clean construction entrance; install a crushed stone apron where truck traffic is frequent to reduce soil compaction constant sweeping is required and limit tracking of sediment into streets, sweeping street when silt is observed on street.
7. A temporary concrete washout station and equipment wash station shall be located on the site. Areas shall be surrounded with a silt fence and or Filter Mitt to contain materials and provide ease of cleanup.
8. Stock pile materials, and maintain Erosion Control around the materials where it can easily be accessed. Maintain easy access to clean up materials to include brooms, mops, rags gloves, goggles, sand, sawdust, plastic and metal trash containers.
9. Clean up spills.
   a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry cleanup methods (sawdust, cat litter and/or rags and absorbent pads).
   b. Sweep up dry materials immediately. Never wash them away or bury them.

c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil in a certified container and notify a certified hauler for removal.
d. Report significant spills to the Fire Department.

10. It is the responsibility of the site superintendent or employees designated by the Applicant to inspect erosion control and repair as needed, also to inspect all on site vehicles for leaks and check all containers on site that may contain hazardous materials daily.

C. Site Development Plans
1. See Site Plan set "Site Plan 86 Holliston Street, Medway, Massachusetts" dated April 14, 2022, prepared by Guerriere & Halnon, Inc.

D. Construction Erosion and Sedimentation Control Plan:
1. See Site Plan set "Site Plan 86 Holliston Street, Medway, Massachusetts" dated April 14, 2022, prepared by Guerriere & Halnon, Inc.

E. Plans
1. Construction Sequencing Plan
a. A NPDES NOI shall be filed with the EPA.
b. Record Order of Conditions - The site superintendent shall be aware of all the Conditions contained within the Order including inspection schedules.
c. Install DEP File # Sign prior to commencement of work.
d. Prior to any work on the site including tree/brush clearing, the approved limit of clearing as well as the location of the proposed erosion control devices (such as silt fence/straw bales, etc.) must be staked on the ground under the direction of a Massachusetts registered Professional Land Surveyor.
e. Install erosion control barrier at locations depicted on the plans.
f. Erosion control to be inspected by either the design engineer (or agent) or an erosion control monitor appointed by the Town of Medway.
g. Extra erosion control devices (at least 10% of the linear footage required for the site) shall be stored on the site to be used in case of an emergency (large storm).
h. Perform tree/brush removal.
i. Strip off top and subsoil. Stockpile material to be reused away from any drainage inlet or protected wetland areas, remove excess material from the site. Install and maintain erosion control barrier around stockpile.
j. Rough grade site, maintaining temporary low areas/sediment traps for sediment accumulation and away from the wetlands and prevent sedimentation from migrating from the site.
k. Construct stormwater chamber systems. Install pipes, manholes and catch basins. Stabilize side slopes with loam, seed and mulch.
l. Install underground utilities; protect all open drainage structures with erosion/siltation control devices, and rope off any areas susceptible to heavy vehicle damage.
m. Prepare compacted pavement base.
n. Loam and seed (mulch as required) disturbed areas of site other than immediately adjacent to work area.

o. Upon all catchment structures and mitigation features becoming operational, install pavement up to binder finish grade. Straw bales backed by crushed stone to be provided on down gradient side of catch basins to direct water to temporary basin.
p. Install curbing and catch basin curb inlets.
q. Install final pavement wearing course.
r. Finish grade - loam and seed (mulch as required adjacent to parking lot.
s. Maintain all erosion control devices until site is stabilized and final inspections are performed.

The Contractor shall be responsible to schedule any required inspections of his/her work.

2. Construction Waste Management Plan
   a. Dumpster for trash and bulk waste collection shall be provided separately for construction.
   b. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
   c. Segregate and provide containers for disposal options for waste.
   d. Do not bury waste and debris on site.
   e. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
   f. The sewer system is only for disposal of human waste.

F. Operation and Maintenance of Erosion and Sedimentation Controls

The operation and maintenance of sedimentation control shall be the responsibility of the contractor. The inspection and maintenance of the storm water component shall be performed as noted below. The contractor shall, at all times have erosion control in place. The contractor, based on future weather reports shall prepare and inspect all erosion control devices; cleaning, repairing and upgrading is a priority so that the devices perform as per design. Inspect the site during rain events. **Don't stay away from the site.** At a minimum, there should be inspection to assure the devices are not clogged or plugged, or that devices have not been destroyed or damaged during the rain event. After a storm event inspection is required to clean and repair any damage components. Immediate repair is required.

G. Inspection and Maintenance Schedules

1. Inspection must be conducted at least once every 7 days and within 24 hours prior to and after the end of a storm event 0.5 inches or greater.
2. Inspection frequency can be reduced to once a month if:
   a. The site is temporarily stabilized.
   b. Runoff is unlikely due to winter conditions, when site is covered with snow or ice.
3. Inspections must be conducted by qualified personnel, "qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls and who possess the skills to assess the conditions and take measures to maintain and ensure proper operation, also to conclude if the erosion control methods selected are effective.
4. For each inspection, the inspection report must include:
   a. The inspection date.
   b. Names, titles of personnel making the inspection.
   c. Weather information for the period since the last inspection.
   d. Weather information at the time of the inspection.
   e. Locations of discharges of sediment from the site, if any.

f. Locations of BMP's that need to be maintained.
g. Locations where additional BMP's may be required.
h. Corrective action required or any changes to the SWPPP that may be necessary.

5. Qualified personnel shall inspect the following in-place work;

Inspection Schedule:	
Erosion Control	Weekly
Catch Basins	Weekly
Temporary Sedimentation Traps/Basins	Weekly
Pavement Sweeping	Weekly

Please Note: Special inspections shall also be made after a significant rainfall event.

Maintenance Schedule	
Erosion Control Devices Failure	Immediately
Temporary Sedimentation Traps/Basins	As needed
Pavement Sweeping	14 days minimum and prior to any significant rain event.

Please Note: Special maintenance shall also be made after a significant rainfall event.

H. Inspection and Maintenance Log Form.
1. See Construction Phase Inspection and Maintenance Form attached

Standard 9: A Long –Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that storm water management systems function as designed.

The following shall serve as the (O&M) Plan required by Standard 9, as well as the Long-Term Pollution Prevention Plan required by Standard 4.

A. Names of Persons or Entities Responsible for Plan Compliance:

Kevin Lobisser
Lobisser Companies
1 Charlesview Road
Hopedale, MA 01747
Tel: 508-478-6235

It is the intent of the Applicant to have the site completed and released by the various town Departments and Boards.

B. Good housekeeping practices
1. Maintain site, landscaping and vegetation.
2. Sweep and pick up litter on pavements and grounds.
3. Deliveries shall be monitored by owners or representative to ensure that if any spillage occurs, it shall be contained and cleaned up immediately.
4. Maintain pavement and curbing in good repair.

C. Requirements for routine inspections and maintenance of stormwater BMPs

1. Plans: The storm water Operation and Maintenance Plan shall consist of all Plans, documents and all local state and federal approvals as required for the subject property.
2. Record Keeping:
   a. Maintain a log of all operation and maintenance activities for at least three years following construction, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
3. Descriptions and Designs: The Best Management Practices (BMP) incorporated into the design include the following;
   a. Pavement Sweeping – Stipulated within the Construction Period Pollution Prevention Plan, the Long Term Pollution Prevention Plan, and the Operation and Maintenance Plan. As the amount of TSS removal is discretionary, no credit was taken within the calculations for this BMP.
   b. Deep sump catch basins with hoods installed to promote TSS Removal of solids and control floatable pollutants. This BMP has a design rate of 25% TSS Removal.
   c. Contech Water Quality Manholes - installed to promote TSS Removal of solids. These proprietary BMPs have a variable rate of TSS removal, see manufacturer calculations in attachment section of this report.
   d. Infiltration Chambers – infiltration BMP provides the required groundwater recharge and has a design rate of 80% TSS Removal. Refer to TSS Removal Worksheet included in the Attachments.
   e. Spill Containment Kit to contain and clean-up spills that could occur on site.
4. BMP Maintenance: After construction it is the responsibility of the owner to perform maintenance. The cleaning of the components of the stormwater management system shall generally be as follows:
   a. Pavement: The owner shall keep the pavement swept with a mechanical sweeper or hand swept semi-annually at a minimum.
   b. Catch Basins: Shall be cleaned by excavating, pumping or vacuuming. The sediment shall be disposed of off-site by the Owner. Inspect quarterly, remove silt when ¼ full.
   c. Water Quality Manholes: Inspect quarterly. remove silt when ¼ full.
   d. Infiltration Basin: Inspect for proper function after every major storm event during the first 3 months of operation, inspect/remove debris twice per year afterward. Mow basin at least twice per year, remove clippings.
5. Access Provisions: All of the components of the storm water system will be accessible by the Owner

D. Spill prevention and response plans

1. Train employees and subcontractors in prevention and clean up procedures.
2. All materials stored on site will be stored in their appropriate containers under a roof or in the approved underground storage tanks.
3. Follow manufacturer's recommendation for disposal of used containers.
4. On site equipment, fueling and maintenance measures:
   a. Inspect on-site vehicles and equipment daily for leaks.
   b. Conduct all vehicle and equipment maintenance off Site and refueling in one location, away from storm drains and wetlands.

5. Clean up spills.
   a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean-up methods (sawdust, cat litter and/or rags and absorbent pads).
   b. Sweep up dry materials immediately. Never wash them away or bury them.
   c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil.
   d. Report significant spills to the Fire Department, Conservation Commission and Board of Health.

E. Provisions for maintenance of lawns, gardens, and other landscaped areas
Dispose of clippings away from storm drainage.

F. Requirements for storage and use of herbicides, and pesticides
The application of herbicides or pesticides will be done by professional certified contractor.

G. Provisions for solid waste management
1. Waste Management Plan
   a. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material is recommended.
   b. Do not bury waste and debris on site.
   c. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.

H. Snow disposal and plowing plans
Snow storage is adequate around the site for large storm events, see site plan

I. Winter Road Salt and/or Sand Use and Storage restrictions
No sand, salt, or chemicals for de-icing will be stored outside.

J. Pavement sweeping schedules
Sweeping, the act of cleaning pavement can be done by mechanical sweepers, vacuum sweeper or hand sweeper. The quantity of sand is a direct correlation with the treatment of ice and snow and the types of chemicals and spreaders that are being used on site to manage snow. If a liquid de-icer such as calcium chloride is used as a pretreatment to new events the amount of sand is minimized. Sweeping for this site should be done semi-annually at a minimum. Collecting the particulate before it enters the catch basins is cheaper and more environmentally friendly than in a catch basin mixing with oils and greases in the surface water runoff in catch basins.

K. Provisions for prevention of illicit discharges to the stormwater management system
The discharge into the stormwater system is not being violated, see attachment for illicit discharges compliance.

L. Training the staff or personnel involved with implementing Long-Term Pollution Prevention Plan The owner shall develop policies and procedures for containing the illicit spilling of oils, soda, beer, paper, and litter. These wastes provide a degrading of the water quality. The placement of signs and trash barrels with lids around the site would contribute to a clean water quality site conditions.

M. List of Emergency contacts for implementing Long-Term Pollution Prevention Plan:

Kevin Lobisser
Lobisser Companies
1 Charlesview Road
Hopedale, MA 01747
Tel: 508-478-6235

BMP	Estimated Maintenance Cost
Pavement sweeping	$ 400 per year
Catch basin & WQMH cleaning	$ 200 per catch basin per cleaning
Infiltration Chambers	$ 500 per cleaning
Spill Containment Kit	$ 750 purchase price

Stormwater Report
Medway Medical Building
Medway, MA

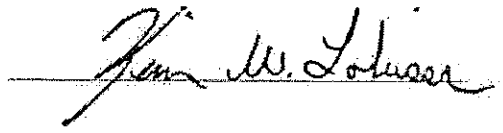
Standard 10: All illicit discharges to the stormwater management system are prohibited.

Standard 10 prohibits illicit discharges to stormwater management systems. The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site, including stormwater best management practices and any pipes intended to transport stormwater to the ground water, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated ground water, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

Illicit Discharge Compliance Statement

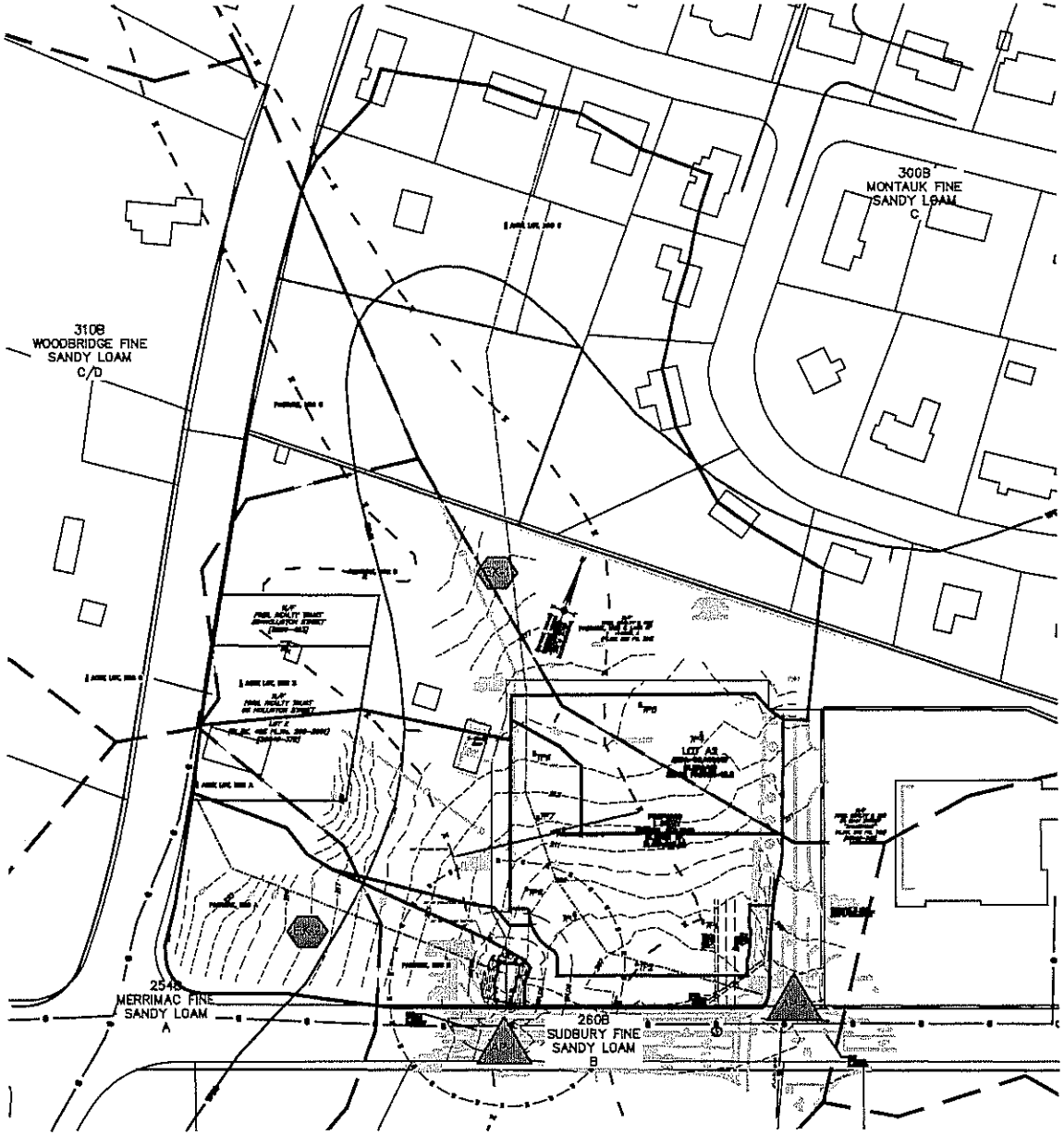
It is the intent of the Applicant, Kevin Lobisser, Lobisser Companies, 1 Charlesview Road, Hopedale, MA 01747 to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. There will be no connection to the storm water system to inadvertently direct other types of liquids, chemicals or solids into the storm drainage system. The Owner will also promote a clean Green Environment by mitigating spills onto pavements; oils, soda, chemicals, pet waste, debris and litter.

Respectfully Acknowledged,



ATTACHMENTS

Pre- Post Drainage Plans



APPROVED DATE

MERRIMACK FLANNERS BOARD

BEING A MAJORITY

LEGAL NOTES

UTILITIES ARE PLOTTED AS A COMPILATION OF RECORD DOCUMENTS, MARKINGS AND OTHER OBSERVED EVIDENCE. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES AND SHOULD BE CONSIDERED APPROXIMATE. UNLESS EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. ADDITIONAL UTILITIES NOT EVIDENCED BY RECORD DOCUMENTS OR OBSERVED PHYSICAL EVIDENCE MAY EXIST. CONTRACTORS IN ACCORDANCE WITH MASS.G.L. CHAPTER 82 SECTION 40 AS AMENDED) MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING AND CALL DIGSAFE AT 1(888)DIG-SAFE(7233).

CONSTRUCTION ON THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS, OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

OWNER

PEBEL REALTY II, LLC
DEED BOOK 37888 PAGE 200
PLAN BK. 998, PG 178 OF 2020
A.K.A. LOT 2

APPLICANT

LOCKHEED CONSTRUCTION
1 CHARLEMONT ROAD
HOPEDALE, MA 01747

SITE PLAN
86 HOLLISTON STREET
MEDWAY
MASSACHUSETTS

EXISTING WATERSHED

MARCH 21, 2022

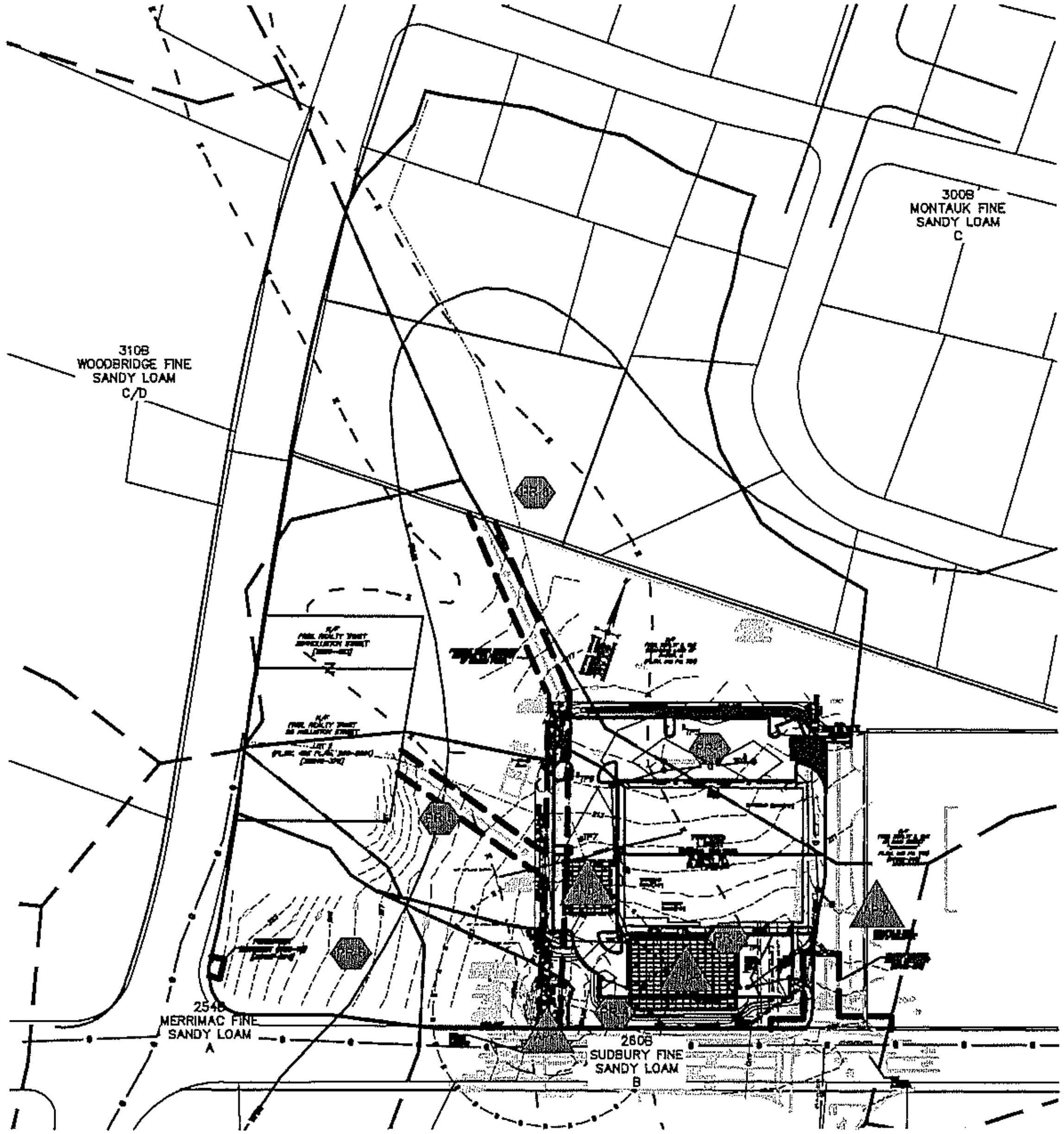
DATE	REVISION DESCRIPTION

GRAPHIC SCALE: 1"=50'

Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
55 WEST CENTRAL ST. TEL (508) 528-3221
FRANKLIN, MA 02038 FX (508) 528-7921
www.gandhengineering.com

SHEET 1 OF 8

JOB NO. F4516



F4516

APPROVED DATED ______

MEDWAY PLANNING BOARD

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BEING A MAJORITY

LEGAL NOTES

UTILITIES ARE PLOTTED AS A COMPILATION OF RECORD DOCUMENTS, MARKINGS AND OTHER OBSERVED EVIDENCE TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES AND SHOULD BE CONSIDERED APPROXIMATE. LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. ADDITIONAL UTILITIES NOT EVIDENCED BY RECORD DOCUMENTS OR OBSERVED PHYSICAL EVIDENCE MAY EXIST. CONTRACTORS (IN ACCORDANCE WITH M.G.L. CHAPTER 82 SECTION 40 AS AMENDED) MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING AND CALL DIGSAFE AT 1(888)DIG-SAFE(7233).

CONSTRUCTION ON THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS, OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

OWNER

[illegible]

APPLICANT

[illegible]

SITE PLAN
66 HOLLISTON STREET
MEDWAY
MASSACHUSETTS

PROPOSED WATERSHED

MARCH 21, 2022

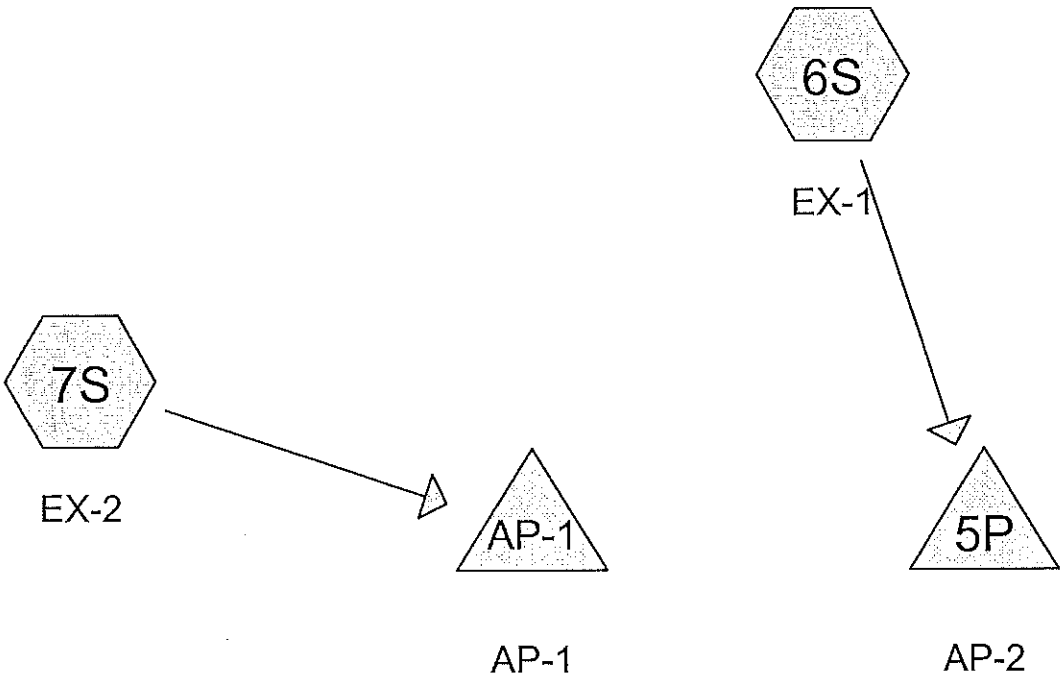
DATE	REVISION DESCRIPTION

GRAPHIC SCALE: 1"=50'

Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
55 WEST CENTRAL ST. FRANKLIN, MA 02038
PH. (508) 528-3221 FX. (508) 528-7921

SHEET 3 OF 3 | JOB NO. F4516

Hydro CAD Calculations



Subcat Reach Pond Link

Routing Diagram for F-4516 pre-development
Prepared by {enter your company name here}, Printed 4/5/2022
HydroCAD® 10.00-21 s/n 10299 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.068	54	1/2 acre lots, 25% imp, HSG A (6S)
0.601	70	1/2 acre lots, 25% imp, HSG B (6S)
2.553	83	1/4 acre lots, 38% imp, HSG C (6S)
0.746	39	Pasture/grassland/range, Good, HSG A (6S, 7S)
3.329	61	Pasture/grassland/range, Good, HSG B (6S, 7S)
2.343	74	Pasture/grassland/range, Good, HSG C (6S)
9.641	**69**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.815	HSG A	6S, 7S
3.930	HSG B	6S, 7S
4.896	HSG C	6S
0.000	HSG D	
0.000	Other	
9.641		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.068	0.601	0.000	0.000	0.000	0.669	1/2 acre lots, 25% imp	6S
0.000	0.000	2.553	0.000	0.000	2.553	1/4 acre lots, 38% imp	6S
0.746	3.329	2.343	0.000	0.000	6.418	Pasture/grassland/range, Good	6S, 7S
0.815	**3.930**	**4.896**	**0.000**	**0.000**	**9.641**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment6S: EX-1 Runoff Area=378,950 sf 13.08% Impervious Runoff Depth=0.89"
Flow Length=997' Tc=17.4 min CN=71 Runoff=5.85 cfs 0.645 af

Subcatchment7S: EX-2 Runoff Area=41,011 sf 0.00% Impervious Runoff Depth=0.05"
Tc=10.0 min CN=45 Runoff=0.01 cfs 0.004 af

Pond 5P: AP-2 Inflow=5.85 cfs 0.645 af
Primary=5.85 cfs 0.645 af

Pond AP-1: AP-1 Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Total Runoff Area = 9.641 ac Runoff Volume = 0.649 af Average Runoff Depth = 0.81"
88.20% Pervious = 8.503 ac 11.80% Impervious = 1.138 ac

Summary for Subcatchment 6S: EX-1

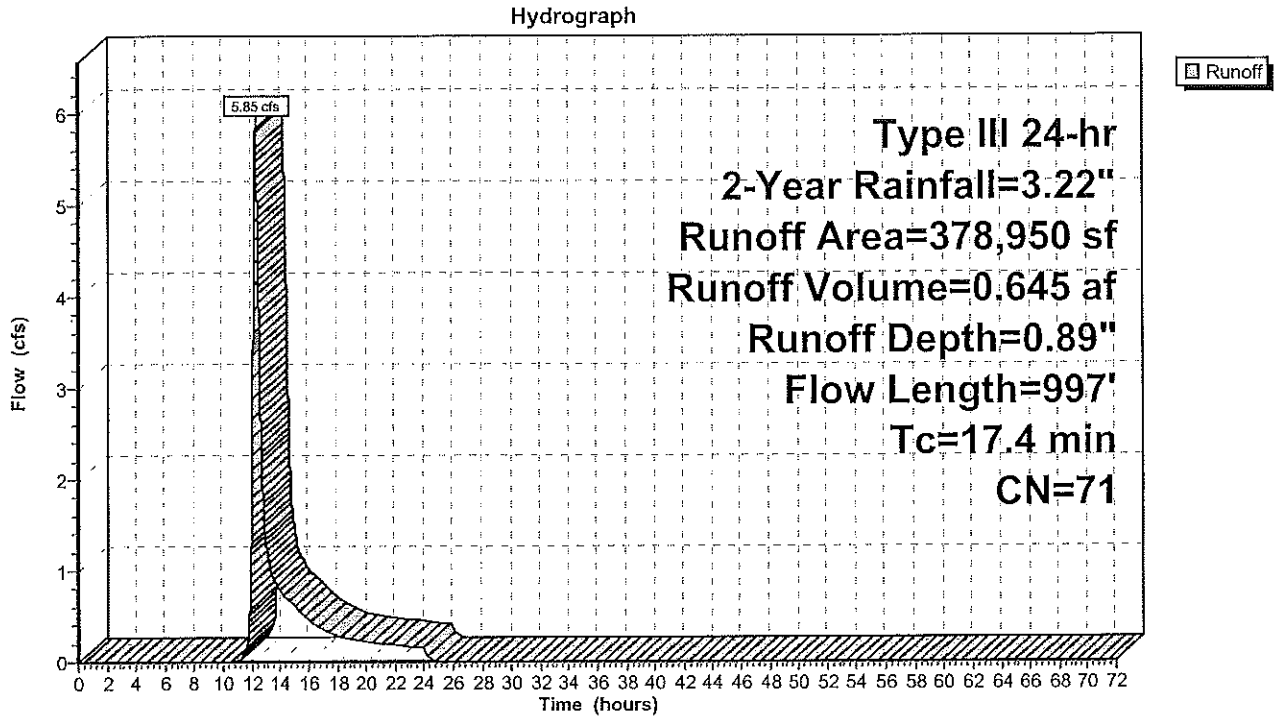
Runoff = 5.85 cfs @ 12.27 hrs, Volume= 0.645 af, Depth= 0.89"

