EXISTING GRADE, INC.

Land Surveyors - Civil Engineers

Storm Water Drainage Report

for

710 Main Street
Four (4) Proposed Duplex Structures
Site Development

Leicester, Massachusetts

Prepared for:

Rapid Transit, LLC
1 Sherri Lane
Leicester, Massachusetts 01524

Prepared by:

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January 23, 2019

EGI Project No. 1785

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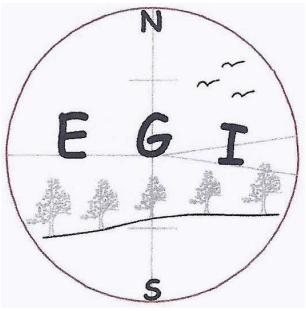

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2. Introduction

Project Summary

The proponent, Rapid Transit, LLC, proposes to construct four (4) new single family residential duplex structures on the current property located at adjacent to 710 Main Street, Leicester MA. The proposed project will include the selective clearing and grubbing of development areas; a proposed bituminous concrete driveway with 1' crushed stone drip edge, and a two family (duplex) residential structure to be serviced by Town water and sewer for each lot. Onsite storm water management infrastructures will be inclusive of a Cultec® stormwater infiltration device to manage and infiltrate each structure's roof runoff as well as gravel drip edge along the entire length of each driveway. The proposed project will be conducted per the Massachusetts Department of Environmental Protection requirements, Local Town and State bylaws, as well as using best management practices.

The property is comprised of two parcels (not currently updated with the Town of Leicester Assessing Maps due to recent subdivision). The recorded parcel is shown as lot 8, block A, on Assessors Map 21B and appears to lie within the Business (B) zoning district based upon a review of the most recent Town of Leicester Zoning Map. The Parcel and is located within the FEMA Flood Zone X Area based upon a review of FIRM Map 25027C0782E, Panel 782 of 1075; last revised July 04, 2011. Currently there is overhead electric telephone/cable to service the property as well as municipal water and sewer.

The property's address is recorded as 710 Main Street, Leicester MA and abuts Main Street (Route 9) to the West with Town owned land to the North and privately owned land to the East and South. Access to the site is proposed via a driveway for each proposed structure via Main Street to the West. The existing site is comprised of a mix of wooded areas with one delineated wetland boundary to the East within the parcel.

The Worcester County Soil Survey, issued by the US Department of Agriculture was referenced to determine the type and hydrologic group of the soils located on the property. The property is comprised of mostly hydrologic soil group B, C, and D type soils.

Pre- and Post-Development Analysis

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

for post-development conditions were created and one point of comparison, or Design Point, was analyzed. The Design Point as well as the Watershed areas and associated time of concentration paths (Tc), are shown on the pre and post-development watershed plans, which are located in an appendix to this report.

The pre- and post development conditions were analyzed for the 2, 10, 25 and 100-year Type III storm events. The rainfall intensities used for each storm event were taken from the latest Atlas-14 rainfall data as published by NCRS (provided by Hydrocad), and are shown in the table below.

Storm Event	***Intensity (24-hr Duration (in)***
2-year	3.13
10-year	4.68
25-year	5.88
100-year	8.34

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

3. Compliance with Storm Water Management Standards

Standard 1: No New Untreated Discharges

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

Standard 2: Peak Rate Attenuation

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

	Design Point	
Storm Event	***Pre-Development***	***Post-Development***
2-year	0.84 cfs	0.93 cfs
10-year	3.20 cfs	3.05 cfs
25-year	5.44 cfs	5.09 cfs
100-year	10.69 cfs	9.63 cfs

As shown in the tables above, the peak rates of storm water runoff generated under post-development conditions will be equal or less than the peak rates generated under pre-development conditions except for the 2-year storm event.

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

Standard 3: Groundwater Recharge

The groundwater recharge volume will be maximized for the development and will be achieved through the proposed gravel drip edge and subsurface infiltration. Refer to Appendix C for all Groundwater Recharge Calculations.

Standard 4: Water Quality

The storm water management system was designed with treatment trains consisting of Cultec® infiltration units as well as gravel drip-edges along the proposed driveway to facilitate the maximum extent practical removal of Total Suspended Solids (TSS). The Total Suspended Solids (TSS) removal calculations are provided in Appendix C.

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

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

Standard 6: Critical Areas

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

The Operation and Maintenance Plan is provided in Appendix E.

Standard 10: Prohibition of Illicit Discharges

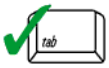
There are no illicit discharges anticipated for the proposed development however measures to prevent illicit discharges will be included within the Long-Term Pollution Prevention Plan. Also, as required, an Illicit Discharge Compliance Statement will be submitted prior to the discharge of any storm water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

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

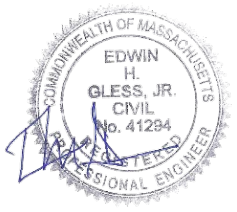
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☒ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

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.

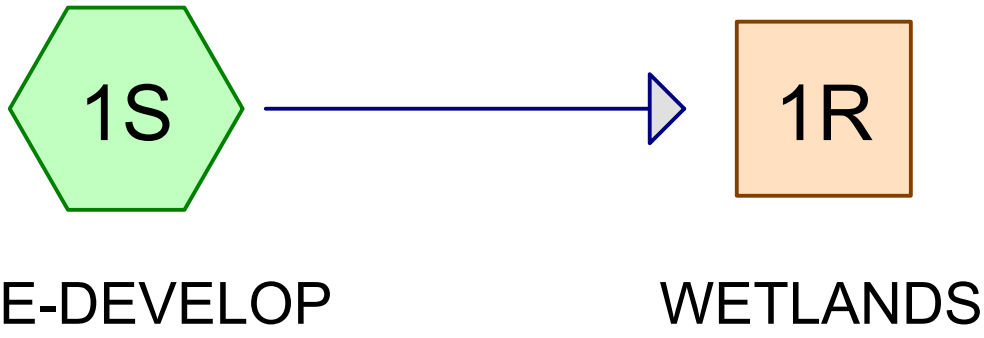
Standard 10: Prohibition of Illicit Discharges

☐ 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.

APPENDIX A



Subcat Reach Pond Link

Routing Diagram for 1785_PRE
Prepared by {enter your company name here}, Printed 1/23/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.054	96	Gravel surface, HSG B (1S)
0.067	98	Roofs, HSG B (1S)
1.968	55	Woods, Good, HSG B (1S)
1.198	70	Woods, Good, HSG C (1S)
3.286	**62**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.054	0.000	0.000	0.000	0.054	Gravel surface	1S
0.000	0.067	0.000	0.000	0.000	0.067	Roofs	1S
0.000	1.968	1.198	0.000	0.000	3.165	Woods, Good	1S
0.000	**2.089**	**1.198**	**0.000**	**0.000**	**3.286**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PRE-DEVELOP Runoff Area=143,151 sf 2.04% Impervious Runoff Depth>0.45"
Flow Length=385' Tc=12.8 min CN=62 Runoff=0.84 cfs 0.123 af

Reach1R: WETLANDS Inflow=0.84 cfs 0.123 af
Outflow=0.84 cfs 0.123 af

Total Runoff Area = 3.286 ac Runoff Volume = 0.123 af Average Runoff Depth = 0.45"
97.96% Pervious = 3.219 ac 2.04% Impervious = 0.067 ac

Summary for Subcatchment 1S: PRE-DEVELOP

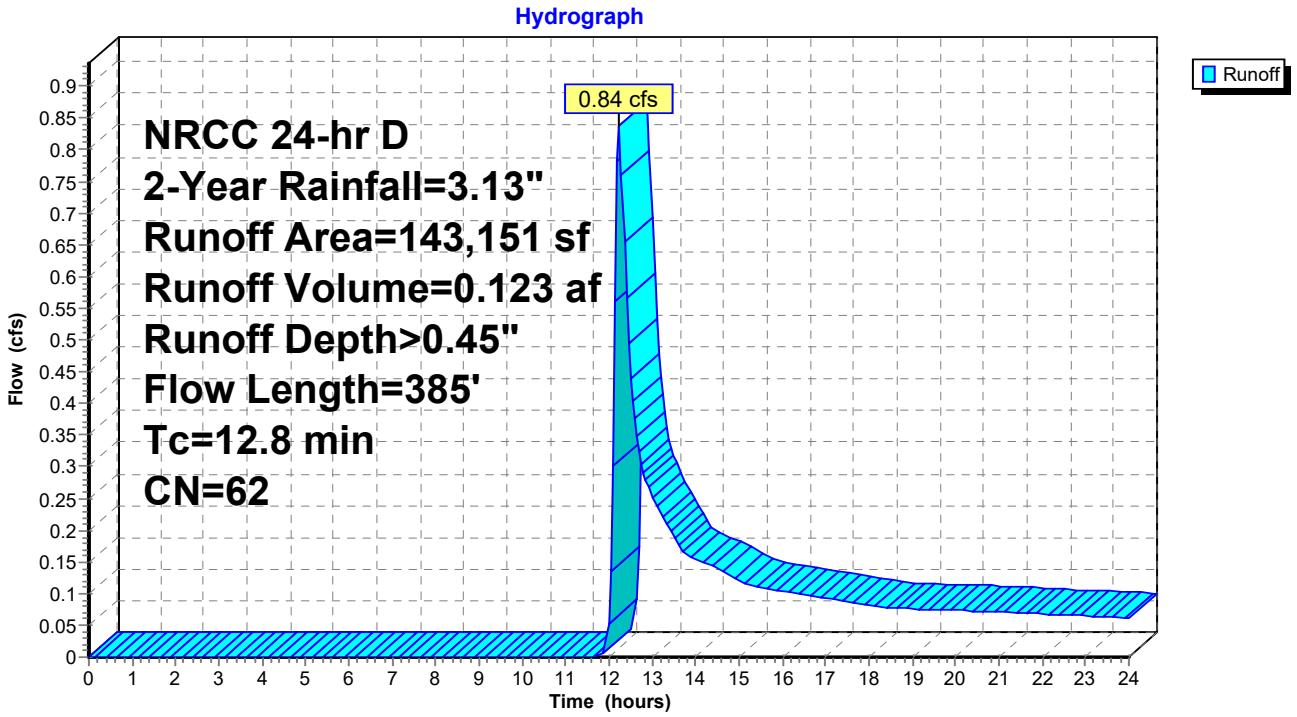
Runoff = 0.84 cfs @ 12.25 hrs, Volume= 0.123 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
85,711	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
143,151	62	Weighted Average
140,228		97.96% Pervious Area
2,923		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.13"
2.7	189	0.0529	1.15		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.1	19	0.5300	3.64		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.4	127	0.0866	1.47		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
12.8	385	Total			

Subcatchment 1S: PRE-DEVELOP

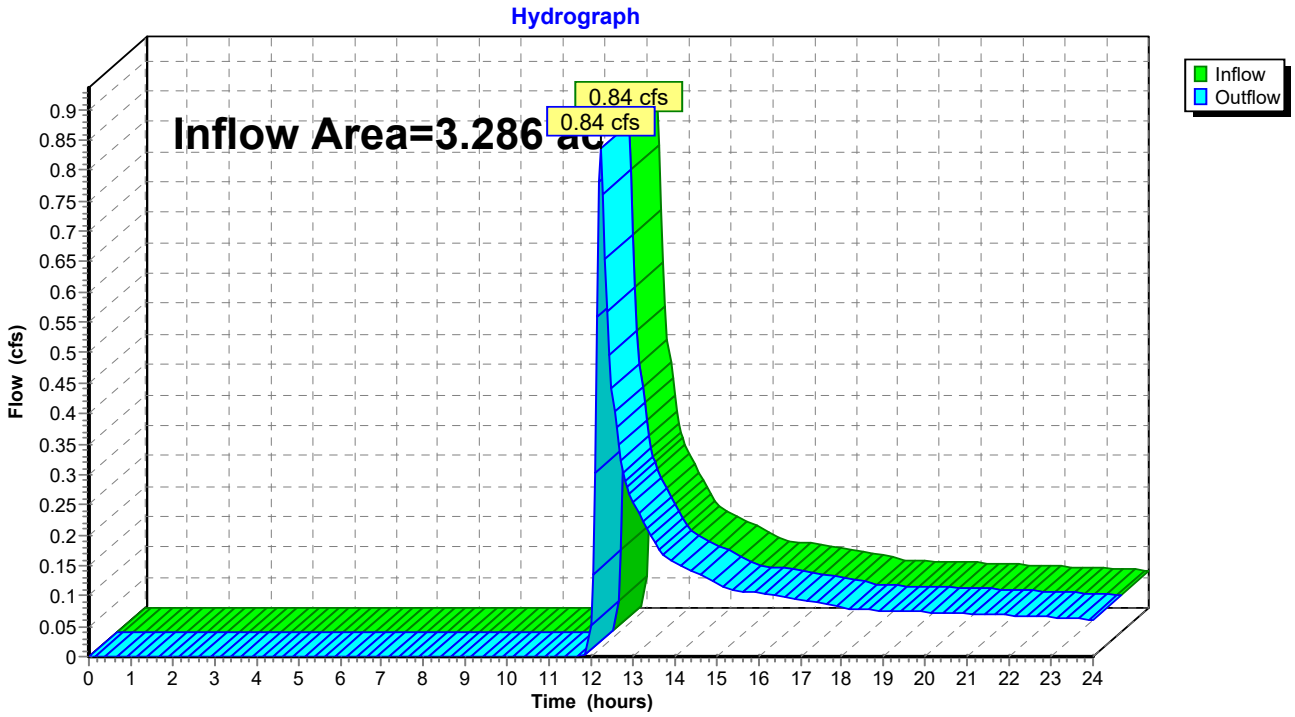


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 2.04% Impervious, Inflow Depth > 0.45" for 2-Year event
Inflow = 0.84 cfs @ 12.25 hrs, Volume= 0.123 af
Outflow = 0.84 cfs @ 12.25 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PRE-DEVELOP Runoff Area=143,151 sf 2.04% Impervious Runoff Depth>1.24"
Flow Length=385' Tc=12.8 min CN=62 Runoff=3.20 cfs 0.339 af

Reach1R: WETLANDS Inflow=3.20 cfs 0.339 af
Outflow=3.20 cfs 0.339 af

Total Runoff Area = 3.286 ac Runoff Volume = 0.339 af Average Runoff Depth = 1.24"
97.96% Pervious = 3.219 ac 2.04% Impervious = 0.067 ac

Summary for Subcatchment 1S: PRE-DEVELOP

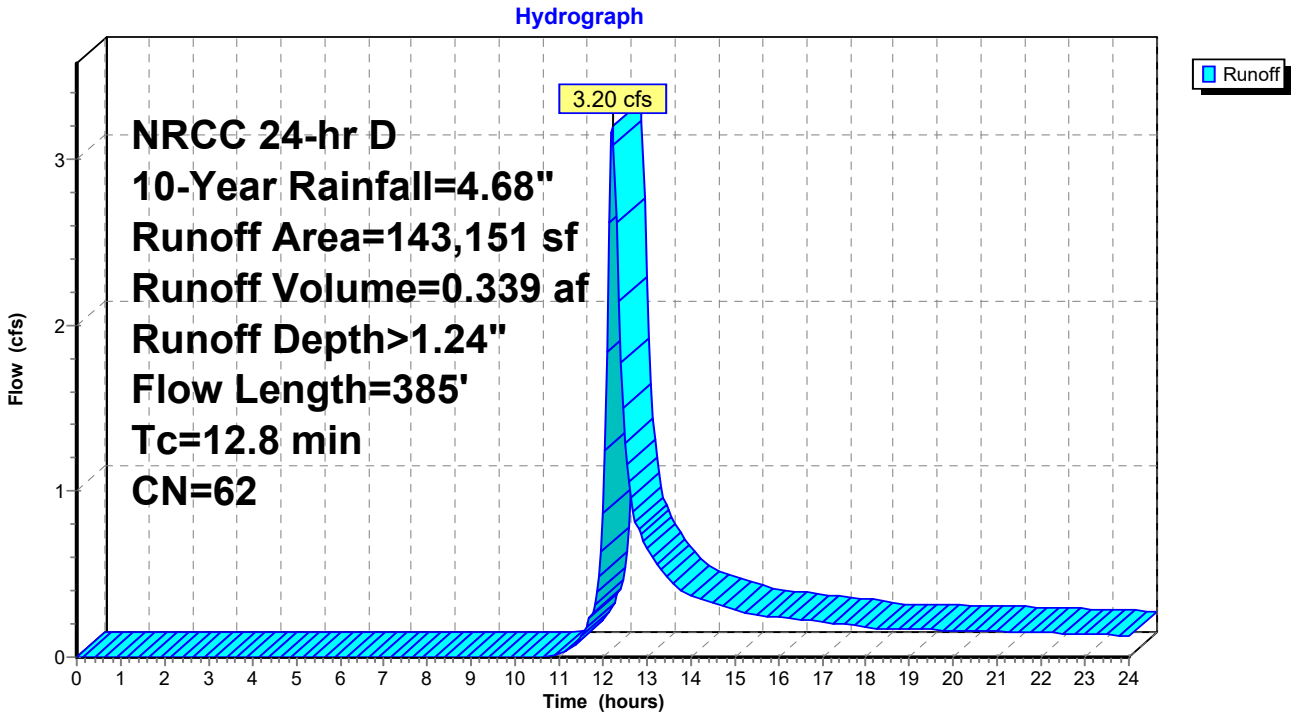
Runoff = 3.20 cfs @ 12.22 hrs, Volume= 0.339 af, Depth> 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
85,711	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
143,151	62	Weighted Average
140,228		97.96% Pervious Area
2,923		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.13"
2.7	189	0.0529	1.15		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.1	19	0.5300	3.64		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.4	127	0.0866	1.47		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
12.8	385	Total			

Subcatchment 1S: PRE-DEVELOP

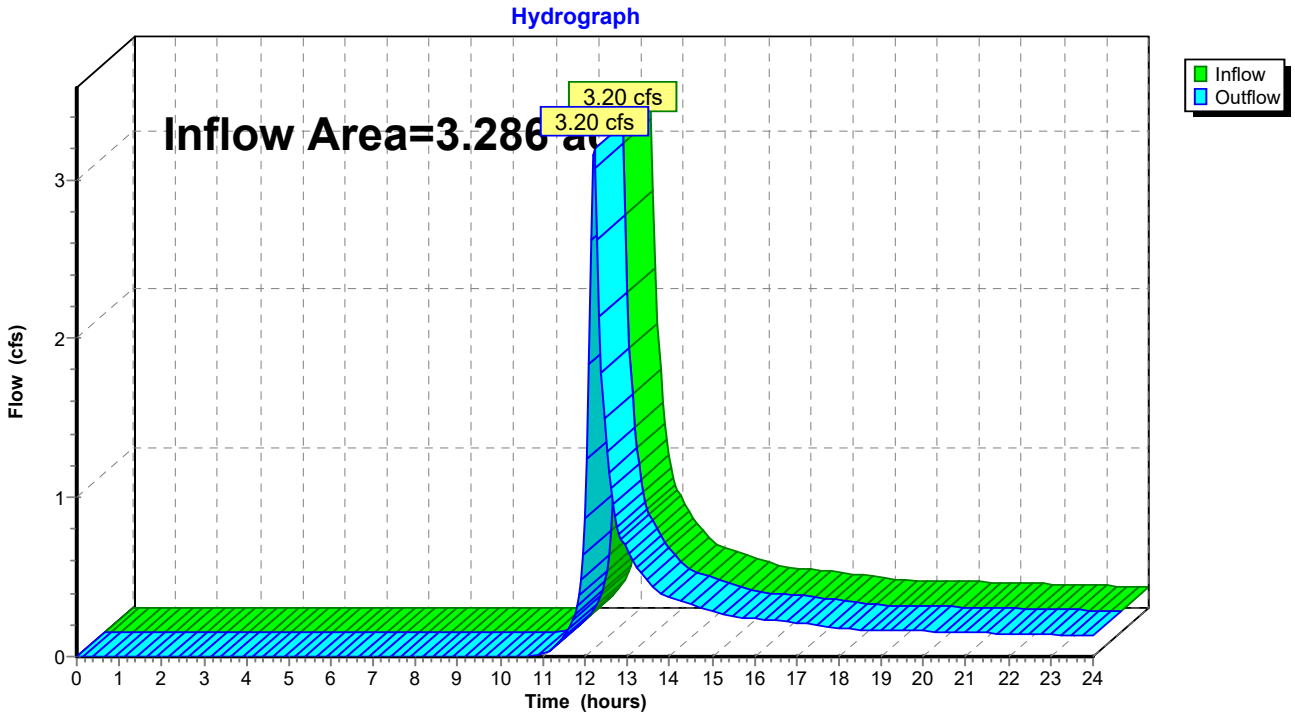


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 2.04% Impervious, Inflow Depth > 1.24" for 10-Year event
Inflow = 3.20 cfs @ 12.22 hrs, Volume= 0.339 af
Outflow = 3.20 cfs @ 12.22 hrs, Volume= 0.339 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PRE-DEVELOP Runoff Area=143,151 sf 2.04% Impervious Runoff Depth>2.00"
Flow Length=385' Tc=12.8 min CN=62 Runoff=5.44 cfs 0.547 af

Reach1R: WETLANDS Inflow=5.44 cfs 0.547 af
Outflow=5.44 cfs 0.547 af

Total Runoff Area = 3.286 ac Runoff Volume = 0.547 af Average Runoff Depth = 2.00"
97.96% Pervious = 3.219 ac 2.04% Impervious = 0.067 ac

Summary for Subcatchment 1S: PRE-DEVELOP

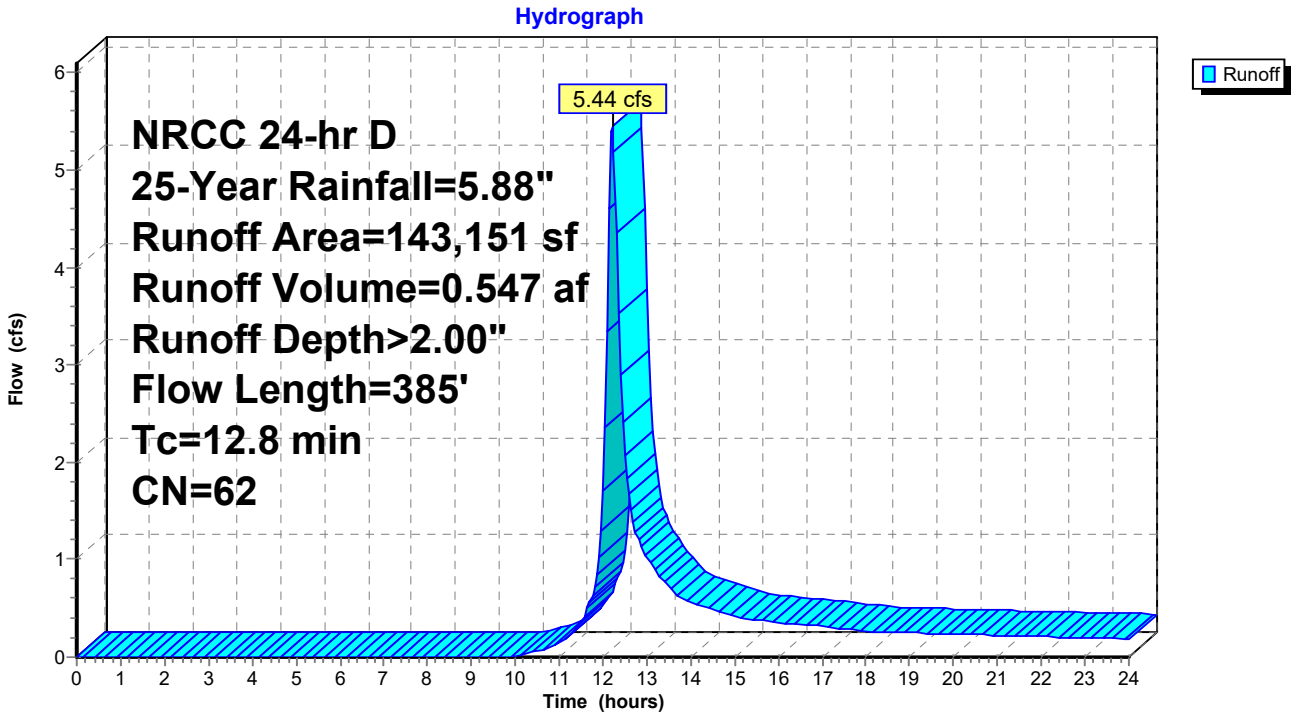
Runoff = 5.44 cfs @ 12.21 hrs, Volume= 0.547 af, Depth> 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.88"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
85,711	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
143,151	62	Weighted Average
140,228		97.96% Pervious Area
2,923		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.13"
2.7	189	0.0529	1.15		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.1	19	0.5300	3.64		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.4	127	0.0866	1.47		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
12.8	385	Total			

