Summit Engineering & Survey, Inc.

HYDRAULIC / HYDROLOGIC CALCULATIONS

SITE PLAN
6 PICKER ROAD
STURBRIDGE, MASSACHUSETTS

Prepared For:

NEW ENGLAND COLD STORAGE, LLC

Prepared By:

SUMMIT ENGINEERING & SURVEY, INC.
710 MAIN STREET
OXFORD, MASSACHUSETTS

MAY 11, 2020

710 Main Street North Oxford MA 01537 (P) 508-987-8713 (F) 508-987-8714

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DRAINAGE SUMMARY

Summit Engineering & Survey, Inc. is pleased to provide the following Hydraulic / Hydrologic analysis for the proposed site plan for New England Cold, LLC. The proposed development is located at 6 Picker Road, Sturbridge, Massachusetts. The existing site consists of predominantly un-developed land, much of it wooded with mature woodland. The hydrologic conditions were analyzed using TR-55 and HydroCAD® for the 2, 10, 25 and 100 year storm events utilizing Technical Paper 40, 24 hour Rainfall events.

The proposed site consists of the construction of a new 82,000 square foot freezer warehouse building, truck dock and supporting infrastructure. The site is the last remaining commercial lot on Picker Road to be developed. The project as designed conforms to the Massachusetts DEP Stormwater Management Policy.

EXISTING CONDITIONS:

The site is abutted by Picker Road on the west, Route 49 (Podunk Pike) to the east, the Mass Pike to the north and commercial lots on Technology Drive to the south east. The site is predominately wooded with a bordering vegetated wetland system on the westerly portion of the site. The wetland system conveys water from the south to the north toward the state highway.

The topography of the site is sloped. A majority of the site is graded toward the northwest. There is a high point parallel to Podunk Pike that is graded toward a wetland system on the easterly portion of the property.

There are four commercial properties located up stream of the site with varying types of drainage systems that flow onto the site. The storage facility conveys sheet flow onto the property. Sail Energy and WHM III, LLC are operational sites that conveys treated water onto the site , which flows into the wetland system. The 51 Technology, LLC property site is currently under construction. The approved design also discharges to the aforementioned northerly flowing wetland system.

The runoff from the site to the north is directed either to the existing 36” culvert in the driveway for 8 Picker road or the wetland system to the north of 8 Picker Road.

For the purpose of the analysis of the effect on site development, the site was analyzed as three independent watersheds. In the Pre-Development Condition, Subcatchment 1 represents the tributary area of the property that flows to the 36 inch culvert at 8 Picker Road. Subcatchment 2 represents the tributary portion of the site that flows to the northerly wetland on 8 Picker Road. Subcatchment 3 represents the tributary area that flows to the east toward the intersection of Technology Park and Podunk Pike.

According to the online USGS soil survey, the analyzed area consists of soils with “C” hydrologic ratings. On site soil testing confirms the condition along with varying depths to bedrock. The cover consists of predominantly woodland. A portion of the abutting storage tactility has a gravel parking lot that was constructed over the property line. The delineated wetlands on the property were considered “D” type soils for this analysis.

PROPOSED CONDITIONS:

The proposed condition of the site includes the construction of a main access road, a perimeter access road, a truck loading dock/terminal, employee parking lot and the 82,000 square foot warehouse/office space. The site is serviced by municipal water and sewer systems.

The site will be re-graded to support the project and control stormwater in accordance with the Massachusetts Stormwater Management Policy. The development includes the construction of two drainage basins, two roof drain recharge basins, catch basins and proprietary devices to provide stormwater treatment and attenuation to reduce the impact of surface alterations.

In order to analyze the surface water flows, the site was divided into multiple Subcatchents, Ponds and a Reach. The series (100, 200, 300) are then compared to the Pre-Development Conditions.

In summary, the peak rates of runoff were compared under pre-development and post-development conditions for analysis of the 2 year, 10 year, 25 year and 100 year storm events. The following is a **Peak Discharge Summary Table**:

Design Point Analysis:

Watershed		Design Event			
		2 Year	10 Year	25 Year	100 Year
Pre-Development	1	4.3	10.3	14.0	19.8
	2	2.4	6.3	8.7	12.5
	3	1.7	4.4	6.1	8.7
Post Development	100 Series	2.9	8.1	10.5	16.6
	200 Series	1.2	3.4	5.2	7.6
	300 Series	1.6	4.1	5.7	8.2

DEP Stormwater Management Standards:

Standard #1: The proposed changes will not cause erosion in adjacent water of the Commonwealth, as BMP measures are proposed in accordance with the design requirements of the Stormwater Management handbook. The Erosion & Sedimentation Control Plan provides for the installation of siltation barriers, temporary basins, temporary construction entrances and outlines intermediary measures to control runoff during construction and after construction.

Standard #2: The proposed development peak discharge rates for the total off-site flow are less than or equal to pre-development discharge rates for the 2 year, 10 year, and 100 year storm events for the design points analyzed. Attached calculations show how the site mitigates the increased flow rates due to surface changes from the site development.

Standard #3: The roof drain runoff is directed to two direct infilfration basins that meets the recharge requirement for Class C Soils. Basins A and B are also designed to infiltrate runoff from the driveway and parking areas after pre-treatment. Infiltration depths are designed to drain in under 72 hours as required by the Policy.

Standard #4: Over 80% TSS shall occur based on the BMP measurements provided. The treatment train varies for each section. TSS worksheets are provided in the report for each treatment train in the site. The water quality volume was determined using 1.0" of runoff over the proposed impervious area.

Standard #5: The proposed development will not generate higher potential pollutant loads and therefore will not require additional BMP practices.

Standard #6: The proposed project is not near a critical area.

Standard #7: The proposed project is not a redevelopment project.

Standard #8: Erosion and sediment control measures are proposed as part of the proposed project.

Standard #9: An Operation & Maintenance plan is provided within this document

Standard #10: This project does not propose any illicit discharges.

STORMWATER MANAGEMENT CHECKLIST

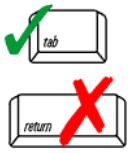
Summit Engineering & Survey, Inc.
710 Main Street North Oxford MA 01537 (P) 508-987-8713 (F) 508-987-8714

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

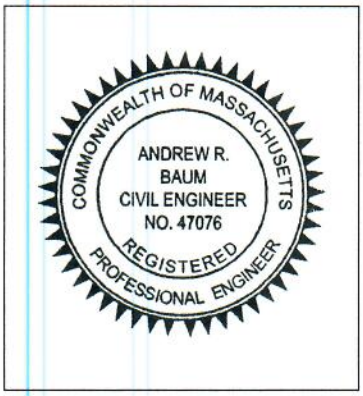
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



5/11/20

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.

STANDARD #2- PEAK DISCHARGE RATES

Summit Engineering & Survey, Inc.
710 Main Street North Oxford MA 01537 (P) 508-987-8713 (F) 508-987-8714

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Runoff Area=407,066 sf 0.50% Impervious Runoff Depth=0.81"
Flow Length=990' Tc=34.4 min CN=72 Runoff=4.25 cfs 0.629 af

Subcatchment 2: Runoff Area=228,530 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=490' Tc=23.0 min CN=70 Runoff=2.42 cfs 0.312 af

Subcatchment 3: Runoff Area=183,174 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=1.70 cfs 0.250 af

Subcatchment 200: Runoff Area=101,682 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=490' Tc=23.0 min CN=71 Runoff=1.17 cfs 0.148 af

Subcatchment 201: Roof Runoff Area=27,374 sf 100.00% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=98 Runoff=1.78 cfs 0.143 af

Subcatchment 300: Runoff Area=172,079 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=1.59 cfs 0.235 af

Pond 8P: RECHARGE BASIN Peak Elev=734.58' Storage=4,675 cf Inflow=1.78 cfs 0.143 af
Discarded=0.03 cfs 0.135 af Primary=0.02 cfs 0.007 af Outflow=0.05 cfs 0.142 af

Pond p200: 200 Series Analysis Point Inflow=1.17 cfs 0.155 af
Primary=1.17 cfs 0.155 af

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Runoff Area=407,066 sf 0.50% Impervious Runoff Depth=1.82"
Flow Length=990' Tc=34.4 min CN=72 Runoff=10.34 cfs 1.418 af

Subcatchment 2: Runoff Area=228,530 sf 0.00% Impervious Runoff Depth=1.67"
Flow Length=490' Tc=23.0 min CN=70 Runoff=6.30 cfs 0.732 af

Subcatchment 3: Runoff Area=183,174 sf 0.00% Impervious Runoff Depth=1.67"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=4.41 cfs 0.587 af

Subcatchment 200: Runoff Area=101,682 sf 0.00% Impervious Runoff Depth=1.75"
Flow Length=490' Tc=23.0 min CN=71 Runoff=2.94 cfs 0.340 af

Subcatchment 201: Roof Runoff Area=27,374 sf 100.00% Impervious Runoff Depth>4.16"
Tc=6.0 min CN=98 Runoff=2.70 cfs 0.218 af

Subcatchment 300: Runoff Area=172,079 sf 0.00% Impervious Runoff Depth=1.67"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=4.14 cfs 0.551 af

Pond 8P: RECHARGE BASIN Peak Elev=734.89' Storage=5,476 cf Inflow=2.70 cfs 0.218 af
Discarded=0.03 cfs 0.140 af Primary=0.54 cfs 0.078 af Outflow=0.57 cfs 0.218 af

Pond p200: 200 Series Analysis Point Inflow=3.38 cfs 0.418 af
Primary=3.38 cfs 0.418 af

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Runoff Area=407,066 sf 0.50% Impervious Runoff Depth=2.43"
Flow Length=990' Tc=34.4 min CN=72 Runoff=13.99 cfs 1.893 af

Subcatchment 2: Runoff Area=228,530 sf 0.00% Impervious Runoff Depth=2.26"
Flow Length=490' Tc=23.0 min CN=70 Runoff=8.67 cfs 0.989 af

Subcatchment 3: Runoff Area=183,174 sf 0.00% Impervious Runoff Depth=2.26"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=6.06 cfs 0.792 af

Subcatchment 200: Runoff Area=101,682 sf 0.00% Impervious Runoff Depth=2.35"
Flow Length=490' Tc=23.0 min CN=71 Runoff=4.02 cfs 0.456 af

Subcatchment 201: Roof Runoff Area=27,374 sf 100.00% Impervious Runoff Depth>4.92"
Tc=6.0 min CN=98 Runoff=3.18 cfs 0.258 af

Subcatchment 300: Runoff Area=172,079 sf 0.00% Impervious Runoff Depth=2.26"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=5.69 cfs 0.744 af

Pond 8P: RECHARGE BASIN Peak Elev=735.04' Storage=5,858 cf Inflow=3.18 cfs 0.258 af
Discarded=0.03 cfs 0.141 af Primary=1.16 cfs 0.116 af Outflow=1.19 cfs 0.257 af

Pond p200: 200 Series Analysis Point Inflow=5.18 cfs 0.573 af
Primary=5.18 cfs 0.573 af

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Runoff Area=407,066 sf 0.50% Impervious Runoff Depth=3.41"
Flow Length=990' Tc=34.4 min CN=72 Runoff=19.75 cfs 2.653 af

Subcatchment 2: Runoff Area=228,530 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=490' Tc=23.0 min CN=70 Runoff=12.46 cfs 1.402 af

Subcatchment 3: Runoff Area=183,174 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=8.69 cfs 1.124 af

Subcatchment 200: Runoff Area=101,682 sf 0.00% Impervious Runoff Depth=3.31"
Flow Length=490' Tc=23.0 min CN=71 Runoff=5.73 cfs 0.643 af

Subcatchment 201: Roof Runoff Area=27,374 sf 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=3.91 cfs 0.318 af

Subcatchment 300: Runoff Area=172,079 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=490' Slope=0.0100 '/' Tc=31.5 min CN=70 Runoff=8.17 cfs 1.056 af

Pond 8P: RECHARGE BASIN Peak Elev=735.16' Storage=6,191 cf Inflow=3.91 cfs 0.318 af
Discarded=0.03 cfs 0.142 af Primary=2.89 cfs 0.175 af Outflow=2.93 cfs 0.317 af

Pond p200: 200 Series Analysis Point Inflow=7.58 cfs 0.818 af
Primary=7.58 cfs 0.818 af

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 101: Runoff Area=53,263 sf 56.41% Impervious Runoff Depth=1.82"
Tc=6.0 min CN=88 Runoff=2.55 cfs 0.185 af

Subcatchment 102: Runoff Area=44,799 sf 68.72% Impervious Runoff Depth=1.98"
Flow Length=160' Tc=6.3 min CN=90 Runoff=2.31 cfs 0.170 af

Subcatchment 103: Runoff Area=26,731 sf 67.77% Impervious Runoff Depth=1.98"
Flow Length=320' Tc=7.0 min CN=90 Runoff=1.35 cfs 0.101 af

Subcatchment 104: Runoff Area=18,115 sf 32.95% Impervious Runoff Depth=1.38"
Tc=6.0 min CN=82 Runoff=0.66 cfs 0.048 af

Subcatchment 105: Runoff Area=39,222 sf 27.33% Impervious Runoff Depth=1.31"
Tc=6.0 min CN=81 Runoff=1.35 cfs 0.099 af

Subcatchment 106: Runoff Area=68,972 sf 0.00% Impervious Runoff Depth=0.86"
Flow Length=190' Tc=11.5 min CN=73 Runoff=1.19 cfs 0.113 af

Subcatchment 110: Runoff Area=25,308 sf 45.96% Impervious Runoff Depth=1.59"
Tc=6.0 min CN=85 Runoff=1.06 cfs 0.077 af

Subcatchment 111: Runoff Area=10,855 sf 47.39% Impervious Runoff Depth=1.59"
Tc=6.0 min CN=85 Runoff=0.45 cfs 0.033 af

Subcatchment 112: Runoff Area=179,485 sf 2.01% Impervious Runoff Depth=0.91"
Flow Length=820' Tc=40.4 min CN=74 Runoff=2.00 cfs 0.312 af

Subcatchment 113: Roof Runoff Area=54,769 sf 100.00% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=98 Runoff=3.57 cfs 0.285 af

Reach 5R: REACH TO POINT OF ANALYSIS Avg. Flow Depth=0.12' Max Vel=1.39 fps Inflow=2.90 cfs 0.924 af
n=0.040 L=300.0' S=0.0400 '/' Capacity=20.33 cfs Outflow=2.88 cfs 0.924 af

Pond 2P: BASIN A Peak Elev=728.36' Storage=20,441 cf Inflow=9.14 cfs 0.771 af
Discarded=0.12 cfs 0.295 af Primary=0.46 cfs 0.476 af Outflow=0.58 cfs 0.771 af

Pond 3P: BASIN B Peak Elev=717.27' Storage=1,172 cf Inflow=1.06 cfs 0.077 af
Outflow=0.46 cfs 0.068 af

Pond 4P: RECHARGE BASIN Peak Elev=736.72' Storage=6,979 cf Inflow=3.57 cfs 0.285 af
Discarded=0.07 cfs 0.195 af Primary=0.37 cfs 0.055 af Secondary=0.23 cfs 0.036 af Outflow=0.66 cfs 0.285 af

Pond P101: Peak Elev=740.74' Inflow=2.55 cfs 0.185 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=2.55 cfs 0.185 af

Pond P102: Peak Elev=737.95' Inflow=4.85 cfs 0.355 af
24.0" Round Culvert n=0.013 L=460.0' S=0.0100 '/' Outflow=4.85 cfs 0.355 af

Pond P103: Peak Elev=733.59' Inflow=6.20 cfs 0.457 af
24.0" Round Culvert n=0.013 L=110.0' S=0.0100 '/' Outflow=6.20 cfs 0.457 af

Pond P104: Peak Elev=739.41' Inflow=0.66 cfs 0.048 af
12.0" Round Culvert n=0.013 L=160.0' S=0.0200 '/' Outflow=0.66 cfs 0.048 af

Total Runoff Area = 11.972 ac Runoff Volume = 1.423 af Average Runoff Depth = 1.43"
67.25% Pervious = 8.052 ac 32.75% Impervious = 3.921 ac

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 101: Runoff Area=53,263 sf 56.41% Impervious Runoff Depth=3.20"
Tc=6.0 min CN=88 Runoff=4.40 cfs 0.326 af

Subcatchment 102: Runoff Area=44,799 sf 68.72% Impervious Runoff Depth>3.40"
Flow Length=160' Tc=6.3 min CN=90 Runoff=3.86 cfs 0.291 af

Subcatchment 103: Runoff Area=26,731 sf 67.77% Impervious Runoff Depth>3.40"
Flow Length=320' Tc=7.0 min CN=90 Runoff=2.26 cfs 0.174 af

Subcatchment 104: Runoff Area=18,115 sf 32.95% Impervious Runoff Depth=2.64"
Tc=6.0 min CN=82 Runoff=1.26 cfs 0.091 af

Subcatchment 105: Runoff Area=39,222 sf 27.33% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=81 Runoff=2.64 cfs 0.191 af

Subcatchment 106: Runoff Area=68,972 sf 0.00% Impervious Runoff Depth=1.90"
Flow Length=190' Tc=11.5 min CN=73 Runoff=2.87 cfs 0.250 af

Subcatchment 110: Runoff Area=25,308 sf 45.96% Impervious Runoff Depth=2.91"
Tc=6.0 min CN=85 Runoff=1.93 cfs 0.141 af

Subcatchment 111: Runoff Area=10,855 sf 47.39% Impervious Runoff Depth=2.91"
Tc=6.0 min CN=85 Runoff=0.83 cfs 0.060 af

Subcatchment 112: Runoff Area=179,485 sf 2.01% Impervious Runoff Depth=1.97"
Flow Length=820' Tc=40.4 min CN=74 Runoff=4.60 cfs 0.677 af

Subcatchment 113: Roof Runoff Area=54,769 sf 100.00% Impervious Runoff Depth>4.16"
Tc=6.0 min CN=98 Runoff=5.40 cfs 0.436 af

Reach 5R: REACH TO POINT OF ANALYSIS Avg. Flow Depth=0.20' Max Vel=1.92 fps Inflow=8.14 cfs 2.084 af
n=0.040 L=300.0' S=0.0400 '/' Capacity=20.33 cfs Outflow=8.12 cfs 2.084 af

Pond 2P: BASIN A Peak Elev=729.41' Storage=32,749 cf Inflow=17.58 cfs 1.475 af
Discarded=0.16 cfs 0.339 af Primary=2.25 cfs 1.136 af Outflow=2.41 cfs 1.475 af

Pond 3P: BASIN B Peak Elev=717.78' Storage=1,827 cf Inflow=1.93 cfs 0.141 af
Outflow=0.91 cfs 0.132 af

Pond 4P: RECHARGE BASIN Peak Elev=737.07' Storage=8,849 cf Inflow=5.40 cfs 0.436 af
Discarded=0.07 cfs 0.206 af Primary=1.82 cfs 0.152 af Secondary=0.54 cfs 0.078 af Outflow=2.43 cfs 0.436 af

Pond P101: Peak Elev=741.02' Inflow=4.40 cfs 0.326 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=4.40 cfs 0.326 af

Pond P102: Peak Elev=738.29' Inflow=8.26 cfs 0.617 af
24.0" Round Culvert n=0.013 L=460.0' S=0.0100 '/' Outflow=8.26 cfs 0.617 af

Pond P103: Peak Elev=734.00' Inflow=10.52 cfs 0.790 af
24.0" Round Culvert n=0.013 L=110.0' S=0.0100 '/' Outflow=10.52 cfs 0.790 af

Pond P104: Peak Elev=739.59' Inflow=1.26 cfs 0.091 af
12.0" Round Culvert n=0.013 L=160.0' S=0.0200 '/' Outflow=1.26 cfs 0.091 af

Total Runoff Area = 11.972 ac Runoff Volume = 2.637 af Average Runoff Depth = 2.64"
67.25% Pervious = 8.052 ac 32.75% Impervious = 3.921 ac

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 101: Runoff Area=53,263 sf 56.41% Impervious Runoff Depth>3.95"
Tc=6.0 min CN=88 Runoff=5.40 cfs 0.403 af

Subcatchment 102: Runoff Area=44,799 sf 68.72% Impervious Runoff Depth>4.16"
Flow Length=160' Tc=6.3 min CN=90 Runoff=4.69 cfs 0.357 af

Subcatchment 103: Runoff Area=26,731 sf 67.77% Impervious Runoff Depth>4.16"
Flow Length=320' Tc=7.0 min CN=90 Runoff=2.75 cfs 0.213 af

Subcatchment 104: Runoff Area=18,115 sf 32.95% Impervious Runoff Depth=3.35"
Tc=6.0 min CN=82 Runoff=1.59 cfs 0.116 af

Subcatchment 105: Runoff Area=39,222 sf 27.33% Impervious Runoff Depth=3.25"
Tc=6.0 min CN=81 Runoff=3.35 cfs 0.244 af

Subcatchment 106: Runoff Area=68,972 sf 0.00% Impervious Runoff Depth=2.52"
Flow Length=190' Tc=11.5 min CN=73 Runoff=3.85 cfs 0.332 af

Subcatchment 110: Runoff Area=25,308 sf 45.96% Impervious Runoff Depth=3.65"
Tc=6.0 min CN=85 Runoff=2.40 cfs 0.177 af

Subcatchment 111: Runoff Area=10,855 sf 47.39% Impervious Runoff Depth=3.65"
Tc=6.0 min CN=85 Runoff=1.03 cfs 0.076 af

Subcatchment 112: Runoff Area=179,485 sf 2.01% Impervious Runoff Depth=2.61"
Flow Length=820' Tc=40.4 min CN=74 Runoff=6.13 cfs 0.895 af