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
102,073	74	Pasture/grassland/range, Good, HSG C
111,214	83	1/4 acre lots, 38% imp, HSG C
133,551	61	Pasture/grassland/range, Good, HSG B
26,192	70	1/2 acre lots, 25% imp, HSG B
2,953	39	Pasture/grassland/range, Good, HSG A
2,967	54	1/2 acre lots, 25% imp, HSG A
378,950	71	Weighted Average
329,399		86.92% Pervious Area
49,551		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.8	184	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	345	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	267	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	151	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.4	997	Total			

Subcatchment 6S: EX-1



Summary for Subcatchment 7S: EX-2

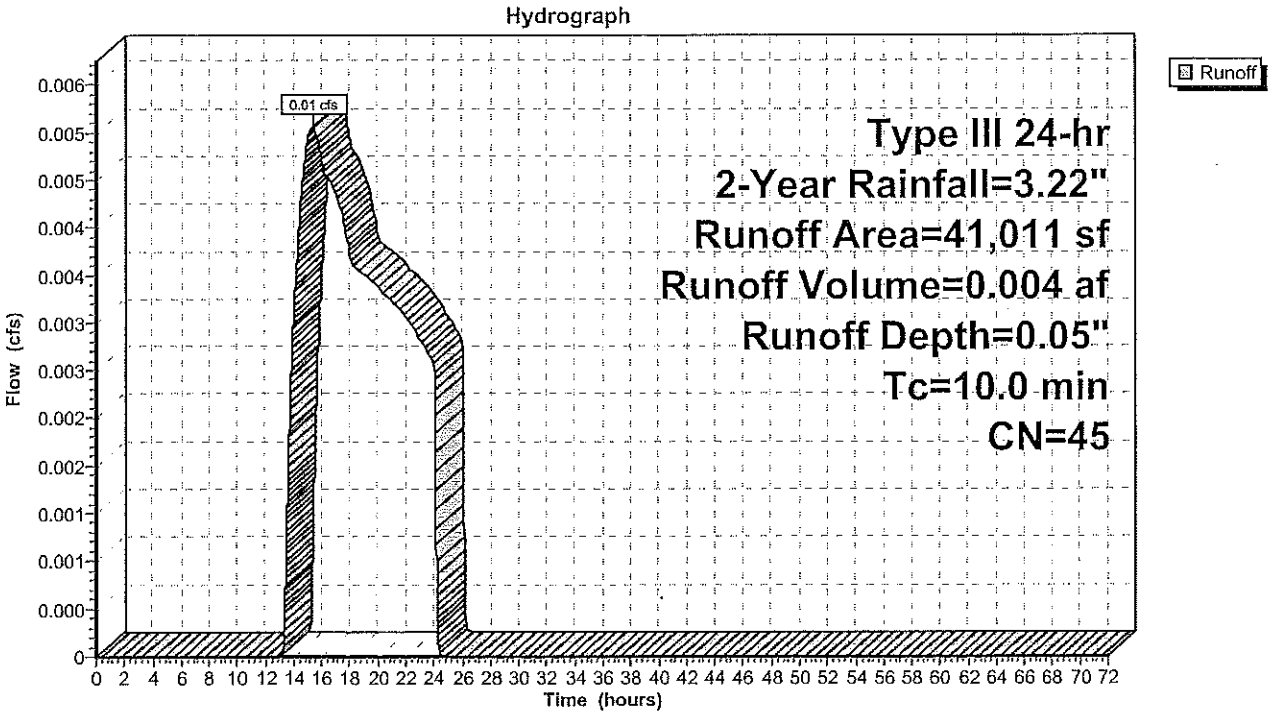
Runoff = 0.01 cfs @ 15.39 hrs, Volume= 0.004 af, Depth= 0.05"

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
11,449	61	Pasture/grassland/range, Good, HSG B
29,562	39	Pasture/grassland/range, Good, HSG A
41,011	45	Weighted Average
41,011		100.00% Pervious Area

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

Subcatchment 7S: EX-2

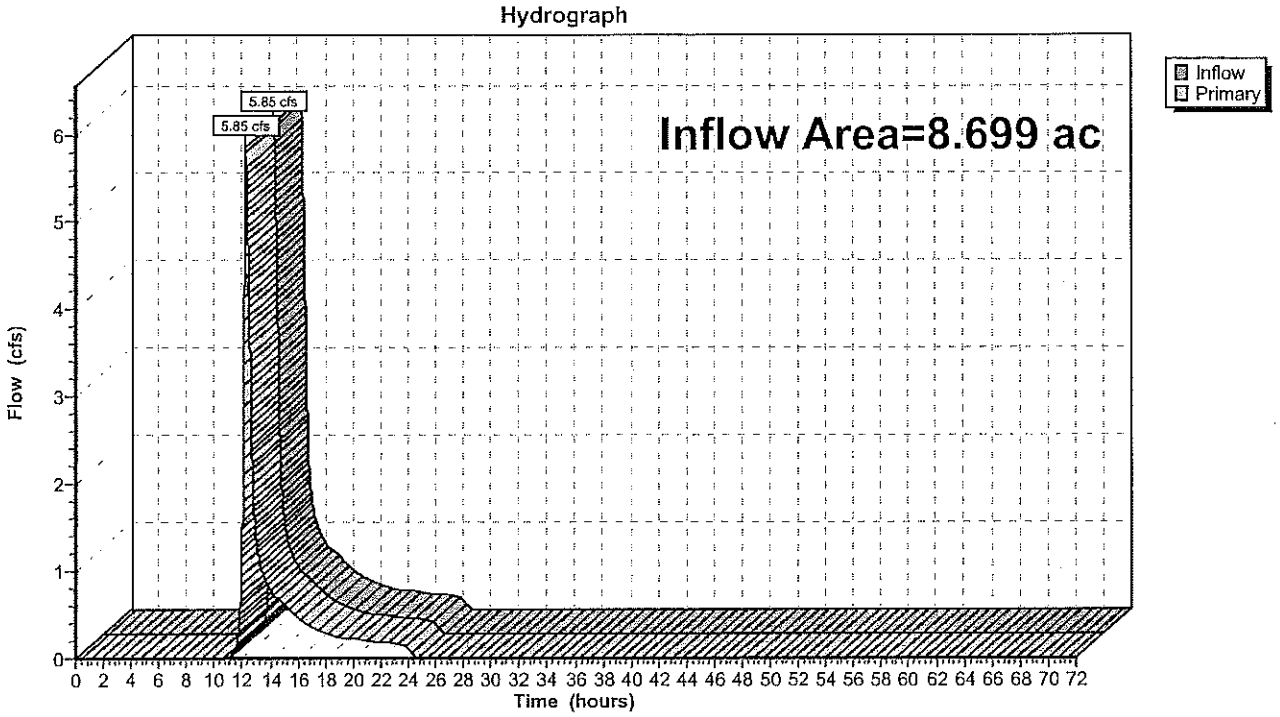


Summary for Pond 5P: AP-2

Inflow Area = 8.699 ac, 13.08% Impervious, Inflow Depth = 0.89" for 2-Year event
Inflow = 5.85 cfs @ 12.27 hrs, Volume= 0.645 af
Primary = 5.85 cfs @ 12.27 hrs, Volume= 0.645 af, Atten= 0%, Lag= 0.0 min

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

Pond 5P: AP-2

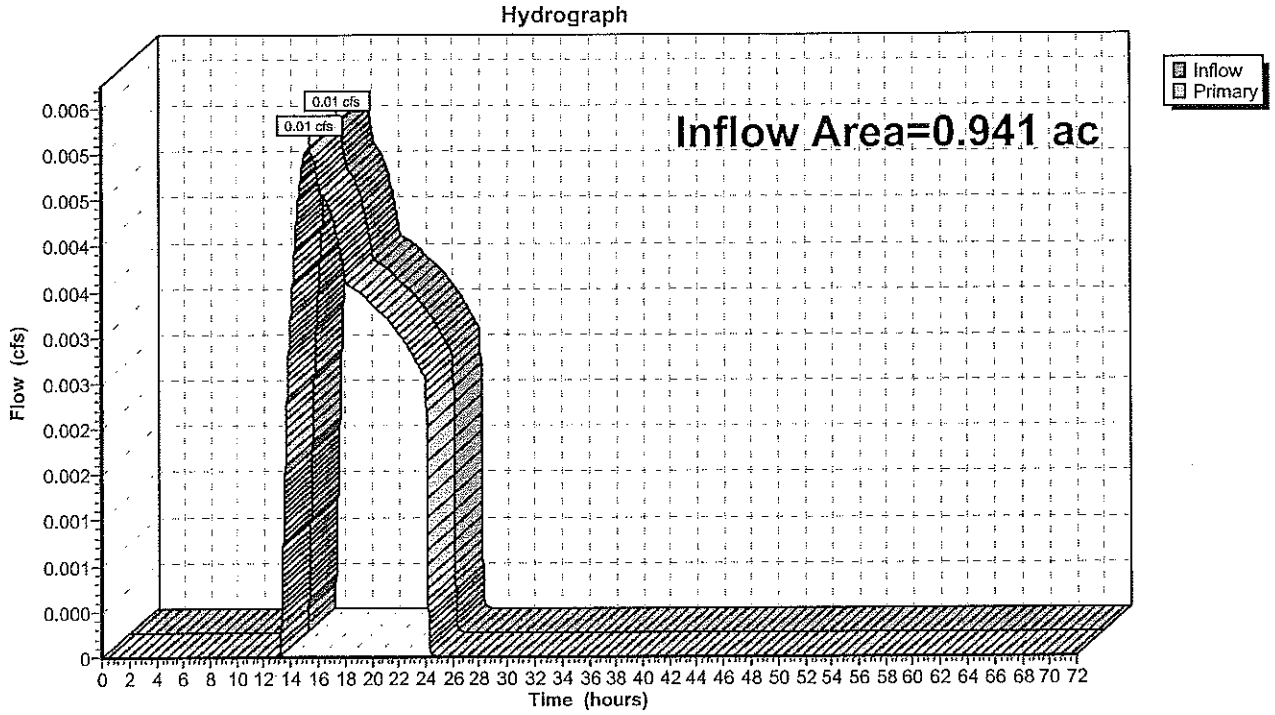


Summary for Pond AP-1: AP-1

Inflow Area = 0.941 ac, 0.00% Impervious, Inflow Depth = 0.05" for 2-Year event
Inflow = 0.01 cfs @ 15.39 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 15.39 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

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

Pond AP-1: AP-1



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment6S: EX-1 Runoff Area=378,950 sf 13.08% Impervious Runoff Depth=2.01"
Flow Length=997' Tc=17.4 min CN=71 Runoff=14.35 cfs 1.458 af

Subcatchment7S: EX-2 Runoff Area=41,011 sf 0.00% Impervious Runoff Depth=0.40"
Tc=10.0 min CN=45 Runoff=0.15 cfs 0.031 af

Pond 5P: AP-2 Inflow=14.35 cfs 1.458 af
Primary=14.35 cfs 1.458 af

Pond AP-1: AP-1 Inflow=0.15 cfs 0.031 af
Primary=0.15 cfs 0.031 af

Total Runoff Area = 9.641 ac Runoff Volume = 1.489 af Average Runoff Depth = 1.85"
88.20% Pervious = 8.503 ac 11.80% Impervious = 1.138 ac

Summary for Subcatchment 6S: EX-1

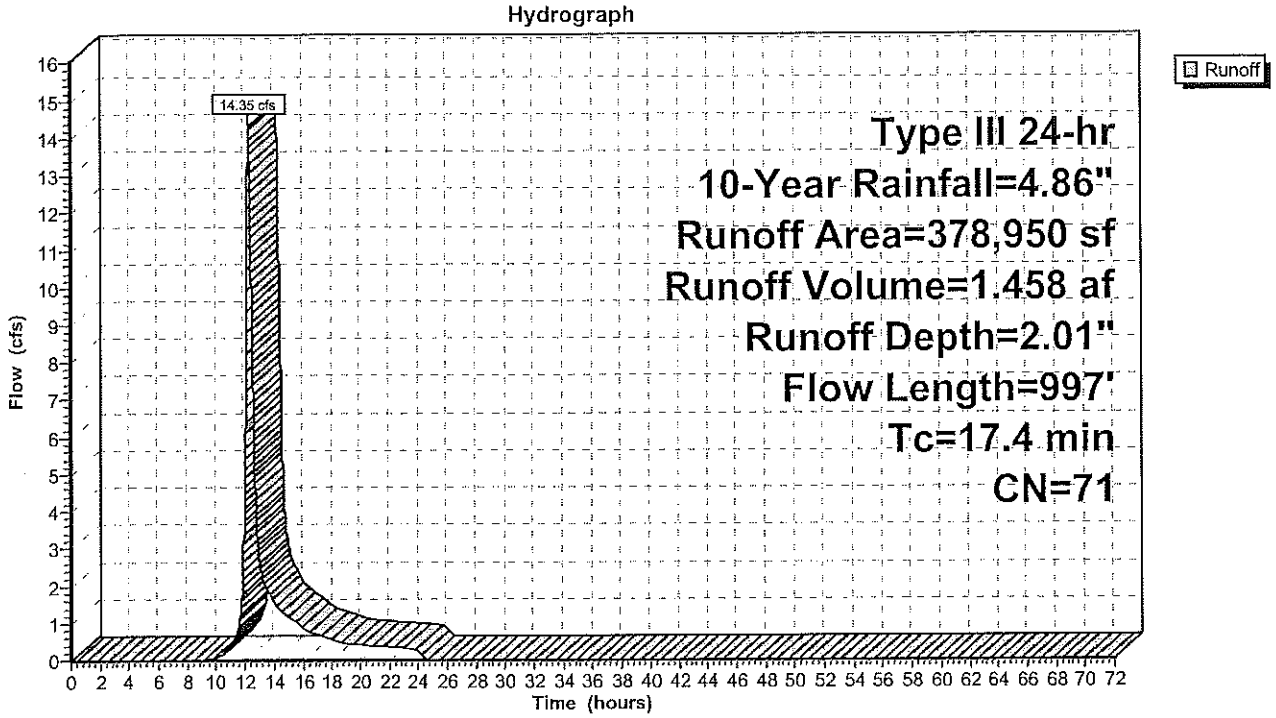
Runoff = 14.35 cfs @ 12.24 hrs, Volume= 1.458 af, Depth= 2.01"

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
102,073	74	Pasture/grassland/range, Good, HSG C
111,214	83	1/4 acre lots, 38% imp, HSG C
133,551	61	Pasture/grassland/range, Good, HSG B
26,192	70	1/2 acre lots, 25% imp, HSG B
2,953	39	Pasture/grassland/range, Good, HSG A
2,967	54	1/2 acre lots, 25% imp, HSG A
378,950	71	Weighted Average
329,399		86.92% Pervious Area
49,551		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.8	184	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	345	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	267	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	151	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.4	997	Total			

Subcatchment 6S: EX-1



Summary for Subcatchment 7S: EX-2

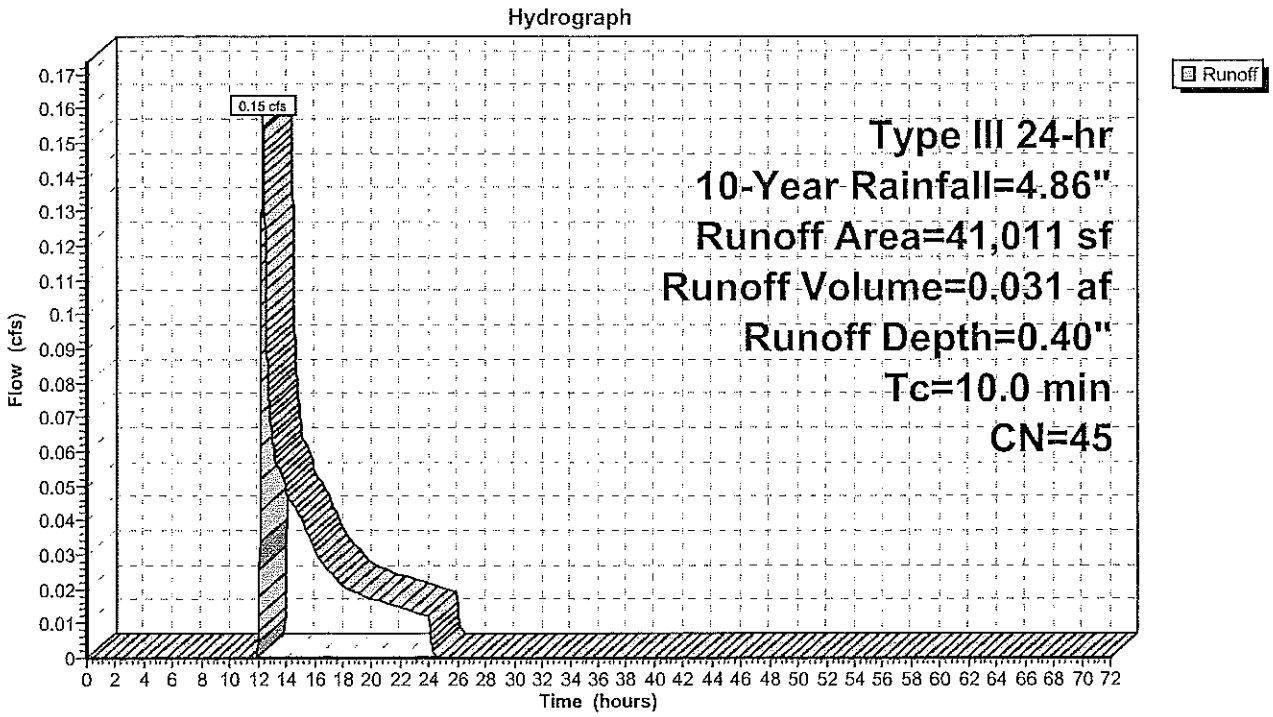
Runoff = 0.15 cfs @ 12.39 hrs, Volume= 0.031 af, Depth= 0.40"

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
11,449	61	Pasture/grassland/range, Good, HSG B
29,562	39	Pasture/grassland/range, Good, HSG A
41,011	45	Weighted Average
41,011		100.00% Pervious Area

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

Subcatchment 7S: EX-2

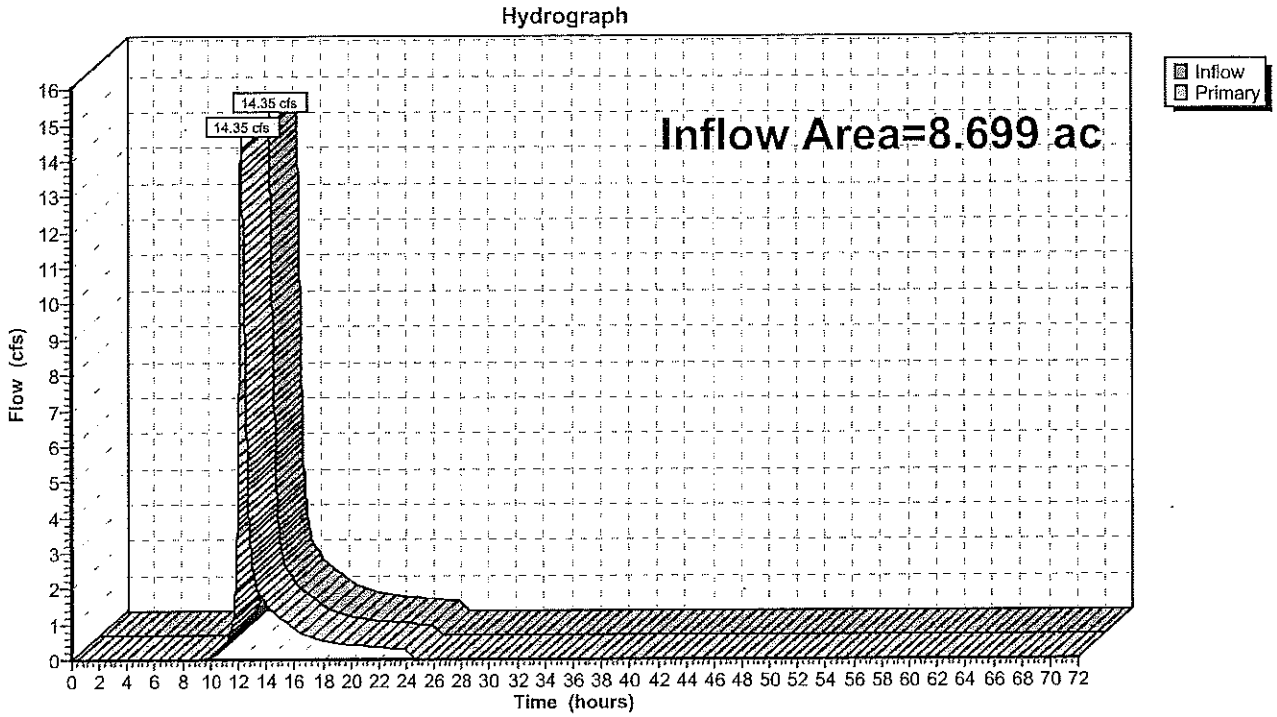


Summary for Pond 5P: AP-2

Inflow Area = 8.699 ac, 13.08% Impervious, Inflow Depth = 2.01" for 10-Year event
Inflow = 14.35 cfs @ 12.24 hrs, Volume= 1.458 af
Primary = 14.35 cfs @ 12.24 hrs, Volume= 1.458 af, Atten= 0%, Lag= 0.0 min

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

Pond 5P: AP-2

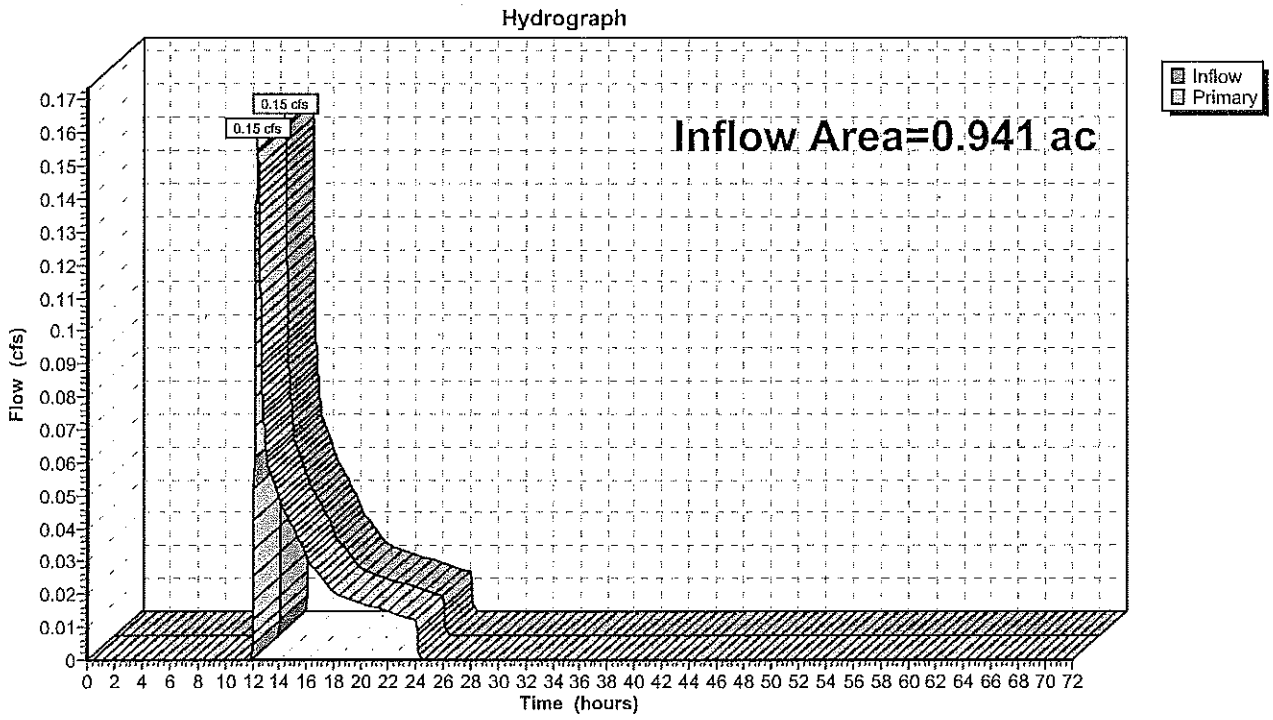


Summary for Pond AP-1: AP-1

Inflow Area = 0.941 ac, 0.00% Impervious, Inflow Depth = 0.40" for 10-Year event
Inflow = 0.15 cfs @ 12.39 hrs, Volume= 0.031 af
Primary = 0.15 cfs @ 12.39 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

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

Pond AP-1: AP-1



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment6S: EX-1 Runoff Area=378,950 sf 13.08% Impervious Runoff Depth=5.28"
Flow Length=997' Tc=17.4 min CN=71 Runoff=38.49 cfs 3.829 af

Subcatchment7S: EX-2 Runoff Area=41,011 sf 0.00% Impervious Runoff Depth=2.17"
Tc=10.0 min CN=45 Runoff=1.83 cfs 0.171 af

Pond 5P: AP-2 Inflow=38.49 cfs 3.829 af
Primary=38.49 cfs 3.829 af

Pond AP-1: AP-1 Inflow=1.83 cfs 0.171 af
Primary=1.83 cfs 0.171 af

Total Runoff Area = 9.641 ac Runoff Volume = 3.999 af Average Runoff Depth = 4.98"
88.20% Pervious = 8.503 ac 11.80% Impervious = 1.138 ac

Summary for Subcatchment 6S: EX-1

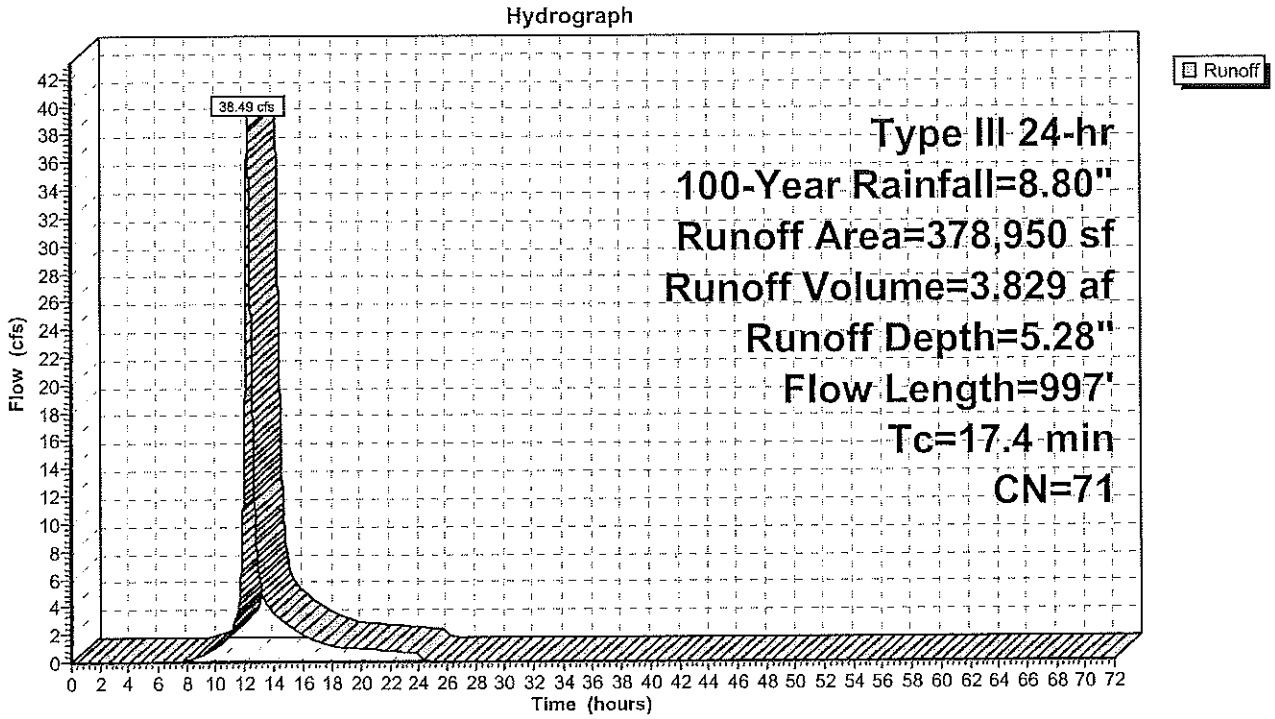
Runoff = 38.49 cfs @ 12.24 hrs, Volume= 3.829 af, Depth= 5.28"