Subcatchment 1S: PRE-DEVELOP

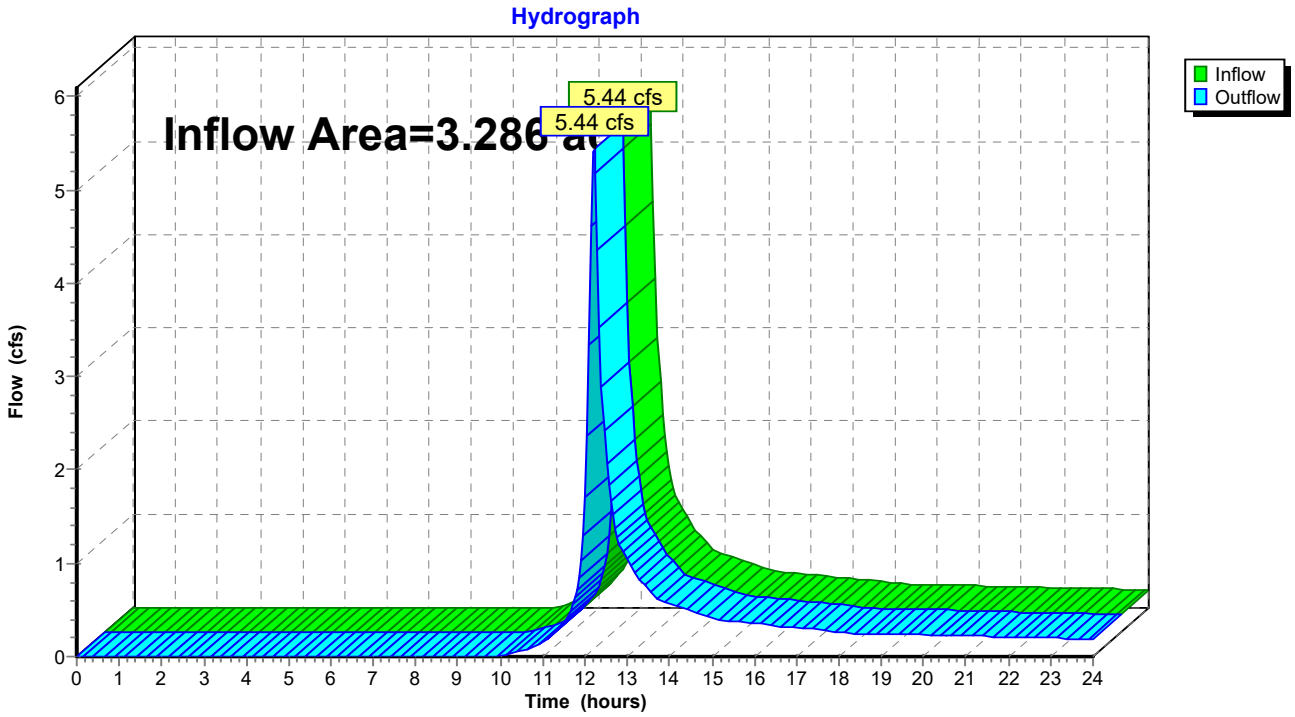


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 2.04% Impervious, Inflow Depth > 2.00" for 25-Year event
Inflow = 5.44 cfs @ 12.21 hrs, Volume= 0.547 af
Outflow = 5.44 cfs @ 12.21 hrs, Volume= 0.547 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: PRE-DEVELOP Runoff Area=143,151 sf 2.04% Impervious Runoff Depth>3.81"
Flow Length=385' Tc=12.8 min CN=62 Runoff=10.69 cfs 1.042 af

Reach1R: WETLANDS Inflow=10.69 cfs 1.042 af
Outflow=10.69 cfs 1.042 af

Total Runoff Area = 3.286 ac Runoff Volume = 1.042 af Average Runoff Depth = 3.81"
97.96% Pervious = 3.219 ac 2.04% Impervious = 0.067 ac

Summary for Subcatchment 1S: PRE-DEVELOP

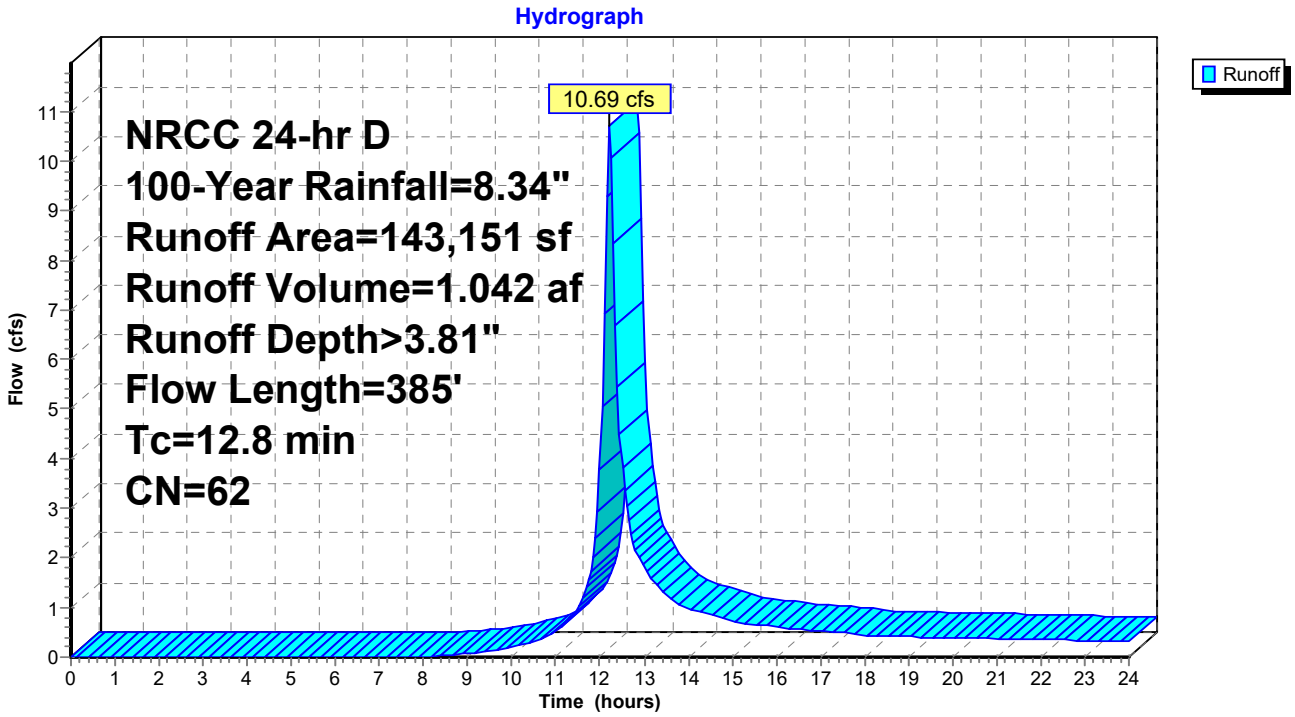
Runoff = 10.69 cfs @ 12.21 hrs, Volume= 1.042 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
85,711	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
143,151	62	Weighted Average
140,228		97.96% Pervious Area
2,923		2.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, SHEET** Woods: Light underbrush n= 0.400 P2= 3.13"
2.7	189	0.0529	1.15		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.1	19	0.5300	3.64		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
1.4	127	0.0866	1.47		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
12.8	385	Total			

Subcatchment 1S: PRE-DEVELOP

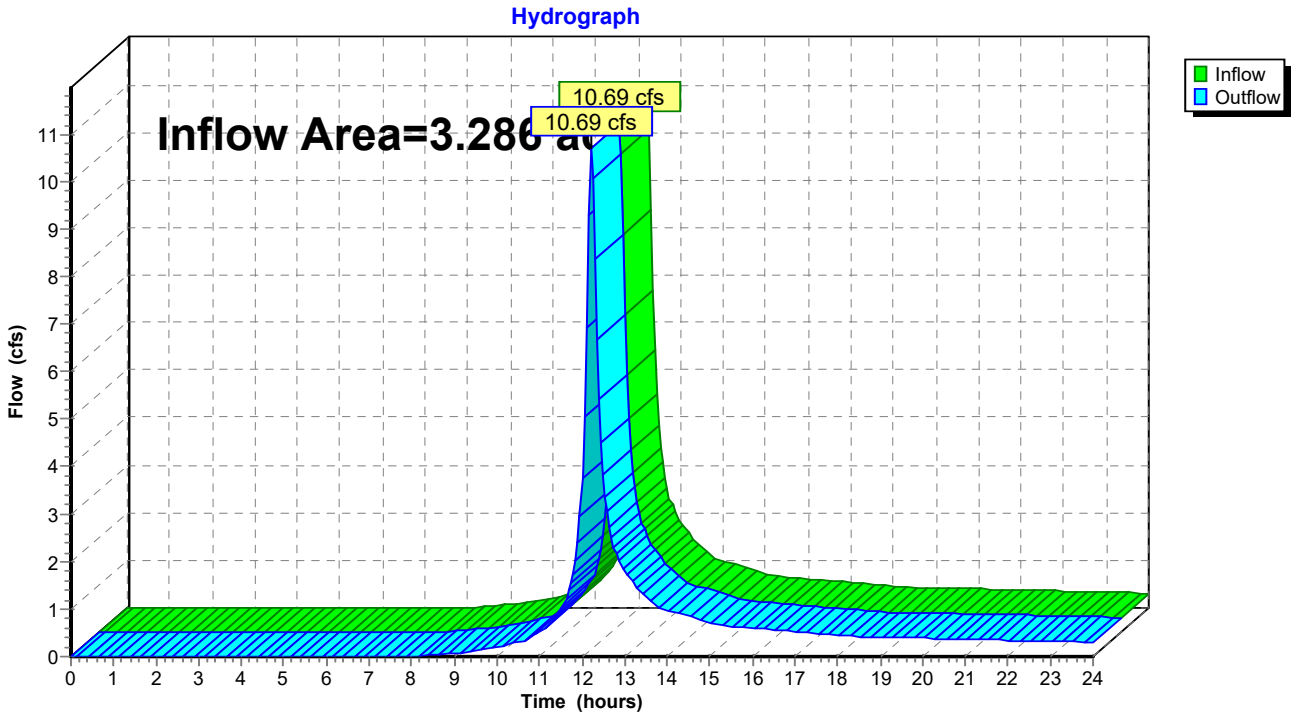


Summary for Reach 1R: WETLANDS

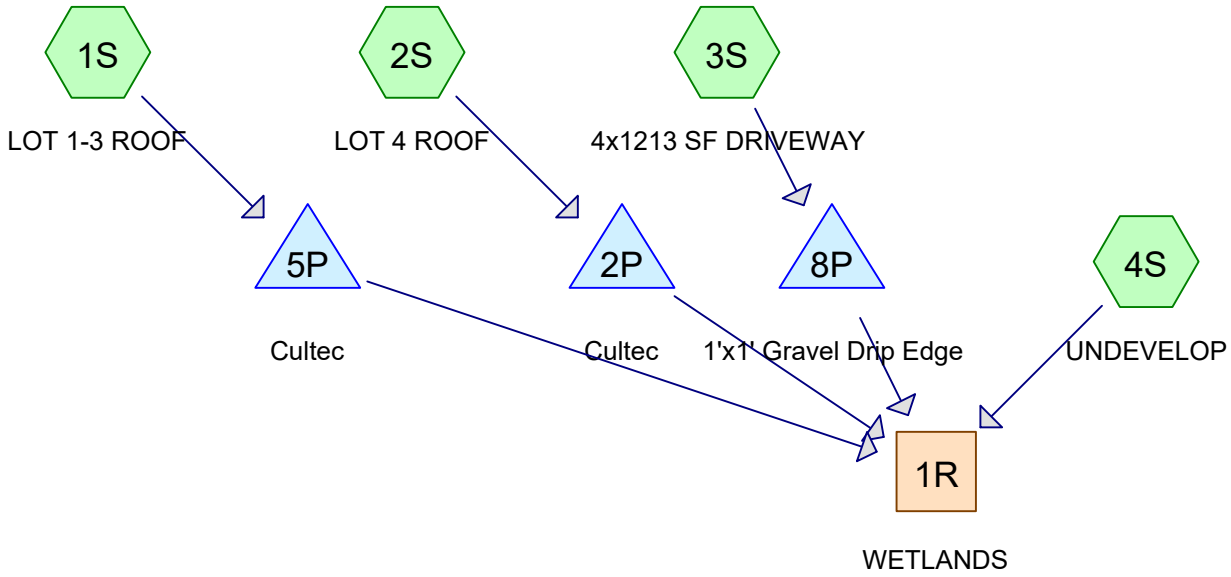
Inflow Area = 3.286 ac, 2.04% Impervious, Inflow Depth > 3.81" for 100-Year event
Inflow = 10.69 cfs @ 12.21 hrs, Volume= 1.042 af
Outflow = 10.69 cfs @ 12.21 hrs, Volume= 1.042 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



APPENDIX B



Subcat Reach Pond Link

Routing Diagram for 1785_POST
Prepared by {enter your company name here}, Printed 1/23/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.054	96	Gravel surface, HSG B (4S)
0.111	98	Paved parking, HSG A (3S)
0.212	98	Roofs, HSG B (1S, 4S)
0.048	98	Roofs, HSG C (2S)
1.663	55	Woods, Good, HSG B (4S)
1.198	70	Woods, Good, HSG C (4S)
3.286	**66**	**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.054	0.000	0.000	0.000	0.054	Gravel surface	4S
0.111	0.000	0.000	0.000	0.000	0.111	Paved parking	3S
0.000	0.212	0.048	0.000	0.000	0.260	Roofs	1S, 2S, 4S
0.000	1.663	1.198	0.000	0.000	2.861	Woods, Good	4S
0.111	**1.929**	**1.246**	**0.000**	**0.000**	**3.286**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: LOT 1-3 ROOF Runoff Area=6,300 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.035 af

Subcatchment2S: LOT 4 ROOF Runoff Area=2,100 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.13 cfs 0.012 af

Subcatchment3S: 4x1213SF DRIVEWAY Runoff Area=4,852 sf 100.00% Impervious Runoff Depth>2.89"
Tc=6.0 min CN=98 Runoff=0.30 cfs 0.027 af

Subcatchment4S: UNDEVELOP Runoff Area=129,899 sf 2.25% Impervious Runoff Depth>0.48"
Flow Length=372' Tc=16.5 min CN=63 Runoff=0.78 cfs 0.120 af

Reach1R: WETLANDS Inflow=0.93 cfs 0.136 af
Outflow=0.93 cfs 0.136 af

Pond2P: Cultec Peak Elev=852.11' Storage=279 cf Inflow=0.13 cfs 0.012 af
Discarded=0.00 cfs 0.003 af Primary=0.02 cfs 0.002 af Outflow=0.02 cfs 0.005 af

Pond5P: Cultec Peak Elev=845.58' Storage=450 cf Inflow=0.39 cfs 0.035 af
Discarded=0.04 cfs 0.035 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.035 af

Pond8P: 1'x1' Gravel Drip Edge Peak Elev=850.22' Storage=58 cf Inflow=0.30 cfs 0.027 af
Discarded=0.01 cfs 0.013 af Primary=0.26 cfs 0.013 af Outflow=0.27 cfs 0.027 af

Total Runoff Area = 3.286 ac Runoff Volume = 0.194 af Average Runoff Depth = 0.71"
88.70% Pervious = 2.915 ac 11.30% Impervious = 0.371 ac

Summary for Subcatchment 1S: LOT 1-3 ROOF

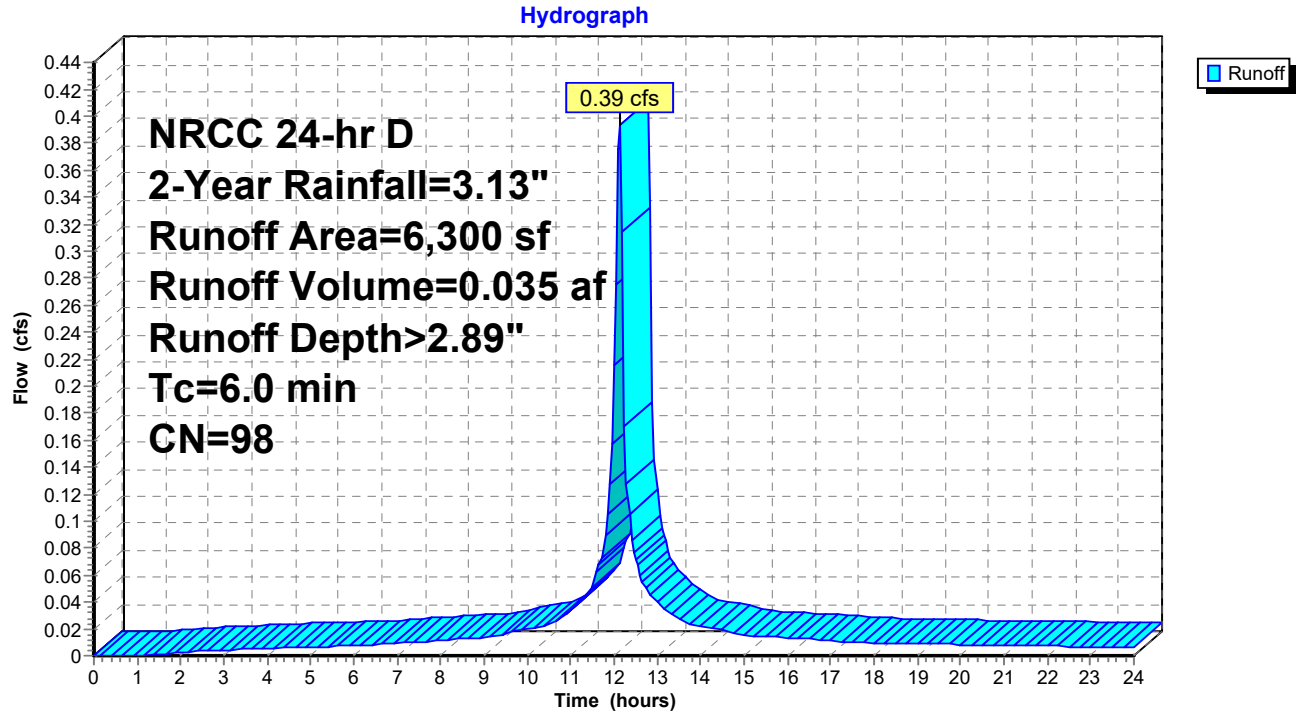
Runoff = 0.39 cfs @ 12.13 hrs, Volume= 0.035 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
6,300	98	Roofs, HSG B
6,300		100.00% Impervious Area

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

Subcatchment 1S: LOT 1-3 ROOF



Summary for Subcatchment 2S: LOT 4 ROOF

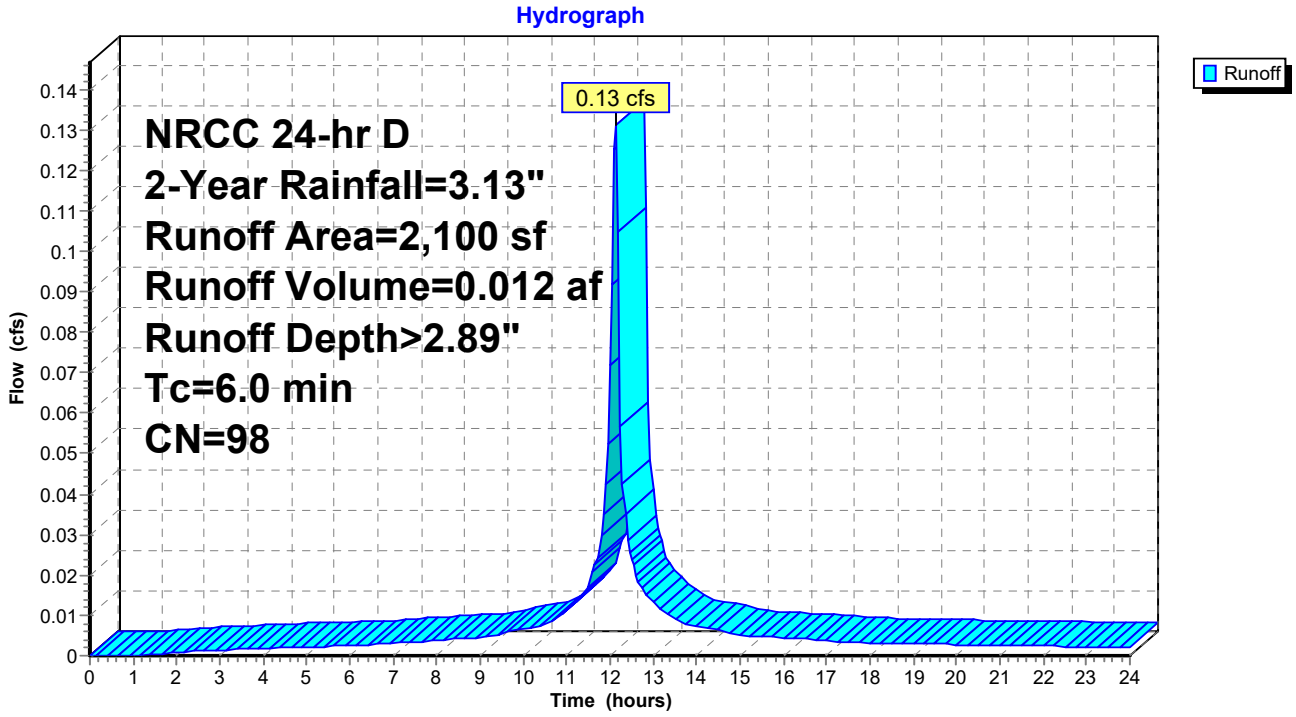
Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.012 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
2,100	98	Roofs, HSG C
2,100		100.00% Impervious Area

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

Subcatchment 2S: LOT 4 ROOF



Summary for Subcatchment 3S: 4x1213 SF DRIVEWAY

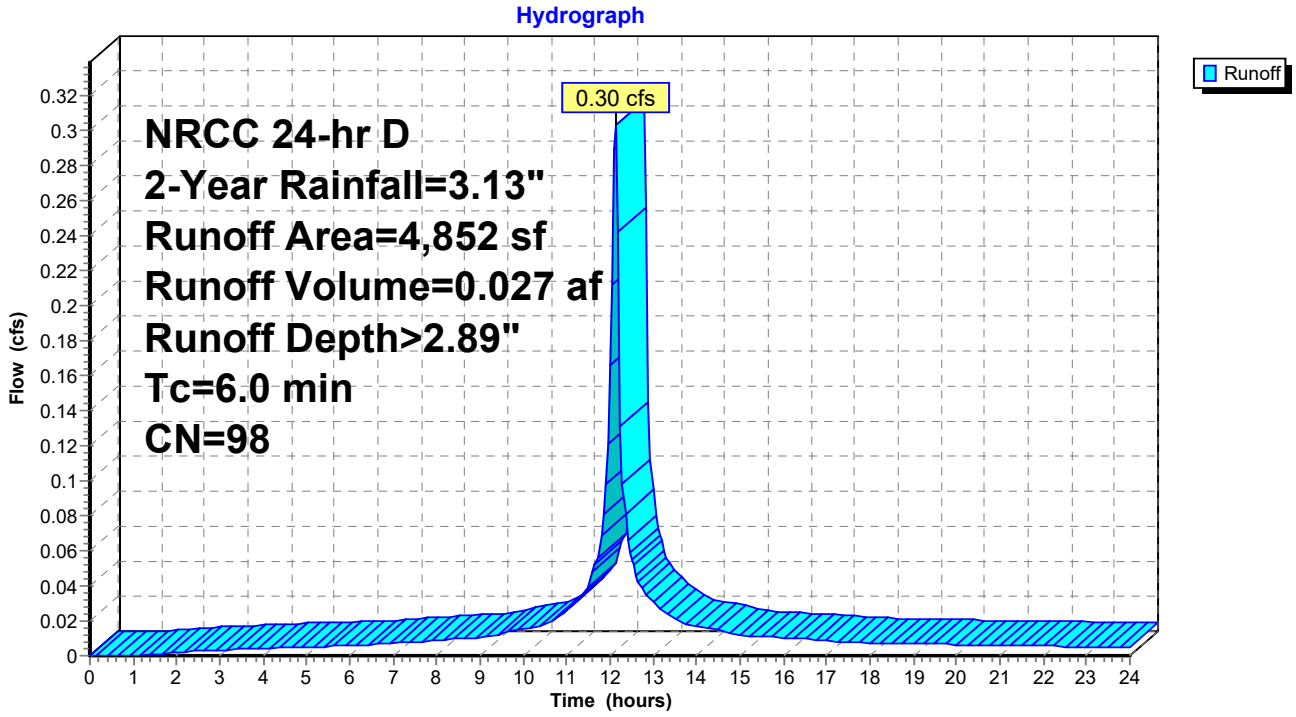
Runoff = 0.30 cfs @ 12.13 hrs, Volume= 0.027 af, Depth> 2.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
4,852	98	Paved parking, HSG A
4,852		100.00% Impervious Area