Subcatchment 113: Roof Runoff Area=54,769 sf 100.00% Impervious Runoff Depth>4.92"
Tc=6.0 min CN=98 Runoff=6.37 cfs 0.516 af

Reach 5R: REACH TO POINT OF ANALYSIS Avg. Flow Depth=0.22' Max Vel=2.08 fps Inflow=10.58 cfs 2.749 af
n=0.040 L=300.0' S=0.0400 '/' Capacity=20.33 cfs Outflow=10.54 cfs 2.749 af

Pond 2P: BASIN A Peak Elev=730.12' Storage=42,114 cf Inflow=23.00 cfs 1.878 af
Discarded=0.19 cfs 0.360 af Primary=2.88 cfs 1.517 af Outflow=3.07 cfs 1.878 af

Pond 3P: BASIN B Peak Elev=718.04' Storage=2,204 cf Inflow=2.40 cfs 0.177 af
Outflow=1.07 cfs 0.168 af

Pond 4P: RECHARGE BASIN Peak Elev=737.17' Storage=9,405 cf Inflow=6.37 cfs 0.516 af
Discarded=0.08 cfs 0.209 af Primary=3.38 cfs 0.213 af Secondary=0.60 cfs 0.094 af Outflow=4.05 cfs 0.516 af

Pond P101: Peak Elev=741.16' Inflow=5.40 cfs 0.403 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=5.40 cfs 0.403 af

Pond P102: Peak Elev=738.46' Inflow=10.08 cfs 0.760 af
24.0" Round Culvert n=0.013 L=460.0' S=0.0100 '/' Outflow=10.08 cfs 0.760 af

Pond P103: Peak Elev=734.22' Inflow=12.82 cfs 0.972 af
24.0" Round Culvert n=0.013 L=110.0' S=0.0100 '/' Outflow=12.82 cfs 0.972 af

Pond P104: Peak Elev=739.68' Inflow=1.59 cfs 0.116 af
12.0" Round Culvert n=0.013 L=160.0' S=0.0200 '/' Outflow=1.59 cfs 0.116 af

Total Runoff Area = 11.972 ac Runoff Volume = 3.328 af Average Runoff Depth = 3.34"
67.25% Pervious = 8.052 ac 32.75% Impervious = 3.921 ac

Time span=5.00-96.00 hrs, dt=0.05 hrs, 1821 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 101: Runoff Area=53,263 sf 56.41% Impervious Runoff Depth>5.10"
Tc=6.0 min CN=88 Runoff=6.88 cfs 0.520 af

Subcatchment 102: Runoff Area=44,799 sf 68.72% Impervious Runoff Depth>5.32"
Flow Length=160' Tc=6.3 min CN=90 Runoff=5.92 cfs 0.456 af

Subcatchment 103: Runoff Area=26,731 sf 67.77% Impervious Runoff Depth>5.32"
Flow Length=320' Tc=7.0 min CN=90 Runoff=3.47 cfs 0.272 af

Subcatchment 104: Runoff Area=18,115 sf 32.95% Impervious Runoff Depth=4.45"
Tc=6.0 min CN=82 Runoff=2.10 cfs 0.154 af

Subcatchment 105: Runoff Area=39,222 sf 27.33% Impervious Runoff Depth=4.34"
Tc=6.0 min CN=81 Runoff=4.44 cfs 0.326 af

Subcatchment 106: Runoff Area=68,972 sf 0.00% Impervious Runoff Depth=3.51"
Flow Length=190' Tc=11.5 min CN=73 Runoff=5.39 cfs 0.463 af

Subcatchment 110: Runoff Area=25,308 sf 45.96% Impervious Runoff Depth>4.78"
Tc=6.0 min CN=85 Runoff=3.11 cfs 0.231 af

Subcatchment 111: Runoff Area=10,855 sf 47.39% Impervious Runoff Depth>4.78"
Tc=6.0 min CN=85 Runoff=1.33 cfs 0.099 af

Subcatchment 112: Runoff Area=179,485 sf 2.01% Impervious Runoff Depth=3.61"
Flow Length=820' Tc=40.4 min CN=74 Runoff=8.53 cfs 1.239 af

Subcatchment 113: Roof Runoff Area=54,769 sf 100.00% Impervious Runoff Depth>6.07"
Tc=6.0 min CN=98 Runoff=7.83 cfs 0.636 af

Reach 5R: REACH TO POINT OF ANALYSIS Avg. Flow Depth=0.27' Max Vel=2.39 fps Inflow=16.67 cfs 3.787 af
n=0.040 L=300.0' S=0.0400 '/' Capacity=20.33 cfs Outflow=16.56 cfs 3.787 af

Pond 2P: BASIN A Peak Elev=730.96' Storage=54,803 cf Inflow=32.13 cfs 2.496 af
Discarded=0.22 cfs 0.387 af Primary=6.24 cfs 2.109 af Outflow=6.47 cfs 2.496 af

Pond 3P: BASIN B Peak Elev=718.42' Storage=2,820 cf Inflow=3.11 cfs 0.231 af
Outflow=1.26 cfs 0.222 af

Pond 4P: RECHARGE BASIN Peak Elev=737.27' Storage=9,988 cf Inflow=7.83 cfs 0.636 af
Discarded=0.08 cfs 0.213 af Primary=5.47 cfs 0.306 af Secondary=0.65 cfs 0.117 af Outflow=6.21 cfs 0.636 af

Pond P101: Peak Elev=741.39' Inflow=6.88 cfs 0.520 af
18.0" Round Culvert n=0.013 L=300.0' S=0.0100 '/' Outflow=6.88 cfs 0.520 af

Pond P102: Peak Elev=738.72' Inflow=12.80 cfs 0.976 af
24.0" Round Culvert n=0.013 L=460.0' S=0.0100 '/' Outflow=12.80 cfs 0.976 af

Pond P103: Peak Elev=734.65' Inflow=16.25 cfs 1.248 af
24.0" Round Culvert n=0.013 L=110.0' S=0.0100 '/' Outflow=16.25 cfs 1.248 af

Pond P104: Peak Elev=739.81' Inflow=2.10 cfs 0.154 af
12.0" Round Culvert n=0.013 L=160.0' S=0.0200 '/' Outflow=2.10 cfs 0.154 af

Total Runoff Area = 11.972 ac Runoff Volume = 4.396 af Average Runoff Depth = 4.41"
67.25% Pervious = 8.052 ac 32.75% Impervious = 3.921 ac

Summary for Subcatchment 1:

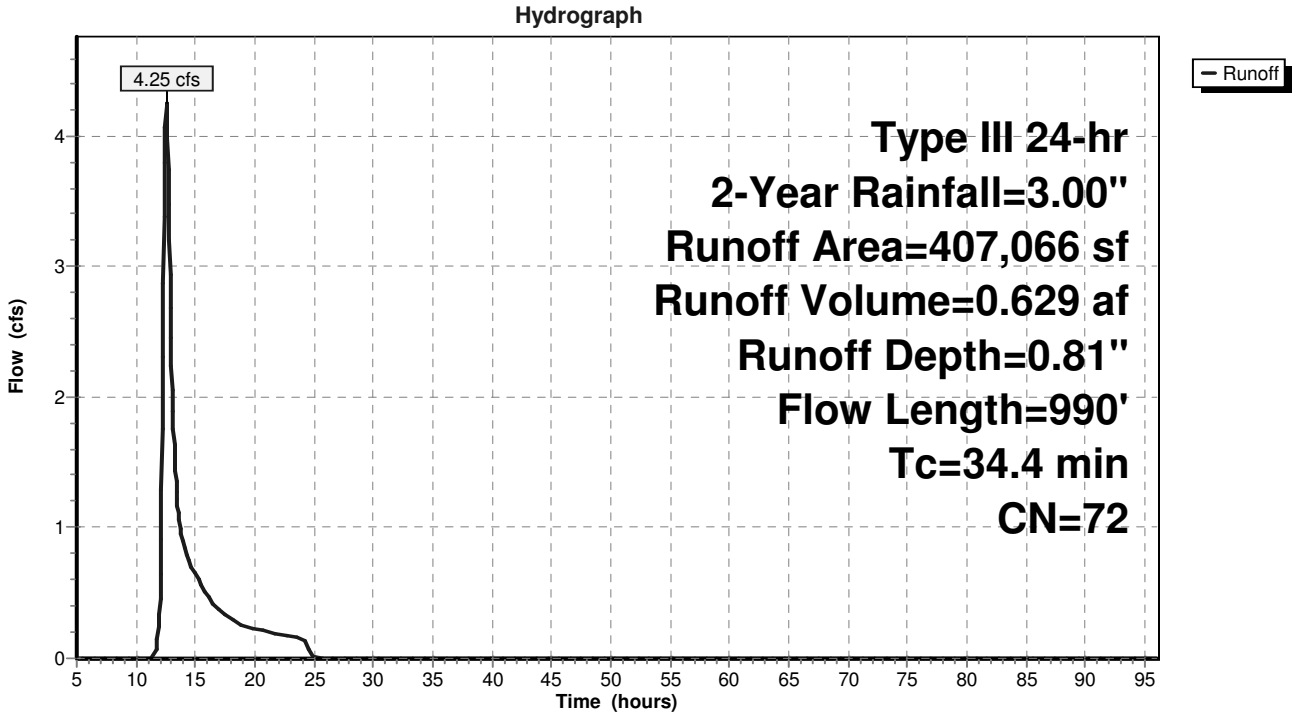
Runoff = 4.25 cfs @ 12.54 hrs, Volume= 0.629 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
62,923	77	Woods, Good, HSG D
14,539	96	Gravel surface, HSG C
4,086	92	Paved roads w/open ditches, 50% imp, HSG C
325,518	70	Woods, Good, HSG C
407,066	72	Weighted Average
405,023		99.50% Pervious Area
2,043		0.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	400	0.0350	0.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	410	0.0780	0.68	0.91	**Parabolic Channel,** W=20.00' D=0.10' Area=1.3 sf Perim=20.0' n= 0.100 Earth, dense brush, high stage
0.5	130	0.0600	4.36	14.52	**Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.040 Earth, cobble bottom, clean sides
34.4	990	Total			

Subcatchment 1:



Summary for Subcatchment 2:

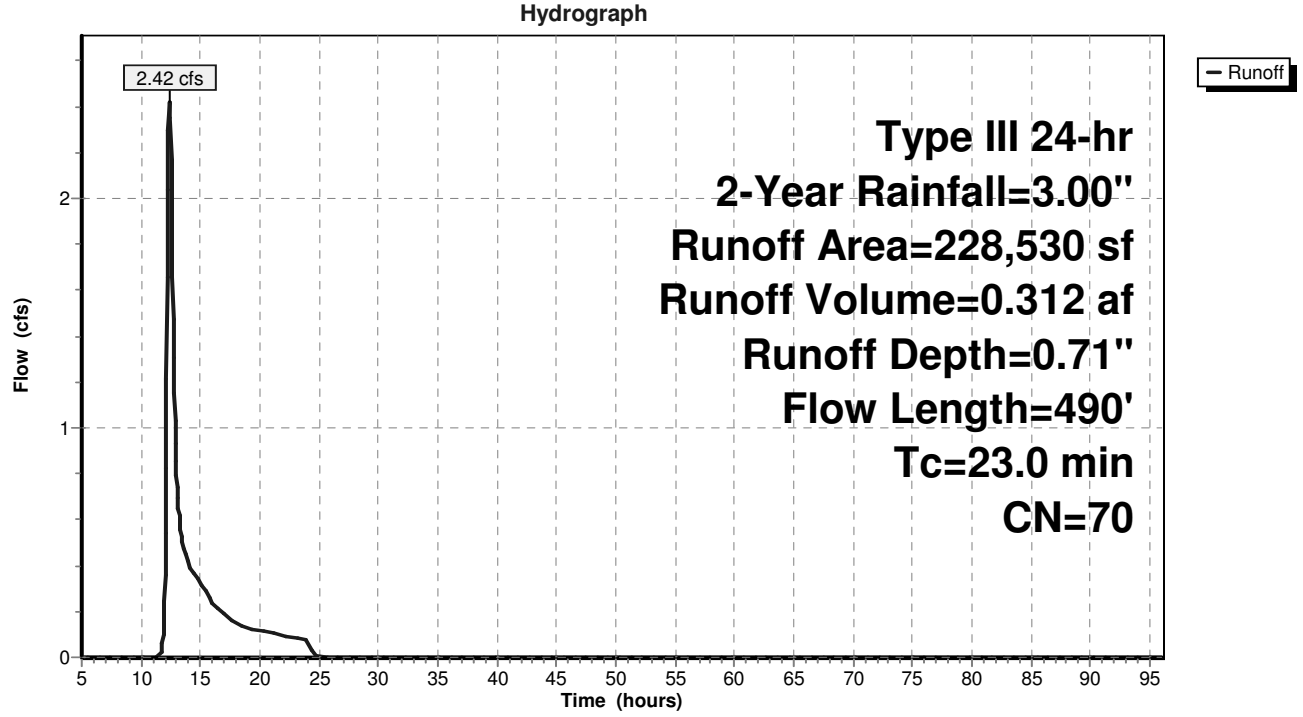
Runoff = 2.42 cfs @ 12.37 hrs, Volume= 0.312 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
228,530	70	Woods, Good, HSG C
228,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
6.2	440	0.0560	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.0	490	Total			

Subcatchment 2:



Summary for Subcatchment 3:

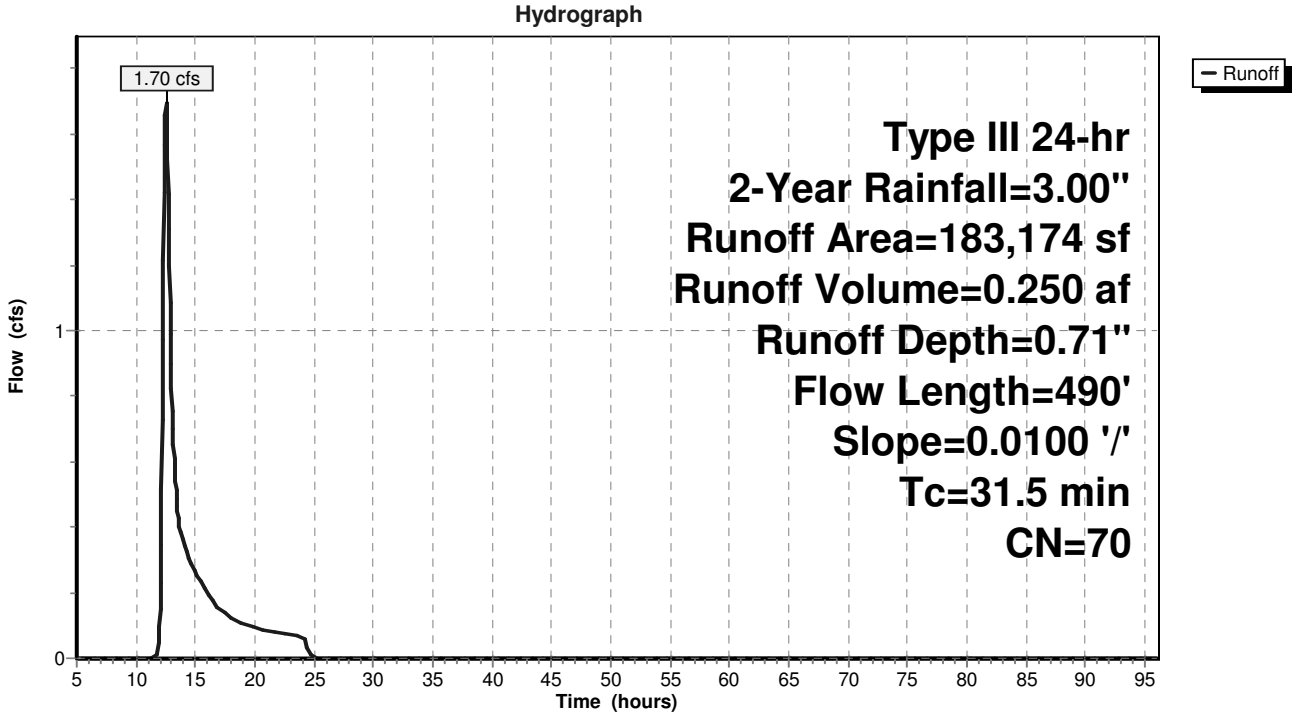
Runoff = 1.70 cfs @ 12.51 hrs, Volume= 0.250 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
179,524	70	Woods, Good, HSG C
3,650	77	Woods, Good, HSG D
183,174	70	Weighted Average
183,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
14.7	440	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.5	490	Total			

Subcatchment 3:



Summary for Subcatchment 200:

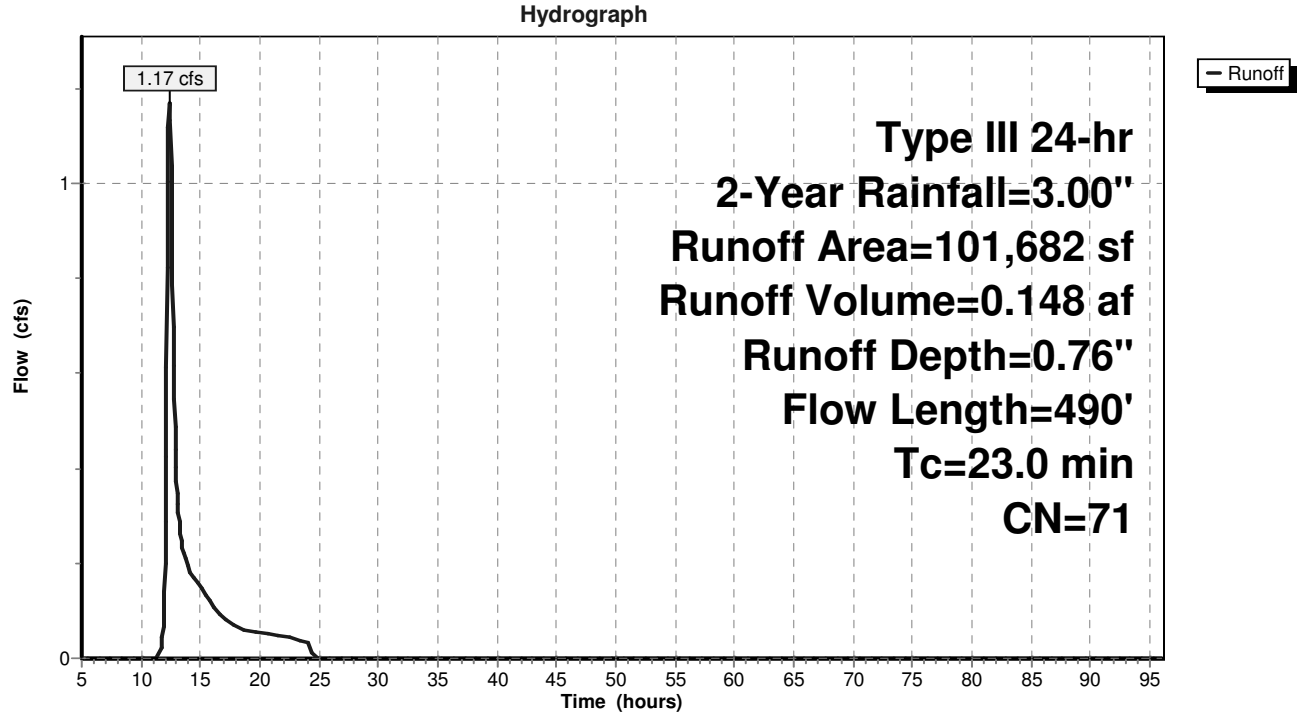
Runoff = 1.17 cfs @ 12.37 hrs, Volume= 0.148 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
79,634	70	Woods, Good, HSG C
22,048	74	>75% Grass cover, Good, HSG C
101,682	71	Weighted Average
101,682		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
6.2	440	0.0560	1.18		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.0	490	Total			

Subcatchment 200:



Summary for Subcatchment 201: Roof

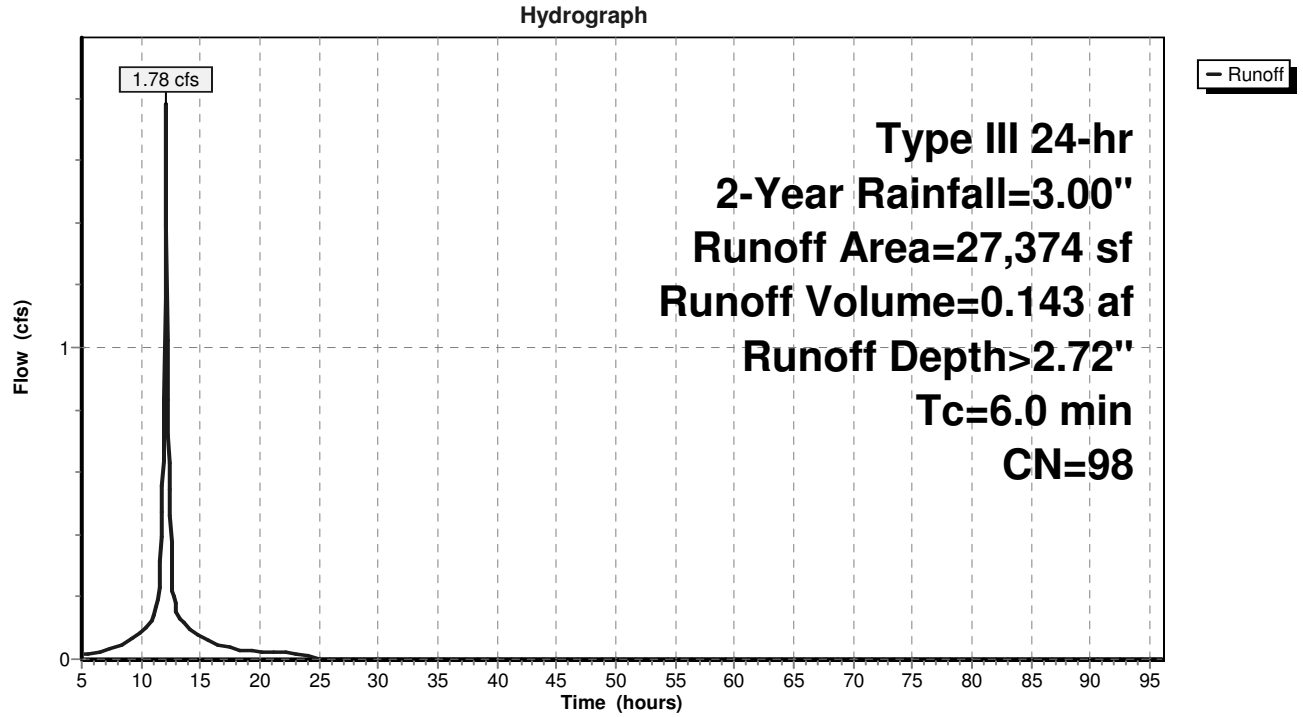
Runoff = 1.78 cfs @ 12.09 hrs, Volume= 0.143 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
27,374	98	Roofs, HSG C
27,374		100.00% Impervious Area