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
102,073	74	Pasture/grassland/range, Good, HSG C
111,214	83	1/4 acre lots, 38% imp, HSG C
133,551	61	Pasture/grassland/range, Good, HSG B
26,192	70	1/2 acre lots, 25% imp, HSG B
2,953	39	Pasture/grassland/range, Good, HSG A
2,967	54	1/2 acre lots, 25% imp, HSG A
378,950	71	Weighted Average
329,399		86.92% Pervious Area
49,551		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
1.8	184	0.0600	1.71		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	345	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.7	267	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.6	151	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.4	997	Total			

Subcatchment 6S: EX-1



Summary for Subcatchment 7S: EX-2

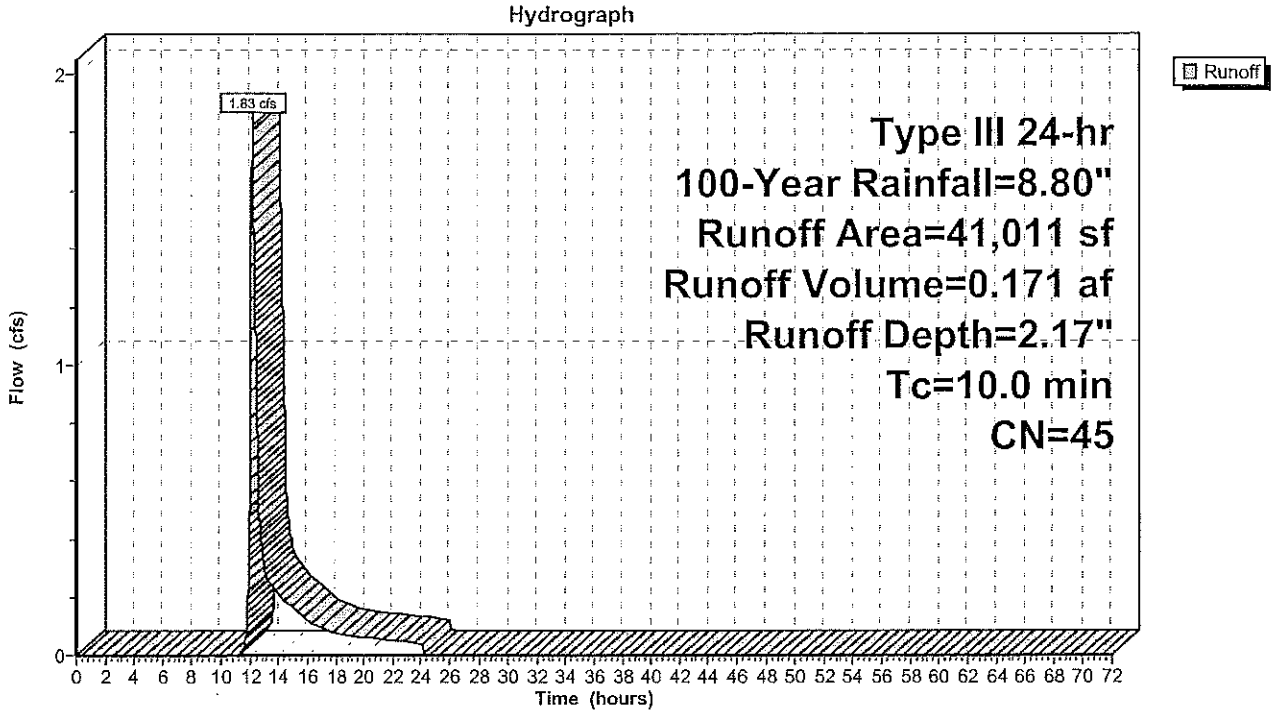
Runoff = 1.83 cfs @ 12.16 hrs, Volume= 0.171 af, Depth= 2.17"

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
11,449	61	Pasture/grassland/range, Good, HSG B
29,562	39	Pasture/grassland/range, Good, HSG A
41,011	45	Weighted Average
41,011		100.00% Pervious Area

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

Subcatchment 7S: EX-2

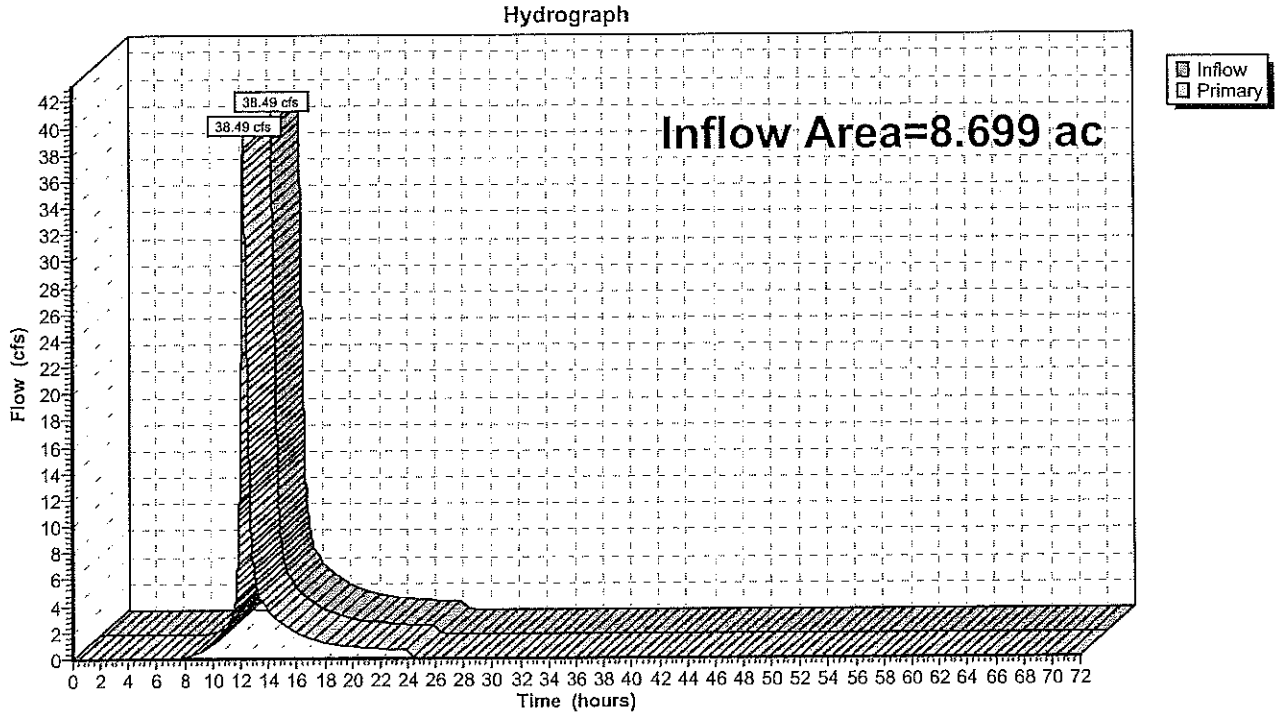


Summary for Pond 5P: AP-2

Inflow Area = 8.699 ac, 13.08% Impervious, Inflow Depth = 5.28" for 100-Year event
Inflow = 38.49 cfs @ 12.24 hrs, Volume= 3.829 af
Primary = 38.49 cfs @ 12.24 hrs, Volume= 3.829 af, Atten= 0%, Lag= 0.0 min

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

Pond 5P: AP-2

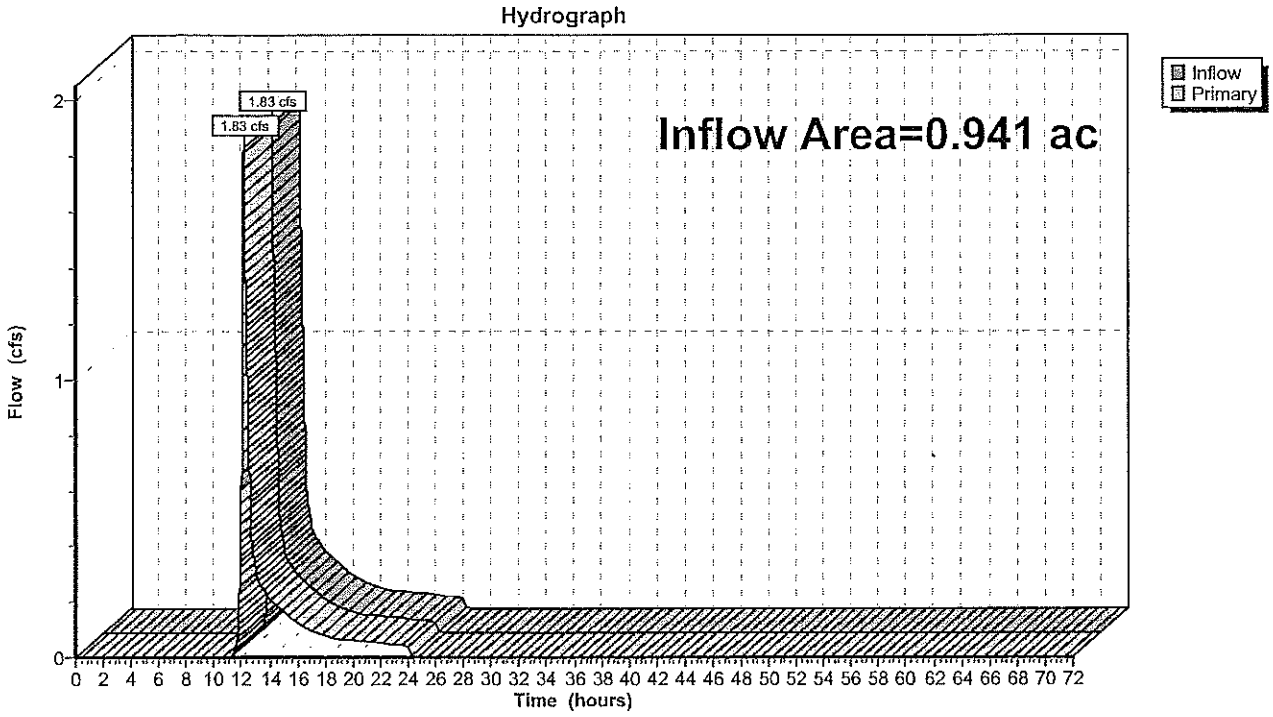


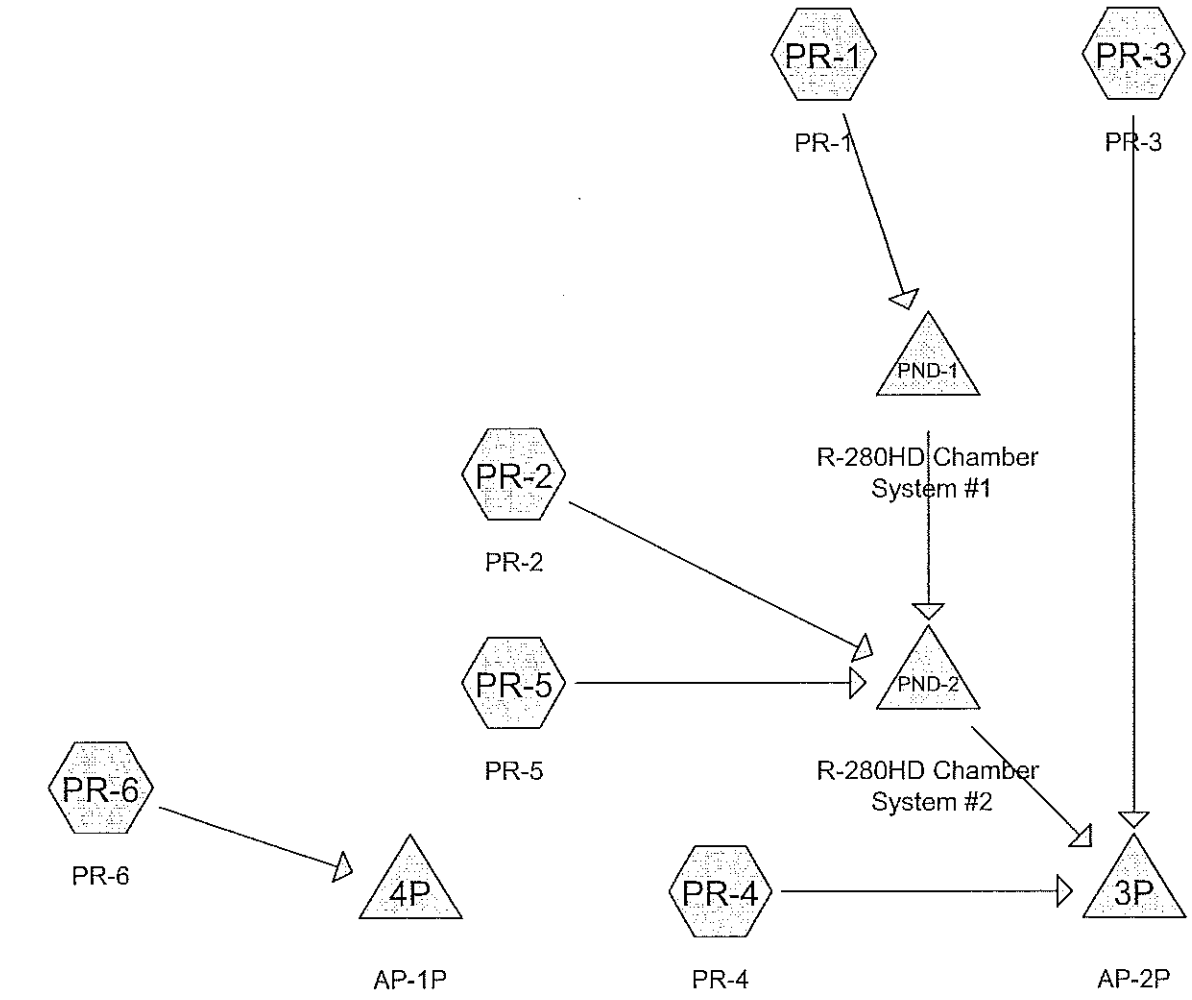
Summary for Pond AP-1: AP-1

Inflow Area = 0.941 ac, 0.00% Impervious, Inflow Depth = 2.17" for 100-Year event
Inflow = 1.83 cfs @ 12.16 hrs, Volume= 0.171 af
Primary = 1.83 cfs @ 12.16 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

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

Pond AP-1: AP-1





Subcat Reach Pond Link

Routing Diagram for F-4516 post development
Prepared by {enter your company name here}, Printed 4/5/2022

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.068	54	1/2 acre lots, 25% imp, HSG A (PR-5)
0.612	70	1/2 acre lots, 25% imp, HSG B (PR-3, PR-5)
2.553	80	1/2 acre lots, 25% imp, HSG C (PR-3)
0.302	61	>75% Grass cover, Good, HSG B (PR-1, PR-2, PR-4)
0.057	74	>75% Grass cover, Good, HSG C (PR-1)
0.746	39	Pasture/grassland/range, Good, HSG A (PR-5, PR-6)
1.930	61	Pasture/grassland/range, Good, HSG B (PR-3, PR-4, PR-5, PR-6)
1.989	74	Pasture/grassland/range, Good, HSG C (PR-3)
0.645	98	Paved parking, HSG B (PR-1, PR-2, PR-4)
0.237	98	Paved parking, HSG C (PR-1)
0.446	98	Roofs, HSG B (PR-1, PR-2)
0.056	98	Roofs, HSG C (PR-1)
9.641	**73**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.814	HSG A	PR-5, PR-6
3.935	HSG B	PR-1, PR-2, PR-3, PR-4, PR-5, PR-6
4.891	HSG C	PR-1, PR-3
0.000	HSG D	
0.000	Other	
9.641		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.068	0.612	2.553	0.000	0.000	3.233	1/2 acre lots, 25% imp	PR-3, PR-5
0.000	0.302	0.057	0.000	0.000	0.358	>75% Grass cover, Good	PR-1, PR-2, PR-4
0.746	1.930	1.989	0.000	0.000	4.665	Pasture/grassland/range, Good	PR-3, PR-4, PR-5, PR-6
0.000	0.645	0.237	0.000	0.000	0.883	Paved parking	PR-1, PR-2, PR-4
0.000	0.446	0.056	0.000	0.000	0.502	Roofs	PR-1, PR-2
0.814	**3.935**	**4.891**	**0.000**	**0.000**	**9.641**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	PND-1	208.00	206.40	20.0	0.0800	0.013	12.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPR-1: PR-1 Runoff Area=28,285 sf 89.32% Impervious Runoff Depth=2.66"
Tc=6.0 min CN=95 Runoff=1.92 cfs 0.144 af

SubcatchmentPR-2: PR-2 Runoff Area=37,310 sf 91.54% Impervious Runoff Depth=2.66"
Tc=6.0 min CN=95 Runoff=2.53 cfs 0.190 af

SubcatchmentPR-3: PR-3 Runoff Area=259,245 sf 12.46% Impervious Runoff Depth=1.05"
Tc=12.0 min CN=74 Runoff=5.67 cfs 0.521 af

SubcatchmentPR-4: PR-4 Runoff Area=12,965 sf 6.84% Impervious Runoff Depth=0.57"
Tc=6.0 min CN=64 Runoff=0.15 cfs 0.014 af

SubcatchmentPR-5: PR-5 Runoff Area=41,128 sf 7.09% Impervious Runoff Depth=0.45"
Flow Length=433' Tc=7.1 min CN=61 Runoff=0.30 cfs 0.036 af

SubcatchmentPR-6: PR-6 Runoff Area=41,012 sf 0.00% Impervious Runoff Depth=0.05"
Tc=10.0 min CN=45 Runoff=0.01 cfs 0.004 af

Pond 3P: AP-2P Inflow=5.80 cfs 0.535 af
Primary=5.80 cfs 0.535 af

Pond 4P: AP-1P Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Pond PND-1: R-280HD Chamber System #1 Peak Elev=208.96' Storage=2,397 cf Inflow=1.92 cfs 0.144 af
Discarded=0.14 cfs 0.138 af Primary=0.07 cfs 0.006 af Outflow=0.21 cfs 0.144 af

Pond PND-2: R-280HD Chamber System #2 Peak Elev=206.52' Storage=2,840 cf Inflow=2.77 cfs 0.232 af
Discarded=0.40 cfs 0.232 af Primary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.232 af

Total Runoff Area = 9.641 ac Runoff Volume = 0.909 af Average Runoff Depth = 1.13"
77.26% Pervious = 7.448 ac 22.74% Impervious = 2.193 ac

Summary for Subcatchment PR-1: PR-1

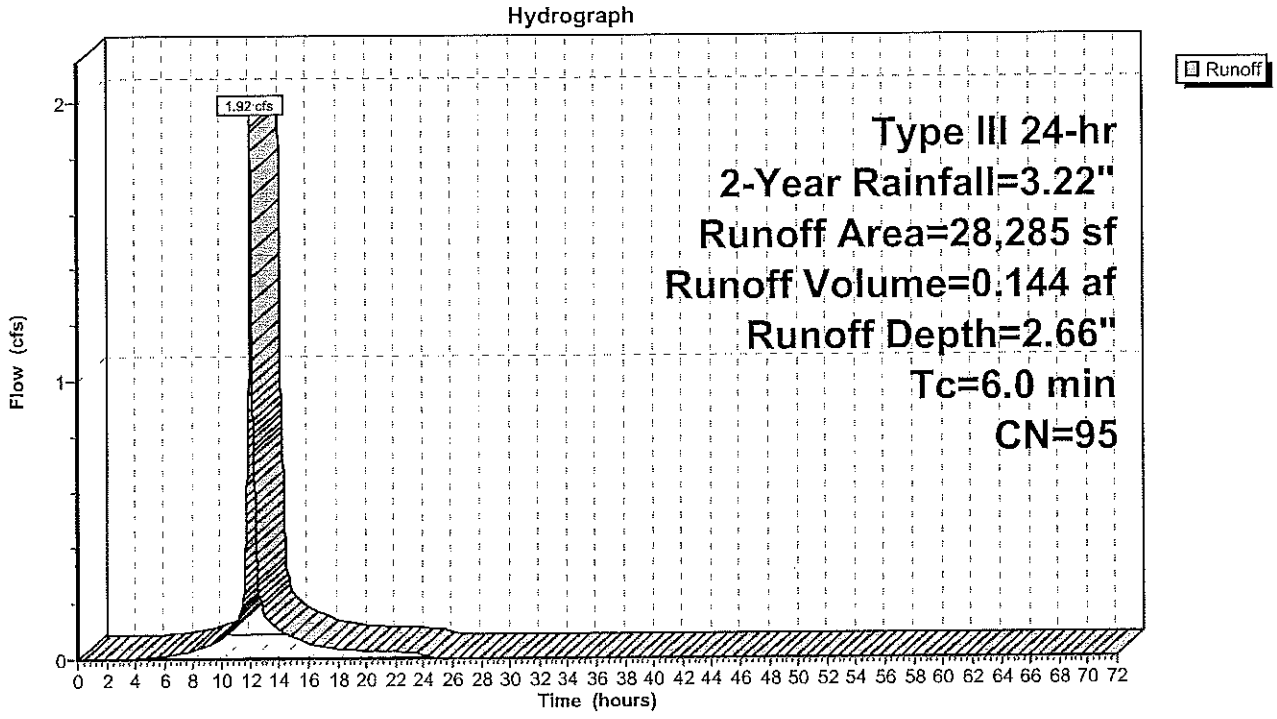
Runoff = 1.92 cfs @ 12.08 hrs, Volume= 0.144 af, Depth= 2.66"

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
10,327	98	Paved parking, HSG C
2,469	74	>75% Grass cover, Good, HSG C
2,424	98	Roofs, HSG C
4,035	98	Paved parking, HSG B
552	61	>75% Grass cover, Good, HSG B
8,478	98	Roofs, HSG B
28,285	95	Weighted Average
3,021		10.68% Pervious Area
25,264		89.32% Impervious Area

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

Subcatchment PR-1: PR-1



Summary for Subcatchment PR-2: PR-2

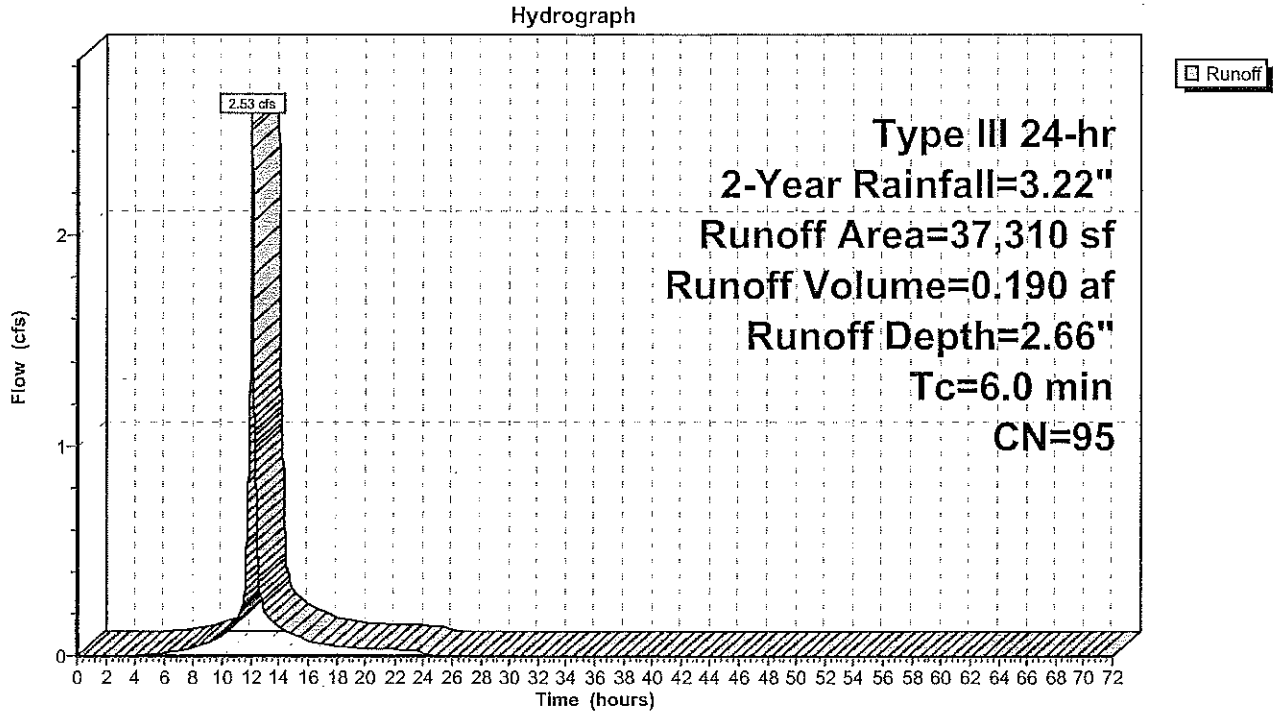
Runoff = 2.53 cfs @ 12.08 hrs, Volume= 0.190 af, Depth= 2.66"

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
23,195	98	Paved parking, HSG B
10,960	98	Roofs, HSG B
3,155	61	>75% Grass cover, Good, HSG B
37,310	95	Weighted Average
3,155		8.46% Pervious Area
34,155		91.54% Impervious Area

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

Subcatchment PR-2: PR-2



Summary for Subcatchment PR-3: PR-3

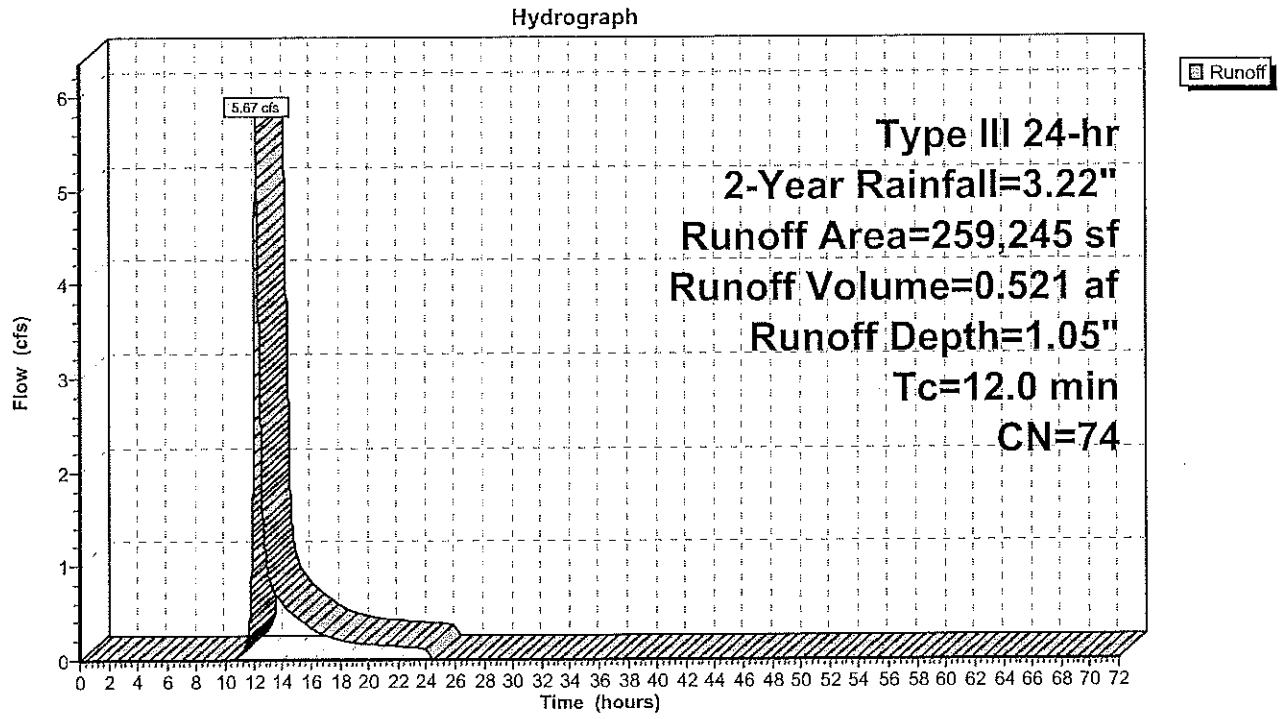
Runoff = 5.67 cfs @ 12.18 hrs, Volume= 0.521 af, Depth= 1.05"