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

Subcatchment 3S: 4x1213 SF DRIVEWAY



Summary for Subcatchment 4S: UNDEVELOP

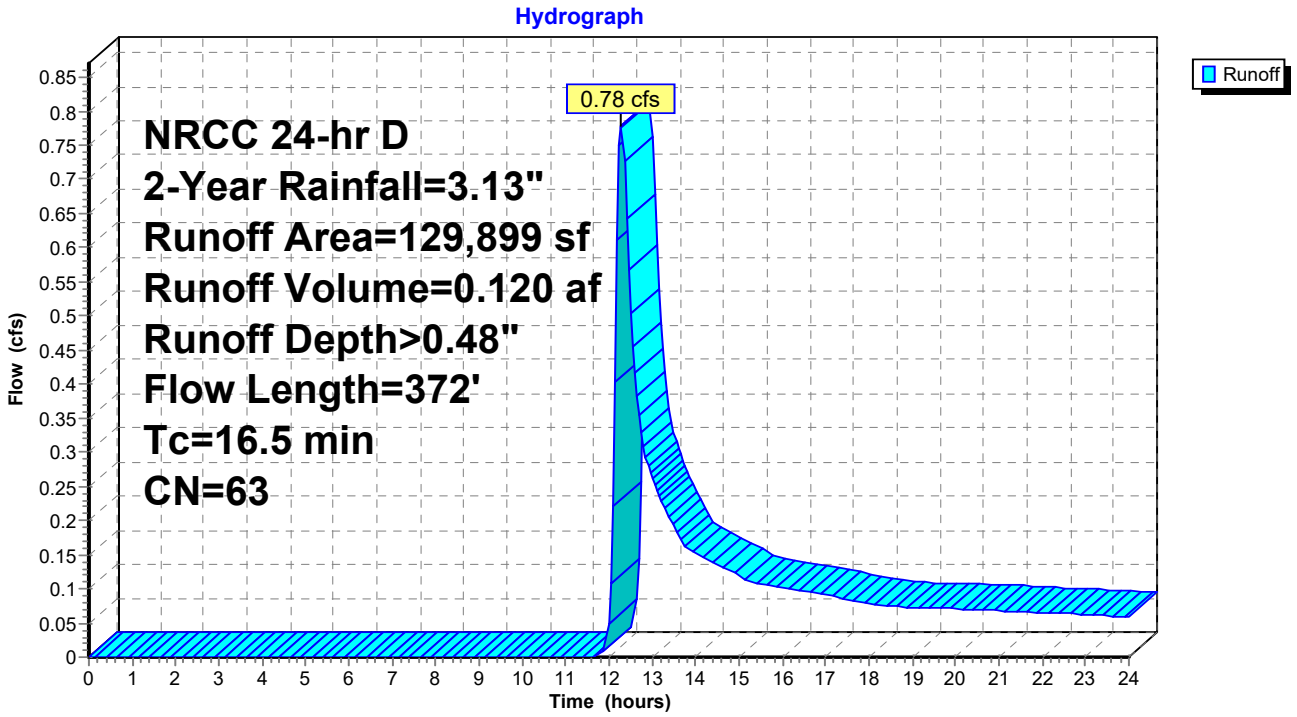
Runoff = 0.78 cfs @ 12.29 hrs, Volume= 0.120 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.13"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
72,459	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
129,899	63	Weighted Average
126,976		97.75% Pervious Area
2,923		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0290	0.08		**Sheet Flow, SHEET** Grass: Bermuda n= 0.410 P2= 3.13"
1.2	86	0.0600	1.22		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
3.6	167	0.0240	0.77		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.7	69	0.1200	1.73		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
16.5	372	Total			

Subcatchment 4S: UNDEVELOP

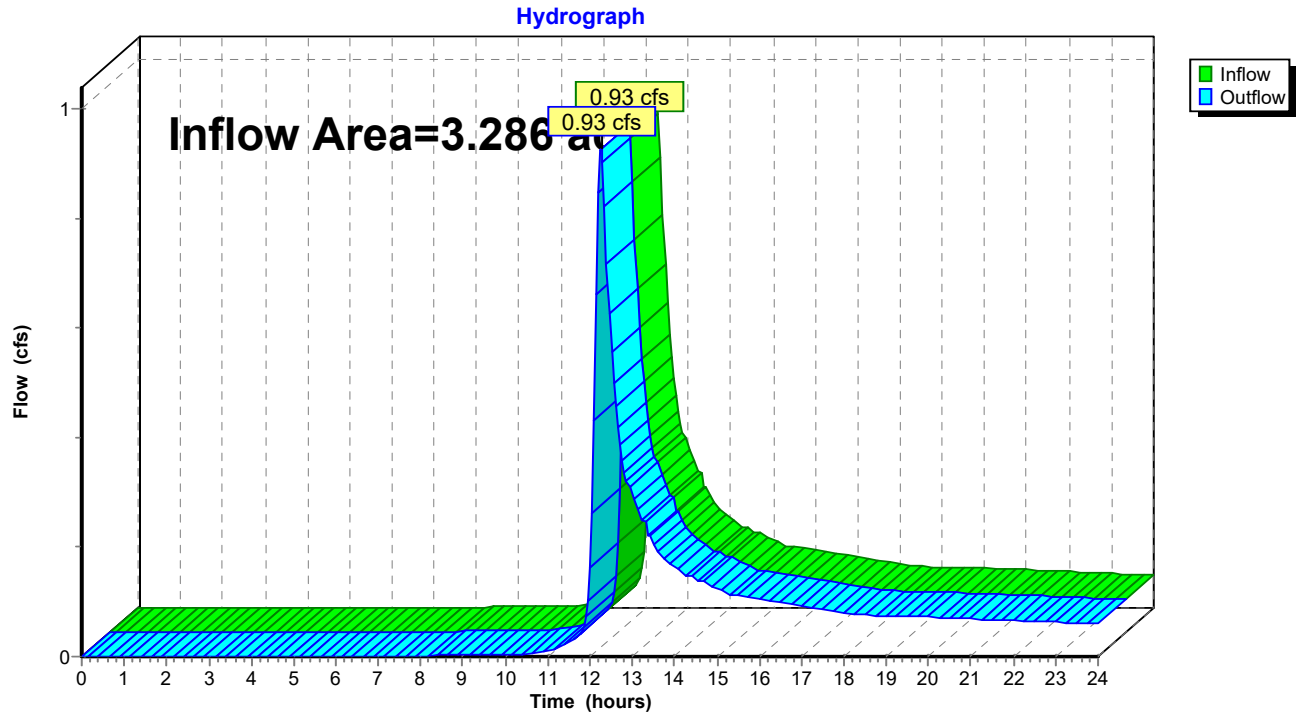


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 11.30% Impervious, Inflow Depth > 0.50" for 2-Year event
Inflow = 0.93 cfs @ 12.26 hrs, Volume= 0.136 af
Outflow = 0.93 cfs @ 12.26 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Summary for Pond 2P: Cultec

Inflow Area = 0.048 ac, 100.00% Impervious, Inflow Depth > 2.89" for 2-Year event
Inflow = 0.13 cfs @ 12.13 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 12.90 hrs, Volume= 0.005 af, Atten= 82%, Lag= 46.5 min
Discarded = 0.00 cfs @ 12.90 hrs, Volume= 0.003 af
Primary = 0.02 cfs @ 12.90 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 852.11' @ 12.90 hrs Surf.Area= 279 sf Storage= 279 cf

Plug-Flow detention time=281.5 min calculated for 0.005 af (45% of inflow)
Center-of-Mass det. time=108.8 min (869.1 - 760.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	194 cf	**10.33'W x 27.00'L x 2.04'H Field A** 570 cf Overall - 86 cf Embedded = 484 cf x 40.0% Voids
#2A	845.50'	86 cf	**Cultec C-100HD** x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		279 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.00 cfs @ 12.90 hrs HW=852.11' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.02 cfs @ 12.90 hrs HW=852.10' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.02 cfs @ 0.86 fps)

Pond 2P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

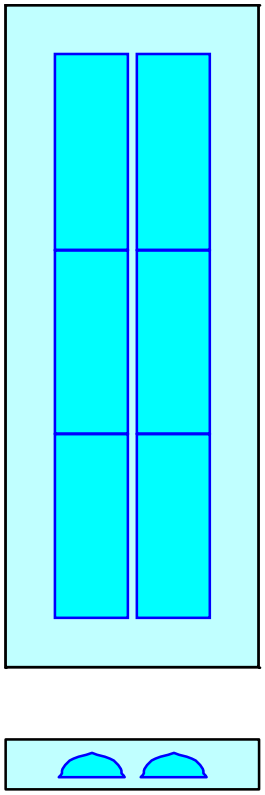
3 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 23.00' Row Length +24.0" End Stone x 2 = 27.00' Base Length
2 Rows x 36.0" Wide + 4.0" Spacing x 1 + 24.0" Side Stone x 2 = 10.33' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 85.6 cf Chamber Storage

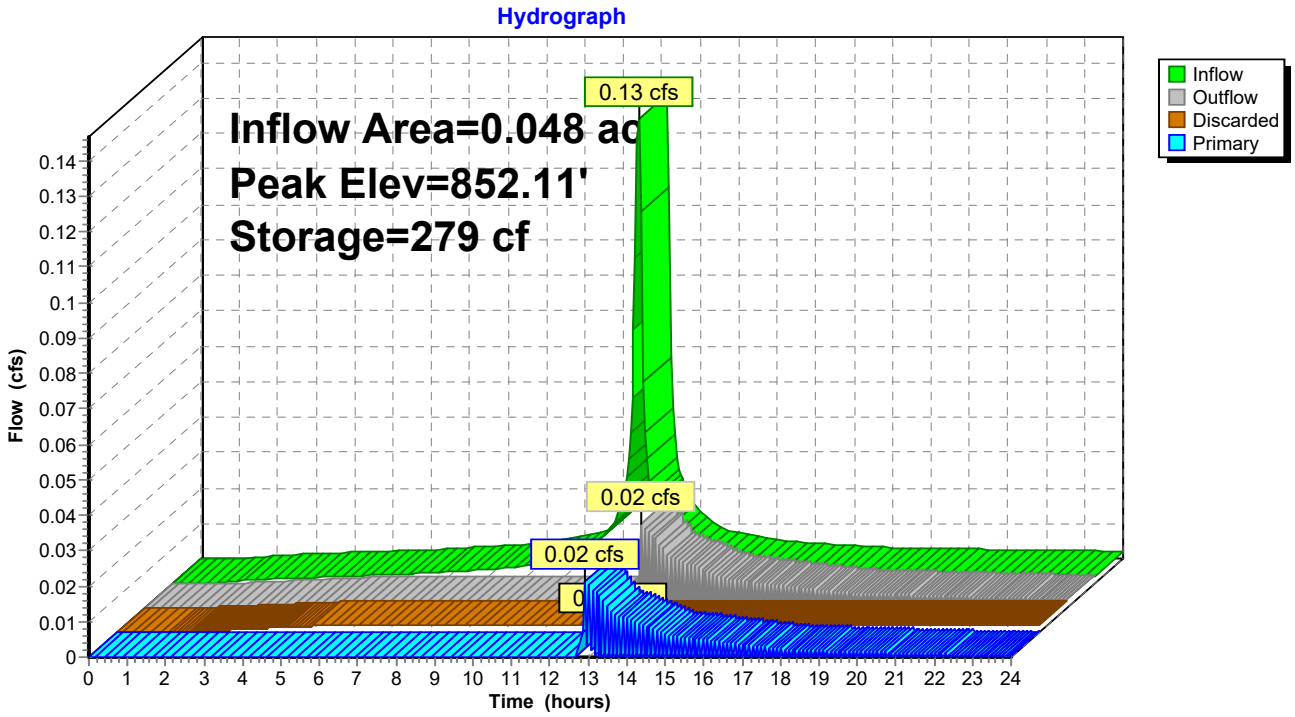
569.6 cf Field - 85.6 cf Chambers = 484.0 cf Stone x 40.0% Voids = 193.6 cf Stone Storage

Chamber Storage + Stone Storage = 279.2 cf = 0.006 af
Overall Storage Efficiency = 49.0%
Overall System Size = 27.00' x 10.33' x 2.04'

6 Chambers
21.1 cy Field
17.9 cy Stone



Pond 2P: Cultec



Summary for Pond 5P: Cultec

Inflow Area = 0.145 ac, 100.00% Impervious, Inflow Depth > 2.89" for 2-Year event
Inflow = 0.39 cfs @ 12.13 hrs, Volume= 0.035 af
Outflow = 0.04 cfs @ 12.98 hrs, Volume= 0.035 af, Atten= 90%, Lag= 51.5 min
Discarded = 0.04 cfs @ 12.98 hrs, Volume= 0.035 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 845.58' @ 12.98 hrs Surf.Area= 1,704 sf Storage= 450 cf

Plug-Flow detention time=77.9 min calculated for 0.035 af (99% of inflow)
Center-of-Mass det. time=74.3 min (834.5 - 760.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	1,088 cf	**23.67'W x 72.00'L x 2.04'H Field A** 3,479 cf Overall - 759 cf Embedded = 2,720 cf x 40.0% Voids
#2A	845.50'	759 cf	**Cultec C-100HD** x 54 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		1,847 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.04 cfs @ 12.98 hrs HW=845.58' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=845.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 5P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 6 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

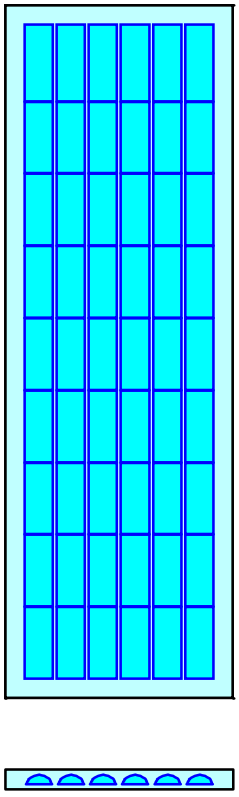
9 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 68.00' Row Length +24.0" End Stone x 2 = 72.00' Base Length
6 Rows x 36.0" Wide + 4.0" Spacing x 5 + 24.0" Side Stone x 2 = 23.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

54 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 6 Rows = 759.5 cf Chamber Storage

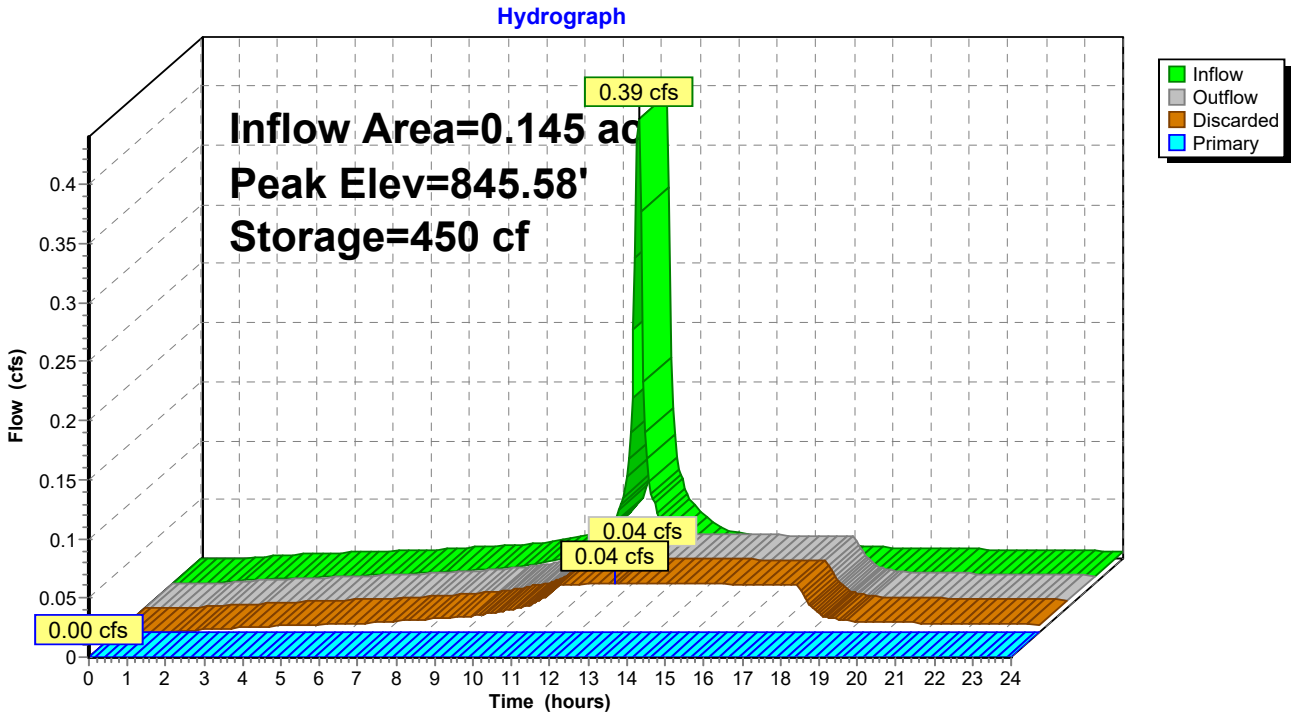
3,479.0 cf Field - 759.5 cf Chambers = 2,719.5 cf Stone x 40.0% Voids = 1,087.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,847.3 cf = 0.042 af
Overall Storage Efficiency = 53.1%
Overall System Size = 72.00' x 23.67' x 2.04'

54 Chambers
128.9 cy Field
100.7 cy Stone



Pond 5P: Cultec



Summary for Pond 8P: 1'x1' Gravel Drip Edge

Inflow Area = 0.111 ac, 100.00% Impervious, Inflow Depth > 2.89" for 2-Year event
Inflow = 0.30 cfs @ 12.13 hrs, Volume= 0.027 af
Outflow = 0.27 cfs @ 12.16 hrs, Volume= 0.027 af, Atten= 9%, Lag= 1.9 min
Discarded = 0.01 cfs @ 12.16 hrs, Volume= 0.013 af
Primary = 0.26 cfs @ 12.16 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 850.22' @ 12.16 hrs Surf.Area= 528 sf Storage= 58 cf

Plug-Flow detention time=3.9 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time=3.4 min (763.6 - 760.3)

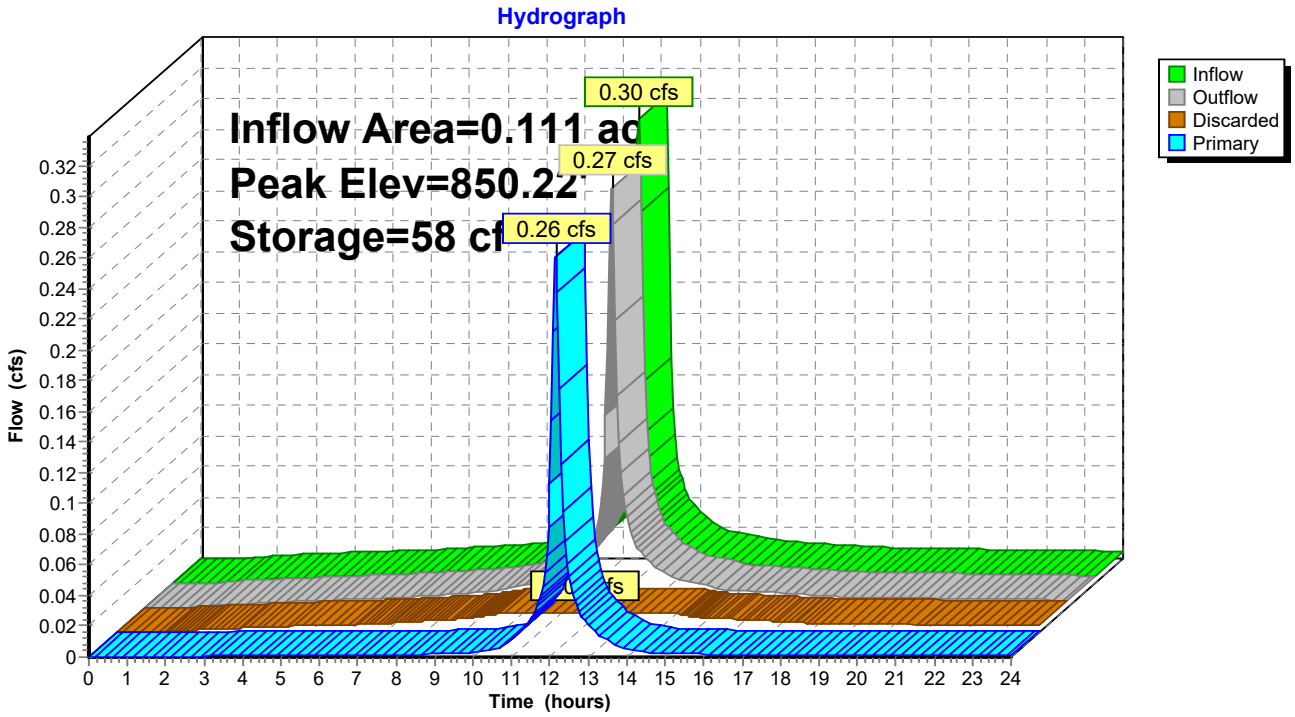
Volume	Invert	Avail.Storage	Storage Description
#1	850.00'	264 cf	**12.0" W x 12.0" H Box Pipe Storage** L= 528.0' 528 cf Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	850.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	850.00'	**12.0" W x 12.0" H Box Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 849.00' S= 0.1000 '/' Cc= 0.900 n= 0.033 Riprap, 1-inch, Flow Area= 1.00 sf

Discarded OutFlow Max=0.01 cfs @ 12.16 hrs HW=850.22' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.26 cfs @ 12.16 hrs HW=850.22' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.26 cfs @ 1.18 fps)

Pond 8P: 1'x1' Gravel Drip Edge



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: LOT 1-3 ROOF Runoff Area=6,300 sf 100.00% Impervious Runoff Depth>4.44"
Tc=6.0 min CN=98 Runoff=0.59 cfs 0.054 af

Subcatchment2S: LOT 4 ROOF Runoff Area=2,100 sf 100.00% Impervious Runoff Depth>4.44"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.018 af

Subcatchment3S: 4x1213SF DRIVEWAY Runoff Area=4,852 sf 100.00% Impervious Runoff Depth>4.44"
Tc=6.0 min CN=98 Runoff=0.46 cfs 0.041 af

Subcatchment4S: UNDEVELOP Runoff Area=129,899 sf 2.25% Impervious Runoff Depth>1.30"
Flow Length=372' Tc=16.5 min CN=63 Runoff=2.77 cfs 0.323 af

Reach1R: WETLANDS Inflow=3.05 cfs 0.355 af
Outflow=3.05 cfs 0.355 af

Pond2P: Cultec Peak Elev=852.66' Storage=279 cf Inflow=0.20 cfs 0.018 af
Discarded=0.00 cfs 0.003 af Primary=0.24 cfs 0.008 af Outflow=0.24 cfs 0.011 af

Pond5P: Cultec Peak Elev=845.87' Storage=823 cf Inflow=0.59 cfs 0.054 af
Discarded=0.04 cfs 0.053 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.053 af

Pond8P: 1'x1' Gravel Drip Edge Peak Elev=850.30' Storage=78 cf Inflow=0.46 cfs 0.041 af
Discarded=0.01 cfs 0.018 af Primary=0.41 cfs 0.024 af Outflow=0.42 cfs 0.041 af

Total Runoff Area = 3.286 ac Runoff Volume = 0.436 af Average Runoff Depth = 1.59"
88.70% Pervious = 2.915 ac 11.30% Impervious = 0.371 ac

Summary for Subcatchment 1S: LOT 1-3 ROOF

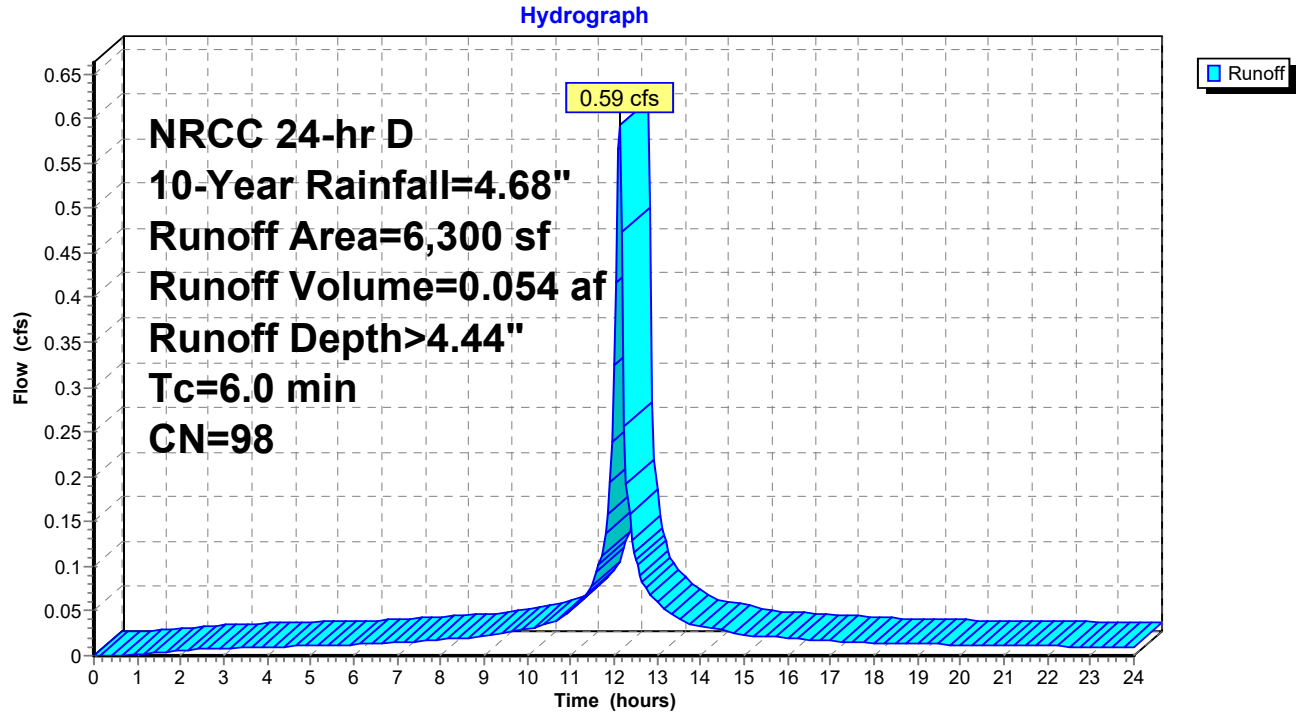
Runoff = 0.59 cfs @ 12.13 hrs, Volume= 0.054 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
6,300	98	Roofs, HSG B
6,300		100.00% Impervious Area