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

Subcatchment 201: Roof



Summary for Subcatchment 300:

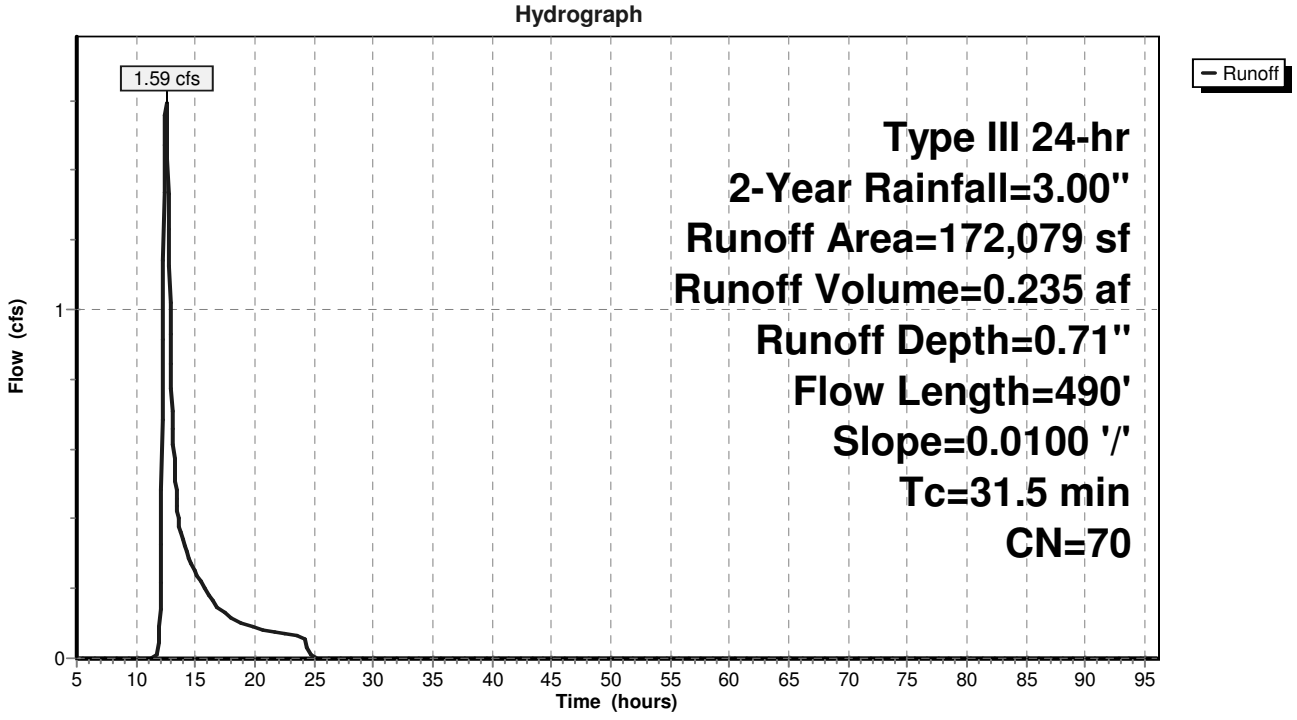
Runoff = 1.59 cfs @ 12.51 hrs, Volume= 0.235 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
168,429	70	Woods, Good, HSG C
3,650	77	Woods, Good, HSG D
172,079	70	Weighted Average
172,079		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	50	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
14.7	440	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.5	490	Total			

Subcatchment 300:



Summary for Pond 8P: RECHARGE BASIN

Inflow Area = 0.628 ac,100.00% Impervious, Inflow Depth > 2.72" for 2-Year event
Inflow = 1.78 cfs @ 12.09 hrs, Volume= 0.143 af
Outflow = 0.05 cfs @ 15.94 hrs, Volume= 0.142 af, Atten= 97%, Lag= 231.4 min
Discarded = 0.03 cfs @ 15.94 hrs, Volume= 0.135 af
Primary = 0.02 cfs @ 15.94 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 734.58' @ 15.94 hrs Surf.Area= 3,439 sf Storage= 4,675 cf

Plug-Flow detention time= 1,759.1 min calculated for 0.142 af (100% of inflow)
Center-of-Mass det. time= 1,758.1 min (2,525.1 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	8,427 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	731.00'	342 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,035 cf Overall x 33.0% Voids
		8,769 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
732.00	1,035	0	0
734.00	2,025	3,060	3,060
736.00	3,342	5,367	8,427

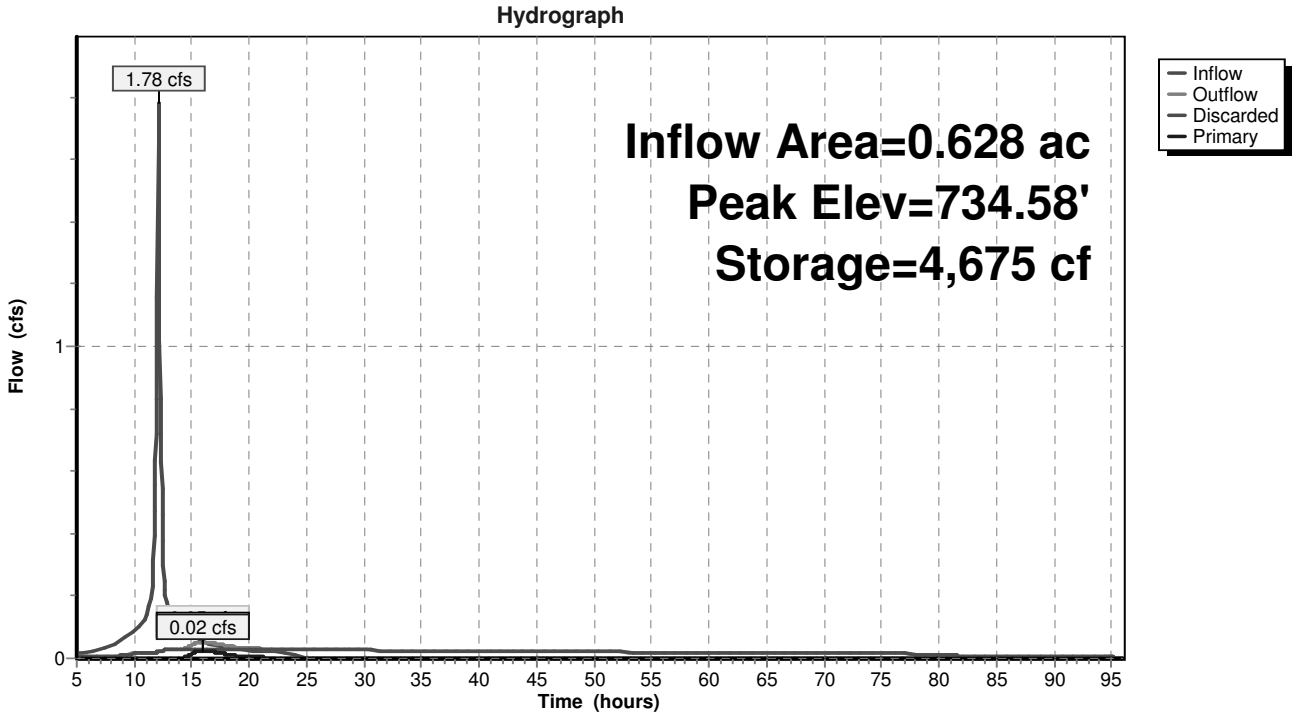
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
731.00	1,035	0	0
732.00	1,035	1,035	1,035

Device	Routing	Invert	Outlet Devices
#1	Primary	735.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	731.00'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 726.00'
#3	Primary	734.50'	**12.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 734.50' / 733.90' S= 0.0120 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.03 cfs @ 15.94 hrs HW=734.58' (Free Discharge)
└**2=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.02 cfs @ 15.94 hrs HW=734.58' (Free Discharge)
├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Inlet Controls 0.02 cfs @ 0.82 fps)

Pond 8P: RECHARGE BASIN

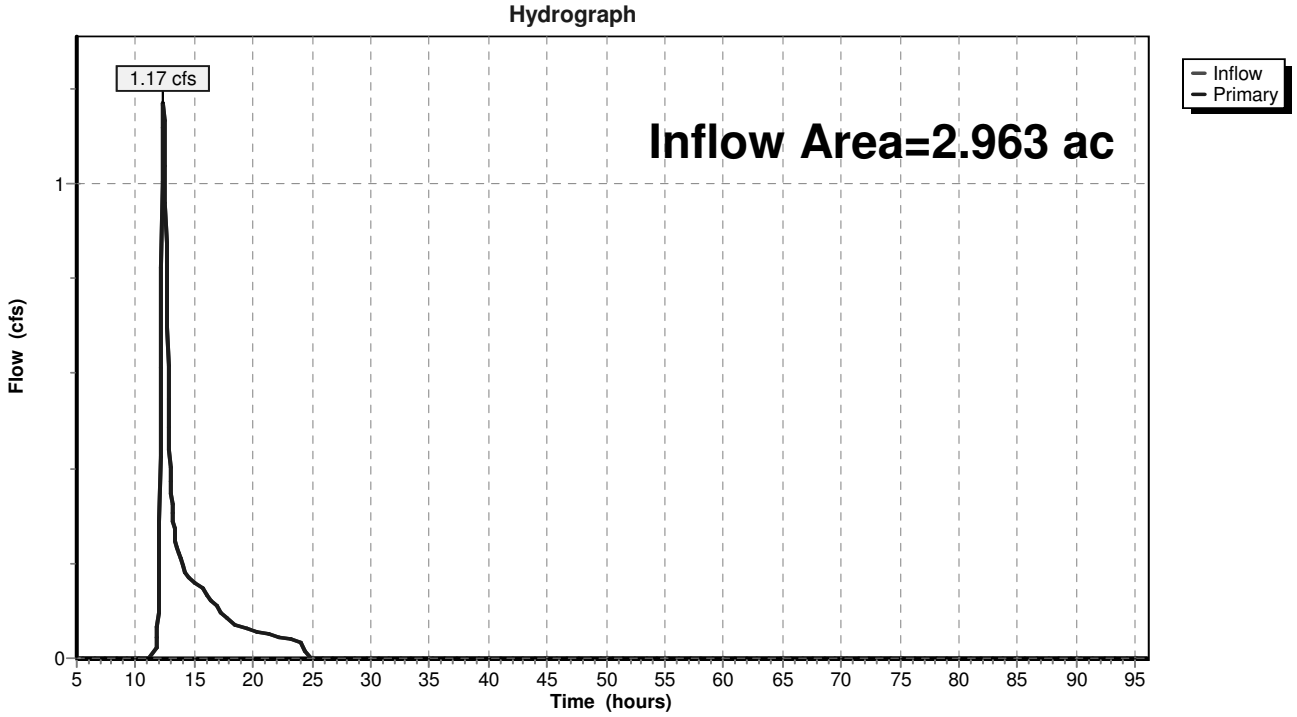


Summary for Pond p200: 200 Series Analysis Point

Inflow Area = 2.963 ac, 21.21% Impervious, Inflow Depth = 0.63" for 2-Year event
Inflow = 1.17 cfs @ 12.37 hrs, Volume= 0.155 af
Primary = 1.17 cfs @ 12.37 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs

Pond p200: 200 Series Analysis Point



Summary for Subcatchment 101:

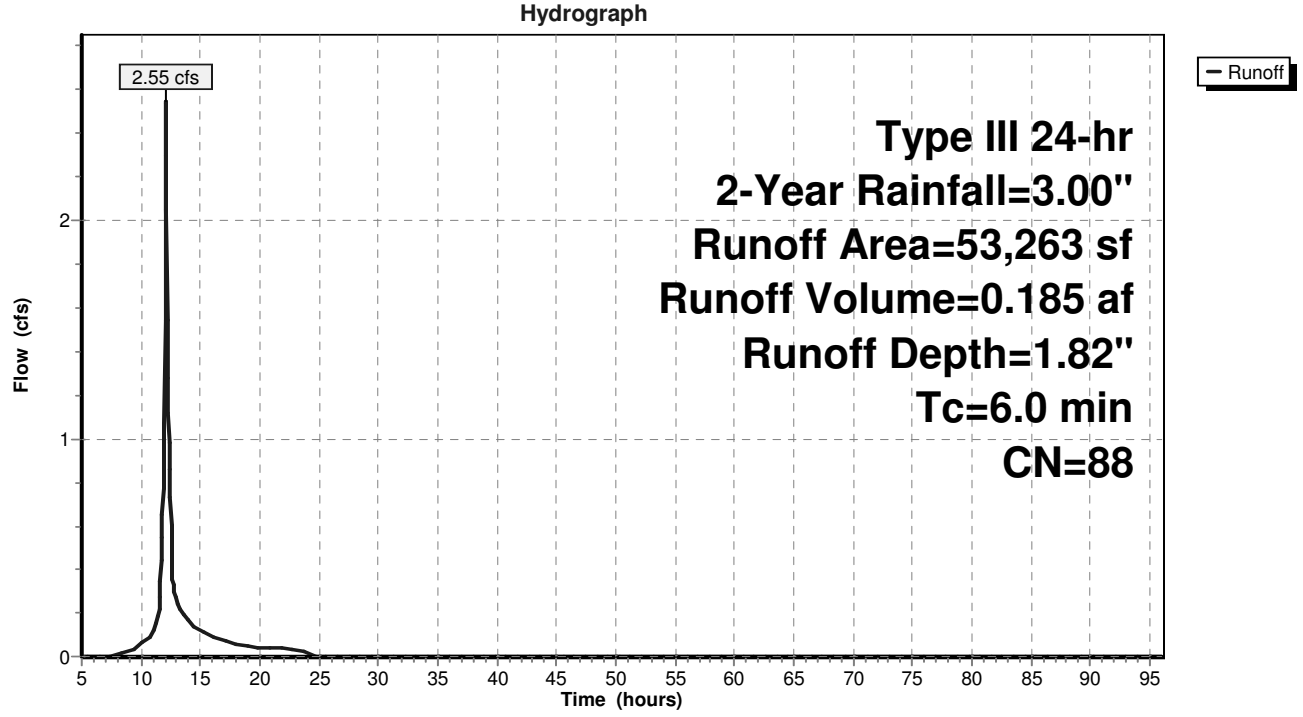
Runoff = 2.55 cfs @ 12.09 hrs, Volume= 0.185 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
23,217	74	>75% Grass cover, Good, HSG C
30,046	98	Paved parking, HSG C
53,263	88	Weighted Average
23,217		43.59% Pervious Area
30,046		56.41% Impervious Area

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

Subcatchment 101:



Summary for Subcatchment 102:

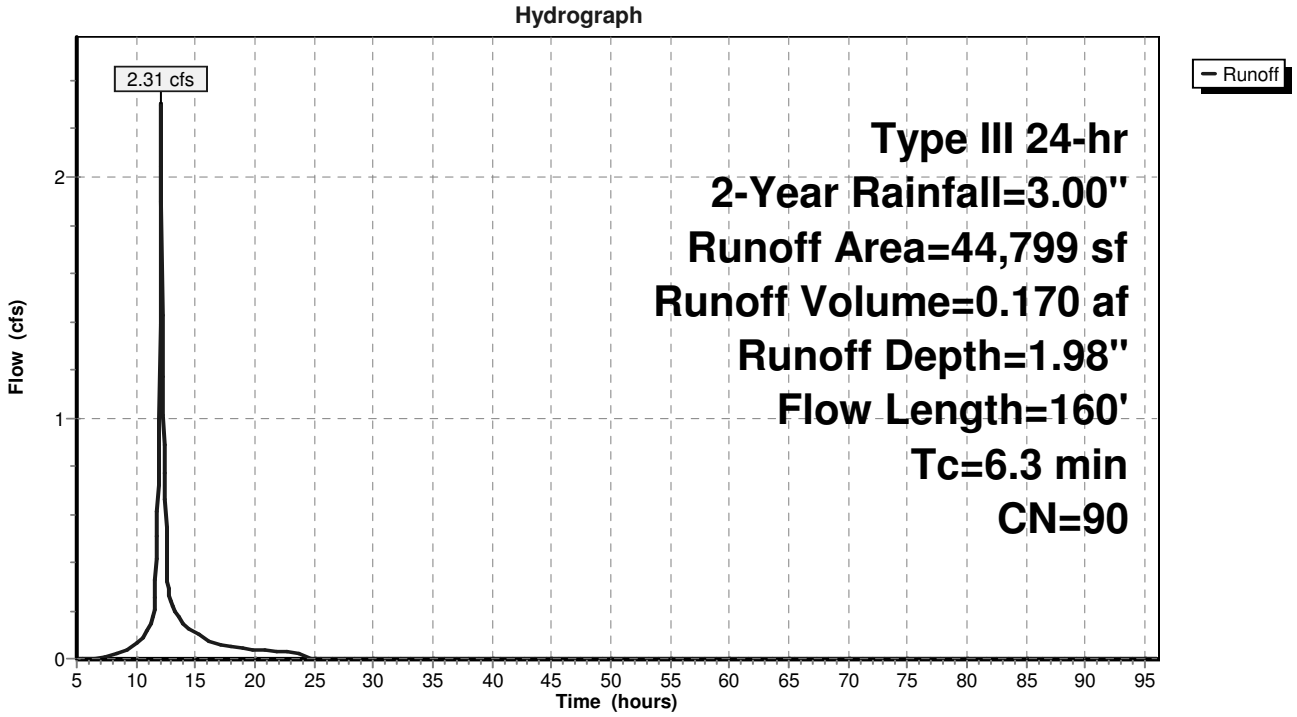
Runoff = 2.31 cfs @ 12.09 hrs, Volume= 0.170 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
14,015	74	>75% Grass cover, Good, HSG C
30,784	98	Paved parking, HSG C
44,799	90	Weighted Average
14,015		31.28% Pervious Area
30,784		68.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
0.5	110	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.3	160	Total			

Subcatchment 102:



Summary for Subcatchment 103:

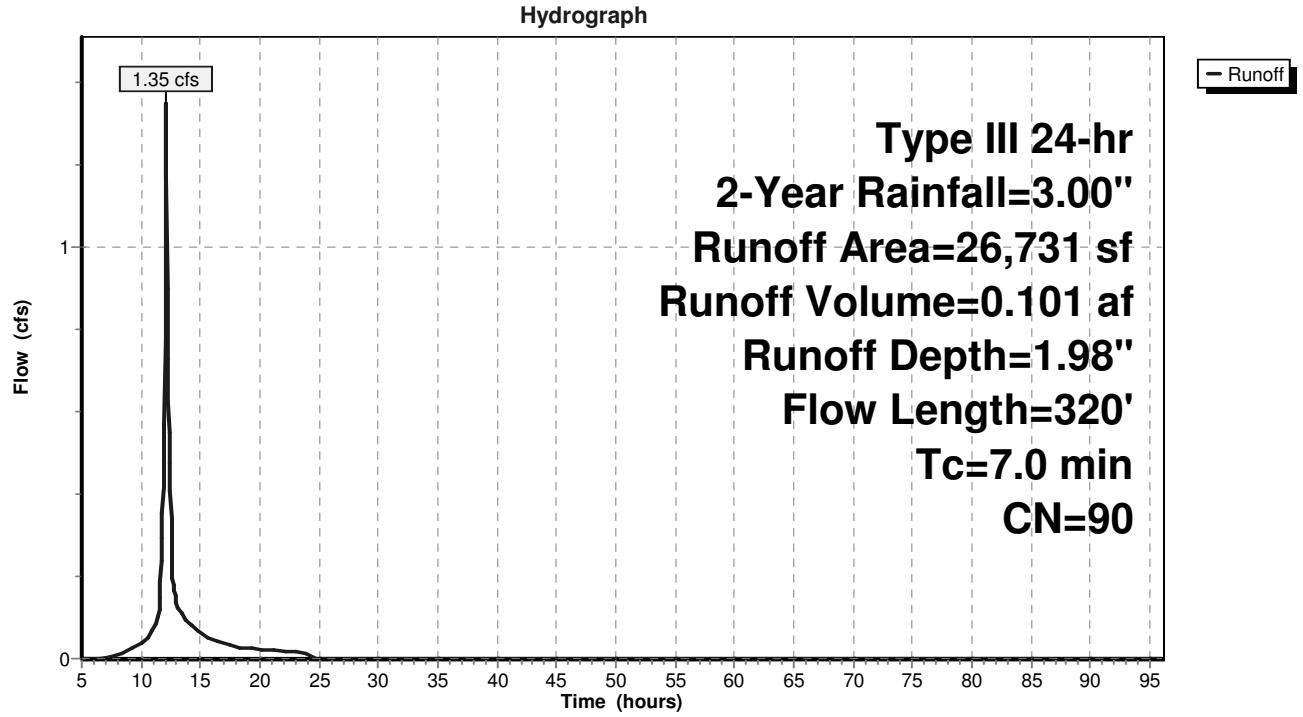
Runoff = 1.35 cfs @ 12.10 hrs, Volume= 0.101 af, Depth= 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
8,615	74	>75% Grass cover, Good, HSG C
18,116	98	Paved parking, HSG C
26,731	90	Weighted Average
8,615		32.23% Pervious Area
18,116		67.77% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0200	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.00"
1.2	270	0.0330	3.69		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
7.0	320	Total			

