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*Every Project Needs a Plan*

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**Project:** 262-270 Main St Development

**Project #:** JMA02P003

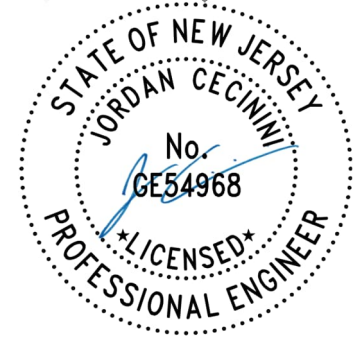
**Subject:** Engineering Stormwater Narrative

**Date:** May 26, 2026

**Prepared by:** Jordan Cecinini, PE

**License #:** GE54968

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## Contents

|   |                                                    |    |
|---|----------------------------------------------------|----|
| 1 | Introduction.....                                  | 1  |
| 2 | Methodology.....                                   | 1  |
| 3 | Pre-Design Investigative Analysis.....             | 1  |
| 4 | Pre-Developed Condition.....                       | 1  |
| 5 | Post-Developed Condition .....                     | 1  |
| 6 | Groundwater Recharge .....                         | 2  |
| 7 | Groundwater Mounding.....                          | 3  |
| 8 | Conclusion .....                                   | 3  |
|   | Appendix A: Precipitation Frequency Estimates..... | 4  |
|   | Appendix B: Soils Maps & Soil Data.....            | 5  |
|   | Appendix C: Pre-Development Analysis.....          | 6  |
|   | Appendix D: Post-Development Analysis .....        | 7  |
|   | Appendix E: Water Quality Analysis .....           | 8  |
|   | Appendix F: Groundwater Recharge .....             | 10 |

|                                                   |    |
|---------------------------------------------------|----|
| Appendix G: Groundwater Mounding.....             | 11 |
| Appendix H: Low Impact Development Checklist..... | 12 |

## **1 Introduction**

Hudson Engineering, LLC (HE) was engaged by Jorge Mastropietro Architects to perform a Geotechnical Investigation for the new development at 262-270 Main St West Orange, NJ, 07052 (Block: 114 Lot: 50 & 55) in Essex County, New Jersey ("Project Site"). The proposed development will consist of a new supermarket and parking lot.

This Stormwater Management plan references the Best Management Practices (BMPs) to control stormwater and erosion during and upon the completion of the proposed supermarket at the Project Site. The design is in accordance with the New Jersey Department of Environmental Protection (NJDEP) stormwater regulations as the proposed work does disturb more than one acre of land.

## **2 Methodology**

The site was modeled for the Site Specific 24 hour storm event, as provided by the NOAA, using HydroCAD, the Soil Conservation Service (SCS) TR-20's software to aid in the design of the stormwater system. The rainfall data for the 2-, 10-, & 100-year storm events was used, and the precipitation factors from NJAC 7:8 for both the current and future storms were used for the design storm. The "Complex Number" (CN) value was determined based on the soil type, surface conditions, and land use. The minimum "Time of Concentration" (Tc) was used per the BMP.

## **3 Pre-Design Investigative Analysis**

A pre-design investigative analysis was previously performed including deep hole test. Deep test holes were excavated for the existing project site and labeled [T1 & T2], as shown on the plans.

- B1 was excavated to a depth of 30-feet and contained silty gravel to a depth of 18-feet and silty sand down to 30-feet to the bottom of the excavation. Ground water was not observed.
- B2 was excavated to a depth of 9.5-feet and contained sand with silt to a depth of 9.5-feet down to the bottom of the excavation. Ground water was not observed.

See Appendix E for the geotechnical report.

## **4 Pre-Developed Condition**

In the pre-developed condition, the project site can be characterized as moderately sloped from west to east. The soil classification, based upon Essex County Soil Mapping, is Urban land, Boonton substratum – Boonton complex, red sandstone lowland. The site is located on Main Street in between 262 and 270 Main Street. The site is mostly developed impervious.

## **5 Post-Developed Condition**

In the post-developed condition, the proposed impervious areas were modeled as two (2) watersheds which flow into two stormwater management systems, "Basin A" and "Porous Pavement B." The watershed contains approximately 29,311 square feet of impervious coverage consisting of the proposed supermarket and asphalt driveways. Two (2) stormwater systems are proposed on the site. One (1) is an approximate 2,140 square foot underground Cultec system that collects all of the runoff from the roof of the supermarket. The system is designed to contain the full Water Quality Volume for the required storm event from the watershed and percolate the water into the soil, whilst discharging the Water Quantity storms into the storm system on Main Street. Since the roof runoff is not a surface where vehicles will travel, treatment is not required for this runoff.

One (1) is an approximate 5,700 square feet porous pavement system that collects the runoff from the parking area. The system is designed to contain the full Water Quality Volume for the required storm event from the watershed and percolate the water into the soil, whilst discharging the Water Quantity storms into the storm system on Main Street. Since the parking area is subject to regular vehicular traffic, a TSS removal rate of 80% is required. A portion of the parking area discharges directly into the porous pavement system, which treats the runoff at a rate of 80%.

The remaining runoff discharges into two (2) trench drain systems that flow into an Aqua-Ponic treatment unit. The Aqua-Ponic unit treats the runoff at a rate of 80% before discharging into the porous pavement system for quantity control. Therefore, the total treatment for the site meets the required 80% and complies with Water Quality requirements.

As for Water Quantity requirements, the NJDEP requires a reduction of 50%, 75%, and 80% for the 2-, 10-, and 100-year storm events, respectively, from the existing flow rates to the proposed flow rates. These requirements apply for the quantity storm events with both the current and future reduction factors applied as listed in NJAC 7:8 tables 5-5 and 5-6. These requirements will be met by the underground Cultec system and the porous pavement system which both discharge from their respective outlet control structures into the existing storm system on Main Street. The tables below demonstrate how the project complies with the Quantity reduction requirements.

| <b>STORMWATER ANALYSIS (CURRENT)</b> |                            |                         |                                     |                            |
|--------------------------------------|----------------------------|-------------------------|-------------------------------------|----------------------------|
| STORM TYPE                           | EXISTING RUNOFF RATE (CFS) | PERCENTAGE OF REDUCTION | MAXIMUM ALLOWABLE RUNOFF RATE (CFS) | PROPOSED RUNOFF RATE (CFS) |
| 2-YEAR                               | 2.68                       | 50%                     | 1.34                                | 0.06                       |
| 10-YEAR                              | 4.20                       | 75%                     | 3.15                                | 0.39                       |
| 100-YEAR                             | 7.27                       | 80%                     | 5.82                                | 3.15                       |

| <b>STORMWATER ANALYSIS (FUTURE)</b> |                            |                         |                                     |                            |
|-------------------------------------|----------------------------|-------------------------|-------------------------------------|----------------------------|
| STORM TYPE                          | EXISTING RUNOFF RATE (CFS) | PERCENTAGE OF REDUCTION | MAXIMUM ALLOWABLE RUNOFF RATE (CFS) | PROPOSED RUNOFF RATE (CFS) |
| 2-YEAR                              | 3.17                       | 50%                     | 1.59                                | 0.11                       |
| 10-YEAR                             | 4.98                       | 75%                     | 3.74                                | 1.34                       |
| 100-YEAR                            | 9.13                       | 80%                     | 7.30                                | 4.05                       |

## **6 Groundwater Recharge**

According to chapter 5.4 of NJAC 7:8, groundwater recharge is required for a major development project. The groundwater recharge was calculated using the GSR-32 spreadsheet taken from the New Jersey Best Management Practices (NJBMP) manual. The post-development annual recharge deficit was calculated to be -543 cubic feet. Since the deficit is negative, which indicates that more groundwater will be recharged into the soil for post-development conditions than pre-development conditions, the groundwater recharge requirements for this project have been met.

## 7 Groundwater Mounding

| GROUNDWATER MOUNDING |                    |                            |                                |                                      |
|----------------------|--------------------|----------------------------|--------------------------------|--------------------------------------|
| BMP                  | ESTIMATED<br>SHGWT | BOTTOM OF BMP<br>ELEVATION | GROUNDWATER<br>MOUNDING HEIGHT | GROUNDWATER<br>MOUNDING<br>ELEVATION |
| Basin A              | 91.50              | 95.70                      | 3.19                           | 94.69                                |
| Porous Pavement B    | 91.50              | 97.00                      | 4.00                           | 95.50                                |

As shown in the table above, the groundwater mounding does not exceed the bottom elevation of the stormwater management measures. Therefore, the groundwater mounding requirements have been met.

## 8 Conclusion

The stormwater management plan proposed meets all the requirements set forth by the NJDEP. Design modification requirements that may occur during the approval process will be performed and submitted for review to the Township of West Orange.

## **Appendix A: Precipitation Frequency Estimates**



NOAA Atlas 14, Volume 2, Version 3  
Location name: West Orange, New Jersey, USA\*  
Latitude: 40.7866°, Longitude: -74.2324°  
Elevation: 196 ft\*\*  
\* source: ESRI Maps  
\*\* source: USGS



## POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps & aerals](#)

### PF tabular

| PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup> |                                     |                        |                        |                        |                        |                        |                        |                        |                        |                        |
|----------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Duration                                                                                                 | Average recurrence interval (years) |                        |                        |                        |                        |                        |                        |                        |                        |                        |
|                                                                                                          | 1                                   | 2                      | 5                      | 10                     | 25                     | 50                     | 100                    | 200                    | 500                    | 1000                   |
| 5-min                                                                                                    | 0.335<br>(0.306-0.368)              | 0.400<br>(0.366-0.439) | 0.473<br>(0.432-0.519) | 0.528<br>(0.480-0.579) | 0.593<br>(0.538-0.650) | 0.639<br>(0.577-0.700) | 0.685<br>(0.616-0.750) | 0.726<br>(0.648-0.795) | 0.780<br>(0.690-0.857) | 0.818<br>(0.718-0.901) |
| 10-min                                                                                                   | 0.534<br>(0.488-0.586)              | 0.638<br>(0.583-0.699) | 0.755<br>(0.689-0.829) | 0.838<br>(0.763-0.919) | 0.938<br>(0.852-1.03)  | 1.01<br>(0.913-1.11)   | 1.08<br>(0.971-1.18)   | 1.14<br>(1.02-1.25)    | 1.22<br>(1.08-1.34)    | 1.27<br>(1.12-1.40)    |
| 15-min                                                                                                   | 0.664<br>(0.607-0.729)              | 0.798<br>(0.730-0.876) | 0.951<br>(0.868-1.04)  | 1.06<br>(0.962-1.16)   | 1.19<br>(1.08-1.30)    | 1.28<br>(1.15-1.40)    | 1.36<br>(1.23-1.49)    | 1.44<br>(1.28-1.58)    | 1.53<br>(1.36-1.68)    | 1.60<br>(1.40-1.76)    |
| 30-min                                                                                                   | 0.907<br>(0.829-0.995)              | 1.10<br>(1.00-1.20)    | 1.34<br>(1.23-1.48)    | 1.52<br>(1.38-1.67)    | 1.75<br>(1.59-1.91)    | 1.91<br>(1.72-2.09)    | 2.07<br>(1.86-2.27)    | 2.22<br>(1.98-2.43)    | 2.42<br>(2.14-2.66)    | 2.56<br>(2.25-2.82)    |
| 60-min                                                                                                   | 1.13<br>(1.03-1.24)                 | 1.37<br>(1.26-1.51)    | 1.72<br>(1.57-1.89)    | 1.98<br>(1.80-2.17)    | 2.32<br>(2.10-2.54)    | 2.58<br>(2.33-2.82)    | 2.84<br>(2.55-3.11)    | 3.10<br>(2.77-3.40)    | 3.45<br>(3.05-3.79)    | 3.72<br>(3.26-4.10)    |
| 2-hr                                                                                                     | 1.38<br>(1.26-1.52)                 | 1.68<br>(1.54-1.85)    | 2.13<br>(1.94-2.35)    | 2.48<br>(2.26-2.73)    | 2.97<br>(2.68-3.26)    | 3.37<br>(3.02-3.69)    | 3.78<br>(3.36-4.14)    | 4.20<br>(3.72-4.61)    | 4.80<br>(4.20-5.28)    | 5.28<br>(4.57-5.81)    |
| 3-hr                                                                                                     | 1.54<br>(1.41-1.70)                 | 1.88<br>(1.72-2.07)    | 2.38<br>(2.18-2.62)    | 2.78<br>(2.53-3.05)    | 3.32<br>(3.01-3.65)    | 3.77<br>(3.39-4.13)    | 4.23<br>(3.78-4.63)    | 4.71<br>(4.17-5.16)    | 5.38<br>(4.71-5.90)    | 5.91<br>(5.13-6.49)    |
| 6-hr                                                                                                     | 1.99<br>(1.83-2.19)                 | 2.42<br>(2.22-2.66)    | 3.06<br>(2.80-3.35)    | 3.58<br>(3.26-3.91)    | 4.33<br>(3.91-4.71)    | 4.95<br>(4.44-5.38)    | 5.61<br>(4.99-6.10)    | 6.31<br>(5.56-6.87)    | 7.33<br>(6.36-7.98)    | 8.17<br>(7.01-8.91)    |
| 12-hr                                                                                                    | 2.48<br>(2.27-2.73)                 | 3.01<br>(2.75-3.31)    | 3.82<br>(3.49-4.20)    | 4.51<br>(4.10-4.94)    | 5.52<br>(4.97-6.01)    | 6.38<br>(5.70-6.94)    | 7.31<br>(6.46-7.95)    | 8.34<br>(7.28-9.07)    | 9.86<br>(8.44-10.7)    | 11.2<br>(9.40-12.1)    |
| 24-hr                                                                                                    | 2.80<br>(2.60-3.04)                 | 3.39<br>(3.14-3.69)    | 4.35<br>(4.02-4.72)    | 5.17<br>(4.76-5.61)    | 6.40<br>(5.86-6.93)    | 7.47<br>(6.79-8.09)    | 8.66<br>(7.78-9.38)    | 9.99<br>(8.87-10.8)    | 12.0<br>(10.5-13.0)    | 13.7<br>(11.8-15.0)    |
| 2-day                                                                                                    | 3.30<br>(3.05-3.59)                 | 4.00<br>(3.69-4.35)    | 5.11<br>(4.71-5.56)    | 6.04<br>(5.55-6.56)    | 7.40<br>(6.76-8.04)    | 8.56<br>(7.77-9.31)    | 9.83<br>(8.85-10.7)    | 11.2<br>(10.0-12.3)    | 13.3<br>(11.6-14.6)    | 15.0<br>(13.0-16.6)    |
| 3-day                                                                                                    | 3.48<br>(3.22-3.77)                 | 4.21<br>(3.90-4.57)    | 5.35<br>(4.95-5.81)    | 6.30<br>(5.81-6.84)    | 7.68<br>(7.04-8.33)    | 8.85<br>(8.05-9.60)    | 10.1<br>(9.13-11.0)    | 11.5<br>(10.3-12.5)    | 13.5<br>(11.9-14.8)    | 15.2<br>(13.2-16.7)    |
| 4-day                                                                                                    | 3.65<br>(3.38-3.95)                 | 4.42<br>(4.10-4.78)    | 5.60<br>(5.18-6.06)    | 6.57<br>(6.06-7.11)    | 7.97<br>(7.32-8.62)    | 9.14<br>(8.33-9.89)    | 10.4<br>(9.40-11.3)    | 11.7<br>(10.5-12.8)    | 13.7<br>(12.1-15.0)    | 15.3<br>(13.4-16.9)    |
| 7-day                                                                                                    | 4.31<br>(4.02-4.65)                 | 5.18<br>(4.83-5.59)    | 6.44<br>(5.99-6.94)    | 7.48<br>(6.93-8.05)    | 8.97<br>(8.26-9.65)    | 10.2<br>(9.35-11.0)    | 11.5<br>(10.5-12.4)    | 12.9<br>(11.7-14.0)    | 14.9<br>(13.3-16.3)    | 16.6<br>(14.6-18.2)    |
| 10-day                                                                                                   | 4.94<br>(4.62-5.31)                 | 5.90<br>(5.52-6.34)    | 7.23<br>(6.75-7.76)    | 8.32<br>(7.74-8.92)    | 9.85<br>(9.13-10.6)    | 11.1<br>(10.2-11.9)    | 12.4<br>(11.4-13.4)    | 13.8<br>(12.6-14.9)    | 15.8<br>(14.2-17.2)    | 17.4<br>(15.4-19.0)    |
| 20-day                                                                                                   | 6.68<br>(6.28-7.12)                 | 7.92<br>(7.45-8.44)    | 9.46<br>(8.88-10.1)    | 10.7<br>(9.99-11.4)    | 12.3<br>(11.5-13.1)    | 13.6<br>(12.6-14.5)    | 14.9<br>(13.8-15.9)    | 16.2<br>(14.9-17.3)    | 17.9<br>(16.3-19.3)    | 19.2<br>(17.4-20.8)    |
| 30-day                                                                                                   | 8.33<br>(7.87-8.80)                 | 9.83<br>(9.29-10.4)    | 11.5<br>(10.9-12.2)    | 12.8<br>(12.0-13.5)    | 14.4<br>(13.6-15.3)    | 15.7<br>(14.7-16.6)    | 16.9<br>(15.8-17.9)    | 18.1<br>(16.8-19.2)    | 19.6<br>(18.2-21.0)    | 20.7<br>(19.1-22.2)    |
| 45-day                                                                                                   | 10.6<br>(10.0-11.1)                 | 12.4<br>(11.8-13.1)    | 14.3<br>(13.6-15.1)    | 15.8<br>(15.0-16.6)    | 17.6<br>(16.7-18.6)    | 19.0<br>(17.9-20.1)    | 20.4<br>(19.2-21.5)    | 21.6<br>(20.3-22.9)    | 23.3<br>(21.7-24.7)    | 24.4<br>(22.7-26.0)    |
| 60-day                                                                                                   | 12.7<br>(12.1-13.3)                 | 14.9<br>(14.1-15.6)    | 17.0<br>(16.1-17.9)    | 18.6<br>(17.6-19.5)    | 20.6<br>(19.5-21.6)    | 22.0<br>(20.8-23.2)    | 23.3<br>(22.0-24.6)    | 24.6<br>(23.2-26.0)    | 26.1<br>(24.5-27.7)    | 27.2<br>(25.4-28.9)    |

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

### PF graphical

## **Appendix B: Soils Maps & Soil Data**



United States  
Department of  
Agriculture

NRCS

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for Essex County, New Jersey



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

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|                                                                                                               |    |
|---------------------------------------------------------------------------------------------------------------|----|
| <b>Preface</b> .....                                                                                          | 2  |
| <b>How Soil Surveys Are Made</b> .....                                                                        | 5  |
| <b>Soil Map</b> .....                                                                                         | 8  |
| Soil Map.....                                                                                                 | 9  |
| Legend.....                                                                                                   | 10 |
| Map Unit Legend.....                                                                                          | 11 |
| Map Unit Descriptions.....                                                                                    | 11 |
| Essex County, New Jersey.....                                                                                 | 13 |
| USBOOB—Urban land, Boonton substratum - Boonton complex, red<br>sandstone lowland, 0 to 8 percent slopes..... | 13 |
| <b>References</b> .....                                                                                       | 15 |

# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report  
Soil Map



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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: Essex County, New Jersey  
Survey Area Data: Version 21, Aug 28, 2025

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

Date(s) aerial images were photographed: Oct 10, 2022—Oct 16, 2022

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

MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

**Special Point Features**

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

## Map Unit Legend

| Map Unit Symbol                    | Map Unit Name                                                                                  | Acres in AOI | Percent of AOI |
|------------------------------------|------------------------------------------------------------------------------------------------|--------------|----------------|
| USBOOB                             | Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes | 0.8          | 100.0%         |
| <b>Totals for Area of Interest</b> |                                                                                                | <b>0.8</b>   | <b>100.0%</b>  |

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Essex County, New Jersey

### USBOOB—Urban land, Boonton substratum - Boonton complex, red sandstone lowland, 0 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* w9c3

*Elevation:* 0 to 560 feet

*Mean annual precipitation:* 30 to 64 inches

*Mean annual air temperature:* 46 to 79 degrees F

*Frost-free period:* 131 to 178 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Urban land, boonton red sandstone lowland substratum:* 60 percent

*Boonton, red sandstone lowland, and similar soils:* 30 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Urban Land, Boonton Red Sandstone Lowland Substratum

##### Setting

*Landform:* Ground moraines

*Landform position (three-dimensional):* Lower third of mountainflank

*Anthropogenic Feature:* Urban land

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material

##### Typical profile

*H1 - 0 to 12 inches:* material

*H2 - 12 to 67 inches:* gravelly loam

*2CB - 67 to 83 inches:* gravelly sandy loam

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* Unranked

#### Description of Boonton, Red Sandstone Lowland

##### Setting

*Landscape:* Till plains

*Landform:* Ground moraines

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Coarse-loamy till derived from sandstone and shale

##### Typical profile

*Oi - 0 to 1 inches:* slightly decomposed plant material

*A - 1 to 3 inches:* silt loam

*BE - 3 to 10 inches:* loam

*Bw - 10 to 27 inches:* gravelly loam

*Bx1 - 27 to 40 inches:* gravelly fine sandy loam

*Bx2 - 40 to 67 inches:* gravelly fine sandy loam

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*BCx - 67 to 83 inches: gravelly sandy loam*

### **Properties and qualities**

*Slope: 3 to 8 percent*

*Depth to restrictive feature: 20 to 36 inches to fragipan*

*Drainage class: Well drained*

*Runoff class: Medium*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)*

*Depth to water table: More than 80 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water supply, 0 to 60 inches: Low (about 4.8 inches)*

### **Interpretive groups**

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 2e*

*Hydrologic Soil Group: C*

*Ecological site: F144AY037MA - Moist Dense Till Uplands*

*Hydric soil rating: No*

### **Minor Components**

#### **Udorthents, boonton red sandstone lowland substratum**

*Percent of map unit: 10 percent*

*Landform: Ground moraines*

*Landform position (three-dimensional): Lower third of mountainflank*

*Anthropogenic features: Leveled land*

*Down-slope shape: Convex*

*Across-slope shape: Linear*

*Hydric soil rating: No*

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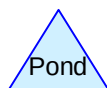
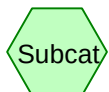
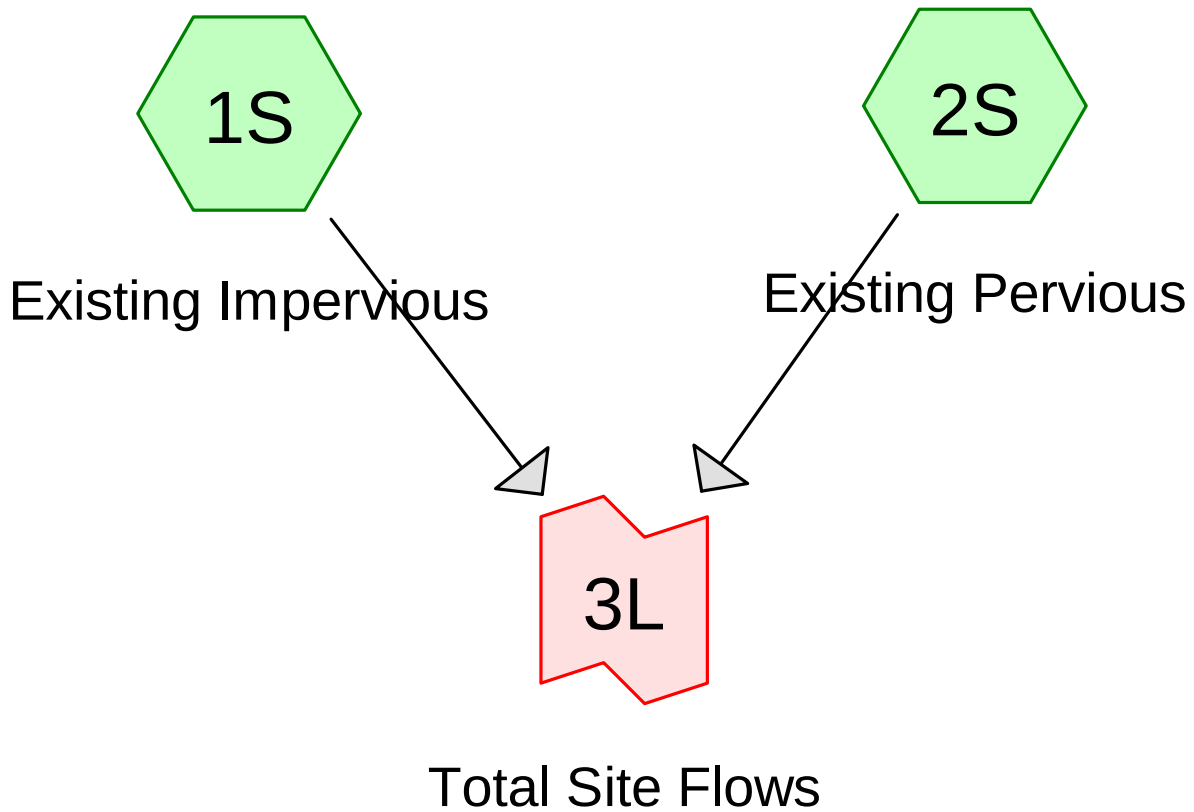
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## **Appendix C: Pre-Development Analysis**



#### Routing Diagram for Existing Flows

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## Existing Flows

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### Rainfall Events Listing

| Event# | Event Name       | Storm Type   | Curve | Mode    | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|------------------|--------------|-------|---------|------------------|-----|----------------|-----|
| 1      | 2-Year-Current   | NOAA10 24-hr | D     | Default | 24.00            | 1   | 3.43           | 2   |
| 2      | 10-Year-Current  | NOAA10 24-hr | D     | Default | 24.00            | 1   | 5.33           | 2   |
| 3      | 100-Year-Current | NOAA10 24-hr | D     | Default | 24.00            | 1   | 9.18           | 2   |
| 4      | 2-Year-Future    | NOAA10 24-hr | D     | Default | 24.00            | 1   | 4.04           | 2   |
| 5      | 10-Year-Future   | NOAA10 24-hr | D     | Default | 24.00            | 1   | 6.31           | 2   |
| 6      | 100-Year-Future  | NOAA10 24-hr | D     | Default | 24.00            | 1   | 11.52          | 2   |

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### Area Listing (all nodes)

| Area<br>(sq-ft) | CN        | Description<br>(subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 302             | 74        | >75% Grass cover, Good, HSG C (2S)    |
| 18,867          | 98        | Paved parking, HSG C (1S)             |
| 11,049          | 98        | Roofs, HSG C (1S)                     |
| <b>30,218</b>   | <b>98</b> | <b>TOTAL AREA</b>                     |

## Existing Flows

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### Soil Listing (all nodes)

| Area<br>(sq-ft) | Soil<br>Group | Subcatchment<br>Numbers |
|-----------------|---------------|-------------------------|
| 0               | HSG A         |                         |
| 0               | HSG B         |                         |
| 30,218          | HSG C         | 1S, 2S                  |
| 0               | HSG D         |                         |
| 0               | Other         |                         |
| <b>30,218</b>   |               | <b>TOTAL AREA</b>       |

## Existing Flows

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### Ground Covers (all nodes)

| HSG-A<br>(sq-ft) | HSG-B<br>(sq-ft) | HSG-C<br>(sq-ft) | HSG-D<br>(sq-ft) | Other<br>(sq-ft) | Total<br>(sq-ft) | Ground<br>Cover           | Subcatchment<br>Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|---------------------------|-------------------------|
| 0                | 0                | 302              | 0                | 0                | 302              | >75% Grass cover,<br>Good |                         |
| 0                | 0                | 18,867           | 0                | 0                | 18,867           | Paved parking             |                         |
| 0                | 0                | 11,049           | 0                | 0                | 11,049           | Roofs                     |                         |
| <b>0</b>         | <b>0</b>         | <b>30,218</b>    | <b>0</b>         | <b>0</b>         | <b>30,218</b>    | <b>TOTAL AREA</b>         |                         |

## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Existing Impervious

Runoff Area=29,916 sf 100.00% Impervious Runoff Depth=3.20"  
Flow Length=166' Tc=0.9 min CN=98 Runoff=2.67 cfs 7,969 cf

### Subcatchment 2S: Existing Pervious

Runoff Area=302 sf 0.00% Impervious Runoff Depth=1.19"  
Tc=1.0 min CN=74 Runoff=0.01 cfs 30 cf

### Link 3L: Total Site Flows

Inflow=2.68 cfs 7,999 cf  
Primary=2.68 cfs 7,999 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 7,999 cf   Average Runoff Depth = 3.18"**  
**1.00% Pervious = 302 sf   99.00% Impervious = 29,916 sf**

## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Summary for Subcatchment 1S: Existing Impervious

Runoff = 2.67 cfs @ 12.06 hrs, Volume= 7,969 cf, Depth= 3.20"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 11,049    | 98 | Roofs, HSG C            |
| 18,867    | 98 | Paved parking, HSG C    |
| 29,916    | 98 | Weighted Average        |
| 29,916    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                              |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------|
| 0.7      | 100           | 0.0750        | 2.42              |                | <b>Sheet Flow,</b><br>Smooth surfaces n= 0.011 P2= 3.43" |
| 0.2      | 66            | 0.0530        | 4.67              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps  |
| 0.9      | 166           | Total         |                   |                |                                                          |

## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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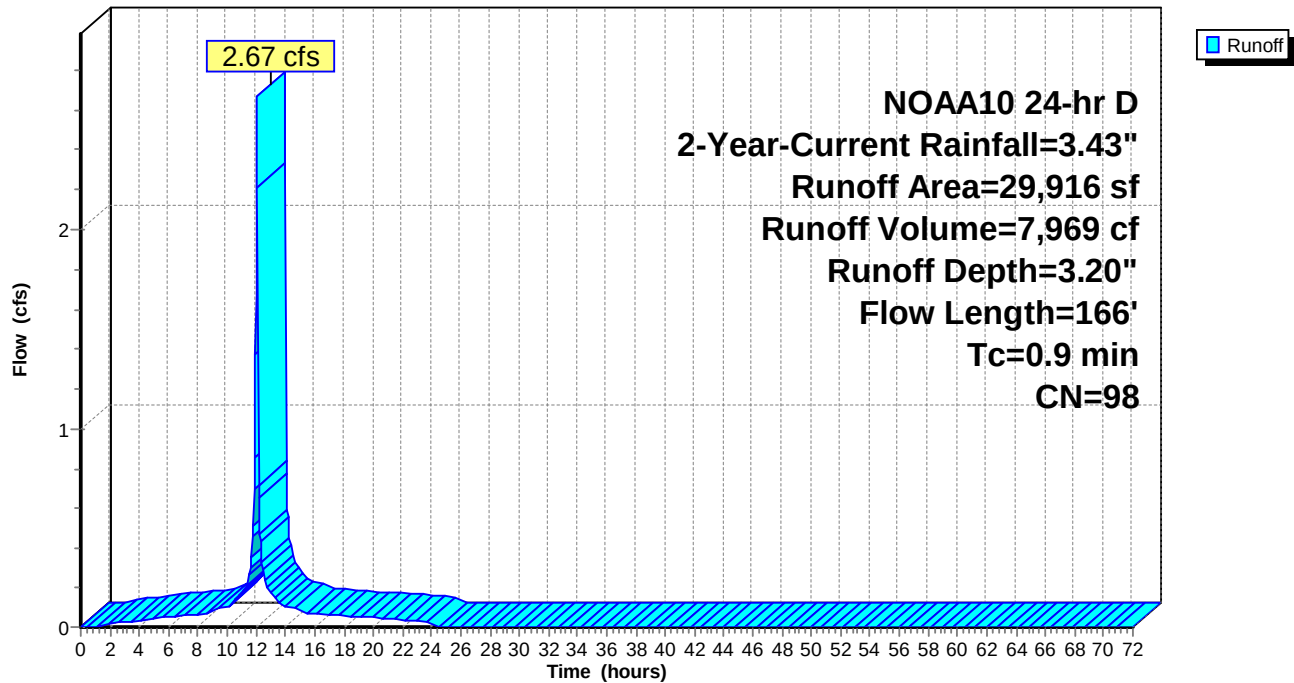
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### Subcatchment 1S: Existing Impervious

Hydrograph



## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Subcatchment 1S: Existing Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 3.43                | 3.20               | 0.00            |
| 1.00            | 0.04                | 0.00               | 0.00            | 48.00           | 3.43                | 3.20               | 0.00            |
| 2.00            | 0.10                | 0.01               | 0.01            | 49.00           | 3.43                | 3.20               | 0.00            |
| 3.00            | 0.16                | 0.04               | 0.03            | 50.00           | 3.43                | 3.20               | 0.00            |
| 4.00            | 0.22                | 0.09               | 0.04            | 51.00           | 3.43                | 3.20               | 0.00            |
| 5.00            | 0.30                | 0.14               | 0.04            | 52.00           | 3.43                | 3.20               | 0.00            |
| 6.00            | 0.38                | 0.21               | 0.05            | 53.00           | 3.43                | 3.20               | 0.00            |
| 7.00            | 0.47                | 0.29               | 0.06            | 54.00           | 3.43                | 3.20               | 0.00            |
| 8.00            | 0.57                | 0.38               | 0.06            | 55.00           | 3.43                | 3.20               | 0.00            |
| 9.00            | 0.68                | 0.48               | 0.08            | 56.00           | 3.43                | 3.20               | 0.00            |
| 10.00           | 0.82                | 0.62               | 0.10            | 57.00           | 3.43                | 3.20               | 0.00            |
| 11.00           | 1.02                | 0.81               | 0.17            | 58.00           | 3.43                | 3.20               | 0.00            |
| 12.00           | 1.62                | 1.40               | <b>1.67</b>     | 59.00           | 3.43                | 3.20               | 0.00            |
| 13.00           | 2.41                | 2.19               | <b>0.18</b>     | 60.00           | 3.43                | 3.20               | 0.00            |
| 14.00           | 2.61                | 2.38               | 0.11            | 61.00           | 3.43                | 3.20               | 0.00            |
| 15.00           | 2.75                | 2.52               | 0.09            | 62.00           | 3.43                | 3.20               | 0.00            |
| 16.00           | 2.86                | 2.63               | 0.07            | 63.00           | 3.43                | 3.20               | 0.00            |
| 17.00           | 2.96                | 2.73               | 0.06            | 64.00           | 3.43                | 3.20               | 0.00            |
| 18.00           | 3.05                | 2.82               | 0.06            | 65.00           | 3.43                | 3.20               | 0.00            |
| 19.00           | 3.13                | 2.90               | 0.05            | 66.00           | 3.43                | 3.20               | 0.00            |
| 20.00           | 3.21                | 2.97               | 0.05            | 67.00           | 3.43                | 3.20               | 0.00            |
| 21.00           | 3.27                | 3.04               | 0.04            | 68.00           | 3.43                | 3.20               | 0.00            |
| 22.00           | 3.33                | 3.10               | 0.04            | 69.00           | 3.43                | 3.20               | 0.00            |
| 23.00           | 3.39                | 3.15               | 0.03            | 70.00           | 3.43                | 3.20               | 0.00            |
| 24.00           | <b>3.43</b>         | <b>3.20</b>        | 0.02            | 71.00           | 3.43                | 3.20               | 0.00            |
| 25.00           | 3.43                | 3.20               | 0.00            | 72.00           | 3.43                | 3.20               | 0.00            |
| 26.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 27.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 28.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 29.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 30.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 31.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 32.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 33.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 34.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 35.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 36.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 37.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 38.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 39.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 40.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 41.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 42.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 43.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 44.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 45.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 46.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

Prepared by HydroCAD SAMPLER 1-800-927-7246 www.hydrocad.net

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### Summary for Subcatchment 2S: Existing Pervious

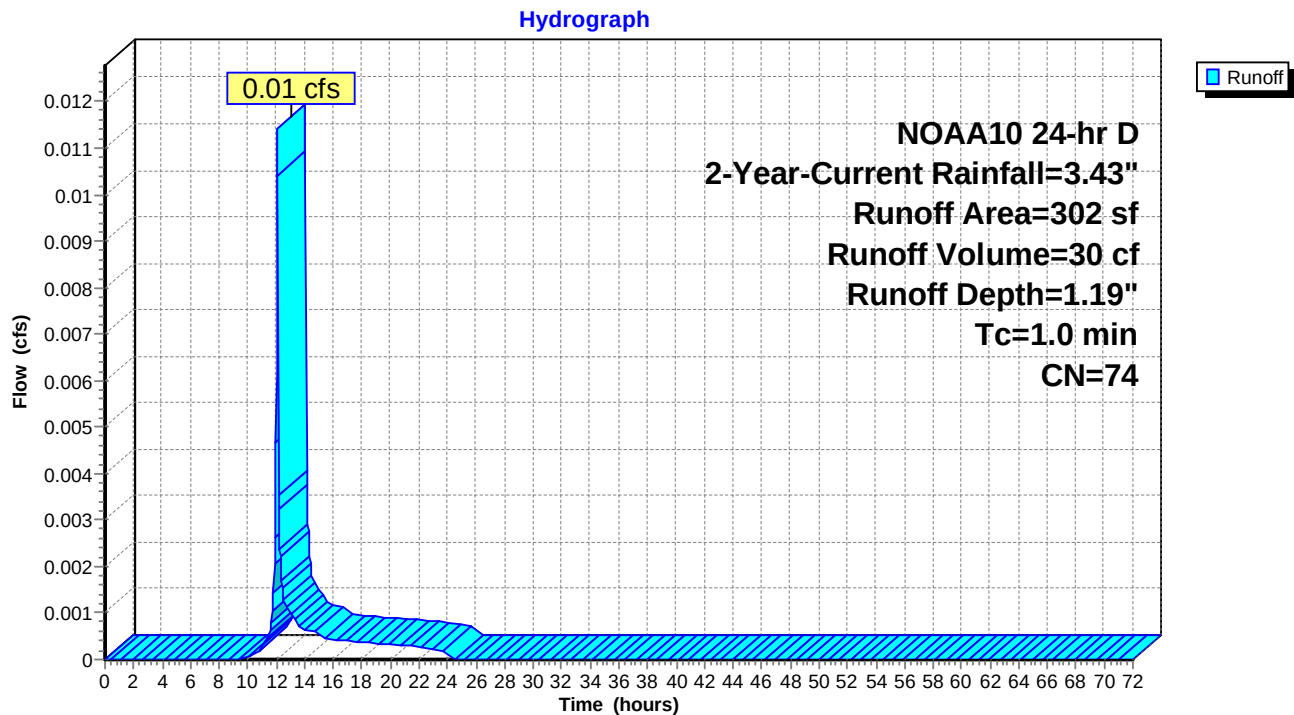
Runoff = 0.01 cfs @ 12.07 hrs, Volume= 30 cf, Depth= 1.19"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 302       | 74 | >75% Grass cover, Good, HSG C |
| 302       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 2S: Existing Pervious



## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Subcatchment 2S: Existing Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 3.43                | 1.19               | 0.00            |
| 1.00            | 0.04                | 0.00               | 0.00            | 48.00           | 3.43                | 1.19               | 0.00            |
| 2.00            | 0.10                | 0.00               | 0.00            | 49.00           | 3.43                | 1.19               | 0.00            |
| 3.00            | 0.16                | 0.00               | 0.00            | 50.00           | 3.43                | 1.19               | 0.00            |
| 4.00            | 0.22                | 0.00               | 0.00            | 51.00           | 3.43                | 1.19               | 0.00            |
| 5.00            | 0.30                | 0.00               | 0.00            | 52.00           | 3.43                | 1.19               | 0.00            |
| 6.00            | 0.38                | 0.00               | 0.00            | 53.00           | 3.43                | 1.19               | 0.00            |
| 7.00            | 0.47                | 0.00               | 0.00            | 54.00           | 3.43                | 1.19               | 0.00            |
| 8.00            | 0.57                | 0.00               | 0.00            | 55.00           | 3.43                | 1.19               | 0.00            |
| 9.00            | 0.68                | 0.00               | 0.00            | 56.00           | 3.43                | 1.19               | 0.00            |
| 10.00           | 0.82                | 0.00               | 0.00            | 57.00           | 3.43                | 1.19               | 0.00            |
| 11.00           | 1.02                | 0.03               | 0.00            | 58.00           | 3.43                | 1.19               | 0.00            |
| 12.00           | 1.62                | 0.19               | <b>0.01</b>     | 59.00           | 3.43                | 1.19               | 0.00            |
| 13.00           | 2.41                | 0.56               | <b>0.00</b>     | 60.00           | 3.43                | 1.19               | 0.00            |
| 14.00           | 2.61                | 0.67               | 0.00            | 61.00           | 3.43                | 1.19               | 0.00            |
| 15.00           | 2.75                | 0.76               | 0.00            | 62.00           | 3.43                | 1.19               | 0.00            |
| 16.00           | 2.86                | 0.82               | 0.00            | 63.00           | 3.43                | 1.19               | 0.00            |
| 17.00           | 2.96                | 0.88               | 0.00            | 64.00           | 3.43                | 1.19               | 0.00            |
| 18.00           | 3.05                | 0.94               | 0.00            | 65.00           | 3.43                | 1.19               | 0.00            |
| 19.00           | 3.13                | 0.99               | 0.00            | 66.00           | 3.43                | 1.19               | 0.00            |
| 20.00           | 3.21                | 1.04               | 0.00            | 67.00           | 3.43                | 1.19               | 0.00            |
| 21.00           | 3.27                | 1.09               | 0.00            | 68.00           | 3.43                | 1.19               | 0.00            |
| 22.00           | 3.33                | 1.13               | 0.00            | 69.00           | 3.43                | 1.19               | 0.00            |
| 23.00           | 3.39                | 1.16               | 0.00            | 70.00           | 3.43                | 1.19               | 0.00            |
| 24.00           | <b>3.43</b>         | <b>1.19</b>        | 0.00            | 71.00           | 3.43                | 1.19               | 0.00            |
| 25.00           | 3.43                | 1.19               | 0.00            | 72.00           | 3.43                | 1.19               | 0.00            |
| 26.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 27.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 28.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 29.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 30.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 31.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 32.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 33.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 34.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 35.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 36.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 37.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 38.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 39.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 40.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 41.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 42.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 43.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 44.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 45.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 46.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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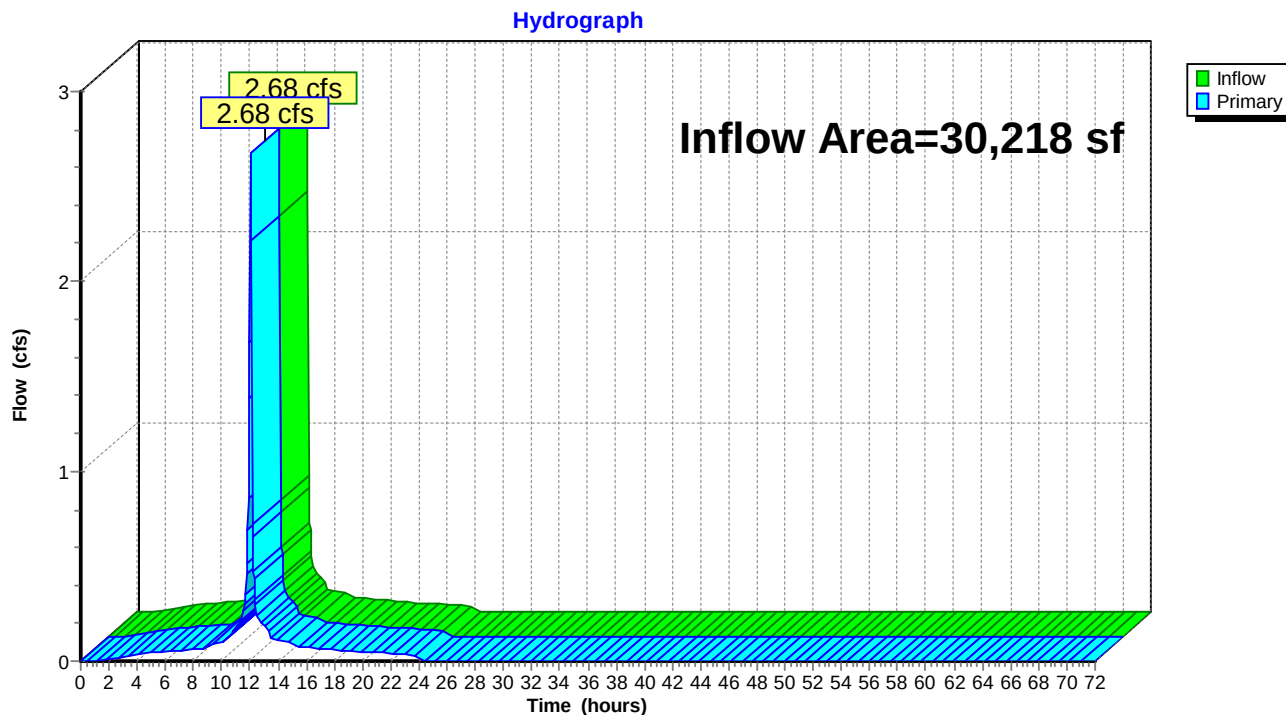
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### Summary for Link 3L: Total Site Flows

Inflow Area = 30,218 sf, 99.00% Impervious, Inflow Depth = 3.18" for 2-Year-Current event  
Inflow = 2.68 cfs @ 12.06 hrs, Volume= 7,999 cf  
Primary = 2.68 cfs @ 12.06 hrs, Volume= 7,999 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Link 3L: Total Site Flows



## Existing Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Link 3L: Total Site Flows

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | <b>0.00</b>         | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.00            | 0.00                | 0.00             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.01            | 0.00                | 0.01             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.03            | 0.00                | 0.03             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.04            | 0.00                | 0.04             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.04            | 0.00                | 0.04             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.05            | 0.00                | 0.05             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.06            | 0.00                | 0.06             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.06            | 0.00                | 0.06             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.08            | 0.00                | 0.08             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.10            | 0.00                | 0.10             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.17            | 0.00                | 0.17             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | <b>1.68</b>     | 0.00                | <b>1.68</b>      | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | <b>0.18</b>     | 0.00                | <b>0.18</b>      | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.11            | 0.00                | 0.11             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.09            | 0.00                | 0.09             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.07            | 0.00                | 0.07             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.07            | 0.00                | 0.07             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.06            | 0.00                | 0.06             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.05            | 0.00                | 0.05             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.05            | 0.00                | 0.05             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.04            | 0.00                | 0.04             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.04            | 0.00                | 0.04             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.03            | 0.00                | 0.03             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.02            | 0.00                | 0.02             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |

## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Existing Impervious

Runoff Area=29,916 sf 100.00% Impervious Runoff Depth=5.09"  
Flow Length=166' Tc=0.9 min CN=98 Runoff=4.17 cfs 12,696 cf

### Subcatchment 2S: Existing Pervious

Runoff Area=302 sf 0.00% Impervious Runoff Depth=2.63"  
Tc=1.0 min CN=74 Runoff=0.03 cfs 66 cf

### Link 3L: Total Site Flows

Inflow=4.20 cfs 12,762 cf  
Primary=4.20 cfs 12,762 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 12,762 cf   Average Runoff Depth = 5.07"**  
**1.00% Pervious = 302 sf   99.00% Impervious = 29,916 sf**

## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Subcatchment 1S: Existing Impervious

Runoff = 4.17 cfs @ 12.06 hrs, Volume= 12,696 cf, Depth= 5.09"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 11,049    | 98 | Roofs, HSG C            |
| 18,867    | 98 | Paved parking, HSG C    |
| 29,916    | 98 | Weighted Average        |
| 29,916    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                              |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------|
| 0.7      | 100           | 0.0750        | 2.42              |                | <b>Sheet Flow,</b><br>Smooth surfaces n= 0.011 P2= 3.43" |
| 0.2      | 66            | 0.0530        | 4.67              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps  |
| 0.9      | 166           | Total         |                   |                |                                                          |

## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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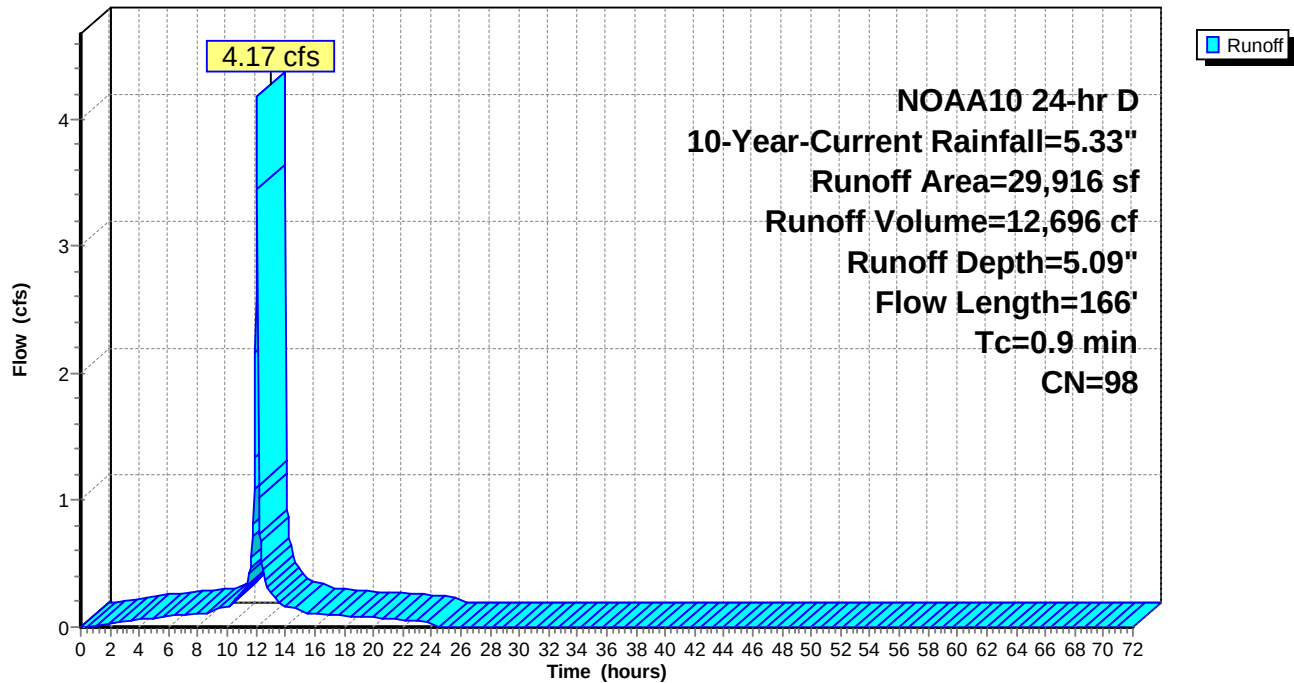
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### Subcatchment 1S: Existing Impervious

Hydrograph



## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Subcatchment 1S: Existing Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 5.33                | 5.09               | 0.00            |
| 1.00            | 0.07                | 0.00               | 0.01            | 48.00           | 5.33                | 5.09               | 0.00            |
| 2.00            | 0.15                | 0.04               | 0.03            | 49.00           | 5.33                | 5.09               | 0.00            |
| 3.00            | 0.24                | 0.10               | 0.05            | 50.00           | 5.33                | 5.09               | 0.00            |
| 4.00            | 0.35                | 0.19               | 0.06            | 51.00           | 5.33                | 5.09               | 0.00            |
| 5.00            | 0.47                | 0.29               | 0.08            | 52.00           | 5.33                | 5.09               | 0.00            |
| 6.00            | 0.59                | 0.40               | 0.09            | 53.00           | 5.33                | 5.09               | 0.00            |
| 7.00            | 0.73                | 0.54               | 0.10            | 54.00           | 5.33                | 5.09               | 0.00            |
| 8.00            | 0.89                | 0.68               | 0.10            | 55.00           | 5.33                | 5.09               | 0.00            |
| 9.00            | 1.05                | 0.84               | 0.12            | 56.00           | 5.33                | 5.09               | 0.00            |
| 10.00           | 1.28                | 1.06               | 0.16            | 57.00           | 5.33                | 5.09               | 0.00            |
| 11.00           | 1.58                | 1.36               | 0.27            | 58.00           | 5.33                | 5.09               | 0.00            |
| 12.00           | 2.52                | 2.29               | <b>2.62</b>     | 59.00           | 5.33                | 5.09               | 0.00            |
| 13.00           | 3.75                | 3.52               | <b>0.29</b>     | 60.00           | 5.33                | 5.09               | 0.00            |
| 14.00           | 4.05                | 3.82               | 0.17            | 61.00           | 5.33                | 5.09               | 0.00            |
| 15.00           | 4.28                | 4.04               | 0.14            | 62.00           | 5.33                | 5.09               | 0.00            |
| 16.00           | 4.44                | 4.21               | 0.11            | 63.00           | 5.33                | 5.09               | 0.00            |
| 17.00           | 4.60                | 4.36               | 0.10            | 64.00           | 5.33                | 5.09               | 0.00            |
| 18.00           | 4.74                | 4.50               | 0.09            | 65.00           | 5.33                | 5.09               | 0.00            |
| 19.00           | 4.86                | 4.63               | 0.08            | 66.00           | 5.33                | 5.09               | 0.00            |
| 20.00           | 4.98                | 4.74               | 0.08            | 67.00           | 5.33                | 5.09               | 0.00            |
| 21.00           | 5.09                | 4.85               | 0.07            | 68.00           | 5.33                | 5.09               | 0.00            |
| 22.00           | 5.18                | 4.94               | 0.06            | 69.00           | 5.33                | 5.09               | 0.00            |
| 23.00           | 5.26                | 5.02               | 0.05            | 70.00           | 5.33                | 5.09               | 0.00            |
| 24.00           | <b>5.33</b>         | <b>5.09</b>        | 0.03            | 71.00           | 5.33                | 5.09               | 0.00            |
| 25.00           | 5.33                | 5.09               | 0.00            | 72.00           | 5.33                | 5.09               | 0.00            |
| 26.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 27.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 28.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 29.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 30.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 31.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 32.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 33.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 34.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 35.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 36.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 37.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 38.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 39.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 40.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 41.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 42.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 43.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 44.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 45.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 46.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Subcatchment 2S: Existing Pervious

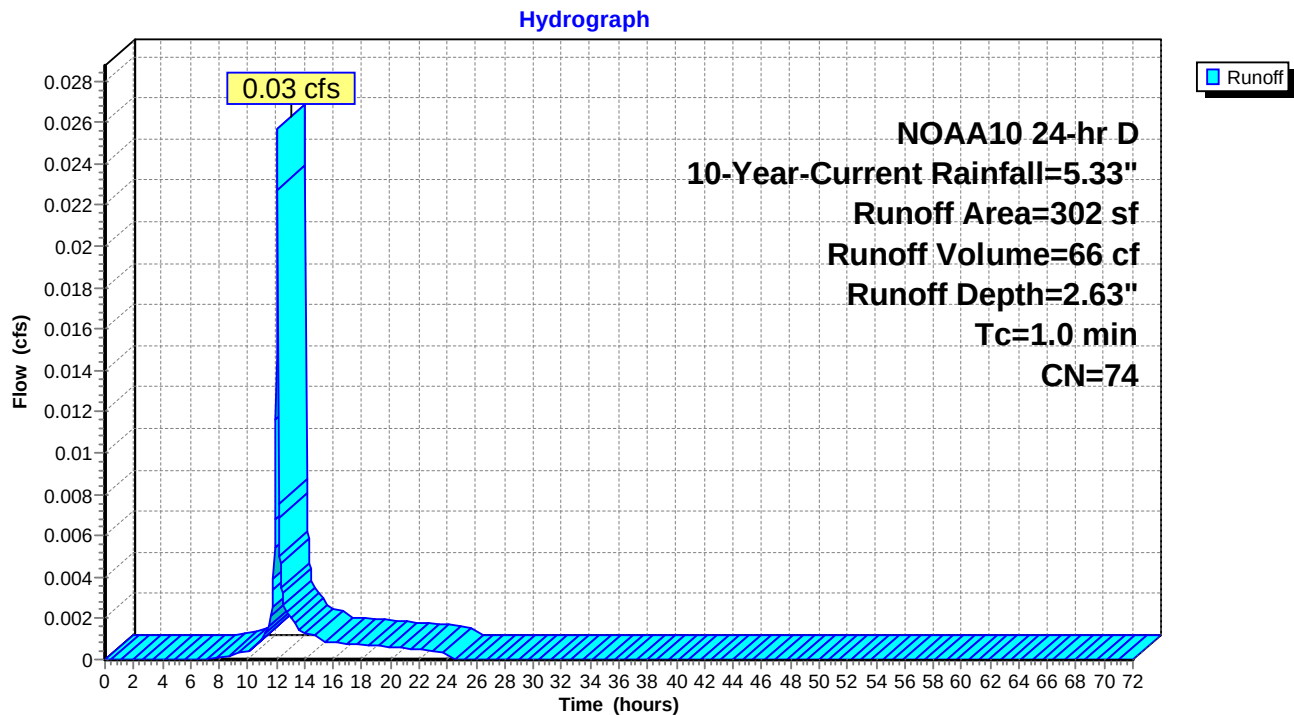
Runoff = 0.03 cfs @ 12.07 hrs, Volume= 66 cf, Depth= 2.63"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 302       | 74 | >75% Grass cover, Good, HSG C |
| 302       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 2S: Existing Pervious



## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Subcatchment 2S: Existing Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 5.33                | 2.63               | 0.00            |
| 1.00            | 0.07                | 0.00               | 0.00            | 48.00           | 5.33                | 2.63               | 0.00            |
| 2.00            | 0.15                | 0.00               | 0.00            | 49.00           | 5.33                | 2.63               | 0.00            |
| 3.00            | 0.24                | 0.00               | 0.00            | 50.00           | 5.33                | 2.63               | 0.00            |
| 4.00            | 0.35                | 0.00               | 0.00            | 51.00           | 5.33                | 2.63               | 0.00            |
| 5.00            | 0.47                | 0.00               | 0.00            | 52.00           | 5.33                | 2.63               | 0.00            |
| 6.00            | 0.59                | 0.00               | 0.00            | 53.00           | 5.33                | 2.63               | 0.00            |
| 7.00            | 0.73                | 0.00               | 0.00            | 54.00           | 5.33                | 2.63               | 0.00            |
| 8.00            | 0.89                | 0.01               | 0.00            | 55.00           | 5.33                | 2.63               | 0.00            |
| 9.00            | 1.05                | 0.03               | 0.00            | 56.00           | 5.33                | 2.63               | 0.00            |
| 10.00           | 1.28                | 0.08               | 0.00            | 57.00           | 5.33                | 2.63               | 0.00            |
| 11.00           | 1.58                | 0.17               | 0.00            | 58.00           | 5.33                | 2.63               | 0.00            |
| 12.00           | 2.52                | 0.62               | <b>0.01</b>     | 59.00           | 5.33                | 2.63               | 0.00            |
| 13.00           | 3.75                | 1.42               | <b>0.00</b>     | 60.00           | 5.33                | 2.63               | 0.00            |
| 14.00           | 4.05                | 1.64               | 0.00            | 61.00           | 5.33                | 2.63               | 0.00            |
| 15.00           | 4.28                | 1.81               | 0.00            | 62.00           | 5.33                | 2.63               | 0.00            |
| 16.00           | 4.44                | 1.93               | 0.00            | 63.00           | 5.33                | 2.63               | 0.00            |
| 17.00           | 4.60                | 2.05               | 0.00            | 64.00           | 5.33                | 2.63               | 0.00            |
| 18.00           | 4.74                | 2.16               | 0.00            | 65.00           | 5.33                | 2.63               | 0.00            |
| 19.00           | 4.86                | 2.26               | 0.00            | 66.00           | 5.33                | 2.63               | 0.00            |
| 20.00           | 4.98                | 2.35               | 0.00            | 67.00           | 5.33                | 2.63               | 0.00            |
| 21.00           | 5.09                | 2.43               | 0.00            | 68.00           | 5.33                | 2.63               | 0.00            |
| 22.00           | 5.18                | 2.51               | 0.00            | 69.00           | 5.33                | 2.63               | 0.00            |
| 23.00           | 5.26                | 2.57               | 0.00            | 70.00           | 5.33                | 2.63               | 0.00            |
| 24.00           | <b>5.33</b>         | <b>2.63</b>        | 0.00            | 71.00           | 5.33                | 2.63               | 0.00            |
| 25.00           | 5.33                | 2.63               | 0.00            | 72.00           | 5.33                | 2.63               | 0.00            |
| 26.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 27.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 28.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 29.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 30.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 31.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 32.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 33.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 34.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 35.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 36.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 37.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 38.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 39.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 40.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 41.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 42.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 43.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 44.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 45.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 46.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Link 3L: Total Site Flows

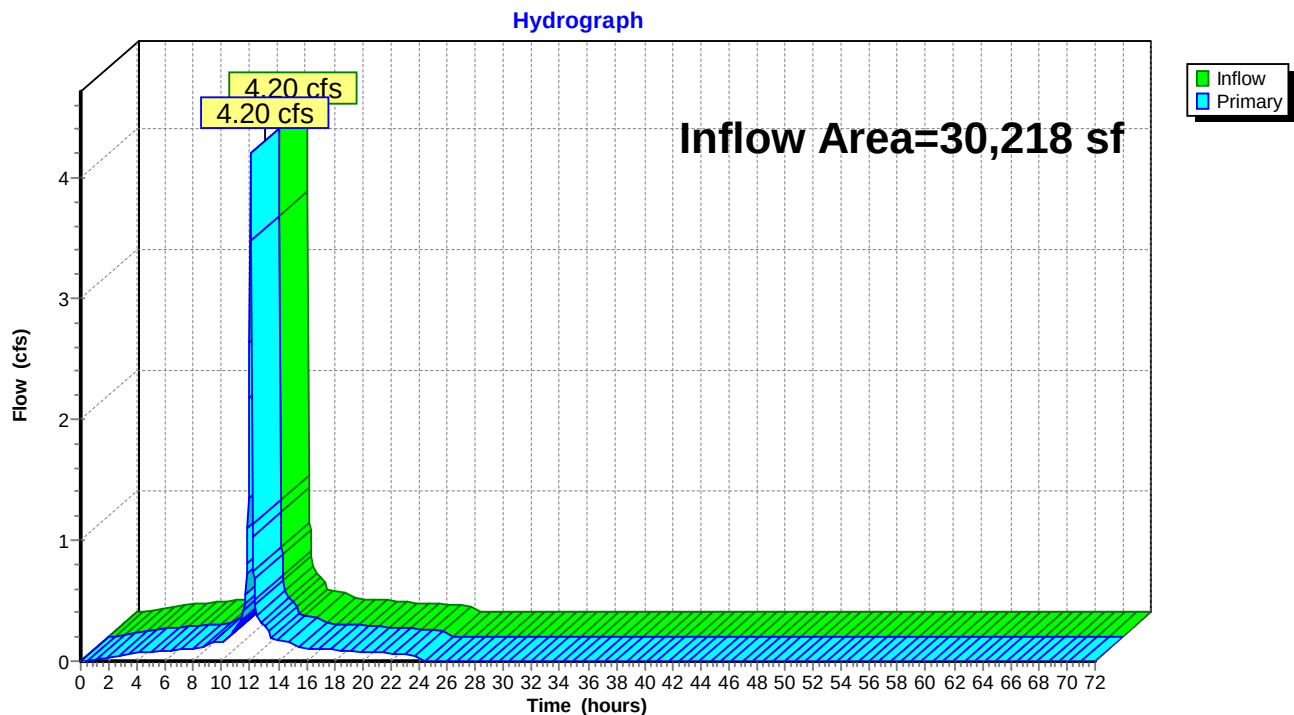
Inflow Area = 30,218 sf, 99.00% Impervious, Inflow Depth = 5.07" for 10-Year-Current event

Inflow = 4.20 cfs @ 12.06 hrs, Volume= 12,762 cf

Primary = 4.20 cfs @ 12.06 hrs, Volume= 12,762 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Link 3L: Total Site Flows



## Existing Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Link 3L: Total Site Flows

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | <b>0.00</b>         | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.01            | 0.00                | 0.01             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.03            | 0.00                | 0.03             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.05            | 0.00                | 0.05             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.06            | 0.00                | 0.06             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.08            | 0.00                | 0.08             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.09            | 0.00                | 0.09             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.10            | 0.00                | 0.10             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.10            | 0.00                | 0.10             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.12            | 0.00                | 0.12             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.16            | 0.00                | 0.16             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.28            | 0.00                | 0.28             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | <b>2.64</b>     | 0.00                | <b>2.64</b>      | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | <b>0.29</b>     | 0.00                | <b>0.29</b>      | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.17            | 0.00                | 0.17             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.14            | 0.00                | 0.14             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.11            | 0.00                | 0.11             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.10            | 0.00                | 0.10             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.09            | 0.00                | 0.09             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.09            | 0.00                | 0.09             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.08            | 0.00                | 0.08             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.07            | 0.00                | 0.07             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.06            | 0.00                | 0.06             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.05            | 0.00                | 0.05             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.03            | 0.00                | 0.03             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |

## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Existing Impervious

Runoff Area=29,916 sf 100.00% Impervious Runoff Depth=8.94"  
Flow Length=166' Tc=0.9 min CN=98 Runoff=7.21 cfs 22,286 cf

### Subcatchment 2S: Existing Pervious

Runoff Area=302 sf 0.00% Impervious Runoff Depth=5.99"  
Tc=1.0 min CN=74 Runoff=0.06 cfs 151 cf

### Link 3L: Total Site Flows

Inflow=7.27 cfs 22,437 cf  
Primary=7.27 cfs 22,437 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 22,437 cf   Average Runoff Depth = 8.91"**  
**1.00% Pervious = 302 sf   99.00% Impervious = 29,916 sf**

## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Subcatchment 1S: Existing Impervious

Runoff = 7.21 cfs @ 12.06 hrs, Volume= 22,286 cf, Depth= 8.94"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 11,049    | 98 | Roofs, HSG C            |
| 18,867    | 98 | Paved parking, HSG C    |
| 29,916    | 98 | Weighted Average        |
| 29,916    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                              |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------|
| 0.7      | 100           | 0.0750        | 2.42              |                | <b>Sheet Flow,</b><br>Smooth surfaces n= 0.011 P2= 3.43" |
| 0.2      | 66            | 0.0530        | 4.67              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps  |
| 0.9      | 166           | Total         |                   |                |                                                          |

## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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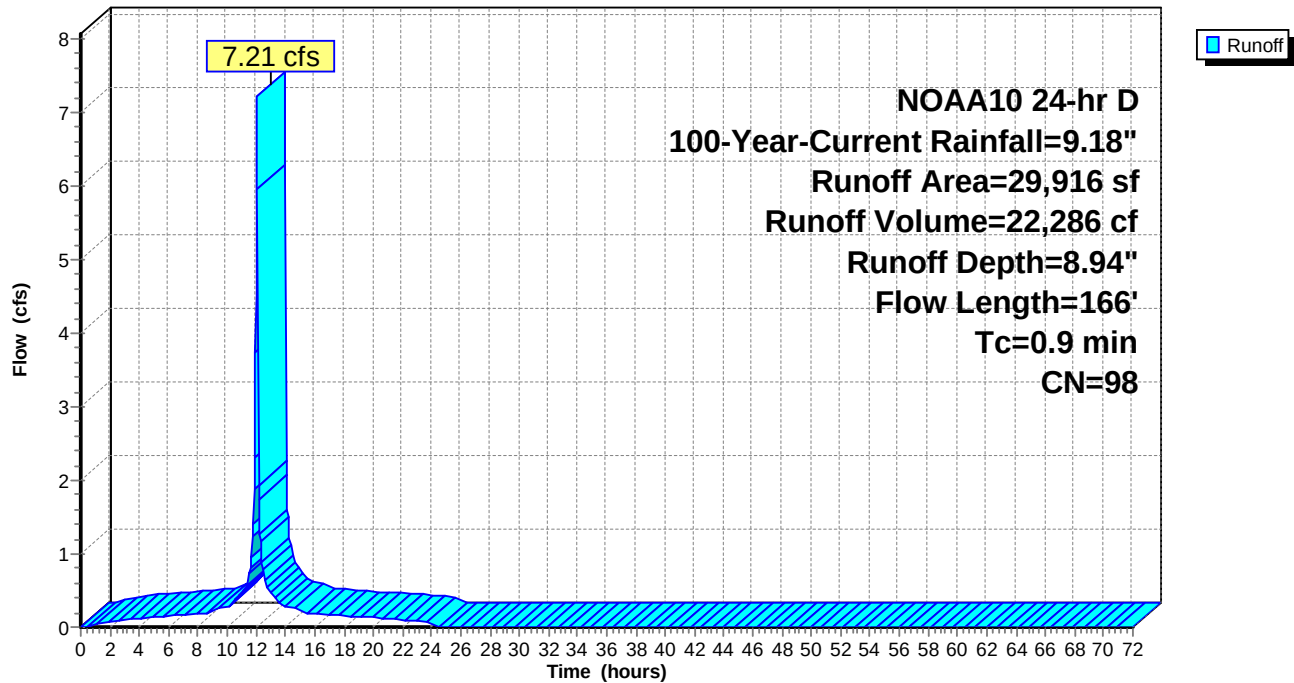
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### Subcatchment 1S: Existing Impervious

Hydrograph



## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Hydrograph for Subcatchment 1S: Existing Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 9.18                | 8.94               | 0.00            |
| 1.00            | 0.12                | 0.02               | 0.04            | 48.00           | 9.18                | 8.94               | 0.00            |
| 2.00            | 0.26                | 0.11               | 0.08            | 49.00           | 9.18                | 8.94               | 0.00            |
| 3.00            | 0.42                | 0.25               | 0.10            | 50.00           | 9.18                | 8.94               | 0.00            |
| 4.00            | 0.60                | 0.41               | 0.12            | 51.00           | 9.18                | 8.94               | 0.00            |
| 5.00            | 0.80                | 0.60               | 0.14            | 52.00           | 9.18                | 8.94               | 0.00            |
| 6.00            | 1.02                | 0.81               | 0.15            | 53.00           | 9.18                | 8.94               | 0.00            |
| 7.00            | 1.26                | 1.05               | 0.17            | 54.00           | 9.18                | 8.94               | 0.00            |
| 8.00            | 1.53                | 1.31               | 0.18            | 55.00           | 9.18                | 8.94               | 0.00            |
| 9.00            | 1.81                | 1.58               | 0.21            | 56.00           | 9.18                | 8.94               | 0.00            |
| 10.00           | 2.20                | 1.97               | 0.28            | 57.00           | 9.18                | 8.94               | 0.00            |
| 11.00           | 2.72                | 2.49               | 0.48            | 58.00           | 9.18                | 8.94               | 0.00            |
| 12.00           | 4.34                | 4.11               | <b>4.53</b>     | 59.00           | 9.18                | 8.94               | 0.00            |
| 13.00           | 6.46                | 6.22               | <b>0.49</b>     | 60.00           | 9.18                | 8.94               | 0.00            |
| 14.00           | 6.98                | 6.74               | 0.28            | 61.00           | 9.18                | 8.94               | 0.00            |
| 15.00           | 7.37                | 7.13               | 0.25            | 62.00           | 9.18                | 8.94               | 0.00            |
| 16.00           | 7.65                | 7.41               | 0.19            | 63.00           | 9.18                | 8.94               | 0.00            |
| 17.00           | 7.92                | 7.68               | 0.17            | 64.00           | 9.18                | 8.94               | 0.00            |
| 18.00           | 8.16                | 7.92               | 0.16            | 65.00           | 9.18                | 8.94               | 0.00            |
| 19.00           | 8.38                | 8.14               | 0.15            | 66.00           | 9.18                | 8.94               | 0.00            |
| 20.00           | 8.58                | 8.34               | 0.13            | 67.00           | 9.18                | 8.94               | 0.00            |
| 21.00           | 8.76                | 8.52               | 0.12            | 68.00           | 9.18                | 8.94               | 0.00            |
| 22.00           | 8.92                | 8.68               | 0.10            | 69.00           | 9.18                | 8.94               | 0.00            |
| 23.00           | 9.06                | 8.82               | 0.09            | 70.00           | 9.18                | 8.94               | 0.00            |
| 24.00           | <b>9.18</b>         | <b>8.94</b>        | 0.06            | 71.00           | 9.18                | 8.94               | 0.00            |
| 25.00           | 9.18                | 8.94               | 0.00            | 72.00           | 9.18                | 8.94               | 0.00            |
| 26.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 27.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 28.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 29.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 30.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 31.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 32.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 33.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 34.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 35.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 36.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 37.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 38.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 39.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 40.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 41.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 42.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 43.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 44.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 45.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 46.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Subcatchment 2S: Existing Pervious

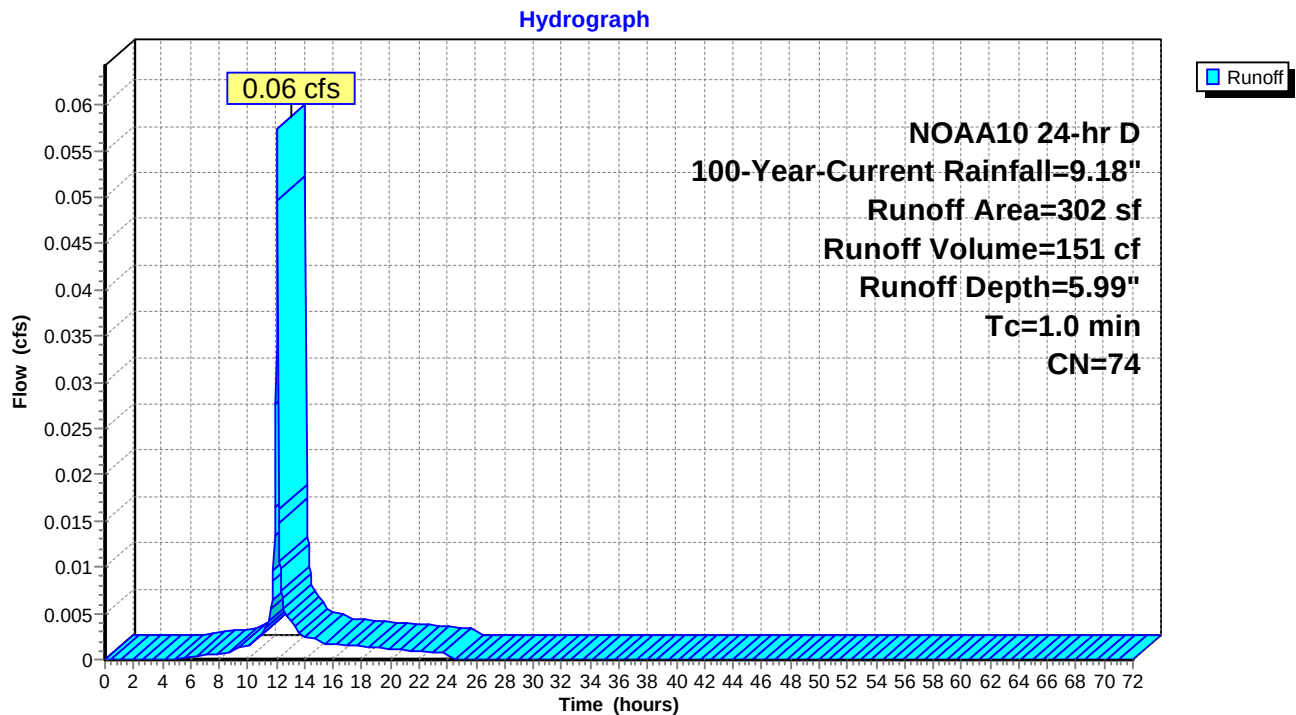
Runoff = 0.06 cfs @ 12.06 hrs, Volume= 151 cf, Depth= 5.99"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 302       | 74 | >75% Grass cover, Good, HSG C |
| 302       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 2S: Existing Pervious



## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Hydrograph for Subcatchment 2S: Existing Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 9.18                | 5.99               | 0.00            |
| 1.00            | 0.12                | 0.00               | 0.00            | 48.00           | 9.18                | 5.99               | 0.00            |
| 2.00            | 0.26                | 0.00               | 0.00            | 49.00           | 9.18                | 5.99               | 0.00            |
| 3.00            | 0.42                | 0.00               | 0.00            | 50.00           | 9.18                | 5.99               | 0.00            |
| 4.00            | 0.60                | 0.00               | 0.00            | 51.00           | 9.18                | 5.99               | 0.00            |
| 5.00            | 0.80                | 0.00               | 0.00            | 52.00           | 9.18                | 5.99               | 0.00            |
| 6.00            | 1.02                | 0.03               | 0.00            | 53.00           | 9.18                | 5.99               | 0.00            |
| 7.00            | 1.26                | 0.08               | 0.00            | 54.00           | 9.18                | 5.99               | 0.00            |
| 8.00            | 1.53                | 0.16               | 0.00            | 55.00           | 9.18                | 5.99               | 0.00            |
| 9.00            | 1.81                | 0.26               | 0.00            | 56.00           | 9.18                | 5.99               | 0.00            |
| 10.00           | 2.20                | 0.45               | 0.00            | 57.00           | 9.18                | 5.99               | 0.00            |
| 11.00           | 2.72                | 0.73               | 0.00            | 58.00           | 9.18                | 5.99               | 0.00            |
| 12.00           | 4.34                | 1.85               | <b>0.03</b>     | 59.00           | 9.18                | 5.99               | 0.00            |
| 13.00           | 6.46                | 3.58               | <b>0.00</b>     | 60.00           | 9.18                | 5.99               | 0.00            |
| 14.00           | 6.98                | 4.03               | 0.00            | 61.00           | 9.18                | 5.99               | 0.00            |
| 15.00           | 7.37                | 4.37               | 0.00            | 62.00           | 9.18                | 5.99               | 0.00            |
| 16.00           | 7.65                | 4.62               | 0.00            | 63.00           | 9.18                | 5.99               | 0.00            |
| 17.00           | 7.92                | 4.85               | 0.00            | 64.00           | 9.18                | 5.99               | 0.00            |
| 18.00           | 8.16                | 5.07               | 0.00            | 65.00           | 9.18                | 5.99               | 0.00            |
| 19.00           | 8.38                | 5.26               | 0.00            | 66.00           | 9.18                | 5.99               | 0.00            |
| 20.00           | 8.58                | 5.45               | 0.00            | 67.00           | 9.18                | 5.99               | 0.00            |
| 21.00           | 8.76                | 5.61               | 0.00            | 68.00           | 9.18                | 5.99               | 0.00            |
| 22.00           | 8.92                | 5.76               | 0.00            | 69.00           | 9.18                | 5.99               | 0.00            |
| 23.00           | 9.06                | 5.88               | 0.00            | 70.00           | 9.18                | 5.99               | 0.00            |
| 24.00           | <b>9.18</b>         | <b>5.99</b>        | 0.00            | 71.00           | 9.18                | 5.99               | 0.00            |
| 25.00           | 9.18                | 5.99               | 0.00            | 72.00           | 9.18                | 5.99               | 0.00            |
| 26.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 27.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 28.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 29.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 30.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 31.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 32.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 33.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 34.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 35.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 36.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 37.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 38.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 39.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 40.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 41.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 42.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 43.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 44.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 45.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 46.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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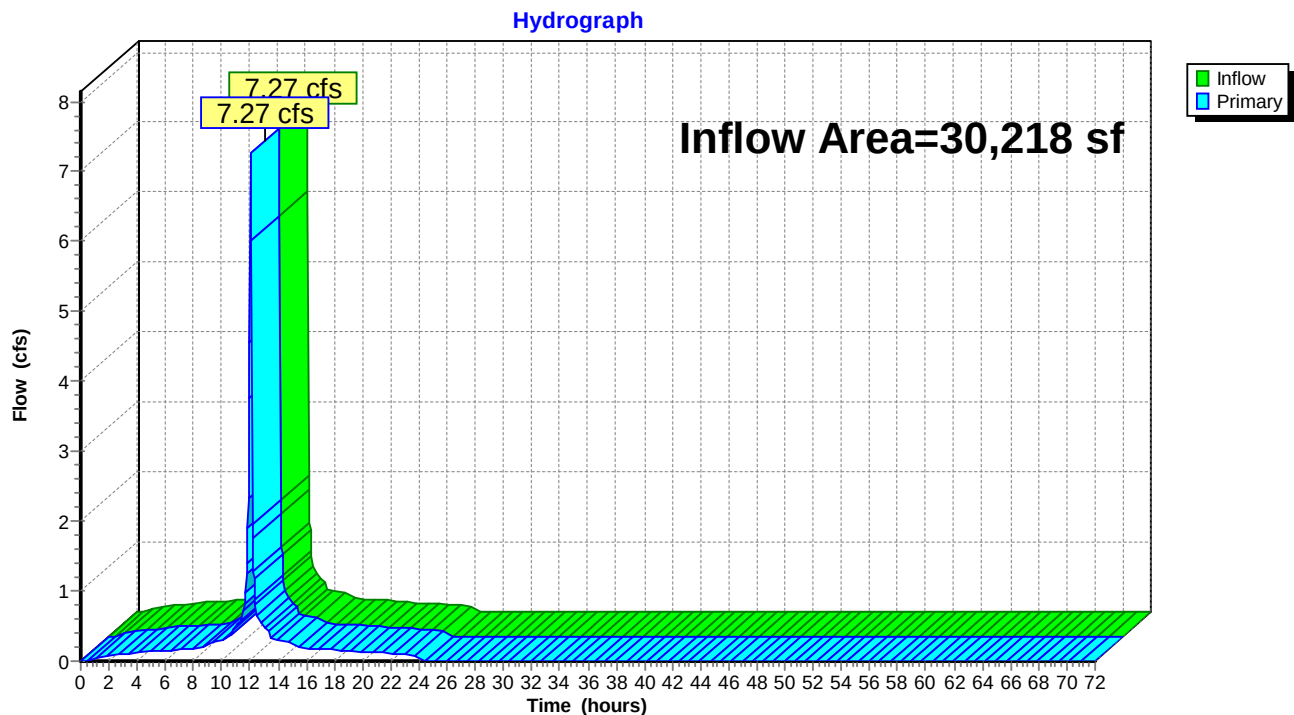
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### Summary for Link 3L: Total Site Flows

Inflow Area = 30,218 sf, 99.00% Impervious, Inflow Depth = 8.91" for 100-Year-Current event  
Inflow = 7.27 cfs @ 12.06 hrs, Volume= 22,437 cf  
Primary = 7.27 cfs @ 12.06 hrs, Volume= 22,437 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Link 3L: Total Site Flows



## Existing Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Hydrograph for Link 3L: Total Site Flows

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | <b>0.00</b>         | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.04            | 0.00                | 0.04             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.08            | 0.00                | 0.08             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.10            | 0.00                | 0.10             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.12            | 0.00                | 0.12             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.14            | 0.00                | 0.14             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.15            | 0.00                | 0.15             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.17            | 0.00                | 0.17             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.19            | 0.00                | 0.19             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.21            | 0.00                | 0.21             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.28            | 0.00                | 0.28             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.48            | 0.00                | 0.48             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | <b>4.57</b>     | 0.00                | <b>4.57</b>      | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | <b>0.50</b>     | 0.00                | <b>0.50</b>      | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.29            | 0.00                | 0.29             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.25            | 0.00                | 0.25             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.19            | 0.00                | 0.19             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.18            | 0.00                | 0.18             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.16            | 0.00                | 0.16             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.15            | 0.00                | 0.15             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.13            | 0.00                | 0.13             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.12            | 0.00                | 0.12             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.11            | 0.00                | 0.11             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.09            | 0.00                | 0.09             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.06            | 0.00                | 0.06             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |

## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Existing Impervious

Runoff Area=29,916 sf 100.00% Impervious Runoff Depth=3.81"  
Flow Length=166' Tc=0.9 min CN=98 Runoff=3.15 cfs 9,486 cf

### Subcatchment 2S: Existing Pervious

Runoff Area=302 sf 0.00% Impervious Runoff Depth=1.63"  
Tc=1.0 min CN=74 Runoff=0.02 cfs 41 cf

### Link 3L: Total Site Flows

Inflow=3.17 cfs 9,527 cf  
Primary=3.17 cfs 9,527 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 9,527 cf   Average Runoff Depth = 3.78"**  
**1.00% Pervious = 302 sf   99.00% Impervious = 29,916 sf**

## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Subcatchment 1S: Existing Impervious

Runoff = 3.15 cfs @ 12.06 hrs, Volume= 9,486 cf, Depth= 3.81"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 11,049    | 98 | Roofs, HSG C            |
| 18,867    | 98 | Paved parking, HSG C    |
| 29,916    | 98 | Weighted Average        |
| 29,916    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                              |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------|
| 0.7      | 100           | 0.0750        | 2.42              |                | <b>Sheet Flow,</b><br>Smooth surfaces n= 0.011 P2= 3.43" |
| 0.2      | 66            | 0.0530        | 4.67              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps  |
| 0.9      | 166           | Total         |                   |                |                                                          |

## Existing Flows

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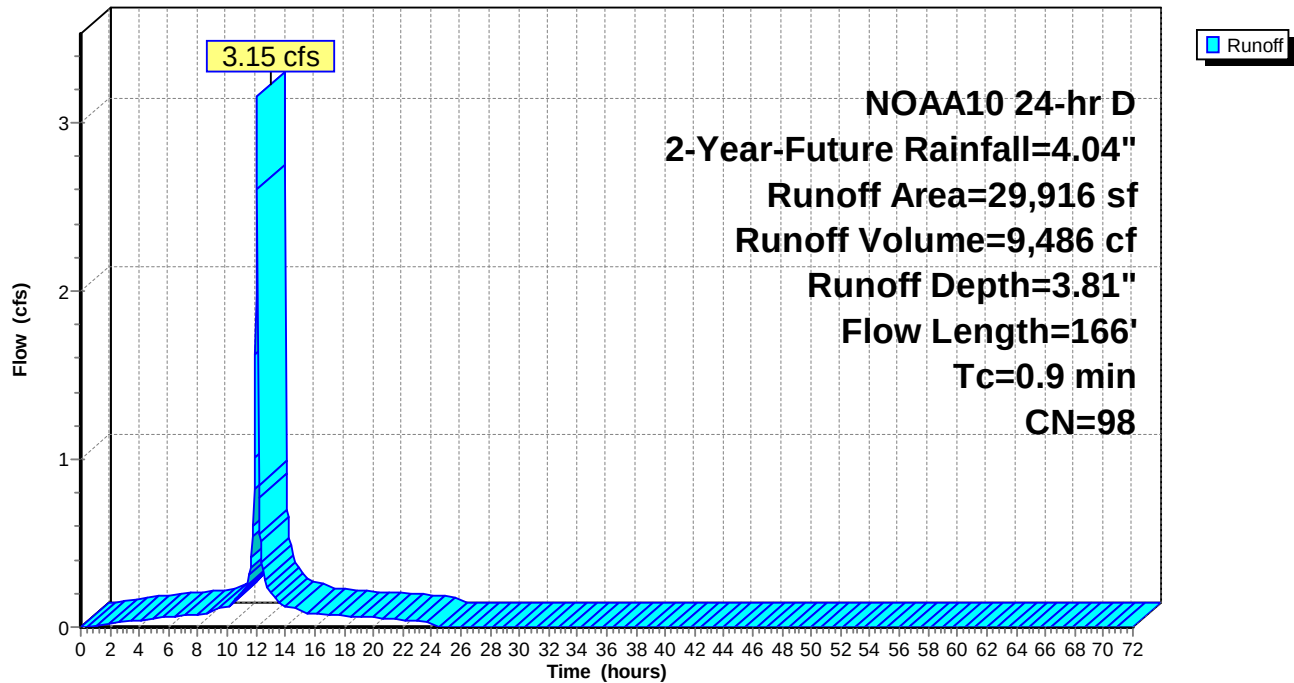
NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Subcatchment 1S: Existing Impervious

Hydrograph



## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Subcatchment 1S: Existing Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 4.04                | 3.81               | 0.00            |
| 1.00            | 0.05                | 0.00               | 0.00            | 48.00           | 4.04                | 3.81               | 0.00            |
| 2.00            | 0.11                | 0.02               | 0.02            | 49.00           | 4.04                | 3.81               | 0.00            |
| 3.00            | 0.19                | 0.06               | 0.03            | 50.00           | 4.04                | 3.81               | 0.00            |
| 4.00            | 0.26                | 0.12               | 0.04            | 51.00           | 4.04                | 3.81               | 0.00            |
| 5.00            | 0.35                | 0.19               | 0.05            | 52.00           | 4.04                | 3.81               | 0.00            |
| 6.00            | 0.45                | 0.27               | 0.06            | 53.00           | 4.04                | 3.81               | 0.00            |
| 7.00            | 0.56                | 0.37               | 0.07            | 54.00           | 4.04                | 3.81               | 0.00            |
| 8.00            | 0.67                | 0.48               | 0.08            | 55.00           | 4.04                | 3.81               | 0.00            |
| 9.00            | 0.80                | 0.59               | 0.09            | 56.00           | 4.04                | 3.81               | 0.00            |
| 10.00           | 0.97                | 0.76               | 0.12            | 57.00           | 4.04                | 3.81               | 0.00            |
| 11.00           | 1.20                | 0.98               | 0.21            | 58.00           | 4.04                | 3.81               | 0.00            |
| 12.00           | 1.91                | 1.69               | <b>1.98</b>     | 59.00           | 4.04                | 3.81               | 0.00            |
| 13.00           | 2.84                | 2.61               | <b>0.22</b>     | 60.00           | 4.04                | 3.81               | 0.00            |
| 14.00           | 3.07                | 2.84               | 0.12            | 61.00           | 4.04                | 3.81               | 0.00            |
| 15.00           | 3.24                | 3.01               | 0.11            | 62.00           | 4.04                | 3.81               | 0.00            |
| 16.00           | 3.37                | 3.14               | 0.08            | 63.00           | 4.04                | 3.81               | 0.00            |
| 17.00           | 3.48                | 3.25               | 0.08            | 64.00           | 4.04                | 3.81               | 0.00            |
| 18.00           | 3.59                | 3.36               | 0.07            | 65.00           | 4.04                | 3.81               | 0.00            |
| 19.00           | 3.69                | 3.45               | 0.06            | 66.00           | 4.04                | 3.81               | 0.00            |
| 20.00           | 3.78                | 3.54               | 0.06            | 67.00           | 4.04                | 3.81               | 0.00            |
| 21.00           | 3.85                | 3.62               | 0.05            | 68.00           | 4.04                | 3.81               | 0.00            |
| 22.00           | 3.93                | 3.69               | 0.05            | 69.00           | 4.04                | 3.81               | 0.00            |
| 23.00           | 3.99                | 3.75               | 0.04            | 70.00           | 4.04                | 3.81               | 0.00            |
| 24.00           | <b>4.04</b>         | <b>3.81</b>        | 0.03            | 71.00           | 4.04                | 3.81               | 0.00            |
| 25.00           | 4.04                | 3.81               | 0.00            | 72.00           | 4.04                | 3.81               | 0.00            |
| 26.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 27.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 28.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 29.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 30.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 31.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 32.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 33.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 34.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 35.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 36.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 37.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 38.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 39.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 40.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 41.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 42.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 43.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 44.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 45.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 46.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Subcatchment 2S: Existing Pervious

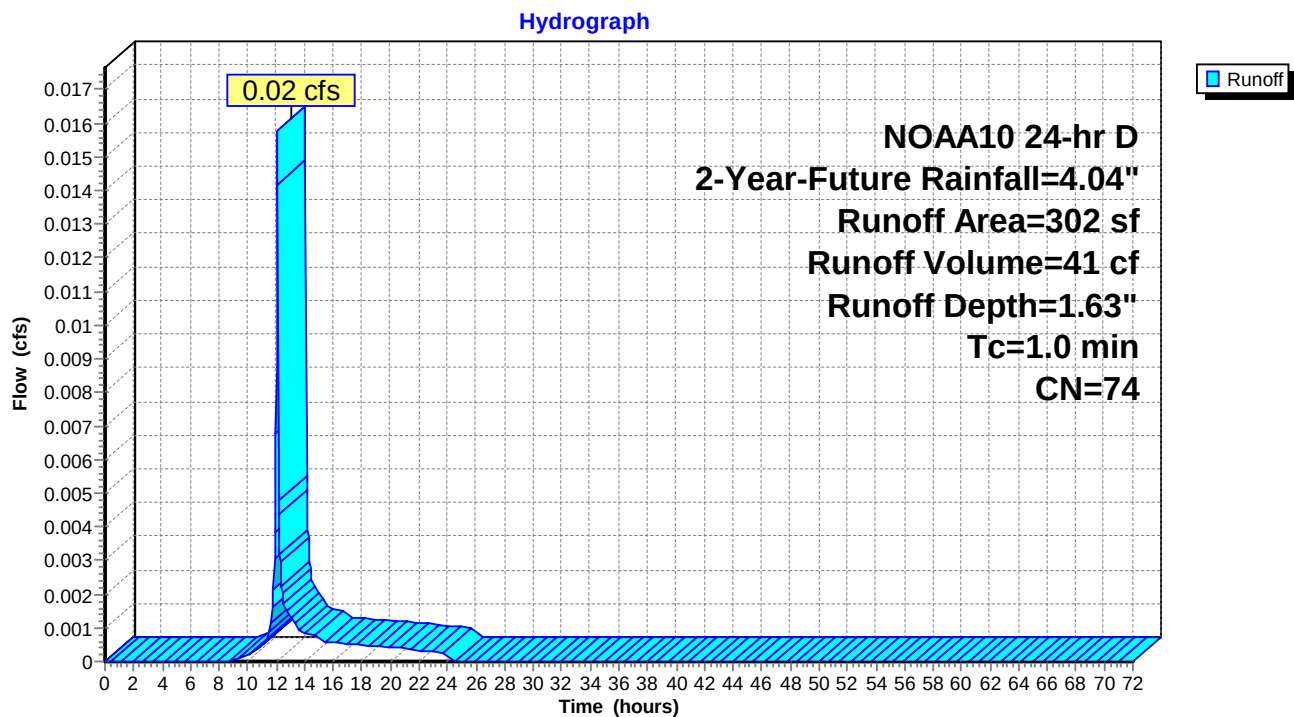
Runoff = 0.02 cfs @ 12.07 hrs, Volume= 41 cf, Depth= 1.63"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 302       | 74 | >75% Grass cover, Good, HSG C |
| 302       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 2S: Existing Pervious



## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Subcatchment 2S: Existing Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 4.04                | 1.63               | 0.00            |
| 1.00            | 0.05                | 0.00               | 0.00            | 48.00           | 4.04                | 1.63               | 0.00            |
| 2.00            | 0.11                | 0.00               | 0.00            | 49.00           | 4.04                | 1.63               | 0.00            |
| 3.00            | 0.19                | 0.00               | 0.00            | 50.00           | 4.04                | 1.63               | 0.00            |
| 4.00            | 0.26                | 0.00               | 0.00            | 51.00           | 4.04                | 1.63               | 0.00            |
| 5.00            | 0.35                | 0.00               | 0.00            | 52.00           | 4.04                | 1.63               | 0.00            |
| 6.00            | 0.45                | 0.00               | 0.00            | 53.00           | 4.04                | 1.63               | 0.00            |
| 7.00            | 0.56                | 0.00               | 0.00            | 54.00           | 4.04                | 1.63               | 0.00            |
| 8.00            | 0.67                | 0.00               | 0.00            | 55.00           | 4.04                | 1.63               | 0.00            |
| 9.00            | 0.80                | 0.00               | 0.00            | 56.00           | 4.04                | 1.63               | 0.00            |
| 10.00           | 0.97                | 0.02               | 0.00            | 57.00           | 4.04                | 1.63               | 0.00            |
| 11.00           | 1.20                | 0.06               | 0.00            | 58.00           | 4.04                | 1.63               | 0.00            |
| 12.00           | 1.91                | 0.31               | <b>0.01</b>     | 59.00           | 4.04                | 1.63               | 0.00            |
| 13.00           | 2.84                | 0.81               | <b>0.00</b>     | 60.00           | 4.04                | 1.63               | 0.00            |
| 14.00           | 3.07                | 0.95               | 0.00            | 61.00           | 4.04                | 1.63               | 0.00            |
| 15.00           | 3.24                | 1.07               | 0.00            | 62.00           | 4.04                | 1.63               | 0.00            |
| 16.00           | 3.37                | 1.15               | 0.00            | 63.00           | 4.04                | 1.63               | 0.00            |
| 17.00           | 3.48                | 1.23               | 0.00            | 64.00           | 4.04                | 1.63               | 0.00            |
| 18.00           | 3.59                | 1.30               | 0.00            | 65.00           | 4.04                | 1.63               | 0.00            |
| 19.00           | 3.69                | 1.37               | 0.00            | 66.00           | 4.04                | 1.63               | 0.00            |
| 20.00           | 3.78                | 1.43               | 0.00            | 67.00           | 4.04                | 1.63               | 0.00            |
| 21.00           | 3.85                | 1.49               | 0.00            | 68.00           | 4.04                | 1.63               | 0.00            |
| 22.00           | 3.93                | 1.54               | 0.00            | 69.00           | 4.04                | 1.63               | 0.00            |
| 23.00           | 3.99                | 1.59               | 0.00            | 70.00           | 4.04                | 1.63               | 0.00            |
| 24.00           | <b>4.04</b>         | <b>1.63</b>        | 0.00            | 71.00           | 4.04                | 1.63               | 0.00            |
| 25.00           | 4.04                | 1.63               | 0.00            | 72.00           | 4.04                | 1.63               | 0.00            |
| 26.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 27.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 28.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 29.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 30.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 31.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 32.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 33.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 34.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 35.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 36.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 37.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 38.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 39.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 40.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 41.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 42.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 43.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 44.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 45.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 46.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Link 3L: Total Site Flows

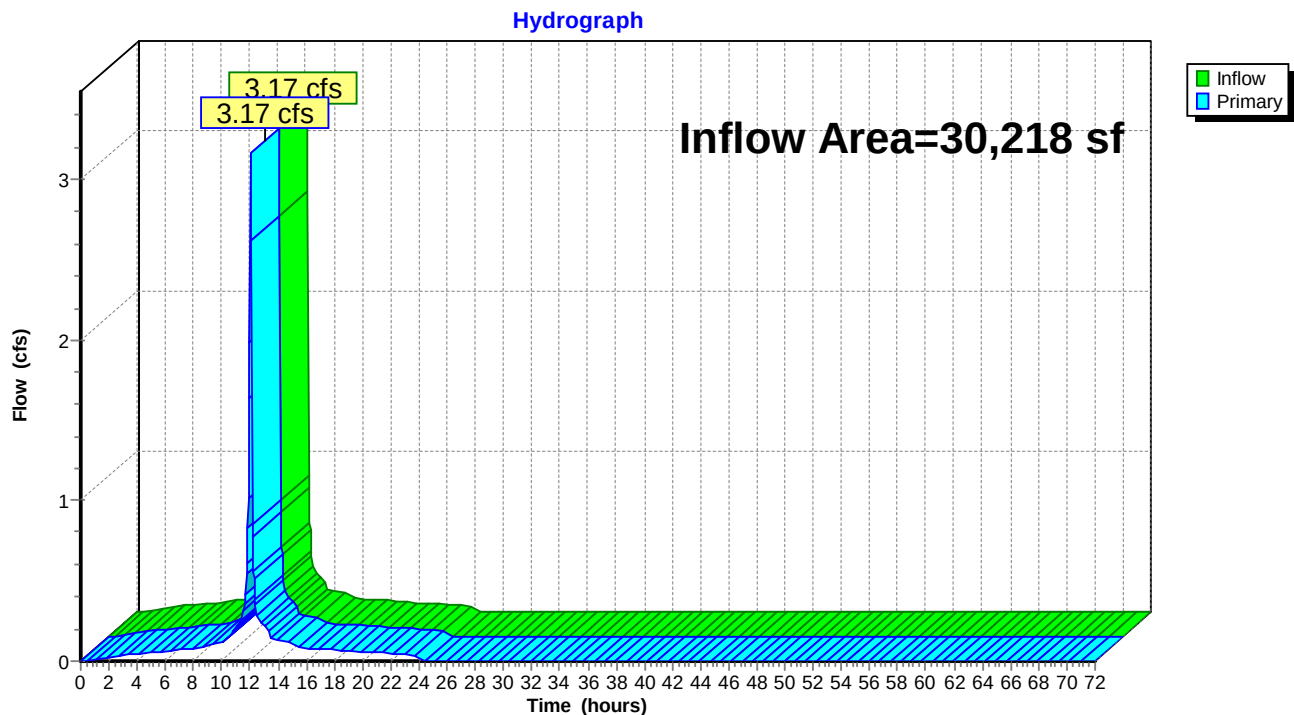
Inflow Area = 30,218 sf, 99.00% Impervious, Inflow Depth = 3.78" for 2-Year-Future event

Inflow = 3.17 cfs @ 12.06 hrs, Volume= 9,527 cf

Primary = 3.17 cfs @ 12.06 hrs, Volume= 9,527 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Link 3L: Total Site Flows



## Existing Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Link 3L: Total Site Flows

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | <b>0.00</b>         | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.00            | 0.00                | 0.00             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.02            | 0.00                | 0.02             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.03            | 0.00                | 0.03             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.04            | 0.00                | 0.04             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.05            | 0.00                | 0.05             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.06            | 0.00                | 0.06             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.07            | 0.00                | 0.07             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.08            | 0.00                | 0.08             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.09            | 0.00                | 0.09             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.12            | 0.00                | 0.12             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.21            | 0.00                | 0.21             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | <b>1.99</b>     | 0.00                | <b>1.99</b>      | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | <b>0.22</b>     | 0.00                | <b>0.22</b>      | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.13            | 0.00                | 0.13             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.11            | 0.00                | 0.11             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.08            | 0.00                | 0.08             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.08            | 0.00                | 0.08             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.07            | 0.00                | 0.07             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.06            | 0.00                | 0.06             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.06            | 0.00                | 0.06             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.05            | 0.00                | 0.05             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.05            | 0.00                | 0.05             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.04            | 0.00                | 0.04             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.03            | 0.00                | 0.03             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |

## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Existing Impervious

Runoff Area=29,916 sf 100.00% Impervious Runoff Depth=6.07"  
Flow Length=166' Tc=0.9 min CN=98 Runoff=4.95 cfs 15,136 cf

### Subcatchment 2S: Existing Pervious

Runoff Area=302 sf 0.00% Impervious Runoff Depth=3.45"  
Tc=1.0 min CN=74 Runoff=0.03 cfs 87 cf

### Link 3L: Total Site Flows

Inflow=4.98 cfs 15,223 cf  
Primary=4.98 cfs 15,223 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 15,223 cf   Average Runoff Depth = 6.05"**  
**1.00% Pervious = 302 sf   99.00% Impervious = 29,916 sf**

## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Subcatchment 1S: Existing Impervious

Runoff = 4.95 cfs @ 12.06 hrs, Volume= 15,136 cf, Depth= 6.07"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 11,049    | 98 | Roofs, HSG C            |
| 18,867    | 98 | Paved parking, HSG C    |
| 29,916    | 98 | Weighted Average        |
| 29,916    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                              |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------|
| 0.7      | 100           | 0.0750        | 2.42              |                | <b>Sheet Flow,</b><br>Smooth surfaces n= 0.011 P2= 3.43" |
| 0.2      | 66            | 0.0530        | 4.67              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps  |
| 0.9      | 166           | Total         |                   |                |                                                          |

## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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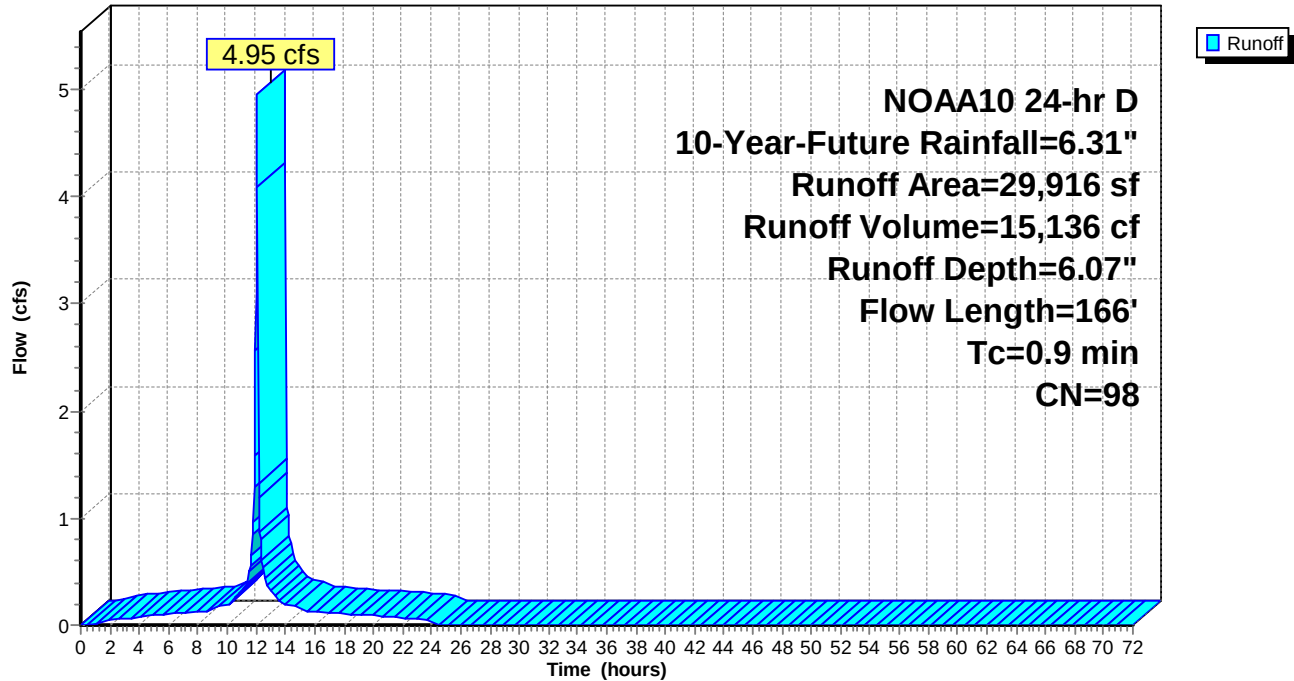
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### Subcatchment 1S: Existing Impervious

Hydrograph



## Existing Flows

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### Hydrograph for Subcatchment 1S: Existing Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 6.31                | 6.07               | 0.00            |
| 1.00            | 0.08                | 0.01               | 0.02            | 48.00           | 6.31                | 6.07               | 0.00            |
| 2.00            | 0.18                | 0.06               | 0.05            | 49.00           | 6.31                | 6.07               | 0.00            |
| 3.00            | 0.29                | 0.14               | 0.06            | 50.00           | 6.31                | 6.07               | 0.00            |
| 4.00            | 0.41                | 0.24               | 0.08            | 51.00           | 6.31                | 6.07               | 0.00            |
| 5.00            | 0.55                | 0.37               | 0.09            | 52.00           | 6.31                | 6.07               | 0.00            |
| 6.00            | 0.70                | 0.51               | 0.10            | 53.00           | 6.31                | 6.07               | 0.00            |
| 7.00            | 0.87                | 0.66               | 0.11            | 54.00           | 6.31                | 6.07               | 0.00            |
| 8.00            | 1.05                | 0.84               | 0.13            | 55.00           | 6.31                | 6.07               | 0.00            |
| 9.00            | 1.24                | 1.03               | 0.14            | 56.00           | 6.31                | 6.07               | 0.00            |
| 10.00           | 1.51                | 1.29               | 0.19            | 57.00           | 6.31                | 6.07               | 0.00            |
| 11.00           | 1.87                | 1.64               | 0.33            | 58.00           | 6.31                | 6.07               | 0.00            |
| 12.00           | 2.99                | 2.75               | <b>3.11</b>     | 59.00           | 6.31                | 6.07               | 0.00            |
| 13.00           | 4.44                | 4.21               | <b>0.34</b>     | 60.00           | 6.31                | 6.07               | 0.00            |
| 14.00           | 4.80                | 4.56               | 0.20            | 61.00           | 6.31                | 6.07               | 0.00            |
| 15.00           | 5.07                | 4.83               | 0.17            | 62.00           | 6.31                | 6.07               | 0.00            |
| 16.00           | 5.26                | 5.02               | 0.13            | 63.00           | 6.31                | 6.07               | 0.00            |
| 17.00           | 5.44                | 5.20               | 0.12            | 64.00           | 6.31                | 6.07               | 0.00            |
| 18.00           | 5.61                | 5.37               | 0.11            | 65.00           | 6.31                | 6.07               | 0.00            |
| 19.00           | 5.76                | 5.52               | 0.10            | 66.00           | 6.31                | 6.07               | 0.00            |
| 20.00           | 5.90                | 5.66               | 0.09            | 67.00           | 6.31                | 6.07               | 0.00            |
| 21.00           | 6.02                | 5.78               | 0.08            | 68.00           | 6.31                | 6.07               | 0.00            |
| 22.00           | 6.13                | 5.89               | 0.07            | 69.00           | 6.31                | 6.07               | 0.00            |
| 23.00           | 6.23                | 5.99               | 0.06            | 70.00           | 6.31                | 6.07               | 0.00            |
| 24.00           | <b>6.31</b>         | <b>6.07</b>        | 0.04            | 71.00           | 6.31                | 6.07               | 0.00            |
| 25.00           | 6.31                | 6.07               | 0.00            | 72.00           | 6.31                | 6.07               | 0.00            |
| 26.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 27.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 28.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 29.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 30.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 31.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 32.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 33.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 34.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 35.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 36.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 37.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 38.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 39.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 40.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 41.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 42.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 43.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 44.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 45.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 46.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Subcatchment 2S: Existing Pervious

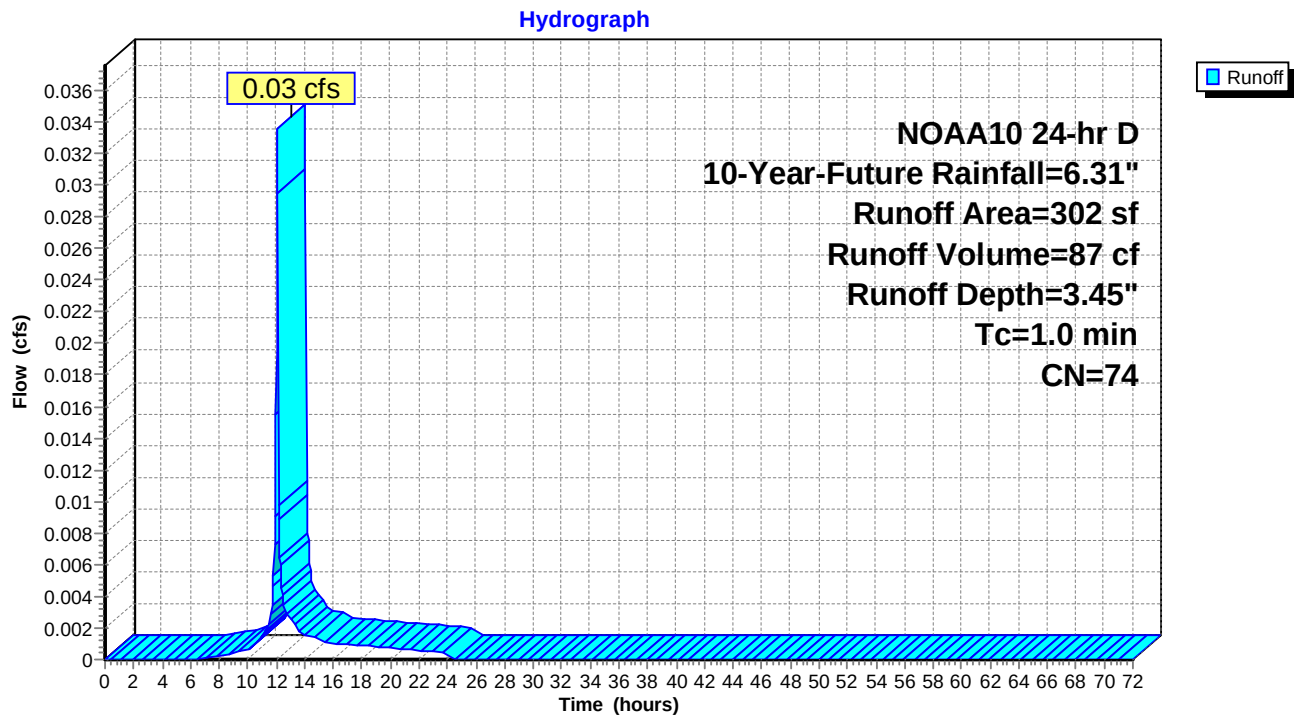
Runoff = 0.03 cfs @ 12.07 hrs, Volume= 87 cf, Depth= 3.45"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 302       | 74 | >75% Grass cover, Good, HSG C |
| 302       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 2S: Existing Pervious



## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Hydrograph for Subcatchment 2S: Existing Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 6.31                | 3.45               | 0.00            |
| 1.00            | 0.08                | 0.00               | 0.00            | 48.00           | 6.31                | 3.45               | 0.00            |
| 2.00            | 0.18                | 0.00               | 0.00            | 49.00           | 6.31                | 3.45               | 0.00            |
| 3.00            | 0.29                | 0.00               | 0.00            | 50.00           | 6.31                | 3.45               | 0.00            |
| 4.00            | 0.41                | 0.00               | 0.00            | 51.00           | 6.31                | 3.45               | 0.00            |
| 5.00            | 0.55                | 0.00               | 0.00            | 52.00           | 6.31                | 3.45               | 0.00            |
| 6.00            | 0.70                | 0.00               | 0.00            | 53.00           | 6.31                | 3.45               | 0.00            |
| 7.00            | 0.87                | 0.01               | 0.00            | 54.00           | 6.31                | 3.45               | 0.00            |
| 8.00            | 1.05                | 0.03               | 0.00            | 55.00           | 6.31                | 3.45               | 0.00            |
| 9.00            | 1.24                | 0.07               | 0.00            | 56.00           | 6.31                | 3.45               | 0.00            |
| 10.00           | 1.51                | 0.15               | 0.00            | 57.00           | 6.31                | 3.45               | 0.00            |
| 11.00           | 1.87                | 0.29               | 0.00            | 58.00           | 6.31                | 3.45               | 0.00            |
| 12.00           | 2.99                | 0.90               | <b>0.02</b>     | 59.00           | 6.31                | 3.45               | 0.00            |
| 13.00           | 4.44                | 1.93               | <b>0.00</b>     | 60.00           | 6.31                | 3.45               | 0.00            |
| 14.00           | 4.80                | 2.20               | 0.00            | 61.00           | 6.31                | 3.45               | 0.00            |
| 15.00           | 5.07                | 2.42               | 0.00            | 62.00           | 6.31                | 3.45               | 0.00            |
| 16.00           | 5.26                | 2.57               | 0.00            | 63.00           | 6.31                | 3.45               | 0.00            |
| 17.00           | 5.44                | 2.72               | 0.00            | 64.00           | 6.31                | 3.45               | 0.00            |
| 18.00           | 5.61                | 2.86               | 0.00            | 65.00           | 6.31                | 3.45               | 0.00            |
| 19.00           | 5.76                | 2.98               | 0.00            | 66.00           | 6.31                | 3.45               | 0.00            |
| 20.00           | 5.90                | 3.10               | 0.00            | 67.00           | 6.31                | 3.45               | 0.00            |
| 21.00           | 6.02                | 3.20               | 0.00            | 68.00           | 6.31                | 3.45               | 0.00            |
| 22.00           | 6.13                | 3.30               | 0.00            | 69.00           | 6.31                | 3.45               | 0.00            |
| 23.00           | 6.23                | 3.38               | 0.00            | 70.00           | 6.31                | 3.45               | 0.00            |
| 24.00           | <b>6.31</b>         | <b>3.45</b>        | 0.00            | 71.00           | 6.31                | 3.45               | 0.00            |
| 25.00           | 6.31                | 3.45               | 0.00            | 72.00           | 6.31                | 3.45               | 0.00            |
| 26.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 27.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 28.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 29.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 30.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 31.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 32.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 33.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 34.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 35.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 36.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 37.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 38.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 39.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 40.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 41.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 42.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 43.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 44.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 45.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 46.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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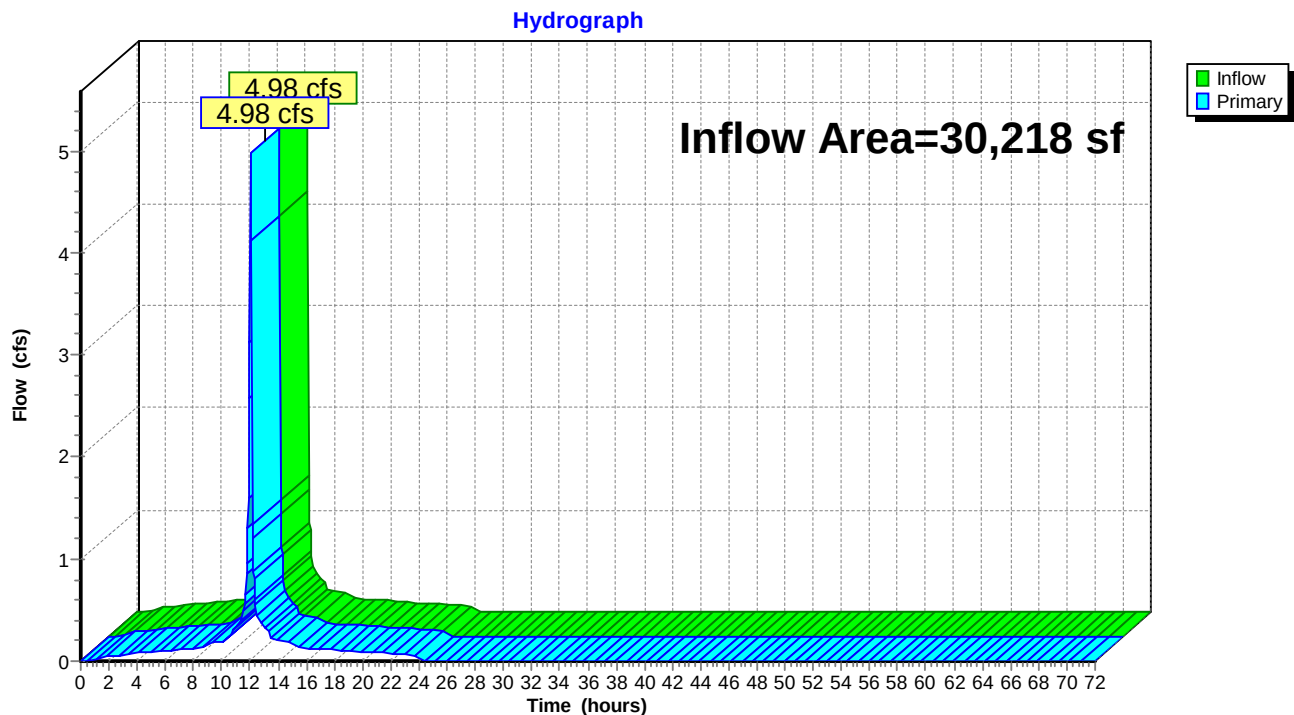
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### Summary for Link 3L: Total Site Flows

Inflow Area = 30,218 sf, 99.00% Impervious, Inflow Depth = 6.05" for 10-Year-Future event  
Inflow = 4.98 cfs @ 12.06 hrs, Volume= 15,223 cf  
Primary = 4.98 cfs @ 12.06 hrs, Volume= 15,223 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Link 3L: Total Site Flows



## Existing Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Hydrograph for Link 3L: Total Site Flows

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | <b>0.00</b>         | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.02            | 0.00                | 0.02             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.05            | 0.00                | 0.05             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.06            | 0.00                | 0.06             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.08            | 0.00                | 0.08             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.09            | 0.00                | 0.09             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.10            | 0.00                | 0.10             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.11            | 0.00                | 0.11             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.13            | 0.00                | 0.13             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.14            | 0.00                | 0.14             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.19            | 0.00                | 0.19             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.33            | 0.00                | 0.33             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | <b>3.13</b>     | 0.00                | <b>3.13</b>      | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | <b>0.34</b>     | 0.00                | <b>0.34</b>      | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.20            | 0.00                | 0.20             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.17            | 0.00                | 0.17             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.13            | 0.00                | 0.13             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.12            | 0.00                | 0.12             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.11            | 0.00                | 0.11             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.10            | 0.00                | 0.10             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.09            | 0.00                | 0.09             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.08            | 0.00                | 0.08             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.07            | 0.00                | 0.07             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.06            | 0.00                | 0.06             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.04            | 0.00                | 0.04             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |

## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Existing Impervious

Runoff Area=29,916 sf 100.00% Impervious Runoff Depth=11.28"  
Flow Length=166' Tc=0.9 min CN=98 Runoff=9.05 cfs 28,118 cf

### Subcatchment 2S: Existing Pervious

Runoff Area=302 sf 0.00% Impervious Runoff Depth=8.17"  
Tc=1.0 min CN=74 Runoff=0.08 cfs 205 cf

### Link 3L: Total Site Flows

Inflow=9.13 cfs 28,323 cf  
Primary=9.13 cfs 28,323 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 28,323 cf   Average Runoff Depth = 11.25"**  
**1.00% Pervious = 302 sf   99.00% Impervious = 29,916 sf**

## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Subcatchment 1S: Existing Impervious

Runoff = 9.05 cfs @ 12.06 hrs, Volume= 28,118 cf, Depth=11.28"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 11,049    | 98 | Roofs, HSG C            |
| 18,867    | 98 | Paved parking, HSG C    |
| 29,916    | 98 | Weighted Average        |
| 29,916    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                              |
|----------|---------------|---------------|-------------------|----------------|----------------------------------------------------------|
| 0.7      | 100           | 0.0750        | 2.42              |                | <b>Sheet Flow,</b><br>Smooth surfaces n= 0.011 P2= 3.43" |
| 0.2      | 66            | 0.0530        | 4.67              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps  |
| 0.9      | 166           | Total         |                   |                |                                                          |

## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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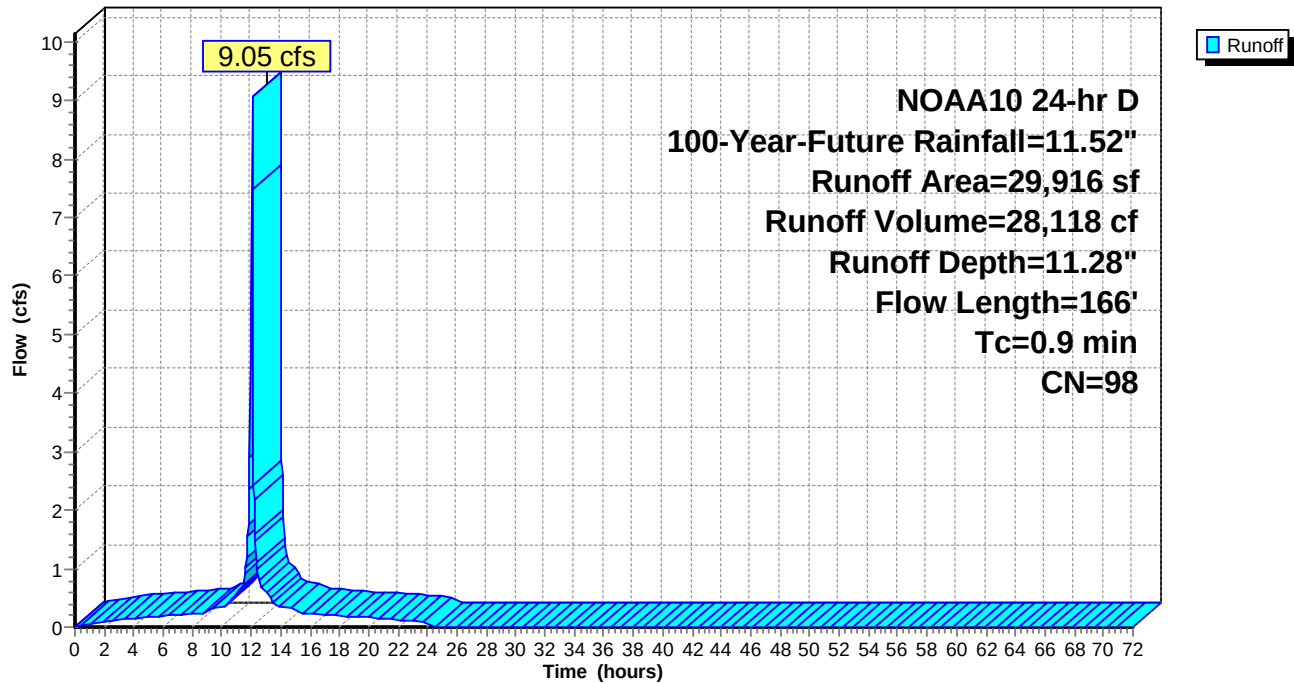
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### Subcatchment 1S: Existing Impervious

Hydrograph



## Existing Flows

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### Hydrograph for Subcatchment 1S: Existing Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 11.52               | 11.28              | 0.00            |
| 1.00            | 0.15                | 0.04               | 0.06            | 48.00           | 11.52               | 11.28              | 0.00            |
| 2.00            | 0.33                | 0.17               | 0.11            | 49.00           | 11.52               | 11.28              | 0.00            |
| 3.00            | 0.53                | 0.34               | 0.13            | 50.00           | 11.52               | 11.28              | 0.00            |
| 4.00            | 0.76                | 0.56               | 0.16            | 51.00           | 11.52               | 11.28              | 0.00            |
| 5.00            | 1.01                | 0.80               | 0.18            | 52.00           | 11.52               | 11.28              | 0.00            |
| 6.00            | 1.28                | 1.07               | 0.20            | 53.00           | 11.52               | 11.28              | 0.00            |
| 7.00            | 1.59                | 1.37               | 0.21            | 54.00           | 11.52               | 11.28              | 0.00            |
| 8.00            | 1.92                | 1.69               | 0.23            | 55.00           | 11.52               | 11.28              | 0.00            |
| 9.00            | 2.27                | 2.04               | 0.27            | 56.00           | 11.52               | 11.28              | 0.00            |
| 10.00           | 2.76                | 2.53               | 0.35            | 57.00           | 11.52               | 11.28              | 0.00            |
| 11.00           | 3.41                | 3.18               | 0.60            | 58.00           | 11.52               | 11.28              | 0.00            |
| 12.00           | 5.45                | 5.21               | <b>5.69</b>     | 59.00           | 11.52               | 11.28              | 0.00            |
| 13.00           | 8.11                | 7.87               | <b>0.62</b>     | 60.00           | 11.52               | 11.28              | 0.00            |
| 14.00           | 8.76                | 8.52               | 0.36            | 61.00           | 11.52               | 11.28              | 0.00            |
| 15.00           | 9.25                | 9.01               | 0.31            | 62.00           | 11.52               | 11.28              | 0.00            |
| 16.00           | 9.60                | 9.36               | 0.24            | 63.00           | 11.52               | 11.28              | 0.00            |
| 17.00           | 9.93                | 9.69               | 0.22            | 64.00           | 11.52               | 11.28              | 0.00            |
| 18.00           | 10.24               | 9.99               | 0.20            | 65.00           | 11.52               | 11.28              | 0.00            |
| 19.00           | 10.51               | 10.27              | 0.18            | 66.00           | 11.52               | 11.28              | 0.00            |
| 20.00           | 10.76               | 10.52              | 0.17            | 67.00           | 11.52               | 11.28              | 0.00            |
| 21.00           | 10.99               | 10.75              | 0.15            | 68.00           | 11.52               | 11.28              | 0.00            |
| 22.00           | 11.19               | 10.95              | 0.13            | 69.00           | 11.52               | 11.28              | 0.00            |
| 23.00           | 11.37               | 11.13              | 0.11            | 70.00           | 11.52               | 11.28              | 0.00            |
| 24.00           | <b>11.52</b>        | <b>11.28</b>       | 0.07            | 71.00           | 11.52               | 11.28              | 0.00            |
| 25.00           | 11.52               | 11.28              | 0.00            | 72.00           | 11.52               | 11.28              | 0.00            |
| 26.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 27.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 28.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 29.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 30.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 31.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 32.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 33.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 34.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 35.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 36.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 37.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 38.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 39.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 40.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 41.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 42.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 43.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 44.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 45.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 46.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Subcatchment 2S: Existing Pervious

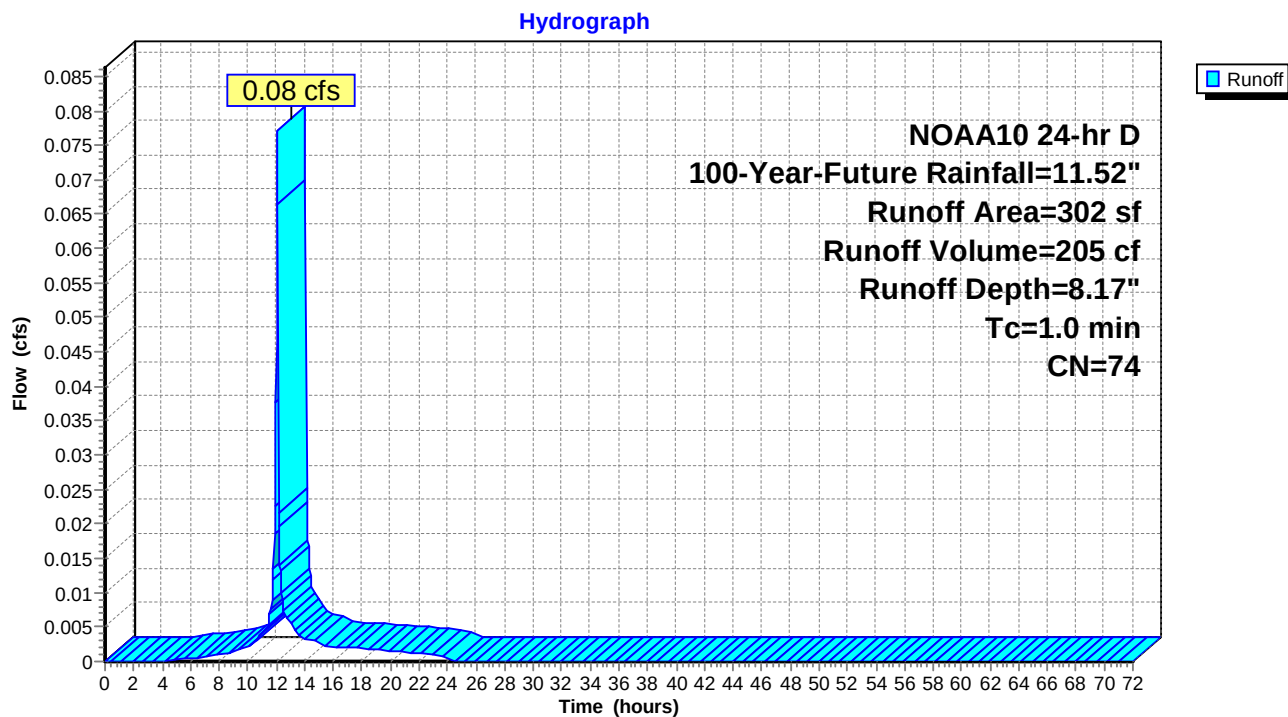
Runoff = 0.08 cfs @ 12.06 hrs, Volume= 205 cf, Depth= 8.17"  
Routed to Link 3L : Total Site Flows

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 302       | 74 | >75% Grass cover, Good, HSG C |
| 302       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 2S: Existing Pervious



## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Hydrograph for Subcatchment 2S: Existing Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 11.52               | 8.17               | 0.00            |
| 1.00            | 0.15                | 0.00               | 0.00            | 48.00           | 11.52               | 8.17               | 0.00            |
| 2.00            | 0.33                | 0.00               | 0.00            | 49.00           | 11.52               | 8.17               | 0.00            |
| 3.00            | 0.53                | 0.00               | 0.00            | 50.00           | 11.52               | 8.17               | 0.00            |
| 4.00            | 0.76                | 0.00               | 0.00            | 51.00           | 11.52               | 8.17               | 0.00            |
| 5.00            | 1.01                | 0.02               | 0.00            | 52.00           | 11.52               | 8.17               | 0.00            |
| 6.00            | 1.28                | 0.08               | 0.00            | 53.00           | 11.52               | 8.17               | 0.00            |
| 7.00            | 1.59                | 0.18               | 0.00            | 54.00           | 11.52               | 8.17               | 0.00            |
| 8.00            | 1.92                | 0.31               | 0.00            | 55.00           | 11.52               | 8.17               | 0.00            |
| 9.00            | 2.27                | 0.48               | 0.00            | 56.00           | 11.52               | 8.17               | 0.00            |
| 10.00           | 2.76                | 0.76               | 0.00            | 57.00           | 11.52               | 8.17               | 0.00            |
| 11.00           | 3.41                | 1.18               | 0.00            | 58.00           | 11.52               | 8.17               | 0.00            |
| 12.00           | 5.45                | 2.73               | <b>0.05</b>     | 59.00           | 11.52               | 8.17               | 0.00            |
| 13.00           | 8.11                | 5.02               | <b>0.01</b>     | 60.00           | 11.52               | 8.17               | 0.00            |
| 14.00           | 8.76                | 5.61               | 0.00            | 61.00           | 11.52               | 8.17               | 0.00            |
| 15.00           | 9.25                | 6.06               | 0.00            | 62.00           | 11.52               | 8.17               | 0.00            |
| 16.00           | 9.60                | 6.38               | 0.00            | 63.00           | 11.52               | 8.17               | 0.00            |
| 17.00           | 9.93                | 6.69               | 0.00            | 64.00           | 11.52               | 8.17               | 0.00            |
| 18.00           | 10.24               | 6.97               | 0.00            | 65.00           | 11.52               | 8.17               | 0.00            |
| 19.00           | 10.51               | 7.22               | 0.00            | 66.00           | 11.52               | 8.17               | 0.00            |
| 20.00           | 10.76               | 7.46               | 0.00            | 67.00           | 11.52               | 8.17               | 0.00            |
| 21.00           | 10.99               | 7.67               | 0.00            | 68.00           | 11.52               | 8.17               | 0.00            |
| 22.00           | 11.19               | 7.86               | 0.00            | 69.00           | 11.52               | 8.17               | 0.00            |
| 23.00           | 11.37               | 8.02               | 0.00            | 70.00           | 11.52               | 8.17               | 0.00            |
| 24.00           | <b>11.52</b>        | <b>8.17</b>        | 0.00            | 71.00           | 11.52               | 8.17               | 0.00            |
| 25.00           | 11.52               | 8.17               | 0.00            | 72.00           | 11.52               | 8.17               | 0.00            |
| 26.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 27.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 28.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 29.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 30.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 31.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 32.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 33.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 34.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 35.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 36.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 37.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 38.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 39.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 40.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 41.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 42.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 43.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 44.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 45.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 46.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |

## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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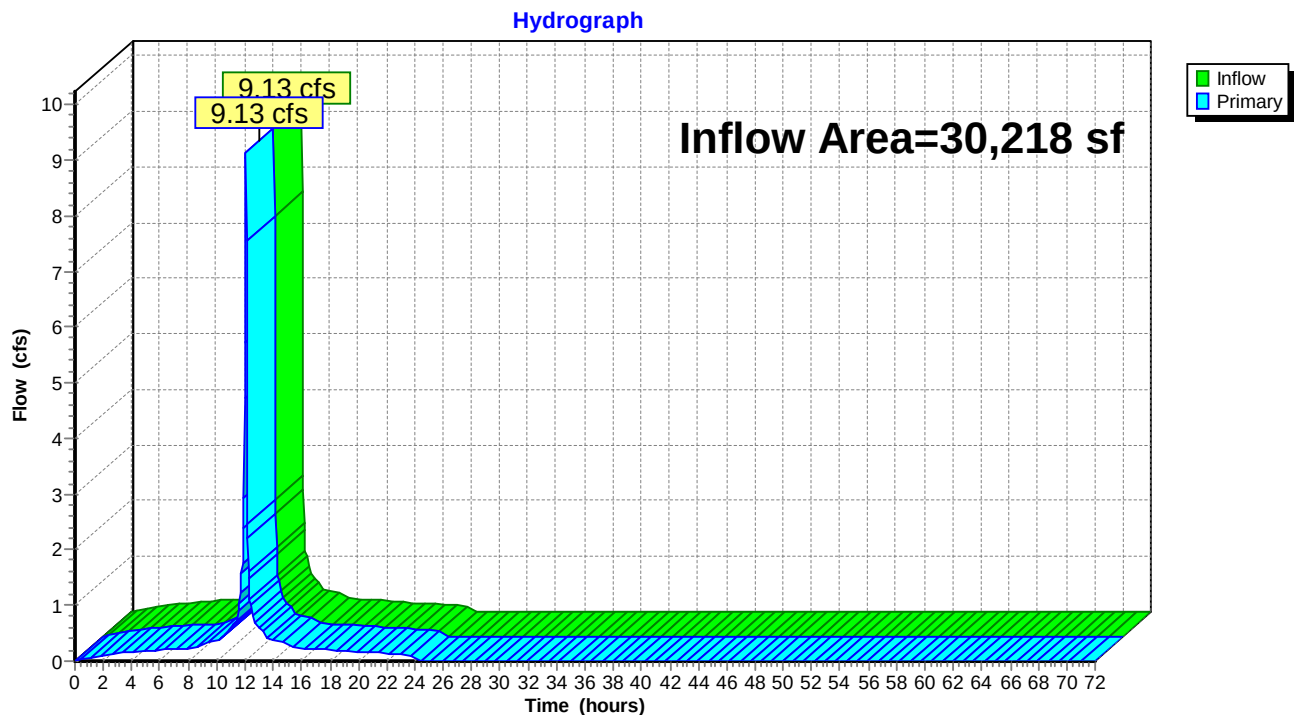
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### Summary for Link 3L: Total Site Flows

Inflow Area = 30,218 sf, 99.00% Impervious, Inflow Depth = 11.25" for 100-Year-Future event  
Inflow = 9.13 cfs @ 12.06 hrs, Volume= 28,323 cf  
Primary = 9.13 cfs @ 12.06 hrs, Volume= 28,323 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

### Link 3L: Total Site Flows



## Existing Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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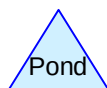
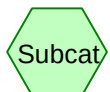
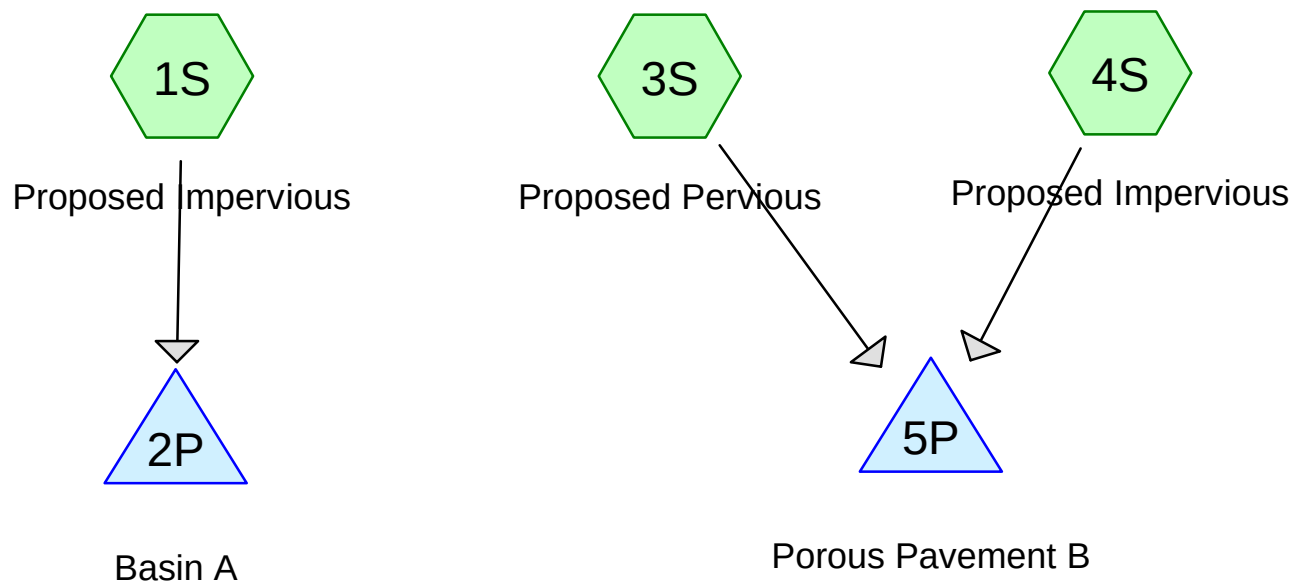
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### Hydrograph for Link 3L: Total Site Flows

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | <b>0.00</b>         | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.06            | 0.00                | 0.06             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.11            | 0.00                | 0.11             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.13            | 0.00                | 0.13             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.16            | 0.00                | 0.16             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.18            | 0.00                | 0.18             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.20            | 0.00                | 0.20             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.22            | 0.00                | 0.22             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.23            | 0.00                | 0.23             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.27            | 0.00                | 0.27             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.36            | 0.00                | 0.36             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.60            | 0.00                | 0.60             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | <b>5.74</b>     | 0.00                | <b>5.74</b>      | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | <b>0.62</b>     | 0.00                | <b>0.62</b>      | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.36            | 0.00                | 0.36             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.31            | 0.00                | 0.31             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.24            | 0.00                | 0.24             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.22            | 0.00                | 0.22             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.20            | 0.00                | 0.20             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.18            | 0.00                | 0.18             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.17            | 0.00                | 0.17             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.15            | 0.00                | 0.15             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.13            | 0.00                | 0.13             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.11            | 0.00                | 0.11             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.08            | 0.00                | 0.08             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |

## **Appendix D: Post-Development Analysis**



#### Routing Diagram for Proposed Flows

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## Proposed Flows

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### Rainfall Events Listing (selected events)

| Event# | Event Name       | Storm Type   | Curve | Mode    | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|------------------|--------------|-------|---------|------------------|-----|----------------|-----|
| 1      | 2-Year-Current   | NOAA10 24-hr | D     | Default | 24.00            | 1   | 3.43           | 2   |
| 2      | 10-Year-Current  | NOAA10 24-hr | D     | Default | 24.00            | 1   | 5.33           | 2   |
| 3      | 100-Year-Current | NOAA10 24-hr | D     | Default | 24.00            | 1   | 9.18           | 2   |
| 4      | 2-Year-Future    | NOAA10 24-hr | D     | Default | 24.00            | 1   | 4.04           | 2   |
| 5      | 10-Year-Future   | NOAA10 24-hr | D     | Default | 24.00            | 1   | 6.31           | 2   |
| 6      | 100-Year-Future  | NOAA10 24-hr | D     | Default | 24.00            | 1   | 11.52          | 2   |

## Proposed Flows

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### Area Listing (all nodes)

| Area<br>(sq-ft) | CN        | Description<br>(subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 907             | 74        | >75% Grass cover, Good, HSG C (3S)    |
| 15,377          | 98        | Paved parking, HSG C (4S)             |
| 13,934          | 98        | Roofs, HSG C (1S)                     |
| <b>30,218</b>   | <b>97</b> | <b>TOTAL AREA</b>                     |

## Proposed Flows

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### Soil Listing (all nodes)

| Area<br>(sq-ft) | Soil<br>Group | Subcatchment<br>Numbers |
|-----------------|---------------|-------------------------|
| 0               | HSG A         |                         |
| 0               | HSG B         |                         |
| 30,218          | HSG C         | 1S, 3S, 4S              |
| 0               | HSG D         |                         |
| 0               | Other         |                         |
| <b>30,218</b>   |               | <b>TOTAL AREA</b>       |

## Proposed Flows

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### Ground Covers (all nodes)

| HSG-A<br>(sq-ft) | HSG-B<br>(sq-ft) | HSG-C<br>(sq-ft) | HSG-D<br>(sq-ft) | Other<br>(sq-ft) | Total<br>(sq-ft) | Ground<br>Cover           | Subcatchment<br>Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|---------------------------|-------------------------|
| 0                | 0                | 907              | 0                | 0                | 907              | >75% Grass cover,<br>Good |                         |
| 0                | 0                | 15,377           | 0                | 0                | 15,377           | Paved parking             |                         |
| 0                | 0                | 13,934           | 0                | 0                | 13,934           | Roofs                     |                         |
| <b>0</b>         | <b>0</b>         | <b>30,218</b>    | <b>0</b>         | <b>0</b>         | <b>30,218</b>    | <b>TOTAL AREA</b>         |                         |

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Proposed Impervious**      Runoff Area=13,934 sf   100.00% Impervious   Runoff Depth=3.20"  
Tc=1.0 min   CN=98   Runoff=1.24 cfs   3,712 cf

**Subcatchment 3S: Proposed Pervious**      Runoff Area=907 sf   0.00% Impervious   Runoff Depth=1.19"  
Tc=1.0 min   CN=74   Runoff=0.03 cfs   90 cf

**Subcatchment 4S: Proposed Impervious**      Runoff Area=15,377 sf   100.00% Impervious   Runoff Depth=3.20"  
Tc=1.0 min   CN=98   Runoff=1.37 cfs   4,096 cf

**Pond 2P: Basin A**      Peak Elev=96.83'   Storage=1,526 cf   Inflow=1.24 cfs   3,712 cf  
Discarded=0.02 cfs   2,932 cf   Primary=0.06 cfs   779 cf   Outflow=0.08 cfs   3,712 cf

**Pond 5P: Porous Pavement B**      Peak Elev=97.26'   Storage=1,489 cf   Inflow=1.41 cfs   4,186 cf  
Discarded=0.07 cfs   4,115 cf   Primary=0.01 cfs   71 cf   Outflow=0.07 cfs   4,186 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 7,898 cf   Average Runoff Depth = 3.14"**  
**3.00% Pervious = 907 sf   97.00% Impervious = 29,311 sf**

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Summary for Subcatchment 1S: Proposed Impervious