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

Subcatchment 1S: LOT 1-3 ROOF



Summary for Subcatchment 2S: LOT 4 ROOF

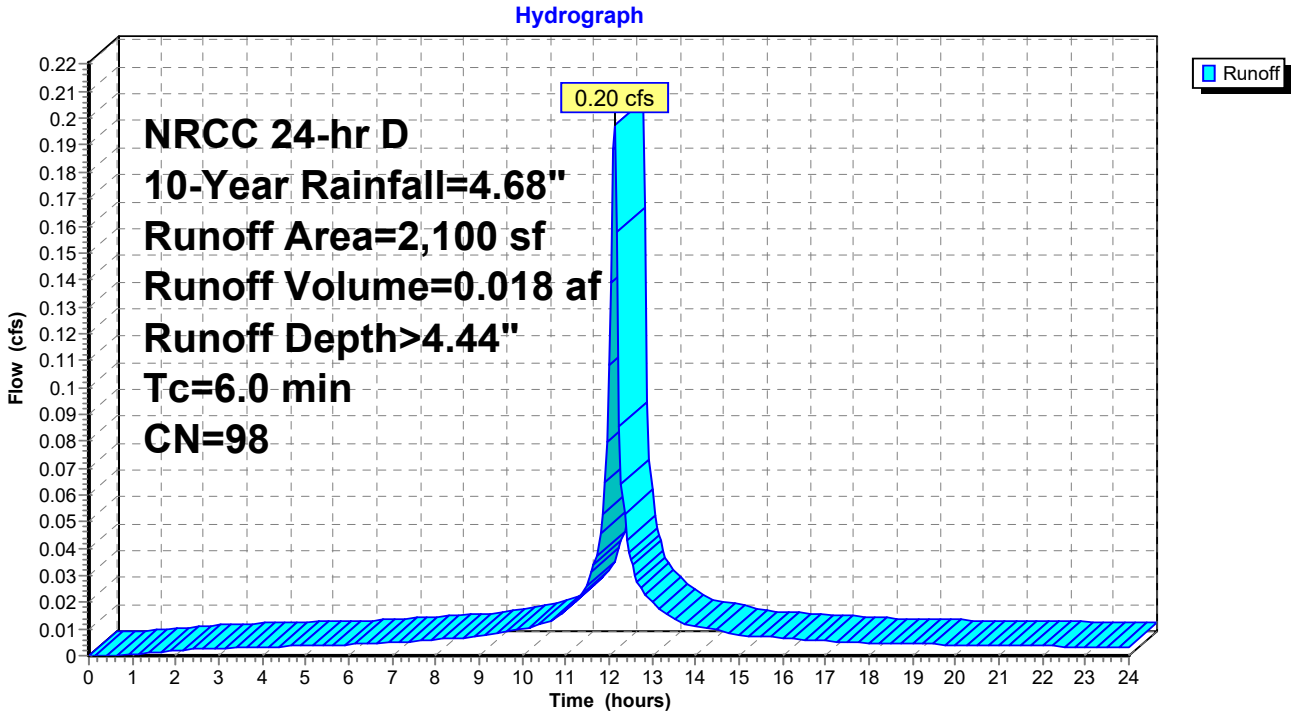
Runoff = 0.20 cfs @ 12.13 hrs, Volume= 0.018 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
2,100	98	Roofs, HSG C
2,100		100.00% Impervious Area

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

Subcatchment 2S: LOT 4 ROOF



Summary for Subcatchment 3S: 4x1213 SF DRIVEWAY

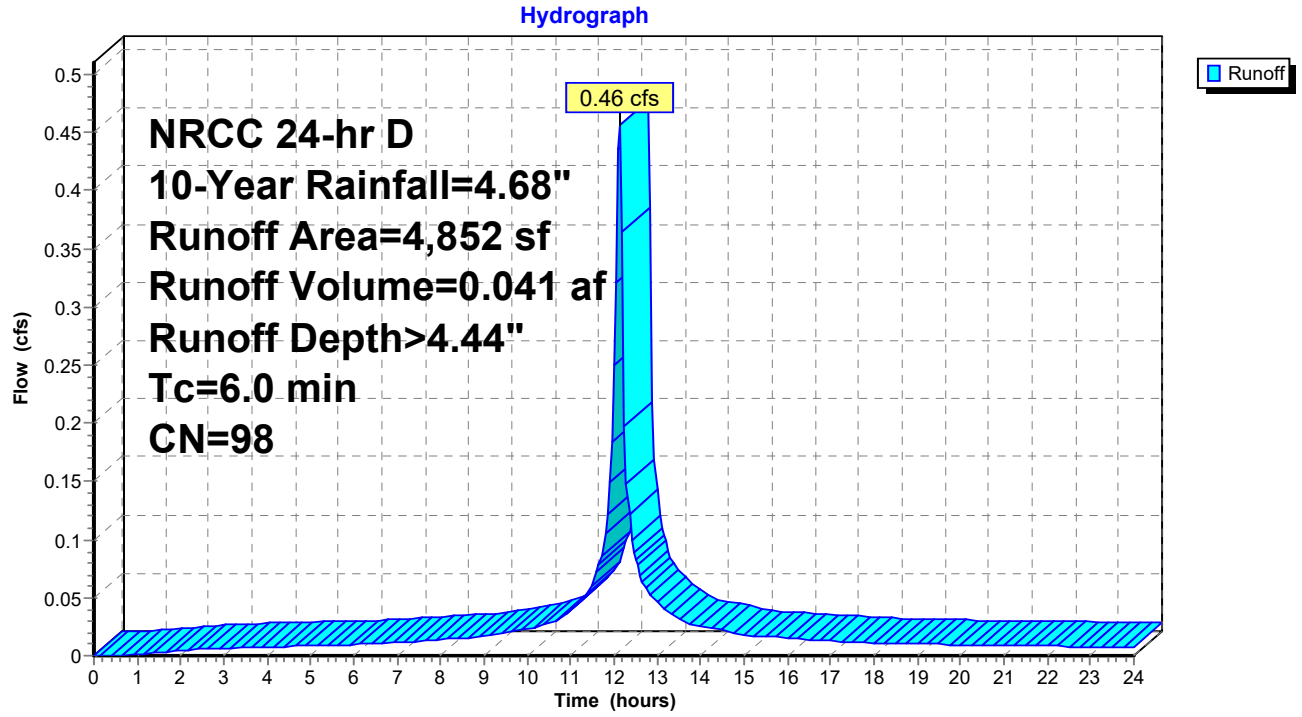
Runoff = 0.46 cfs @ 12.13 hrs, Volume= 0.041 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
4,852	98	Paved parking, HSG A
4,852		100.00% Impervious Area

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

Subcatchment 3S: 4x1213 SF DRIVEWAY



Summary for Subcatchment 4S: UNDEVELOP

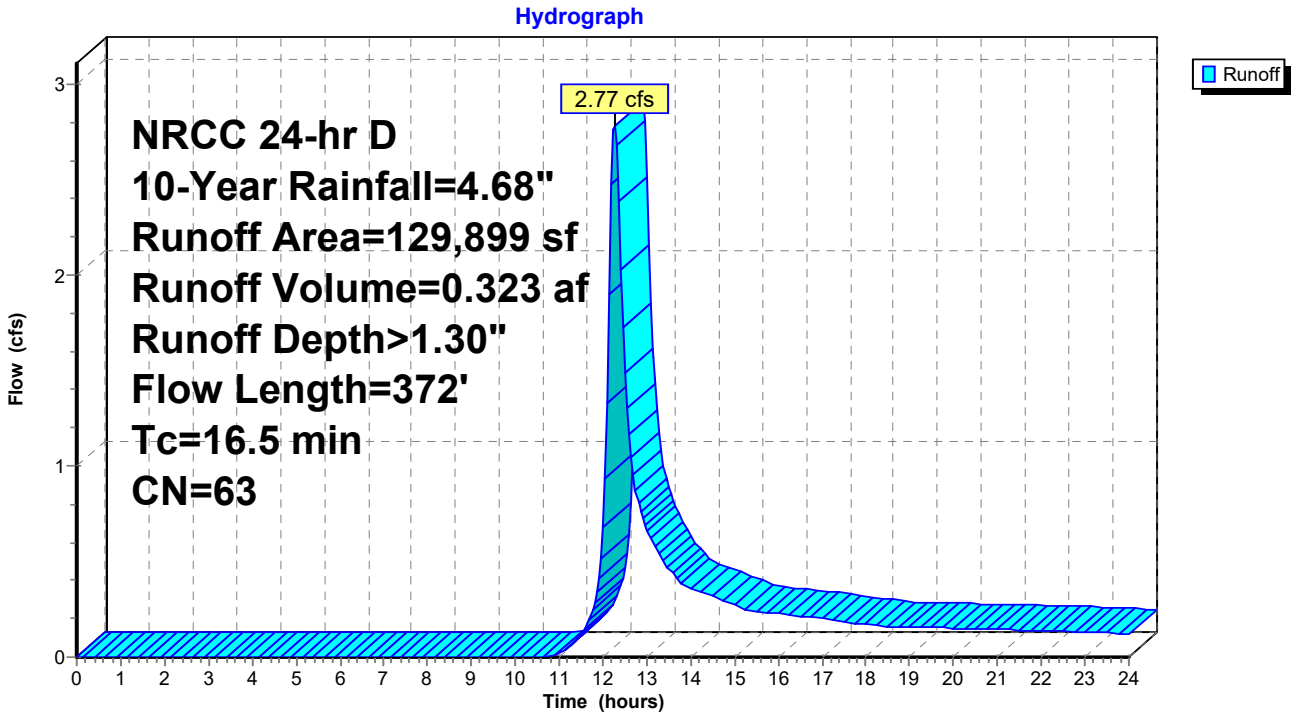
Runoff = 2.77 cfs @ 12.26 hrs, Volume= 0.323 af, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.68"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
72,459	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
129,899	63	Weighted Average
126,976		97.75% Pervious Area
2,923		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0290	0.08		**Sheet Flow, SHEET** Grass: Bermuda n= 0.410 P2= 3.13"
1.2	86	0.0600	1.22		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
3.6	167	0.0240	0.77		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.7	69	0.1200	1.73		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
16.5	372	Total			

Subcatchment 4S: UNDEVELOP

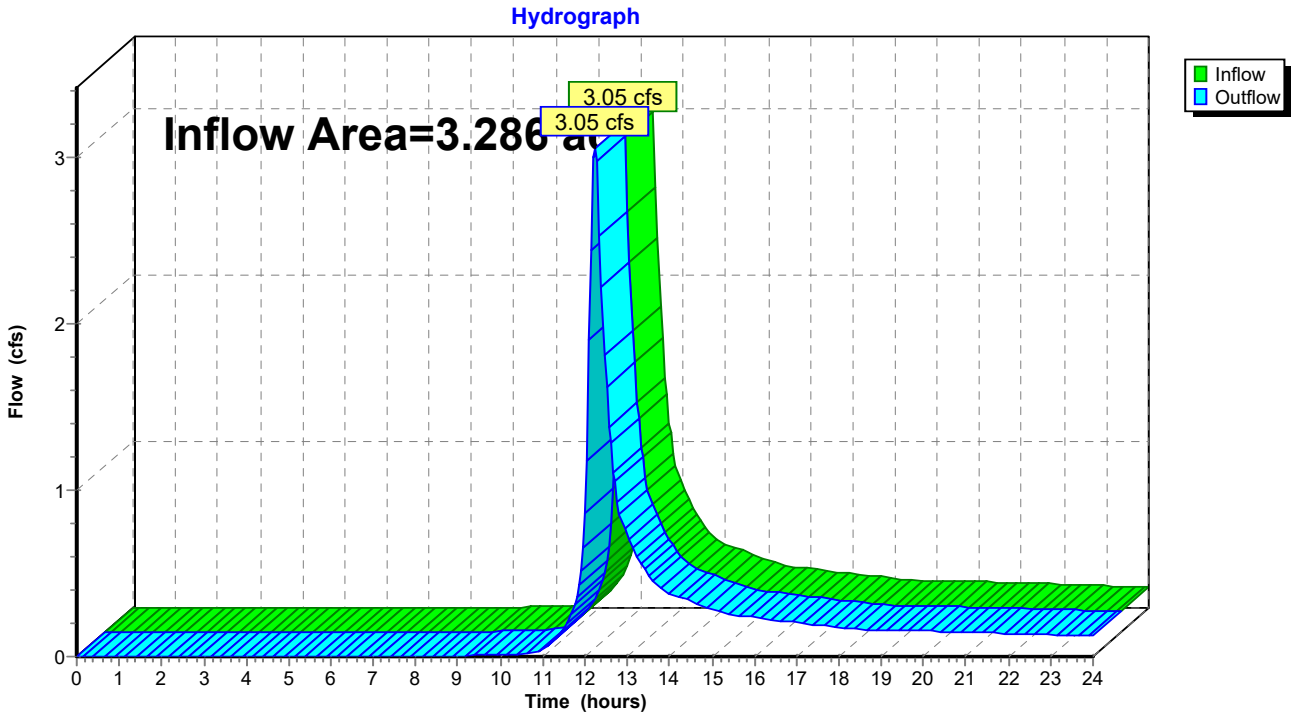


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 11.30% Impervious, Inflow Depth > 1.30" for 10-Year event
Inflow = 3.05 cfs @ 12.24 hrs, Volume= 0.355 af
Outflow = 3.05 cfs @ 12.24 hrs, Volume= 0.355 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Summary for Pond 2P: Cultec

Inflow Area = 0.048 ac, 100.00% Impervious, Inflow Depth > 4.44" for 10-Year event
Inflow = 0.20 cfs @ 12.13 hrs, Volume= 0.018 af
Outflow = 0.24 cfs @ 12.11 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.10 hrs, Volume= 0.003 af
Primary = 0.24 cfs @ 12.11 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 852.66' @ 12.10 hrs Surf.Area= 279 sf Storage= 279 cf

Plug-Flow detention time=214.5 min calculated for 0.011 af (64% of inflow)
Center-of-Mass det. time=84.2 min (835.3 - 751.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	194 cf	**10.33'W x 27.00'L x 2.04'H Field A** 570 cf Overall - 86 cf Embedded = 484 cf x 40.0% Voids
#2A	845.50'	86 cf	**Cultec C-100HD** x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		279 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.00 cfs @ 12.10 hrs HW=852.66' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.22 cfs @ 12.11 hrs HW=852.60' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.22 cfs @ 2.49 fps)

Pond 2P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

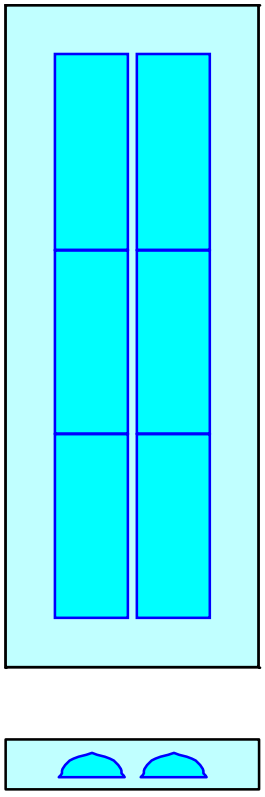
3 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 23.00' Row Length +24.0" End Stone x 2 = 27.00' Base Length
2 Rows x 36.0" Wide + 4.0" Spacing x 1 + 24.0" Side Stone x 2 = 10.33' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 85.6 cf Chamber Storage

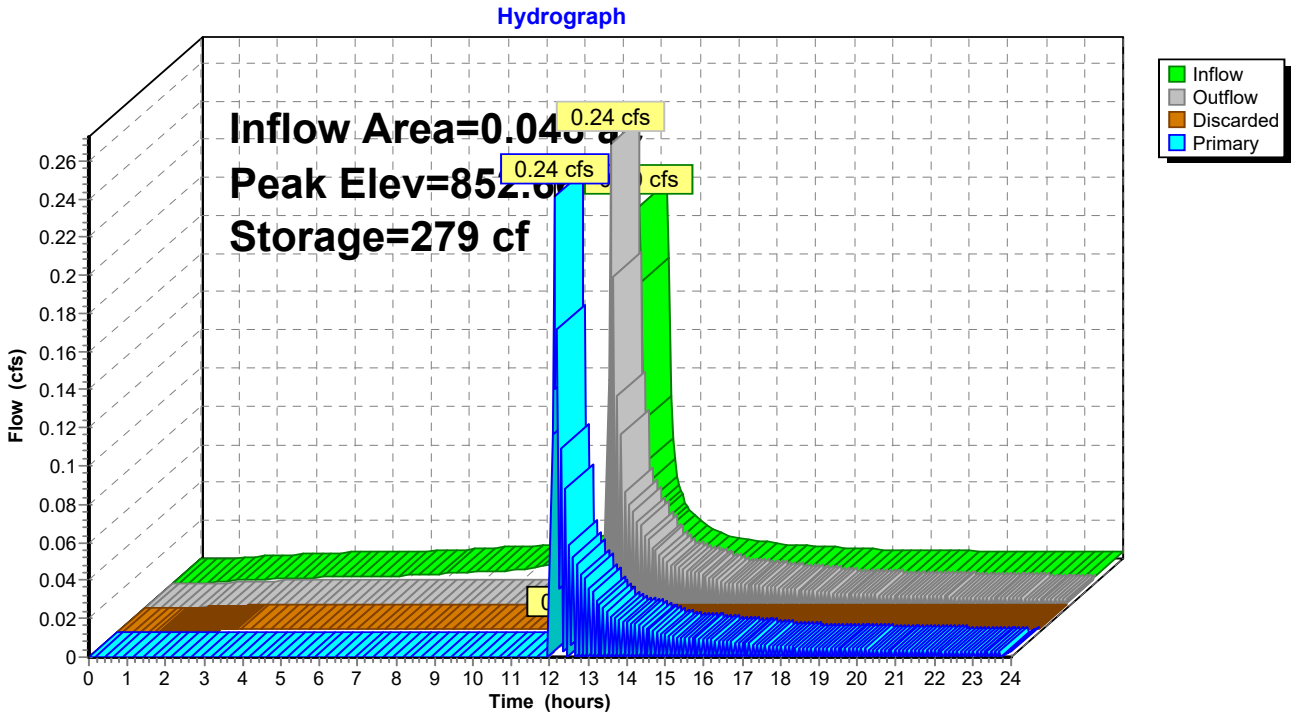
569.6 cf Field - 85.6 cf Chambers = 484.0 cf Stone x 40.0% Voids = 193.6 cf Stone Storage

Chamber Storage + Stone Storage = 279.2 cf = 0.006 af
Overall Storage Efficiency = 49.0%
Overall System Size = 27.00' x 10.33' x 2.04'

6 Chambers
21.1 cy Field
17.9 cy Stone



Pond 2P: Cultec



Summary for Pond 5P: Cultec

Inflow Area = 0.145 ac, 100.00% Impervious, Inflow Depth > 4.44" for 10-Year event
Inflow = 0.59 cfs @ 12.13 hrs, Volume= 0.054 af
Outflow = 0.04 cfs @ 13.50 hrs, Volume= 0.053 af, Atten= 93%, Lag= 82.2 min
Discarded = 0.04 cfs @ 13.50 hrs, Volume= 0.053 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 845.87' @ 13.50 hrs Surf.Area= 1,704 sf Storage= 823 cf

Plug-Flow detention time= 152.4 min calculated for 0.053 af (99% of inflow)
Center-of-Mass det. time= 148.7 min (899.8 - 751.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	1,088 cf	**23.67'W x 72.00'L x 2.04'H Field A** 3,479 cf Overall - 759 cf Embedded = 2,720 cf x 40.0% Voids
#2A	845.50'	759 cf	**Cultec C-100HD** x 54 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		1,847 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.04 cfs @ 13.50 hrs HW=845.87' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=845.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 5P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 6 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

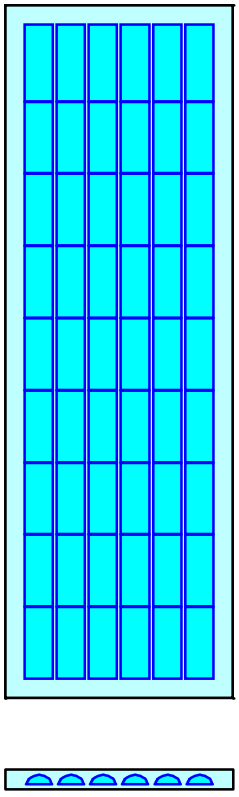
9 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 68.00' Row Length +24.0" End Stone x 2 = 72.00' Base Length
6 Rows x 36.0" Wide + 4.0" Spacing x 5 + 24.0" Side Stone x 2 = 23.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

54 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 6 Rows = 759.5 cf Chamber Storage

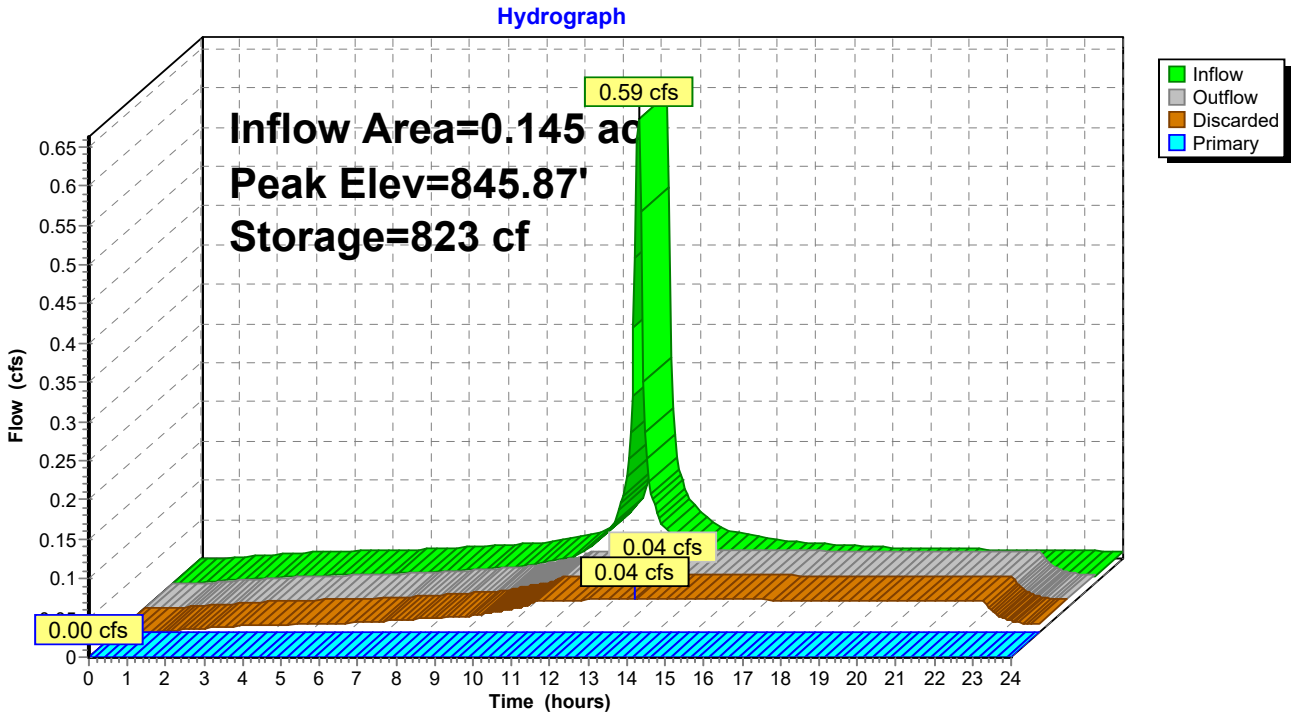
3,479.0 cf Field - 759.5 cf Chambers = 2,719.5 cf Stone x 40.0% Voids = 1,087.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,847.3 cf = 0.042 af
Overall Storage Efficiency = 53.1%
Overall System Size = 72.00' x 23.67' x 2.04'

54 Chambers
128.9 cy Field
100.7 cy Stone



Pond 5P: Cultec



Summary for Pond 8P: 1'x1' Gravel Drip Edge

Inflow Area = 0.111 ac, 100.00% Impervious, Inflow Depth > 4.44" for 10-Year event
Inflow = 0.46 cfs @ 12.13 hrs, Volume= 0.041 af
Outflow = 0.42 cfs @ 12.16 hrs, Volume= 0.041 af, Atten= 8%, Lag= 1.7 min
Discarded = 0.01 cfs @ 12.16 hrs, Volume= 0.018 af
Primary = 0.41 cfs @ 12.16 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 850.30' @ 12.16 hrs Surf.Area= 528 sf Storage= 78 cf

Plug-Flow detention time=4.0 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time=3.5 min (754.6 - 751.1)