Subcatchment 103:



Summary for Subcatchment 104:

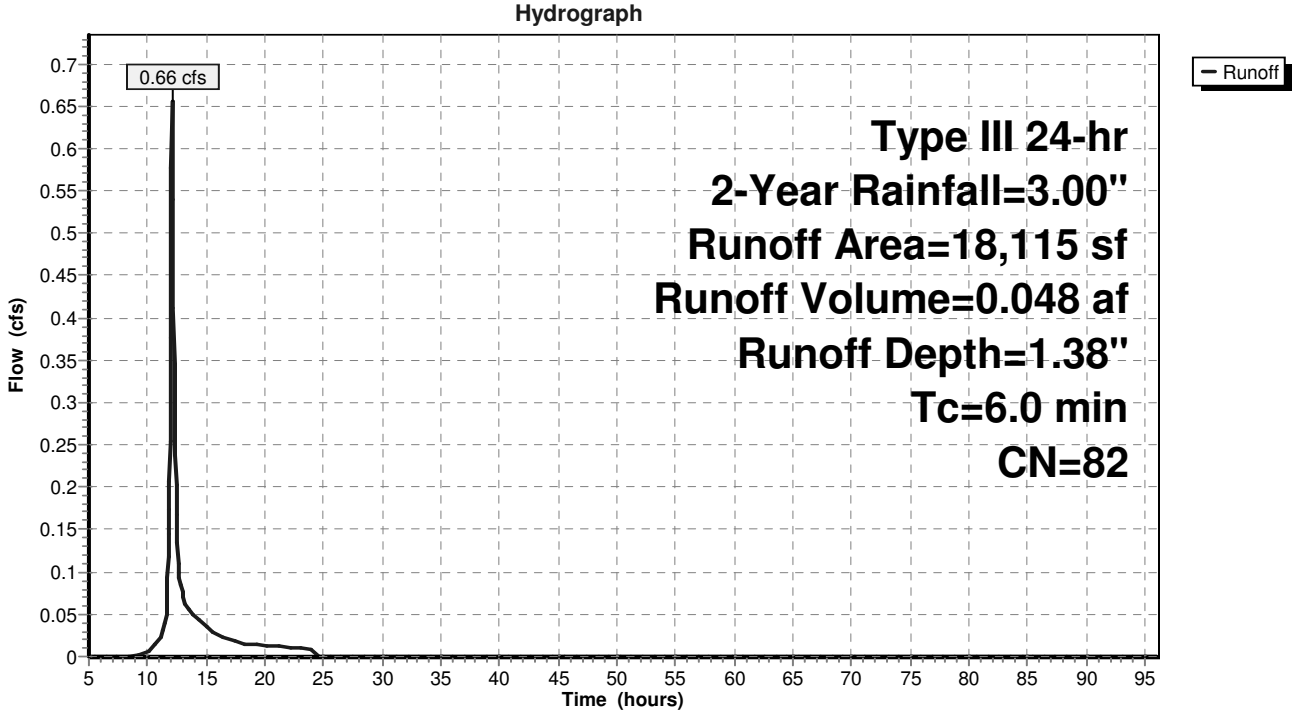
Runoff = 0.66 cfs @ 12.10 hrs, Volume= 0.048 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
12,147	74	>75% Grass cover, Good, HSG C
5,968	98	Paved parking, HSG C
18,115	82	Weighted Average
12,147		67.05% Pervious Area
5,968		32.95% Impervious Area

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

Subcatchment 104:



Summary for Subcatchment 105:

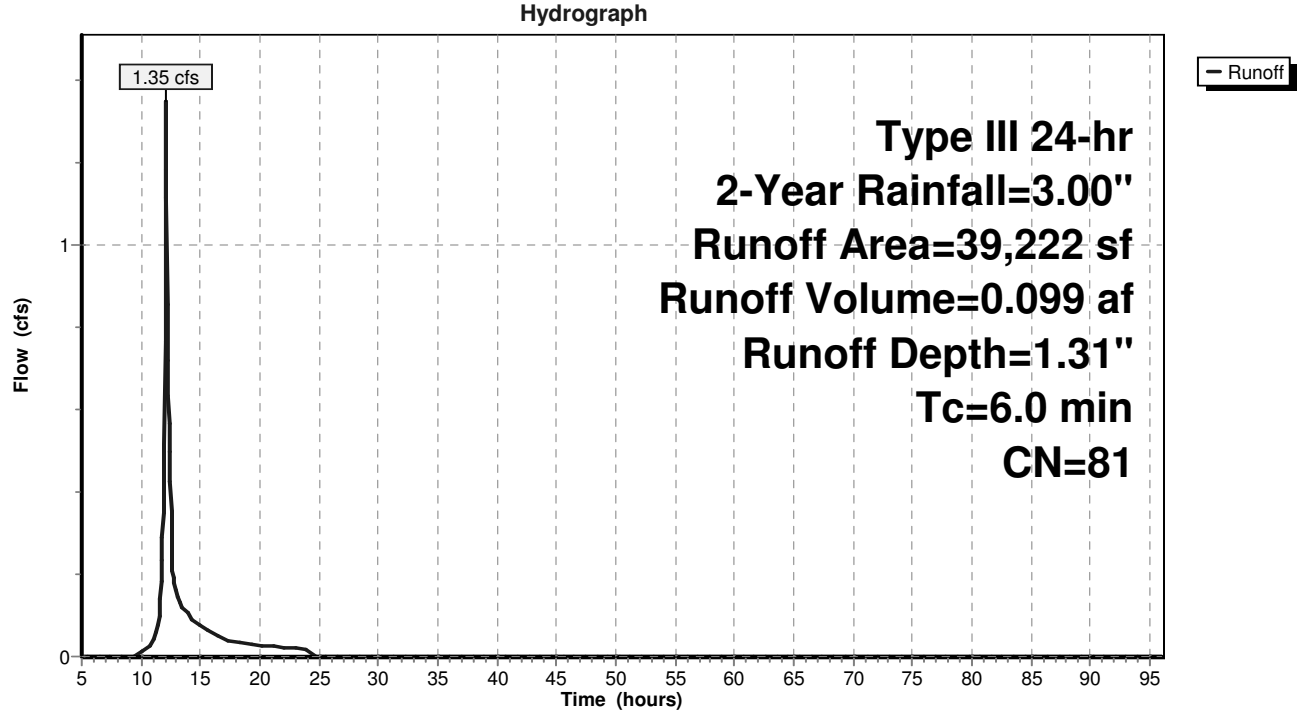
Runoff = 1.35 cfs @ 12.10 hrs, Volume= 0.099 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
28,502	74	>75% Grass cover, Good, HSG C
10,720	98	Paved parking, HSG C
39,222	81	Weighted Average
28,502		72.67% Pervious Area
10,720		27.33% Impervious Area

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

Subcatchment 105:



Summary for Subcatchment 106:

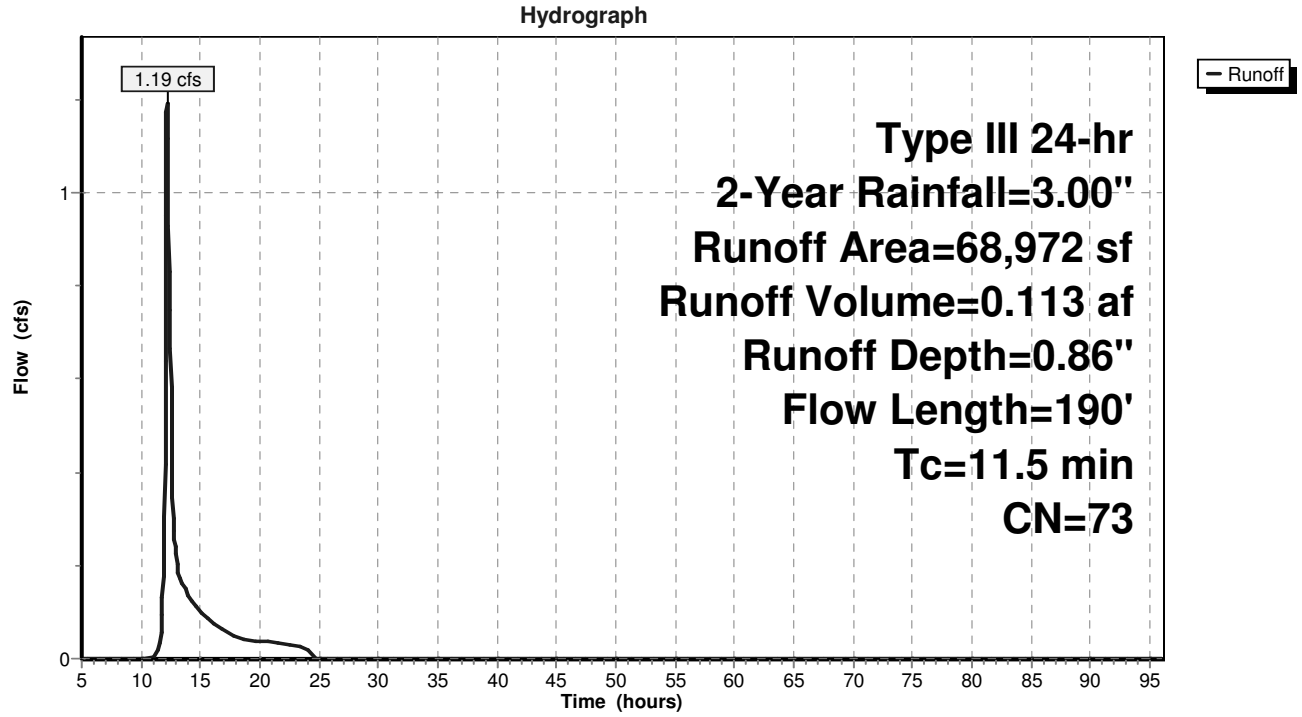
Runoff = 1.19 cfs @ 12.18 hrs, Volume= 0.113 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
9,953	80	>75% Grass cover, Good, HSG D
23,172	74	>75% Grass cover, Good, HSG C
35,847	70	Woods, Good, HSG C
68,972	73	Weighted Average
68,972		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.8	140	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	190	Total			

Subcatchment 106:



Summary for Subcatchment 110:

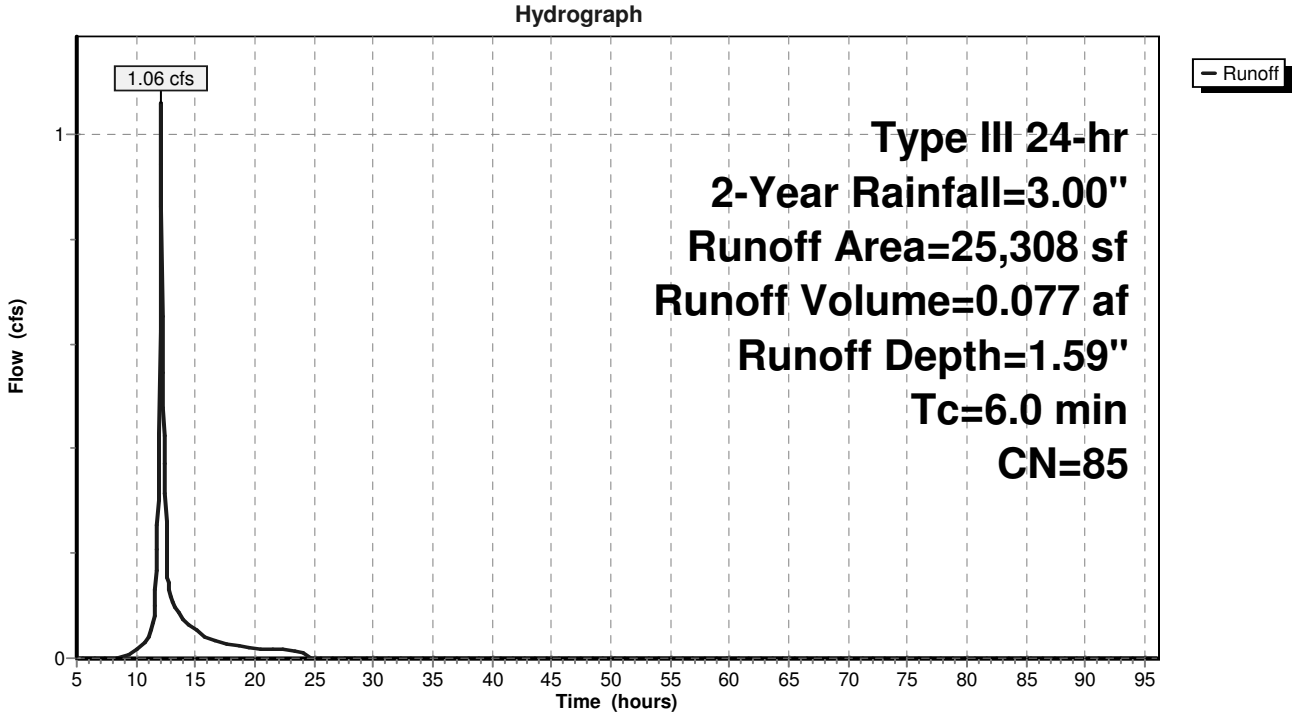
Runoff = 1.06 cfs @ 12.09 hrs, Volume= 0.077 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
12,176	74	>75% Grass cover, Good, HSG C
11,632	98	Paved parking, HSG C
1,500	80	>75% Grass cover, Good, HSG D
25,308	85	Weighted Average
13,676		54.04% Pervious Area
11,632		45.96% Impervious Area

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

Subcatchment 110:



Summary for Subcatchment 111:

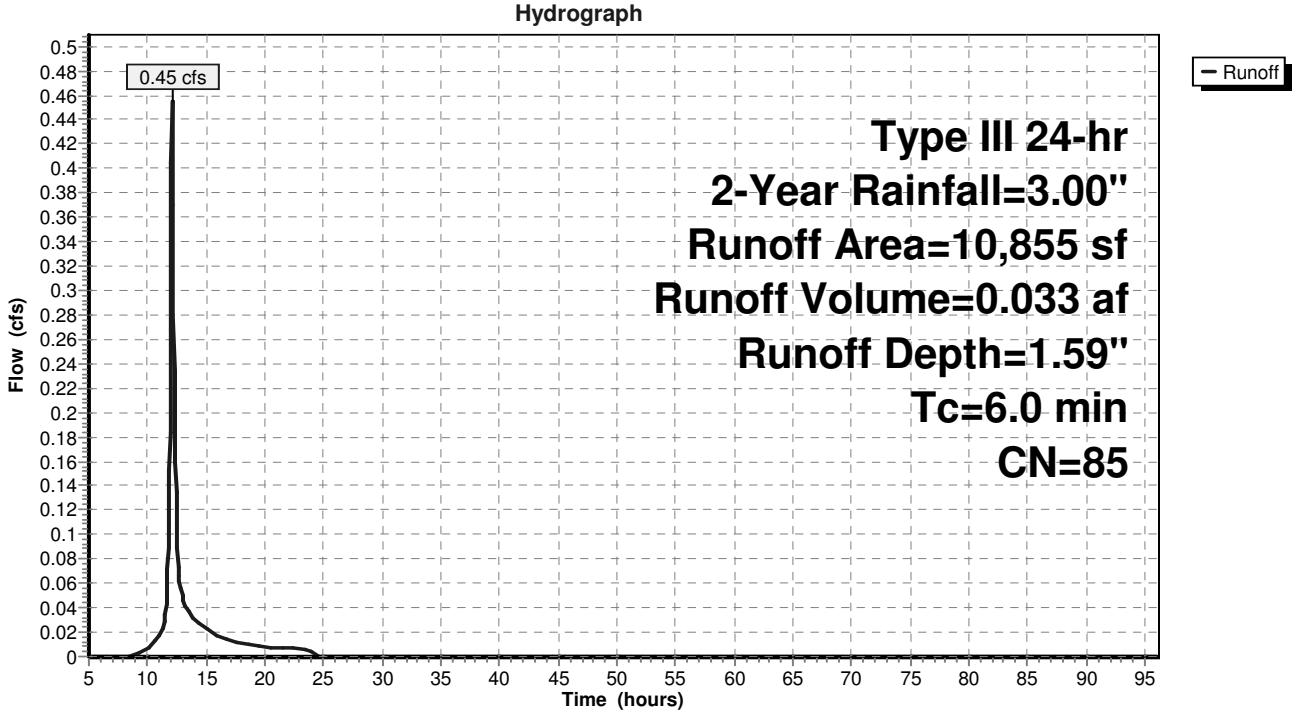
Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.033 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
5,711	74	>75% Grass cover, Good, HSG C
5,144	98	Paved parking, HSG C
10,855	85	Weighted Average
5,711		52.61% Pervious Area
5,144		47.39% Impervious Area

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

Subcatchment 111:



Summary for Subcatchment 112:

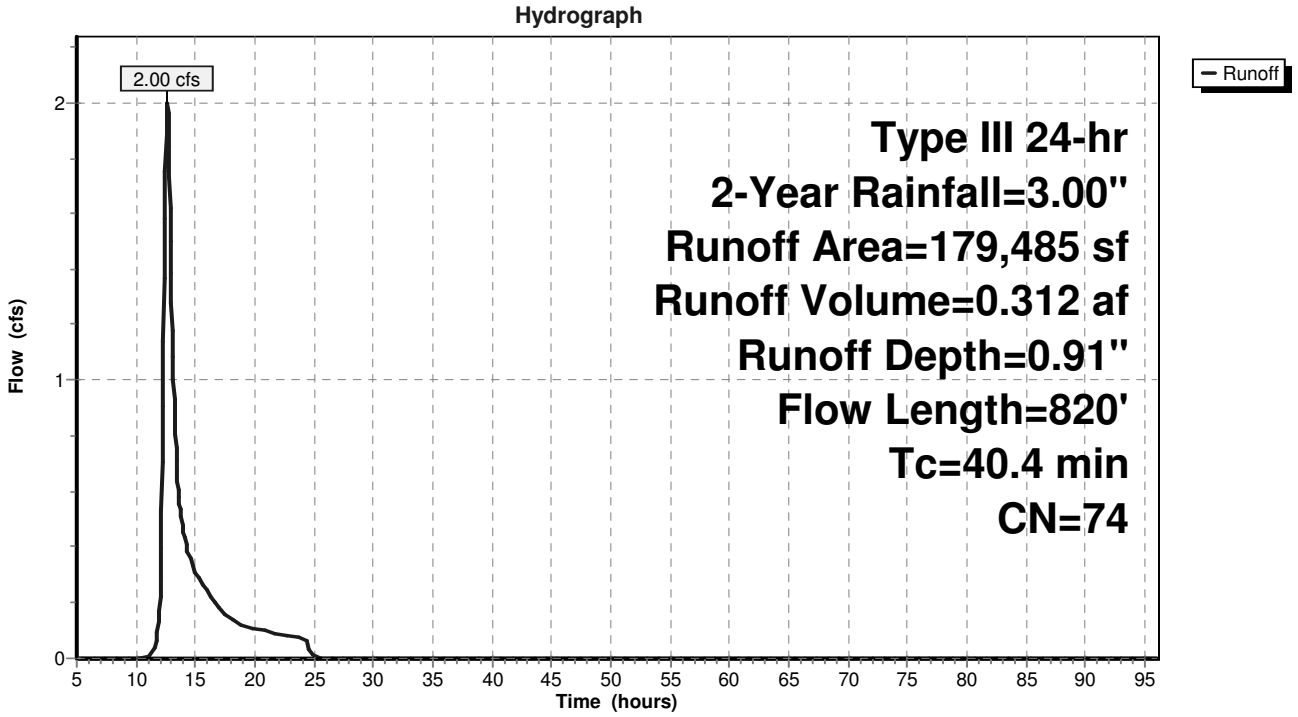
Runoff = 2.00 cfs @ 12.61 hrs, Volume= 0.312 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
61,729	77	Woods, Good, HSG D
4,086	92	Paved roads w/open ditches, 50% imp, HSG C
89,877	70	Woods, Good, HSG C
1,556	98	Paved parking, HSG C
22,237	74	>75% Grass cover, Good, HSG C
179,485	74	Weighted Average
175,886		97.99% Pervious Area
3,599		2.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.3	200	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
24.3	200	0.0200	0.14	0.73	**Parabolic Channel,** W=40.00' D=0.20' Area=5.3 sf Perim=40.0' n= 0.400 Sheet flow: Woods+light brush
2.0	370	0.0300	3.08	10.27	**Parabolic Channel,** W=10.00' D=0.50' Area=3.3 sf Perim=10.1' n= 0.040 Earth, cobble bottom, clean sides
40.4	820	Total			

Subcatchment 112:



Summary for Subcatchment 113: Roof

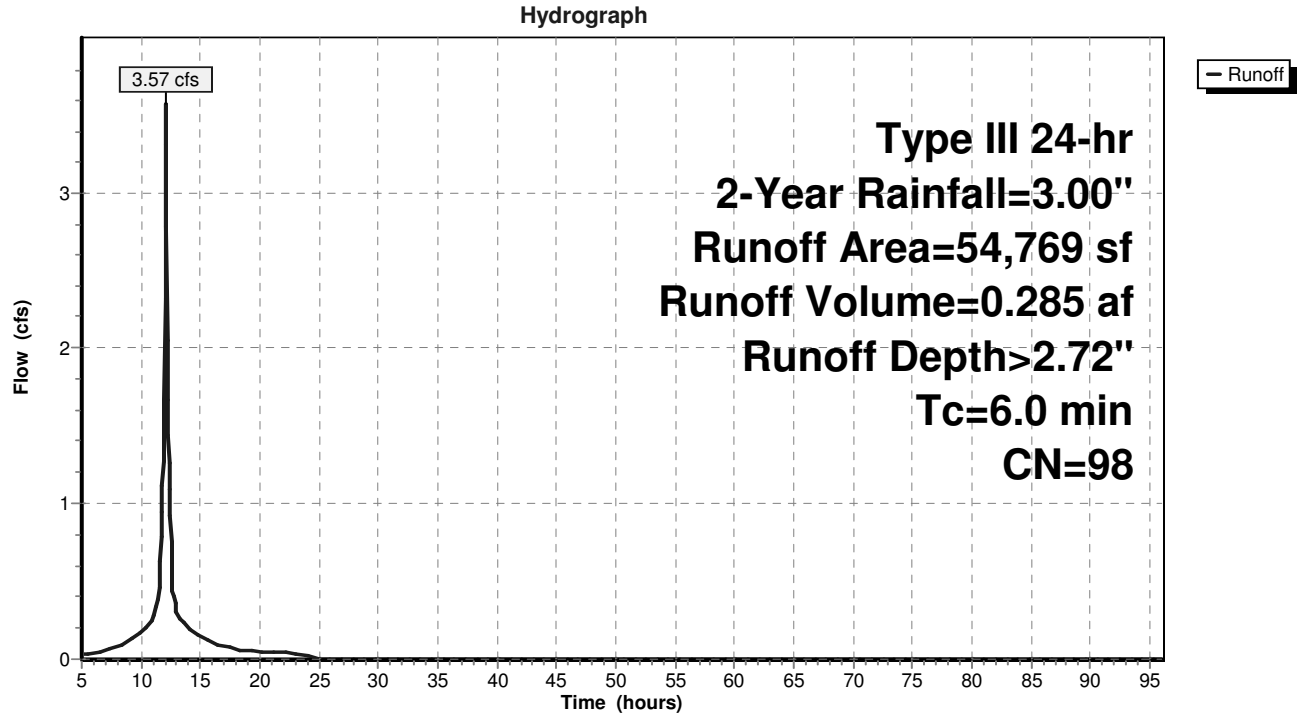
Runoff = 3.57 cfs @ 12.09 hrs, Volume= 0.285 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.00"

Area (sf)	CN	Description
54,769	98	Roofs, HSG C
54,769		100.00% Impervious Area

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

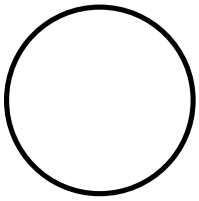
Subcatchment 113: Roof



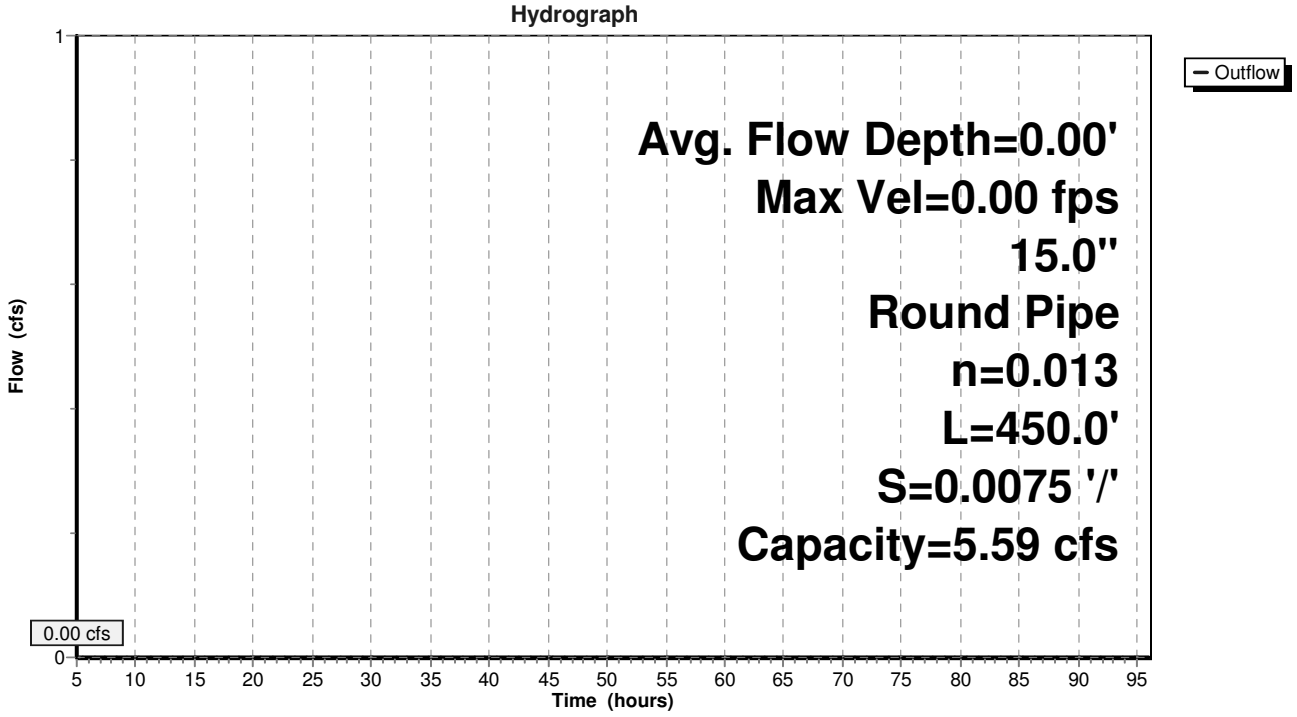
Summary for Reach 1R: (new Reach)

Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 5.59 cfs

15.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 450.0' Slope= 0.0075 '/'
Inlet Invert= 100.00', Outlet Invert= 96.63'



Reach 1R: (new Reach)



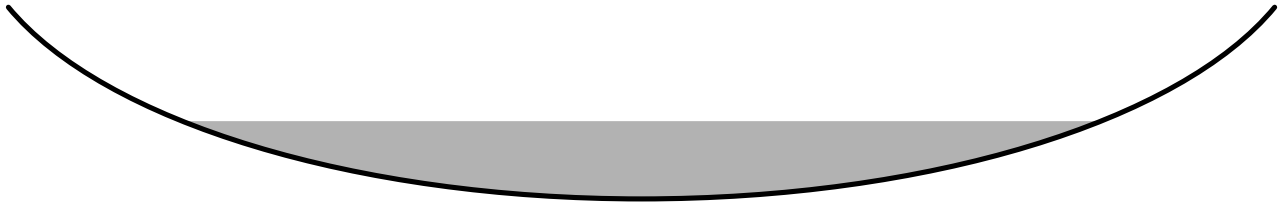
Summary for Reach 5R: REACH TO POINT OF ANALYSIS

Inflow Area = 11.972 ac, 32.75% Impervious, Inflow Depth = 0.93" for 2-Year event
Inflow = 2.90 cfs @ 12.55 hrs, Volume= 0.924 af
Outflow = 2.88 cfs @ 12.66 hrs, Volume= 0.924 af, Atten= 1%, Lag= 6.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.39 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 10.5 min

Peak Storage= 621 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.30' Flow Area= 8.0 sf, Capacity= 20.33 cfs

40.00' x 0.30' deep Parabolic Channel, n= 0.040 Earth, cobble bottom, clean sides
Length= 300.0' Slope= 0.0400 '/'
Inlet Invert= 716.00', Outlet Invert= 704.00'



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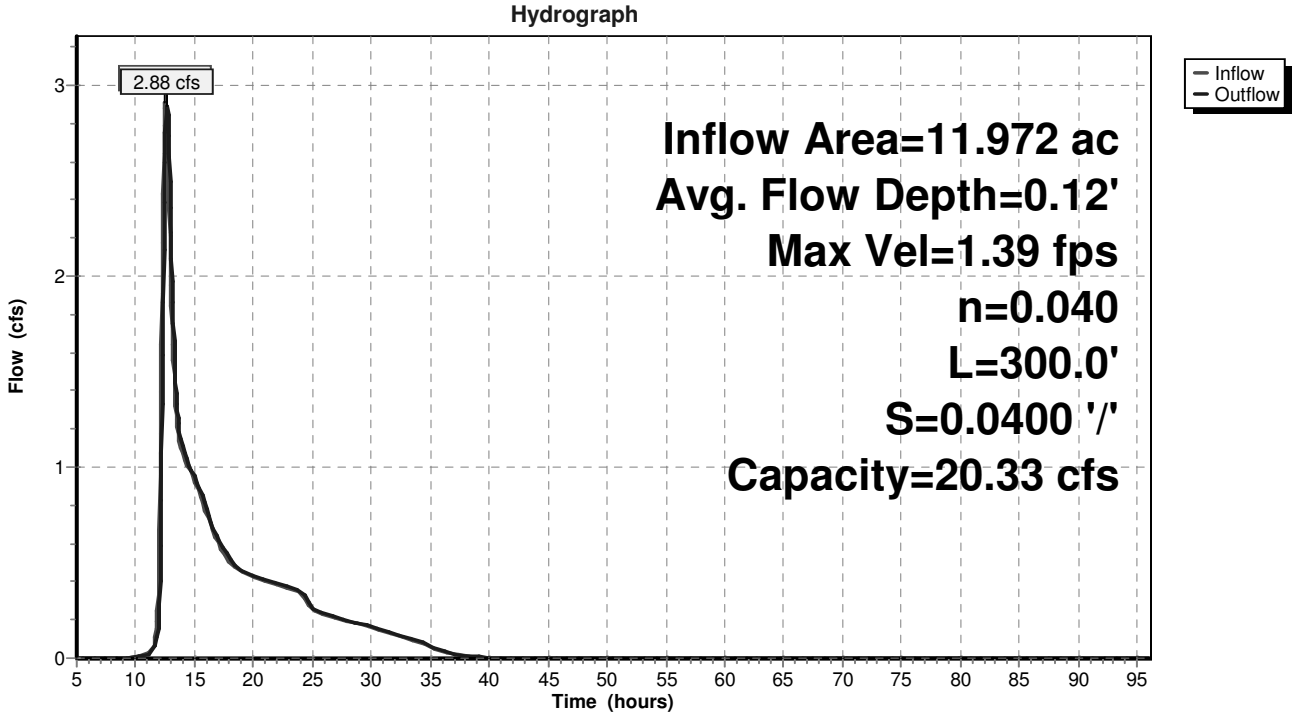
Reach 5R: REACH TO POINT OF ANALYSIS



Summary for Pond 2P: BASIN A

Inflow Area = 7.022 ac, 49.17% Impervious, Inflow Depth = 1.32" for 2-Year event
Inflow = 9.14 cfs @ 12.10 hrs, Volume= 0.771 af
Outflow = 0.58 cfs @ 15.05 hrs, Volume= 0.771 af, Atten= 94%, Lag= 177.2 min
Discarded = 0.12 cfs @ 15.05 hrs, Volume= 0.295 af
Primary = 0.46 cfs @ 15.05 hrs, Volume= 0.476 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 728.36' @ 15.05 hrs Surf.Area= 10,645 sf Storage= 20,441 cf

Plug-Flow detention time= 674.9 min calculated for 0.771 af (100% of inflow)
Center-of-Mass det. time= 676.1 min (1,505.6 - 829.6)

Volume	Invert	Avail.Storage	Storage Description
#1	726.00'	72,528 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

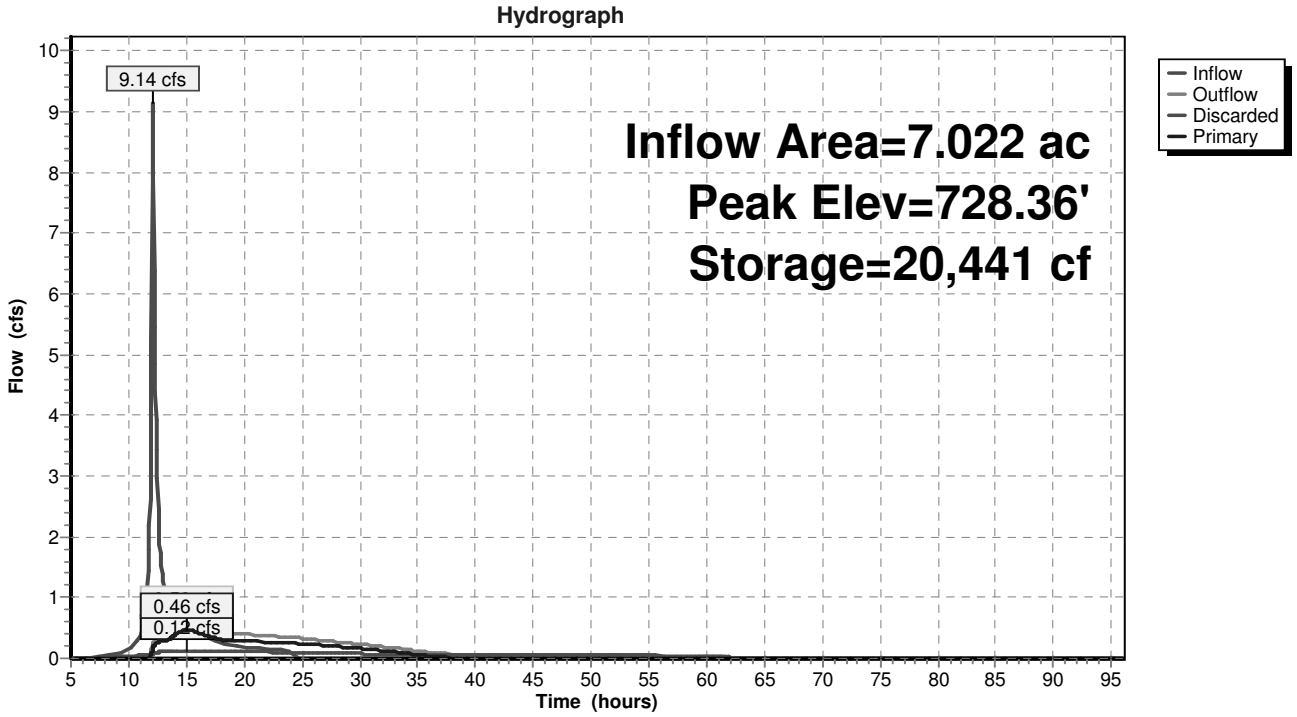
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
726.00	6,793	0	0
728.00	9,952	16,745	16,745
730.00	13,814	23,766	40,511
732.00	18,203	32,017	72,528

Device	Routing	Invert	Outlet Devices
#1	Primary	725.00'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.00' / 723.00' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	726.50'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	728.20'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	730.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	731.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#6	Discarded	726.00'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 724.00'

Discarded OutFlow Max=0.12 cfs @ 15.05 hrs HW=728.36' (Free Discharge)
└**6=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=0.46 cfs @ 15.05 hrs HW=728.36' (Free Discharge)
├**1=Culvert** (Passes 0.46 cfs of 13.74 cfs potential flow)
│ ├**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.34 fps)
│ ├**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.36 fps)
│ └**4=Orifice/Grate** (Controls 0.00 cfs)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: BASIN A



Summary for Pond 3P: BASIN B

Inflow Area = 0.581 ac, 45.96% Impervious, Inflow Depth = 1.59" for 2-Year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 0.077 af
Outflow = 0.46 cfs @ 12.32 hrs, Volume= 0.068 af, Atten= 57%, Lag= 13.8 min
Primary = 0.46 cfs @ 12.32 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 717.27' @ 12.32 hrs Surf.Area= 1,185 sf Storage= 1,172 cf

Plug-Flow detention time= 128.6 min calculated for 0.068 af (89% of inflow)
Center-of-Mass det. time= 74.1 min (903.1 - 829.0)

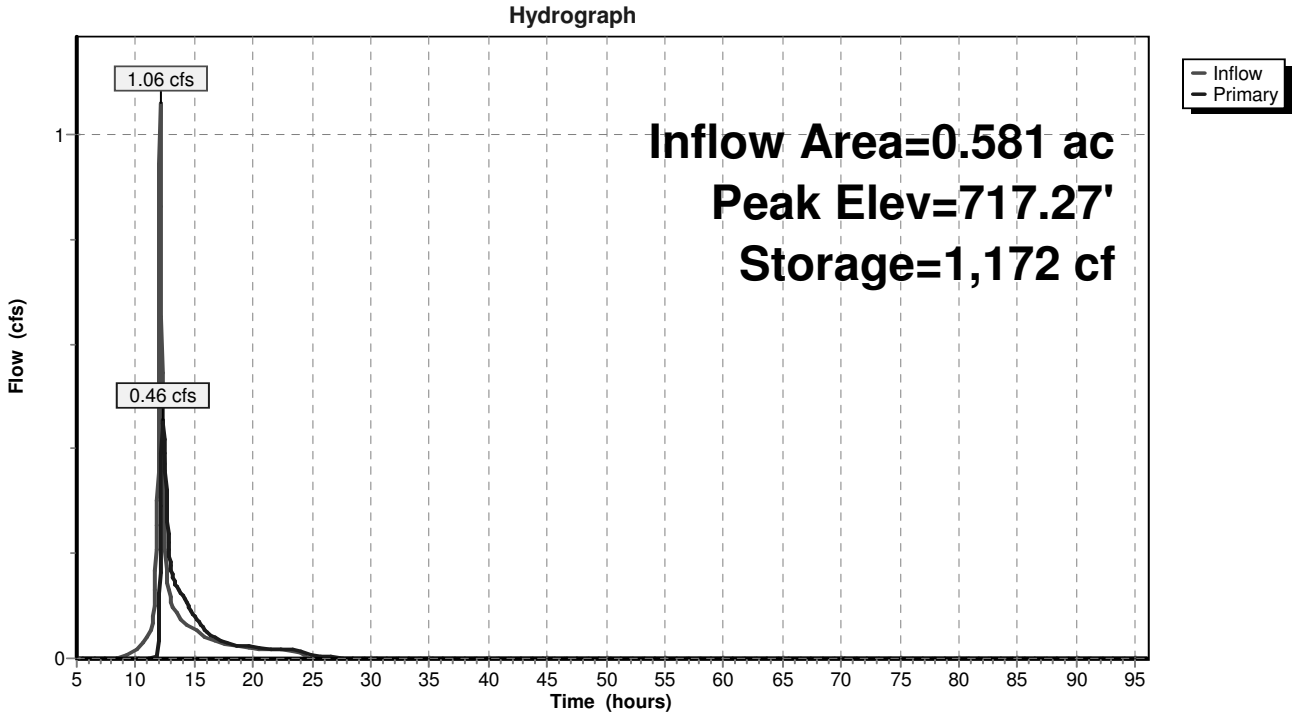
Volume	Invert	Avail.Storage	Storage Description
#1	716.00'	6,266 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
716.00	662	0	0
718.00	1,486	2,148	2,148
720.00	2,632	4,118	6,266

Device	Routing	Invert	Outlet Devices
#1	Primary	715.00'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 715.00' / 714.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	716.50'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	717.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600
#4	Device 1	718.50'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Primary	719.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.45 cfs @ 12.32 hrs HW=717.27' (Free Discharge)
- **1=Culvert** (Passes 0.45 cfs of 5.03 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 3.86 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.26 cfs @ 1.76 fps)
  - **4=Orifice/Grate** (Controls 0.00 cfs)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: BASIN B



Summary for Pond 4P: RECHARGE BASIN

Inflow Area = 1.257 ac,100.00% Impervious, Inflow Depth > 2.72" for 2-Year event
Inflow = 3.57 cfs @ 12.09 hrs, Volume= 0.285 af
Outflow = 0.66 cfs @ 12.53 hrs, Volume= 0.285 af, Atten= 82%, Lag= 26.8 min
Discarded = 0.07 cfs @ 12.53 hrs, Volume= 0.195 af
Primary = 0.37 cfs @ 12.53 hrs, Volume= 0.055 af
Secondary = 0.23 cfs @ 12.53 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 736.72' @ 12.53 hrs Surf.Area= 6,966 sf Storage= 6,979 cf

Plug-Flow detention time= 768.5 min calculated for 0.285 af (100% of inflow)
Center-of-Mass det. time= 767.8 min (1,534.8 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	735.00'	14,046 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	734.00'	599 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,816 cf Overall x 33.0% Voids
		14,645 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
735.00	1,816	0	0
736.00	4,208	3,012	3,012
738.00	6,826	11,034	14,046

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
734.00	1,816	0	0
735.00	1,816	1,816	1,816