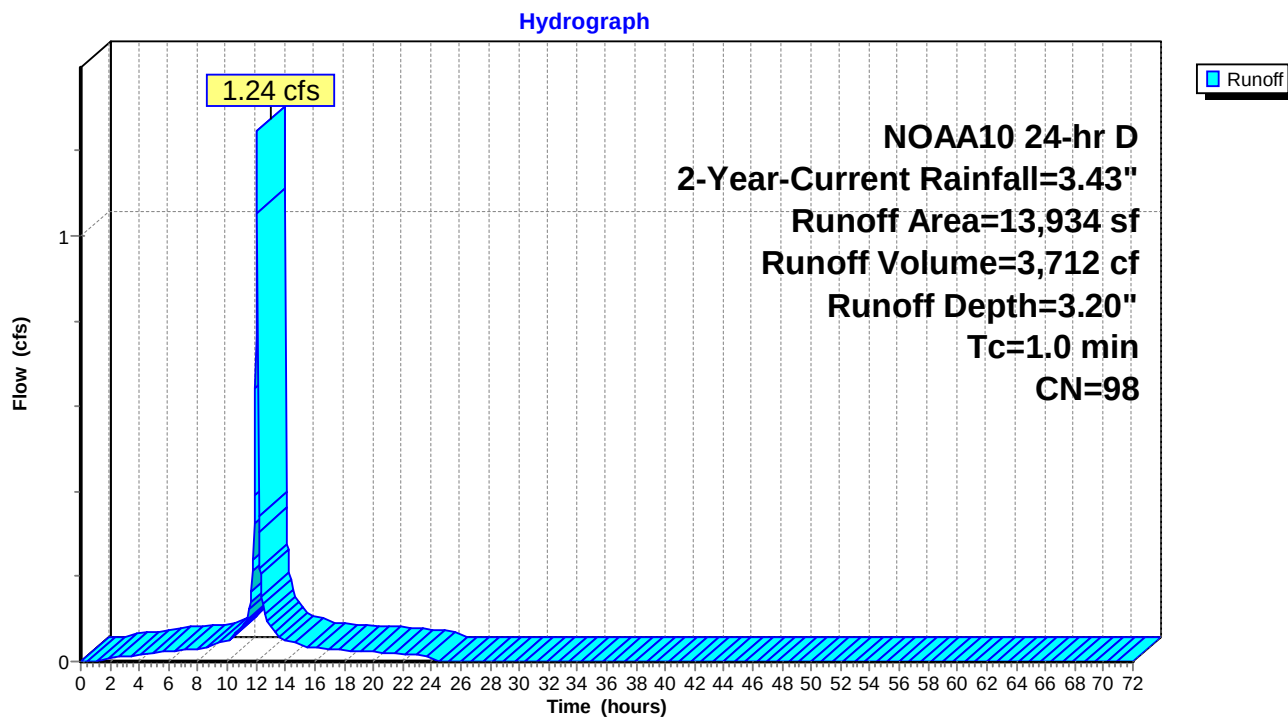
Runoff = 1.24 cfs @ 12.06 hrs, Volume= 3,712 cf, Depth= 3.20"  
Routed to Pond 2P : Basin A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 13,934    | 98 | Roofs, HSG C            |
| 13,934    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 3.43                | 3.20               | 0.00            |
| 1.00            | 0.04                | 0.00               | 0.00            | 48.00           | 3.43                | 3.20               | 0.00            |
| 2.00            | 0.10                | 0.01               | 0.01            | 49.00           | 3.43                | 3.20               | 0.00            |
| 3.00            | 0.16                | 0.04               | 0.01            | 50.00           | 3.43                | 3.20               | 0.00            |
| 4.00            | 0.22                | 0.09               | 0.02            | 51.00           | 3.43                | 3.20               | 0.00            |
| 5.00            | 0.30                | 0.14               | 0.02            | 52.00           | 3.43                | 3.20               | 0.00            |
| 6.00            | 0.38                | 0.21               | 0.02            | 53.00           | 3.43                | 3.20               | 0.00            |
| 7.00            | 0.47                | 0.29               | 0.03            | 54.00           | 3.43                | 3.20               | 0.00            |
| 8.00            | 0.57                | 0.38               | 0.03            | 55.00           | 3.43                | 3.20               | 0.00            |
| 9.00            | 0.68                | 0.48               | 0.03            | 56.00           | 3.43                | 3.20               | 0.00            |
| 10.00           | 0.82                | 0.62               | 0.05            | 57.00           | 3.43                | 3.20               | 0.00            |
| 11.00           | 1.02                | 0.81               | 0.08            | 58.00           | 3.43                | 3.20               | 0.00            |
| 12.00           | 1.62                | 1.40               | <b>0.76</b>     | 59.00           | 3.43                | 3.20               | 0.00            |
| 13.00           | 2.41                | 2.19               | <b>0.09</b>     | 60.00           | 3.43                | 3.20               | 0.00            |
| 14.00           | 2.61                | 2.38               | 0.05            | 61.00           | 3.43                | 3.20               | 0.00            |
| 15.00           | 2.75                | 2.52               | 0.04            | 62.00           | 3.43                | 3.20               | 0.00            |
| 16.00           | 2.86                | 2.63               | 0.03            | 63.00           | 3.43                | 3.20               | 0.00            |
| 17.00           | 2.96                | 2.73               | 0.03            | 64.00           | 3.43                | 3.20               | 0.00            |
| 18.00           | 3.05                | 2.82               | 0.03            | 65.00           | 3.43                | 3.20               | 0.00            |
| 19.00           | 3.13                | 2.90               | 0.03            | 66.00           | 3.43                | 3.20               | 0.00            |
| 20.00           | 3.21                | 2.97               | 0.02            | 67.00           | 3.43                | 3.20               | 0.00            |
| 21.00           | 3.27                | 3.04               | 0.02            | 68.00           | 3.43                | 3.20               | 0.00            |
| 22.00           | 3.33                | 3.10               | 0.02            | 69.00           | 3.43                | 3.20               | 0.00            |
| 23.00           | 3.39                | 3.15               | 0.02            | 70.00           | 3.43                | 3.20               | 0.00            |
| 24.00           | <b>3.43</b>         | <b>3.20</b>        | 0.01            | 71.00           | 3.43                | 3.20               | 0.00            |
| 25.00           | 3.43                | 3.20               | 0.00            | 72.00           | 3.43                | 3.20               | 0.00            |
| 26.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 27.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 28.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 29.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 30.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 31.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 32.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 33.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 34.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 35.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 36.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 37.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 38.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 39.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 40.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 41.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 42.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 43.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 44.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 45.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 46.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Summary for Subcatchment 3S: Proposed Pervious

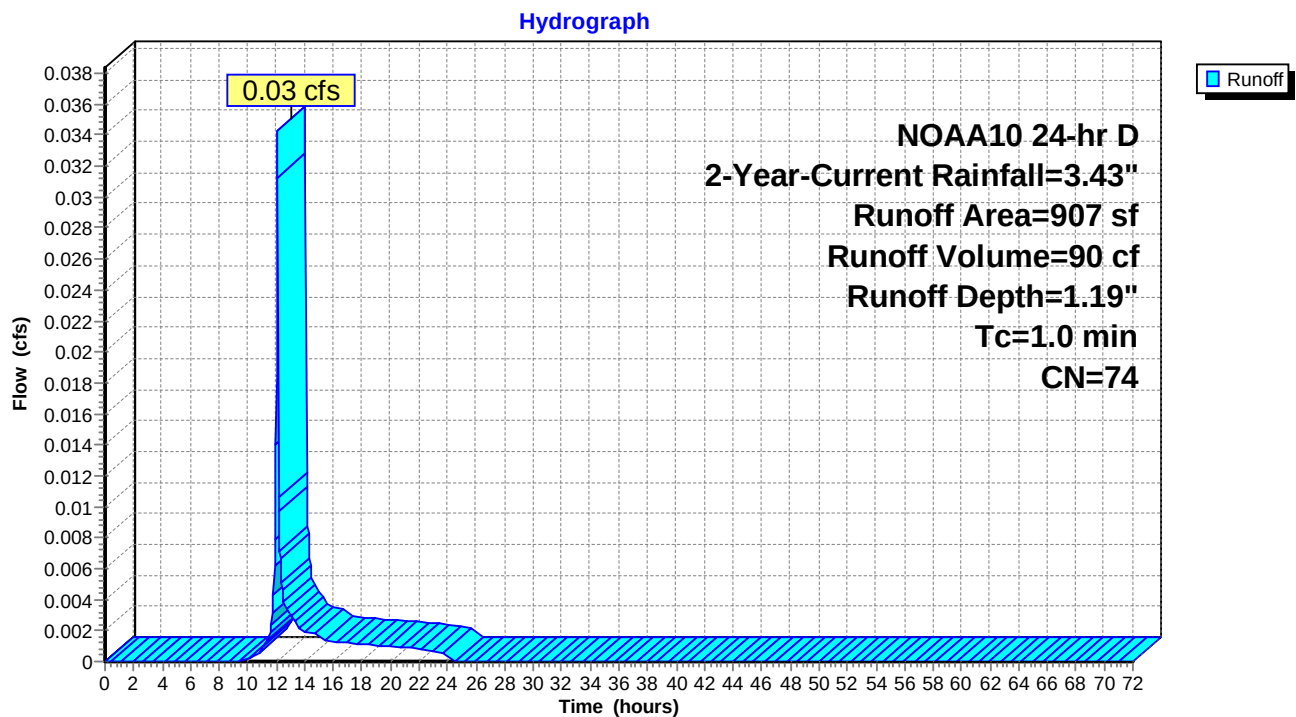
Runoff = 0.03 cfs @ 12.07 hrs, Volume= 90 cf, Depth= 1.19"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 907       | 74 | >75% Grass cover, Good, HSG C |
| 907       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 3S: Proposed Pervious



## Proposed Flows

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### Hydrograph for Subcatchment 3S: Proposed Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 3.43                | 1.19               | 0.00            |
| 1.00            | 0.04                | 0.00               | 0.00            | 48.00           | 3.43                | 1.19               | 0.00            |
| 2.00            | 0.10                | 0.00               | 0.00            | 49.00           | 3.43                | 1.19               | 0.00            |
| 3.00            | 0.16                | 0.00               | 0.00            | 50.00           | 3.43                | 1.19               | 0.00            |
| 4.00            | 0.22                | 0.00               | 0.00            | 51.00           | 3.43                | 1.19               | 0.00            |
| 5.00            | 0.30                | 0.00               | 0.00            | 52.00           | 3.43                | 1.19               | 0.00            |
| 6.00            | 0.38                | 0.00               | 0.00            | 53.00           | 3.43                | 1.19               | 0.00            |
| 7.00            | 0.47                | 0.00               | 0.00            | 54.00           | 3.43                | 1.19               | 0.00            |
| 8.00            | 0.57                | 0.00               | 0.00            | 55.00           | 3.43                | 1.19               | 0.00            |
| 9.00            | 0.68                | 0.00               | 0.00            | 56.00           | 3.43                | 1.19               | 0.00            |
| 10.00           | 0.82                | 0.00               | 0.00            | 57.00           | 3.43                | 1.19               | 0.00            |
| 11.00           | 1.02                | 0.03               | 0.00            | 58.00           | 3.43                | 1.19               | 0.00            |
| 12.00           | 1.62                | 0.19               | <b>0.02</b>     | 59.00           | 3.43                | 1.19               | 0.00            |
| 13.00           | 2.41                | 0.56               | <b>0.00</b>     | 60.00           | 3.43                | 1.19               | 0.00            |
| 14.00           | 2.61                | 0.67               | 0.00            | 61.00           | 3.43                | 1.19               | 0.00            |
| 15.00           | 2.75                | 0.76               | 0.00            | 62.00           | 3.43                | 1.19               | 0.00            |
| 16.00           | 2.86                | 0.82               | 0.00            | 63.00           | 3.43                | 1.19               | 0.00            |
| 17.00           | 2.96                | 0.88               | 0.00            | 64.00           | 3.43                | 1.19               | 0.00            |
| 18.00           | 3.05                | 0.94               | 0.00            | 65.00           | 3.43                | 1.19               | 0.00            |
| 19.00           | 3.13                | 0.99               | 0.00            | 66.00           | 3.43                | 1.19               | 0.00            |
| 20.00           | 3.21                | 1.04               | 0.00            | 67.00           | 3.43                | 1.19               | 0.00            |
| 21.00           | 3.27                | 1.09               | 0.00            | 68.00           | 3.43                | 1.19               | 0.00            |
| 22.00           | 3.33                | 1.13               | 0.00            | 69.00           | 3.43                | 1.19               | 0.00            |
| 23.00           | 3.39                | 1.16               | 0.00            | 70.00           | 3.43                | 1.19               | 0.00            |
| 24.00           | <b>3.43</b>         | <b>1.19</b>        | 0.00            | 71.00           | 3.43                | 1.19               | 0.00            |
| 25.00           | 3.43                | 1.19               | 0.00            | 72.00           | 3.43                | 1.19               | 0.00            |
| 26.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 27.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 28.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 29.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 30.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 31.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 32.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 33.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 34.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 35.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 36.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 37.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 38.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 39.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 40.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 41.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 42.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 43.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 44.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 45.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |
| 46.00           | 3.43                | 1.19               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Summary for Subcatchment 4S: Proposed Impervious

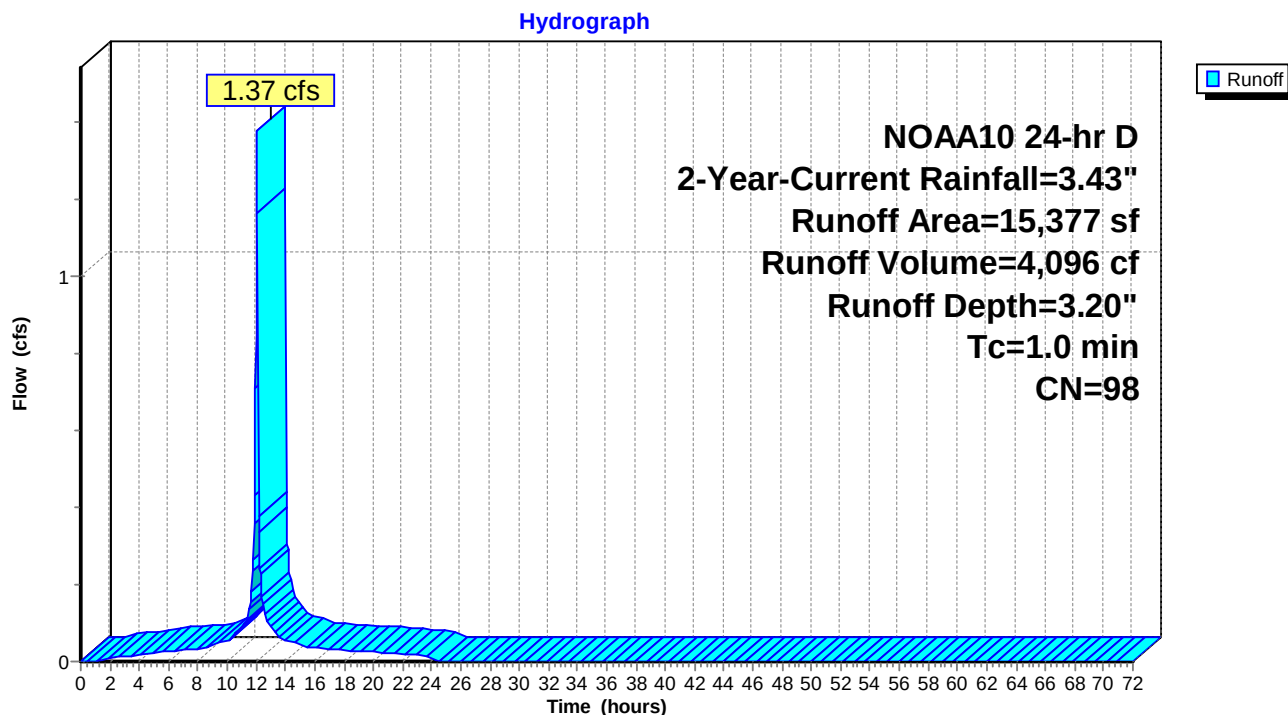
Runoff = 1.37 cfs @ 12.06 hrs, Volume= 4,096 cf, Depth= 3.20"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 15,377    | 98 | Paved parking, HSG C    |
| 15,377    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 4S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Subcatchment 4S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 3.43                | 3.20               | 0.00            |
| 1.00            | 0.04                | 0.00               | 0.00            | 48.00           | 3.43                | 3.20               | 0.00            |
| 2.00            | 0.10                | 0.01               | 0.01            | 49.00           | 3.43                | 3.20               | 0.00            |
| 3.00            | 0.16                | 0.04               | 0.01            | 50.00           | 3.43                | 3.20               | 0.00            |
| 4.00            | 0.22                | 0.09               | 0.02            | 51.00           | 3.43                | 3.20               | 0.00            |
| 5.00            | 0.30                | 0.14               | 0.02            | 52.00           | 3.43                | 3.20               | 0.00            |
| 6.00            | 0.38                | 0.21               | 0.03            | 53.00           | 3.43                | 3.20               | 0.00            |
| 7.00            | 0.47                | 0.29               | 0.03            | 54.00           | 3.43                | 3.20               | 0.00            |
| 8.00            | 0.57                | 0.38               | 0.03            | 55.00           | 3.43                | 3.20               | 0.00            |
| 9.00            | 0.68                | 0.48               | 0.04            | 56.00           | 3.43                | 3.20               | 0.00            |
| 10.00           | 0.82                | 0.62               | 0.05            | 57.00           | 3.43                | 3.20               | 0.00            |
| 11.00           | 1.02                | 0.81               | 0.09            | 58.00           | 3.43                | 3.20               | 0.00            |
| 12.00           | 1.62                | 1.40               | <b>0.84</b>     | 59.00           | 3.43                | 3.20               | 0.00            |
| 13.00           | 2.41                | 2.19               | <b>0.09</b>     | 60.00           | 3.43                | 3.20               | 0.00            |
| 14.00           | 2.61                | 2.38               | 0.05            | 61.00           | 3.43                | 3.20               | 0.00            |
| 15.00           | 2.75                | 2.52               | 0.05            | 62.00           | 3.43                | 3.20               | 0.00            |
| 16.00           | 2.86                | 2.63               | 0.04            | 63.00           | 3.43                | 3.20               | 0.00            |
| 17.00           | 2.96                | 2.73               | 0.03            | 64.00           | 3.43                | 3.20               | 0.00            |
| 18.00           | 3.05                | 2.82               | 0.03            | 65.00           | 3.43                | 3.20               | 0.00            |
| 19.00           | 3.13                | 2.90               | 0.03            | 66.00           | 3.43                | 3.20               | 0.00            |
| 20.00           | 3.21                | 2.97               | 0.03            | 67.00           | 3.43                | 3.20               | 0.00            |
| 21.00           | 3.27                | 3.04               | 0.02            | 68.00           | 3.43                | 3.20               | 0.00            |
| 22.00           | 3.33                | 3.10               | 0.02            | 69.00           | 3.43                | 3.20               | 0.00            |
| 23.00           | 3.39                | 3.15               | 0.02            | 70.00           | 3.43                | 3.20               | 0.00            |
| 24.00           | <b>3.43</b>         | <b>3.20</b>        | 0.01            | 71.00           | 3.43                | 3.20               | 0.00            |
| 25.00           | 3.43                | 3.20               | 0.00            | 72.00           | 3.43                | 3.20               | 0.00            |
| 26.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 27.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 28.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 29.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 30.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 31.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 32.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 33.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 34.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 35.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 36.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 37.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 38.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 39.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 40.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 41.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 42.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 43.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 44.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 45.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |
| 46.00           | 3.43                | 3.20               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Summary for Pond 2P: Basin A

Inflow Area = 13,934 sf, 100.00% Impervious, Inflow Depth = 3.20" for 2-Year-Current event  
Inflow = 1.24 cfs @ 12.06 hrs, Volume = 3,712 cf  
Outflow = 0.08 cfs @ 13.06 hrs, Volume = 3,712 cf, Atten = 93%, Lag = 59.9 min  
Discarded = 0.02 cfs @ 6.55 hrs, Volume = 2,932 cf  
Primary = 0.06 cfs @ 13.06 hrs, Volume = 779 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs  
Peak Elev = 96.83' @ 13.06 hrs Surf. Area = 2,143 sf Storage = 1,526 cf

Plug-Flow detention time = 373.4 min calculated for 3,709 cf (100% of inflow)  
Center-of-Mass det. time = 373.7 min ( 1,128.0 - 754.3 )

| Volume | Invert | Avail. Storage | Storage Description                                                                                                                                                                                                       |
|--------|--------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1A    | 95.70' | 1,544 cf       | <b>29.50'W x 72.63'L x 2.71'H Field A</b><br>5,803 cf Overall - 1,943 cf Embedded = 3,859 cf x 40.0% Voids                                                                                                                |
| #2A    | 96.20' | 1,943 cf       | <b>Cultec R-180HD</b> x 88 Inside #1<br>Effective Size = 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf<br>Overall Size = 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap<br>Row Length Adjustment = +1.00' x 3.44 sf x 8 rows |
|        |        | 3,487 cf       | Total Available Storage                                                                                                                                                                                                   |

Storage Group A created with Chamber Wizard

| Device | Routing   | Invert | Outlet Devices                                                                                                                                     |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.60' | <b>2.5" Vert. Orifice/Grate</b> C = 0.600 Limited to weir flow at low heads                                                                        |
| #2     | Primary   | 97.35' | <b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00<br>Coef. (English) 2.80 2.92 3.08 3.30 3.32 |
| #3     | Discarded | 95.70' | <b>0.500 in/hr Exfiltration over Surface area</b>                                                                                                  |

**Discarded OutFlow** Max = 0.02 cfs @ 6.55 hrs HW = 95.73' (Free Discharge)  
↑ **3=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max = 0.06 cfs @ 13.06 hrs HW = 96.83' (Free Discharge)  
↑ **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.69 fps)  
↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Pond 2P: Basin A - Chamber Wizard Field A

#### Chamber Model = Cultec R-180HD (For residential use only)

Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf

Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 3.44 sf x 8 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

11 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 70.63' Row Length +12.0" End Stone x 2 = 72.63' Base Length

8 Rows x 36.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 29.50' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

88 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 8 Rows = 1,943.5 cf Chamber Storage

5,802.8 cf Field - 1,943.5 cf Chambers = 3,859.4 cf Stone x 40.0% Voids = 1,543.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,487.2 cf = 0.080 af

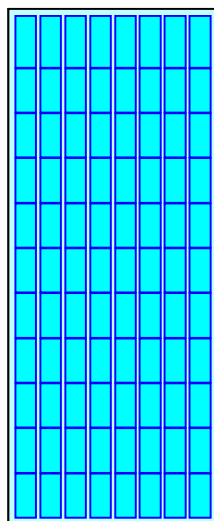
Overall Storage Efficiency = 60.1%

Overall System Size = 72.63' x 29.50' x 2.71'

88 Chambers

214.9 cy Field

142.9 cy Stone



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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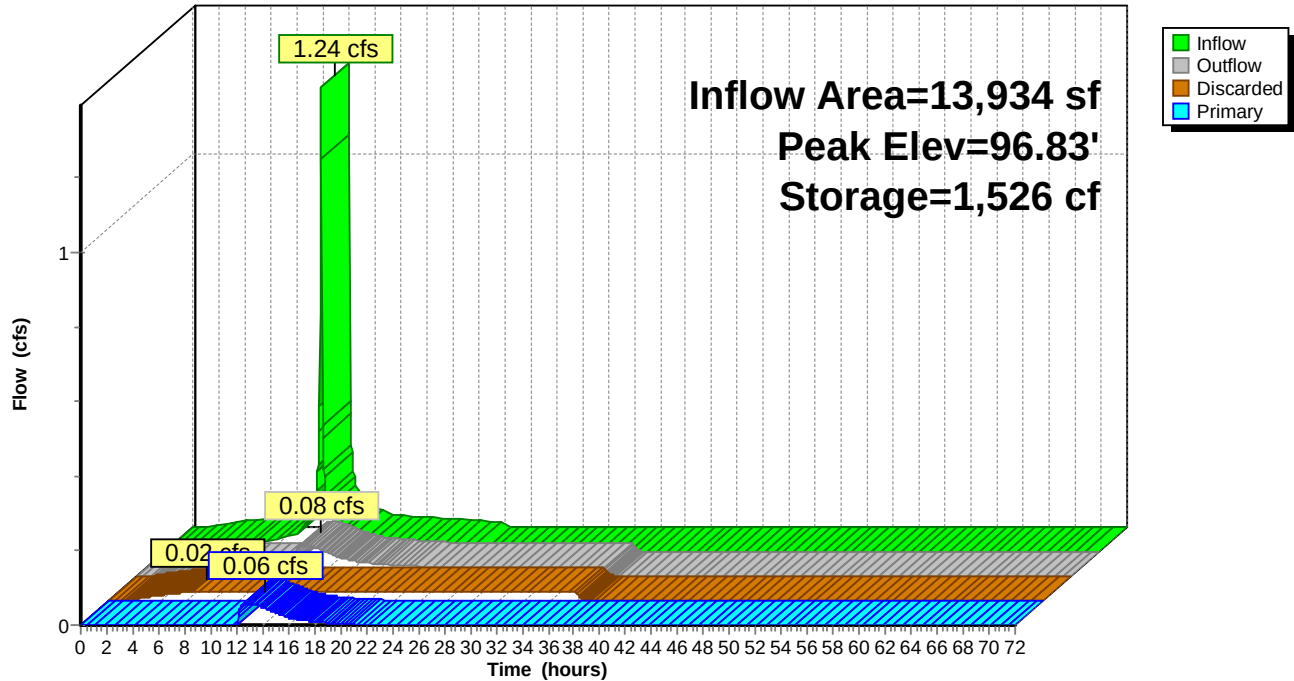
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### Pond 2P: Basin A

#### Hydrograph



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

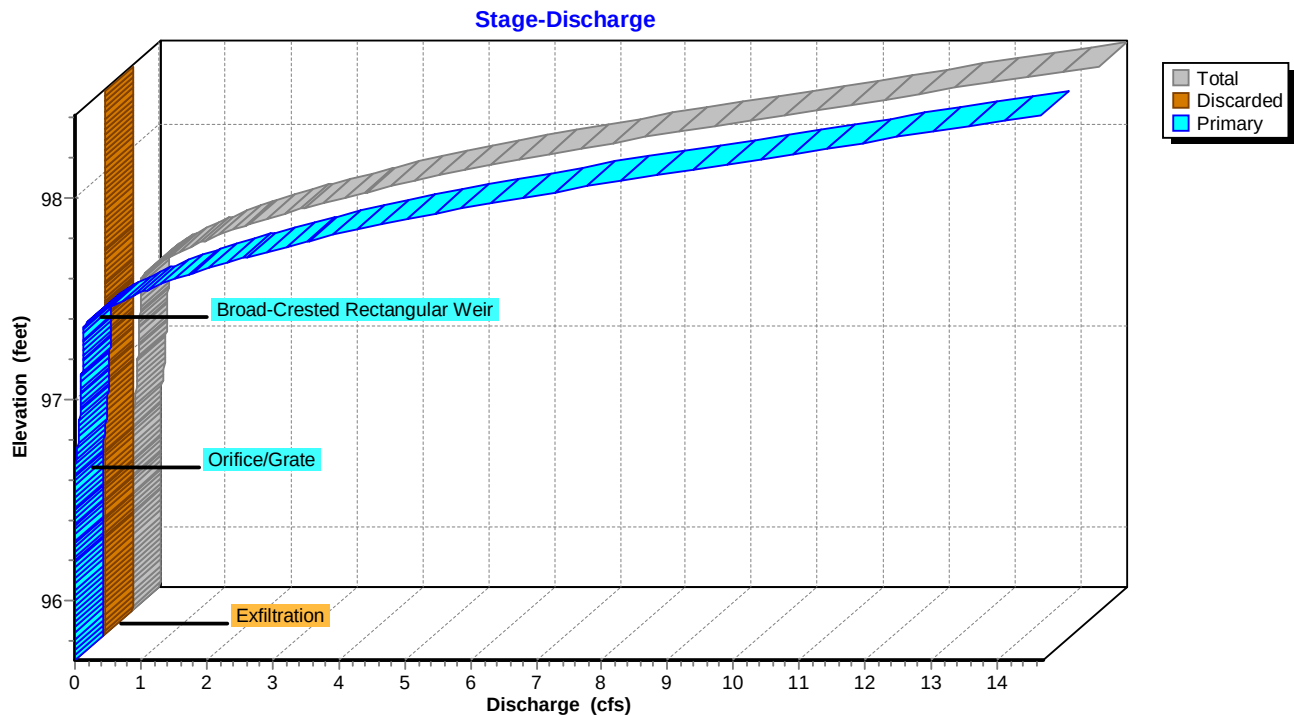
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

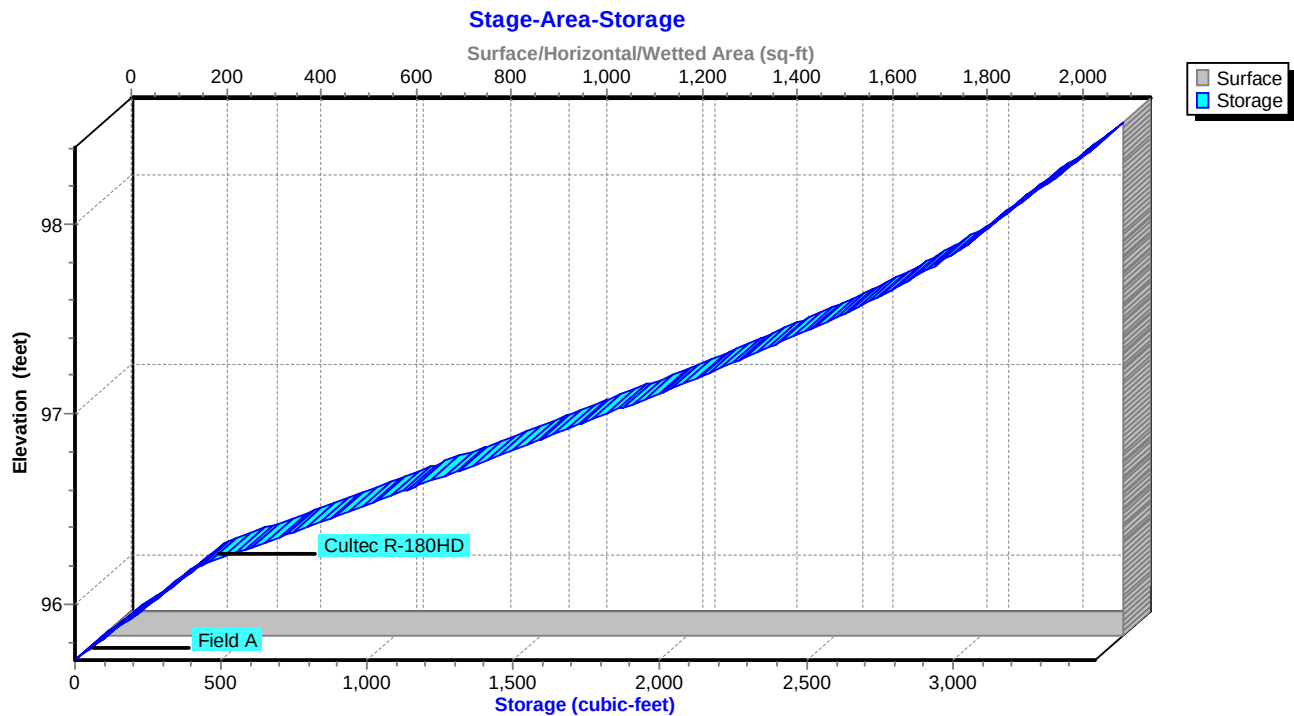
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Pond 2P: Basin A

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.01            | 8                       | 95.71               | 0.01             | 0.01               | 0.00             |
| 5.00            | 0.02            | 18                      | 95.72               | 0.02             | <b>0.02</b>        | 0.00             |
| 7.50            | 0.03            | 31                      | 95.74               | 0.02             | <b>0.02</b>        | 0.00             |
| 10.00           | <b>0.05</b>     | 135                     | 95.86               | 0.02             | 0.02               | 0.00             |
| 12.50           | <b>0.12</b>     | <b>1,498</b>            | <b>96.81</b>        | <b>0.08</b>      | 0.02               | <b>0.05</b>      |
| 15.00           | 0.04            | <b>1,396</b>            | <b>96.75</b>        | <b>0.06</b>      | 0.02               | <b>0.03</b>      |
| 17.50           | 0.03            | 1,275                   | 96.68               | 0.04             | 0.02               | 0.01             |
| 20.00           | 0.02            | 1,216                   | 96.65               | 0.03             | 0.02               | 0.00             |
| 22.50           | 0.02            | 1,154                   | 96.61               | 0.03             | 0.02               | 0.00             |
| 25.00           | 0.00            | 1,012                   | 96.53               | 0.02             | 0.02               | 0.00             |
| 27.50           | 0.00            | 789                     | 96.40               | 0.02             | 0.02               | 0.00             |
| 30.00           | 0.00            | 566                     | 96.28               | 0.02             | 0.02               | 0.00             |
| 32.50           | 0.00            | 343                     | 96.10               | 0.02             | 0.02               | 0.00             |
| 35.00           | 0.00            | 120                     | 95.84               | 0.02             | 0.02               | 0.00             |
| 37.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Summary for Pond 5P: Porous Pavement B

Inflow Area = 16,284 sf, 94.43% Impervious, Inflow Depth = 3.09" for 2-Year-Current event  
Inflow = 1.41 cfs @ 12.06 hrs, Volume= 4,186 cf  
Outflow = 0.07 cfs @ 13.47 hrs, Volume= 4,186 cf, Atten= 95%, Lag= 84.6 min  
Discarded = 0.07 cfs @ 11.00 hrs, Volume= 4,115 cf  
Primary = 0.01 cfs @ 13.47 hrs, Volume= 71 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.26' @ 13.47 hrs Surf.Area= 5,690 sf Storage= 1,489 cf

Plug-Flow detention time= 181.2 min calculated for 4,183 cf (100% of inflow)  
Center-of-Mass det. time= 181.2 min ( 938.5 - 757.3 )

| Volume | Invert | Avail.Storage | Storage Description                                        |
|--------|--------|---------------|------------------------------------------------------------|
| #1     | 97.00' | 14,225 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 97.00               | 5,690                | 0                         | 0                         |
| 98.00               | 5,690                | 5,690                     | 5,690                     |
| 99.00               | 5,690                | 5,690                     | 11,380                    |
| 99.50               | 5,690                | 2,845                     | 14,225                    |

| Device | Routing   | Invert | Outlet Devices                                                             |
|--------|-----------|--------|----------------------------------------------------------------------------|
| #1     | Primary   | 97.20' | <b>2.5" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads |
| #2     | Discarded | 97.00' | <b>0.500 in/hr Exfiltration over Surface area</b>                          |

**Discarded OutFlow** Max=0.07 cfs @ 11.00 hrs HW=97.03' (Free Discharge)  
↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.01 cfs @ 13.47 hrs HW=97.26' (Free Discharge)  
↑ **1=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.85 fps)

## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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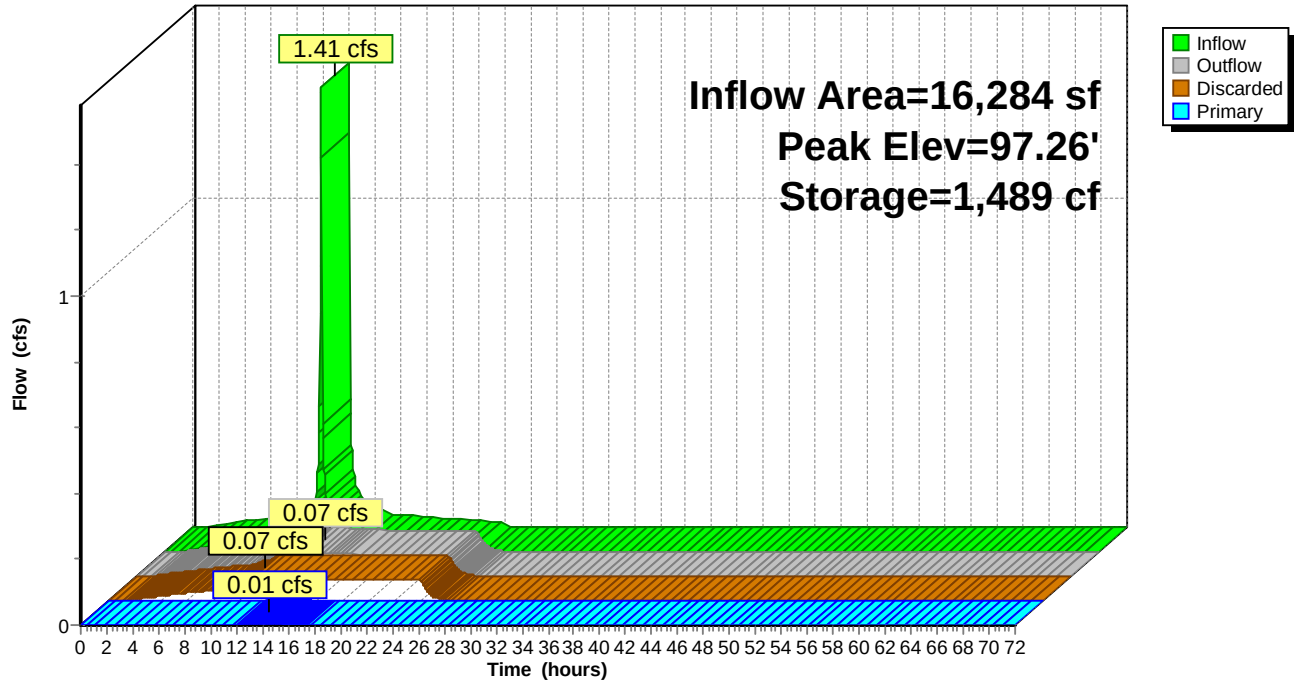
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### Pond 5P: Porous Pavement B

Hydrograph



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

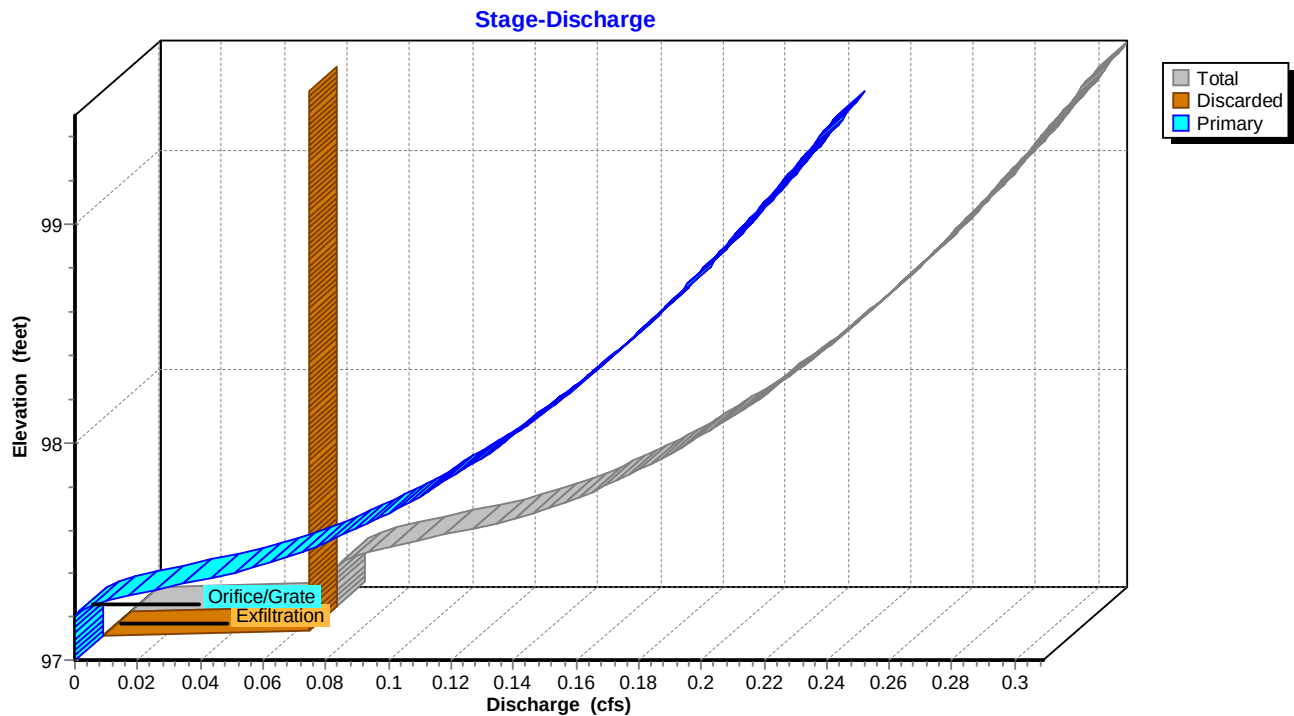
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