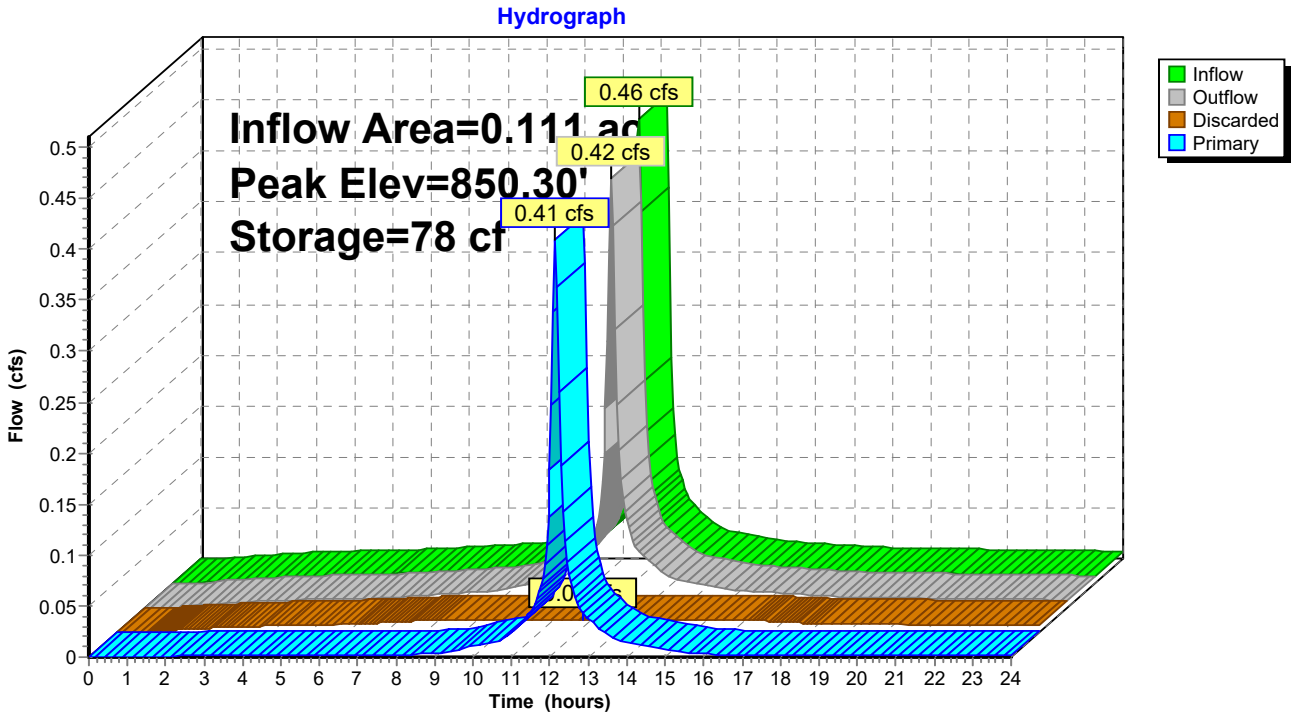
Volume	Invert	Avail.Storage	Storage Description
#1	850.00'	264 cf	**12.0" W x 12.0" H Box Pipe Storage** L= 528.0' 528 cf Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	850.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	850.00'	**12.0" W x 12.0" H Box Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 849.00' S= 0.1000 '/' Cc= 0.900 n= 0.033 Riprap, 1-inch, Flow Area= 1.00 sf

Discarded OutFlow Max=0.01 cfs @ 12.16 hrs HW=850.29' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.40 cfs @ 12.16 hrs HW=850.29' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.40 cfs @ 1.37 fps)

Pond 8P: 1'x1' Gravel Drip Edge



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: LOT 1-3 ROOF Runoff Area=6,300 sf 100.00% Impervious Runoff Depth>5.64"
Tc=6.0 min CN=98 Runoff=0.75 cfs 0.068 af

Subcatchment2S: LOT 4 ROOF Runoff Area=2,100 sf 100.00% Impervious Runoff Depth>5.64"
Tc=6.0 min CN=98 Runoff=0.25 cfs 0.023 af

Subcatchment3S: 4x1213SF DRIVEWAY Runoff Area=4,852 sf 100.00% Impervious Runoff Depth>5.64"
Tc=6.0 min CN=98 Runoff=0.57 cfs 0.052 af

Subcatchment4S: UNDEVELOP Runoff Area=129,899 sf 2.25% Impervious Runoff Depth>2.08"
Flow Length=372' Tc=16.5 min CN=63 Runoff=4.66 cfs 0.517 af

Reach1R: WETLANDS Inflow=5.09 cfs 0.562 af
Outflow=5.09 cfs 0.562 af

Pond2P: Cultec Peak Elev=852.74' Storage=279 cf Inflow=0.25 cfs 0.023 af
Discarded=0.00 cfs 0.004 af Primary=0.25 cfs 0.013 af Outflow=0.26 cfs 0.016 af

Pond5P: Cultec Peak Elev=846.15' Storage=1,147 cf Inflow=0.75 cfs 0.068 af
Discarded=0.04 cfs 0.060 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.060 af

Pond8P: 1'x1' Gravel Drip Edge Peak Elev=850.35' Storage=92 cf Inflow=0.57 cfs 0.052 af
Discarded=0.01 cfs 0.020 af Primary=0.52 cfs 0.032 af Outflow=0.54 cfs 0.052 af

Total Runoff Area = 3.286 ac Runoff Volume = 0.660 af Average Runoff Depth = 2.41"
88.70% Pervious = 2.915 ac 11.30% Impervious = 0.371 ac

Summary for Subcatchment 1S: LOT 1-3 ROOF

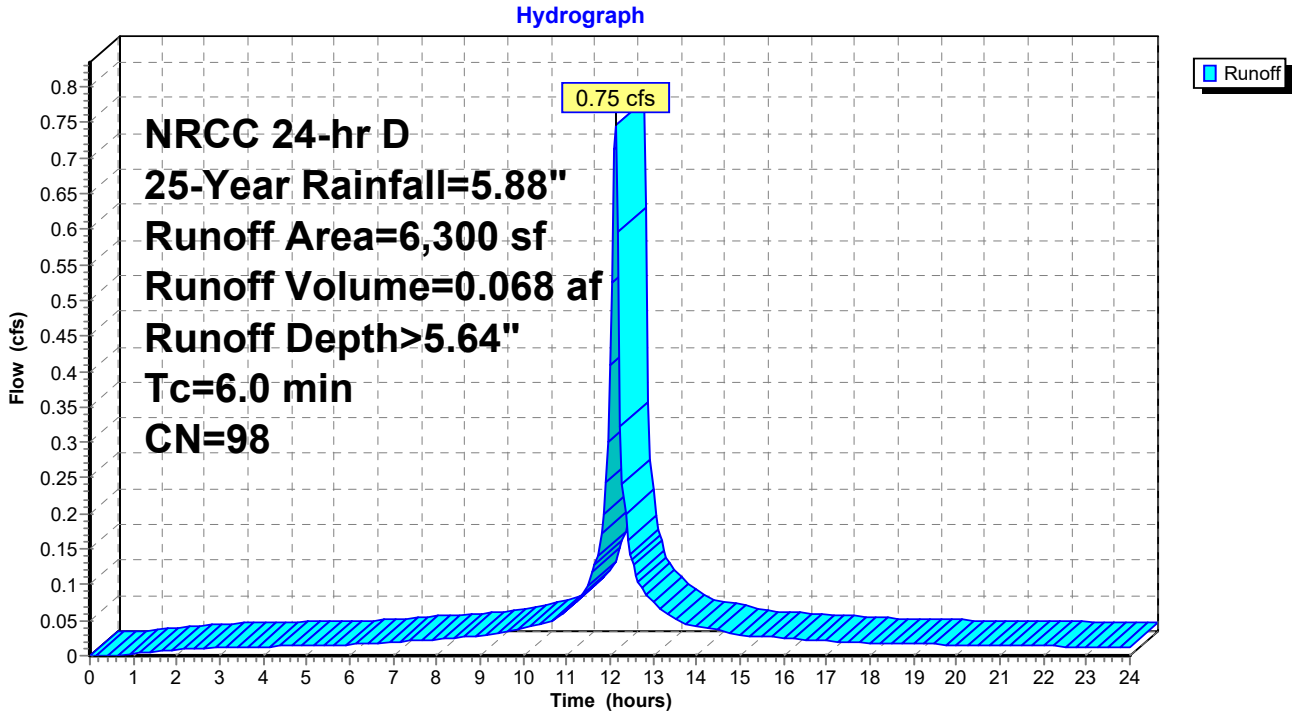
Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.068 af, Depth> 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.88"

Area (sf)	CN	Description
6,300	98	Roofs, HSG B
6,300		100.00% Impervious Area

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

Subcatchment 1S: LOT 1-3 ROOF



Summary for Subcatchment 2S: LOT 4 ROOF

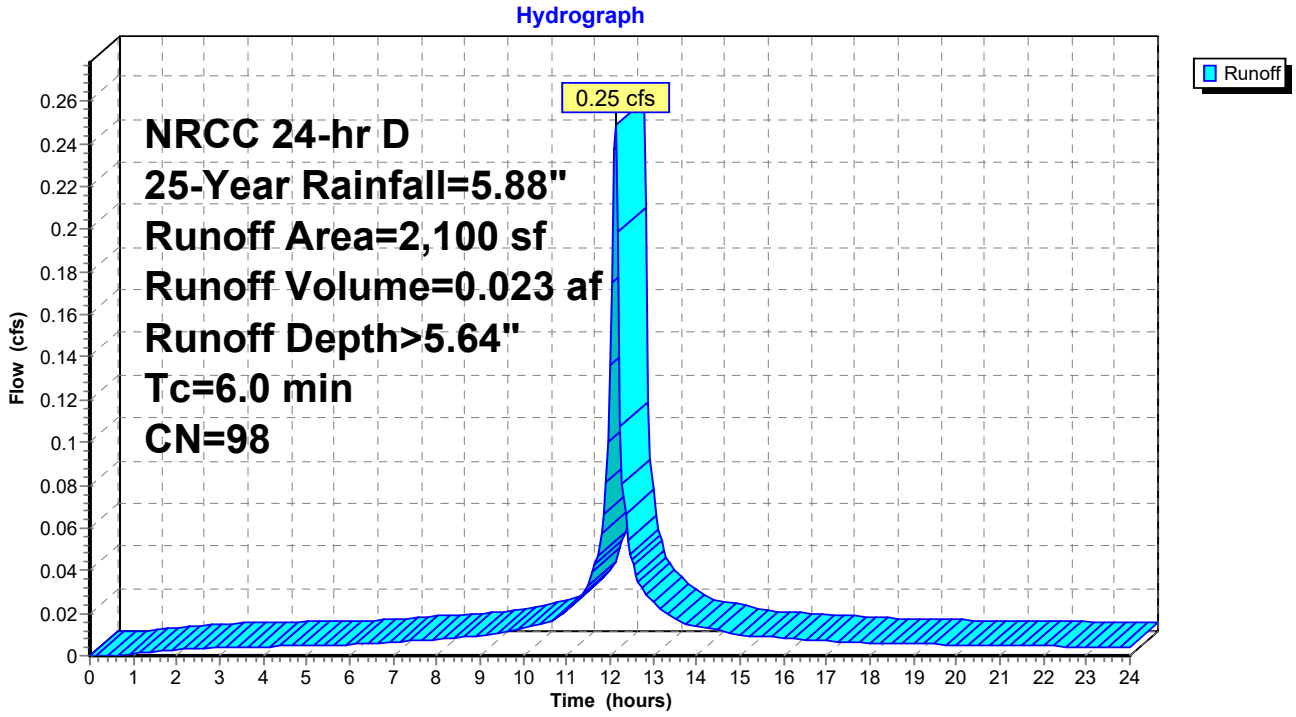
Runoff = 0.25 cfs @ 12.13 hrs, Volume= 0.023 af, Depth> 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.88"

Area (sf)	CN	Description
2,100	98	Roofs, HSG C
2,100		100.00% Impervious Area

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

Subcatchment 2S: LOT 4 ROOF



Summary for Subcatchment 3S: 4x1213 SF DRIVEWAY

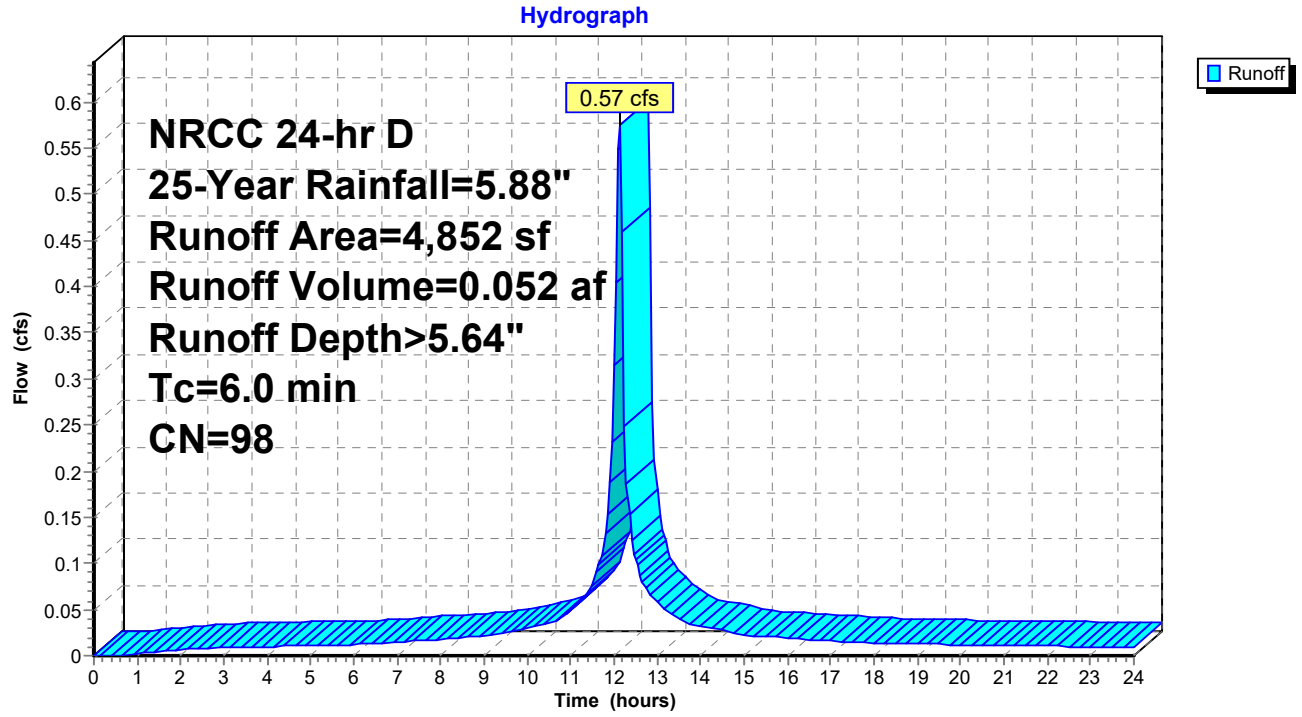
Runoff = 0.57 cfs @ 12.13 hrs, Volume= 0.052 af, Depth> 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.88"

Area (sf)	CN	Description
4,852	98	Paved parking, HSG A
4,852		100.00% Impervious Area

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

Subcatchment 3S: 4x1213 SF DRIVEWAY



Summary for Subcatchment 4S: UNDEVELOP

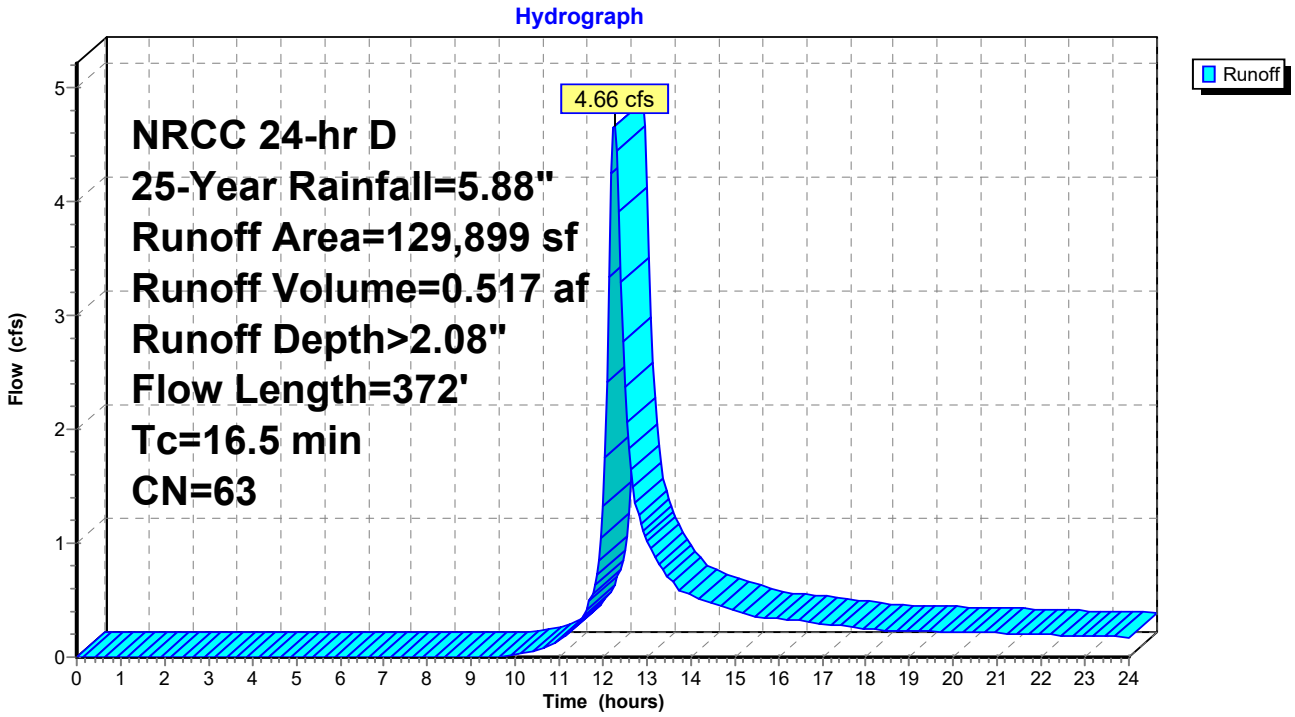
Runoff = 4.66 cfs @ 12.26 hrs, Volume= 0.517 af, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.88"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
72,459	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
129,899	63	Weighted Average
126,976		97.75% Pervious Area
2,923		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0290	0.08		**Sheet Flow, SHEET** Grass: Bermuda n= 0.410 P2= 3.13"
1.2	86	0.0600	1.22		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
3.6	167	0.0240	0.77		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.7	69	0.1200	1.73		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
16.5	372	Total			

Subcatchment 4S: UNDEVELOP

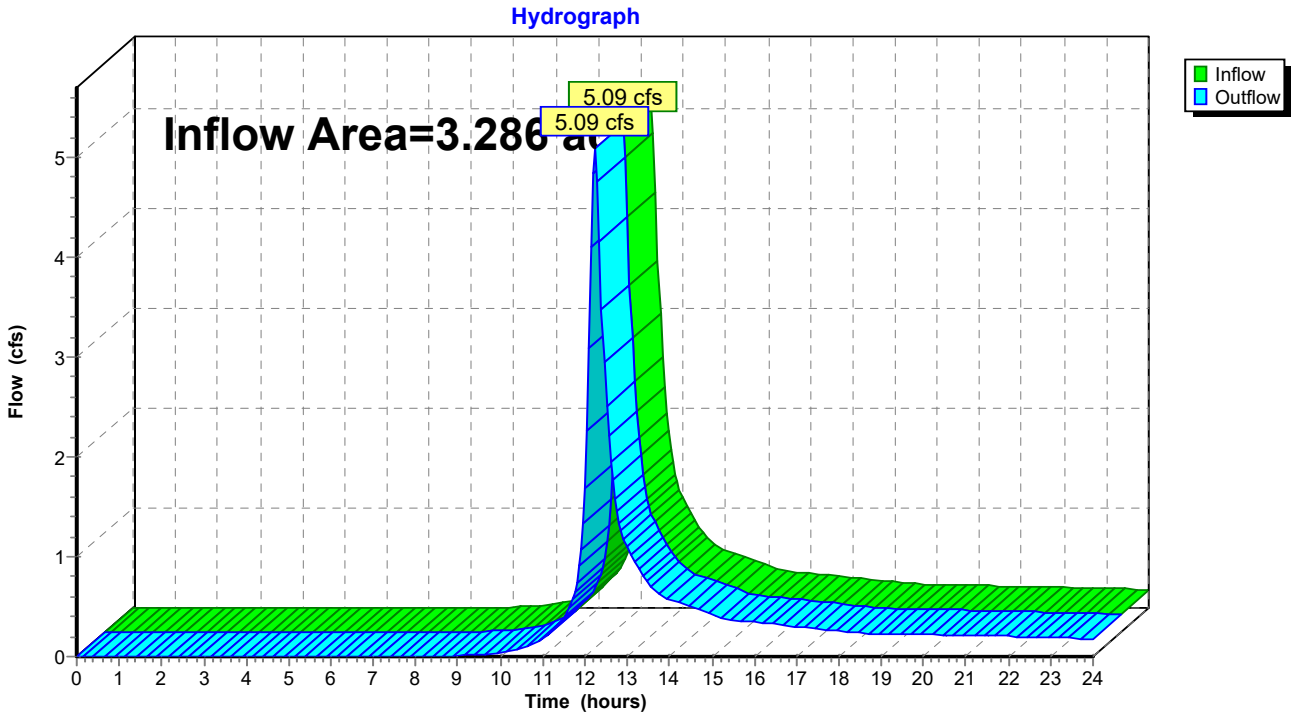


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 11.30% Impervious, Inflow Depth > 2.05" for 25-Year event
Inflow = 5.09 cfs @ 12.25 hrs, Volume= 0.562 af
Outflow = 5.09 cfs @ 12.25 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Summary for Pond 2P: Cultec

Inflow Area = 0.048 ac, 100.00% Impervious, Inflow Depth > 5.64" for 25-Year event
Inflow = 0.25 cfs @ 12.13 hrs, Volume= 0.023 af
Outflow = 0.26 cfs @ 12.13 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.5 min
Discarded = 0.00 cfs @ 12.14 hrs, Volume= 0.004 af
Primary = 0.25 cfs @ 12.13 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 852.74' @ 12.14 hrs Surf.Area= 279 sf Storage= 279 cf

Plug-Flow detention time= 194.9 min calculated for 0.016 af (72% of inflow)
Center-of-Mass det. time= 79.1 min (825.9 - 746.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	194 cf	**10.33'W x 27.00'L x 2.04'H Field A** 570 cf Overall - 86 cf Embedded = 484 cf x 40.0% Voids
#2A	845.50'	86 cf	**Cultec C-100HD** x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		279 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.00 cfs @ 12.14 hrs HW=852.69' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.24 cfs @ 12.13 hrs HW=852.69' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.24 cfs @ 2.75 fps)

Pond 2P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

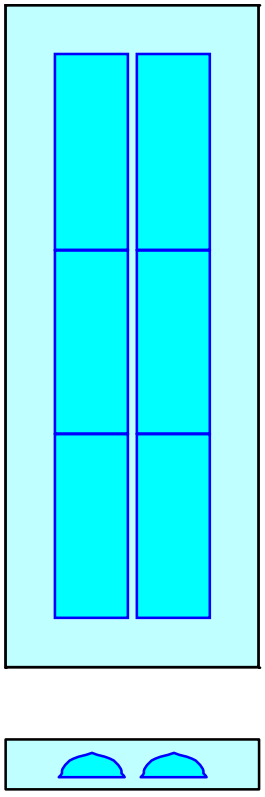
3 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 23.00' Row Length +24.0" End Stone x 2 = 27.00' Base Length
2 Rows x 36.0" Wide + 4.0" Spacing x 1 + 24.0" Side Stone x 2 = 10.33' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 85.6 cf Chamber Storage