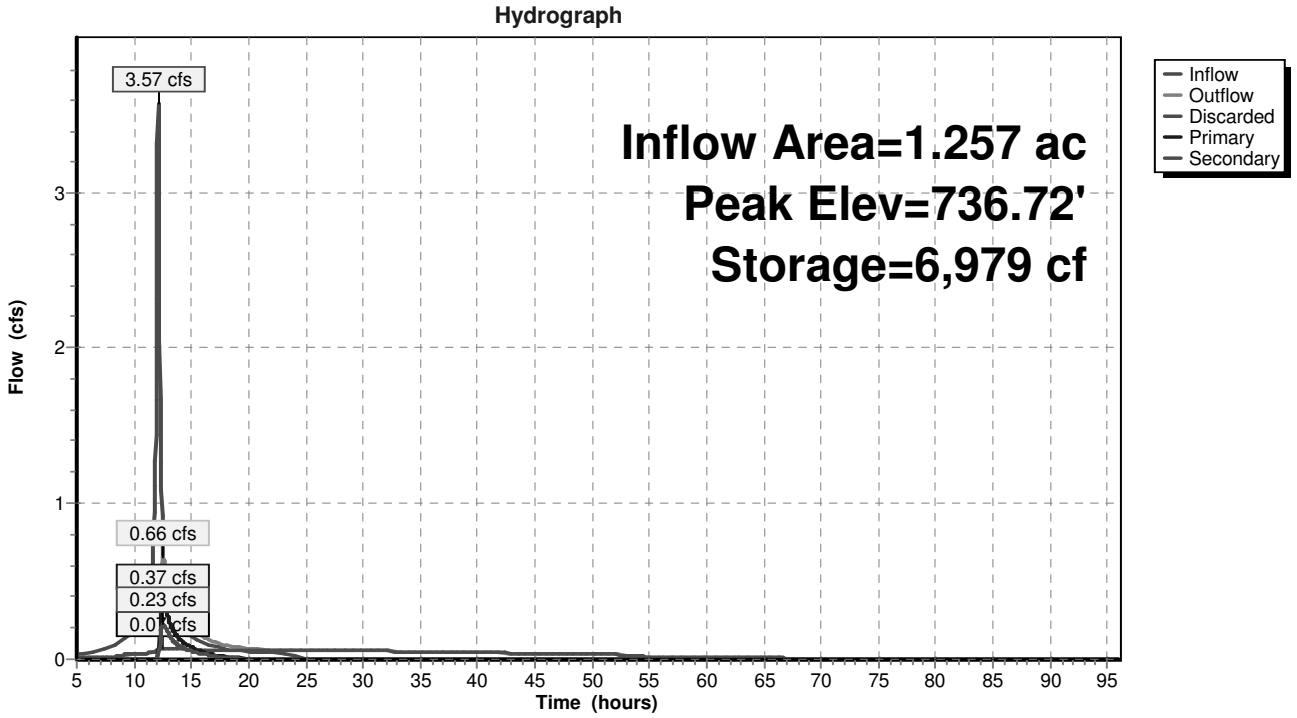
Device	Routing	Invert	Outlet Devices
#1	Primary	737.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	734.00'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 732.00'
#3	Primary	736.40'	**12.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 736.40' / 733.90' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Secondary	736.40'	**6.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 736.40' / 734.40' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.07 cfs @ 12.53 hrs HW=736.72' (Free Discharge)
└**2=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=0.37 cfs @ 12.53 hrs HW=736.72' (Free Discharge)
├**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Inlet Controls 0.37 cfs @ 1.70 fps)

Secondary OutFlow Max=0.22 cfs @ 12.53 hrs HW=736.72' (Free Discharge)
└**4=Culvert** (Inlet Controls 0.22 cfs @ 1.70 fps)

Pond 4P: RECHARGE BASIN



Summary for Pond P101:

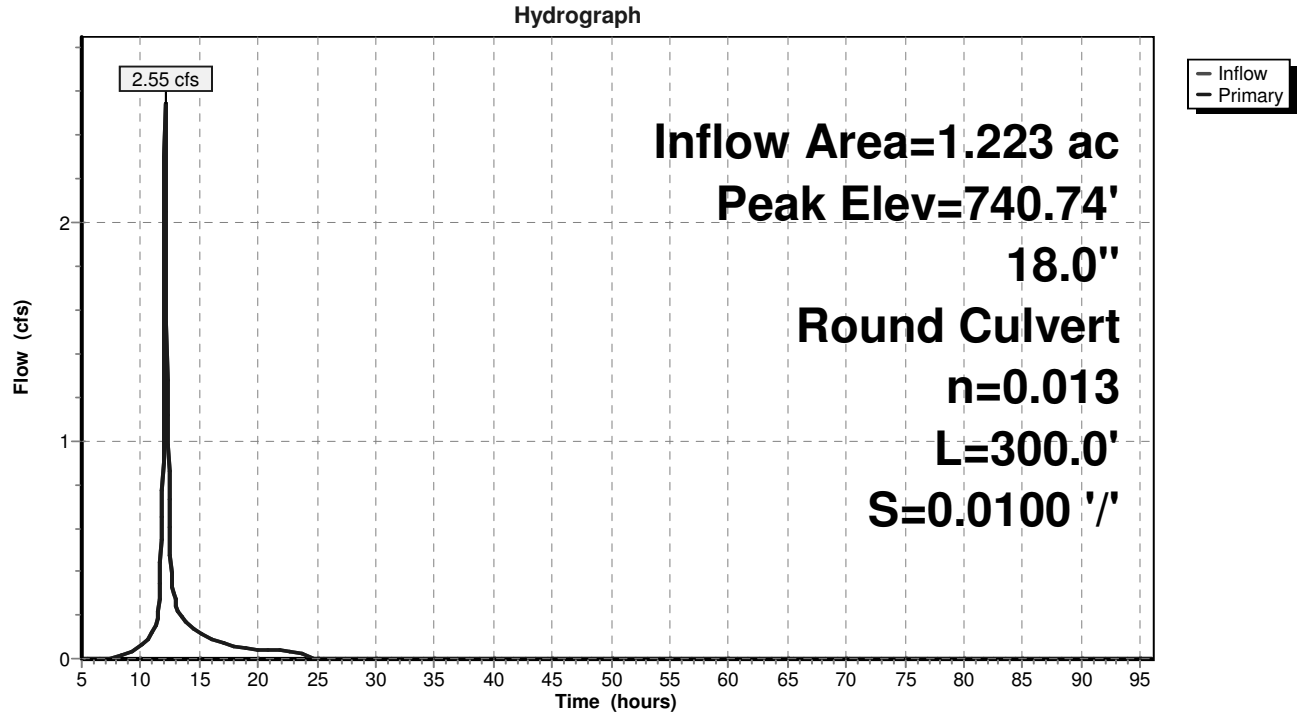
Inflow Area = 1.223 ac, 56.41% Impervious, Inflow Depth = 1.82" for 2-Year event
Inflow = 2.55 cfs @ 12.09 hrs, Volume= 0.185 af
Outflow = 2.55 cfs @ 12.09 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min
Primary = 2.55 cfs @ 12.09 hrs, Volume= 0.185 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 740.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	740.00'	**18.0" Round Culvert** L= 300.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 740.00' / 737.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.50 cfs @ 12.09 hrs HW=740.73' (Free Discharge)
1=Culvert (Inlet Controls 2.50 cfs @ 2.91 fps)

Pond P101:



Summary for Pond P102:

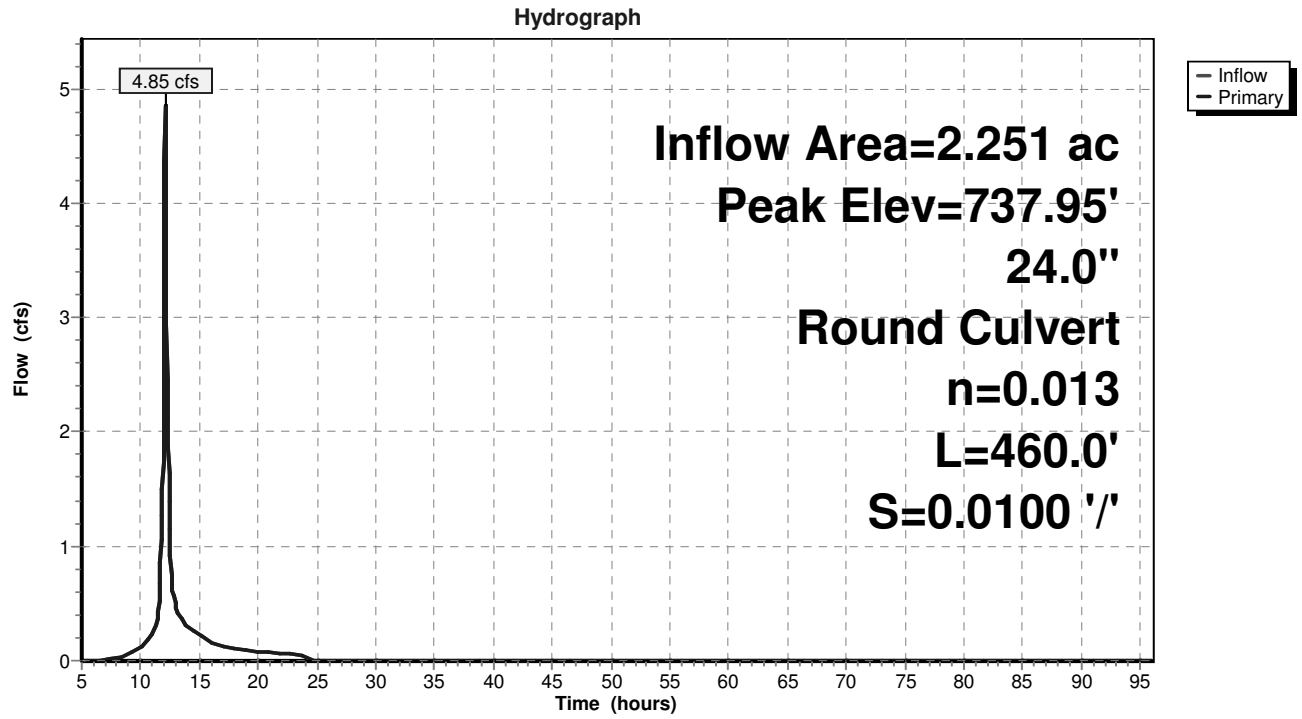
Inflow Area = 2.251 ac, 62.03% Impervious, Inflow Depth = 1.89" for 2-Year event
Inflow = 4.85 cfs @ 12.09 hrs, Volume= 0.355 af
Outflow = 4.85 cfs @ 12.09 hrs, Volume= 0.355 af, Atten= 0%, Lag= 0.0 min
Primary = 4.85 cfs @ 12.09 hrs, Volume= 0.355 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 737.95' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	737.00'	**24.0" Round Culvert** L= 460.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 737.00' / 732.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.77 cfs @ 12.09 hrs HW=737.94' (Free Discharge)
1=Culvert (Inlet Controls 4.77 cfs @ 3.30 fps)

Pond P102:



Summary for Pond P103:

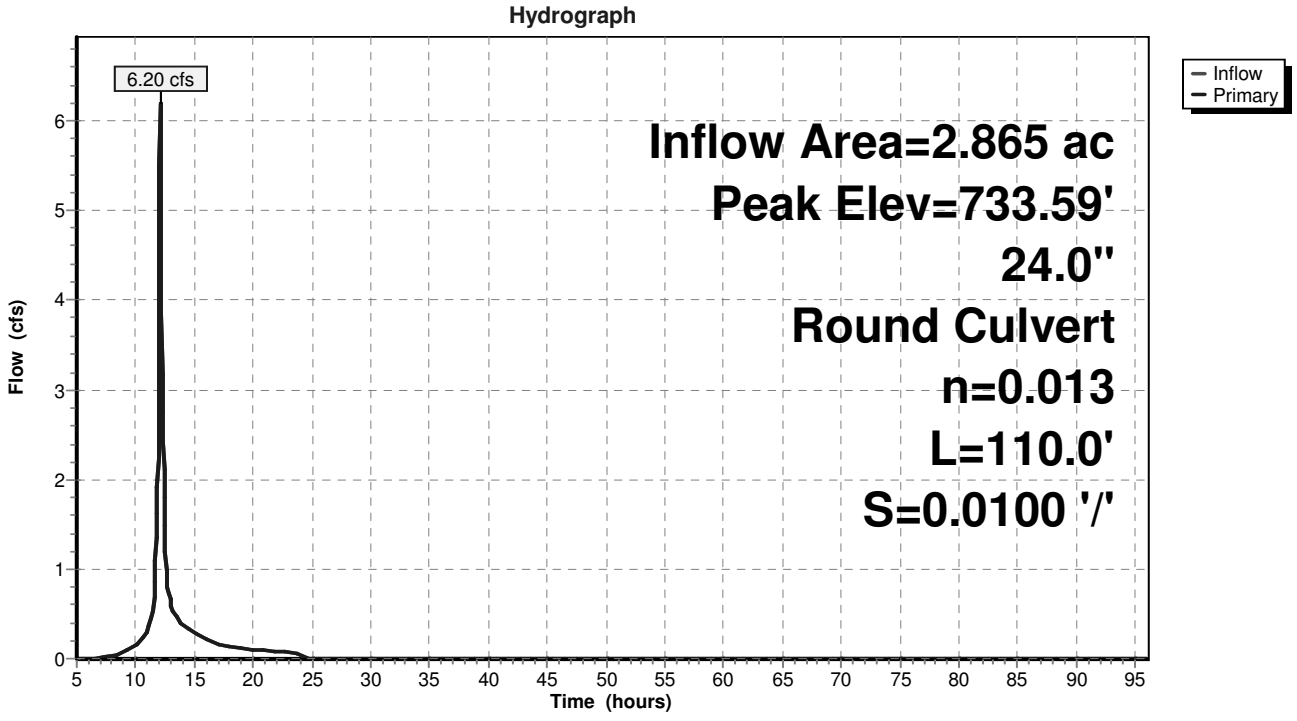
Inflow Area = 2.865 ac, 63.26% Impervious, Inflow Depth = 1.91" for 2-Year event
Inflow = 6.20 cfs @ 12.09 hrs, Volume= 0.457 af
Outflow = 6.20 cfs @ 12.09 hrs, Volume= 0.457 af, Atten= 0%, Lag= 0.0 min
Primary = 6.20 cfs @ 12.09 hrs, Volume= 0.457 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 733.59' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	732.50'	**24.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.50' / 731.40' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.12 cfs @ 12.09 hrs HW=733.58' (Free Discharge)
1=Culvert (Inlet Controls 6.12 cfs @ 3.54 fps)

Pond P103:



Summary for Pond P104:

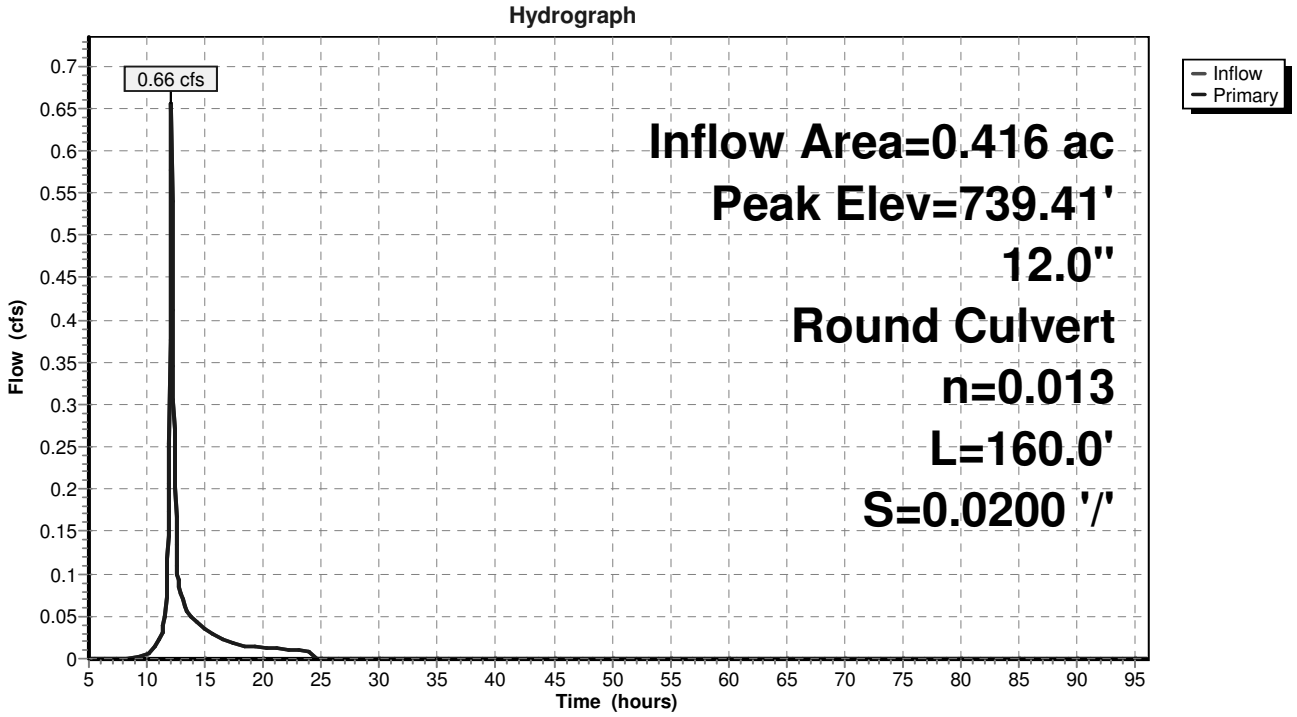
Inflow Area = 0.416 ac, 32.95% Impervious, Inflow Depth = 1.38" for 2-Year event
Inflow = 0.66 cfs @ 12.10 hrs, Volume= 0.048 af
Outflow = 0.66 cfs @ 12.10 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Primary = 0.66 cfs @ 12.10 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 5.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 739.41' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	739.00'	**12.0" Round Culvert** L= 160.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.00' / 735.80' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 12.10 hrs HW=739.41' (Free Discharge)
1=Culvert (Inlet Controls 0.65 cfs @ 2.17 fps)

Pond P104:



STANDARD #3 –LOSS OF ANNUAL RECHARGE

The site is predominately un-developed. The site design incorporates direct recharge of roof drains to infiltration basins. Basins A and B are designed to infiltrate retained runoff after pre-treatment. Soils were found to be Class C permeability.

The table below shows the required and provided recharge volumes for the project. As shown, the proposed condition exceeds the minimum requirement for the additional impervious areas.

Recharge Volume Summary

Soil Type	Recharge Factor (in. runoff)	Existing Impervious Area (sf)	Additional Impervious Area (sf)	Min. Req. Recharge Volume (cf)
A	0.60	0	0	0
B	0.35	0	0	0
C	0.25	0	215,234	4,484
D	0.10	0	0	0
Total Required				**4,484**

Standard #3 Only Applies to Additional Impervious

Provided Recharge Volume (cf)		
South Roof Recharge		5,399
North Roof Recharge		5,756
Basin A		5,150
Basin B		383
Total Provided		**16,688**

Hydrograph for Pond 2P: BASIN A

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.00	0	726.00	0.00	0.00	0.00
7.50	0.08	238	726.03	0.02	0.02	0.00
10.00	**0.43**	1,813	726.26	0.05	0.05	0.00
12.50	**5.16**	**29,415**	**729.15**	**2.10**	**0.15**	**1.95**
15.00	0.95	**26,042**	**728.86**	**1.70**	**0.14**	**1.57**
17.50	0.46	21,254	728.43	0.74	0.12	0.62
20.00	0.31	19,501	728.27	0.45	0.11	0.34
22.50	0.24	18,197	728.14	0.40	0.11	0.29
25.00	0.00	15,959	727.92	0.37	0.10	0.27
27.50	0.00	12,842	727.59	0.32	0.09	0.23
30.00	0.00	10,158	727.30	0.27	0.08	0.19
32.50	0.00	7,919	727.04	0.22	0.07	0.15
35.00	0.00	6,146	726.83	0.17	0.06	0.11
37.50	0.00	4,885	726.67	0.11	0.06	0.05
40.00	0.00	4,125	726.57	0.07	0.06	0.01
42.50	0.00	3,592	726.50	0.05	0.05	0.00
45.00	0.00	3,114	726.44	0.05	0.05	0.00
47.50	0.00	2,652	726.37	0.05	0.05	0.00
50.00	0.00	2,207	726.31	0.05	0.05	0.00
52.50	0.00	1,779	726.25	0.05	0.05	0.00
55.00	0.00	1,366	726.20	0.05	0.05	0.00
57.50	0.00	968	726.14	0.04	0.04	0.00
60.00	0.00	585	726.09	0.04	0.04	0.00
62.50	0.00	254	726.04	0.03	0.03	0.00
65.00	0.00	103	726.02	0.01	0.01	0.00
67.50	0.00	42	726.01	0.00	0.00	0.00
70.00	0.00	17	726.00	0.00	0.00	0.00
72.50	0.00	7	726.00	0.00	0.00	0.00
75.00	0.00	3	726.00	0.00	0.00	0.00
77.50	0.00	1	726.00	0.00	0.00	0.00
80.00	0.00	0	726.00	0.00	0.00	0.00
82.50	0.00	0	726.00	0.00	0.00	0.00
85.00	0.00	0	726.00	0.00	0.00	0.00
87.50	0.00	0	726.00	0.00	0.00	0.00
90.00	0.00	0	726.00	0.00	0.00	0.00
92.50	0.00	0	726.00	0.00	0.00	0.00
95.00	0.00	0	726.00	0.00	0.00	0.00