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
43,424	61	Pasture/grassland/range, Good, HSG B
86,662	74	Pasture/grassland/range, Good, HSG C
17,970	70	1/2 acre lots, 25% imp, HSG B
111,189	80	1/2 acre lots, 25% imp, HSG C
259,245	74	Weighted Average
226,955		87.54% Pervious Area
32,290		12.46% Impervious Area

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

Subcatchment PR-3: PR-3



Summary for Subcatchment PR-4: PR-4

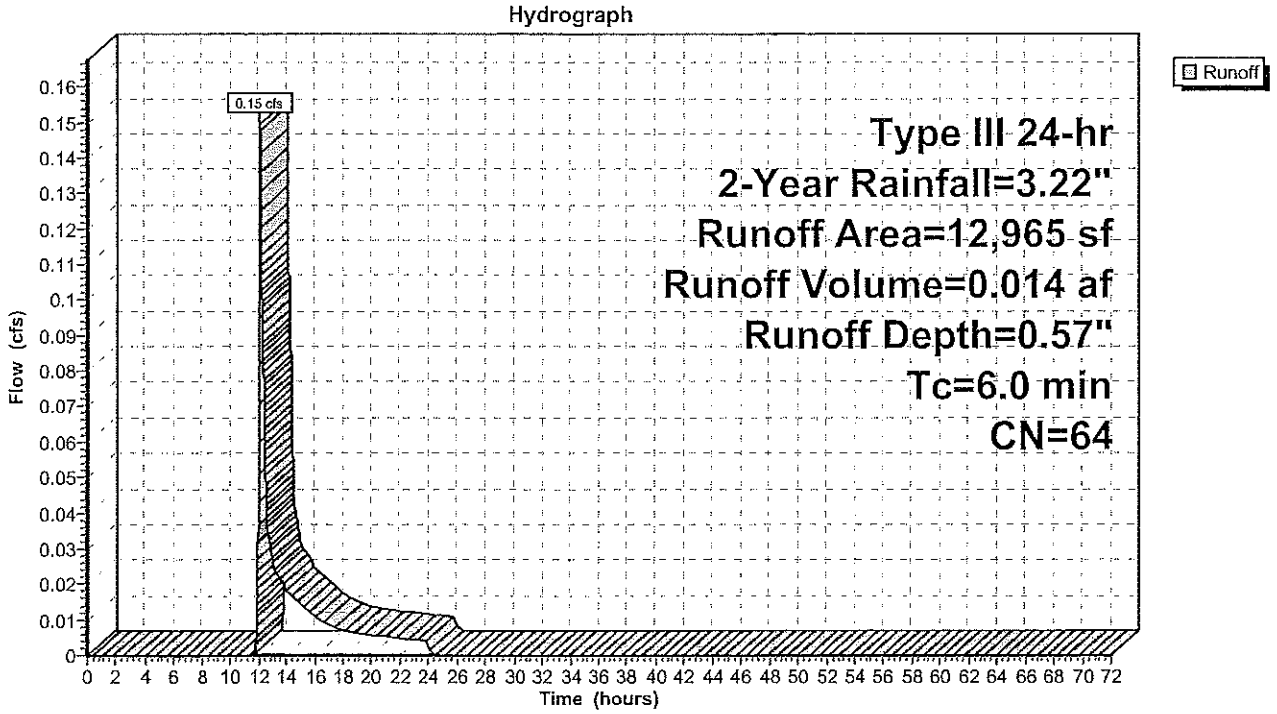
Runoff = 0.15 cfs @ 12.11 hrs, Volume= 0.014 af, Depth= 0.57"

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
2,651	61	Pasture/grassland/range, Good, HSG B
9,427	61	>75% Grass cover, Good, HSG B
887	98	Paved parking, HSG B
12,965	64	Weighted Average
12,078		93.16% Pervious Area
887		6.84% Impervious Area

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

Subcatchment PR-4: PR-4



Summary for Subcatchment PR-5: PR-5

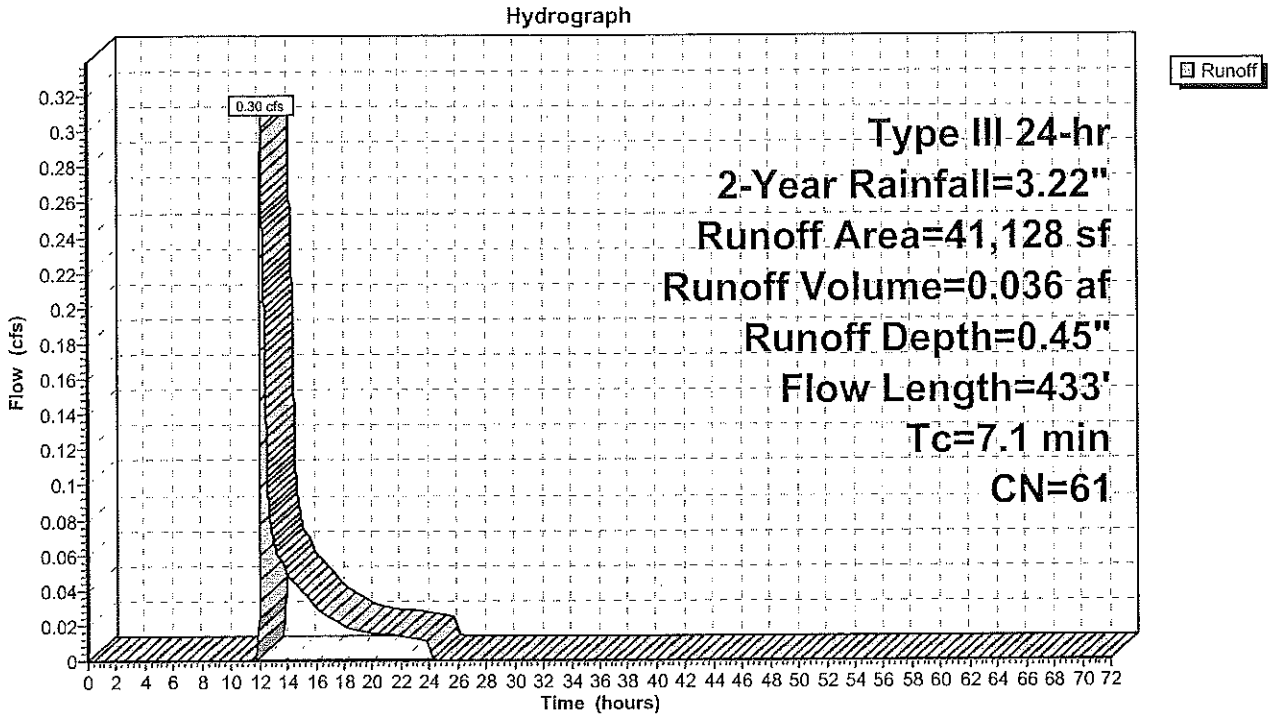
Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.036 af, Depth= 0.45"

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
26,537	61	Pasture/grassland/range, Good, HSG B
2,920	39	Pasture/grassland/range, Good, HSG A
8,705	70	1/2 acre lots, 25% imp, HSG B
2,966	54	1/2 acre lots, 25% imp, HSG A
41,128	61	Weighted Average
38,210		92.91% Pervious Area
2,918		7.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.8	97	0.0900	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	150	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	136	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.1	433	Total			

Subcatchment PR-5: PR-5



Summary for Subcatchment PR-6: PR-6

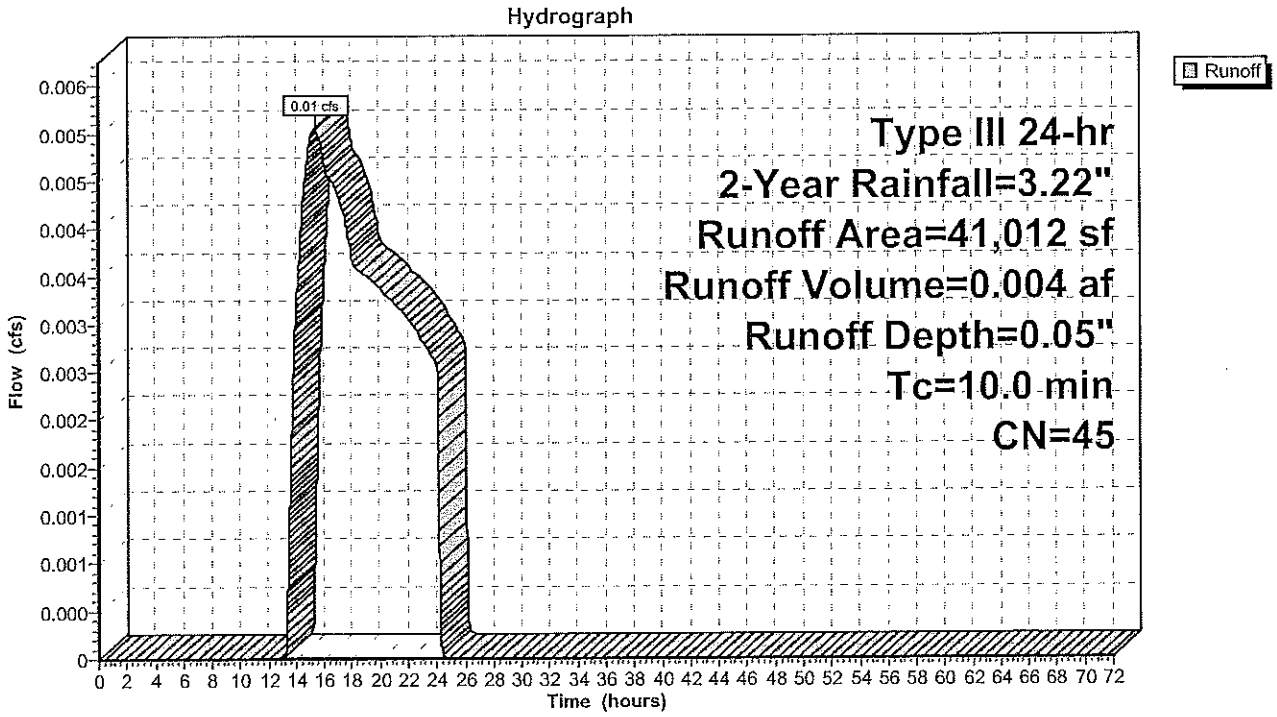
Runoff = 0.01 cfs @ 15.39 hrs, Volume= 0.004 af, Depth= 0.05"

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
29,562	39	Pasture/grassland/range, Good, HSG A
11,450	61	Pasture/grassland/range, Good, HSG B
41,012	45	Weighted Average
41,012		100.00% Pervious Area

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

Subcatchment PR-6: PR-6

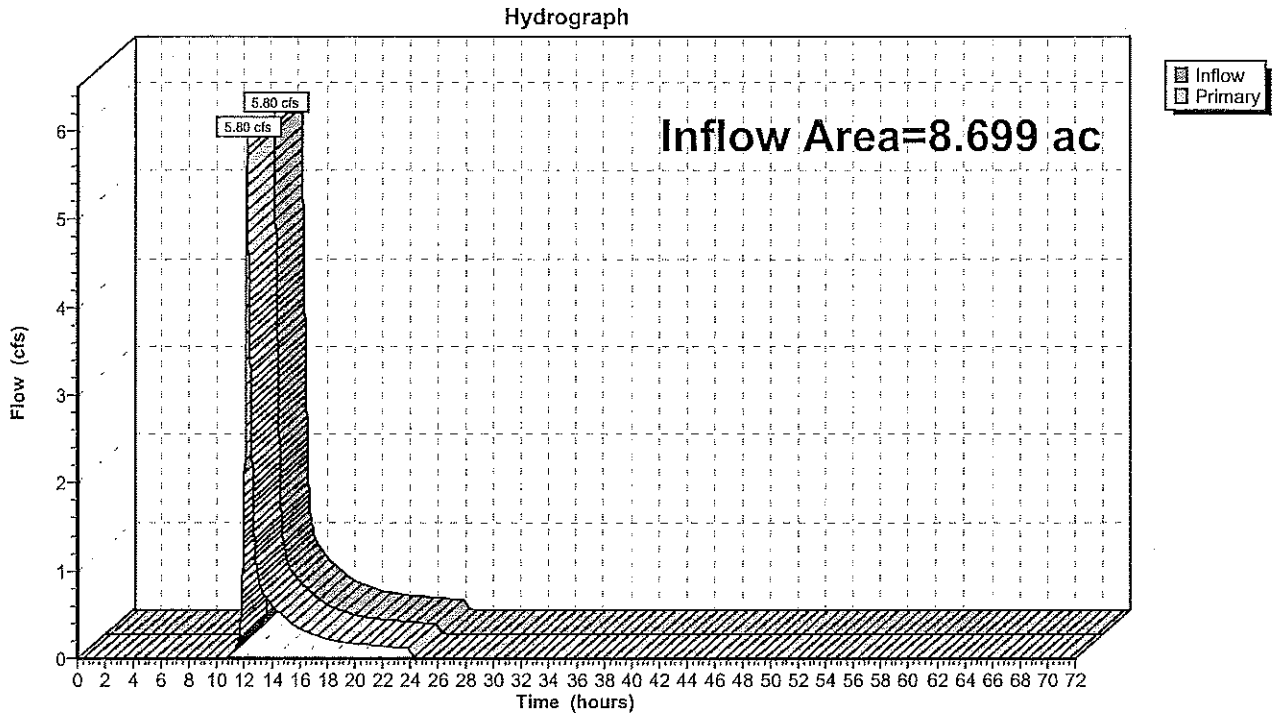


Summary for Pond 3P: AP-2P

Inflow Area = 8.699 ac, 25.21% Impervious, Inflow Depth = 0.74" for 2-Year event
Inflow = 5.80 cfs @ 12.17 hrs, Volume= 0.535 af
Primary = 5.80 cfs @ 12.17 hrs, Volume= 0.535 af, Atten= 0%, Lag= 0.0 min

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

Pond 3P: AP-2P

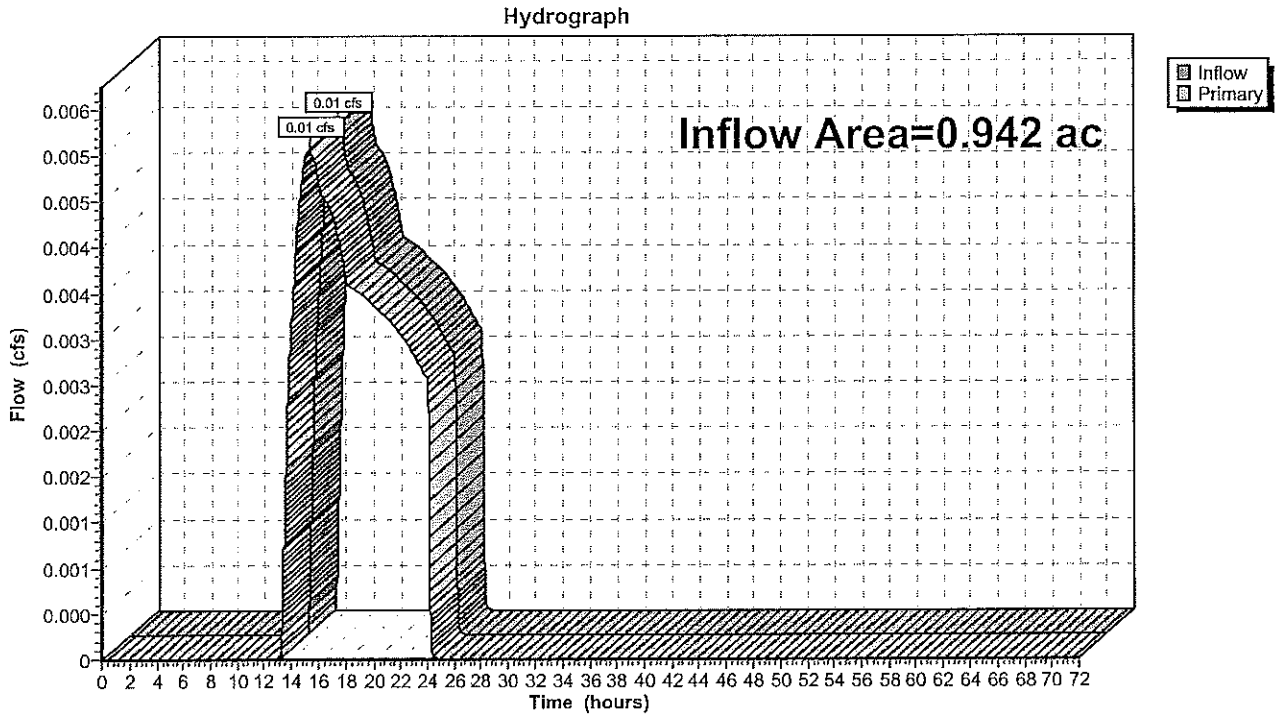


Summary for Pond 4P: AP-1P

Inflow Area = 0.942 ac, 0.00% Impervious, Inflow Depth = 0.05" for 2-Year event
Inflow = 0.01 cfs @ 15.39 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 15.39 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

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

Pond 4P: AP-1P



Summary for Pond PND-1: R-280HD Chamber System #1

Inflow Area = 0.649 ac, 89.32% Impervious, Inflow Depth = 2.66" for 2-Year event
Inflow = 1.92 cfs @ 12.08 hrs, Volume= 0.144 af
Outflow = 0.21 cfs @ 12.78 hrs, Volume= 0.144 af, Atten= 89%, Lag= 41.7 min
Discarded = 0.14 cfs @ 11.43 hrs, Volume= 0.138 af
Primary = 0.07 cfs @ 12.78 hrs, Volume= 0.006 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 208.96' @ 12.78 hrs Surf.Area= 2,448 sf Storage= 2,397 cf

Plug-Flow detention time= 126.6 min calculated for 0.144 af (100% of inflow)
Center-of-Mass det. time= 126.6 min (907.4 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1B	207.50'	1,993 cf	**52.08'W x 47.00'L x 3.21'H Field B** 7,854 cf Overall - 2,872 cf Embedded = 4,982 cf x 40.0% Voids
#2B	208.00'	2,872 cf	**Cultec R-280HD** x 66 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 11 rows
		4,865 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	208.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.00' / 206.40' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	210.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	208.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	207.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.14 cfs @ 11.43 hrs HW=207.53' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.07 cfs @ 12.78 hrs HW=208.96' TW=206.52' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.07 cfs of 2.57 cfs potential flow)
  ├**2=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.35 fps)

Pond PND-1: R-280HD Chamber System #1 - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger®280HD)
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 6.07 sf x 11 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

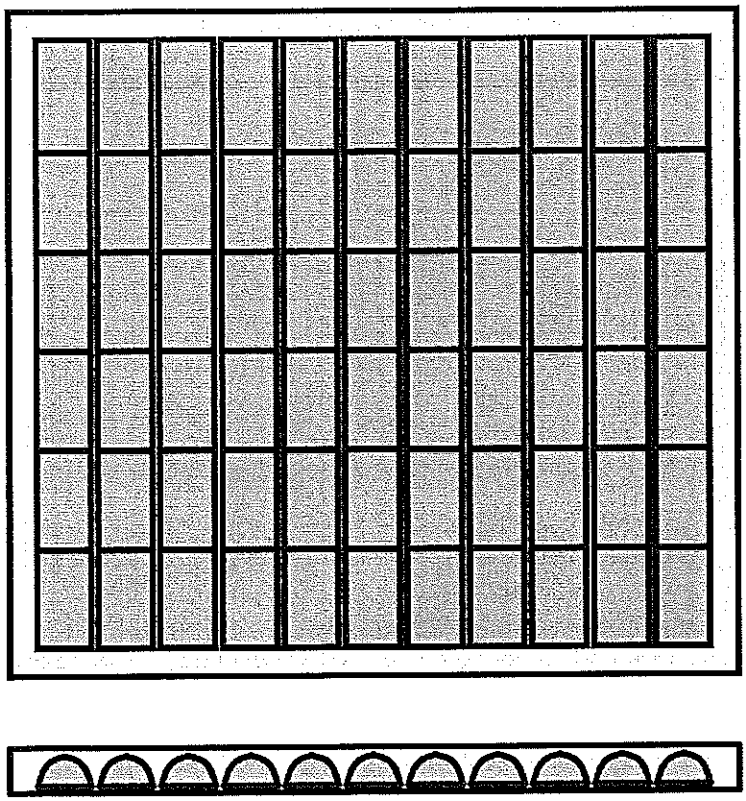
6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +24.0" End Stone x 2 = 47.00' Base Length
11 Rows x 47.0" Wide + 6.0" Spacing x 10 + 24.0" Side Stone x 2 = 52.08' Base Width
6.0" Base + 26.5" Chamber Height + 6.0" Cover = 3.21' Field Height

66 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 11 Rows = 2,871.9 cf Chamber Storage

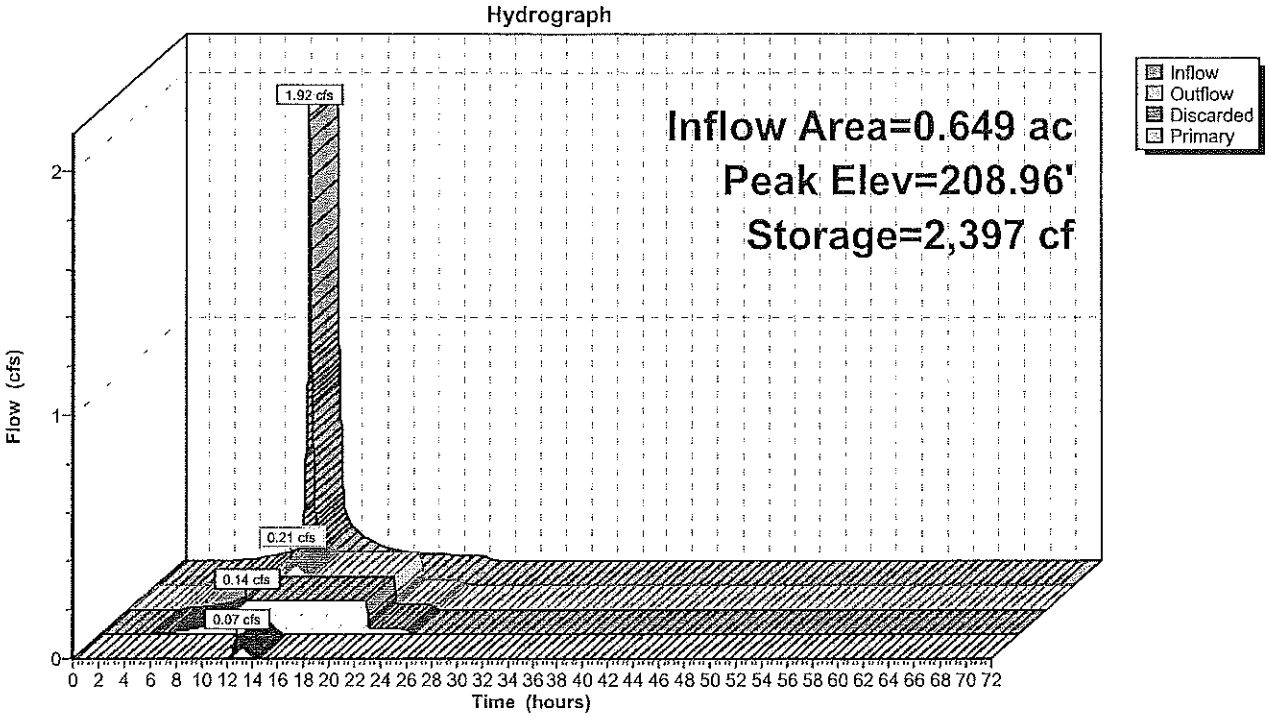
7,853.7 cf Field - 2,871.9 cf Chambers = 4,981.8 cf Stone x 40.0% Voids = 1,992.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,864.7 cf = 0.112 af
Overall Storage Efficiency = 61.9%
Overall System Size = 47.00' x 52.08' x 3.21'

66 Chambers
290.9 cy Field
184.5 cy Stone



Pond PND-1: R-280HD Chamber System #1



Summary for Pond PND-2: R-280HD Chamber System #2

Inflow Area = 2.450 ac, 58.41% Impervious, Inflow Depth = 1.14" for 2-Year event
Inflow = 2.77 cfs @ 12.09 hrs, Volume= 0.232 af
Outflow = 0.40 cfs @ 11.78 hrs, Volume= 0.232 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.40 cfs @ 11.78 hrs, Volume= 0.232 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 206.52' @ 12.86 hrs Surf.Area= 7,184 sf Storage= 2,840 cf

Plug-Flow detention time= 48.7 min calculated for 0.232 af (100% of inflow)
Center-of-Mass det. time= 48.7 min (850.2 - 801.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	205.80'	6,092 cf	**69.75'W x 103.00'L x 3.38'H Field A** 24,247 cf Overall - 9,017 cf Embedded = 15,230 cf x 40.0% Voids
#2A	206.30'	9,017 cf	**Cultec R-280HD** x 210 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 15 rows
		15,109 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	208.80'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	205.80'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.40 cfs @ 11.78 hrs HW=205.83' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.40 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=205.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond PND-2: R-280HD Chamber System #2 - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger®280HD)
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 6.07 sf x 15 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

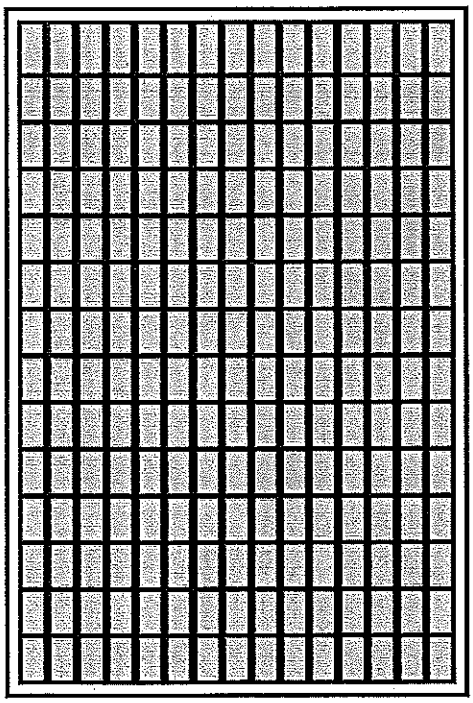
14 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 99.00' Row Length +24.0" End Stone x 2 = 103.00' Base Length
15 Rows x 47.0" Wide + 6.0" Spacing x 14 + 24.0" Side Stone x 2 = 69.75' Base Width
6.0" Base + 26.5" Chamber Height + 8.0" Cover = 3.38' Field Height

210 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 15 Rows = 9,016.5 cf Chamber Storage