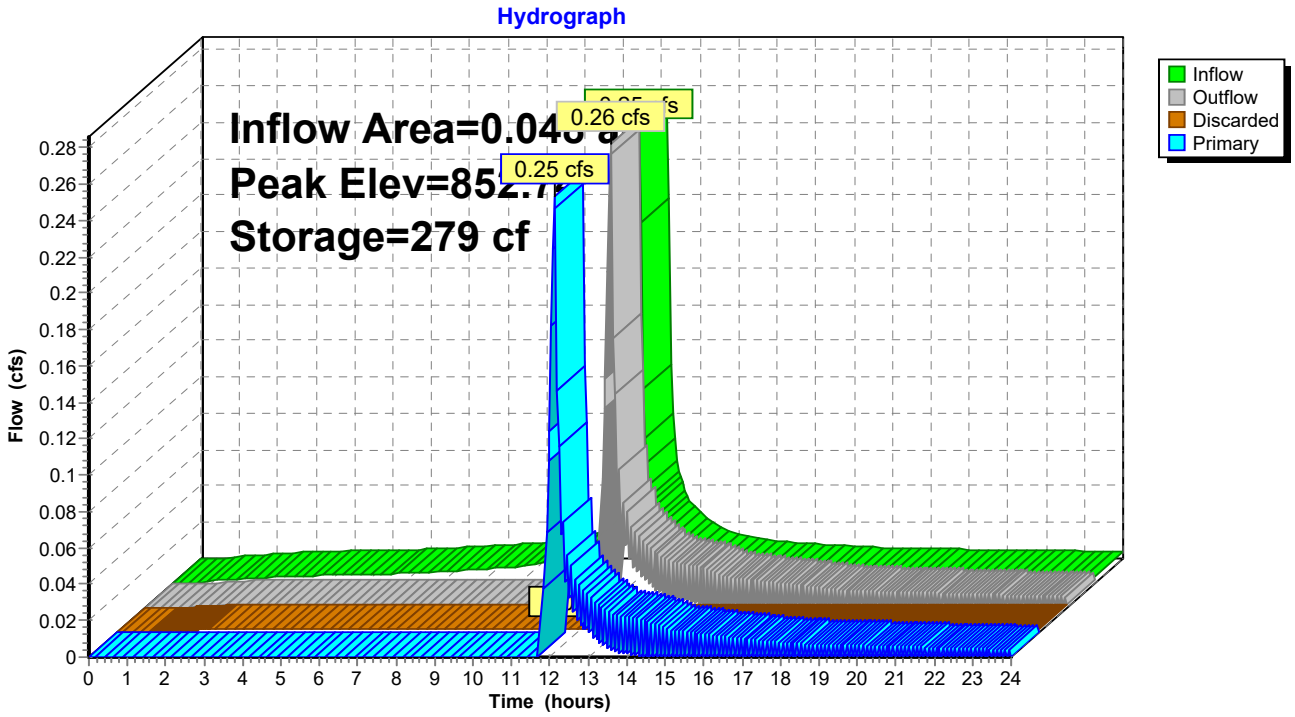
569.6 cf Field - 85.6 cf Chambers = 484.0 cf Stone x 40.0% Voids = 193.6 cf Stone Storage

Chamber Storage + Stone Storage = 279.2 cf = 0.006 af
Overall Storage Efficiency = 49.0%
Overall System Size = 27.00' x 10.33' x 2.04'

6 Chambers
21.1 cy Field
17.9 cy Stone



Pond 2P: Cultec



Summary for Pond 5P: Cultec

Inflow Area = 0.145 ac, 100.00% Impervious, Inflow Depth > 5.64" for 25-Year event
Inflow = 0.75 cfs @ 12.13 hrs, Volume= 0.068 af
Outflow = 0.04 cfs @ 14.00 hrs, Volume= 0.060 af, Atten= 94%, Lag= 112.2 min
Discarded = 0.04 cfs @ 14.00 hrs, Volume= 0.060 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 846.15' @ 14.00 hrs Surf.Area= 1,704 sf Storage= 1,147 cf

Plug-Flow detention time=216.1 min calculated for 0.060 af (88% of inflow)
Center-of-Mass det. time=150.7 min (897.6 - 746.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	1,088 cf	**23.67'W x 72.00'L x 2.04'H Field A** 3,479 cf Overall - 759 cf Embedded = 2,720 cf x 40.0% Voids
#2A	845.50'	759 cf	**Cultec C-100HD** x 54 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		1,847 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.04 cfs @ 14.00 hrs HW=846.15' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=845.00' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 5P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 6 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

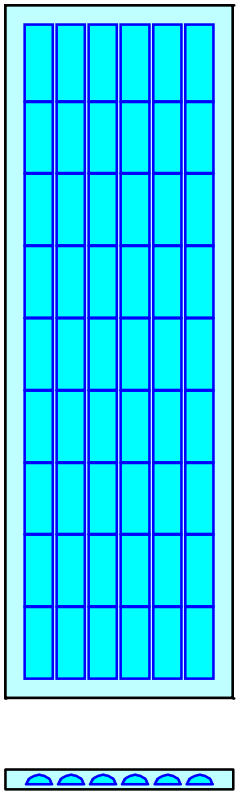
9 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 68.00' Row Length +24.0" End Stone x 2 = 72.00' Base Length
6 Rows x 36.0" Wide + 4.0" Spacing x 5 + 24.0" Side Stone x 2 = 23.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

54 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 6 Rows = 759.5 cf Chamber Storage

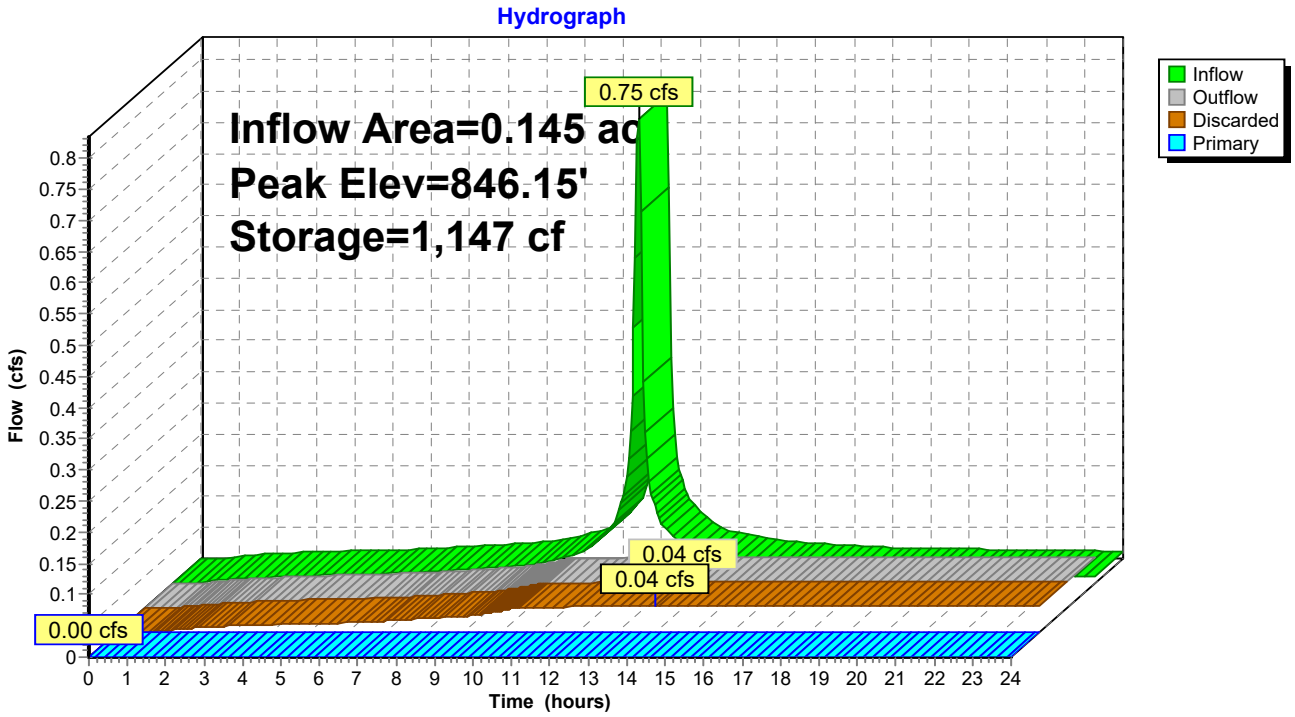
3,479.0 cf Field - 759.5 cf Chambers = 2,719.5 cf Stone x 40.0% Voids = 1,087.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,847.3 cf = 0.042 af
Overall Storage Efficiency = 53.1%
Overall System Size = 72.00' x 23.67' x 2.04'

54 Chambers
128.9 cy Field
100.7 cy Stone



Pond 5P: Cultec



Summary for Pond 8P: 1'x1' Gravel Drip Edge

Inflow Area = 0.111 ac, 100.00% Impervious, Inflow Depth > 5.64" for 25-Year event
Inflow = 0.57 cfs @ 12.13 hrs, Volume= 0.052 af
Outflow = 0.54 cfs @ 12.15 hrs, Volume= 0.052 af, Atten= 7%, Lag= 1.6 min
Discarded = 0.01 cfs @ 12.15 hrs, Volume= 0.020 af
Primary = 0.52 cfs @ 12.15 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 850.35' @ 12.15 hrs Surf.Area= 528 sf Storage= 92 cf

Plug-Flow detention time=4.0 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time=3.5 min (750.3 - 746.8)

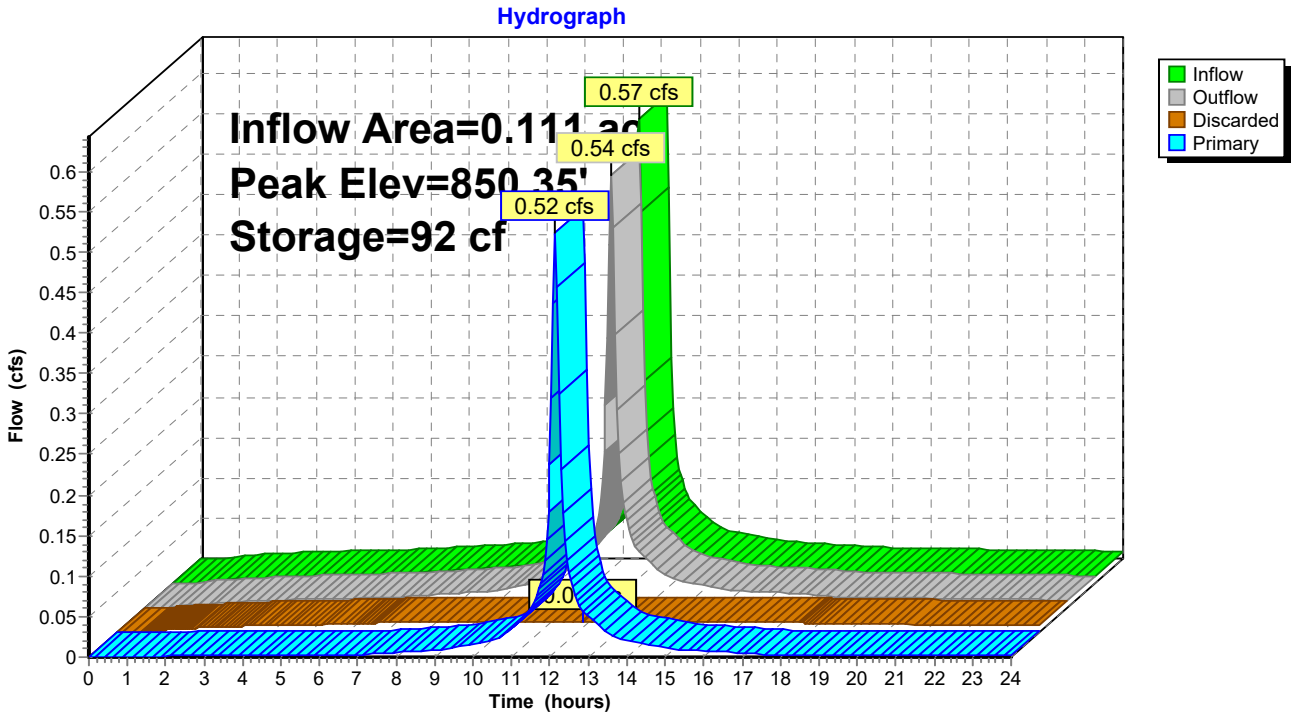
Volume	Invert	Avail.Storage	Storage Description
#1	850.00'	264 cf	**12.0" W x 12.0" H Box Pipe Storage** L= 528.0' 528 cf Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	850.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	850.00'	**12.0" W x 12.0" H Box Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 849.00' S= 0.1000 '/' Cc= 0.900 n= 0.033 Riprap, 1-inch, Flow Area= 1.00 sf

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=850.35' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.52 cfs @ 12.15 hrs HW=850.35' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.52 cfs @ 1.49 fps)

Pond 8P: 1'x1' Gravel Drip Edge



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: LOT 1-3 ROOF Runoff Area=6,300 sf 100.00% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=98 Runoff=1.06 cfs 0.098 af

Subcatchment2S: LOT 4 ROOF Runoff Area=2,100 sf 100.00% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=98 Runoff=0.35 cfs 0.033 af

Subcatchment3S: 4x1213SF DRIVEWAY Runoff Area=4,852 sf 100.00% Impervious Runoff Depth>8.09"
Tc=6.0 min CN=98 Runoff=0.82 cfs 0.075 af

Subcatchment4S: UNDEVELOP Runoff Area=129,899 sf 2.25% Impervious Runoff Depth>3.92"
Flow Length=372' Tc=16.5 min CN=63 Runoff=9.02 cfs 0.973 af

Reach1R: WETLANDS Inflow=9.63 cfs 1.048 af
Outflow=9.63 cfs 1.048 af

Pond2P: Cultec Peak Elev=853.27' Storage=279 cf Inflow=0.35 cfs 0.033 af
Discarded=0.00 cfs 0.004 af Primary=0.35 cfs 0.022 af Outflow=0.35 cfs 0.026 af

Pond5P: Cultec Peak Elev=852.10' Storage=1,847 cf Inflow=1.06 cfs 0.098 af
Discarded=0.05 cfs 0.068 af Primary=0.02 cfs 0.001 af Outflow=0.07 cfs 0.068 af

Pond8P: 1'x1' Gravel Drip Edge Peak Elev=850.45' Storage=118 cf Inflow=0.82 cfs 0.075 af
Discarded=0.01 cfs 0.023 af Primary=0.76 cfs 0.052 af Outflow=0.77 cfs 0.075 af

Total Runoff Area = 3.286 ac Runoff Volume = 1.178 af Average Runoff Depth = 4.30"
88.70% Pervious = 2.915 ac 11.30% Impervious = 0.371 ac

Summary for Subcatchment 1S: LOT 1-3 ROOF

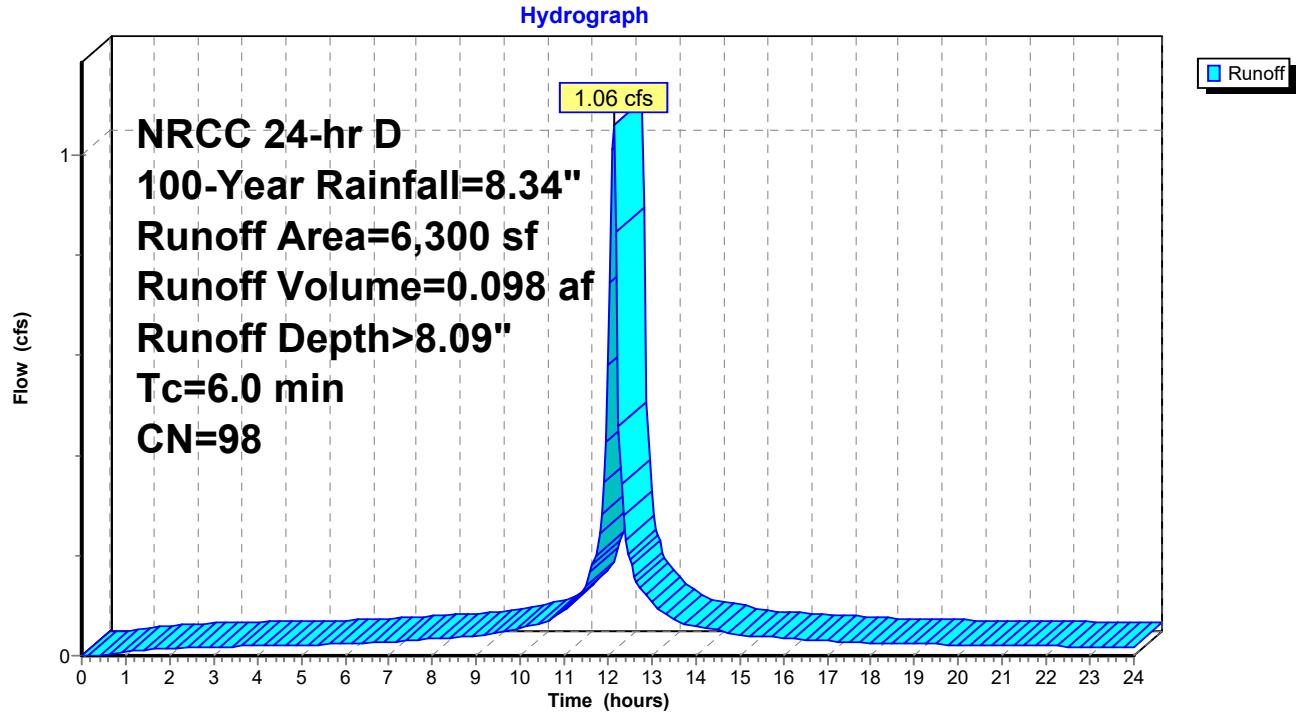
Runoff = 1.06 cfs @ 12.13 hrs, Volume= 0.098 af, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
6,300	98	Roofs, HSG B
6,300		100.00% Impervious Area

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

Subcatchment 1S: LOT 1-3 ROOF



Summary for Subcatchment 2S: LOT 4 ROOF

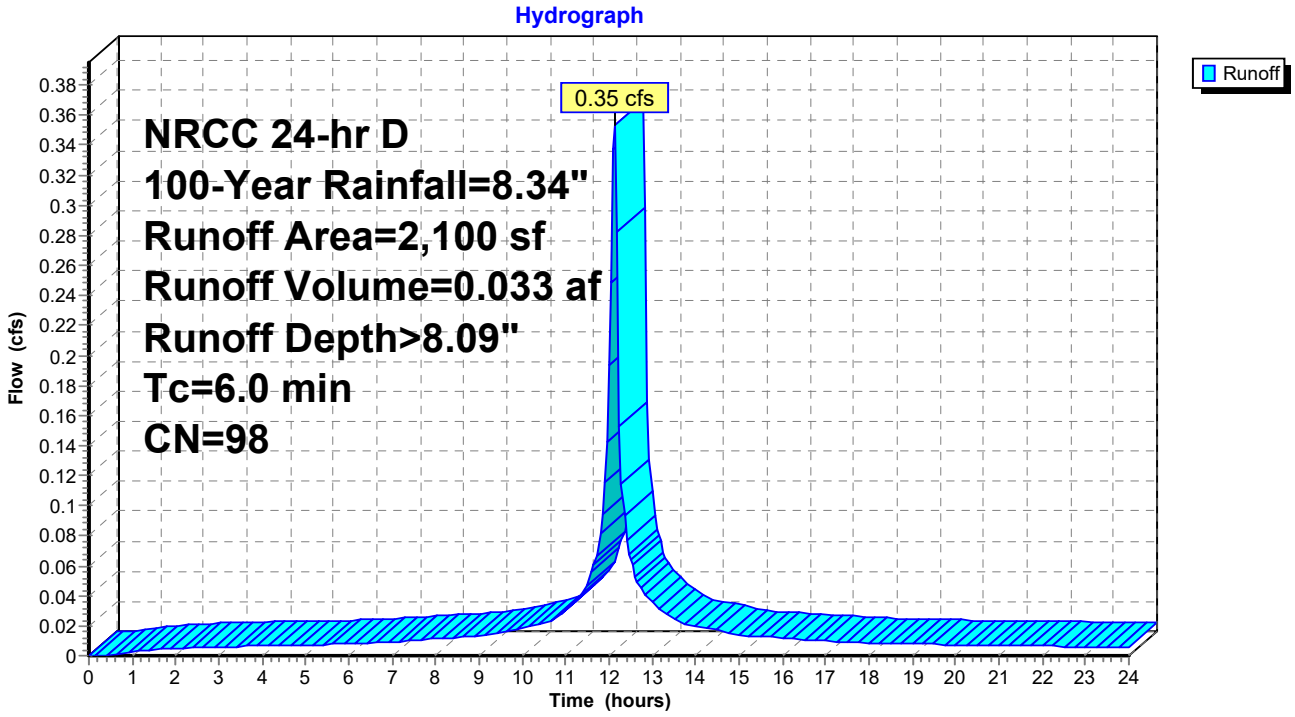
Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
2,100	98	Roofs, HSG C
2,100		100.00% Impervious Area

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

Subcatchment 2S: LOT 4 ROOF



Summary for Subcatchment 3S: 4x1213 SF DRIVEWAY

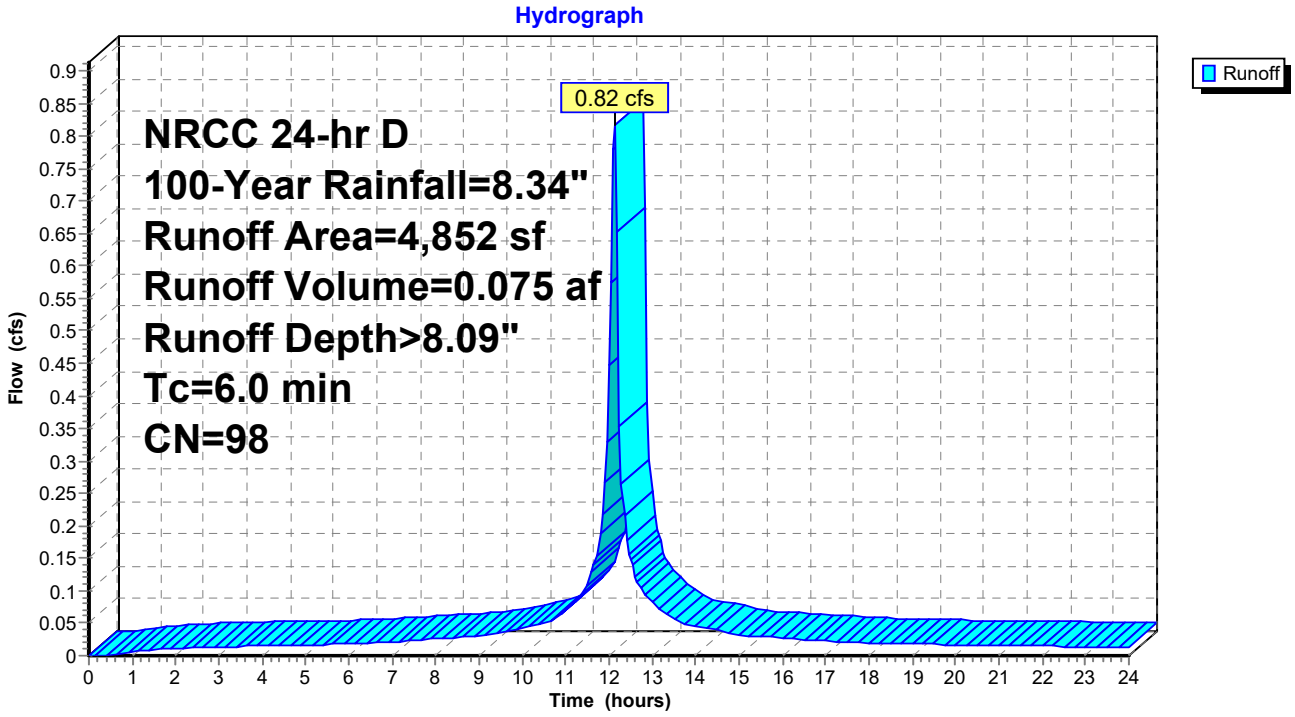
Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.075 af, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
4,852	98	Paved parking, HSG A
4,852		100.00% Impervious Area

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

Subcatchment 3S: 4x1213 SF DRIVEWAY



Summary for Subcatchment 4S: UNDEVELOP

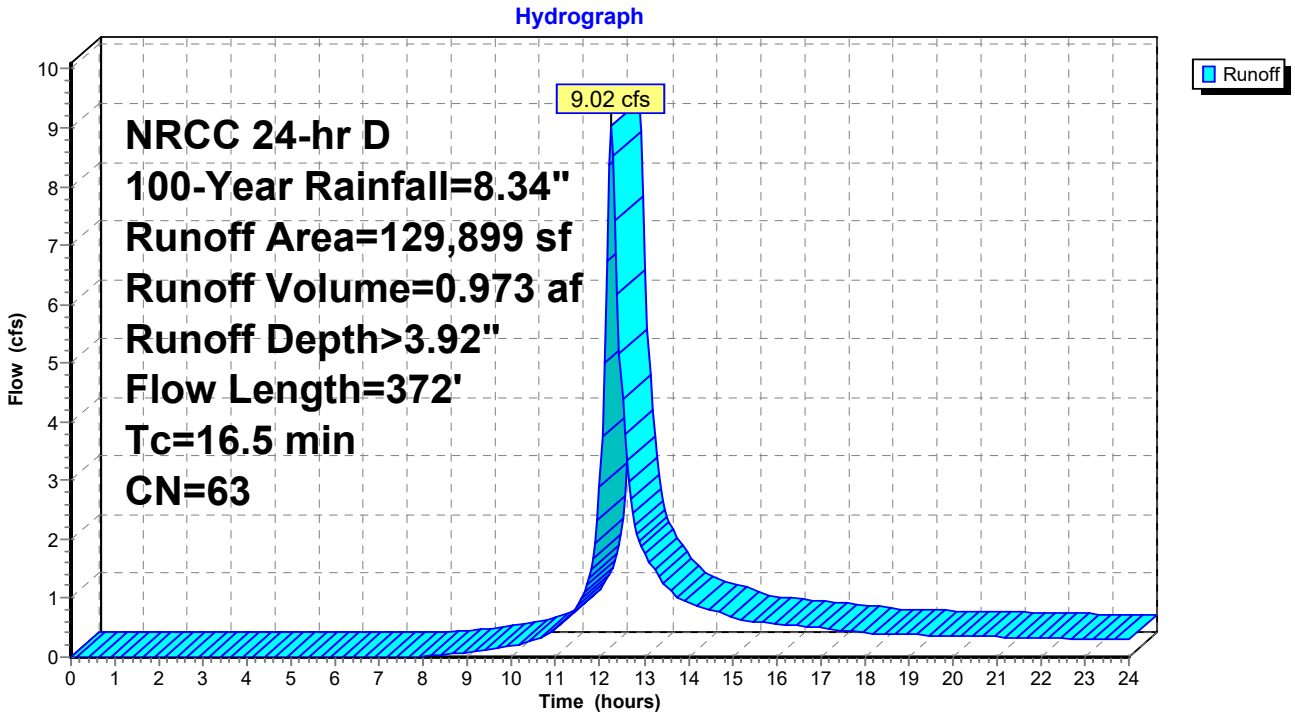
Runoff = 9.02 cfs @ 12.25 hrs, Volume= 0.973 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.34"