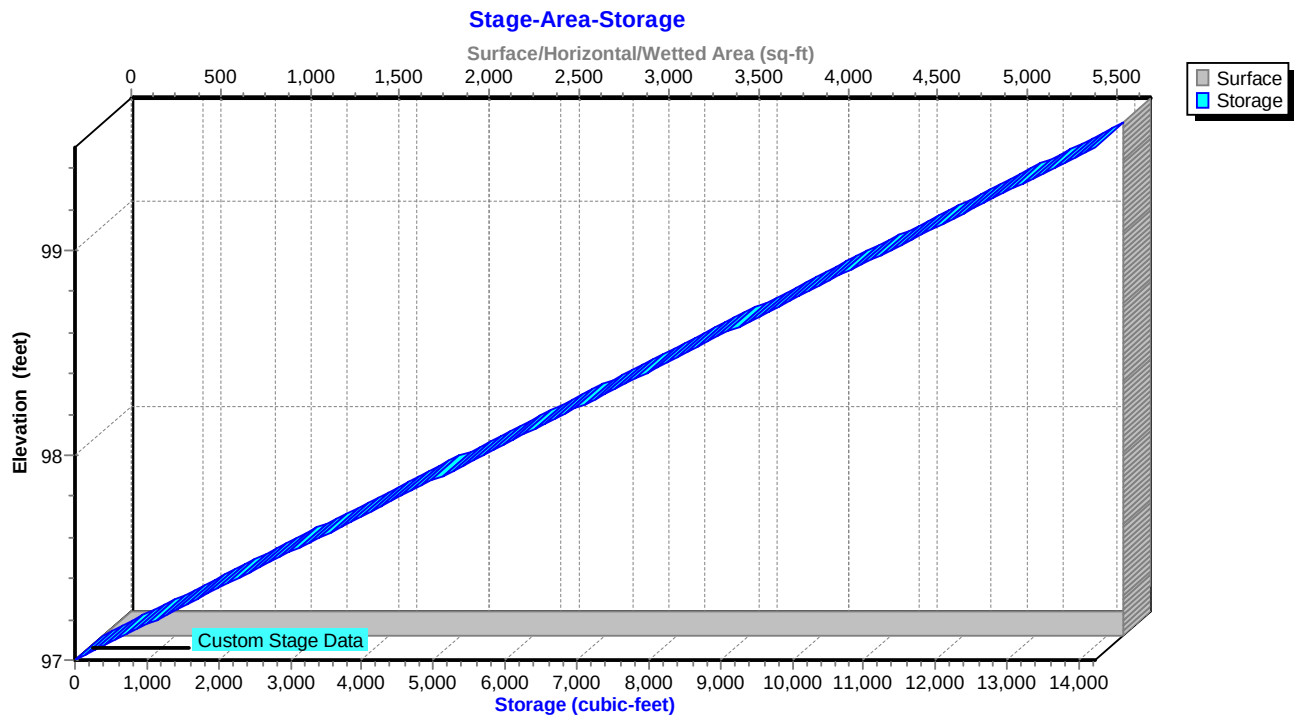
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 2-Year-Current Rainfall=3.43"

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### Hydrograph for Pond 5P: Porous Pavement B

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.01            | 15                      | 97.00               | 0.01             | 0.01               | 0.00             |
| 5.00            | 0.02            | 43                      | 97.01               | 0.02             | 0.02               | 0.00             |
| 7.50            | 0.03            | 64                      | 97.01               | 0.03             | 0.03               | 0.00             |
| 10.00           | <b>0.05</b>     | 102                     | 97.02               | 0.05             | <b>0.05</b>        | 0.00             |
| 12.50           | <b>0.14</b>     | <b>1,399</b>            | <b>97.25</b>        | <b>0.07</b>      | <b>0.07</b>        | <b>0.00</b>      |
| 15.00           | 0.05            | <b>1,400</b>            | <b>97.25</b>        | <b>0.07</b>      | 0.07               | <b>0.00</b>      |
| 17.50           | 0.03            | 1,124                   | 97.20               | 0.07             | 0.07               | 0.00             |
| 20.00           | 0.03            | 799                     | 97.14               | 0.07             | 0.07               | 0.00             |
| 22.50           | 0.02            | 412                     | 97.07               | 0.07             | 0.07               | 0.00             |
| 25.00           | 0.00            | 28                      | 97.00               | 0.01             | 0.01               | 0.00             |
| 27.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 30.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 32.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 35.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 37.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Proposed Impervious**      Runoff Area=13,934 sf   100.00% Impervious   Runoff Depth=5.09"  
Tc=1.0 min   CN=98   Runoff=1.95 cfs   5,913 cf

**Subcatchment 3S: Proposed Pervious**      Runoff Area=907 sf   0.00% Impervious   Runoff Depth=2.63"  
Tc=1.0 min   CN=74   Runoff=0.08 cfs   199 cf

**Subcatchment 4S: Proposed Impervious**      Runoff Area=15,377 sf   100.00% Impervious   Runoff Depth=5.09"  
Tc=1.0 min   CN=98   Runoff=2.15 cfs   6,526 cf

**Pond 2P: Basin A**      Peak Elev=97.42'   Storage=2,470 cf   Inflow=1.95 cfs   5,913 cf  
Discarded=0.02 cfs   3,179 cf   Primary=0.34 cfs   2,735 cf   Outflow=0.36 cfs   5,913 cf

**Pond 5P: Porous Pavement B**      Peak Elev=97.45'   Storage=2,539 cf   Inflow=2.22 cfs   6,725 cf  
Discarded=0.07 cfs   5,536 cf   Primary=0.06 cfs   1,189 cf   Outflow=0.13 cfs   6,725 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 12,638 cf   Average Runoff Depth = 5.02"**  
**3.00% Pervious = 907 sf   97.00% Impervious = 29,311 sf**

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Subcatchment 1S: Proposed Impervious

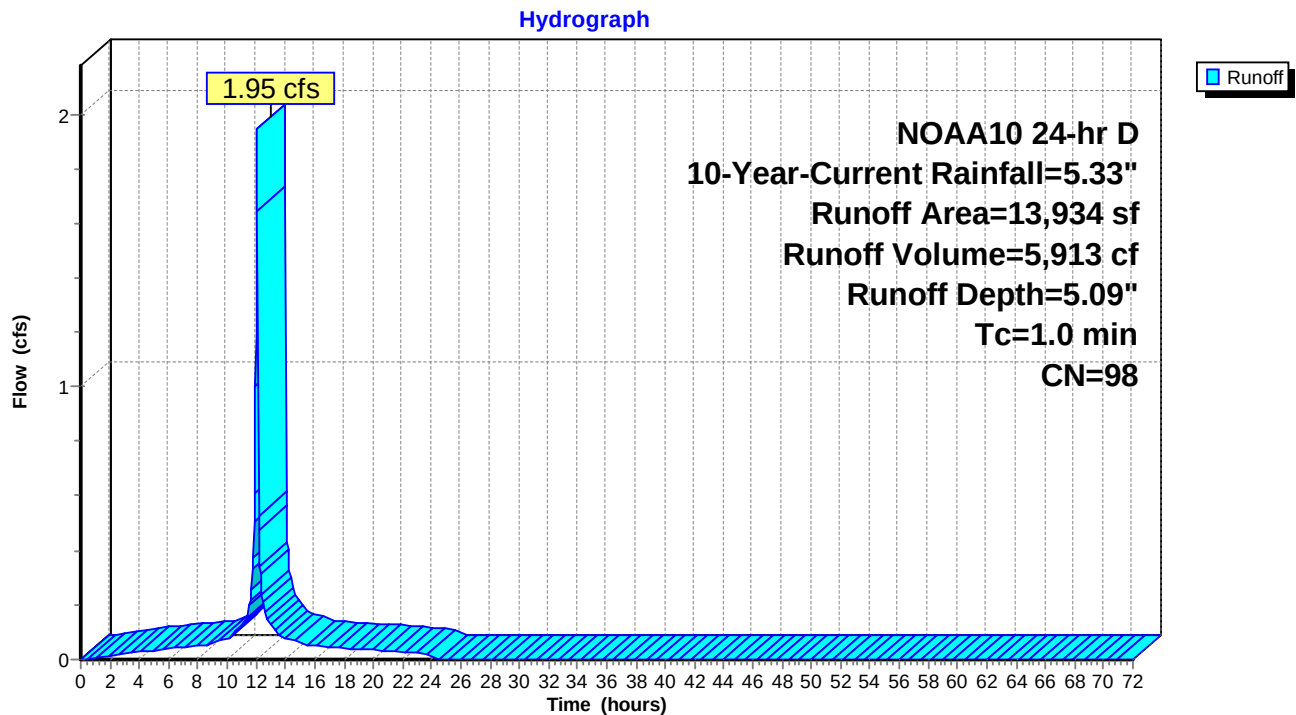
Runoff = 1.95 cfs @ 12.06 hrs, Volume= 5,913 cf, Depth= 5.09"  
Routed to Pond 2P : Basin A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 13,934    | 98 | Roofs, HSG C            |
| 13,934    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 5.33                | 5.09               | 0.00            |
| 1.00            | 0.07                | 0.00               | 0.01            | 48.00           | 5.33                | 5.09               | 0.00            |
| 2.00            | 0.15                | 0.04               | 0.02            | 49.00           | 5.33                | 5.09               | 0.00            |
| 3.00            | 0.24                | 0.10               | 0.02            | 50.00           | 5.33                | 5.09               | 0.00            |
| 4.00            | 0.35                | 0.19               | 0.03            | 51.00           | 5.33                | 5.09               | 0.00            |
| 5.00            | 0.47                | 0.29               | 0.04            | 52.00           | 5.33                | 5.09               | 0.00            |
| 6.00            | 0.59                | 0.40               | 0.04            | 53.00           | 5.33                | 5.09               | 0.00            |
| 7.00            | 0.73                | 0.54               | 0.04            | 54.00           | 5.33                | 5.09               | 0.00            |
| 8.00            | 0.89                | 0.68               | 0.05            | 55.00           | 5.33                | 5.09               | 0.00            |
| 9.00            | 1.05                | 0.84               | 0.06            | 56.00           | 5.33                | 5.09               | 0.00            |
| 10.00           | 1.28                | 1.06               | 0.08            | 57.00           | 5.33                | 5.09               | 0.00            |
| 11.00           | 1.58                | 1.36               | 0.13            | 58.00           | 5.33                | 5.09               | 0.00            |
| 12.00           | 2.52                | 2.29               | <b>1.20</b>     | 59.00           | 5.33                | 5.09               | 0.00            |
| 13.00           | 3.75                | 3.52               | <b>0.13</b>     | 60.00           | 5.33                | 5.09               | 0.00            |
| 14.00           | 4.05                | 3.82               | 0.08            | 61.00           | 5.33                | 5.09               | 0.00            |
| 15.00           | 4.28                | 4.04               | 0.07            | 62.00           | 5.33                | 5.09               | 0.00            |
| 16.00           | 4.44                | 4.21               | 0.05            | 63.00           | 5.33                | 5.09               | 0.00            |
| 17.00           | 4.60                | 4.36               | 0.05            | 64.00           | 5.33                | 5.09               | 0.00            |
| 18.00           | 4.74                | 4.50               | 0.04            | 65.00           | 5.33                | 5.09               | 0.00            |
| 19.00           | 4.86                | 4.63               | 0.04            | 66.00           | 5.33                | 5.09               | 0.00            |
| 20.00           | 4.98                | 4.74               | 0.04            | 67.00           | 5.33                | 5.09               | 0.00            |
| 21.00           | 5.09                | 4.85               | 0.03            | 68.00           | 5.33                | 5.09               | 0.00            |
| 22.00           | 5.18                | 4.94               | 0.03            | 69.00           | 5.33                | 5.09               | 0.00            |
| 23.00           | 5.26                | 5.02               | 0.02            | 70.00           | 5.33                | 5.09               | 0.00            |
| 24.00           | <b>5.33</b>         | <b>5.09</b>        | 0.02            | 71.00           | 5.33                | 5.09               | 0.00            |
| 25.00           | 5.33                | 5.09               | 0.00            | 72.00           | 5.33                | 5.09               | 0.00            |
| 26.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 27.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 28.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 29.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 30.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 31.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 32.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 33.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 34.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 35.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 36.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 37.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 38.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 39.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 40.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 41.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 42.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 43.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 44.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 45.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 46.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Subcatchment 3S: Proposed Pervious

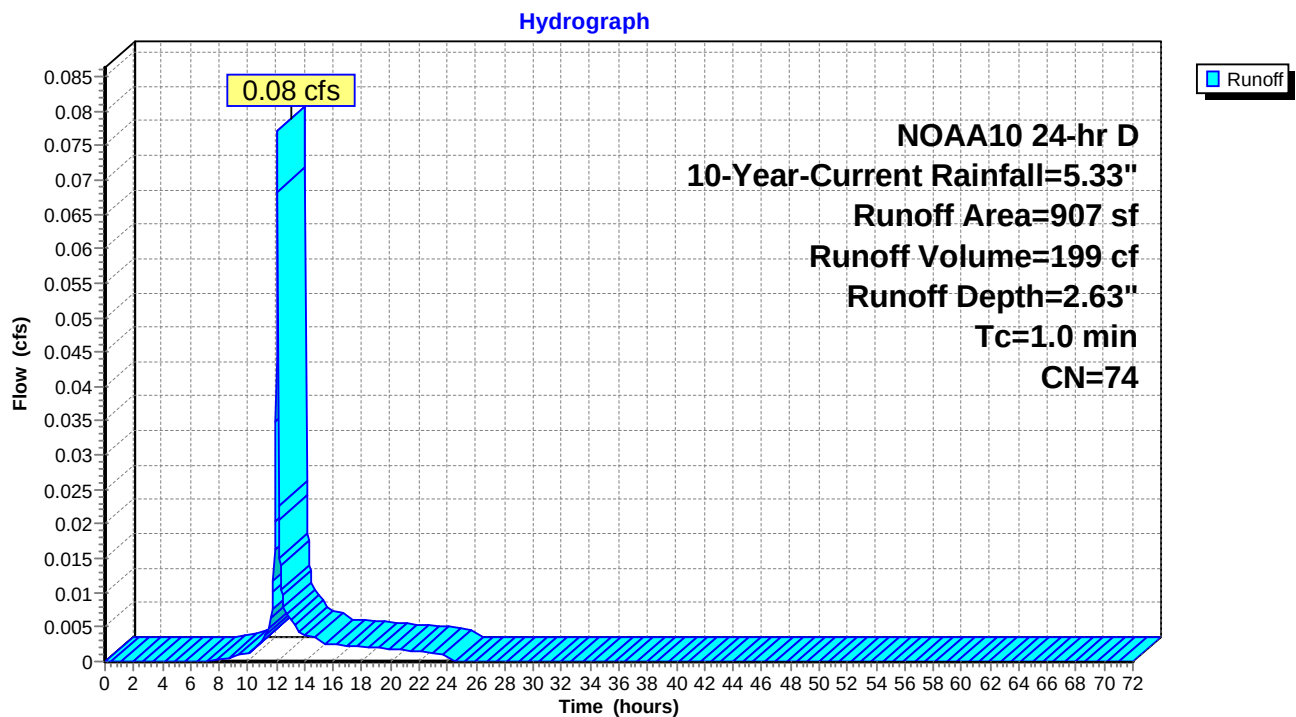
Runoff = 0.08 cfs @ 12.07 hrs, Volume= 199 cf, Depth= 2.63"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 907       | 74 | >75% Grass cover, Good, HSG C |
| 907       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 3S: Proposed Pervious



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Subcatchment 3S: Proposed Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 5.33                | 2.63               | 0.00            |
| 1.00            | 0.07                | 0.00               | 0.00            | 48.00           | 5.33                | 2.63               | 0.00            |
| 2.00            | 0.15                | 0.00               | 0.00            | 49.00           | 5.33                | 2.63               | 0.00            |
| 3.00            | 0.24                | 0.00               | 0.00            | 50.00           | 5.33                | 2.63               | 0.00            |
| 4.00            | 0.35                | 0.00               | 0.00            | 51.00           | 5.33                | 2.63               | 0.00            |
| 5.00            | 0.47                | 0.00               | 0.00            | 52.00           | 5.33                | 2.63               | 0.00            |
| 6.00            | 0.59                | 0.00               | 0.00            | 53.00           | 5.33                | 2.63               | 0.00            |
| 7.00            | 0.73                | 0.00               | 0.00            | 54.00           | 5.33                | 2.63               | 0.00            |
| 8.00            | 0.89                | 0.01               | 0.00            | 55.00           | 5.33                | 2.63               | 0.00            |
| 9.00            | 1.05                | 0.03               | 0.00            | 56.00           | 5.33                | 2.63               | 0.00            |
| 10.00           | 1.28                | 0.08               | 0.00            | 57.00           | 5.33                | 2.63               | 0.00            |
| 11.00           | 1.58                | 0.17               | 0.00            | 58.00           | 5.33                | 2.63               | 0.00            |
| 12.00           | 2.52                | 0.62               | <b>0.04</b>     | 59.00           | 5.33                | 2.63               | 0.00            |
| 13.00           | 3.75                | 1.42               | <b>0.01</b>     | 60.00           | 5.33                | 2.63               | 0.00            |
| 14.00           | 4.05                | 1.64               | 0.00            | 61.00           | 5.33                | 2.63               | 0.00            |
| 15.00           | 4.28                | 1.81               | 0.00            | 62.00           | 5.33                | 2.63               | 0.00            |
| 16.00           | 4.44                | 1.93               | 0.00            | 63.00           | 5.33                | 2.63               | 0.00            |
| 17.00           | 4.60                | 2.05               | 0.00            | 64.00           | 5.33                | 2.63               | 0.00            |
| 18.00           | 4.74                | 2.16               | 0.00            | 65.00           | 5.33                | 2.63               | 0.00            |
| 19.00           | 4.86                | 2.26               | 0.00            | 66.00           | 5.33                | 2.63               | 0.00            |
| 20.00           | 4.98                | 2.35               | 0.00            | 67.00           | 5.33                | 2.63               | 0.00            |
| 21.00           | 5.09                | 2.43               | 0.00            | 68.00           | 5.33                | 2.63               | 0.00            |
| 22.00           | 5.18                | 2.51               | 0.00            | 69.00           | 5.33                | 2.63               | 0.00            |
| 23.00           | 5.26                | 2.57               | 0.00            | 70.00           | 5.33                | 2.63               | 0.00            |
| 24.00           | <b>5.33</b>         | <b>2.63</b>        | 0.00            | 71.00           | 5.33                | 2.63               | 0.00            |
| 25.00           | 5.33                | 2.63               | 0.00            | 72.00           | 5.33                | 2.63               | 0.00            |
| 26.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 27.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 28.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 29.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 30.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 31.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 32.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 33.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 34.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 35.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 36.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 37.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 38.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 39.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 40.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 41.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 42.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 43.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 44.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 45.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |
| 46.00           | 5.33                | 2.63               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Subcatchment 4S: Proposed Impervious

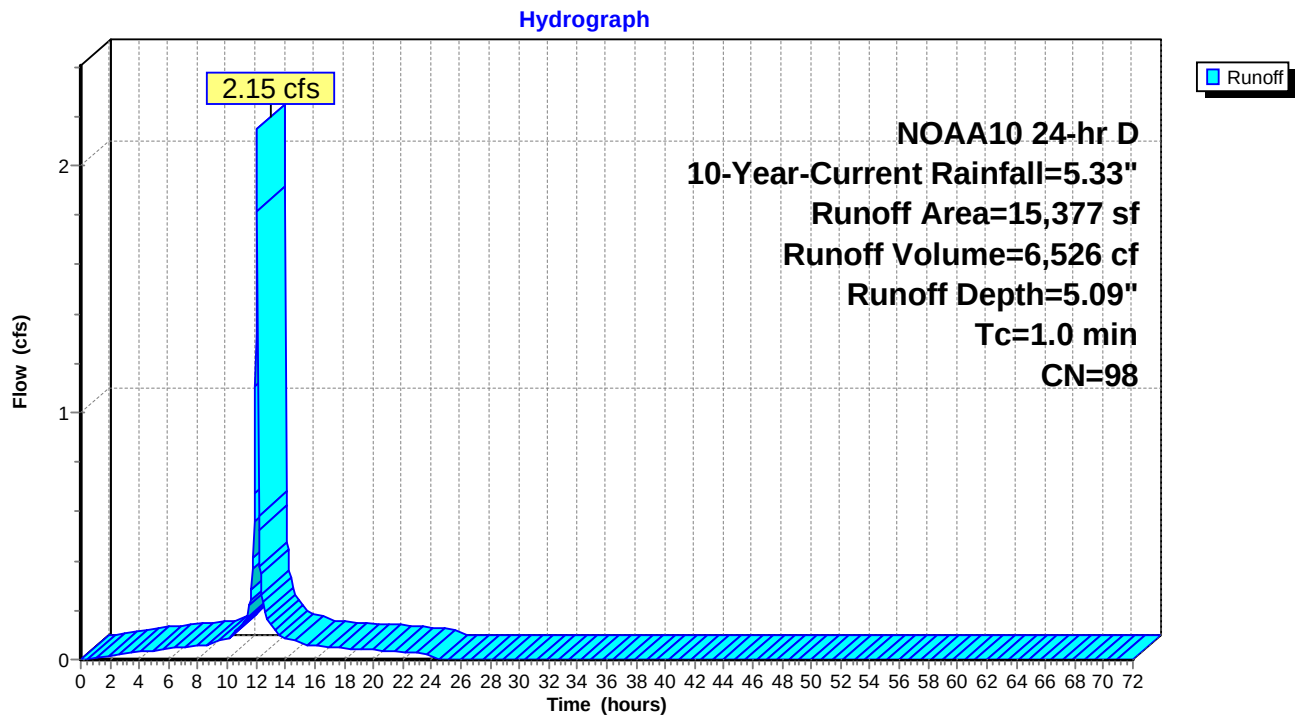
Runoff = 2.15 cfs @ 12.06 hrs, Volume= 6,526 cf, Depth= 5.09"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 15,377    | 98 | Paved parking, HSG C    |
| 15,377    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 4S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Subcatchment 4S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 5.33                | 5.09               | 0.00            |
| 1.00            | 0.07                | 0.00               | 0.01            | 48.00           | 5.33                | 5.09               | 0.00            |
| 2.00            | 0.15                | 0.04               | 0.02            | 49.00           | 5.33                | 5.09               | 0.00            |
| 3.00            | 0.24                | 0.10               | 0.03            | 50.00           | 5.33                | 5.09               | 0.00            |
| 4.00            | 0.35                | 0.19               | 0.03            | 51.00           | 5.33                | 5.09               | 0.00            |
| 5.00            | 0.47                | 0.29               | 0.04            | 52.00           | 5.33                | 5.09               | 0.00            |
| 6.00            | 0.59                | 0.40               | 0.04            | 53.00           | 5.33                | 5.09               | 0.00            |
| 7.00            | 0.73                | 0.54               | 0.05            | 54.00           | 5.33                | 5.09               | 0.00            |
| 8.00            | 0.89                | 0.68               | 0.05            | 55.00           | 5.33                | 5.09               | 0.00            |
| 9.00            | 1.05                | 0.84               | 0.06            | 56.00           | 5.33                | 5.09               | 0.00            |
| 10.00           | 1.28                | 1.06               | 0.08            | 57.00           | 5.33                | 5.09               | 0.00            |
| 11.00           | 1.58                | 1.36               | 0.14            | 58.00           | 5.33                | 5.09               | 0.00            |
| 12.00           | 2.52                | 2.29               | <b>1.32</b>     | 59.00           | 5.33                | 5.09               | 0.00            |
| 13.00           | 3.75                | 3.52               | <b>0.15</b>     | 60.00           | 5.33                | 5.09               | 0.00            |
| 14.00           | 4.05                | 3.82               | 0.08            | 61.00           | 5.33                | 5.09               | 0.00            |
| 15.00           | 4.28                | 4.04               | 0.07            | 62.00           | 5.33                | 5.09               | 0.00            |
| 16.00           | 4.44                | 4.21               | 0.06            | 63.00           | 5.33                | 5.09               | 0.00            |
| 17.00           | 4.60                | 4.36               | 0.05            | 64.00           | 5.33                | 5.09               | 0.00            |
| 18.00           | 4.74                | 4.50               | 0.05            | 65.00           | 5.33                | 5.09               | 0.00            |
| 19.00           | 4.86                | 4.63               | 0.04            | 66.00           | 5.33                | 5.09               | 0.00            |
| 20.00           | 4.98                | 4.74               | 0.04            | 67.00           | 5.33                | 5.09               | 0.00            |
| 21.00           | 5.09                | 4.85               | 0.04            | 68.00           | 5.33                | 5.09               | 0.00            |
| 22.00           | 5.18                | 4.94               | 0.03            | 69.00           | 5.33                | 5.09               | 0.00            |
| 23.00           | 5.26                | 5.02               | 0.03            | 70.00           | 5.33                | 5.09               | 0.00            |
| 24.00           | <b>5.33</b>         | <b>5.09</b>        | 0.02            | 71.00           | 5.33                | 5.09               | 0.00            |
| 25.00           | 5.33                | 5.09               | 0.00            | 72.00           | 5.33                | 5.09               | 0.00            |
| 26.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 27.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 28.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 29.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 30.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 31.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 32.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 33.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 34.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 35.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 36.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 37.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 38.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 39.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 40.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 41.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 42.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 43.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 44.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 45.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |
| 46.00           | 5.33                | 5.09               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Pond 2P: Basin A

Inflow Area = 13,934 sf, 100.00% Impervious, Inflow Depth = 5.09" for 10-Year-Current event  
Inflow = 1.95 cfs @ 12.06 hrs, Volume = 5,913 cf  
Outflow = 0.36 cfs @ 12.26 hrs, Volume = 5,913 cf, Atten = 81%, Lag = 12.0 min  
Discarded = 0.02 cfs @ 3.45 hrs, Volume = 3,179 cf  
Primary = 0.34 cfs @ 12.26 hrs, Volume = 2,735 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs  
Peak Elev = 97.42' @ 12.26 hrs Surf. Area = 2,143 sf Storage = 2,470 cf

Plug-Flow detention time = 310.1 min calculated for 5,909 cf (100% of inflow)

Center-of-Mass det. time = 310.5 min ( 1,055.2 - 744.8 )

| Volume | Invert | Avail. Storage | Storage Description                                                                                                                                                                                                       |
|--------|--------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1A    | 95.70' | 1,544 cf       | <b>29.50'W x 72.63'L x 2.71'H Field A</b><br>5,803 cf Overall - 1,943 cf Embedded = 3,859 cf x 40.0% Voids                                                                                                                |
| #2A    | 96.20' | 1,943 cf       | <b>Cultec R-180HD</b> x 88 Inside #1<br>Effective Size = 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf<br>Overall Size = 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap<br>Row Length Adjustment = +1.00' x 3.44 sf x 8 rows |
|        |        | 3,487 cf       | Total Available Storage                                                                                                                                                                                                   |

Storage Group A created with Chamber Wizard

| Device | Routing   | Invert | Outlet Devices                                                                                                                                     |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.60' | <b>2.5" Vert. Orifice/Grate</b> C = 0.600 Limited to weir flow at low heads                                                                        |
| #2     | Primary   | 97.35' | <b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00<br>Coef. (English) 2.80 2.92 3.08 3.30 3.32 |
| #3     | Discarded | 95.70' | <b>0.500 in/hr Exfiltration over Surface area</b>                                                                                                  |

**Discarded OutFlow** Max = 0.02 cfs @ 3.45 hrs HW = 95.73' (Free Discharge)

↑ **3=Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max = 0.33 cfs @ 12.26 hrs HW = 97.42' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 0.14 cfs @ 4.06 fps)

↑ **2=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.72 fps)

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Pond 2P: Basin A - Chamber Wizard Field A

#### Chamber Model = Cultec R-180HD (For residential use only)

Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf

Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 3.44 sf x 8 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

11 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 70.63' Row Length +12.0" End Stone x 2 = 72.63' Base Length

8 Rows x 36.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 29.50' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

88 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 8 Rows = 1,943.5 cf Chamber Storage

5,802.8 cf Field - 1,943.5 cf Chambers = 3,859.4 cf Stone x 40.0% Voids = 1,543.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,487.2 cf = 0.080 af

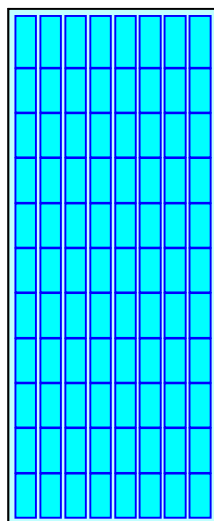
Overall Storage Efficiency = 60.1%

Overall System Size = 72.63' x 29.50' x 2.71'

88 Chambers

214.9 cy Field

142.9 cy Stone



## Proposed Flows

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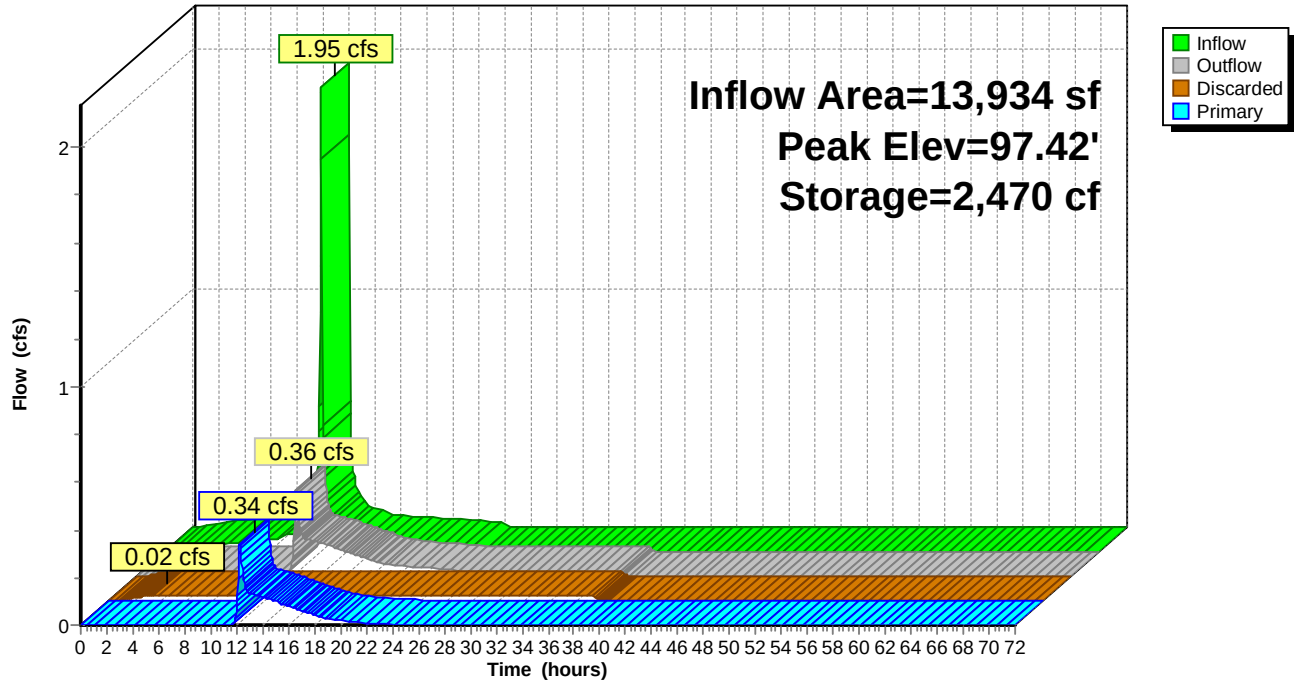
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### Pond 2P: Basin A

#### Hydrograph



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

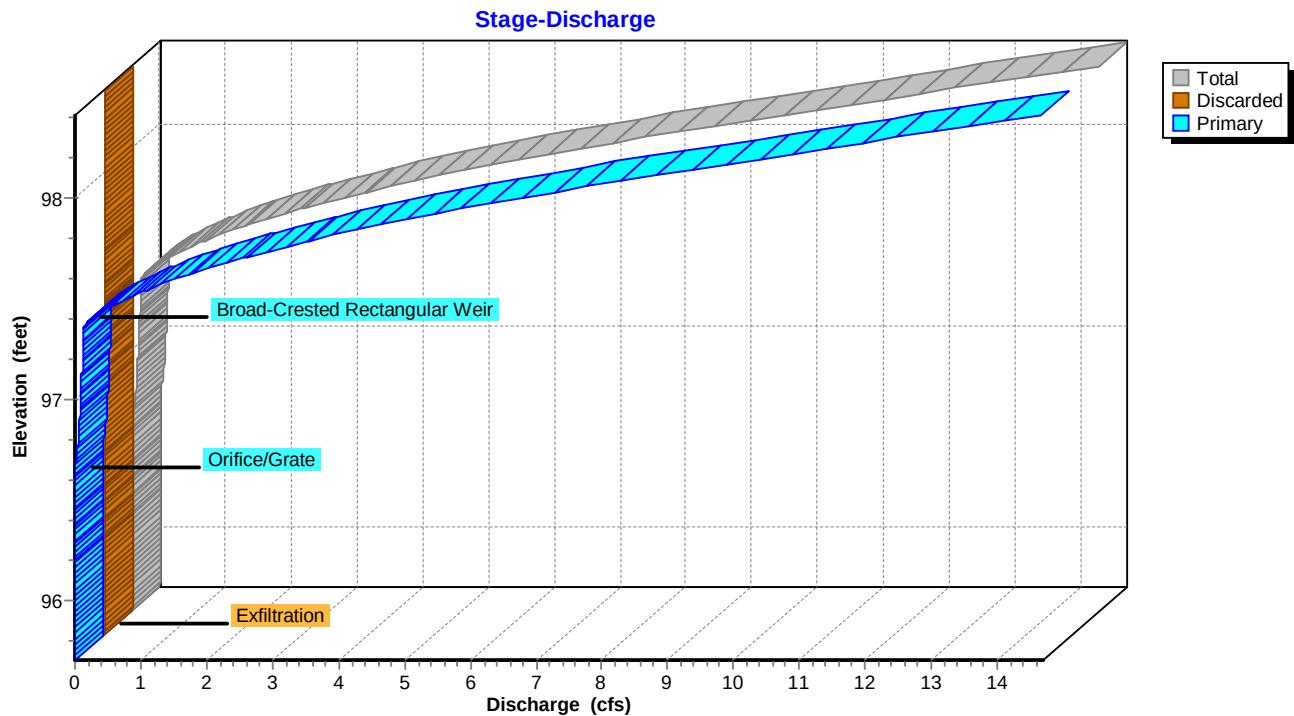
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

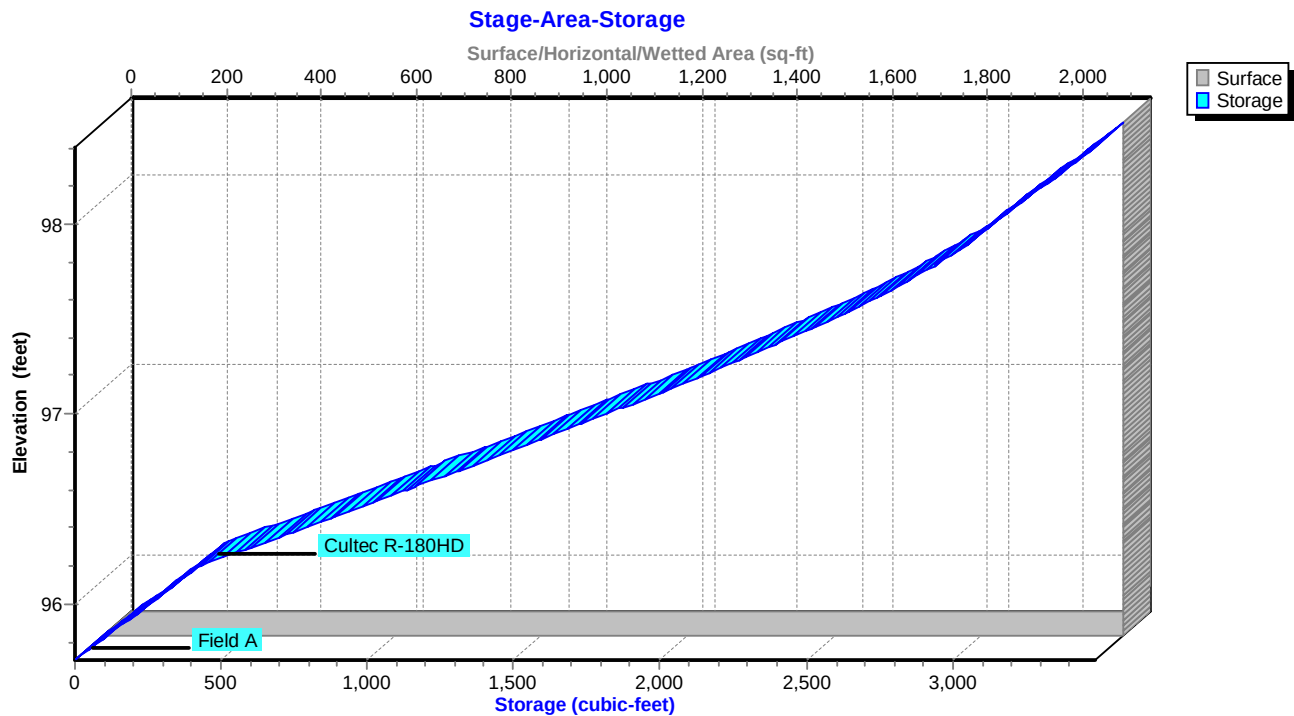
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### Pond 2P: Basin A