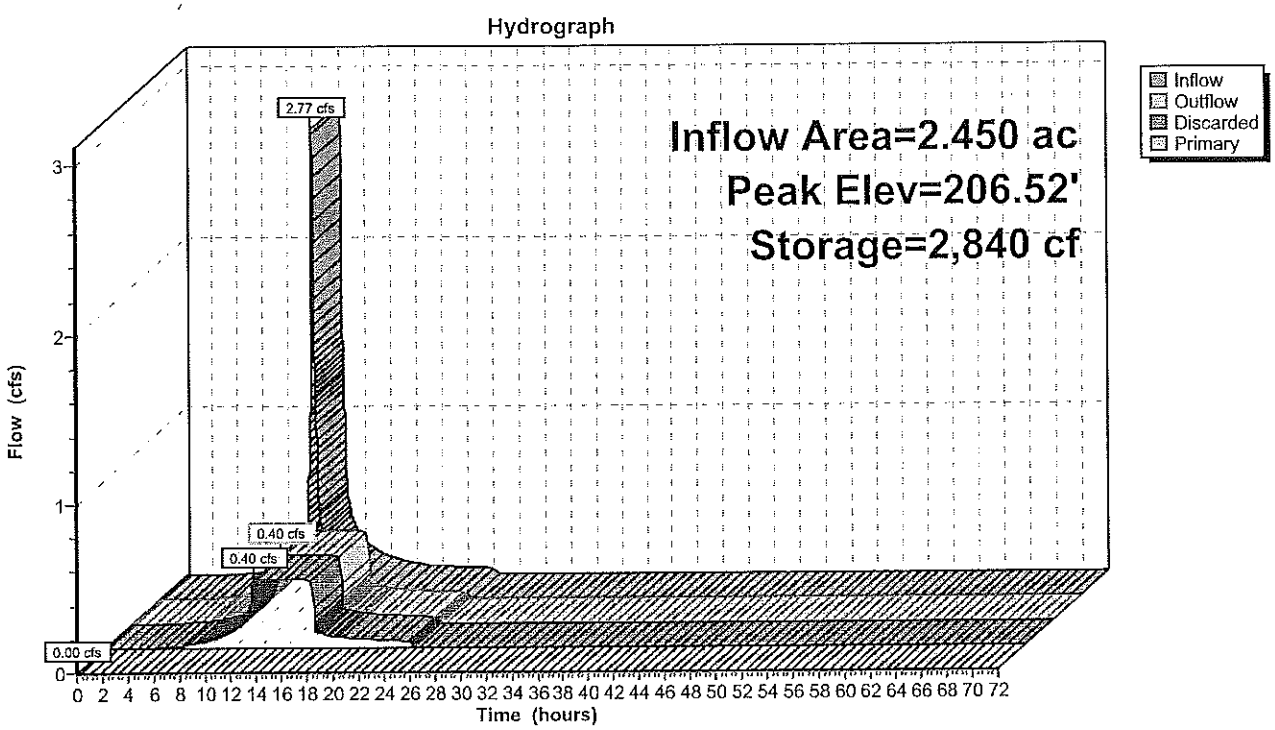
24,246.8 cf Field - 9,016.5 cf Chambers = 15,230.3 cf Stone x 40.0% Voids = 6,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 15,108.7 cf = 0.347 af
Overall Storage Efficiency = 62.3%
Overall System Size = 103.00' x 69.75' x 3.38'

210 Chambers
898.0 cy Field
564.1 cy Stone



Pond PND-2: R-280HD Chamber System #2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPR-1: PR-1 Runoff Area=28,285 sf 89.32% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=95 Runoff=3.00 cfs 0.232 af

SubcatchmentPR-2: PR-2 Runoff Area=37,310 sf 91.54% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=95 Runoff=3.95 cfs 0.306 af

SubcatchmentPR-3: PR-3 Runoff Area=259,245 sf 12.46% Impervious Runoff Depth=2.25"
Tc=12.0 min CN=74 Runoff=12.82 cfs 1.117 af

SubcatchmentPR-4: PR-4 Runoff Area=12,965 sf 6.84% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=64 Runoff=0.49 cfs 0.037 af

SubcatchmentPR-5: PR-5 Runoff Area=41,128 sf 7.09% Impervious Runoff Depth=1.29"
Flow Length=433' Tc=7.1 min CN=61 Runoff=1.23 cfs 0.101 af

SubcatchmentPR-6: PR-6 Runoff Area=41,012 sf 0.00% Impervious Runoff Depth=0.40"
Tc=10.0 min CN=45 Runoff=0.15 cfs 0.031 af

Pond 3P: AP-2P Inflow=13.18 cfs 1.154 af
Primary=13.18 cfs 1.154 af

Pond 4P: AP-1P Inflow=0.15 cfs 0.031 af
Primary=0.15 cfs 0.031 af

Pond PND-1: R-280HD Chamber System #1 Peak Elev=209.53' Storage=3,439 cf Inflow=3.00 cfs 0.232 af
Discarded=0.14 cfs 0.172 af Primary=0.66 cfs 0.060 af Outflow=0.79 cfs 0.232 af

Pond PND-2: R-280HD Chamber System #2 Peak Elev=207.57' Storage=9,019 cf Inflow=5.18 cfs 0.466 af
Discarded=0.40 cfs 0.466 af Primary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.466 af

Total Runoff Area = 9.641 ac Runoff Volume = 1.824 af Average Runoff Depth = 2.27"
77.26% Pervious = 7.448 ac 22.74% Impervious = 2.193 ac

Summary for Subcatchment PR-1: PR-1

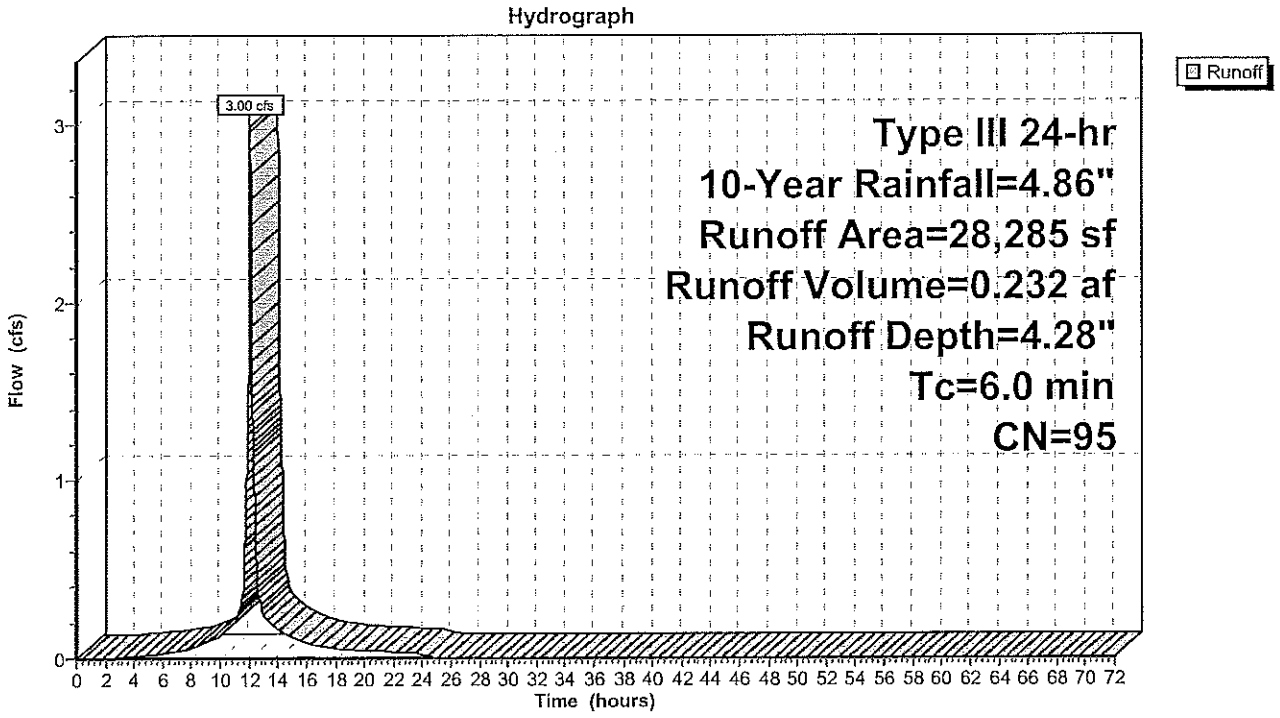
Runoff = 3.00 cfs @ 12.08 hrs, Volume= 0.232 af, Depth= 4.28"

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
10,327	98	Paved parking, HSG C
2,469	74	>75% Grass cover, Good, HSG C
2,424	98	Roofs, HSG C
4,035	98	Paved parking, HSG B
552	61	>75% Grass cover, Good, HSG B
8,478	98	Roofs, HSG B
28,285	95	Weighted Average
3,021		10.68% Pervious Area
25,264		89.32% Impervious Area

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

Subcatchment PR-1: PR-1



Summary for Subcatchment PR-2: PR-2

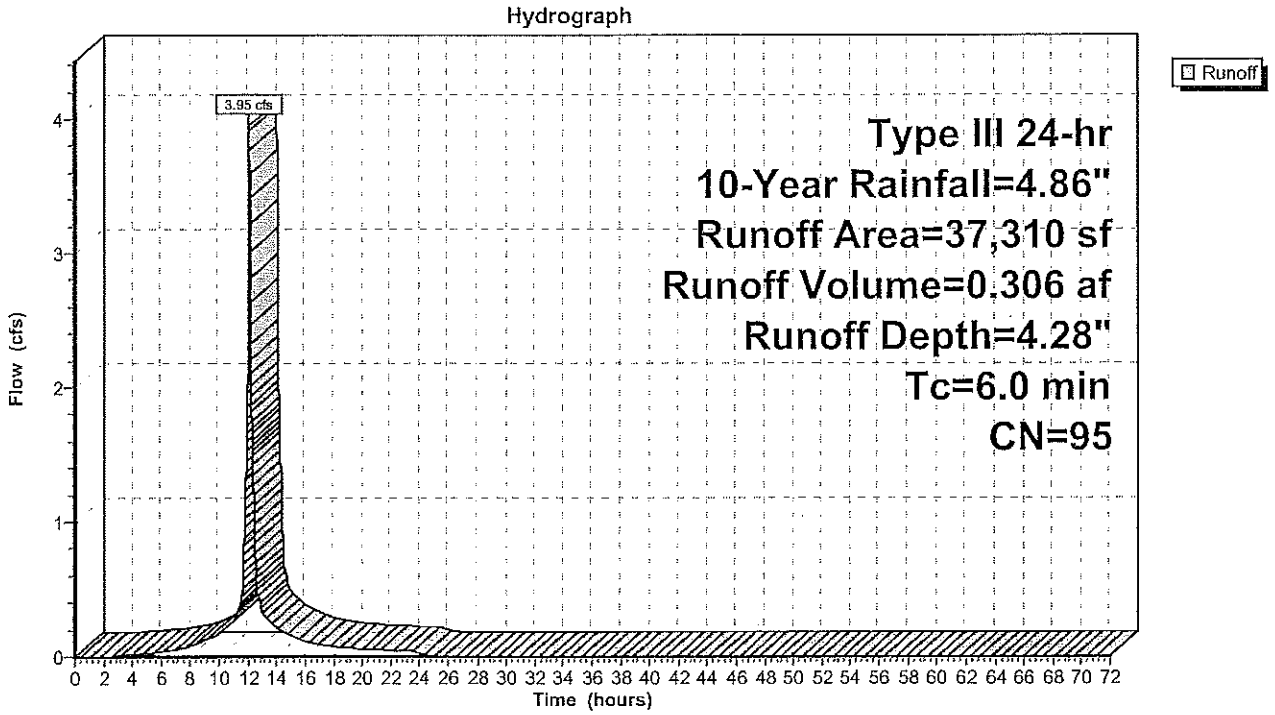
Runoff = 3.95 cfs @ 12.08 hrs, Volume= 0.306 af, Depth= 4.28"

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
23,195	98	Paved parking, HSG B
10,960	98	Roofs, HSG B
3,155	61	>75% Grass cover, Good, HSG B
37,310	95	Weighted Average
3,155		8.46% Pervious Area
34,155		91.54% Impervious Area

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

Subcatchment PR-2: PR-2



Summary for Subcatchment PR-3: PR-3

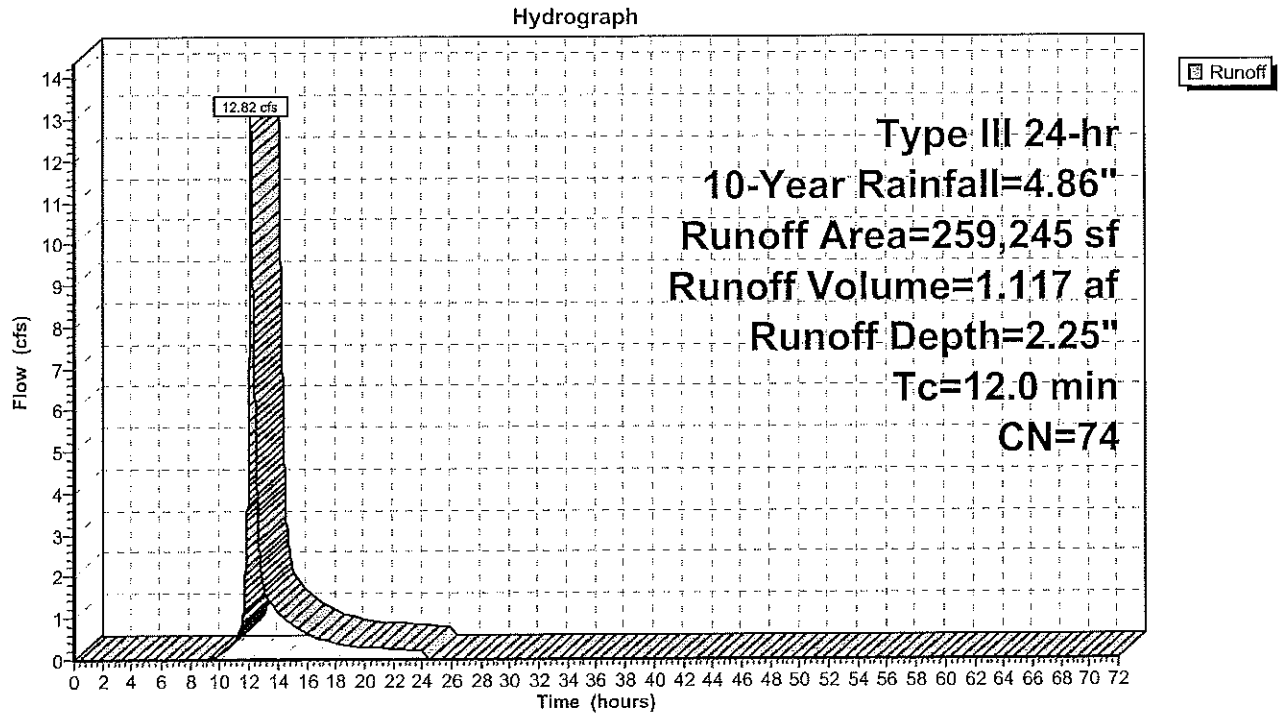
Runoff = 12.82 cfs @ 12.17 hrs, Volume= 1.117 af, Depth= 2.25"

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
43,424	61	Pasture/grassland/range, Good, HSG B
86,662	74	Pasture/grassland/range, Good, HSG C
17,970	70	1/2 acre lots, 25% imp, HSG B
111,189	80	1/2 acre lots, 25% imp, HSG C
259,245	74	Weighted Average
226,955		87.54% Pervious Area
32,290		12.46% Impervious Area

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

Subcatchment PR-3: PR-3



Summary for Subcatchment PR-4: PR-4

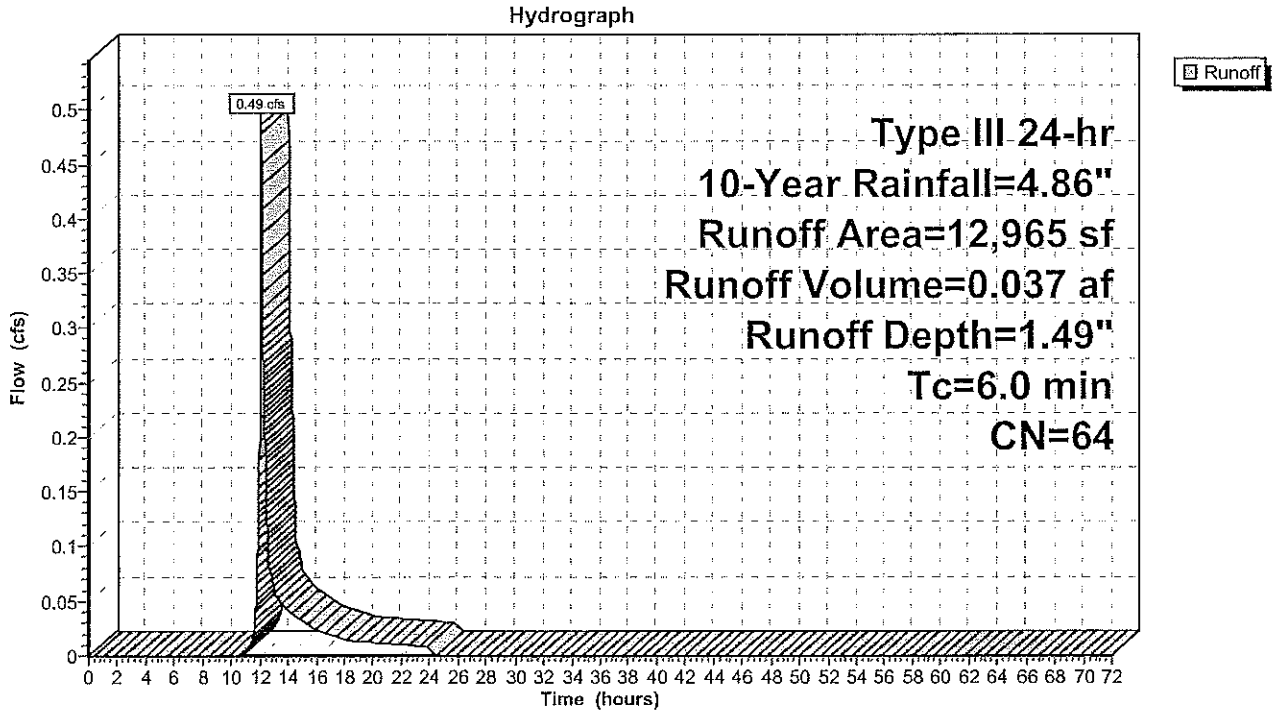
Runoff = 0.49 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 1.49"

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
2,651	61	Pasture/grassland/range, Good, HSG B
9,427	61	>75% Grass cover, Good, HSG B
887	98	Paved parking, HSG B
12,965	64	Weighted Average
12,078		93.16% Pervious Area
887		6.84% Impervious Area

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

Subcatchment PR-4: PR-4



Summary for Subcatchment PR-5: PR-5

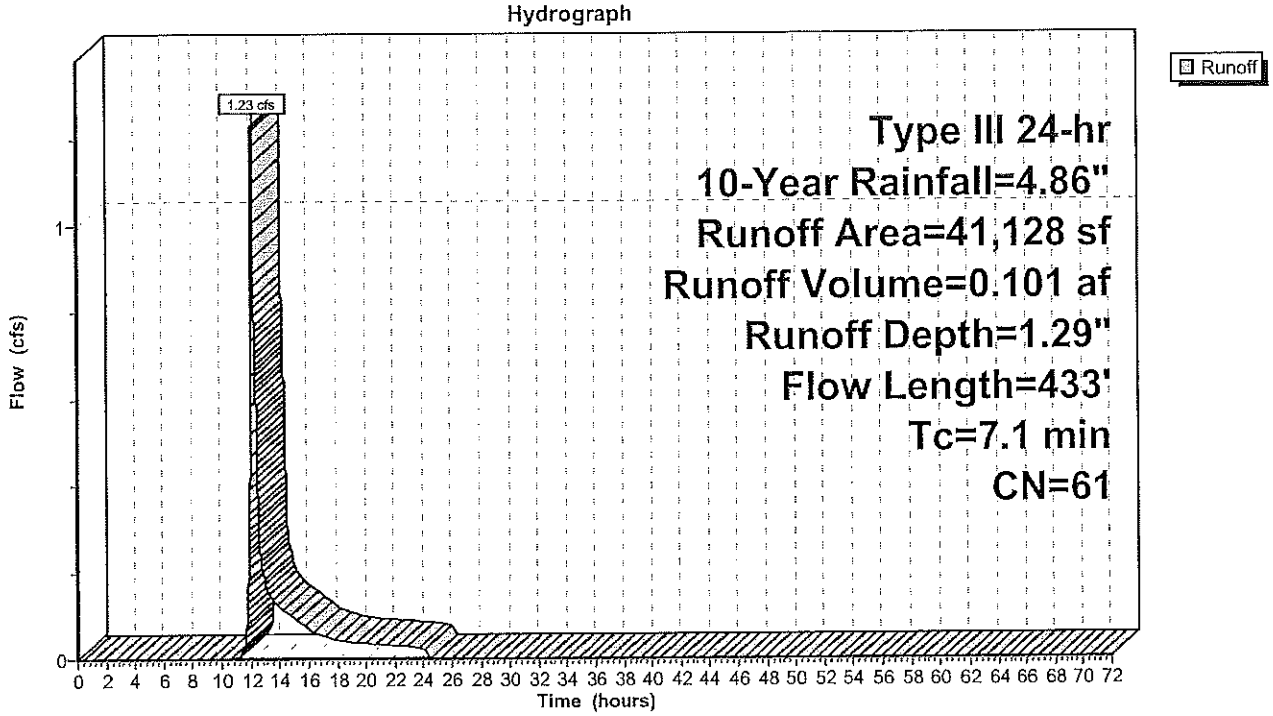
Runoff = 1.23 cfs @ 12.11 hrs, Volume= 0.101 af, Depth= 1.29"

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
26,537	61	Pasture/grassland/range, Good, HSG B
2,920	39	Pasture/grassland/range, Good, HSG A
8,705	70	1/2 acre lots, 25% imp, HSG B
2,966	54	1/2 acre lots, 25% imp, HSG A
41,128	61	Weighted Average
38,210		92.91% Pervious Area
2,918		7.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.8	97	0.0900	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	150	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	136	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.1	433	Total			

Subcatchment PR-5: PR-5



Summary for Subcatchment PR-6: PR-6

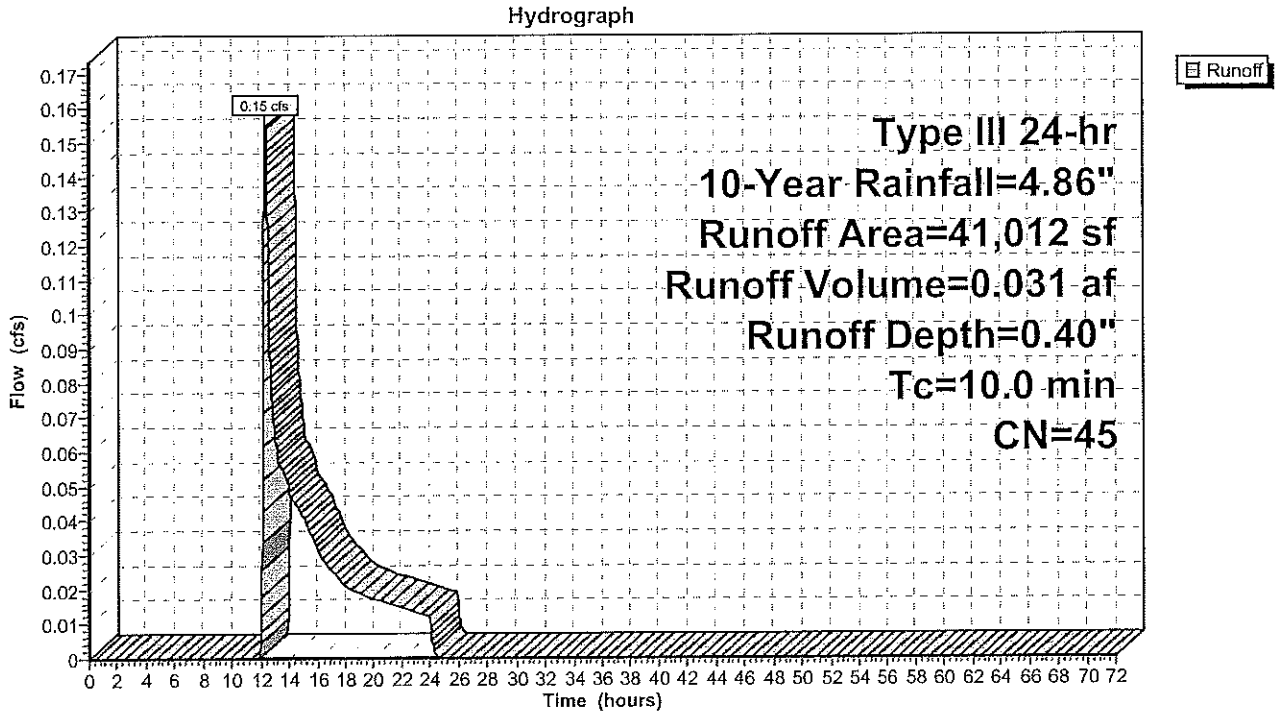
Runoff = 0.15 cfs @ 12.39 hrs, Volume= 0.031 af, Depth= 0.40"

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
29,562	39	Pasture/grassland/range, Good, HSG A
11,450	61	Pasture/grassland/range, Good, HSG B
41,012	45	Weighted Average
41,012		100.00% Pervious Area

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

Subcatchment PR-6: PR-6

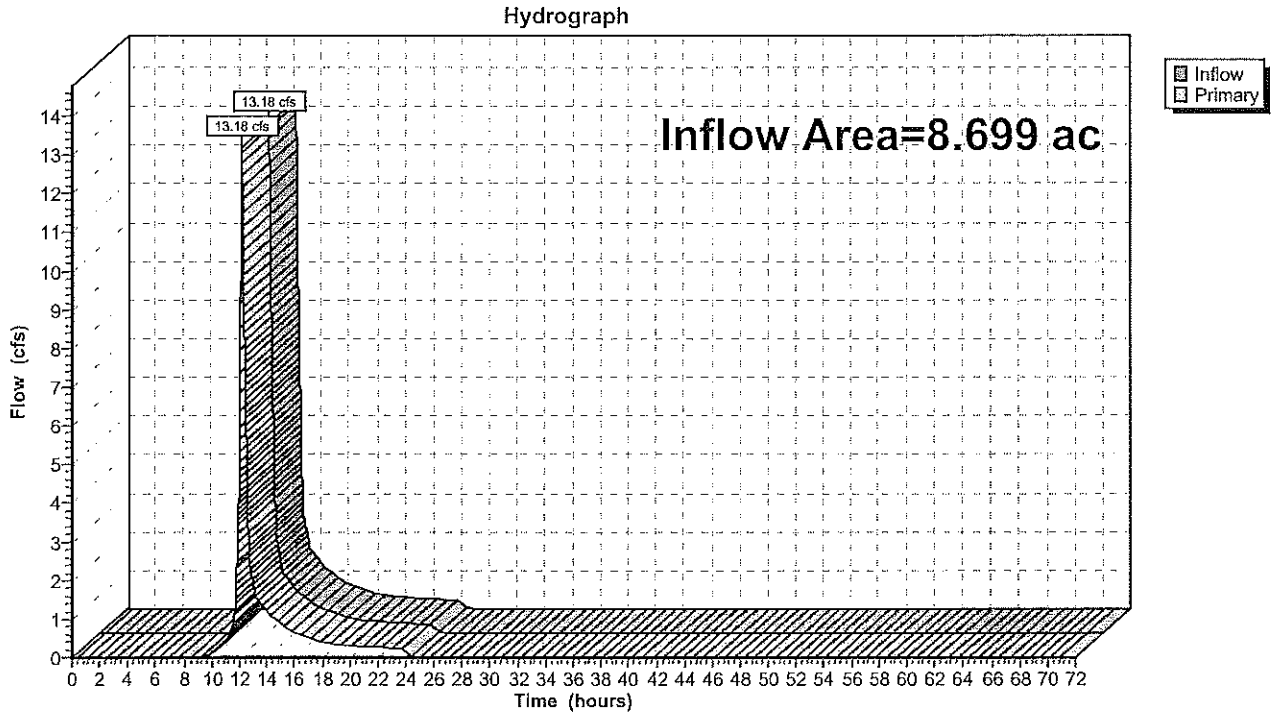


Summary for Pond 3P: AP-2P

Inflow Area = 8.699 ac, 25.21% Impervious, Inflow Depth = 1.59" for 10-Year event
Inflow = 13.18 cfs @ 12.17 hrs, Volume= 1.154 af
Primary = 13.18 cfs @ 12.17 hrs, Volume= 1.154 af, Atten= 0%, Lag= 0.0 min