Area (sf)	CN	Description
2,923	98	Roofs, HSG B
2,343	96	Gravel surface, HSG B
72,459	55	Woods, Good, HSG B
52,174	70	Woods, Good, HSG C
129,899	63	Weighted Average
126,976		97.75% Pervious Area
2,923		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0290	0.08		**Sheet Flow, SHEET** Grass: Bermuda n= 0.410 P2= 3.13"
1.2	86	0.0600	1.22		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
3.6	167	0.0240	0.77		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
0.7	69	0.1200	1.73		**Shallow Concentrated Flow, SCF** Woodland Kv= 5.0 fps
16.5	372	Total			

Subcatchment 4S: UNDEVELOP

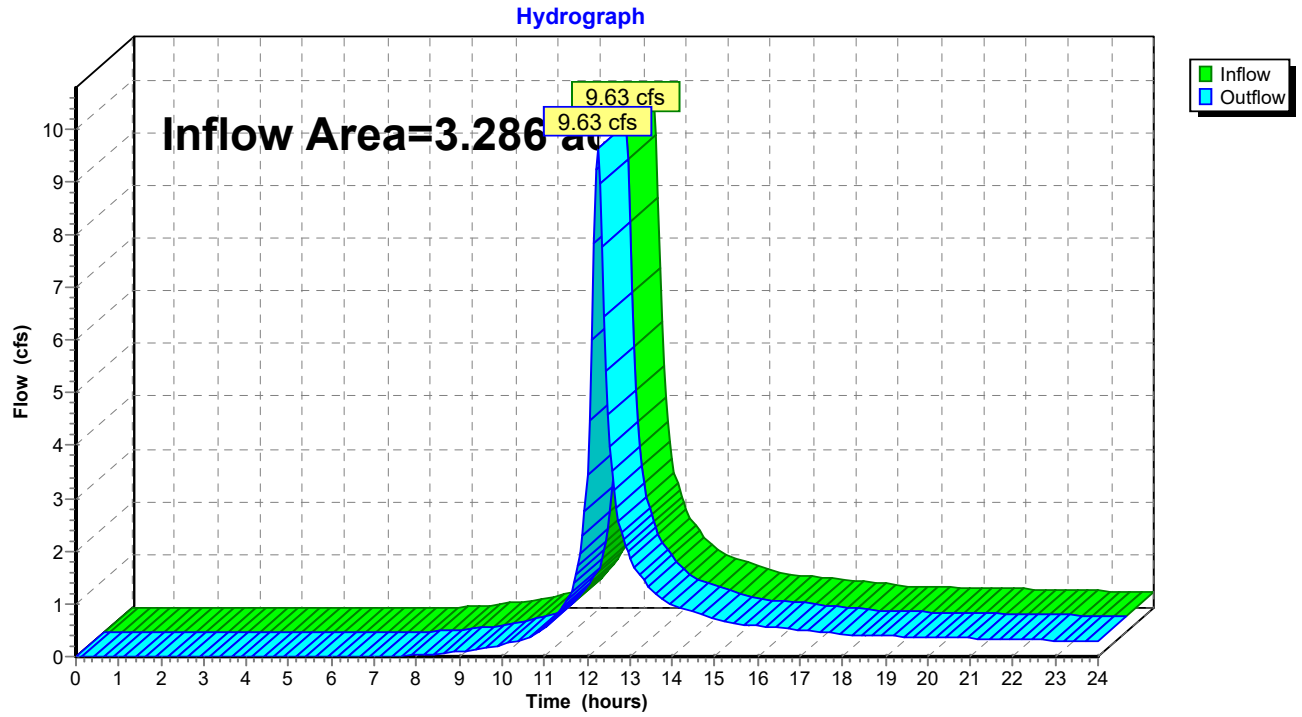


Summary for Reach 1R: WETLANDS

Inflow Area = 3.286 ac, 11.30% Impervious, Inflow Depth > 3.83" for 100-Year event
Inflow = 9.63 cfs @ 12.24 hrs, Volume= 1.048 af
Outflow = 9.63 cfs @ 12.24 hrs, Volume= 1.048 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 1R: WETLANDS



Summary for Pond 2P: Cultec

Inflow Area = 0.048 ac, 100.00% Impervious, Inflow Depth > 8.09" for 100-Year event
Inflow = 0.35 cfs @ 12.13 hrs, Volume= 0.033 af
Outflow = 0.35 cfs @ 12.13 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.13 hrs, Volume= 0.004 af
Primary = 0.35 cfs @ 12.13 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 853.27' @ 12.13 hrs Surf.Area= 279 sf Storage= 279 cf

Plug-Flow detention time= 166.4 min calculated for 0.026 af (80% of inflow)
Center-of-Mass det. time= 73.0 min (814.4 - 741.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	194 cf	**10.33'W x 27.00'L x 2.04'H Field A** 570 cf Overall - 86 cf Embedded = 484 cf x 40.0% Voids
#2A	845.50'	86 cf	**Cultec C-100HD** x 6 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 2 rows
		279 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**0.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.00 cfs @ 12.13 hrs HW=853.19' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.34 cfs @ 12.13 hrs HW=853.19' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.34 cfs @ 3.85 fps)

Pond 2P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 2 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

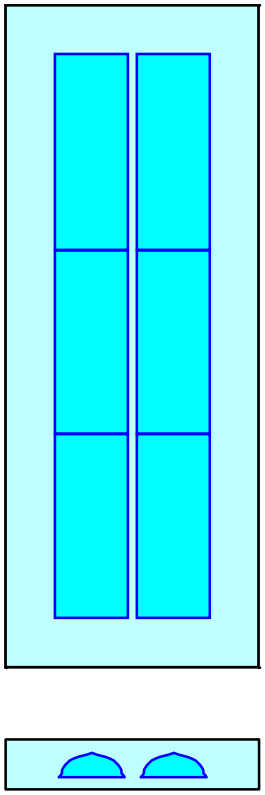
3 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 23.00' Row Length +24.0" End Stone x 2 = 27.00' Base Length
2 Rows x 36.0" Wide + 4.0" Spacing x 1 + 24.0" Side Stone x 2 = 10.33' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

6 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 2 Rows = 85.6 cf Chamber Storage

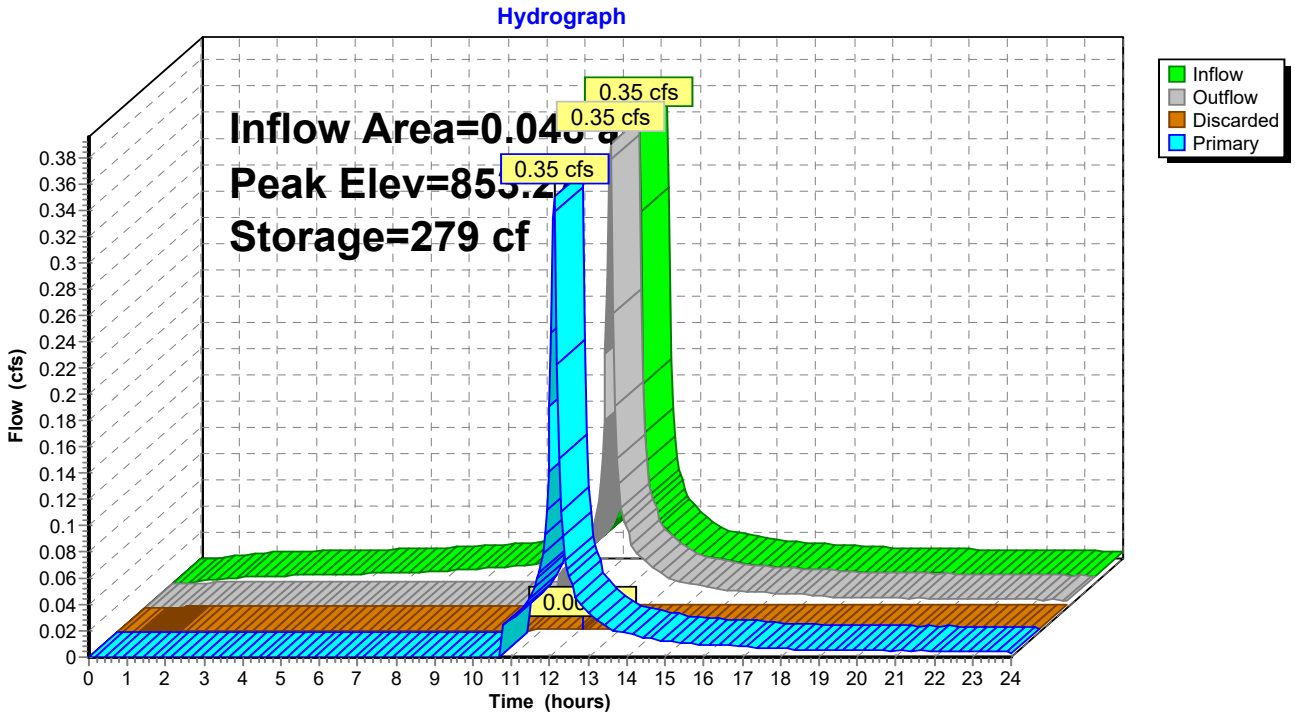
569.6 cf Field - 85.6 cf Chambers = 484.0 cf Stone x 40.0% Voids = 193.6 cf Stone Storage

Chamber Storage + Stone Storage = 279.2 cf = 0.006 af
Overall Storage Efficiency = 49.0%
Overall System Size = 27.00' x 10.33' x 2.04'

6 Chambers
21.1 cy Field
17.9 cy Stone



Pond 2P: Cultec



Summary for Pond 5P: Cultec

Inflow Area = 0.145 ac, 100.00% Impervious, Inflow Depth > 8.09" for 100-Year event
Inflow = 1.06 cfs @ 12.13 hrs, Volume= 0.098 af
Outflow = 0.07 cfs @ 13.62 hrs, Volume= 0.068 af, Atten= 93%, Lag= 89.4 min
Discarded = 0.05 cfs @ 13.60 hrs, Volume= 0.068 af
Primary = 0.02 cfs @ 13.61 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 852.10' @ 13.60 hrs Surf.Area= 1,704 sf Storage= 1,847 cf

Plug-Flow detention time=232.7 min calculated for 0.068 af (70% of inflow)
Center-of-Mass det. time=113.1 min (854.5 - 741.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	845.00'	1,088 cf	**23.67'W x 72.00'L x 2.04'H Field A** 3,479 cf Overall - 759 cf Embedded = 2,720 cf x 40.0% Voids
#2A	845.50'	759 cf	**Cultec C-100HD** x 54 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 6 rows
		1,847 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	845.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	852.00'	**4.0" Round Culvert** L= 5.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 852.00' S= -0.4000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.05 cfs @ 13.60 hrs HW=852.10' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.02 cfs @ 13.61 hrs HW=852.09' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.02 cfs @ 0.81 fps)

Pond 5P: Cultec - Chamber Wizard Field A

ChamberModel = CultecC-100HD(CultecContactor®100HD)
Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
Row Length Adjustment= +0.50' x 1.86 sf x 6 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

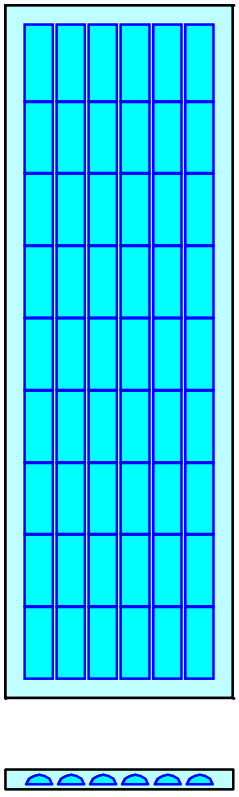
9 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 68.00' Row Length +24.0" End Stone x 2 = 72.00' Base Length
6 Rows x 36.0" Wide + 4.0" Spacing x 5 + 24.0" Side Stone x 2 = 23.67' Base Width
6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

54 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 6 Rows = 759.5 cf Chamber Storage

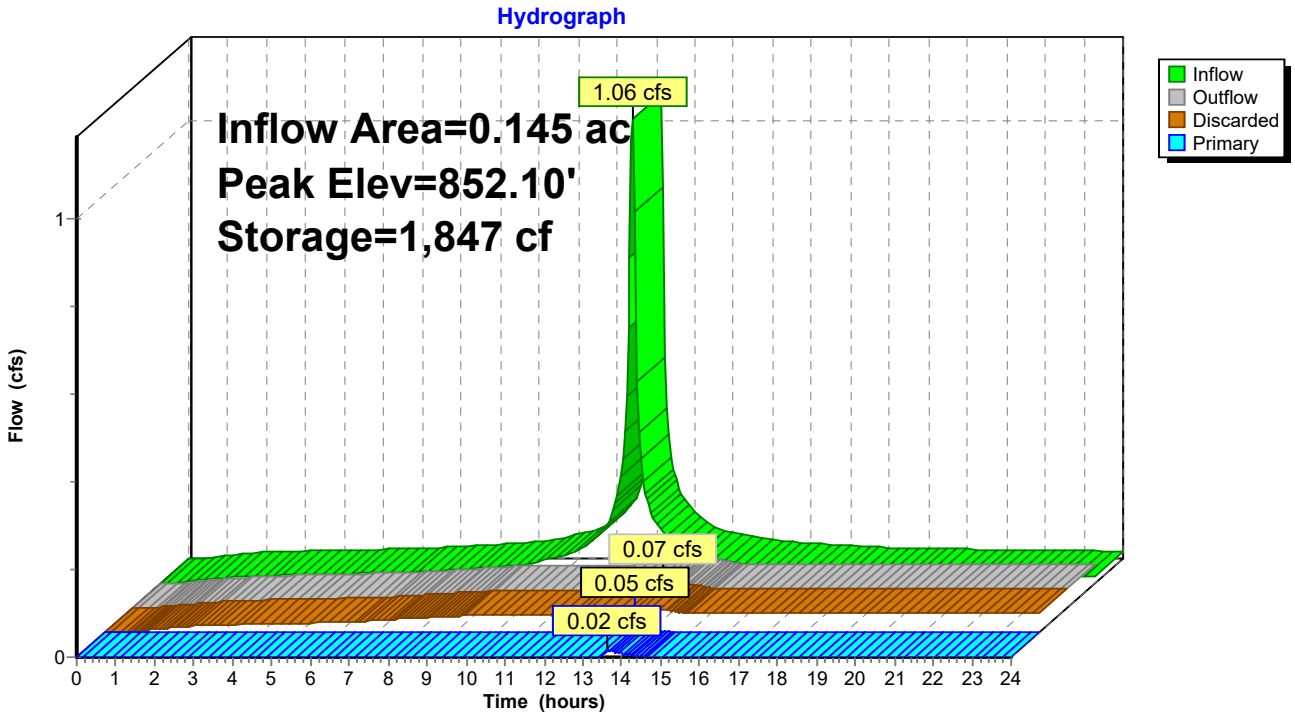
3,479.0 cf Field - 759.5 cf Chambers = 2,719.5 cf Stone x 40.0% Voids = 1,087.8 cf Stone Storage

Chamber Storage + Stone Storage = 1,847.3 cf = 0.042 af
Overall Storage Efficiency = 53.1%
Overall System Size = 72.00' x 23.67' x 2.04'

54 Chambers
128.9 cy Field
100.7 cy Stone



Pond 5P: Cultec



Summary for Pond 8P: 1'x1' Gravel Drip Edge

Inflow Area = 0.111 ac, 100.00% Impervious, Inflow Depth > 8.09" for 100-Year event
Inflow = 0.82 cfs @ 12.13 hrs, Volume= 0.075 af
Outflow = 0.77 cfs @ 12.15 hrs, Volume= 0.075 af, Atten= 6%, Lag= 1.5 min
Discarded = 0.01 cfs @ 12.15 hrs, Volume= 0.023 af
Primary = 0.76 cfs @ 12.15 hrs, Volume= 0.052 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 850.45' @ 12.15 hrs Surf.Area= 528 sf Storage= 118 cf

Plug-Flow detention time=4.1 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time=3.6 min (745.0 - 741.4)

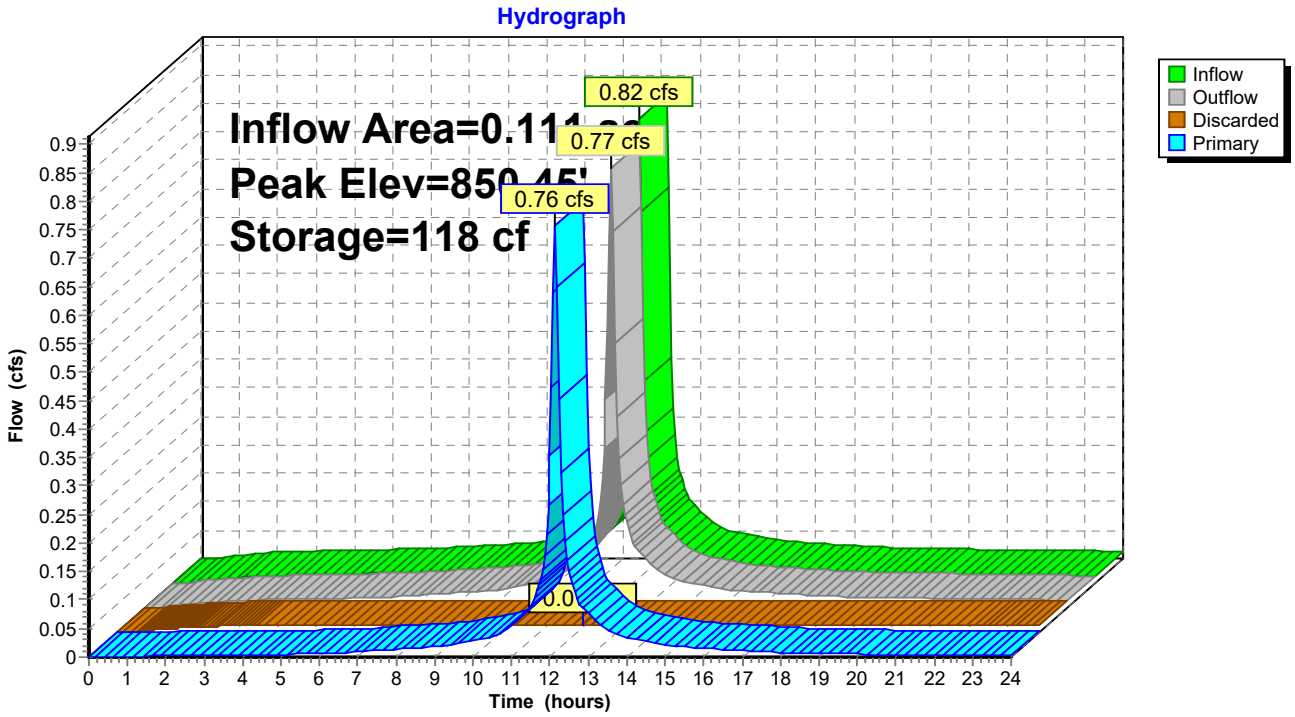
Volume	Invert	Avail.Storage	Storage Description
#1	850.00'	264 cf	**12.0" W x 12.0" H Box Pipe Storage** L= 528.0' 528 cf Overall x 50.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	850.00'	**1.020 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 818.00'
#2	Primary	850.00'	**12.0" W x 12.0" H Box Culvert** L= 10.0' Ke= 0.900 Inlet / Outlet Invert= 850.00' / 849.00' S= 0.1000 '/' Cc= 0.900 n= 0.033 Riprap, 1-inch, Flow Area= 1.00 sf

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=850.45' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=0.76 cfs @ 12.15 hrs HW=850.45' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.76 cfs @ 1.69 fps)

Pond 8P: 1'x1' Gravel Drip Edge



APPENDIX C

Stormwater Recharge Volume Calculations

Subcatchment 3S (Driveway)

Area Impervious = A_I= 4,852 sf (0.11 ac)

All development within HSG B & C

Re_{Vol}= 0.6" x A_I= 0.6" x 1ft/12" x 4,852 sf= 243 cf

$Re_{V\ Req'd}$=**243 cf**

Recharge Volume Provided = **264 cf (Drip Edge)**

Re_V 264 cf > $Re_{V\ Req's}$ 243 cf : OK

Subcatchment 1-2S (Roof)

Area Impervious = A_I= 8,400 sf (0.19 ac)

All development within HSG B & C

Re_{Vol}= 0.6" x A_I= 0.6" x 1ft/12" x 8,400 sf= 420 cf

$Re_{V\ Req'd}$=**420 cf**

Recharge Volume Provided = **2,126 cf (subsurface infiltration)**

Re_V 2,126 cf > $Re_{V\ Req's}$ 420 cf : OK

Water Quality Volume Calculations

Subcatchment 1-2S (Roof)

Area Impervious = A_I= 8,400 sf (0.19 ac)

WQV= 1.0" x A_I= 1.0" x 1ft/12" x 8,400 sf= 700 cf

$WQV_{Req'd}$=**700 cf**

Water Quality Volume Provided = **2,126 cf**

Re_V 2,126 cf > $Re_{V\ Req's}$ 700 cf : OK

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

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

Location: 710 Main Street, Leicester

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Subsurface Infiltration Structure	**0.80**	**1.00**	**0.80**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**

Total TSS Removal = **80%**

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

Project: 1785

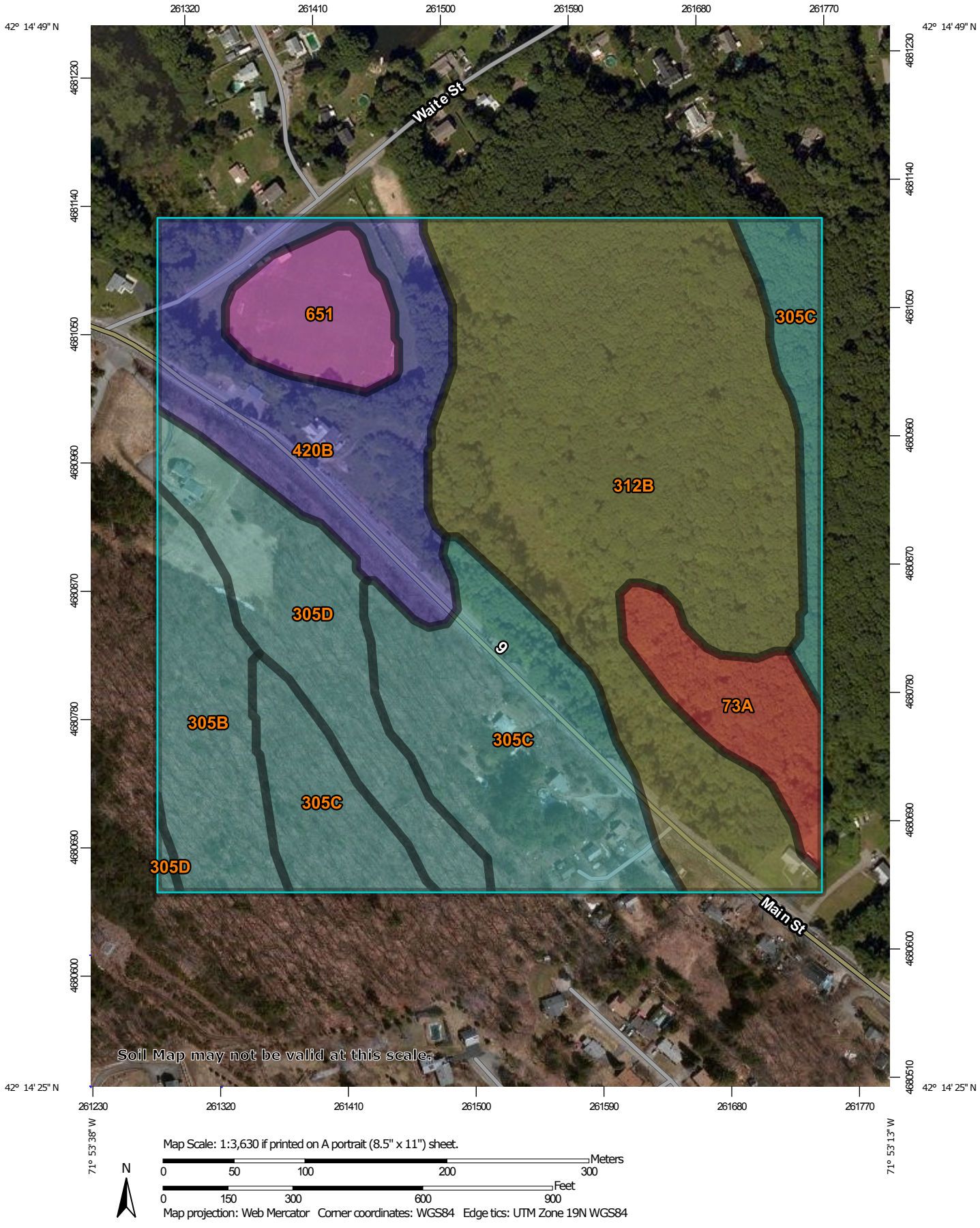
Prepared By: Zachary Gless

Date: 1/22/2019

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

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

1. From MassDEP Stormwater Handbook Vol. 1


71° 53' 38" W
71° 53' 13" W
42° 14' 49" N
42° 14' 25" N
261320
261410
261500
261590
261680
261770
261230
4681230
4681140
4681050
4680960
4680870
4680780
4680690
4680600
4680510
Waite St
Main St
651
420B
305D
305B
305C
305C
305D
312B
305C
9
73A
Soil Map may not be valid at this scale.
Map Scale: 1:3,630 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
50
100
200
300
Feet
0
150
300
600
900
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 11, Sep 11, 2018

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

Date(s) aerial images were photographed: Apr 8, 2011—Aug 27, 2016

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	2.8	5.0%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	4.2	7.6%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	12.2	22.2%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	C	5.3	9.7%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	20.1	36.5%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	7.9	14.4%
651	Udorthents, smoothed	A	2.5	4.6%
Totals for Area of Interest			**54.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan

for

710 Main Street
Four (4) Proposed Duplex Structures
Site Development

Leicester, Massachusetts

Prepared for:

Rapid Transit, LLC
1 Sherri Lane
Leicester, Massachusetts 01524

Prepared by:

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

January 23, 2019

EGI Project No. 1785

TABLE OF CONTENTS

1. Introduction

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

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

Rapid Transit, LLC
Leicester, Massachusetts

2. Project Narrative

The proponent, Rapid Transit, LLC, proposes to construct four (4) new single family residential duplex structures on the current property located at adjacent to 710 Main Street, Leicester MA. The proposed project will include the selective clearing and grubbing of development areas; a proposed bituminous concrete driveway with 1' crushed stone drip edge, and a two family (duplex) residential structure to be serviced by Town water and sewer for each lot. Onsite storm water management infrastructures will be inclusive of a Cultec® stormwater infiltration device to manage and infiltrate each structure's roof runoff as well as gravel drip edge along the entire length of each driveway. The proposed project will be conducted per the Massachusetts Department of Environmental Protection requirements, Local Town and State bylaws, as well as using best management practices.