Hydrograph for Pond 3P: BASIN B

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
5.00	0.00	0	716.00	0.00
7.50	0.01	10	716.02	0.00
10.00	**0.05**	**214**	**716.30**	**0.00**
12.50	**0.45**	**1,652**	**717.65**	**0.82**
15.00	0.09	765	716.90	0.12
17.50	0.04	545	716.68	0.05
20.00	0.03	503	716.63	0.03
22.50	0.02	486	716.62	0.03
25.00	0.00	434	716.56	0.01
27.50	0.00	402	716.52	0.00
30.00	0.00	395	716.51	0.00
32.50	0.00	390	716.51	0.00
35.00	0.00	387	716.51	0.00
37.50	0.00	386	716.50	0.00
40.00	0.00	384	716.50	0.00
42.50	0.00	384	716.50	0.00
45.00	0.00	383	716.50	0.00
47.50	0.00	383	716.50	0.00
50.00	0.00	383	716.50	0.00
52.50	0.00	383	716.50	0.00
55.00	0.00	383	716.50	0.00
57.50	0.00	383	716.50	0.00
60.00	0.00	383	716.50	0.00
62.50	0.00	383	716.50	0.00
65.00	0.00	383	716.50	0.00
67.50	0.00	383	716.50	0.00
70.00	0.00	383	716.50	0.00
72.50	0.00	383	716.50	0.00
75.00	0.00	383	716.50	0.00
77.50	0.00	383	716.50	0.00
80.00	0.00	383	716.50	0.00
82.50	0.00	383	716.50	0.00
85.00	0.00	383	716.50	0.00
87.50	0.00	383	716.50	0.00
90.00	0.00	383	716.50	0.00
92.50	0.00	383	716.50	0.00
95.00	0.00	383	716.50	0.00

Hydrograph for Pond 8P: RECHARGE BASIN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.05	4	731.01	0.00	0.00	0.00
7.50	0.09	509	732.16	0.01	0.01	0.00
10.00	**0.20**	**1,618**	**733.00**	**0.02**	**0.02**	**0.00**
12.50	**0.88**	**6,072**	**735.12**	**1.09**	**0.03**	**1.05**
15.00	0.17	5,823	735.02	0.18	0.03	0.14
17.50	0.08	5,781	735.01	0.09	0.03	0.05
20.00	0.06	5,769	735.00	0.06	0.03	0.03
22.50	0.05	5,763	735.00	0.05	0.03	0.01
25.00	0.00	5,658	734.96	0.03	0.03	0.00
27.50	0.00	5,384	734.86	0.03	0.03	0.00
30.00	0.00	5,117	734.75	0.03	0.03	0.00
32.50	0.00	4,856	734.65	0.03	0.03	0.00
35.00	0.00	4,602	734.54	0.03	0.03	0.00
37.50	0.00	4,355	734.44	0.03	0.03	0.00
40.00	0.00	4,114	734.33	0.03	0.03	0.00
42.50	0.00	3,880	734.23	0.03	0.03	0.00
45.00	0.00	3,652	734.12	0.02	0.02	0.00
47.50	0.00	3,432	734.01	0.02	0.02	0.00
50.00	0.00	3,217	733.91	0.02	0.02	0.00
52.50	0.00	3,008	733.80	0.02	0.02	0.00
55.00	0.00	2,805	733.69	0.02	0.02	0.00
57.50	0.00	2,607	733.59	0.02	0.02	0.00
60.00	0.00	2,414	733.48	0.02	0.02	0.00
62.50	0.00	2,227	733.37	0.02	0.02	0.00
65.00	0.00	2,046	733.26	0.02	0.02	0.00
67.50	0.00	1,870	733.16	0.02	0.02	0.00
70.00	0.00	1,699	733.05	0.02	0.02	0.00
72.50	0.00	1,534	732.94	0.02	0.02	0.00
75.00	0.00	1,374	732.83	0.02	0.02	0.00
77.50	0.00	1,219	732.72	0.02	0.02	0.00
80.00	0.00	1,070	732.61	0.02	0.02	0.00
82.50	0.00	926	732.50	0.02	0.02	0.00
85.00	0.00	787	732.39	0.02	0.02	0.00
87.50	0.00	653	732.28	0.01	0.01	0.00
90.00	0.00	525	732.17	0.01	0.01	0.00
92.50	0.00	401	732.06	0.01	0.01	0.00
95.00	0.00	305	731.89	0.01	0.01	0.00

Hydrograph for Pond 4P: RECHARGE BASIN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
5.00	0.05	4	734.01	0.00	0.00	0.00	0.00
7.50	0.09	448	734.75	0.01	0.01	0.00	0.00
10.00	**0.19**	**1,394**	**735.35**	**0.03**	**0.03**	**0.00**	**0.00**
12.50	**0.83**	**7,437**	**736.81**	**0.97**	**0.07**	**0.58**	**0.33**
15.00	0.16	6,122	736.55	0.21	0.06	0.09	0.06
17.50	0.08	5,792	736.48	0.11	0.06	0.03	0.02
20.00	0.05	5,590	736.44	0.07	0.06	0.01	0.00
22.50	0.04	5,435	736.41	0.06	0.06	0.00	0.00
25.00	0.00	5,130	736.34	0.06	0.06	0.00	0.00
27.50	0.00	4,621	736.23	0.06	0.06	0.00	0.00
30.00	0.00	4,132	736.12	0.05	0.05	0.00	0.00
32.50	0.00	3,664	736.01	0.05	0.05	0.00	0.00
35.00	0.00	3,218	735.90	0.05	0.05	0.00	0.00
37.50	0.00	2,797	735.79	0.05	0.05	0.00	0.00
40.00	0.00	2,402	735.68	0.04	0.04	0.00	0.00
42.50	0.00	2,032	735.57	0.04	0.04	0.00	0.00
45.00	0.00	1,687	735.46	0.04	0.04	0.00	0.00
47.50	0.00	1,367	735.34	0.03	0.03	0.00	0.00
50.00	0.00	1,072	735.23	0.03	0.03	0.00	0.00
52.50	0.00	803	735.10	0.03	0.03	0.00	0.00
55.00	0.00	569	734.95	0.02	0.02	0.00	0.00
57.50	0.00	435	734.73	0.01	0.01	0.00	0.00
60.00	0.00	311	734.52	0.01	0.01	0.00	0.00
62.50	0.00	197	734.33	0.01	0.01	0.00	0.00
65.00	0.00	91	734.15	0.01	0.01	0.00	0.00
67.50	0.00	6	734.01	0.00	0.00	0.00	0.00
70.00	0.00	0	734.00	0.00	0.00	0.00	0.00
72.50	0.00	0	734.00	0.00	0.00	0.00	0.00
75.00	0.00	0	734.00	0.00	0.00	0.00	0.00
77.50	0.00	0	734.00	0.00	0.00	0.00	0.00
80.00	0.00	0	734.00	0.00	0.00	0.00	0.00
82.50	0.00	0	734.00	0.00	0.00	0.00	0.00
85.00	0.00	0	734.00	0.00	0.00	0.00	0.00
87.50	0.00	0	734.00	0.00	0.00	0.00	0.00
90.00	0.00	0	734.00	0.00	0.00	0.00	0.00
92.50	0.00	0	734.00	0.00	0.00	0.00	0.00
95.00	0.00	0	734.00	0.00	0.00	0.00	0.00

STANDARD #4- 80% TSS REMOVAL

ESTIMATED PROPOSED NEW PAVED COVER= 112,390 S.F.

REQUIRED WATER QUALITY VOLUME:

Water Quality Volume		
Required Treatment Volume	1.0	Inches Over Impervious Areas
Watershed Series	Paved Area	Water Quality Volume
100 - Basin A	95,614	7,968
100 - Basin B	11,632	969
100 - Main Entrance	5,144	429
200	0	0
300	0	0

The design of the drainage system is such that the site is routed through a series of treatment BMP's meeting the Standard. The attached TSS worksheets and Proprietary systems show the site meeting this requirement. No bypass is designed of the BMP's reducing the WQV.

****PLEASE SEE THE FOLLOWING PAGES FOR TSS REMOVAL CALCULATIONS AND STORMCEPTOR® SIZING DETAILED REPORTS****

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: 6 Picker Road, Drainage Basin A

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 Catch Basins	**0.25**	**1.00**	**0.25**	**0.75**
Sediment Forebay	**25%**	**0.75**	**0.19**	**0.56**
Infiltration Basin	**80%**	**0.56**	**0.45**	**0.11**
		0.11	**0.00**	**0.11**
		0.11	**0.00**	**0.11**

Total TSS Removal = **89%**

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

Project: **20-122, ARCO**

Prepared By: **ARB**

Date: **5/9/2020**

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

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: 6 Picker Road, Main Access Road Low Point

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 Catch Basins	**0.25**	**1.00**	**0.25**	**0.75**
Stormceptor 450i Proprietary Device	**88%**	**0.75**	**0.66**	**0.09**
Infiltration Basin	**80%**	**0.09**	**0.07**	**0.02**
		0.02	**0.00**	**0.02**
		0.02	**0.00**	**0.02**

Total TSS Removal = **98%**

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

Project: **20-122, ARCO**

Prepared By: **ARB**

Date: **5/9/2020**

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

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: 6 Picker Road, Main Entrance

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 Catch Basins	**25%**	**1.00**	**0.25**	**0.75**
Stormceptor 450i Proprietary Device	**93%**	**0.75**	**0.70**	**0.05**
		0.05	**0.00**	**0.05**
		0.05	**0.00**	**0.05**
		0.05	**0.00**	**0.05**

Total TSS Removal = **95%**

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

Project: **20-122, ARCO**

Prepared By: **ARB**

Date: **5/9/2020**

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

Brief Stormceptor Sizing Report - 6 Picker Road Entrance

Project Information & Location			
Project Name	6 Picker Road	**Project Number**	20-122
City	Sturbridge	**State/ Province**	Massachusetts
Country	United States of America	**Date**	5/9/2020
Designer Information		**EOR Information (optional)**	
Name	Andrew Baum	**Name**	
Company	Summit Engineering & Survey, Inc.	**Company**	
Phone #	508-987-8713	**Phone #**	
Email	abaum@summitesinc.com	**Email**	

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	6 Picker Road Entrance
Target TSS Removal (%)	80
TSS Removal (%) Provided	93
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	93
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	98
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Sizing Details

Drainage Area

Total Area (acres)	0.25
Imperviousness %	48.0

Rainfall

Station Name	EAST BRIMFIELD LAKE
State/Province	Massachusetts
Station ID #	2107
Years of Records	45
Latitude	42°7'0"N
Longitude	72°8'0"W

Water Quality Objective

TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	

Up Stream Storage

Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion

Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

Fine Distribution

Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

Brief Stormceptor Sizing Report - 6 Picker Road, Low Point

Project Information & Location			
Project Name	6 Picker Road	**Project Number**	20-122
City	Sturbridge	**State/ Province**	Massachusetts
Country	United States of America	**Date**	5/9/2020
Designer Information		**EOR Information (optional)**	
Name	Andrew Baum	**Name**	
Company	Summit Engineering & Survey, Inc.	**Company**	
Phone #	508-987-8713	**Phone #**	
Email	abaum@summitesinc.com	**Email**	

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	6 Picker Road, Low Point
Target TSS Removal (%)	80
TSS Removal (%) Provided	88
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	88
STC 900	93
STC 1200	93
STC 1800	93
STC 2400	95
STC 3600	95
STC 4800	97
STC 6000	97
STC 7200	97
STC 11000	98
STC 13000	98
STC 16000	99

Stormceptor®

CONTECH ENGINEERED SOLUTIONS
A QUIKRETE COMPANY

Sizing Details

Drainage Area

Total Area (acres)	0.58
Imperviousness %	46.0

Rainfall

Station Name	EAST BRIMFIELD LAKE
State/Province	Massachusetts
Station ID #	2107
Years of Records	45
Latitude	42°7'0"N
Longitude	72°8'0"W

Water Quality Objective

TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	

Up Stream Storage

Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion

Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

Fine Distribution

Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

STANDARD #9- OPERATION & MAINTENANCE

OPERATION & MAINTENANCE PLAN:

CURRENT OWNER & RESPONSIBLE PARTY:

New England Cold, LLC (Contractor shall be responsible during construction)

FUTURE OWNER & RESPONSIBLE PARTY:

New England Cold, LLC

DURING CONSTRUCTION:

***SILT FENCE BARRIER*:**

The silt fence barrier shall be installed prior to construction.

During construction the contractor shall inspect the silt fence barrier on a weekly basis and after any significant rainstorm resulting in greater than 0.5" of rainfall. The barrier shall be inspected for any breaches or disturbed silt fence and repaired immediately.

After construction the barrier shall be maintained as stated above until all new areas are vegetated.

After construction these duties shall transfer to the property owner.

***CONSTRUCTION ENTRANCE APRONS*:**

Construction aprons shall be installed to protect Route 20. The construction entrance apron shall be installed prior to commencement of construction and shall be inspected weekly. The construction entrance apron shall be replaced when debris becomes noticeable on the existing pavement surfaces leading to and from the construction site.

***SLOPE STABILIZATION*:**

The slope stabilization controls shall be installed immediately upon obtaining final grades as shown on the project plans. Slopes in the swale area shall be stabilized according to the details provided. All 3:1 slopes established on-site shall be loamed and seeded as soon as weather permits. Any 2:1 slopes established shall be covered with slope stabilization fabric, then loamed and seeded as soon as weather permits. Areas in failure shall be re-graded to final grade and stabilized as necessary.

***TEMPORARY BASINS*:**

The temporary basins shall be inspected immediately after storm events and cleaned to remove sediment build-up. Outfalls shall be inspected for erosion or scouring. Additional rip rap shall be added as required to minimize erosion.

***CATCH BASINS*:**

Catch basins shall entrances shall have temporary stone or other filtration device installed around inlet to prevent sediment deposits. Sediment shall be removed when accumulation exceeds 1" depth on paved surfaces.

***CHECK DAMS*:**

Check Dams shall be inspected weekly and after rainfall in excess of 0.5". Accumulated sediment shall be removed when depth exceeds 3" on the upstream sided of the dam. Stone or fabric shall be replaced when evidence of clogging is present.

***PROPRIETARY SEPARATOR*:**

The proprietary separator shall be inspected immediately after storm events and cleaned to remove sediment build-up. Cleaning methods shall adhere to the manufacturer's directions.

During construction the proprietary separator shall be inspected on a weekly basis for evidence of clogging or other situation that may adversely affect its function.

***CONSTRUCTION COMPLETION*:**

The entire stormwater management system shall be inspected upon completion of construction. Portions of the system containing sediment shall be cleaned and all sediment properly removed.

AFTER CONSTRUCTION:

***CATCH BASINS*:**

At a minimum, the catch basins shall be inspected and cleaned on a quarterly basis. It is preferred that collection of accumulated sediment shall be accomplished by means of vacuum pumping and not by means of a clamshell bucket. Disposal of accumulated sediment shall be performed in accordance with applicable local, state, and federal guidelines and regulations.

***PROPRIETARY SEPARATOR*:**

The proprietary separator shall be inspected immediately after 0.5 inch storm events and cleaned to remove sediment build-up. Cleaning methods shall adhere to the manufacturer's directions. It is critical that sediment be removed periodically from the proprietary separator to insure it is not being carried to the detention areas and also to insure proper functioning of the separator.

The proprietary separator shall be inspected every three (3) months for evidence of clogging or other situation that may adversely affect its function.

SEDIMENT FORBAYS

Sediment forebays shall be visually inspected monthly for accumulation of debris, slope failure, or stone displacement. Slopes shall be mowed quarterly. Bottom shall be swept, vacuumed of accumulated debris semi-annually.

INFILTRATION BASINS

Inspect infiltration basins after major storm events (>3.0 inches) to verify stabilization and infiltration. Mow slopes, berms quarterly. Removed accumulated clippings from infiltration stone. Inspect basin semi-annually for the following:

- Signs of differential settlement
- Cracking
- Erosion
- Leakage in embankments
- Tree growth on embankments
- Condition of rip rap
- Sediment accumulation
- Turf health.

LONG TERM POLLUTION PREVENTION PLAN

The following are the material management practices that shall be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping: The following good housekeeping practices will be followed on site during the construction project and continued upon completion of the construction activities.

1. A concerted effort shall be made to store only enough product required to complete a particular task.
2. All materials stored on site shall be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure.
3. Products shall be kept in their original containers with the original manufacture's label.
4. Substances shall not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, all of a product shall be used up before disposing of the container.
6. Manufacture's recommendations for proper use and disposal shall be followed.

7. The site superintendent shall inspect daily to ensure proper use and disposal of materials on site.

Hazardous Products: The following practices are intended to reduce the risks associated with hazardous materials.

1. Products shall be kept in original containers unless they are not re-sealable.
2. Where feasible, the original label and material safety data shall be retained, whereas they contain important product information.
3. If surplus product must be disposed of, follow manufacturers or local and State recommended methods for proper disposal.

Product Specific Practices: The following product-specific practices shall be followed on site:
Petroleum Products:

1. All on site vehicles shall be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage.
2. Petroleum products shall be stored in tightly sealed containers which are clearly labeled.
3. Petroleum Products shall be stored in compliance with Fire Marshall regulations.

Bituminous Concrete:
Any bituminous concrete or asphalt substances used on site shall be applied according to the manufacturer's recommendations.

Fertilizers:
Fertilizers shall be applied in the minimum amounts recommended by the manufacturer. Once applied, fertilizers shall be worked into the soil to limit exposure to stormwater. Storage shall be in a covered shed or trailer. The contents of any partially-used bags of fertilizer shall be transferred to a sealable plastic bag or bin to avoid spills

Paints:

1. All containers shall be tightly sealed and stored when not required for use.
2. Excess paint shall not be discharged into any catch basin, drain manhole or any portion of the stormwater management system.
3. Excess paint shall be properly disposed of according to manufacturer's recommendations or State and local regulations.

Concrete Trucks:
Concrete trucks shall not be allowed to wash out or discharge surplus concrete or drum wash water on site.

SPILL CONTROL PRACTICES

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices shall be followed for spill prevention and cleanup:

1. Manufacturer's recommended methods for cleanup shall be readily available at the onsite trailer, and site personnel shall be made aware of the procedures and the location of the information.

2. Materials and equipment necessary for spill clean up shall be kept in the material storage area on site. Equipment and materials shall include, but not be limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust and plastic and metal trash containers specifically for this purpose.
3. All spills shall be cleaned up immediately after discovery.
4. The spill area shall be kept well ventilated, and personnel shall wear appropriate protective clothing to prevent injury from contact with hazardous substance.
5. Spills of toxic or hazardous material shall be reported to the appropriate State and/or local authority in accordance with local and/or State regulations.
6. The spill prevention plan shall be adjusted to include measures to prevent a particular type of spill from reoccurring and instructions on how to clean up the spill if there is another occurrence. A description of the spill, what caused it, and the clean up measures shall also be included.
7. The “Manager” shall be the spill prevention and cleanup coordinator. The “Manager” shall designate at least three other site personnel who will be trained in the spill control practices identified above.