## Proposed Flows

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### Hydrograph for Pond 2P: Basin A

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.02            | 17                      | 95.72               | 0.02             | <b>0.02</b>        | 0.00             |
| 5.00            | 0.04            | 59                      | 95.77               | 0.02             | <b>0.02</b>        | 0.00             |
| 7.50            | 0.05            | 206                     | 95.94               | 0.02             | 0.02               | 0.00             |
| 10.00           | <b>0.08</b>     | <b>509</b>              | <b>96.24</b>        | <b>0.02</b>      | 0.02               | <b>0.00</b>      |
| 12.50           | <b>0.19</b>     | <b>2,423</b>            | <b>97.39</b>        | <b>0.24</b>      | 0.02               | <b>0.21</b>      |
| 15.00           | 0.07            | 1,955                   | 97.08               | 0.13             | 0.02               | 0.10             |
| 17.50           | 0.05            | 1,494                   | 96.81               | 0.08             | 0.02               | 0.05             |
| 20.00           | 0.04            | 1,327                   | 96.71               | 0.05             | 0.02               | 0.02             |
| 22.50           | 0.03            | 1,255                   | 96.67               | 0.03             | 0.02               | 0.01             |
| 25.00           | 0.00            | 1,121                   | 96.59               | 0.02             | 0.02               | 0.00             |
| 27.50           | 0.00            | 897                     | 96.46               | 0.02             | 0.02               | 0.00             |
| 30.00           | 0.00            | 674                     | 96.34               | 0.02             | 0.02               | 0.00             |
| 32.50           | 0.00            | 451                     | 96.21               | 0.02             | 0.02               | 0.00             |
| 35.00           | 0.00            | 228                     | 95.97               | 0.02             | 0.02               | 0.00             |
| 37.50           | 0.00            | 10                      | 95.71               | 0.01             | 0.01               | 0.00             |
| 40.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Summary for Pond 5P: Porous Pavement B

Inflow Area = 16,284 sf, 94.43% Impervious, Inflow Depth = 4.96" for 10-Year-Current event  
Inflow = 2.22 cfs @ 12.06 hrs, Volume= 6,725 cf  
Outflow = 0.13 cfs @ 13.33 hrs, Volume= 6,725 cf, Atten= 94%, Lag= 75.9 min  
Discarded = 0.07 cfs @ 9.40 hrs, Volume= 5,536 cf  
Primary = 0.06 cfs @ 13.33 hrs, Volume= 1,189 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.45' @ 13.33 hrs Surf.Area= 5,690 sf Storage= 2,539 cf

Plug-Flow detention time= 230.3 min calculated for 6,720 cf (100% of inflow)  
Center-of-Mass det. time= 230.4 min ( 978.6 - 748.2 )

| Volume | Invert | Avail.Storage | Storage Description                                        |
|--------|--------|---------------|------------------------------------------------------------|
| #1     | 97.00' | 14,225 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 97.00               | 5,690                | 0                         | 0                         |
| 98.00               | 5,690                | 5,690                     | 5,690                     |
| 99.00               | 5,690                | 5,690                     | 11,380                    |
| 99.50               | 5,690                | 2,845                     | 14,225                    |

| Device | Routing   | Invert | Outlet Devices                                                             |
|--------|-----------|--------|----------------------------------------------------------------------------|
| #1     | Primary   | 97.20' | <b>2.5" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads |
| #2     | Discarded | 97.00' | <b>0.500 in/hr Exfiltration over Surface area</b>                          |

**Discarded OutFlow** Max=0.07 cfs @ 9.40 hrs HW=97.03' (Free Discharge)  
↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.06 cfs @ 13.33 hrs HW=97.45' (Free Discharge)  
↑ **1=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.82 fps)

## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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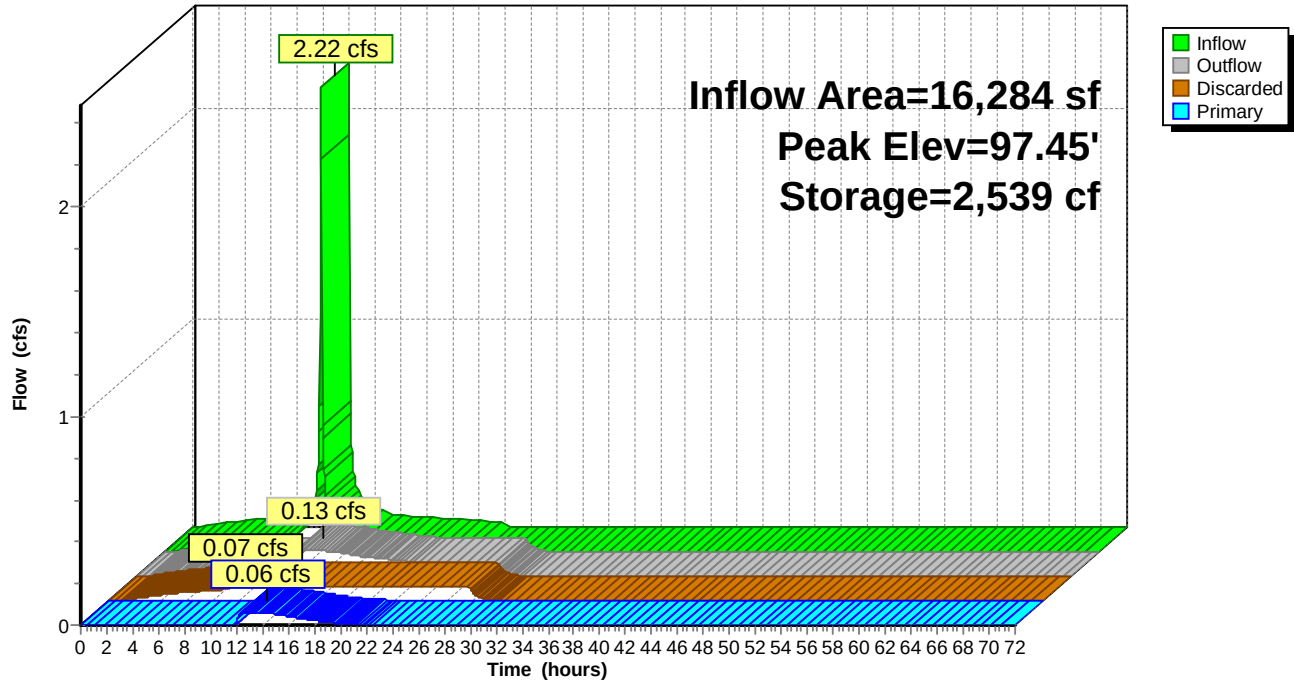
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### Pond 5P: Porous Pavement B

Hydrograph



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

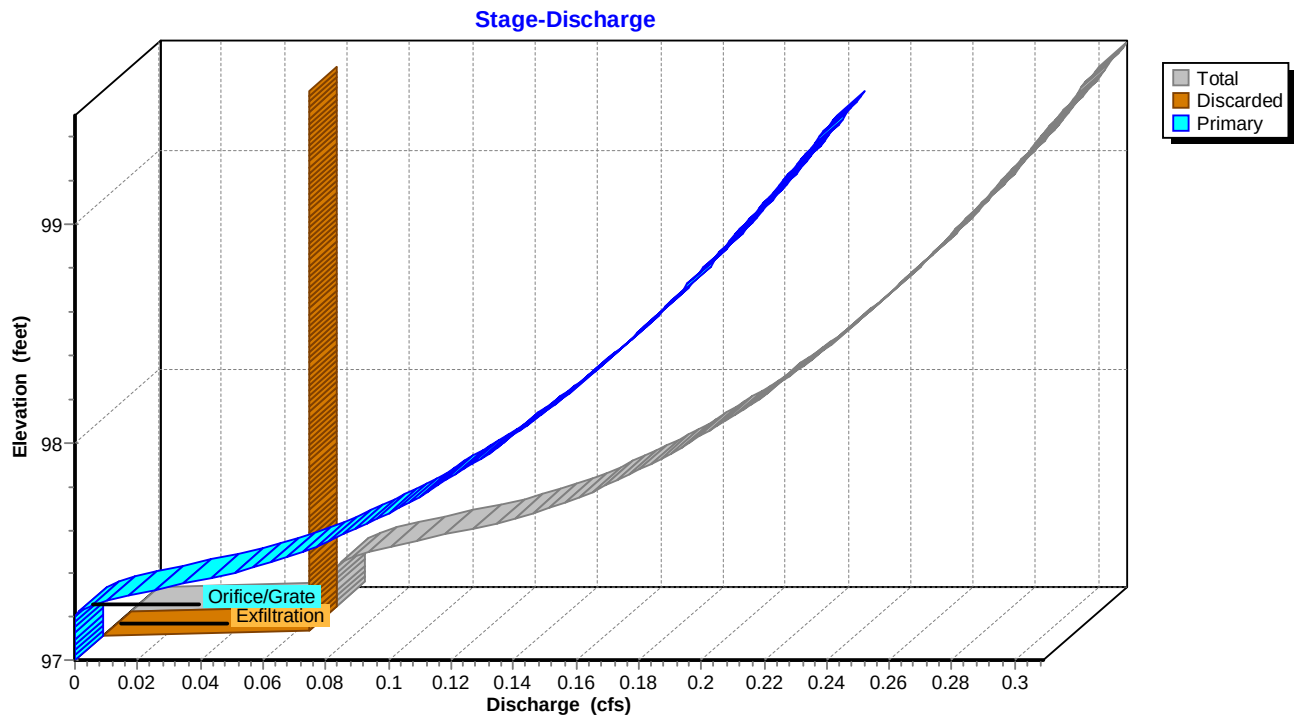
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

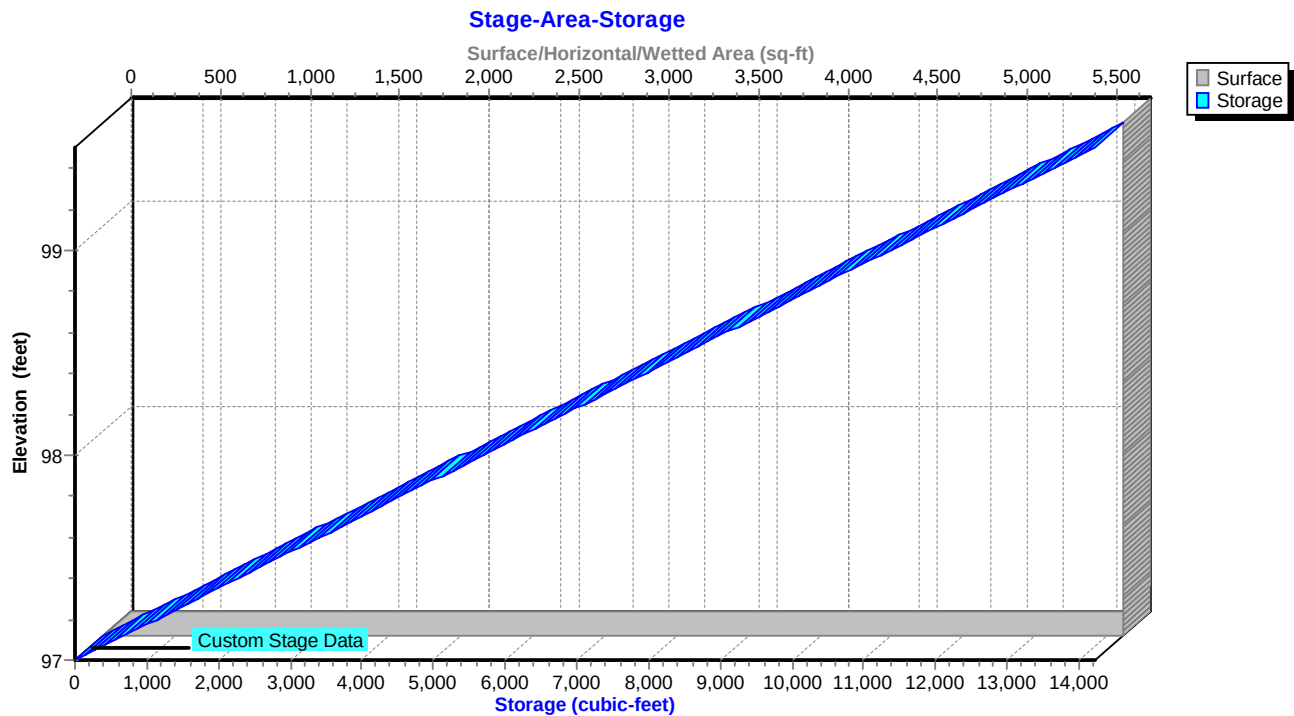
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 10-Year-Current Rainfall=5.33"

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### Hydrograph for Pond 5P: Porous Pavement B

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.02            | 36                      | 97.01               | 0.02             | 0.02               | 0.00             |
| 5.00            | 0.04            | 76                      | 97.01               | 0.04             | 0.04               | 0.00             |
| 7.50            | 0.05            | 105                     | 97.02               | 0.05             | <b>0.05</b>        | 0.00             |
| 10.00           | <b>0.08</b>     | 177                     | 97.03               | 0.07             | <b>0.07</b>        | 0.00             |
| 12.50           | <b>0.22</b>     | <b>2,441</b>            | <b>97.43</b>        | <b>0.12</b>      | 0.07               | <b>0.06</b>      |
| 15.00           | 0.08            | <b>2,335</b>            | <b>97.41</b>        | <b>0.12</b>      | 0.07               | <b>0.05</b>      |
| 17.50           | 0.05            | 1,891                   | 97.33               | 0.09             | 0.07               | 0.03             |
| 20.00           | 0.04            | 1,554                   | 97.27               | 0.08             | 0.07               | 0.01             |
| 22.50           | 0.03            | 1,242                   | 97.22               | 0.07             | 0.07               | 0.00             |
| 25.00           | 0.00            | 796                     | 97.14               | 0.07             | 0.07               | 0.00             |
| 27.50           | 0.00            | 203                     | 97.04               | 0.07             | 0.07               | 0.00             |
| 30.00           | 0.00            | 3                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 32.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 35.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 37.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Proposed Impervious**      Runoff Area=13,934 sf   100.00% Impervious   Runoff Depth=8.94"  
Tc=1.0 min   CN=98   Runoff=3.36 cfs   10,380 cf

**Subcatchment 3S: Proposed Pervious**      Runoff Area=907 sf   0.00% Impervious   Runoff Depth=5.99"  
Tc=1.0 min   CN=74   Runoff=0.17 cfs   453 cf

**Subcatchment 4S: Proposed Impervious**      Runoff Area=15,377 sf   100.00% Impervious   Runoff Depth=8.94"  
Tc=1.0 min   CN=98   Runoff=3.71 cfs   11,455 cf

**Pond 2P: Basin A**      Peak Elev=97.74'   Storage=2,895 cf   Inflow=3.36 cfs   10,380 cf  
Discarded=0.02 cfs   3,345 cf   Primary=3.04 cfs   7,035 cf   Outflow=3.07 cfs   10,380 cf

**Pond 5P: Porous Pavement B**      Peak Elev=97.93'   Storage=5,275 cf   Inflow=3.88 cfs   11,908 cf  
Discarded=0.07 cfs   7,190 cf   Primary=0.13 cfs   4,718 cf   Outflow=0.20 cfs   11,908 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 22,289 cf   Average Runoff Depth = 8.85"**  
**3.00% Pervious = 907 sf   97.00% Impervious = 29,311 sf**

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Subcatchment 1S: Proposed Impervious

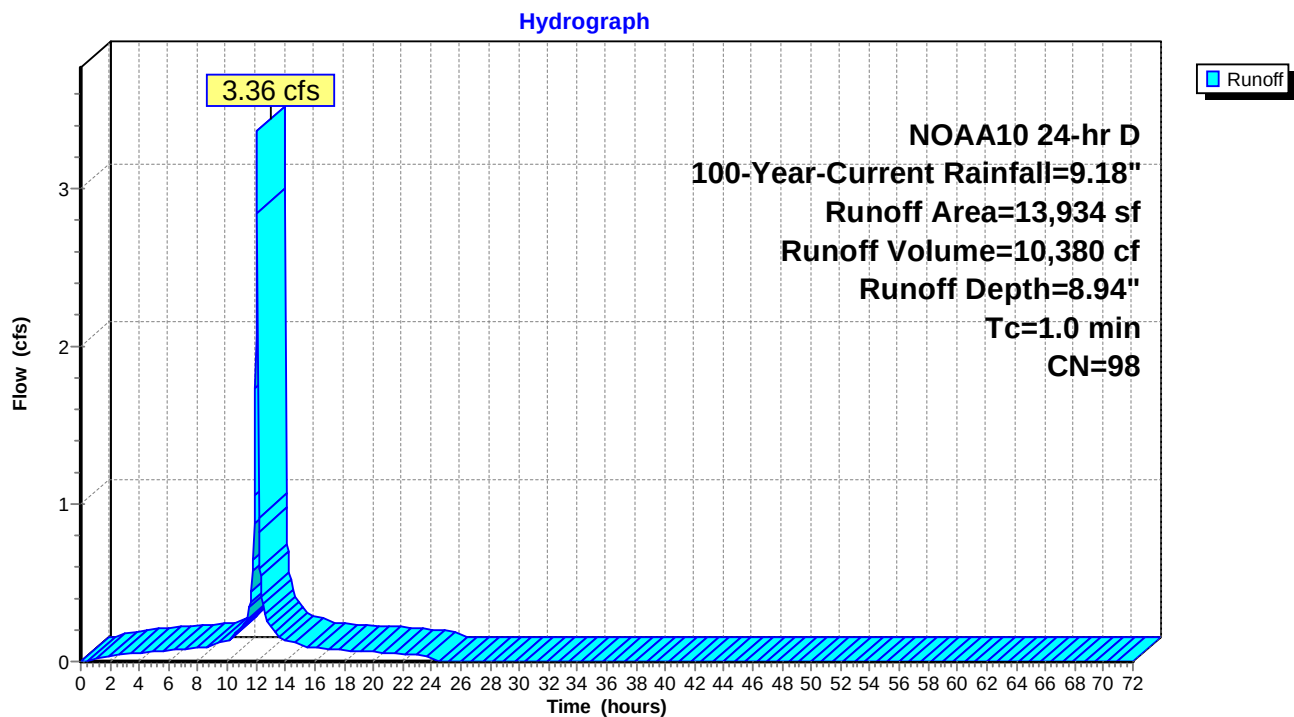
Runoff = 3.36 cfs @ 12.06 hrs, Volume= 10,380 cf, Depth= 8.94"  
Routed to Pond 2P : Basin A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 13,934    | 98 | Roofs, HSG C            |
| 13,934    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 9.18                | 8.94               | 0.00            |
| 1.00            | 0.12                | 0.02               | 0.02            | 48.00           | 9.18                | 8.94               | 0.00            |
| 2.00            | 0.26                | 0.11               | 0.04            | 49.00           | 9.18                | 8.94               | 0.00            |
| 3.00            | 0.42                | 0.25               | 0.05            | 50.00           | 9.18                | 8.94               | 0.00            |
| 4.00            | 0.60                | 0.41               | 0.06            | 51.00           | 9.18                | 8.94               | 0.00            |
| 5.00            | 0.80                | 0.60               | 0.06            | 52.00           | 9.18                | 8.94               | 0.00            |
| 6.00            | 1.02                | 0.81               | 0.07            | 53.00           | 9.18                | 8.94               | 0.00            |
| 7.00            | 1.26                | 1.05               | 0.08            | 54.00           | 9.18                | 8.94               | 0.00            |
| 8.00            | 1.53                | 1.31               | 0.09            | 55.00           | 9.18                | 8.94               | 0.00            |
| 9.00            | 1.81                | 1.58               | 0.10            | 56.00           | 9.18                | 8.94               | 0.00            |
| 10.00           | 2.20                | 1.97               | 0.13            | 57.00           | 9.18                | 8.94               | 0.00            |
| 11.00           | 2.72                | 2.49               | 0.22            | 58.00           | 9.18                | 8.94               | 0.00            |
| 12.00           | 4.34                | 4.11               | <b>2.07</b>     | 59.00           | 9.18                | 8.94               | 0.00            |
| 13.00           | 6.46                | 6.22               | <b>0.23</b>     | 60.00           | 9.18                | 8.94               | 0.00            |
| 14.00           | 6.98                | 6.74               | 0.13            | 61.00           | 9.18                | 8.94               | 0.00            |
| 15.00           | 7.37                | 7.13               | 0.12            | 62.00           | 9.18                | 8.94               | 0.00            |
| 16.00           | 7.65                | 7.41               | 0.09            | 63.00           | 9.18                | 8.94               | 0.00            |
| 17.00           | 7.92                | 7.68               | 0.08            | 64.00           | 9.18                | 8.94               | 0.00            |
| 18.00           | 8.16                | 7.92               | 0.07            | 65.00           | 9.18                | 8.94               | 0.00            |
| 19.00           | 8.38                | 8.14               | 0.07            | 66.00           | 9.18                | 8.94               | 0.00            |
| 20.00           | 8.58                | 8.34               | 0.06            | 67.00           | 9.18                | 8.94               | 0.00            |
| 21.00           | 8.76                | 8.52               | 0.06            | 68.00           | 9.18                | 8.94               | 0.00            |
| 22.00           | 8.92                | 8.68               | 0.05            | 69.00           | 9.18                | 8.94               | 0.00            |
| 23.00           | 9.06                | 8.82               | 0.04            | 70.00           | 9.18                | 8.94               | 0.00            |
| 24.00           | <b>9.18</b>         | <b>8.94</b>        | 0.03            | 71.00           | 9.18                | 8.94               | 0.00            |
| 25.00           | 9.18                | 8.94               | 0.00            | 72.00           | 9.18                | 8.94               | 0.00            |
| 26.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 27.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 28.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 29.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 30.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 31.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 32.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 33.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 34.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 35.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 36.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 37.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 38.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 39.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 40.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 41.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 42.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 43.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 44.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 45.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 46.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Subcatchment 3S: Proposed Pervious

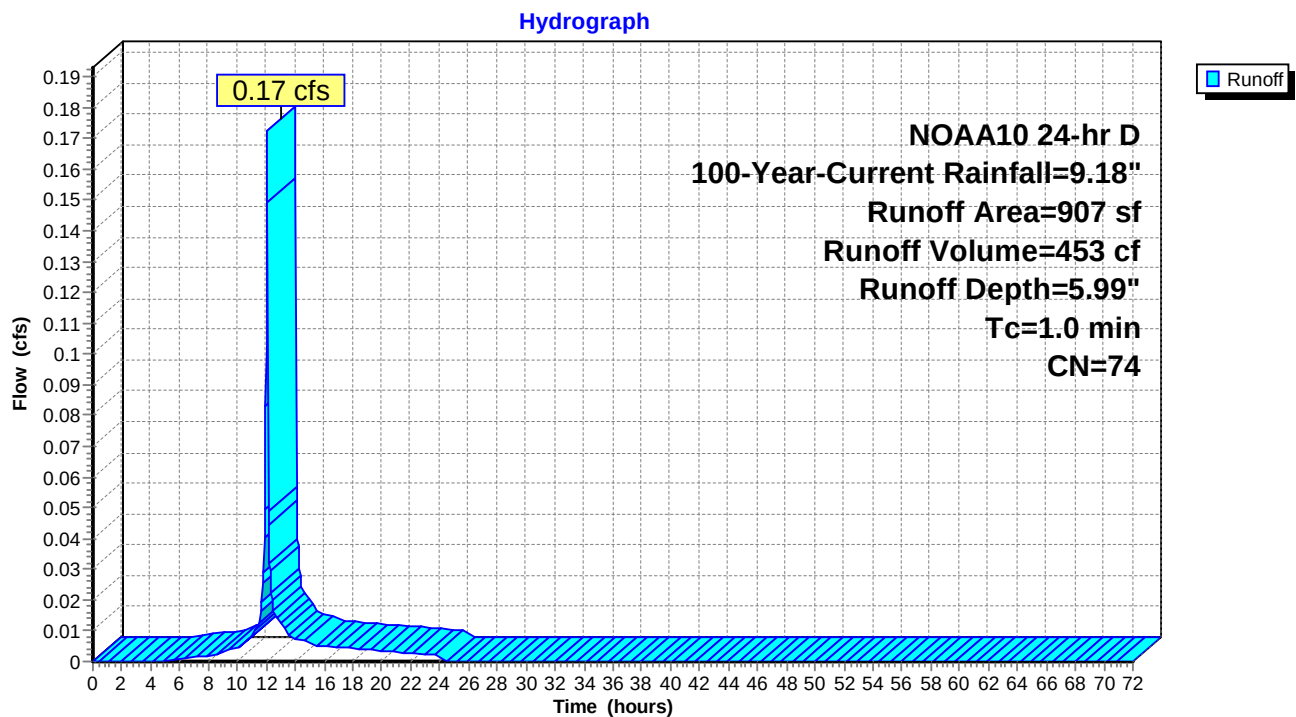
Runoff = 0.17 cfs @ 12.06 hrs, Volume= 453 cf, Depth= 5.99"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 907       | 74 | >75% Grass cover, Good, HSG C |
| 907       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 3S: Proposed Pervious



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Hydrograph for Subcatchment 3S: Proposed Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 9.18                | 5.99               | 0.00            |
| 1.00            | 0.12                | 0.00               | 0.00            | 48.00           | 9.18                | 5.99               | 0.00            |
| 2.00            | 0.26                | 0.00               | 0.00            | 49.00           | 9.18                | 5.99               | 0.00            |
| 3.00            | 0.42                | 0.00               | 0.00            | 50.00           | 9.18                | 5.99               | 0.00            |
| 4.00            | 0.60                | 0.00               | 0.00            | 51.00           | 9.18                | 5.99               | 0.00            |
| 5.00            | 0.80                | 0.00               | 0.00            | 52.00           | 9.18                | 5.99               | 0.00            |
| 6.00            | 1.02                | 0.03               | 0.00            | 53.00           | 9.18                | 5.99               | 0.00            |
| 7.00            | 1.26                | 0.08               | 0.00            | 54.00           | 9.18                | 5.99               | 0.00            |
| 8.00            | 1.53                | 0.16               | 0.00            | 55.00           | 9.18                | 5.99               | 0.00            |
| 9.00            | 1.81                | 0.26               | 0.00            | 56.00           | 9.18                | 5.99               | 0.00            |
| 10.00           | 2.20                | 0.45               | 0.00            | 57.00           | 9.18                | 5.99               | 0.00            |
| 11.00           | 2.72                | 0.73               | 0.01            | 58.00           | 9.18                | 5.99               | 0.00            |
| 12.00           | 4.34                | 1.85               | <b>0.10</b>     | 59.00           | 9.18                | 5.99               | 0.00            |
| 13.00           | 6.46                | 3.58               | <b>0.01</b>     | 60.00           | 9.18                | 5.99               | 0.00            |
| 14.00           | 6.98                | 4.03               | 0.01            | 61.00           | 9.18                | 5.99               | 0.00            |
| 15.00           | 7.37                | 4.37               | 0.01            | 62.00           | 9.18                | 5.99               | 0.00            |
| 16.00           | 7.65                | 4.62               | 0.01            | 63.00           | 9.18                | 5.99               | 0.00            |
| 17.00           | 7.92                | 4.85               | 0.00            | 64.00           | 9.18                | 5.99               | 0.00            |
| 18.00           | 8.16                | 5.07               | 0.00            | 65.00           | 9.18                | 5.99               | 0.00            |
| 19.00           | 8.38                | 5.26               | 0.00            | 66.00           | 9.18                | 5.99               | 0.00            |
| 20.00           | 8.58                | 5.45               | 0.00            | 67.00           | 9.18                | 5.99               | 0.00            |
| 21.00           | 8.76                | 5.61               | 0.00            | 68.00           | 9.18                | 5.99               | 0.00            |
| 22.00           | 8.92                | 5.76               | 0.00            | 69.00           | 9.18                | 5.99               | 0.00            |
| 23.00           | 9.06                | 5.88               | 0.00            | 70.00           | 9.18                | 5.99               | 0.00            |
| 24.00           | <b>9.18</b>         | <b>5.99</b>        | 0.00            | 71.00           | 9.18                | 5.99               | 0.00            |
| 25.00           | 9.18                | 5.99               | 0.00            | 72.00           | 9.18                | 5.99               | 0.00            |
| 26.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 27.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 28.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 29.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 30.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 31.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 32.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 33.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 34.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 35.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 36.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 37.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 38.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 39.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 40.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 41.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 42.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 43.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 44.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 45.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |
| 46.00           | 9.18                | 5.99               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Subcatchment 4S: Proposed Impervious

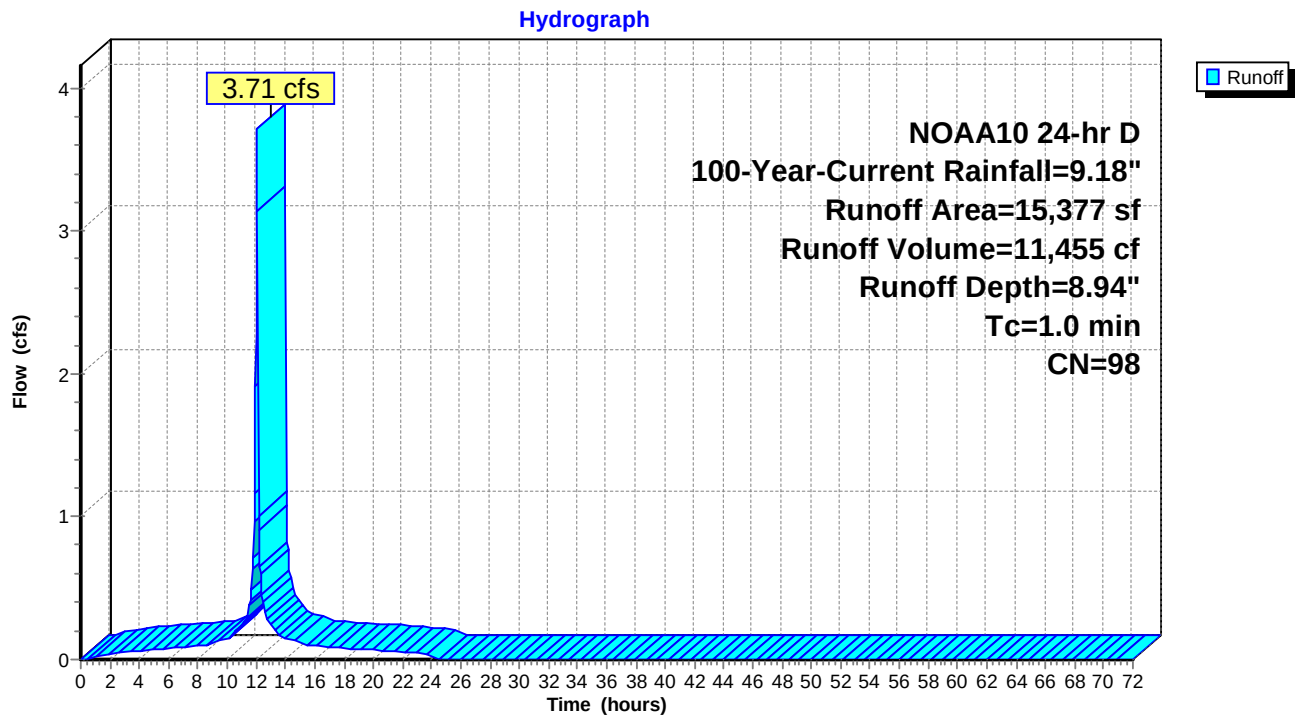
Runoff = 3.71 cfs @ 12.06 hrs, Volume= 11,455 cf, Depth= 8.94"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 15,377    | 98 | Paved parking, HSG C    |
| 15,377    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 4S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Hydrograph for Subcatchment 4S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 9.18                | 8.94               | 0.00            |
| 1.00            | 0.12                | 0.02               | 0.02            | 48.00           | 9.18                | 8.94               | 0.00            |
| 2.00            | 0.26                | 0.11               | 0.04            | 49.00           | 9.18                | 8.94               | 0.00            |
| 3.00            | 0.42                | 0.25               | 0.05            | 50.00           | 9.18                | 8.94               | 0.00            |
| 4.00            | 0.60                | 0.41               | 0.06            | 51.00           | 9.18                | 8.94               | 0.00            |
| 5.00            | 0.80                | 0.60               | 0.07            | 52.00           | 9.18                | 8.94               | 0.00            |
| 6.00            | 1.02                | 0.81               | 0.08            | 53.00           | 9.18                | 8.94               | 0.00            |
| 7.00            | 1.26                | 1.05               | 0.09            | 54.00           | 9.18                | 8.94               | 0.00            |
| 8.00            | 1.53                | 1.31               | 0.09            | 55.00           | 9.18                | 8.94               | 0.00            |
| 9.00            | 1.81                | 1.58               | 0.11            | 56.00           | 9.18                | 8.94               | 0.00            |
| 10.00           | 2.20                | 1.97               | 0.14            | 57.00           | 9.18                | 8.94               | 0.00            |
| 11.00           | 2.72                | 2.49               | 0.25            | 58.00           | 9.18                | 8.94               | 0.00            |
| 12.00           | 4.34                | 4.11               | <b>2.29</b>     | 59.00           | 9.18                | 8.94               | 0.00            |
| 13.00           | 6.46                | 6.22               | <b>0.25</b>     | 60.00           | 9.18                | 8.94               | 0.00            |
| 14.00           | 6.98                | 6.74               | 0.15            | 61.00           | 9.18                | 8.94               | 0.00            |
| 15.00           | 7.37                | 7.13               | 0.13            | 62.00           | 9.18                | 8.94               | 0.00            |
| 16.00           | 7.65                | 7.41               | 0.10            | 63.00           | 9.18                | 8.94               | 0.00            |
| 17.00           | 7.92                | 7.68               | 0.09            | 64.00           | 9.18                | 8.94               | 0.00            |
| 18.00           | 8.16                | 7.92               | 0.08            | 65.00           | 9.18                | 8.94               | 0.00            |
| 19.00           | 8.38                | 8.14               | 0.08            | 66.00           | 9.18                | 8.94               | 0.00            |
| 20.00           | 8.58                | 8.34               | 0.07            | 67.00           | 9.18                | 8.94               | 0.00            |
| 21.00           | 8.76                | 8.52               | 0.06            | 68.00           | 9.18                | 8.94               | 0.00            |
| 22.00           | 8.92                | 8.68               | 0.05            | 69.00           | 9.18                | 8.94               | 0.00            |
| 23.00           | 9.06                | 8.82               | 0.05            | 70.00           | 9.18                | 8.94               | 0.00            |
| 24.00           | <b>9.18</b>         | <b>8.94</b>        | 0.03            | 71.00           | 9.18                | 8.94               | 0.00            |
| 25.00           | 9.18                | 8.94               | 0.00            | 72.00           | 9.18                | 8.94               | 0.00            |
| 26.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 27.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 28.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 29.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 30.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 31.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 32.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 33.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 34.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 35.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 36.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 37.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 38.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 39.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 40.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 41.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 42.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 43.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 44.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 45.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |
| 46.00           | 9.18                | 8.94               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Pond 2P: Basin A

Inflow Area = 13,934 sf, 100.00% Impervious, Inflow Depth = 8.94" for 100-Year-Current event  
Inflow = 3.36 cfs @ 12.06 hrs, Volume = 10,380 cf  
Outflow = 3.07 cfs @ 12.09 hrs, Volume = 10,380 cf, Atten = 9%, Lag = 1.8 min  
Discarded = 0.02 cfs @ 1.55 hrs, Volume = 3,345 cf  
Primary = 3.04 cfs @ 12.09 hrs, Volume = 7,035 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs  
Peak Elev = 97.74' @ 12.09 hrs Surf. Area = 2,143 sf Storage = 2,895 cf