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

Pond 3P: AP-2P

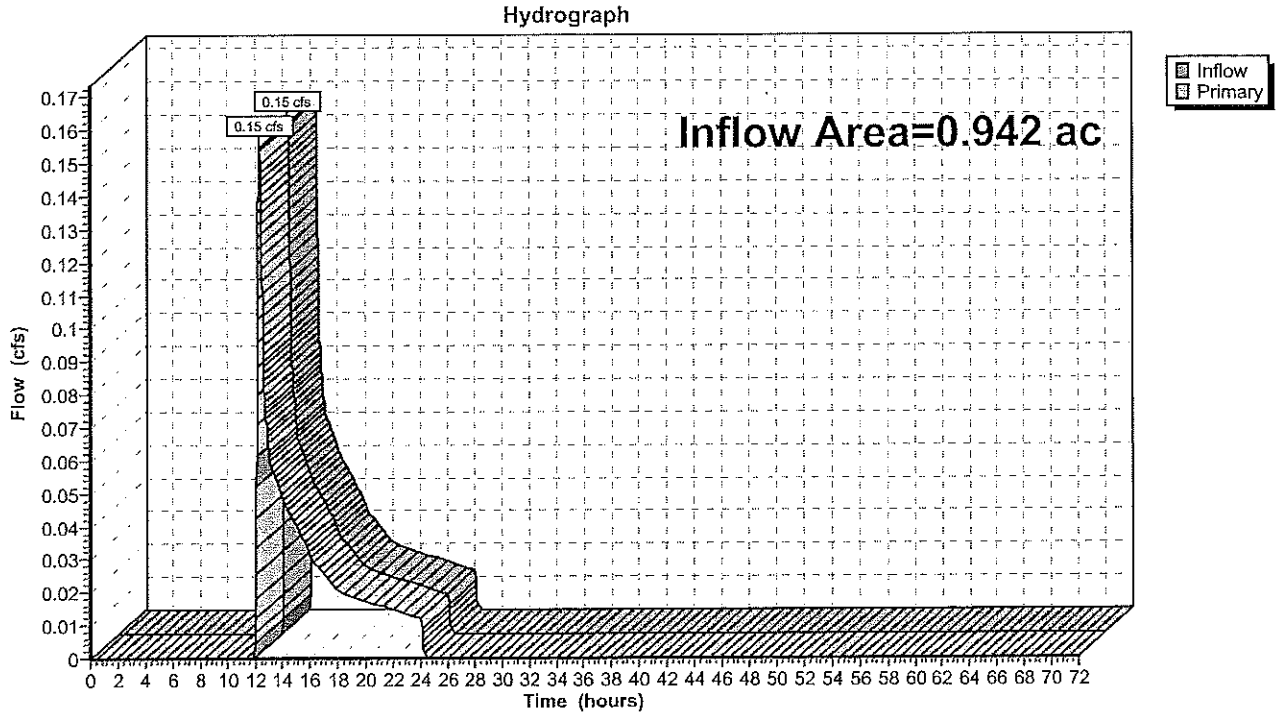


Summary for Pond 4P: AP-1P

Inflow Area = 0.942 ac, 0.00% Impervious, Inflow Depth = 0.40" for 10-Year event
Inflow = 0.15 cfs @ 12.39 hrs, Volume= 0.031 af
Primary = 0.15 cfs @ 12.39 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

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

Pond 4P: AP-1P



Summary for Pond PND-1: R-280HD Chamber System #1

Inflow Area = 0.649 ac, 89.32% Impervious, Inflow Depth = 4.28" for 10-Year event
Inflow = 3.00 cfs @ 12.08 hrs, Volume= 0.232 af
Outflow = 0.79 cfs @ 12.44 hrs, Volume= 0.232 af, Atten= 74%, Lag= 21.3 min
Discarded = 0.14 cfs @ 10.56 hrs, Volume= 0.172 af
Primary = 0.66 cfs @ 12.44 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.53' @ 12.44 hrs Surf.Area= 2,448 sf Storage= 3,439 cf

Plug-Flow detention time= 109.2 min calculated for 0.232 af (100% of inflow)
Center-of-Mass det. time= 109.2 min (878.2 - 769.0)

Volume	Invert	Avail.Storage	Storage Description
#1B	207.50'	1,993 cf	**52.08'W x 47.00'L x 3.21'H Field B** 7,854 cf Overall - 2,872 cf Embedded = 4,982 cf x 40.0% Voids
#2B	208.00'	2,872 cf	**Cultec R-280HD** x 66 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 11 rows
		4,865 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	208.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.00' / 206.40' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	210.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	208.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	207.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.14 cfs @ 10.56 hrs HW=207.53' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.66 cfs @ 12.44 hrs HW=209.53' TW=207.13' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.66 cfs of 3.84 cfs potential flow)
  ├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.66 cfs @ 3.34 fps)

Pond PND-1: R-280HD Chamber System #1 - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger®280HD)
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 6.07 sf x 11 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

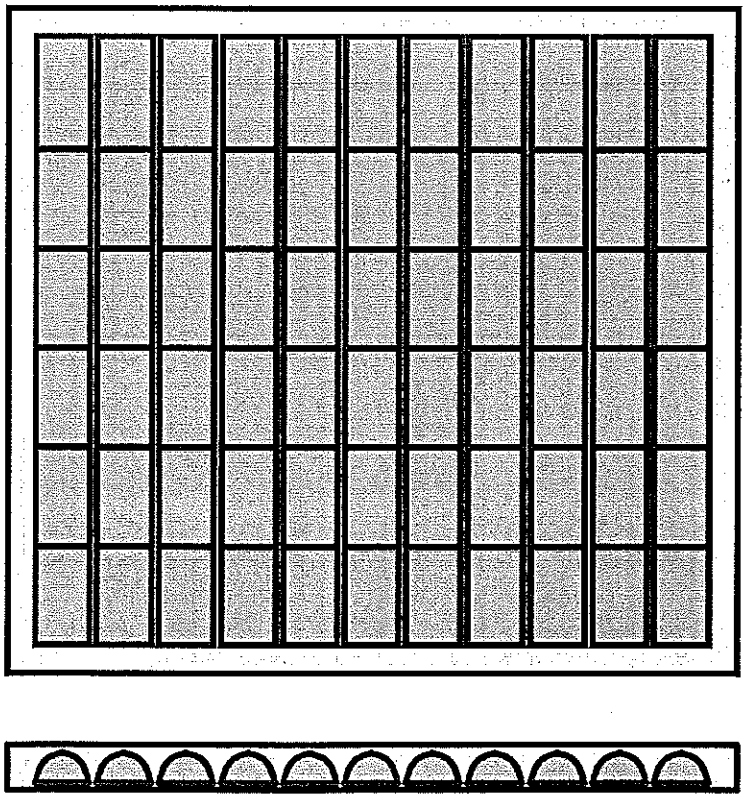
6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +24.0" End Stone x 2 = 47.00' Base Length
11 Rows x 47.0" Wide + 6.0" Spacing x 10 + 24.0" Side Stone x 2 = 52.08' Base Width
6.0" Base + 26.5" Chamber Height + 6.0" Cover = 3.21' Field Height

66 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 11 Rows = 2,871.9 cf Chamber Storage

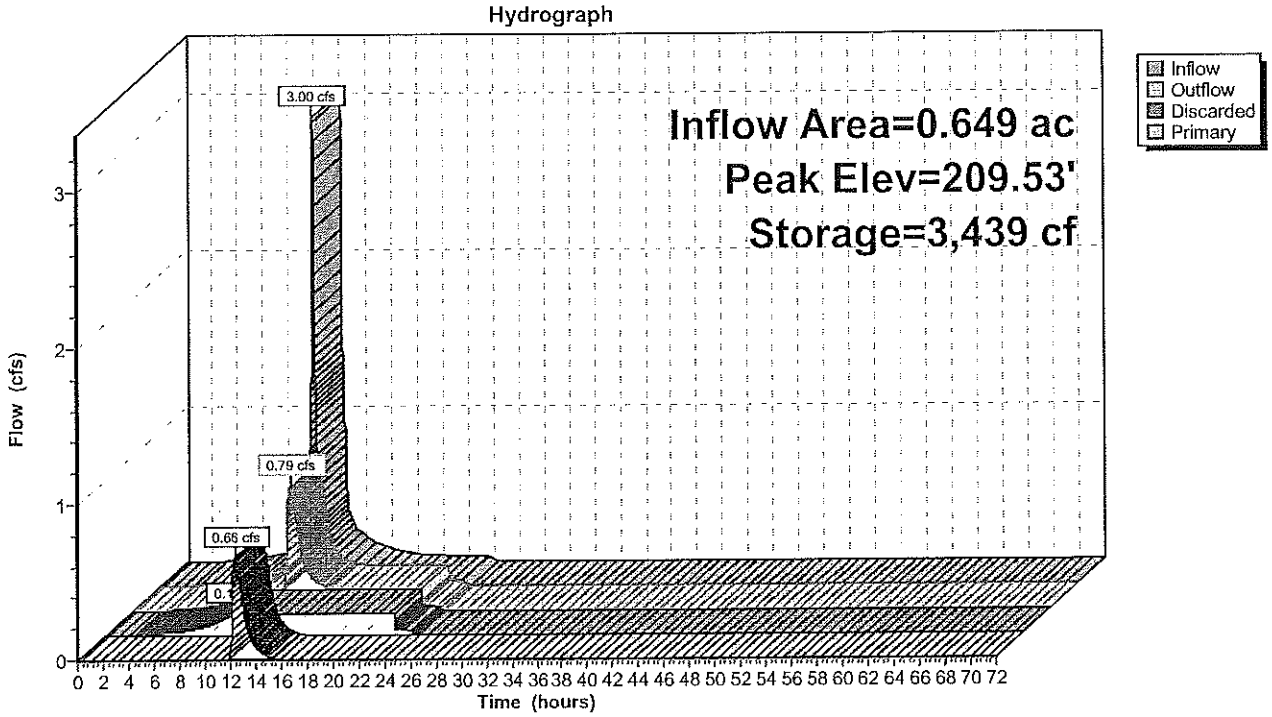
7,853.7 cf Field - 2,871.9 cf Chambers = 4,981.8 cf Stone x 40.0% Voids = 1,992.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,864.7 cf = 0.112 af
Overall Storage Efficiency = 61.9%
Overall System Size = 47.00' x 52.08' x 3.21'

66 Chambers
290.9 cy Field
184.5 cy Stone



Pond PND-1: R-280HD Chamber System #1



Summary for Pond PND-2: R-280HD Chamber System #2

Inflow Area = 2.450 ac, 58.41% Impervious, Inflow Depth = 2.28" for 10-Year event
Inflow = 5.18 cfs @ 12.10 hrs, Volume= 0.466 af
Outflow = 0.40 cfs @ 11.65 hrs, Volume= 0.466 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.40 cfs @ 11.65 hrs, Volume= 0.466 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 207.57' @ 14.07 hrs Surf.Area= 7,184 sf Storage= 9,019 cf

Plug-Flow detention time= 192.4 min calculated for 0.466 af (100% of inflow)
Center-of-Mass det. time= 192.4 min (985.2 - 792.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	205.80'	6,092 cf	**69.75'W x 103.00'L x 3.38'H Field A** 24,247 cf Overall - 9,017 cf Embedded = 15,230 cf x 40.0% Voids
#2A	206.30'	9,017 cf	**Cultec R-280HD** x 210 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 15 rows
		15,109 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	208.80'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	205.80'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.40 cfs @ 11.65 hrs HW=205.84' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.40 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=205.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond PND-2: R-280HD Chamber System #2 - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger®280HD)
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 6.07 sf x 15 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

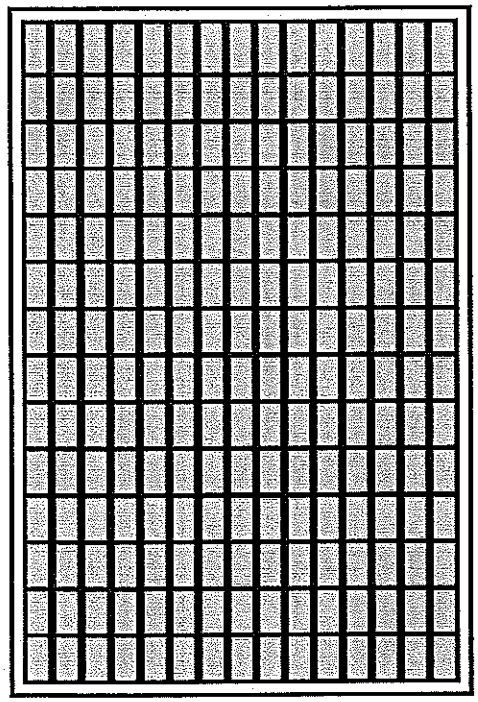
14 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 99.00' Row Length +24.0" End Stone x 2 = 103.00' Base Length
15 Rows x 47.0" Wide + 6.0" Spacing x 14 + 24.0" Side Stone x 2 = 69.75' Base Width
6.0" Base + 26.5" Chamber Height + 8.0" Cover = 3.38' Field Height

210 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 15 Rows = 9,016.5 cf Chamber Storage

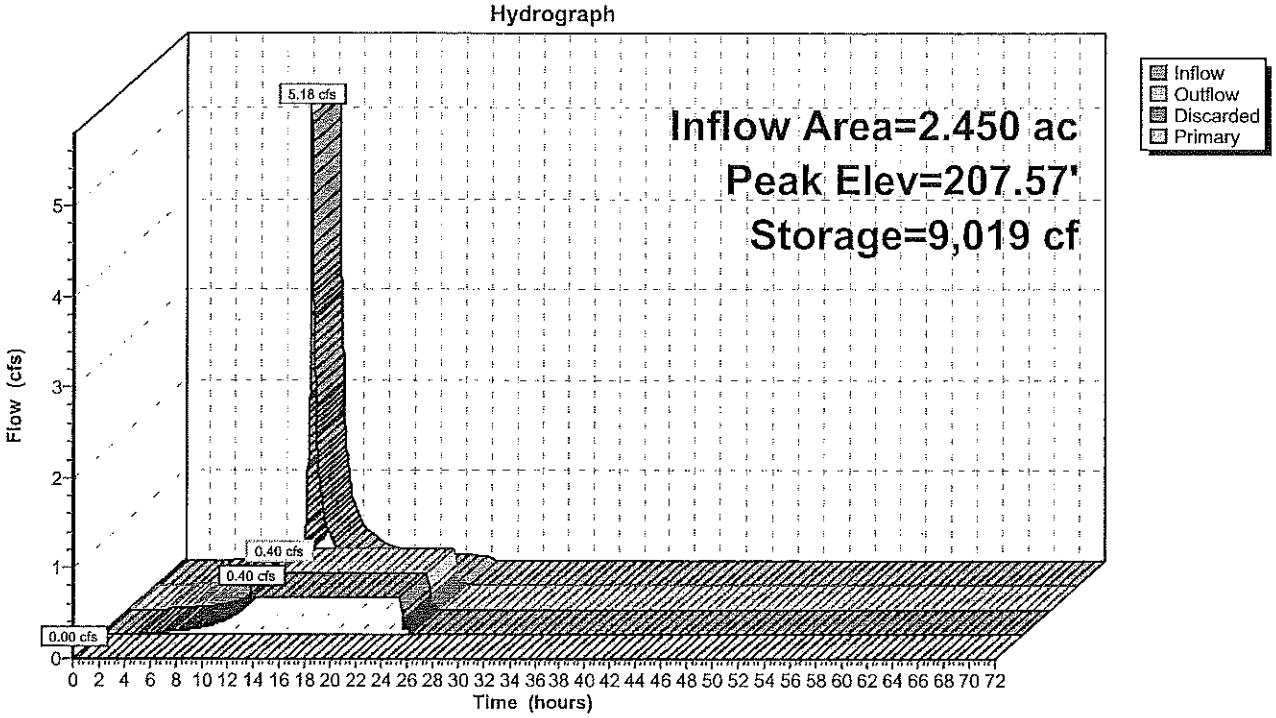
24,246.8 cf Field - 9,016.5 cf Chambers = 15,230.3 cf Stone x 40.0% Voids = 6,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 15,108.7 cf = 0.347 af
Overall Storage Efficiency = 62.3%
Overall System Size = 103.00' x 69.75' x 3.38'

210 Chambers
898.0 cy Field
564.1 cy Stone



Pond PND-2: R-280HD Chamber System #2



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPR-1: PR-1 Runoff Area=28,285 sf 89.32% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=95 Runoff=5.56 cfs 0.444 af

SubcatchmentPR-2: PR-2 Runoff Area=37,310 sf 91.54% Impervious Runoff Depth=8.20"
Tc=6.0 min CN=95 Runoff=7.33 cfs 0.585 af

SubcatchmentPR-3: PR-3 Runoff Area=259,245 sf 12.46% Impervious Runoff Depth=5.65"
Tc=12.0 min CN=74 Runoff=32.26 cfs 2.801 af

SubcatchmentPR-4: PR-4 Runoff Area=12,965 sf 6.84% Impervious Runoff Depth=4.43"
Tc=6.0 min CN=64 Runoff=1.54 cfs 0.110 af

SubcatchmentPR-5: PR-5 Runoff Area=41,128 sf 7.09% Impervious Runoff Depth=4.07"
Flow Length=433' Tc=7.1 min CN=61 Runoff=4.30 cfs 0.320 af

SubcatchmentPR-6: PR-6 Runoff Area=41,012 sf 0.00% Impervious Runoff Depth=2.17"
Tc=10.0 min CN=45 Runoff=1.83 cfs 0.171 af

Pond 3P: AP-2P Inflow=37.62 cfs 3.292 af
Primary=37.62 cfs 3.292 af

Pond 4P: AP-1P Inflow=1.83 cfs 0.171 af
Primary=1.83 cfs 0.171 af

Pond PND-1: R-280HD Chamber System #1 Peak Elev=211.01' Storage=4,865 cf Inflow=5.56 cfs 0.444 af
Discarded=0.14 cfs 0.226 af Primary=6.14 cfs 0.218 af Outflow=6.27 cfs 0.444 af

Pond PND-2: R-280HD Chamber System Peak Elev=209.29' Storage=15,109 cf Inflow=17.67 cfs 1.123 af
Discarded=0.40 cfs 0.741 af Primary=9.11 cfs 0.382 af Outflow=9.51 cfs 1.123 af

Total Runoff Area = 9.641 ac Runoff Volume = 4.430 af Average Runoff Depth = 5.51"
77.26% Pervious = 7.448 ac 22.74% Impervious = 2.193 ac

Summary for Subcatchment PR-1: PR-1

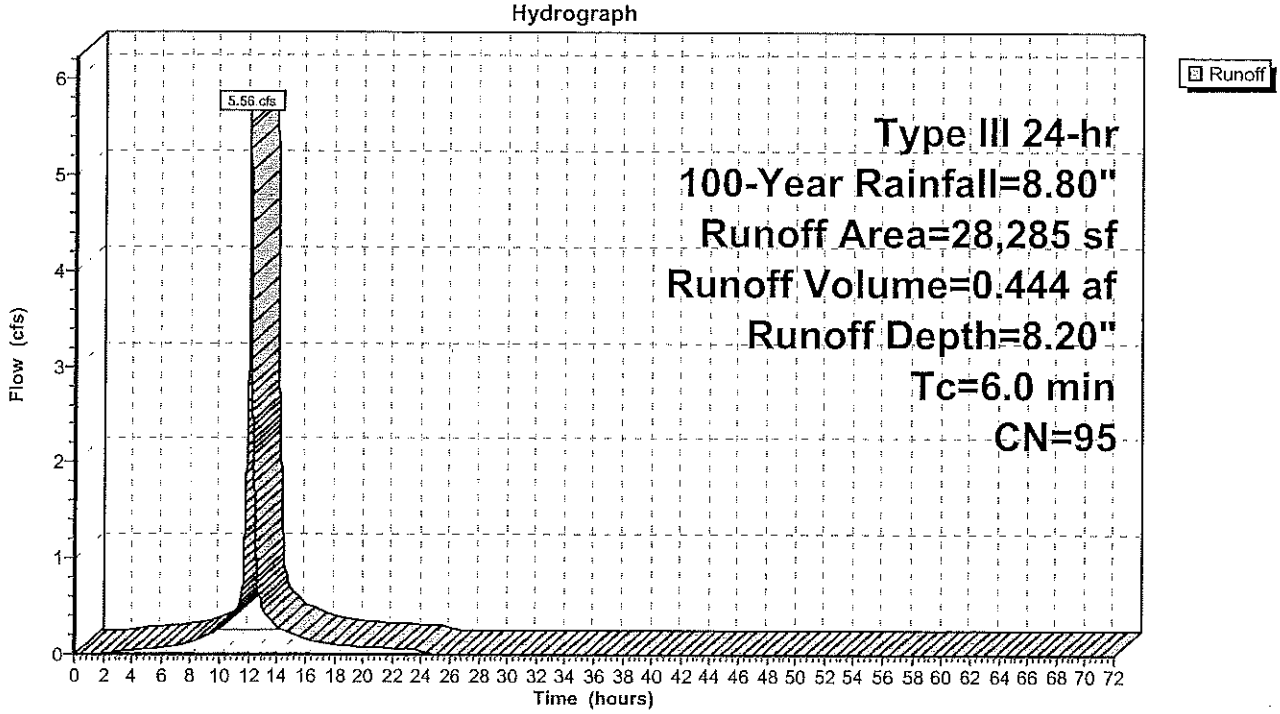
Runoff = 5.56 cfs @ 12.08 hrs, Volume= 0.444 af, Depth= 8.20"

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
10,327	98	Paved parking, HSG C
2,469	74	>75% Grass cover, Good, HSG C
2,424	98	Roofs, HSG C
4,035	98	Paved parking, HSG B
552	61	>75% Grass cover, Good, HSG B
8,478	98	Roofs, HSG B
28,285	95	Weighted Average
3,021		10.68% Pervious Area
25,264		89.32% Impervious Area

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

Subcatchment PR-1: PR-1



Summary for Subcatchment PR-2: PR-2

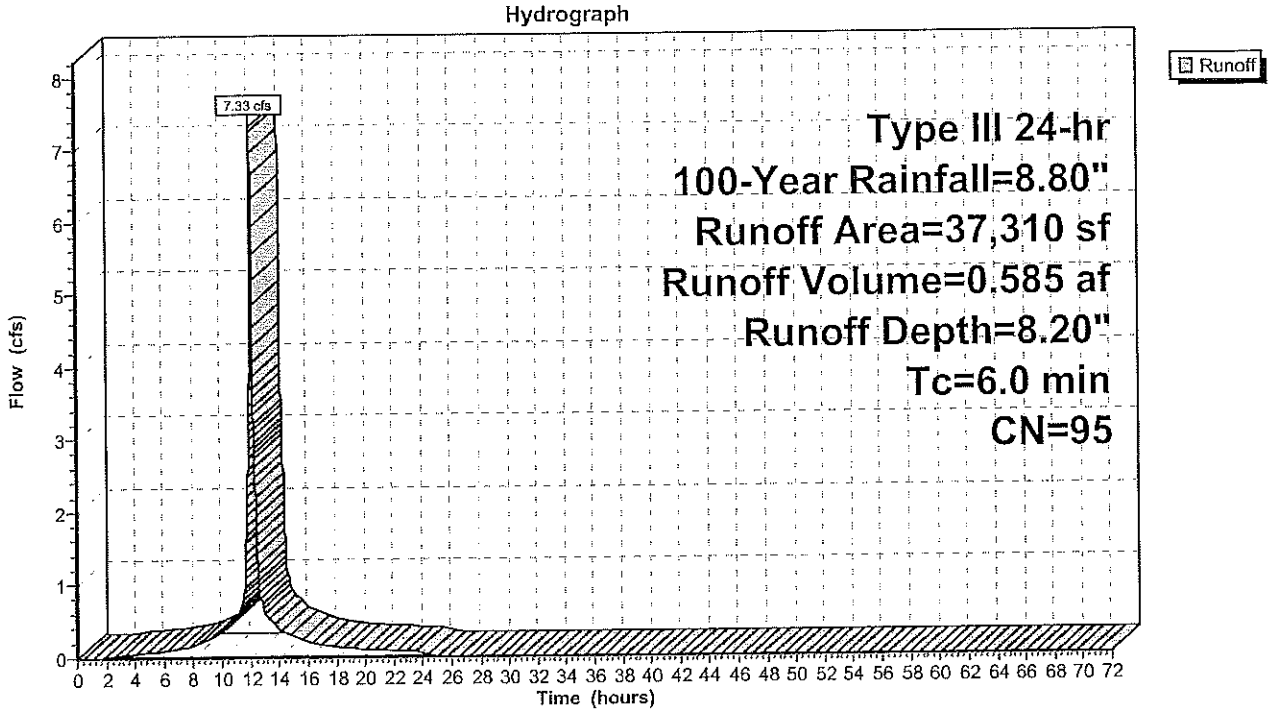
Runoff = 7.33 cfs @ 12.08 hrs, Volume= 0.585 af, Depth= 8.20"

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
23,195	98	Paved parking, HSG B
10,960	98	Roofs, HSG B
3,155	61	>75% Grass cover, Good, HSG B
37,310	95	Weighted Average
3,155		8.46% Pervious Area
34,155		91.54% Impervious Area

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

Subcatchment PR-2: PR-2



Summary for Subcatchment PR-3: PR-3

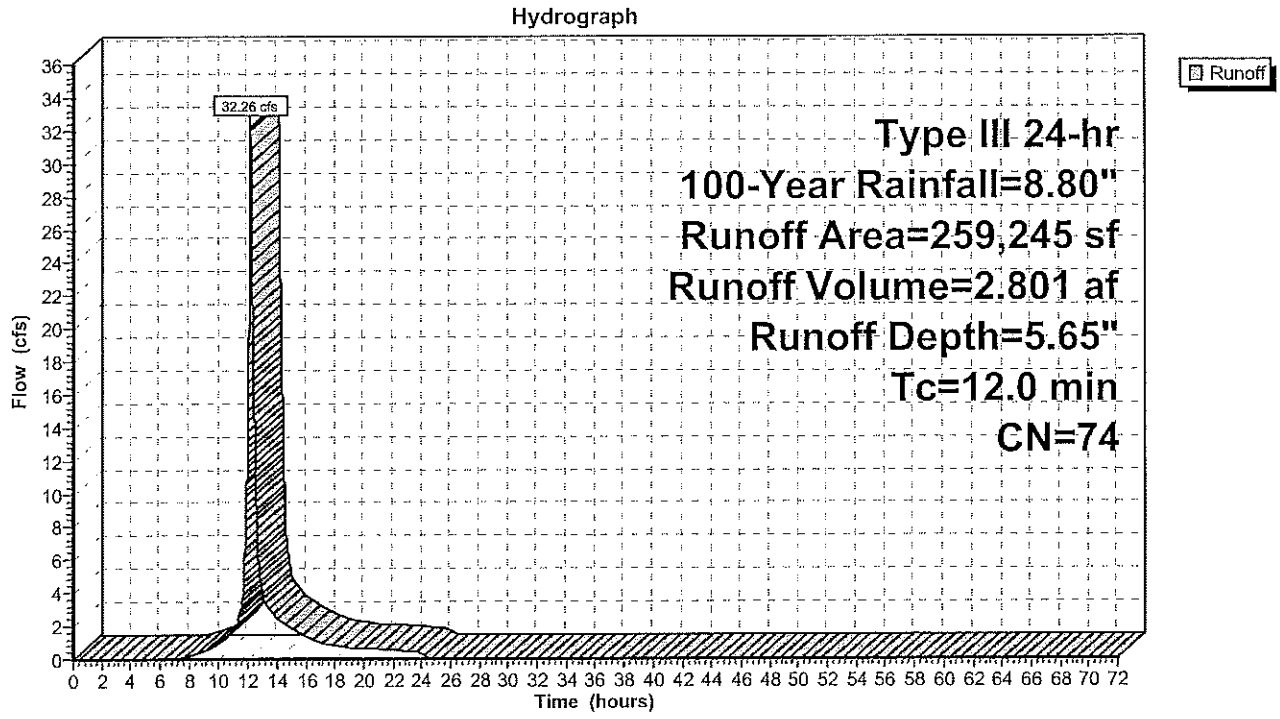
Runoff = 32.26 cfs @ 12.17 hrs, Volume= 2.801 af, Depth= 5.65"

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 100-Year Rainfall=8.80"

Area (sf)	CN	Description
43,424	61	Pasture/grassland/range, Good, HSG B
86,662	74	Pasture/grassland/range, Good, HSG C
17,970	70	1/2 acre lots, 25% imp, HSG B
111,189	80	1/2 acre lots, 25% imp, HSG C
259,245	74	Weighted Average
226,955		87.54% Pervious Area
32,290		12.46% Impervious Area