The property is comprised of two parcels (not currently updated with the Town of Leicester Assessing Maps due to recent subdivision). The recorded parcel is shown as lot 8, block A, on Assessors Map 21B and appears to lie within the Business (B) zoning district based upon a review of the most recent Town of Leicester Zoning Map. The Parcel and is located within the FEMA Flood Zone X Area based upon a review of FIRM Map 25027C0782E, Panel 782 of 1075; last revised July 04, 2011. Currently there is overhead electric telephone/cable to service the property as well as municipal water and sewer.

The property's address is recorded as 710 Main Street, Leicester MA and abuts Main Street (Route 9) to the West with Town owned land to the North and privately owned land to the East and South. Access to the site is proposed via a driveway for each proposed structure via Main Street to the West. The existing site is comprised of a mix of wooded areas with one delineated wetland boundary to the East within the parcel.

The Worcester County Soil Survey, issued by the US Department of Agriculture was referenced to determine the type and hydrologic group of the soils located on the property. The property is comprised of mostly hydrologic soil group B, C, and D type soils.

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

A. Sediment Fence/Hay Bales Barrier Controls

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

Specifications

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

Installation Requirements

1. Hay bales shall be installed as directed by the owner's representative in accordance to manufacturer's Installation Guidelines, Staking Pattern Guide, and CAD details. The extent of hay bales shall be as shown on the project drawings.

2. Hay bales should be installed to intercept water flow and collect sediment on site. They may be placed over bare soil or on top of erosion control blankets.

3. They shall be secured to the subgrade by wood stakes every four lineal feet across the length of the hay bale. The stakes shall be driven through the center of the bales only and driven into the ground a minimum of 24 inches.

4. Hay bales installed in a swale or channel bottom shall allow the installation to continue up the slopes three feet above the anticipated high water mark and perpendicular to the flow of water.

5. The sediment fence shall be installed up gradient of the hay bale in accordance with the detail as shown on the Site Plans.

6. Spacing of hay bales shall be such that the elevation of the bottom of the bales upstream will be equal to the elevation of the top of the bales downstream.

7. Hay bales shall remain in place until fully established vegetation and root systems are present.

8. The sediment fence shall be installed to the up gradient side of the support net in a continuous length with a minimum of twelve (12) inches of the fence placed along the bottom and down gradient face of the trench. Break joints in the sediment fence shall be overlapped in accordance with the detail as shown on the Site Plans with care taken to avoid break joints in low points along the barrier line.

9. The sediment fence/hay bale barrier shall be entrench and backfilled. The trench should be excavated to a width of the proposed bales width plus six (6) inches and to a depth between four (4) to six (6) inches. After the installation of the barrier, the barrier shall be backfilled with the down gradient fill conforming to the existing ground level and the up gradient fill built up a minimum of four (4) inches against the barrier.

10. The barriers should be removed when they have served their usefulness, but not before all upslope areas have been permanently stabilized and permission to remove the barrier has been approved by the Town of Oxford Conservation Commission.

Inspection and Maintenance

1. The sediment fence/hay bale barrier shall be inspected weekly and after every rainfall event of one (1) inch or greater and at least daily during prolonged storm events.

2. Inspect the barrier system for any signs of down gradient erosion or breakout, sediment fence tears, depth of sediment and integrity of the barrier anchor system. All deficiencies shall be repaired or replaced immediately or over burden of sediment shall be removed.

3. The sediment deposits shall be removed after every storm event to reduce pressure on the barrier system and to provide adequate storage volume for the next storm event. Care shall be taken to avoid undermining the barrier system during removal operations.

B. Construction Entrance

A stabilized construction entrance shall be installed at the proposed development entrance off of the existing Rollingwood Drive. The construction entrance shall be installed immediately after any clearing/grubbing operations and all cut/fill activities, required to provide access to the proposed site, has been completed. The purpose of the construction entrance is to keep mud and sediment from being tracked off of the construction site and into the existing roadway. The construction entrance shall be constructed in accordance with the detail and shown on the Site Plans.

Specifications

Filter fabric shall be Mirafi 140 N or approved equivalent.
Stone shall be in accordance with the Massachusetts Highway Department Specifications.

Installation Requirements

1. Grade construction entrance to produce positive drainage toward temporary sedimentation controls on the property.

2. Stone for the construction entrance shall consist of one (1) to two (2) inch stone fill placed on the graded base.

3. The minimal length of the construction entrance should extend onto the site a minimum of fifty (50) feet and should have a width equal to the full width of the proposed roadway or twenty (20) feet, whichever is greater.

4. Place filter fabric shall be between the stone fill and the earth surface below to reduce the migration of soil particles from the underlying soil into the stone and vice versa.

Inspection and Maintenance

1. The construction entrance and sediment disposal area shall be inspected weekly and after every rainfall event of one (1) inch or greater.

2. Mud and sediment, tracked or washed onto public roads, shall be immediately removed by sweeping.

3. Provide periodic topdressing with additional stone to maintain the entrance in a condition that will prevent tracking or flowing of sediment onto public roads.

C. Temporary Sediment Basins

The Contractor shall construct temporary sediment basins where required to filter out sediment from stormwater until the permanent drainage system is functioning properly. The temporary sediment basins shall be lined with sediment fence/hay bale barrier controls. All stormwater runoff from disturbed areas shall be directed toward the temporary sediment basins prior to discharging from the site.

Installation Requirements

1. The sediment basins should be located as close to the sediment source as possible.

2. The sediment basins shall have a minimum length to width ratio of 2:1 and shall have minimum side slopes of 3:1.

3. The bottom of the sediment basin shall be lined with gravel/stone.

4. The sediment basin shall have a minimum storage volume of 3,600 cubic feet for each acre of disturbed drainage area.

Inspection and Maintenance

1. The sediment basins shall be inspected weekly and after every rainfall event of one (1) inch or greater.

2. Inspect the sediment basin for and settlement, seepage and erosion damage. All deficiencies shall be repaired or replaced immediately.

3. Remove and properly dispose of sediment when it accumulates to one-half (½) of the basin design volume. All trash and other debris shall be removed from the sediment basin on weekly basis.

4. Remove and replace gravel/stone when sediment basin does not drain properly.

D. Temporary Drainage Swales

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

Installation Requirements

1. The temporary drainage swales cross-section shall be constructed with a top width between two (2) to four (4) feet and a minimum height of one and on-half (1½) feet. The side slopes of the swale shall be between 2:1 and 4:1.

2. The maximum channel grade shall be one and on-half (1½) percent and shall have a positive grade to the outlet.

3. The stormwater runoff shall outlet through check dams and into temporary sediment basins.

Inspection and Maintenance

1. The temporary drainage swales shall be inspected weekly and after every rainfall event of one (1) inch or greater.

2. Inspect the drainage swales for construction induced damage, settlement and erosion damage. All deficiencies shall be repaired or replaced immediately.

3. Remove and properly dispose of sediment when it accumulates into the flow area. All trash and other debris shall be removed from the drainage swale on weekly basis.

E. Temporary Check Dam

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

Installation Requirements

1. Check dams shall be constructed of anchored hay bales or other approved means with a small sump located immediately upstream of the check dam.

2. The hay bales shall be either wire or nylon bound or string-tied. String-tied bales shall be installed so that the bindings are orientated around the sides, rather than along the tops and bottoms, to prevent the deterioration of the bindings.

3. Each hay bale shall be anchored with a minimum of two (2) wood stakes or steel rebar with the first anchor driven toward the previously laid hay bale to force bales together. The anchors shall be driven deep enough into the ground to securely anchor the bales or to a minimum of eighteen (18) inches.

4. All gaps between hay bales shall be filled by wedging with straw, to prevent water from escaping between the bales, and should be done with care in order not to separate the hay bales.

5. The maximum spacing between check dams shall be that the toe of the up gradient dam is at the same elevation as the top of the down gradient dam.

Inspection and Maintenance

1. The check dams shall be inspected weekly and after every rainfall event of one (1) inch or greater.

2. Inspect the check dams for damage and erosion damage. All deficiencies shall be repaired or replaced immediately.

3. Remove and properly dispose of sediment when it accumulates to a depth of one-half the dam height. All trash and other debris shall be removed from the check dam sump on weekly basis.

4. Construction Sequencing Plan

Anticipated Construction Schedule

1. Demarcate the proposed limit of work as well as trees and other buffer zone areas for protection.

2. Hold a pre-construction meeting a minimum of one (1) week prior to the start of construction.

3. Notify Dig-Safe to demarcate all underground utilities prior to start of construction.

4. Install sediment fence/hay bale barrier at locations indicated on the Site Plans.

5. Construct all temporary drainage swales to collect and divert stormwater runoff from undisturbed areas of the site to bypass construction area.

6. Clear and construct temporary construction entrance.

7. Clear and grub all areas associated with the construction of the development.

8. Excavate topsoil and subsoil from cut areas, install erosion control barriers and stockpile soil on site. Consideration should be given to locating soil stockpiles on the up gradient side of disturbed areas, where possible, to act as temporary diversions.

9. Fill areas in twelve (12) inch lifts and compact to 95% standard proctor. Install slope protection or retaining walls with reinforcement, where required.

10. Rough grade the site.

11. Construct temporary drainage swales with check dams along the sides of the proposed roadway as well as all temporary sediment basins.

12. Construct fine grading of driveways and lots.

13. Install closed drainage system and other utilities. Install Siltsack or approved equivalent at all catch basin grate locations (if applicable).

14. Complete final grading of driveway and development areas. Add additional erosion control measures as necessary.

15. Place the top surface course on driveways and permanently vegetate and landscape including the installation of trees. All slopes greater than 3:1 shall be stabilized with jute mesh.

16. After site is stabilized, remove all temporary measures and install permanent vegetation on all disturbed areas

APPENDIX E

POST-CONSTRUCTION STORM WATER OPERATIONS AND MAINTENANCE PLAN

GENERAL NOTES

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

2. UPON COMPLETION OF CONSTRUCTION, THE OPERATION AND MAINTENANCE OF ALL COMPONENTS OF THE STORMWATER MANAGEMENT SYSTEM WILL BE THE RESPONSIBILITY OF THE OWNER:

   710 Main Street
   Leicester, Massachusetts

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

EROSION CONTROL BMPs

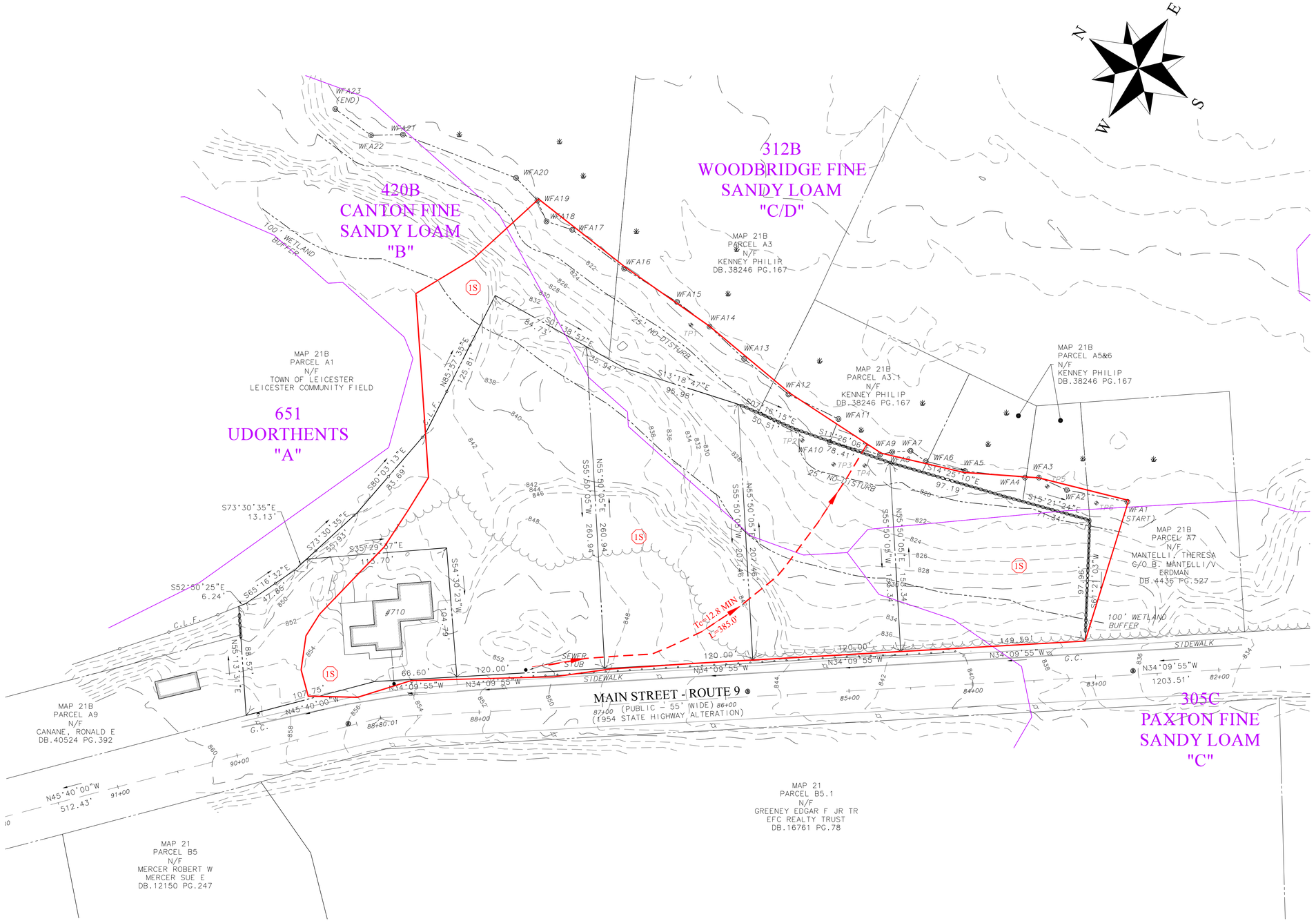
RETENTION SYSTEMS:

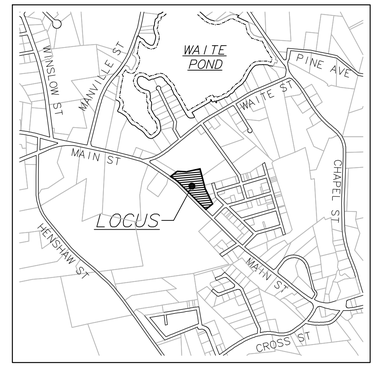
INSPECT AFTER EVERY MAJOR STORM EVENT (1" OR GREATER) DURING CONSTRUCTION AND FOR TWELVE (12) MONTHS AFTER CONSTRUCTION TO ENSURE PROPER STABILIZATION AND FUNCTION. THEREAFTER, INSPECT AT LEAST TWICE PER YEAR DURING WET WEATHER TO ENSURE THE SYSTEM IS DRAINING PROPERLY. CHECK FOR ACCUMULATION OF SEDIMENT AND PONDING WATER. IF PONDING WATER IS VISIBLE INSIDE THE SYSTEM FOR SEVERAL DAYS AFTER A STORM EVENT, NOTIFY THE ENGINEER FOR POSSIBLE REMEDIAL MEASURES. REMOVE SEDIMENT AS NECESSARY DURING CONSTRUCTION, WHILE THE SYSTEM IS DRY, AND AT LEAST ONCE EVERY FIVE YEARS AFTER CONSTRUCTION.

CULTEC UNIT:

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

APPENDIX F





LOCUS PLAN
1" = 1,000'±

GENERAL NOTES

1. RECORD OWNER
RAPID TRANSIT, LLC
1 SHERRI LANE
LEICESTER, MA. 01524
DEED BK. 58394 PG. 30

2. PROPERTY IS SHOWN AS PARCEL 8, BLOCK A, ON ASSESSORS MAP 21B AND APPEARS TO LIE WITHIN THE BUSINESS (B) ZONING DISTRICT PER THE TOWN OF LEICESTER ZONING MAP AND AVAILABLE ASSESSORS INFORMATION.

3. PROPERTY LINES SHOWN ARE DERIVED FROM AN ON THE GROUND SURVEY CONDUCTED ON MARCH 08 & MARCH 30, 2018 BY EXISTING GRADE, INC., LINES OF OCCUPATION, AND FOUND MONUMENTATION.

4. PARCEL APPEARS TO LIE WITHIN FLOOD ZONE X PER FIRM MAP 25027C0782E PANEL 782 OF 1075, LAST REVISED JULY 04, 2011, AS SHOWN ON THE FEMA WEBSITE.

5. EXISTING CONDITIONS SHOWN HEREON WERE COMPILED FROM AN ON THE GROUND SURVEY CONDUCTED ON MARCH 08 & MARCH 30, 2018 BY EXISTING GRADE, INC. AND FROM AERIAL IMAGERY PROVIDED BY THE STATE OF MASSACHUSETTS.

6. ORIGIN OF BEARINGS FROM 1954 MASSACHUSETTS STATE HIGHWAY ALTERATION PLAN FOR MAIN STREET (ROUTE 9).

7. ORIGIN OF ELEVATIONS IS NAVD 88, DETERMINED FROM A GPS SURVEY CONDUCTED BY EXISTING GRADE, INC. ON MARCH 08, 2018.

8. SURVEYOR HAS MADE NO INVESTIGATION OR INDEPENDENT SEARCH FOR EASEMENTS OF RECORD, ENCUMBRANCES, RESTRICTIVE COVENANTS, OWNERSHIP TITLE EVIDENCE, OR ANY OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE.

9. WETLANDS SHOWN FIELD DELINEATED BY EBT ENVIRONMENTAL CONSULTANTS, INC. 601 MAIN STREET, NORTH OXFORD, MA., ON FEBRUARY 20, 2018, FIELD LOCATED BY EXISTING GRADE ON MARCH 08, 2018.

10. EXISTING STRUCTURE (#710) CONNECTED TO TOWN SEWER AND WATER.

ZONE: BUSINESS
(B)

LOT AREA (REQUIRED)	15,000 S.F.
FRONTAGE (REQUIRED)	100'
FRONT YARD (REQUIRED)	25'
SIDE YARD (REQ'D)	10'
REAR YARD (REQ'D)	25'
BUILDING COVERAGE (MAX)	30%

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

SCALE
SCALE 1" = 40'
0 20 40 80

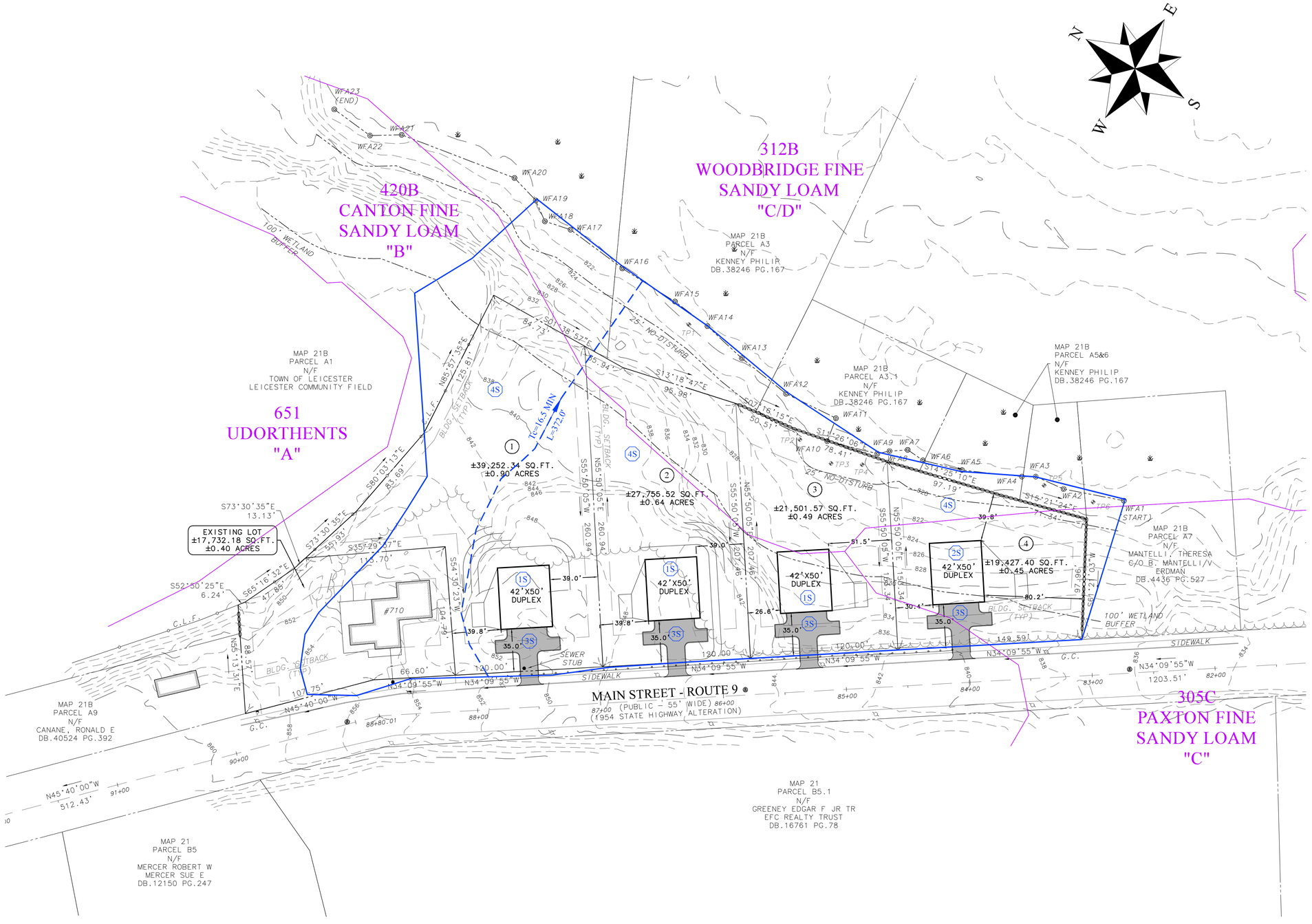
NO.	DATE	BY	REVISIONS

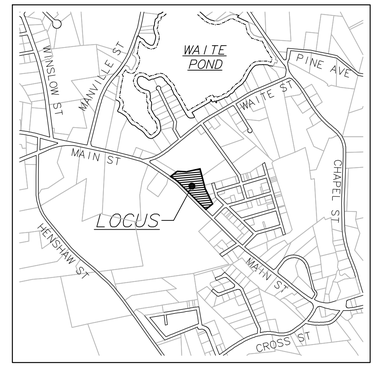
CLIENT
MATTHEW DUMAS
DAVIS HILL ROAD
PAXTON, MASSACHUSETTS 01612

PRE-DEVELOPMENT WATERHSED
FOR
710 MAIN STREET
CHERRY VALLEY, MASSACHUSETTS 01611

1785_LAYOUT

PROJECT NO. 1785
DATE: 01/23/19
SHEET NO. 1 OF 1





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