APPENDICES:

PRE-DEVELOPMENT DIAGRAM

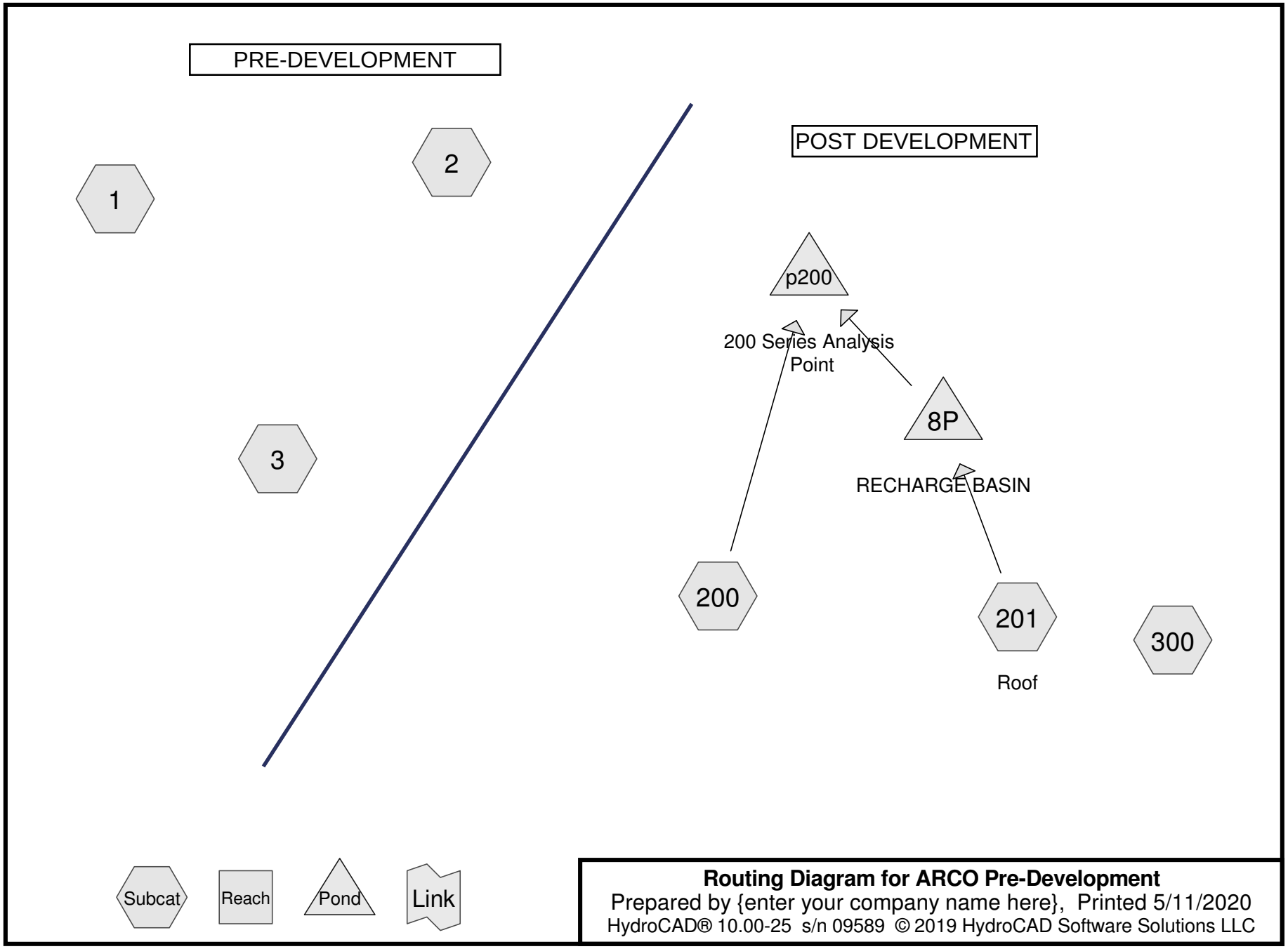
POST-DEVELOPMENT DIAGRAM

PRE-DEVELOPMENT WATERSHED MAP

POST-DEVELOPMENT WATERSHED MAP

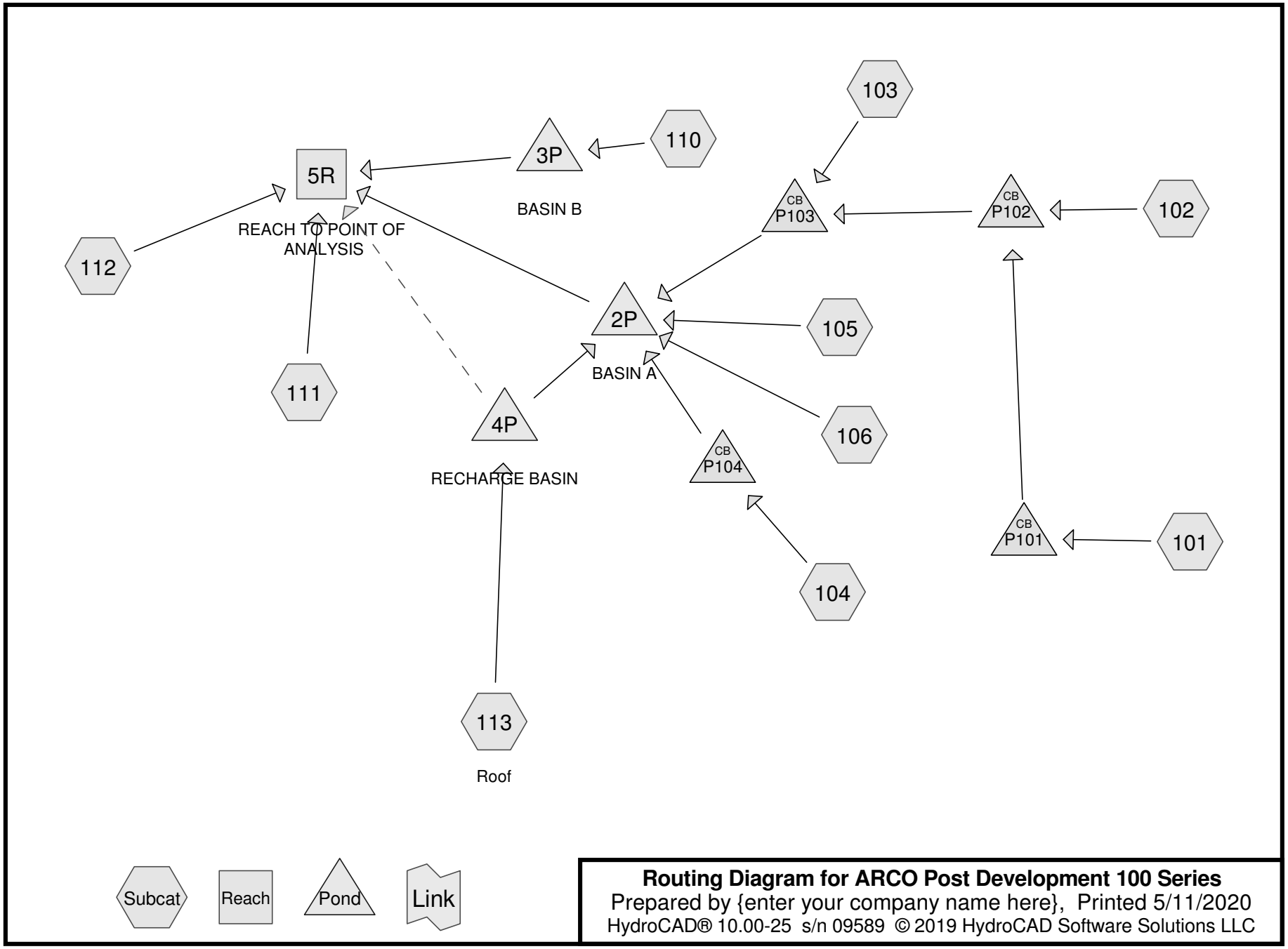
SOIL MAPS

FLOOD MAP



Routing Diagram for ARCO Pre-Development

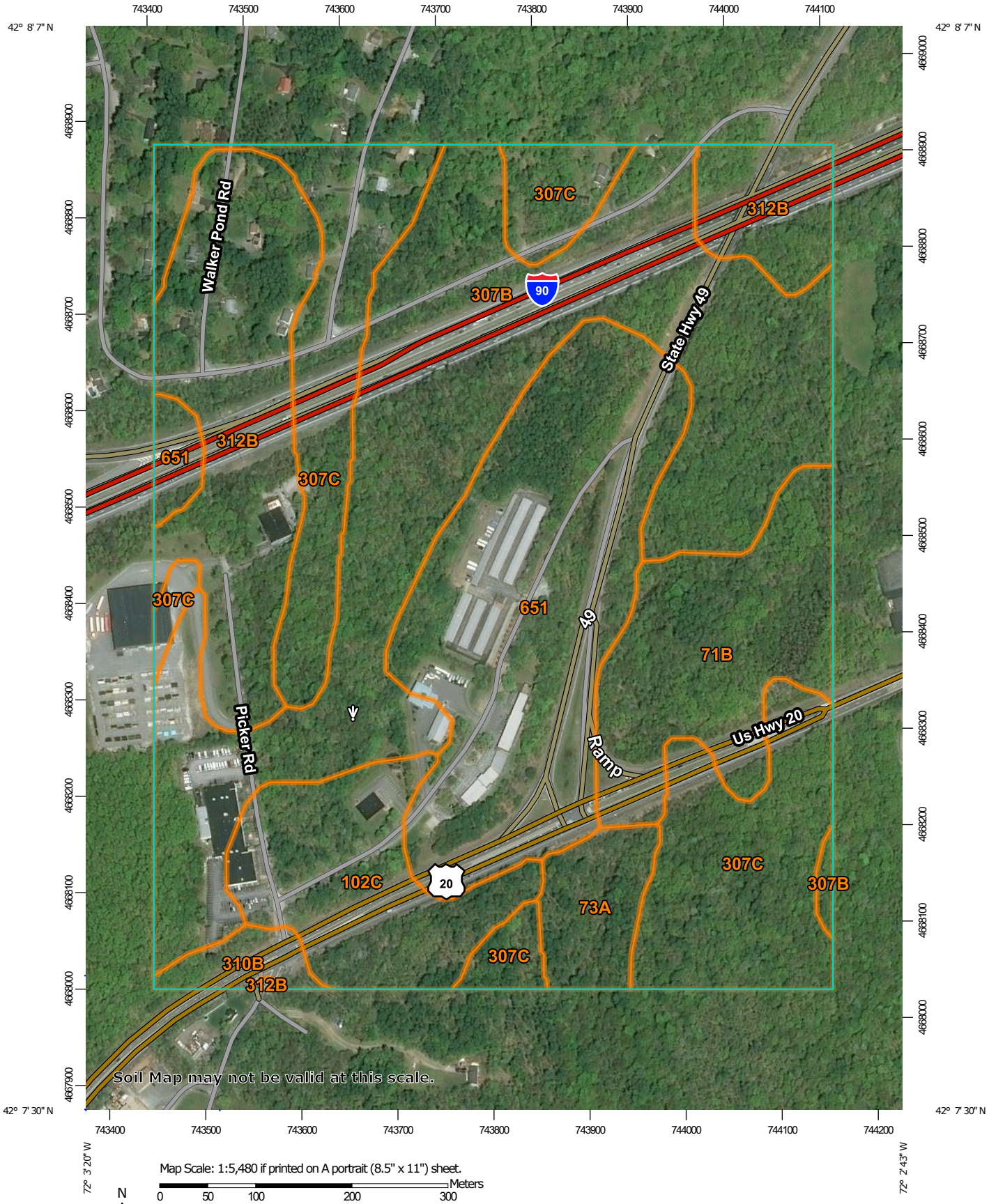
Prepared by {enter your company name here}, Printed 5/11/2020



Routing Diagram for ARCO Post Development 100 Series

Prepared by {enter your company name here}, Printed 5/11/2020

Soil Map—Worcester County, Massachusetts, Southern Part



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 12, Sep 12, 2019

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

Date(s) aerial images were photographed: May 18, 2019—Jul 9, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	13.7	8.9%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	4.1	2.7%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	11.4	7.4%
307B	Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony	44.1	28.7%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	28.5	18.5%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	1.9	1.2%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	21.9	14.2%
651	Udorthents, smoothed	28.1	18.3%
Totals for Area of Interest		**153.6**	**100.0%**

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-15

Page 1 of 1

Project:	Proposed Cold Storage Facility	**WAI Project No.:**	GM2017067.000
Location:	Six Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC
Surface Elevation:	± 731.0 feet above NAVD88	**Date Started:**	3/18/2020
Termination Depth:	7.5 feet bgs	**Date Completed:**	3/18/2020
Proposed Location:	SWM Area (Stake 702)	**Logged By:**	DC
Drill / Test Method:	HSA / SPT	**Contractor:**	SK
		Equipment:	CME 850

Water Depth | Elevation	(feet bgs) | (ft NAVD88)	Cave-In Depth | Elevation	(feet bgs) | (ft NAVD88)
During:	-- | --		
At Completion:	-- | --	At Completion:	– | –
24 Hours:	-- | --	24 Hours:	– | –

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1		2 - 2 - 2 - 2	8	4		TS		3" Forest Mat	
							SUBSOIL		7" Sandy Subsoil	
2 - 4	S-2		9 - 45 - 51 - 47	17	96		GLACIAL TILL		Brown, Very Loose to Loose, Silty Sand with Gravel (SM)	
						5.0			As Above, Very Dense (SM)	
5 - 6.5	S-3		13 - 46 - 61	14	>100				As Above (SM)	
									Boring Log B-15 Terminated upon Auger Refusal at a Depth of 7.5 Feet Below Ground Surface.	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-16

Page 1 of 1

Project:	Proposed Cold Storage Facility	**WAI Project No.:**	GM2017067.000
Location:	Six Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC

				Water Depth | Elevation (feet bgs) | (ft NAVD88)	Cave-In Depth | Elevation (feet bgs) | (ft NAVD88)
Surface Elevation:	± 739.0 feet above NAVD88	**Date Started:**	3/13/2020		
Termination Depth:	3.5 feet bgs	**Date Completed:**	3/13/2020		
Proposed Location:	Roadway (Stake 716)	**Logged By:**	DC	**During:** -- | --	
Drill / Test Method:	HSA / SPT	**Contractor:**	SK	**At Completion:** -- | --	**At Completion:** – | –
		Equipment:	CME 850	**24 Hours:** -- | --	**24 Hours:** – | –

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
0 - 2	S-1	X	1 - 2 - 3 - 17	16	5		TS		6" Forest Mat	
							SUBSOIL		8" Sandy Subsoil	
							GLACIAL TILL		Brown, Loose, Silty Sand with Gravel (SM)	
										Auger refusal @ 3.3 fbgs
										Offset 10 feet N
									Boring Log B-16 Terminated upon Auger Refusal at a Depth of 3.5 Feet Below Ground Surface.	
						5.0				
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-19

Page 1 of 1

Project:	Proposed Cold Storage Facility	**WAI Project No.:**	GM2017067.000
Location:	Six Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC
Surface Elevation:	± 719.0 feet above NAVD88	**Date Started:**	3/18/2020
Termination Depth:	3.8 feet bgs	**Date Completed:**	3/18/2020
Proposed Location:	Roadway (Stake 700)	**Logged By:**	DC
Drill / Test Method:	HSA / SPT	**Contractor:**	SK
		Equipment:	CME 850

Water Depth | Elevation	(feet bgs) | (ft NAVD88)	Cave-In Depth | Elevation	(feet bgs) | (ft NAVD88)
During:	-- | --		
At Completion:	-- | --	**At Completion:**	– | –
24 Hours:	-- | --	**24 Hours:**	– | –

SAMPLE INFORMATION						DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)				
						0.0				
							TS		4" Topsoil	Bedrock outcrops nearby
							GLACIAL TILL		Brown, Silty Sand with Gravel (SM)	
						5.0			Boring Log B-19 Terminated upon Auger Refusal at a Depth of 3.8 Feet Below Ground Surface.	
						10.0				
						15.0				
						20.0				
						25.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-1

Page 1 of 1

Project:	Proposed Industrial Facility	**WAI Project No.:**	GM2017067.000
Location:	6 Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC

				Water Depth (feet bgs)	Elevation (ft NAVD88)	Cave-In Depth (feet bgs)	Elevation (ft NAVD88)
Surface Elevation:	± 734.0 feet NAVD88	**Date Started:**	3/16/2020				
Termination Depth:	4.0 feet bgs	**Date Completed:**	3/16/2020				
Proposed Location:	SWM Area	**Logged By:**	DC	**During:**	– | –		
Excavating Method:	Compact Excavator	**Contractor:**	CH	**At Completion:**	– | –	**At Completion:**	– | –
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB235	**24 Hours:**	– | –		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TS		8" Forest Mat	
				SUBSOIL		7" Sandy Subsoil	
				GLACIAL TILL		Brown, Silty Sand with Gravel, Cobbles, Small Boulders (SM)	
3 - 4	S-1	GRAB					
						Test Pit TP-1 Terminated upon Refusal at Depth of 4 Feet Below Ground Surface.	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-2

Page 1 of 1

Project:	Proposed Industrial Facility	**WAI Project No.:**	GM2017067.000
Location:	6 Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC

				Water Depth (feet bgs)	Elevation (ft NAVD88)	Cave-In Depth (feet bgs)	Elevation (ft NAVD88)
Surface Elevation:	± 731.0 feet NAVD88	**Date Started:**	3/16/2020				
Termination Depth:	3.8 feet bgs	**Date Completed:**	3/16/2020				
Proposed Location:	SWM Area	**Logged By:**	DC	**During:**	– | –		
Excavating Method:	Compact Excavator	**Contractor:**	CH	**At Completion:**	– | –	**At Completion:**	– | –
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB235	**24 Hours:**	– | –		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TS		5" Forest Mat	
				SUBSOIL		6" Sandy Subsoil	
				GLACIAL TILL		Brown, Silty Sand with Gravel, Cobbles (SM)	
2.5 - 3.5	S-1	GRAB					
						Test Pit TP-2 Terminated upon Refusal at Depth of 3.8 Feet Below Ground Surface.	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-3

Page 1 of 1

Project:	Proposed Industrial Facility	**WAI Project No.:**	GM2017067.000
Location:	6 Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC

				Water Depth (feet bgs)	Elevation (ft NAVD88)	Cave-In Depth (feet bgs)	Elevation (ft NAVD88)
Surface Elevation:	± 724.0 feet NAVD88	**Date Started:**	3/16/2020				
Termination Depth:	2.8 feet bgs	**Date Completed:**	3/16/2020				
Proposed Location:	SWM Area	**Logged By:**	DC	**During:**	– / –		
Excavating Method:	Compact Excavator	**Contractor:**	CH	**At Completion:**	2.0 / 722.0	**At Completion:**	– / –
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB235	**24 Hours:**	– / –		

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TS		10" Forest Mat	
				SUBSOIL		6" Sandy Subsoil	
1.5 - 2.5	S-1	GRAB		GLACIAL TILL		Brown, Silty Sand with Gravel, Cobbles (SM)	
						Test Pit TP-3 Terminated upon Refusal at Depth of 2.8 Feet Below Ground Surface.	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE ASSOCIATES, INC.

RECORD OF SUBSURFACE EXPLORATION

Test Pit No.: TP-4

Page 1 of 1

Project:	Proposed Industrial Facility	**WAI Project No.:**	GM2017067.000
Location:	6 Picker Road, Sturbridge, Worcester County, Massachusetts	**Client:**	Mid-Cape Development LLC

Surface Elevation:	± 716.0 feet NAVD88	**Date Started:**	3/16/2020		**Water Depth (feet bgs)**	**Elevation (ft NAVD88)**	**Cave-In Depth (feet bgs)** / **Elevation (ft NAVD88)**
Termination Depth:	3.0 feet bgs	**Date Completed:**	3/16/2020				
Proposed Location:	SWM Area	**Logged By:**	DC	**During:**	–	–	
Excavating Method:	Compact Excavator	**Contractor:**	CH	**At Completion:**	3.0	713.0	**At Completion:** – / –
Test Method:	Visual Observation	**Rig Type:**	Takeuchi TB235	**24 Hours:**	–	–	

SAMPLE INFORMATION			DEPTH	STRATA		DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (ft.)	Number	Type	(feet)				
			0.0				
				TS		8" Forest Mat	
				SUBSOIL		6" Sandy Subsoil	
				GLACIAL TILL		Brown, Silty Sand with Gravel, Cobbles (SM)	
2 - 3	S-1	GRAB					
						Test Pit TP-4 Terminated upon Refusal at Depth of 3 Feet Below Ground Surface.	
			5.0				
			10.0				
			15.0				

NOTES: bgs = below ground surface, msl = mean sea level, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

National Flood Hazard Layer FIRMette

FEMA

42°7'55.85"N

72°3'31.67"W

72°2'54.21"W

42°7'29.16"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

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

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

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

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/11/2020 at 1:22:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

MASSACHUSETTS TURNPIKE (ROUTE 90)
(PUBLIC VARIABLE WIDTH)

PODUNK TURNPIKE (ROUTE 49)
(PUBLIC VARIABLE WIDTH)

TECHNOLOGY PARK ROAD

PICKER ROAD (PRIVATE ROAD)

EXISTING 8" RCP & DRAINAGE MANHOLE FOR DISCHARGE FROM SITE

EX. CHAIN LINK FENCE

B-22 LEDGE @ 18.8'
B-10 LEDGE @ 2.8'
B-16 LEDGE @ 5.5'
B-5 LEDGE @ 5.8'
B-11 LEDGE @ 4.8'
B-21 LEDGE @ 6.0'
B-12 LEDGE @ 4.0'
B-6 LEDGE @ 6.0'
B-13 LEDGE @ 5.5'
B-1 LEDGE @ 11.0' REF @ 16.3'
B-7 LEDGE @ 2.3'
B-4 LEDGE @ 9.0'
B-17 LEDGE @ 8.0'
B-14 LEDGE @ 7.0'
B-8 LEDGE @ 10.3'
B-20 LEDGE @ 9.0'
B-18 LEDGE @ 8.8'
B-3 LEDGE @ 8.0'
B-15 LEDGE @ 7.5'
B-9 LEDGE @ 10.0'
TP-4 H20 @ 3.0' REF @ 3.0'
TP-3 H20 @ 2.0' REF @ 2.8'
B-19 LEDGE @ 3.8'
TP-2 NO H20 REF @ 3.8'
B-2 LEDGE @ 8.0'
TP-1 NO H20 REF @ 4.0'

1
2
3

DRAINAGE ANALYSIS LEGEND

100 SUBCATCHMENT
110 REACH
120 POND
WATERSHED BOUNDARY

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.

PRE-DEVELOPMENT CONDITION

REVISIONS

SUMMIT
Engineering & Survey, Inc.
710 MAIN STREET
NORTH OXFORD, MA 01537
P:(508) 987-8703 F:(508) 987-8704

WATERSHED CONDITIONS PLAN
at
6 PICKER ROAD
STURBRIDGE, MA
PREPARED FOR
ARCO, INC.

SCALE:	1" = 60'
DATE:	MAY 11, 2020
JOB NO:	20-122
PLAN NO:	20-122 DRAINAGE
SHEET NO:	1 OF 2

MASSACHUSETTS TURNPIKE (ROUTE 90)
(PUBLIC VARIABLE WIDTH)

PODUNK TURNPIKE (ROUTE 49)
(PUBLIC VARIABLE WIDTH)

PICKER ROAD (PRIVATE WAY)

TECHNOLOGY PARK ROAD

8P
P102
200
102
300
101
P101
201
103
P103
5R
112
3P
BASIN B
110
105
113
2P
BASIN A
104
106
P104
4P
111
112

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

DRAINAGE ANALYSIS LEGEND

100 SUBCATCHMENT

110 REACH

120 POND

WATERSHED BOUNDARY

POST-DEVELOPMENT CONDITION

REVISIONS

SUMMIT
Engineering & Survey, Inc.
710 MAIN STREET
NORTH OXFORD, MA 01537
P:(508) 987-8703 F:(508) 987-8774

WATERSHED CONDITIONS PLAN
at
6 PICKER ROAD
STURBRIDGE, MA

PREPARED FOR
ARCO, INC.

SCALE:	1" = 60'
DATE:	MAY 11, 2020
JOB NO:	20-122
PLAN NO:	20-122 DRAINAGE
SHEET NO:	2 OF 2