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

Subcatchment PR-3: PR-3



Summary for Subcatchment PR-4: PR-4

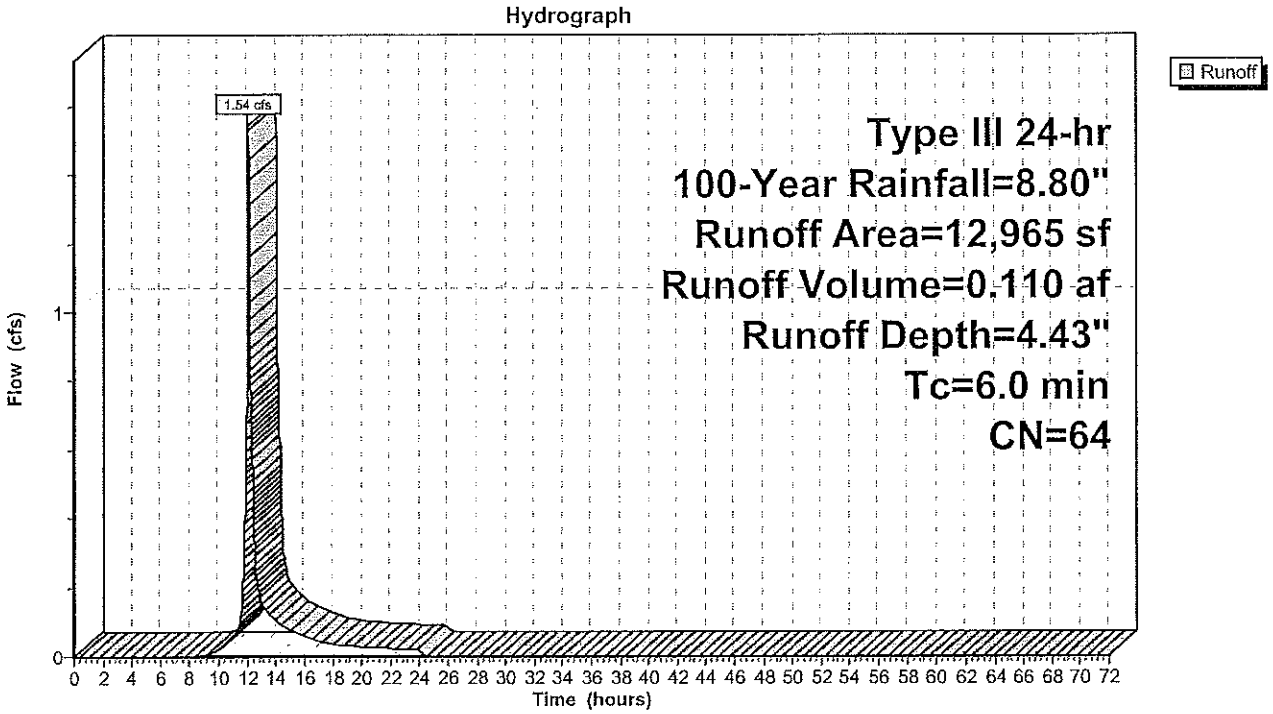
Runoff = 1.54 cfs @ 12.09 hrs, Volume= 0.110 af, Depth= 4.43"

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
2,651	61	Pasture/grassland/range, Good, HSG B
9,427	61	>75% Grass cover, Good, HSG B
887	98	Paved parking, HSG B
12,965	64	Weighted Average
12,078		93.16% Pervious Area
887		6.84% Impervious Area

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

Subcatchment PR-4: PR-4



Summary for Subcatchment PR-5: PR-5

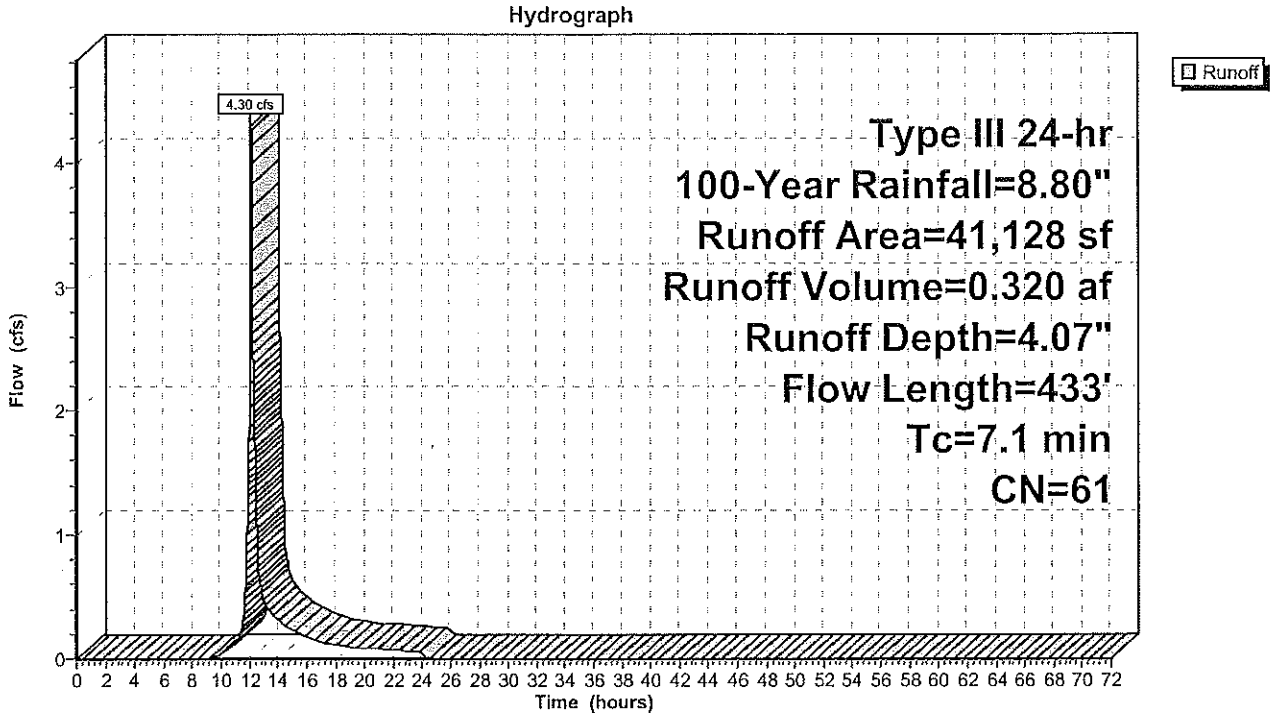
Runoff = 4.30 cfs @ 12.11 hrs, Volume= 0.320 af, Depth= 4.07"

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
26,537	61	Pasture/grassland/range, Good, HSG B
2,920	39	Pasture/grassland/range, Good, HSG A
8,705	70	1/2 acre lots, 25% imp, HSG B
2,966	54	1/2 acre lots, 25% imp, HSG A
41,128	61	Weighted Average
38,210		92.91% Pervious Area
2,918		7.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	50	0.0600	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.20"
0.8	97	0.0900	2.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.6	150	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	136	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
7.1	433	Total			

Subcatchment PR-5: PR-5



Summary for Subcatchment PR-6: PR-6

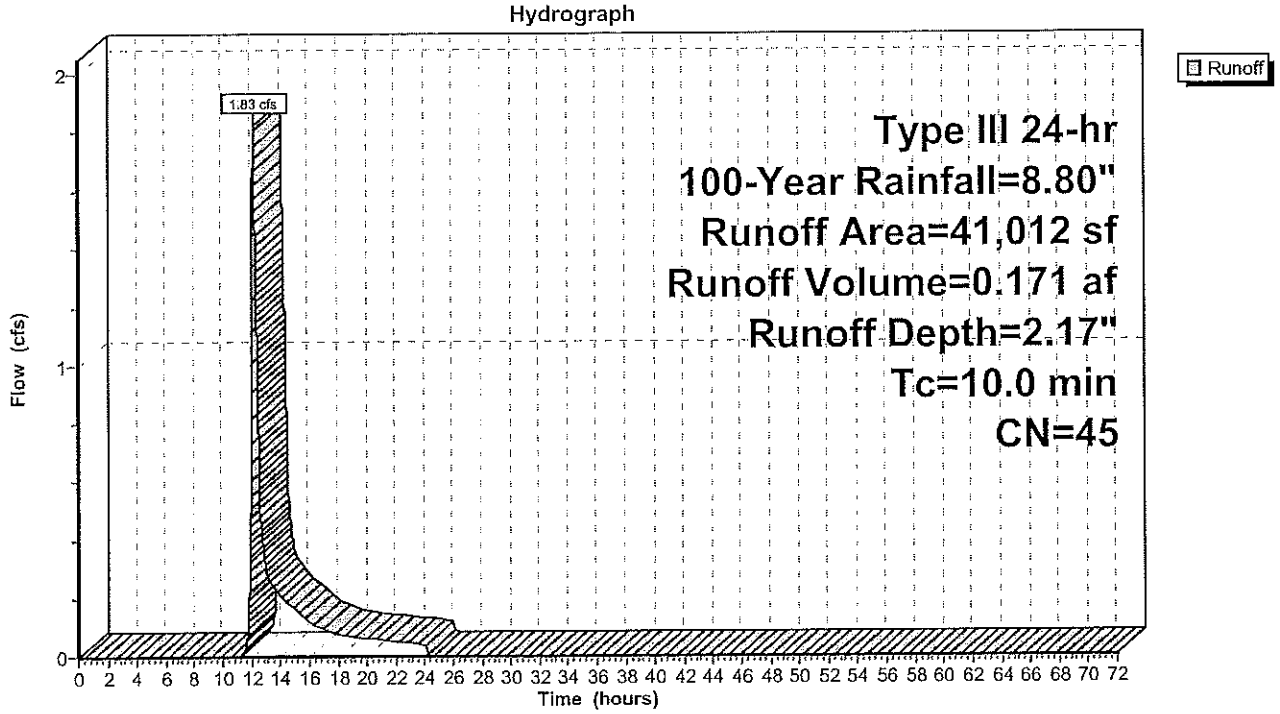
Runoff = 1.83 cfs @ 12.16 hrs, Volume= 0.171 af, Depth= 2.17"

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
29,562	39	Pasture/grassland/range, Good, HSG A
11,450	61	Pasture/grassland/range, Good, HSG B
41,012	45	Weighted Average
41,012		100.00% Pervious Area

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

Subcatchment PR-6: PR-6

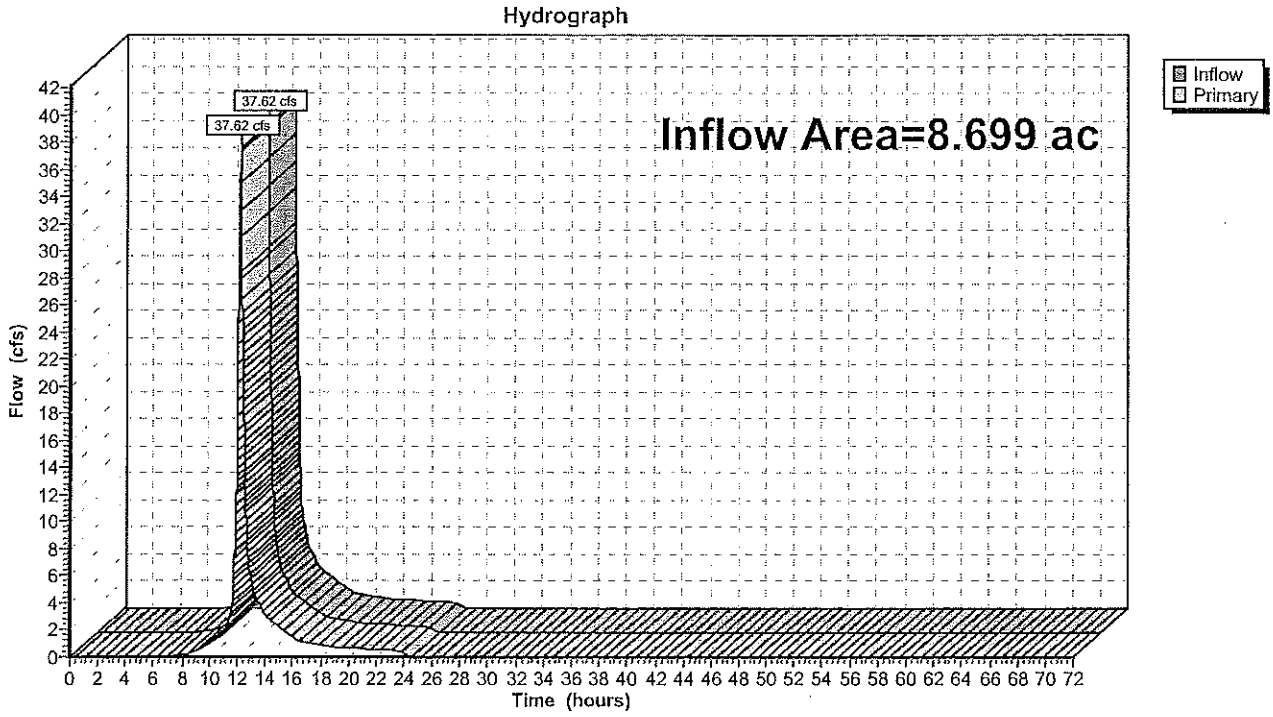


Summary for Pond 3P: AP-2P

Inflow Area = 8.699 ac, 25.21% Impervious, Inflow Depth = 4.54" for 100-Year event
Inflow = 37.62 cfs @ 12.24 hrs, Volume= 3.292 af
Primary = 37.62 cfs @ 12.24 hrs, Volume= 3.292 af, Atten= 0%, Lag= 0.0 min

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

Pond 3P: AP-2P

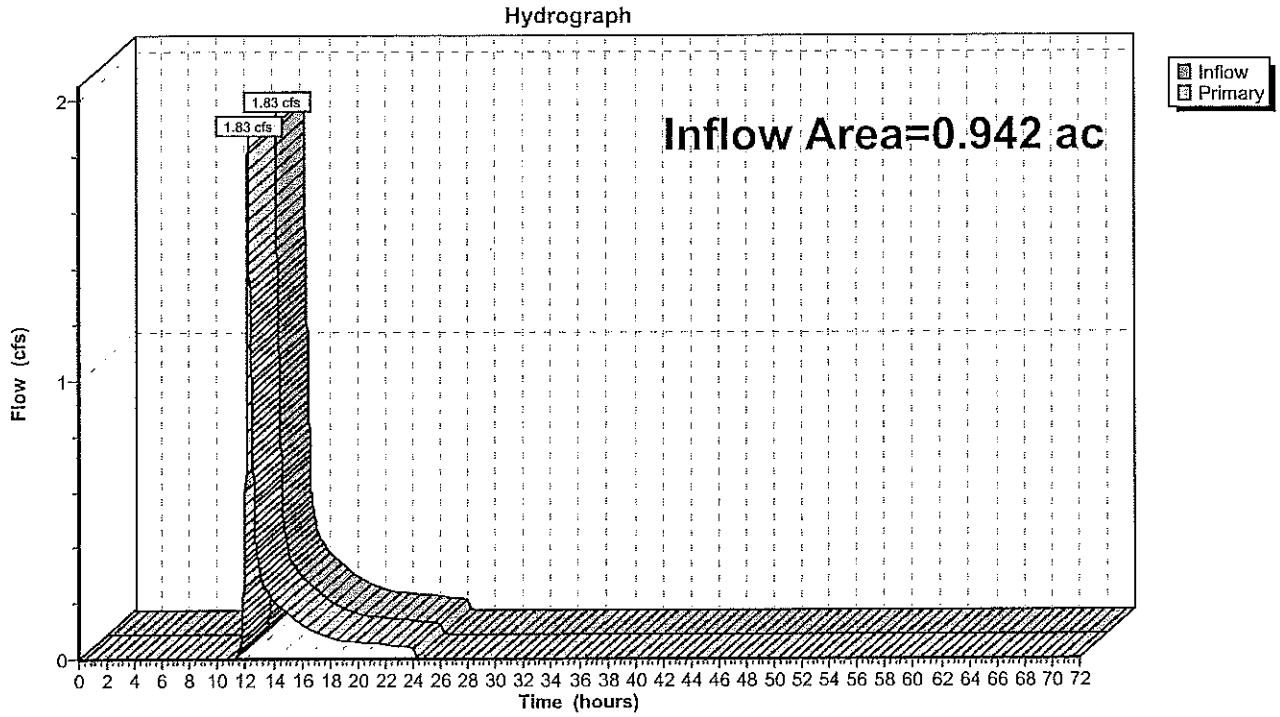


Summary for Pond 4P: AP-1P

Inflow Area = 0.942 ac, 0.00% Impervious, Inflow Depth = 2.17" for 100-Year event
Inflow = 1.83 cfs @ 12.16 hrs, Volume= 0.171 af
Primary = 1.83 cfs @ 12.16 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

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

Pond 4P: AP-1P



Summary for Pond PND-1: R-280HD Chamber System #1

Inflow Area = 0.649 ac, 89.32% Impervious, Inflow Depth = 8.20" for 100-Year event
Inflow = 5.56 cfs @ 12.08 hrs, Volume= 0.444 af
Outflow = 6.27 cfs @ 12.09 hrs, Volume= 0.444 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.14 cfs @ 8.64 hrs, Volume= 0.226 af
Primary = 6.14 cfs @ 12.09 hrs, Volume= 0.218 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 211.01' @ 12.09 hrs Surf.Area= 2,448 sf Storage= 4,865 cf

Plug-Flow detention time= 91.3 min calculated for 0.444 af (100% of inflow)
Center-of-Mass det. time= 91.3 min (846.4 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1B	207.50'	1,993 cf	**52.08'W x 47.00'L x 3.21'H Field B** 7,854 cf Overall - 2,872 cf Embedded = 4,982 cf x 40.0% Voids
#2B	208.00'	2,872 cf	**Cultec R-280HD** x 66 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 11 rows
		4,865 cf	Total Available Storage

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	208.00'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.00' / 206.40' S= 0.0800 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	210.50'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	208.80'	**6.0" Vert. Orifice/Grate** C= 0.600
#4	Discarded	207.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.14 cfs @ 8.64 hrs HW=207.53' (Free Discharge)
↑**4=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=5.94 cfs @ 12.09 hrs HW=210.97' TW=207.68' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.94 cfs @ 7.56 fps)
↑**2=Sharp-Crested Rectangular Weir** (Passes < 5.13 cfs potential flow)
3=Orifice/Grate (Passes < 1.31 cfs potential flow)

Pond PND-1: R-280HD Chamber System #1 - Chamber Wizard Field B

Chamber Model = Cultec R-280HD (Cultec Recharger®280HD)
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 6.07 sf x 11 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

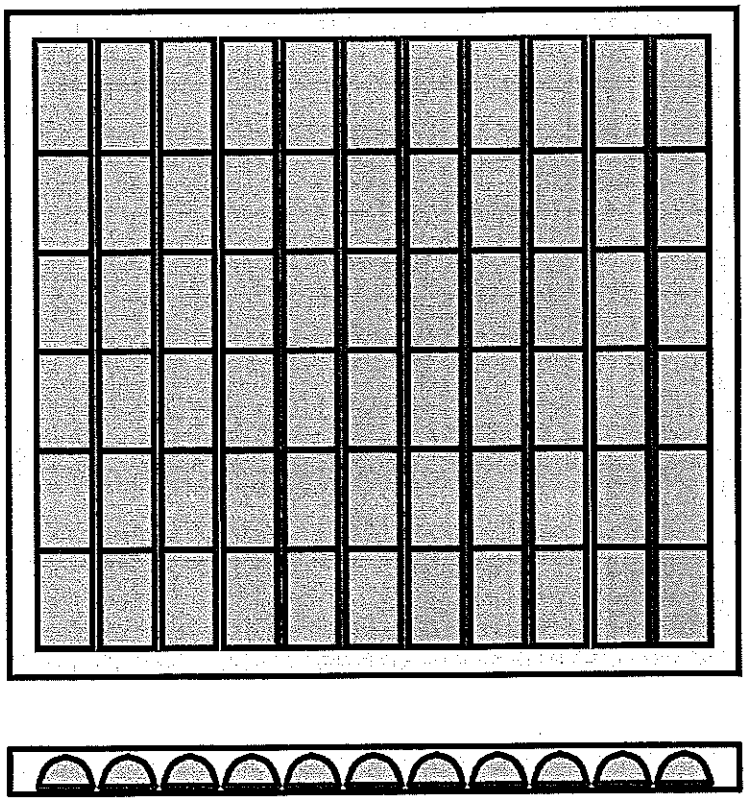
6 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 43.00' Row Length +24.0" End Stone x 2 = 47.00' Base Length
11 Rows x 47.0" Wide + 6.0" Spacing x 10 + 24.0" Side Stone x 2 = 52.08' Base Width
6.0" Base + 26.5" Chamber Height + 6.0" Cover = 3.21' Field Height

66 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 11 Rows = 2,871.9 cf Chamber Storage

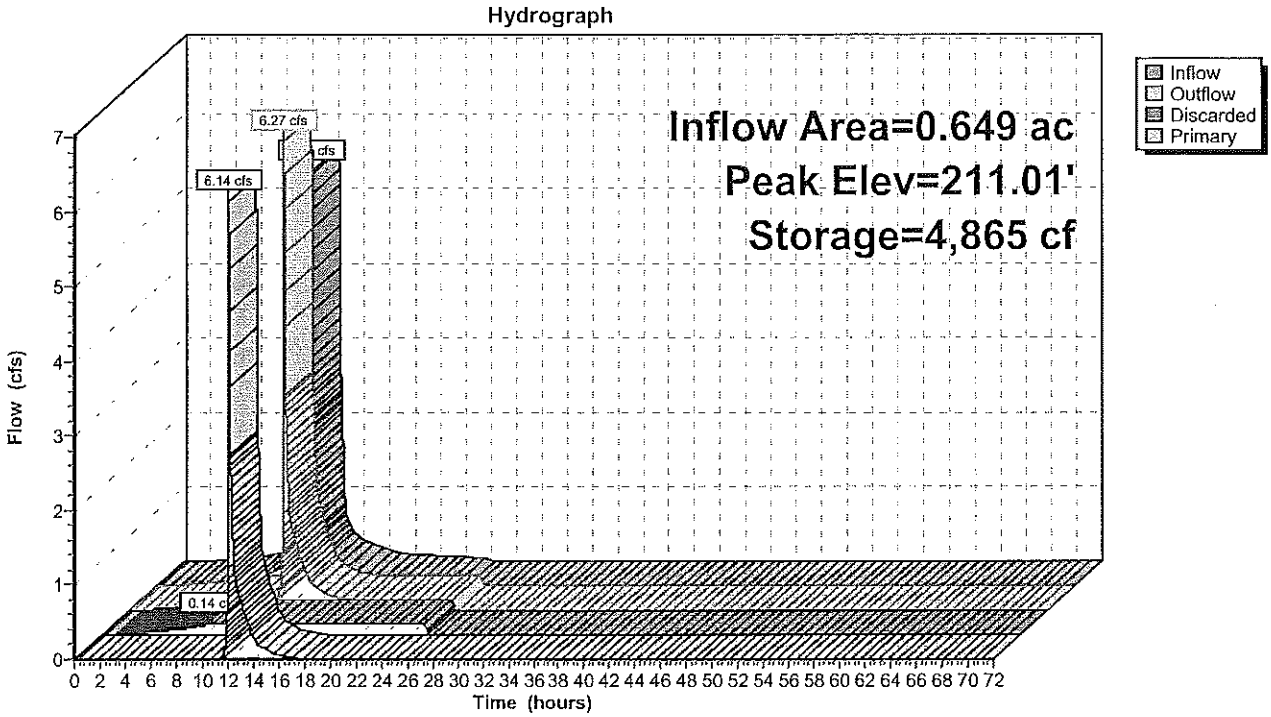
7,853.7 cf Field - 2,871.9 cf Chambers = 4,981.8 cf Stone x 40.0% Voids = 1,992.7 cf Stone Storage

Chamber Storage + Stone Storage = 4,864.7 cf = 0.112 af
Overall Storage Efficiency = 61.9%
Overall System Size = 47.00' x 52.08' x 3.21'

66 Chambers
290.9 cy Field
184.5 cy Stone



Pond PND-1: R-280HD Chamber System #1



Summary for Pond PND-2: R-280HD Chamber System #2

Inflow Area = 2.450 ac, 58.41% Impervious, Inflow Depth = 5.50" for 100-Year event
Inflow = 17.67 cfs @ 12.09 hrs, Volume= 1.123 af
Outflow = 9.51 cfs @ 12.24 hrs, Volume= 1.123 af, Atten= 46%, Lag= 8.8 min
Discarded = 0.40 cfs @ 10.51 hrs, Volume= 0.741 af
Primary = 9.11 cfs @ 12.24 hrs, Volume= 0.382 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 209.29' @ 12.24 hrs Surf.Area= 7,184 sf Storage= 15,109 cf

Plug-Flow detention time= 219.0 min calculated for 1.123 af (100% of inflow)
Center-of-Mass det. time= 219.0 min (1,001.8 - 782.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	205.80'	6,092 cf	**69.75'W x 103.00'L x 3.38'H Field A** 24,247 cf Overall - 9,017 cf Embedded = 15,230 cf x 40.0% Voids
#2A	206.30'	9,017 cf	**Cultec R-280HD** x 210 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 15 rows
		15,109 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	208.80'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	205.80'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.40 cfs @ 10.51 hrs HW=205.83' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.40 cfs)

Primary OutFlow Max=8.97 cfs @ 12.24 hrs HW=209.29' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 8.97 cfs @ 2.29 fps)

Pond PND-2: R-280HD Chamber System #2 - Chamber Wizard Field A

Chamber Model = Cultec R-280HD (Cultec Recharger®280HD)
Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
Row Length Adjustment= +1.00' x 6.07 sf x 15 rows

47.0" Wide + 6.0" Spacing = 53.0" C-C Row Spacing

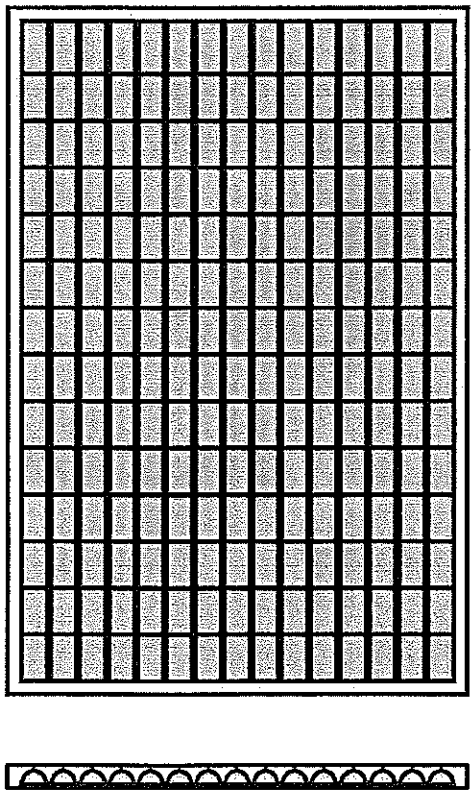
14 Chambers/Row x 7.00' Long +1.00' Row Adjustment = 99.00' Row Length +24.0" End Stone x 2 = 103.00' Base Length
15 Rows x 47.0" Wide + 6.0" Spacing x 14 + 24.0" Side Stone x 2 = 69.75' Base Width
6.0" Base + 26.5" Chamber Height + 8.0" Cover = 3.38' Field Height

210 Chambers x 42.5 cf +1.00' Row Adjustment x 6.07 sf x 15 Rows = 9,016.5 cf Chamber Storage

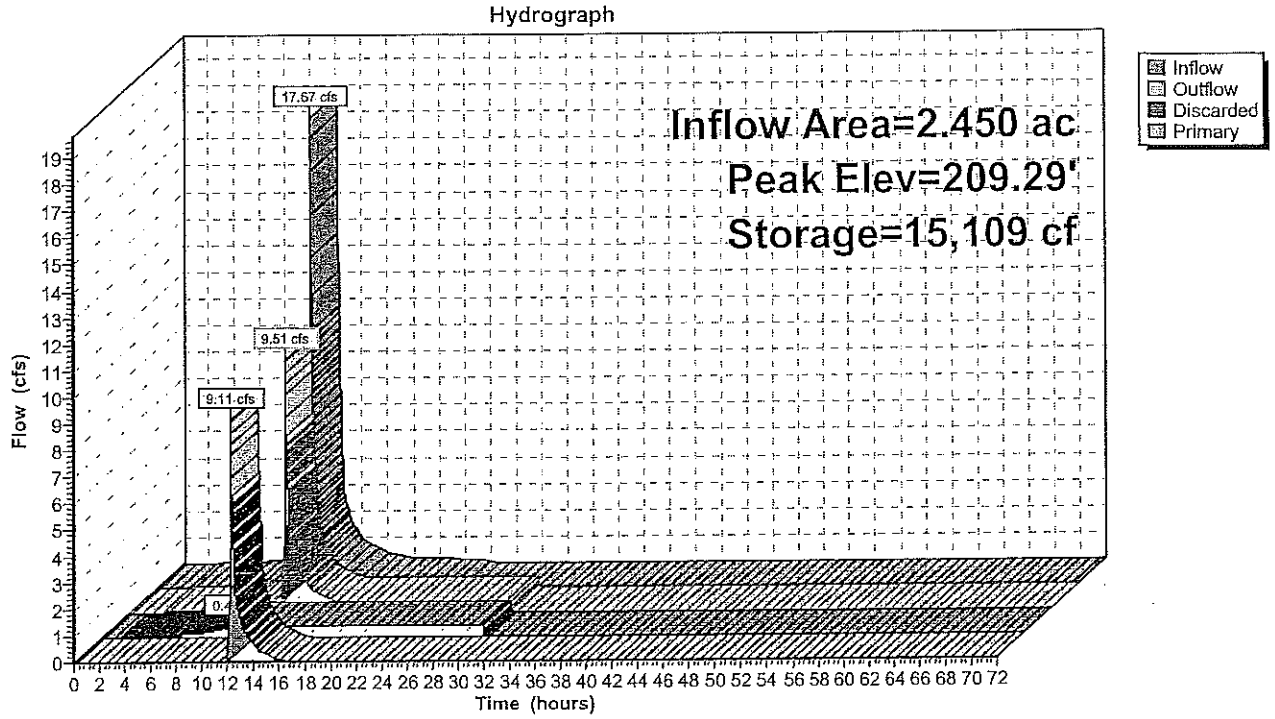
24,246.8 cf Field - 9,016.5 cf Chambers = 15,230.3 cf Stone x 40.0% Voids = 6,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 15,108.7 cf = 0.347 af
Overall Storage Efficiency = 62.3%
Overall System Size = 103.00' x 69.75' x 3.38'

210 Chambers
898.0 cy Field
564.1 cy Stone



Pond PND-2: R-280HD Chamber System #2



Street Drainage Calculations

Land Use Coefficients "C"

Pave	0.90
Gravel	0.80
Wetland	0.72
Grass	0.30
Woods	0.25
Roof	0.90

(af)

Drainage Area	Land Use Area Impervious (acres)	Gravel (acres)	Wetland (acres)	Pervious (acres)	Woods (acres)	Roof (acres)	Total (acres)	Weighted "C"
CB 1&2	0.330			0.069		0.000	0.399	0.80
CB 3	0.067			0.877	0.000	0.000	0.944	0.34
CB 4	0.403			0.048	0.000	0.000	0.451	0.84
CB 5&6	0.129			0.039	0.000	0.000	0.168	0.76
ROOF NORTH	0.000			0.000	0.000	0.250	0.250	0.90
ROOF SOUTH	0.000			0.000	0.000	0.252	0.252	0.90
DMH #9	0.741			5.205	0.000	0.000	5.946	0.37
SUBTOTAL	0.928			1.033		0.502	8.410	
OVERALL TOTALS	0.928			1.033		0.502	8.410	

Guerriere & Halnon, Inc.
55 West Central Steet
Franklin, MA 01757-0235

Project: 86 Hollislon Street
Job No.: 4516

Prepared By: MAH Date: 3/28/2022 Revised
Checked By: Date: Revised

DESIGN COMPUTATIONS FOR STORM DRAINS

Drainage Area	Upper Structure	Lower Structure	Sum of CA's	Time of Concentration (Tc)	Rainfall Intensity (I)	Total Peak Flow Rate (Q)	Pipe Diameter	Slope	Roughness Coefficient (n)	Design Flow Full (Q)	Velocity Full (V)	Actual Velocity (V)	Length (L)	Travel Time	Travel Time	Invert Elevation Elev. Upper End	Invert Elevation Elev. Lower End	Rim Elev. Elev. Upper End	Rim Elev. Elev. Lower End	Description
			(ac)	(min)	(in/hr)	(cfs)	(in)	(ft/ft)		(cfs)	(fps)	(fps)	(ft)	(min)	(s)					
CB-1	CB 1&2	DMH-1	0.32	6.00	5.80	1.84	12	0.005	0.013	2.52	3.21	2.34	86.1	0.45	0.43	209.15	208.72	211.60	211.80	Infiltration Chamber System #1
	CB 3	DMH-5	0.32	6.00	5.80	1.87	12	0.008	0.013	3.27	4.16	2.39	60.6	0.24	0.51	206.91	206.40	210.80	210.90	Infiltration Chamber System #2
	CB 4	DMH-6	0.38	6.00	5.80	2.19	12	0.005	0.013	2.52	3.21	2.78	26.0	0.14	0.13	206.43	206.30	209.70	210.40	
	CB 5&6	DMH-7	0.13	6.00	5.80	0.74	12	0.005	0.013	2.43	3.09	0.94	53.8	0.29	0.25	206.55	206.30	208.80	210.10	
	DMH-1	DMH-2	0.32	6.45	5.80	1.84	12	0.005	0.013	2.52	3.21	2.34	51.8	0.27	0.26	208.72	208.46	211.80	213.30	Infiltration Chamber System #1
	DMH-2	DMH-3	0.32	6.72	5.69	1.81	12	0.005	0.013	2.46	3.13	2.30	75.6	0.40	0.36	208.36	208.00	213.30	212.50	
	DMH-4	DMH-5	0.54	7.12	5.59	3.03	12	0.051	0.013	8.07	10.27	3.86	31.2	0.05	1.60	208.00	206.40	212.10	210.90	
	ROOF NORTH	Chambers #1	0.23	6.00	5.80	1.31	10	0.005	0.013	1.56	2.85	2.39	377.1	2.20	1.90	209.90	208.00			Infiltration Chamber System #1
	ROOF SOUTH	Chambers #2	0.23	6.00	5.80	1.31	10	0.010	0.013	2.21	4.05	2.41	138.0	0.57	1.40	207.70	206.30			Infiltration Chamber System #2
	DMH #9	DMH #10	2.23	12.00	4.68	10.44	15	0.027	0.013	10.52	8.58	8.51	165.0	0.32	4.38	210.25	205.87	214.00	210.50	AP-2
	DMH#10	DMH #11	2.23	12.32	4.68	10.44	15	0.033	0.013	11.70	9.53	8.51	18.9	0.03	0.62	205.87	205.25	210.50	210.00	

NRCS Soils Report

Map Scale: 1:2,680 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

N

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 Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 17, Sep 3, 2021

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

Date(s) aerial images were photographed: Aug 31, 2020—Oct 22, 2020

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

Table—Hydrologic Soil Group (86 Holliston Street)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
31A	Walpole sandy loam, 0 to 3 percent slopes	B/D	0.0	0.1%
245B	Hinckley loamy sand, 3 to 8 percent slopes	A	1.6	5.3%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	2.5	8.2%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	6.3	20.8%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	C	14.7	48.3%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	3.3	10.8%
653	Udorthents, sandy	A	2.0	6.5%
Totals for Area of Interest			30.5	100.0%

Rating Options—Hydrologic Soil Group (86 Holliston Street)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Basin Drawdown Tabulation

Hydrograph for Pond 1P: R-280HD Chamber System #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	207.50	0.00	0.00	0.00
1.00	0.00	0	207.50	0.00	0.00	0.00
2.00	0.01	1	207.50	0.01	0.01	0.00
3.00	0.03	2	207.50	0.03	0.03	0.00
4.00	0.04	3	207.50	0.04	0.04	0.00
5.00	0.05	4	207.50	0.05	0.05	0.00
6.00	0.07	5	207.50	0.07	0.07	0.00
7.00	0.10	7	207.51	0.09	0.09	0.00
8.00	0.13	9	207.51	0.13	**0.13**	0.00
9.00	0.19	84	207.59	0.14	**0.14**	0.00
10.00	0.26	396	207.90	0.14	0.14	0.00
11.00	0.39	1,060	208.28	0.14	0.14	0.00
12.00	**3.49**	**3,806**	**209.76**	**0.93**	0.14	**0.79**
13.00	**0.47**	**3,841**	**209.78**	**0.94**	0.14	**0.81**
14.00	0.29	2,755	209.15	0.43	0.14	0.29
15.00	0.22	2,505	209.01	0.26	0.14	0.13
16.00	0.16	2,368	208.94	0.19	0.14	0.06
17.00	0.12	2,245	208.88	0.15	0.14	0.02
18.00	0.09	2,118	208.81	0.14	0.14	0.00
19.00	0.08	1,945	208.72	0.14	0.14	0.00
20.00	0.08	1,740	208.62	0.14	0.14	0.00
21.00	0.07	1,508	208.50	0.14	0.14	0.00
22.00	0.06	1,252	208.37	0.14	0.14	0.00
23.00	0.06	973	208.23	0.14	0.14	0.00
24.00	0.05	671	208.09	0.14	0.14	0.00
25.00	0.00	195	207.70	0.14	0.14	0.00
26.00	0.00	0	207.50	0.00	0.00	0.00
27.00	0.00	0	207.50	0.00	0.00	0.00
28.00	0.00	0	207.50	0.00	0.00	0.00
29.00	0.00	0	207.50	0.00	0.00	0.00
30.00	0.00	0	207.50	0.00	0.00	0.00
31.00	0.00	0	207.50	0.00	0.00	0.00
32.00	0.00	0	207.50	0.00	0.00	0.00
33.00	0.00	0	207.50	0.00	0.00	0.00
34.00	0.00	0	207.50	0.00	0.00	0.00
35.00	0.00	0	207.50	0.00	0.00	0.00
36.00	0.00	0	207.50	0.00	0.00	0.00
37.00	0.00	0	207.50	0.00	0.00	0.00
38.00	0.00	0	207.50	0.00	0.00	0.00
39.00	0.00	0	207.50	0.00	0.00	0.00
40.00	0.00	0	207.50	0.00	0.00	0.00
41.00	0.00	0	207.50	0.00	0.00	0.00
42.00	0.00	0	207.50	0.00	0.00	0.00
43.00	0.00	0	207.50	0.00	0.00	0.00
44.00	0.00	0	207.50	0.00	0.00	0.00
45.00	0.00	0	207.50	0.00	0.00	0.00
46.00	0.00	0	207.50	0.00	0.00	0.00
47.00	0.00	0	207.50	0.00	0.00	0.00
48.00	0.00	0	207.50	0.00	0.00	0.00
49.00	0.00	0	207.50	0.00	0.00	0.00
50.00	0.00	0	207.50	0.00	0.00	0.00
51.00	0.00	0	207.50	0.00	0.00	0.00

Hydrograph for Pond 1P: R-280HD Chamber System #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
52.00	0.00	0	207.50	0.00	0.00	0.00
53.00	0.00	0	207.50	0.00	0.00	0.00
54.00	0.00	0	207.50	0.00	0.00	0.00
55.00	0.00	0	207.50	0.00	0.00	0.00
56.00	0.00	0	207.50	0.00	0.00	0.00
57.00	0.00	0	207.50	0.00	0.00	0.00
58.00	0.00	0	207.50	0.00	0.00	0.00
59.00	0.00	0	207.50	0.00	0.00	0.00
60.00	0.00	0	207.50	0.00	0.00	0.00
61.00	0.00	0	207.50	0.00	0.00	0.00
62.00	0.00	0	207.50	0.00	0.00	0.00
63.00	0.00	0	207.50	0.00	0.00	0.00
64.00	0.00	0	207.50	0.00	0.00	0.00
65.00	0.00	0	207.50	0.00	0.00	0.00
66.00	0.00	0	207.50	0.00	0.00	0.00
67.00	0.00	0	207.50	0.00	0.00	0.00
68.00	0.00	0	207.50	0.00	0.00	0.00
69.00	0.00	0	207.50	0.00	0.00	0.00
70.00	0.00	0	207.50	0.00	0.00	0.00
71.00	0.00	0	207.50	0.00	0.00	0.00
72.00	0.00	0	207.50	0.00	0.00	0.00

Hydrograph for Pond 2P: R-280HD Chamber System #2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	205.80	0.00	0.00	0.00
1.00	0.00	0	205.80	0.00	0.00	0.00
2.00	0.02	1	205.80	0.01	0.01	0.00
3.00	0.03	2	205.80	0.03	0.03	0.00
4.00	0.05	4	205.80	0.05	0.05	0.00
5.00	0.07	5	205.80	0.07	0.07	0.00
6.00	0.09	6	205.80	0.09	0.09	0.00
7.00	0.13	9	205.80	0.13	0.13	0.00
8.00	0.17	12	205.80	0.17	0.17	0.00
9.00	0.25	18	205.81	0.25	0.25	0.00
10.00	0.38	27	205.81	0.38	**0.38**	0.00
11.00	0.64	399	205.94	0.40	**0.40**	0.00
12.00	**7.61**	**6,014**	**207.05**	**0.40**	0.40	**0.00**
13.00	**1.91**	**14,477**	**208.96**	**2.00**	0.40	**1.60**
14.00	0.99	14,273	208.88	1.04	0.40	0.64
15.00	0.66	14,170	208.85	0.68	0.40	0.28
16.00	0.43	14,083	208.82	0.46	0.40	0.06
17.00	0.32	13,925	208.76	0.40	0.40	0.00
18.00	0.23	13,464	208.60	0.40	0.40	0.00
19.00	0.21	12,800	208.38	0.40	0.40	0.00
20.00	0.18	12,060	208.18	0.40	0.40	0.00
21.00	0.17	11,253	208.00	0.40	0.40	0.00
22.00	0.15	10,391	207.83	0.40	0.40	0.00
23.00	0.14	9,472	207.66	0.40	0.40	0.00
24.00	0.12	8,497	207.48	0.40	0.40	0.00
25.00	0.00	7,098	207.23	0.40	0.40	0.00
26.00	0.00	5,655	206.99	0.40	0.40	0.00
27.00	0.00	4,212	206.75	0.40	0.40	0.00
28.00	0.00	2,770	206.51	0.40	0.40	0.00
29.00	0.00	1,327	206.26	0.40	0.40	0.00
30.00	0.00	0	205.80	0.00	0.00	0.00
31.00	0.00	0	205.80	0.00	0.00	0.00
32.00	0.00	0	205.80	0.00	0.00	0.00
33.00	0.00	0	205.80	0.00	0.00	0.00
34.00	0.00	0	205.80	0.00	0.00	0.00
35.00	0.00	0	205.80	0.00	0.00	0.00
36.00	0.00	0	205.80	0.00	0.00	0.00
37.00	0.00	0	205.80	0.00	0.00	0.00
38.00	0.00	0	205.80	0.00	0.00	0.00
39.00	0.00	0	205.80	0.00	0.00	0.00
40.00	0.00	0	205.80	0.00	0.00	0.00
41.00	0.00	0	205.80	0.00	0.00	0.00
42.00	0.00	0	205.80	0.00	0.00	0.00
43.00	0.00	0	205.80	0.00	0.00	0.00
44.00	0.00	0	205.80	0.00	0.00	0.00
45.00	0.00	0	205.80	0.00	0.00	0.00
46.00	0.00	0	205.80	0.00	0.00	0.00
47.00	0.00	0	205.80	0.00	0.00	0.00
48.00	0.00	0	205.80	0.00	0.00	0.00
49.00	0.00	0	205.80	0.00	0.00	0.00
50.00	0.00	0	205.80	0.00	0.00	0.00
51.00	0.00	0	205.80	0.00	0.00	0.00

Hydrograph for Pond 2P: R-280HD Chamber System #2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
52.00	0.00	0	205.80	0.00	0.00	0.00
53.00	0.00	0	205.80	0.00	0.00	0.00
54.00	0.00	0	205.80	0.00	0.00	0.00
55.00	0.00	0	205.80	0.00	0.00	0.00
56.00	0.00	0	205.80	0.00	0.00	0.00
57.00	0.00	0	205.80	0.00	0.00	0.00
58.00	0.00	0	205.80	0.00	0.00	0.00
59.00	0.00	0	205.80	0.00	0.00	0.00
60.00	0.00	0	205.80	0.00	0.00	0.00
61.00	0.00	0	205.80	0.00	0.00	0.00
62.00	0.00	0	205.80	0.00	0.00	0.00
63.00	0.00	0	205.80	0.00	0.00	0.00
64.00	0.00	0	205.80	0.00	0.00	0.00
65.00	0.00	0	205.80	0.00	0.00	0.00
66.00	0.00	0	205.80	0.00	0.00	0.00
67.00	0.00	0	205.80	0.00	0.00	0.00
68.00	0.00	0	205.80	0.00	0.00	0.00
69.00	0.00	0	205.80	0.00	0.00	0.00
70.00	0.00	0	205.80	0.00	0.00	0.00
71.00	0.00	0	205.80	0.00	0.00	0.00
72.00	0.00	0	205.80	0.00	0.00	0.00

TSS Removal Worksheet

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Medway Mill Parking Expansion, Medway, MA

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Contech WQMH	0.65	0.75	0.49	0.26
Infiltration Basin	0.80	0.26	0.20	0.06

Total TSS Removal = 94%

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

Project: F-4516
Prepared By: Michael Hassett
Date: 3-22-2022

*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

Inspection of Stormwater BMPs Forms

INSPECTION OF STORMWATER BMPs / REMEDIATION AREAS

Medway Medical Building
86 Holliston Street, Medway, MA

General Information Guerriere & Halnon, Inc. Project No._____

BMP/Remediation Area Description			
BMP/Area Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End time	
Type of Inspection: Regular ☐	Pre-Storm Event ☐	During Storm Event ☐	Post-Storm Event ☐
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for soil erosion/sediment buildup	Yes ☐ No ☐	
Inspect for invasive species and remove if present	Yes ☐ No ☐	
Remove trash	Yes ☐ No ☐	
Remove dead vegetation	Yes ☐ No ☐	
Replace dead vegetation	Yes ☐ No ☐	
Prune	Yes ☐ No ☐	
BMP Functioning Satisfactorily	Yes ☐ No ☐	
Comments		

Post Construction Inspection Report
86 Holliston Street,
Medway, Massachusetts

INSPECTION DATE:						
Person Inspecting		Weather				Other Personnel Present
		Clear				
Item	**N/A***	**sat.****	**NMR*****	**CAM****	**MCA***	**Comments:**
Pavement Swept						
Catch Basins						
CB #1						
CB #3						
CB #2						
CB #4						
CB #5						
CB #6						
Water Quality Manholes						
DMH #2						
DMH #7						
Infiltration Chambers #1						
Infiltration Chambers #2						
NMR* normal maintenance requested						
N/A* not applicable at the time of inspection						
CAM* corrective action - minor						
SAT* satisfactory conditions as compliant						
MCA* Major corrective action						

Contech worksheet

Project:	**86 Holliston Street**
Location:	**Medway, MA**
Prepared For:	**Guerriere & Halnon**

CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (qu)\ (A)\ (WQV)$$

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
DMH 2	0.33	0.0005152	6.0	0.100	1.00	774.00	0.40
DMH 7	0.13	0.0002010	6.0	0.100	1.00	774.00	0.16
CB 4	0.40	0.0006296	6.0	0.100	1.00	774.00	0.49

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

86 HOLLISTON STREET
MEDWAY, MA

Area	0.33 ac	Unit Site Designation	DMH 2
Weighted C	0.9	Rainfall Station #	68
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.0
0.04	9.5%	18.8%	0.01	0.01	9.1
0.06	8.7%	27.5%	0.02	0.02	8.4
0.08	10.1%	37.6%	0.02	0.02	9.6
0.10	7.2%	44.8%	0.03	0.03	6.8
0.12	6.0%	50.8%	0.04	0.04	5.7
0.14	6.3%	57.1%	0.04	0.04	6.0
0.16	5.6%	62.7%	0.05	0.05	5.3
0.18	4.7%	67.4%	0.05	0.05	4.4
0.20	3.6%	71.0%	0.06	0.06	3.4
0.25	8.2%	79.1%	0.07	0.07	7.5
0.50	14.9%	94.0%	0.15	0.15	13.0
0.75	3.2%	97.3%	0.22	0.22	2.6
1.00	1.2%	98.5%	0.30	0.30	1.0
1.50	0.7%	99.2%	0.45	0.45	0.5
2.00	0.8%	100.0%	0.59	0.59	0.4
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					92.7

Removal Efficiency Adjustment[2] =	6.5%
Predicted % Annual Rainfall Treated =	93.5%
Predicted Net Annual Load Removal Efficiency =	**86.2%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH®
ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

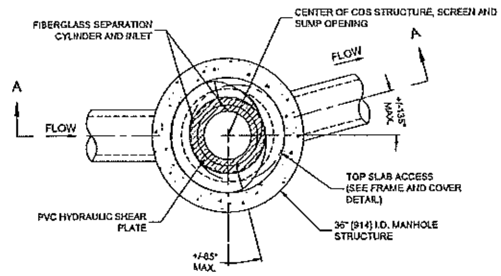
CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

86 HOLLISTON STREET
MEDWAY, MA

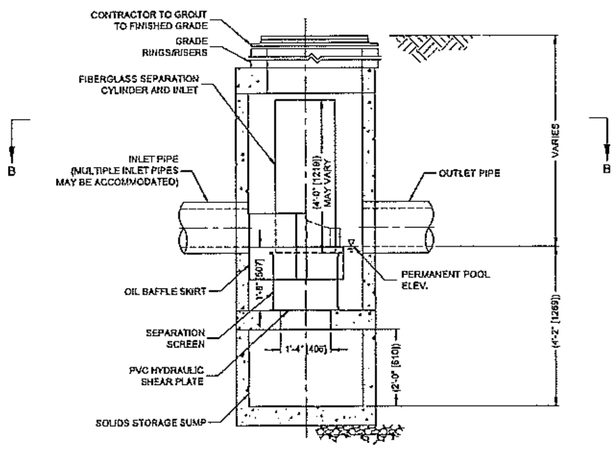
Area	0.13 ac	Unit Site Designation	DMH 7
Weighted C	0.9	Rainfall Station #	68
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.00	0.00	9.1
0.04	9.5%	18.8%	0.00	0.00	9.2
0.06	8.7%	27.5%	0.01	0.01	8.4
0.08	10.1%	37.6%	0.01	0.01	9.7
0.10	7.2%	44.8%	0.01	0.01	6.9
0.12	6.0%	50.8%	0.01	0.01	5.8
0.14	6.3%	57.1%	0.02	0.02	6.1
0.16	5.6%	62.7%	0.02	0.02	5.4
0.18	4.7%	67.4%	0.02	0.02	4.5
0.20	3.6%	71.0%	0.02	0.02	3.5
0.25	8.2%	79.1%	0.03	0.03	7.8
0.50	14.9%	94.0%	0.06	0.06	13.9
0.75	3.2%	97.3%	0.09	0.09	2.9
1.00	1.2%	98.5%	0.12	0.12	1.1
1.50	0.7%	99.2%	0.17	0.17	0.6
2.00	0.8%	100.0%	0.23	0.23	0.6
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					95.4
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**89.0%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.



PLAN VIEW B-B
N.T.S.

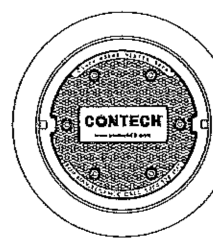


ELEVATION A-A
N.T.S.

CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH®
ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

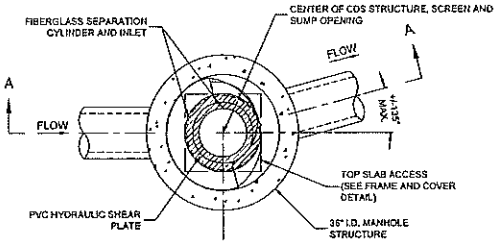
86 HOLLISTON STREET MEDWAY, MA

Area	0.40 ac	Unit Site Designation	CB 4
Weighted C	0.9	Rainfall Station #	68
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

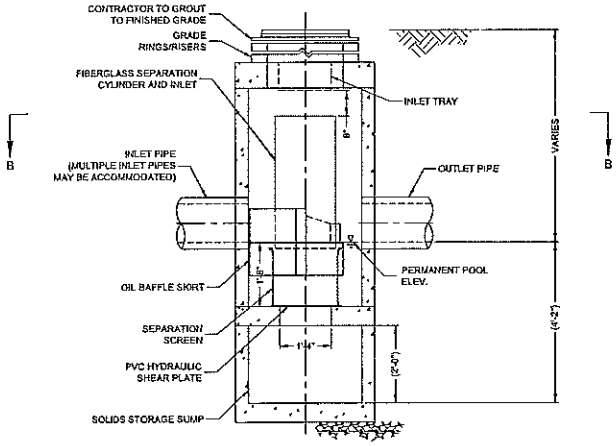
Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.0
0.04	9.5%	18.8%	0.01	0.01	9.1
0.06	8.7%	27.5%	0.02	0.02	8.3
0.08	10.1%	37.6%	0.03	0.03	9.6
0.10	7.2%	44.8%	0.04	0.04	6.8
0.12	6.0%	50.8%	0.04	0.04	5.7
0.14	6.3%	57.1%	0.05	0.05	5.9
0.16	5.6%	62.7%	0.06	0.06	5.2
0.18	4.7%	67.4%	0.07	0.07	4.3
0.20	3.6%	71.0%	0.07	0.07	3.3
0.25	8.2%	79.1%	0.09	0.09	7.4
0.50	14.9%	94.0%	0.18	0.18	12.7
0.75	3.2%	97.3%	0.27	0.27	2.5
1.00	1.2%	98.5%	0.36	0.36	0.9
1.50	0.7%	99.2%	0.54	0.54	0.4
2.00	0.8%	100.0%	0.73	0.73	0.4
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					91.7
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**85.2%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

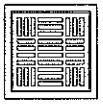
CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS1515-3-C WITH GRATED INLET CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES

INLET TRAY
NOT TO SCALE



24" X 24" FRAME AND GRATE
(MAY VARY)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
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6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
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D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH
ENGINEERED SOLUTIONS LLC
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800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

CONTECH® ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

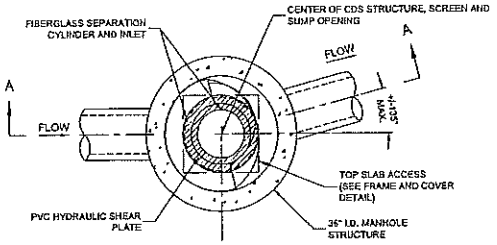
86 HOLLISTON STREET MEDWAY, MA

Area	0.40 ac	Unit Site Designation	CB 4
Weighted C	0.9	Rainfall Station #	68
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

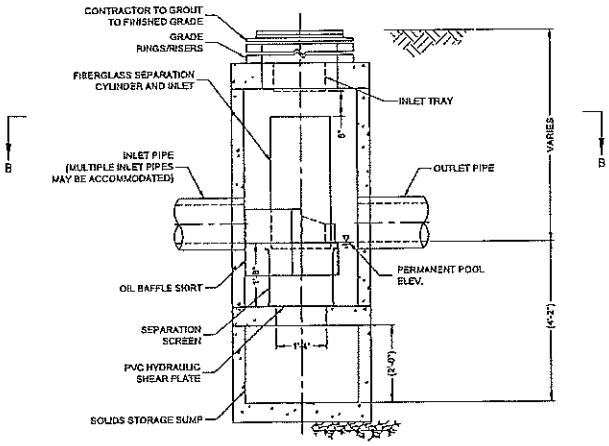
Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.0
0.04	9.5%	18.8%	0.01	0.01	9.1
0.06	8.7%	27.5%	0.02	0.02	8.3
0.08	10.1%	37.6%	0.03	0.03	9.6
0.10	7.2%	44.8%	0.04	0.04	6.8
0.12	6.0%	50.8%	0.04	0.04	5.7
0.14	6.3%	57.1%	0.05	0.05	5.9
0.16	5.6%	62.7%	0.06	0.06	5.2
0.18	4.7%	67.4%	0.07	0.07	4.3
0.20	3.6%	71.0%	0.07	0.07	3.3
0.25	8.2%	79.1%	0.09	0.09	7.4
0.50	14.9%	94.0%	0.18	0.18	12.7
0.75	3.2%	97.3%	0.27	0.27	2.5
1.00	1.2%	98.5%	0.36	0.36	0.9
1.50	0.7%	99.2%	0.54	0.54	0.4
2.00	0.8%	100.0%	0.73	0.73	0.4
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					91.7
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**85.2%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

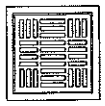
CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS1515-3-C WITH GRATED INLET CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES

INLET TRAY
NOT TO SCALE



24" X 24" FRAME AND GRATE
(MAY VARY)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			*
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE, www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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CDS1515-3-C
ONLINE CDS
STANDARD DETAIL