Plug-Flow detention time = 229.3 min calculated for 10,373 cf (100% of inflow)  
Center-of-Mass det. time = 229.7 min (966.0 - 736.2)

| Volume | Invert | Avail. Storage | Storage Description                                                                                                                                                                                                       |
|--------|--------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1A    | 95.70' | 1,544 cf       | <b>29.50'W x 72.63'L x 2.71'H Field A</b><br>5,803 cf Overall - 1,943 cf Embedded = 3,859 cf x 40.0% Voids                                                                                                                |
| #2A    | 96.20' | 1,943 cf       | <b>Cultec R-180HD</b> x 88 Inside #1<br>Effective Size = 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf<br>Overall Size = 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap<br>Row Length Adjustment = +1.00' x 3.44 sf x 8 rows |
|        |        | 3,487 cf       | Total Available Storage                                                                                                                                                                                                   |

Storage Group A created with Chamber Wizard

| Device | Routing   | Invert | Outlet Devices                                                                                                                                     |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.60' | <b>2.5" Vert. Orifice/Grate</b> C = 0.600 Limited to weir flow at low heads                                                                        |
| #2     | Primary   | 97.35' | <b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00<br>Coef. (English) 2.80 2.92 3.08 3.30 3.32 |
| #3     | Discarded | 95.70' | <b>0.500 in/hr Exfiltration over Surface area</b>                                                                                                  |

**Discarded OutFlow** Max = 0.02 cfs @ 1.55 hrs HW = 95.73' (Free Discharge)  
↑ **3 = Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max = 2.93 cfs @ 12.09 hrs HW = 97.73' (Free Discharge)  
↑ **1 = Orifice/Grate** (Orifice Controls 0.17 cfs @ 4.88 fps)  
↑ **2 = Broad-Crested Rectangular Weir** (Weir Controls 2.76 cfs @ 1.80 fps)

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Pond 2P: Basin A - Chamber Wizard Field A

#### Chamber Model = Cultec R-180HD (For residential use only)

Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf

Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 3.44 sf x 8 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

11 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 70.63' Row Length +12.0" End Stone x 2 = 72.63' Base Length

8 Rows x 36.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 29.50' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

88 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 8 Rows = 1,943.5 cf Chamber Storage

5,802.8 cf Field - 1,943.5 cf Chambers = 3,859.4 cf Stone x 40.0% Voids = 1,543.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,487.2 cf = 0.080 af

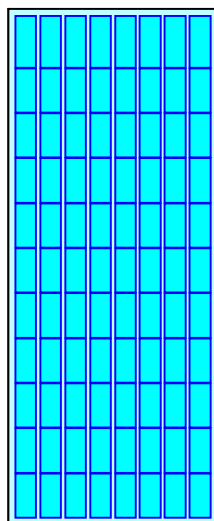
Overall Storage Efficiency = 60.1%

Overall System Size = 72.63' x 29.50' x 2.71'

88 Chambers

214.9 cy Field

142.9 cy Stone



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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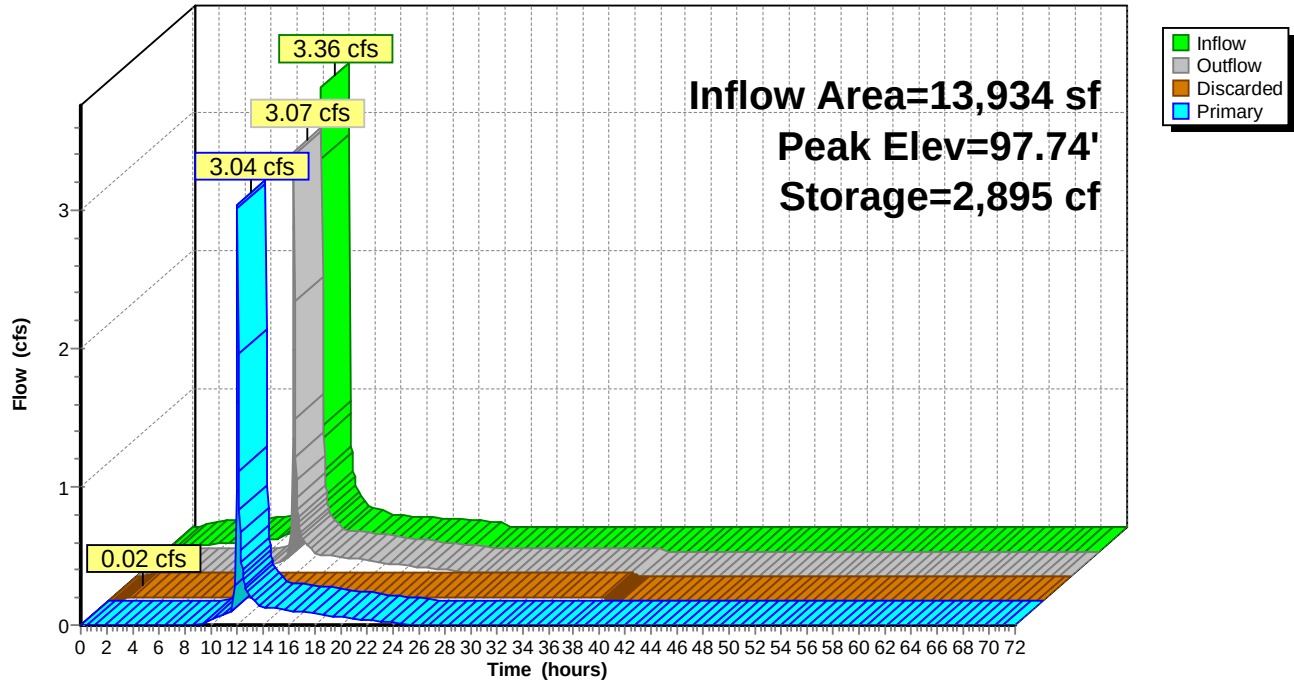
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### Pond 2P: Basin A

#### Hydrograph



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

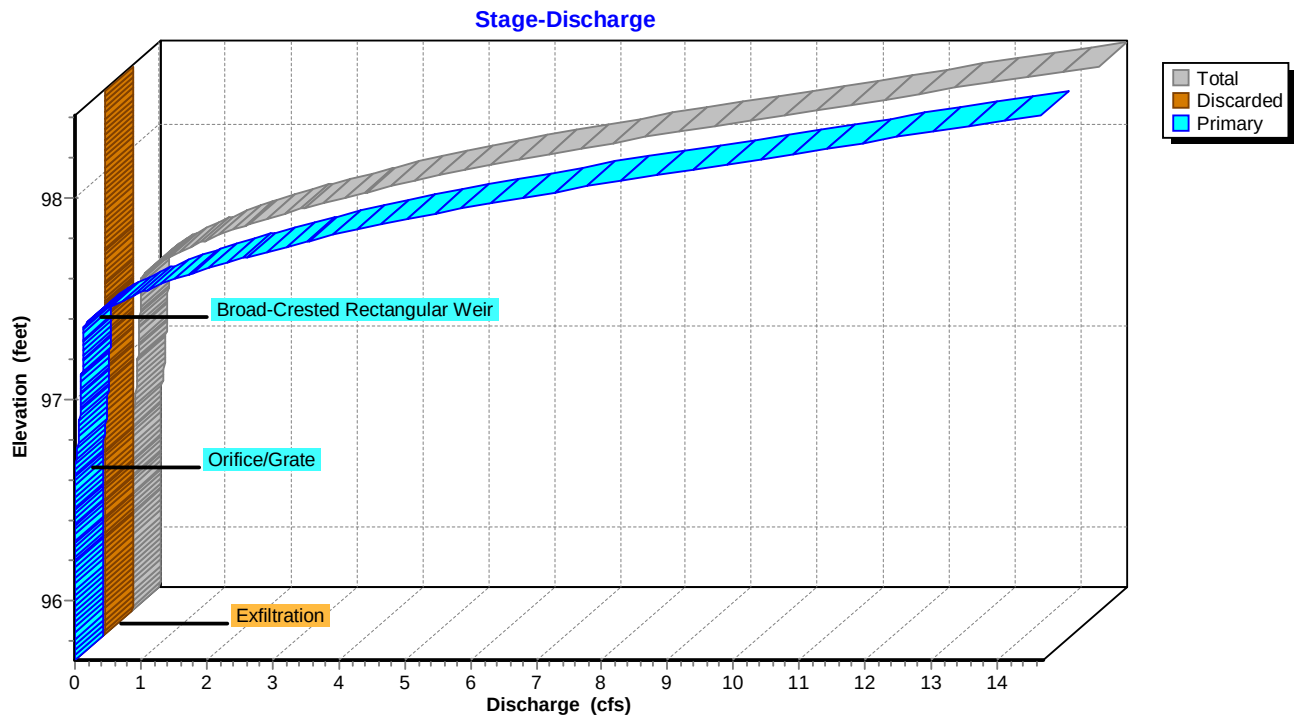
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

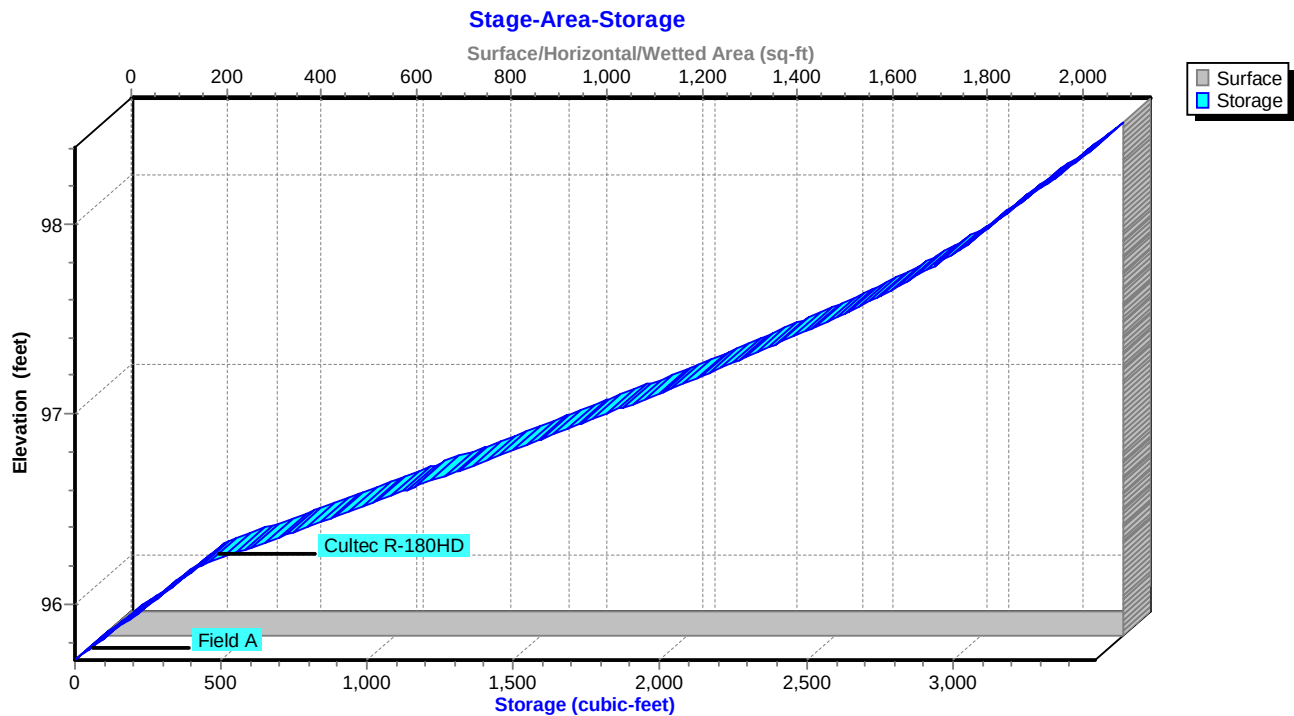
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### Pond 2P: Basin A



## Proposed Flows

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### Hydrograph for Pond 2P: Basin A

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 95.70               | 0.00             | <b>0.00</b>        | 0.00             |
| 2.50            | 0.04            | 66                      | 95.78               | 0.02             | <b>0.02</b>        | 0.00             |
| 5.00            | 0.06            | 335                     | 96.09               | 0.02             | 0.02               | 0.00             |
| 7.50            | 0.08            | 777                     | 96.40               | 0.02             | 0.02               | 0.00             |
| 10.00           | <b>0.13</b>     | <b>1,421</b>            | <b>96.77</b>        | <b>0.06</b>      | 0.02               | <b>0.04</b>      |
| 12.50           | <b>0.33</b>     | <b>2,479</b>            | <b>97.42</b>        | <b>0.39</b>      | 0.02               | <b>0.36</b>      |
| 15.00           | 0.12            | 2,258                   | 97.28               | 0.15             | 0.02               | 0.12             |
| 17.50           | 0.08            | 1,842                   | 97.02               | 0.12             | 0.02               | 0.09             |
| 20.00           | 0.06            | 1,557                   | 96.85               | 0.09             | 0.02               | 0.06             |
| 22.50           | 0.05            | 1,389                   | 96.75               | 0.06             | 0.02               | 0.03             |
| 25.00           | 0.00            | 1,203                   | 96.64               | 0.03             | 0.02               | 0.00             |
| 27.50           | 0.00            | 977                     | 96.51               | 0.02             | 0.02               | 0.00             |
| 30.00           | 0.00            | 754                     | 96.38               | 0.02             | 0.02               | 0.00             |
| 32.50           | 0.00            | 531                     | 96.26               | 0.02             | 0.02               | 0.00             |
| 35.00           | 0.00            | 308                     | 96.06               | 0.02             | 0.02               | 0.00             |
| 37.50           | 0.00            | 84                      | 95.80               | 0.02             | 0.02               | 0.00             |
| 40.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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### Summary for Pond 5P: Porous Pavement B

Inflow Area = 16,284 sf, 94.43% Impervious, Inflow Depth = 8.78" for 100-Year-Current event  
Inflow = 3.88 cfs @ 12.06 hrs, Volume= 11,908 cf  
Outflow = 0.20 cfs @ 13.48 hrs, Volume= 11,908 cf, Atten= 95%, Lag= 85.4 min  
Discarded = 0.07 cfs @ 4.95 hrs, Volume= 7,190 cf  
Primary = 0.13 cfs @ 13.48 hrs, Volume= 4,718 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.93' @ 13.48 hrs Surf.Area= 5,690 sf Storage= 5,275 cf

Plug-Flow detention time= 313.2 min calculated for 11,900 cf (100% of inflow)

Center-of-Mass det. time= 313.4 min ( 1,053.1 - 739.7 )

| Volume | Invert | Avail.Storage | Storage Description                                        |
|--------|--------|---------------|------------------------------------------------------------|
| #1     | 97.00' | 14,225 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 97.00               | 5,690                | 0                         | 0                         |
| 98.00               | 5,690                | 5,690                     | 5,690                     |
| 99.00               | 5,690                | 5,690                     | 11,380                    |
| 99.50               | 5,690                | 2,845                     | 14,225                    |

| Device | Routing   | Invert | Outlet Devices                                                             |
|--------|-----------|--------|----------------------------------------------------------------------------|
| #1     | Primary   | 97.20' | <b>2.5" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads |
| #2     | Discarded | 97.00' | <b>0.500 in/hr Exfiltration over Surface area</b>                          |

**Discarded OutFlow** Max=0.07 cfs @ 4.95 hrs HW=97.03' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.13 cfs @ 13.48 hrs HW=97.93' (Free Discharge)

↑ **1=Orifice/Grate** (Orifice Controls 0.13 cfs @ 3.80 fps)

## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

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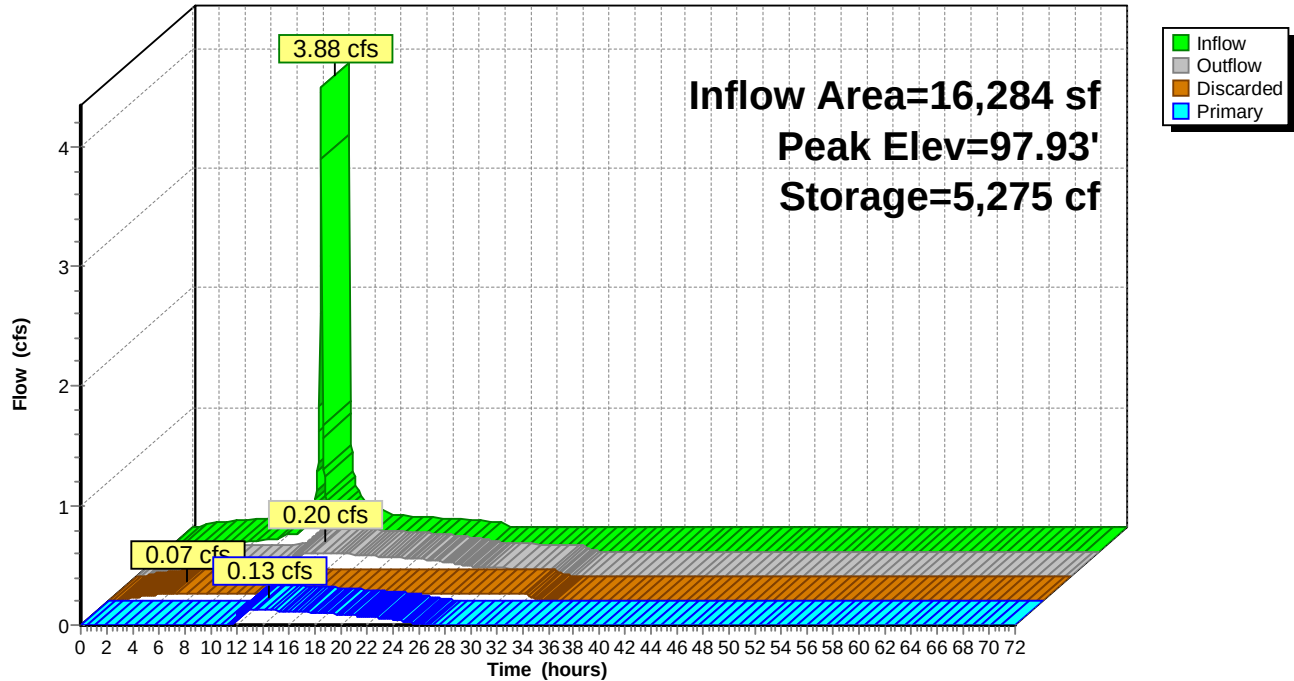
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### Pond 5P: Porous Pavement B

Hydrograph



## Proposed Flows

NOAA10 24-hr D 100-Year-Current Rainfall=9.18"

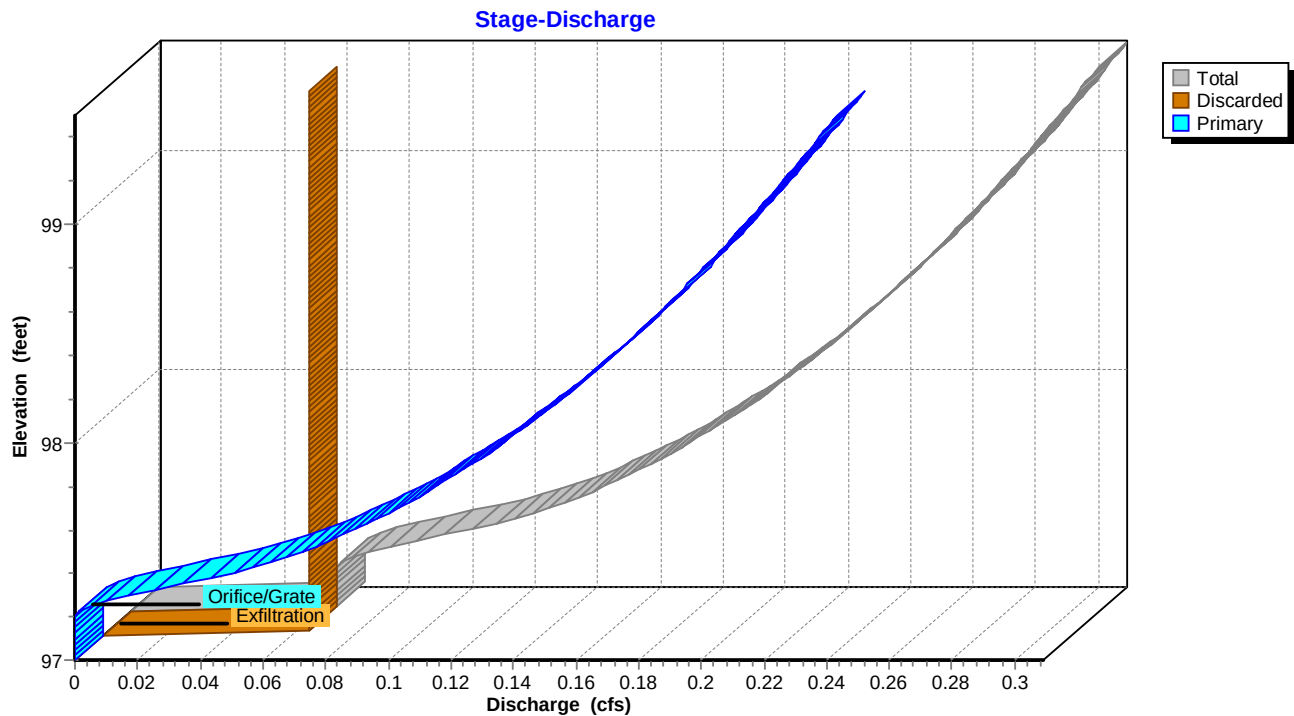
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### Pond 5P: Porous Pavement B



**Proposed Flows**

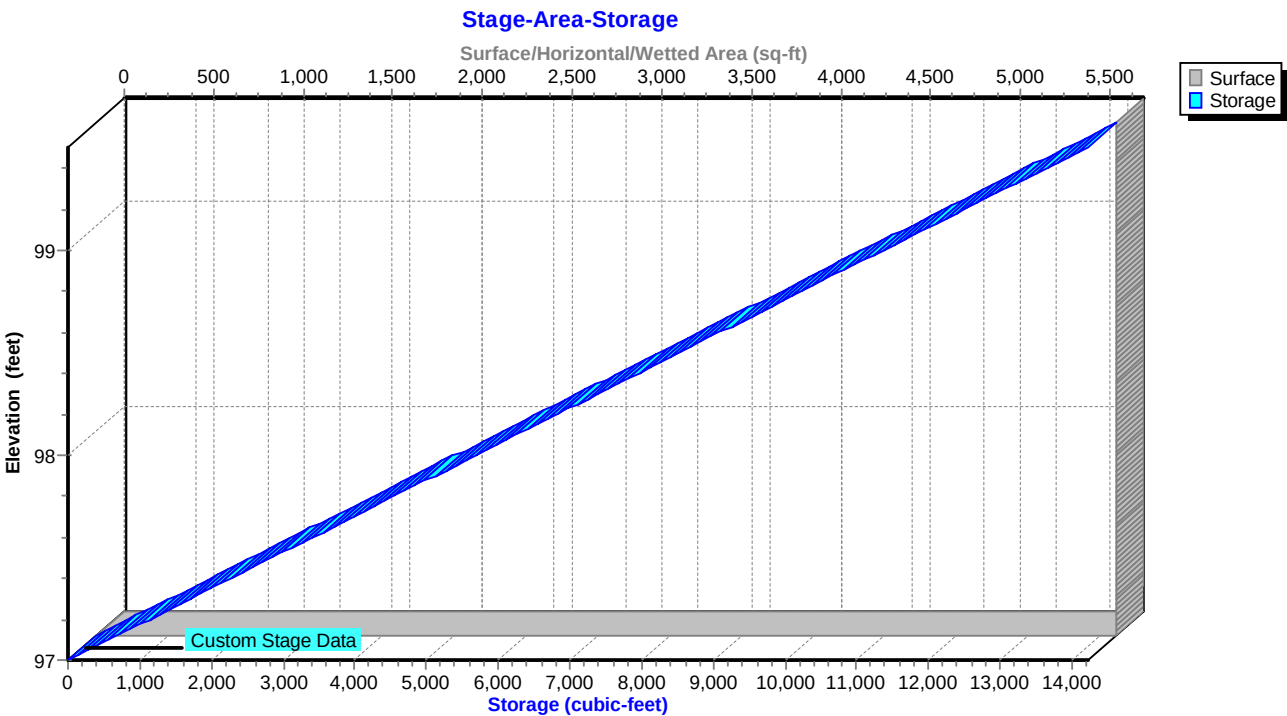
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**Pond 5P: Porous Pavement B**



## Proposed Flows

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### Hydrograph for Pond 5P: Porous Pavement B

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.05            | 83                      | 97.01               | 0.04             | <b>0.04</b>        | 0.00             |
| 5.00            | 0.07            | 143                     | 97.03               | 0.07             | <b>0.07</b>        | 0.00             |
| 7.50            | 0.09            | 293                     | 97.05               | 0.07             | 0.07               | 0.00             |
| 10.00           | <b>0.15</b>     | 744                     | 97.13               | 0.07             | 0.07               | 0.00             |
| 12.50           | <b>0.38</b>     | <b>5,016</b>            | <b>97.88</b>        | <b>0.19</b>      | 0.07               | <b>0.12</b>      |
| 15.00           | 0.13            | <b>5,044</b>            | <b>97.89</b>        | <b>0.19</b>      | 0.07               | <b>0.13</b>      |
| 17.50           | 0.09            | 4,291                   | 97.75               | 0.18             | 0.07               | 0.11             |
| 20.00           | 0.07            | 3,516                   | 97.62               | 0.16             | 0.07               | 0.09             |
| 22.50           | 0.05            | 2,752                   | 97.48               | 0.14             | 0.07               | 0.07             |
| 25.00           | 0.00            | 1,932                   | 97.34               | 0.10             | 0.07               | 0.03             |
| 27.50           | 0.00            | 1,233                   | 97.22               | 0.07             | 0.07               | 0.00             |
| 30.00           | 0.00            | 640                     | 97.11               | 0.07             | 0.07               | 0.00             |
| 32.50           | 0.00            | 73                      | 97.01               | 0.03             | 0.03               | 0.00             |
| 35.00           | 0.00            | 1                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 37.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Proposed Impervious**      Runoff Area=13,934 sf   100.00% Impervious   Runoff Depth=3.81"  
Tc=1.0 min   CN=98   Runoff=1.47 cfs   4,418 cf

**Subcatchment 3S: Proposed Pervious**      Runoff Area=907 sf   0.00% Impervious   Runoff Depth=1.63"  
Tc=1.0 min   CN=74   Runoff=0.05 cfs   123 cf

**Subcatchment 4S: Proposed Impervious**      Runoff Area=15,377 sf   100.00% Impervious   Runoff Depth=3.81"  
Tc=1.0 min   CN=98   Runoff=1.62 cfs   4,876 cf

**Pond 2P: Basin A**      Peak Elev=97.01'   Storage=1,835 cf   Inflow=1.47 cfs   4,418 cf  
Discarded=0.02 cfs   3,042 cf   Primary=0.09 cfs   1,376 cf   Outflow=0.12 cfs   4,418 cf

**Pond 5P: Porous Pavement B**      Peak Elev=97.32'   Storage=1,820 cf   Inflow=1.67 cfs   4,999 cf  
Discarded=0.07 cfs   4,681 cf   Primary=0.02 cfs   318 cf   Outflow=0.09 cfs   4,999 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 9,417 cf   Average Runoff Depth = 3.74"**  
**3.00% Pervious = 907 sf   97.00% Impervious = 29,311 sf**

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Subcatchment 1S: Proposed Impervious

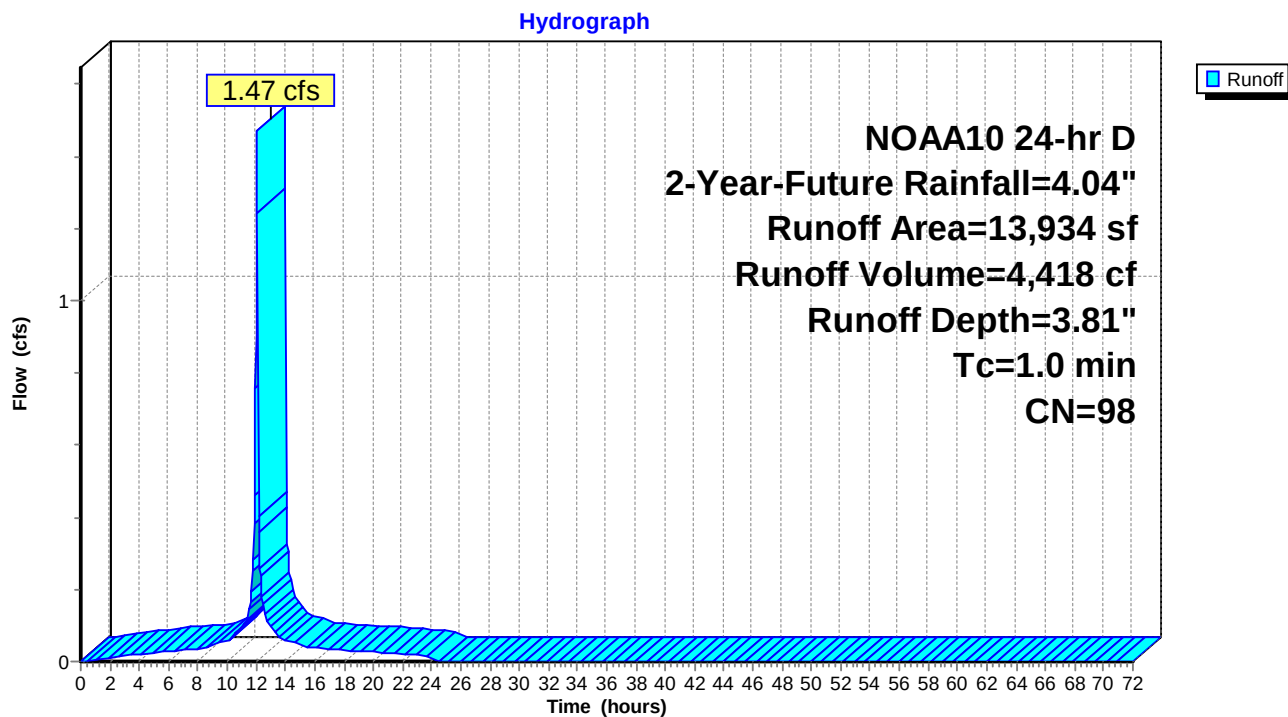
Runoff = 1.47 cfs @ 12.06 hrs, Volume= 4,418 cf, Depth= 3.81"  
Routed to Pond 2P : Basin A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 13,934    | 98 | Roofs, HSG C            |
| 13,934    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 4.04                | 3.81               | 0.00            |
| 1.00            | 0.05                | 0.00               | 0.00            | 48.00           | 4.04                | 3.81               | 0.00            |
| 2.00            | 0.11                | 0.02               | 0.01            | 49.00           | 4.04                | 3.81               | 0.00            |
| 3.00            | 0.19                | 0.06               | 0.02            | 50.00           | 4.04                | 3.81               | 0.00            |
| 4.00            | 0.26                | 0.12               | 0.02            | 51.00           | 4.04                | 3.81               | 0.00            |
| 5.00            | 0.35                | 0.19               | 0.03            | 52.00           | 4.04                | 3.81               | 0.00            |
| 6.00            | 0.45                | 0.27               | 0.03            | 53.00           | 4.04                | 3.81               | 0.00            |
| 7.00            | 0.56                | 0.37               | 0.03            | 54.00           | 4.04                | 3.81               | 0.00            |
| 8.00            | 0.67                | 0.48               | 0.04            | 55.00           | 4.04                | 3.81               | 0.00            |
| 9.00            | 0.80                | 0.59               | 0.04            | 56.00           | 4.04                | 3.81               | 0.00            |
| 10.00           | 0.97                | 0.76               | 0.06            | 57.00           | 4.04                | 3.81               | 0.00            |
| 11.00           | 1.20                | 0.98               | 0.10            | 58.00           | 4.04                | 3.81               | 0.00            |
| 12.00           | 1.91                | 1.69               | <b>0.90</b>     | 59.00           | 4.04                | 3.81               | 0.00            |
| 13.00           | 2.84                | 2.61               | <b>0.10</b>     | 60.00           | 4.04                | 3.81               | 0.00            |
| 14.00           | 3.07                | 2.84               | 0.06            | 61.00           | 4.04                | 3.81               | 0.00            |
| 15.00           | 3.24                | 3.01               | 0.05            | 62.00           | 4.04                | 3.81               | 0.00            |
| 16.00           | 3.37                | 3.14               | 0.04            | 63.00           | 4.04                | 3.81               | 0.00            |
| 17.00           | 3.48                | 3.25               | 0.04            | 64.00           | 4.04                | 3.81               | 0.00            |
| 18.00           | 3.59                | 3.36               | 0.03            | 65.00           | 4.04                | 3.81               | 0.00            |
| 19.00           | 3.69                | 3.45               | 0.03            | 66.00           | 4.04                | 3.81               | 0.00            |
| 20.00           | 3.78                | 3.54               | 0.03            | 67.00           | 4.04                | 3.81               | 0.00            |
| 21.00           | 3.85                | 3.62               | 0.02            | 68.00           | 4.04                | 3.81               | 0.00            |
| 22.00           | 3.93                | 3.69               | 0.02            | 69.00           | 4.04                | 3.81               | 0.00            |
| 23.00           | 3.99                | 3.75               | 0.02            | 70.00           | 4.04                | 3.81               | 0.00            |
| 24.00           | <b>4.04</b>         | <b>3.81</b>        | 0.01            | 71.00           | 4.04                | 3.81               | 0.00            |
| 25.00           | 4.04                | 3.81               | 0.00            | 72.00           | 4.04                | 3.81               | 0.00            |
| 26.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 27.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 28.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 29.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 30.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 31.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 32.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 33.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 34.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 35.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 36.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 37.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 38.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 39.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 40.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 41.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 42.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 43.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 44.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 45.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 46.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Subcatchment 3S: Proposed Pervious

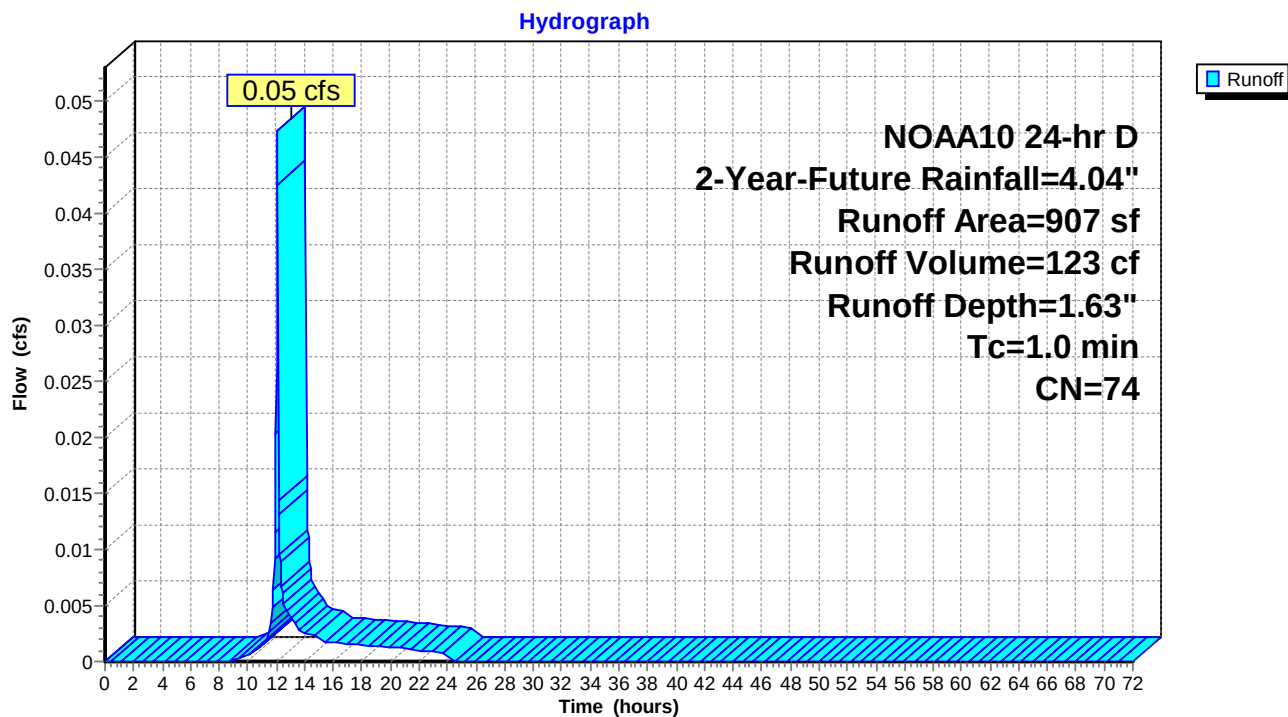
Runoff = 0.05 cfs @ 12.07 hrs, Volume= 123 cf, Depth= 1.63"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 907       | 74 | >75% Grass cover, Good, HSG C |
| 907       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 3S: Proposed Pervious



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Subcatchment 3S: Proposed Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 4.04                | 1.63               | 0.00            |
| 1.00            | 0.05                | 0.00               | 0.00            | 48.00           | 4.04                | 1.63               | 0.00            |
| 2.00            | 0.11                | 0.00               | 0.00            | 49.00           | 4.04                | 1.63               | 0.00            |
| 3.00            | 0.19                | 0.00               | 0.00            | 50.00           | 4.04                | 1.63               | 0.00            |
| 4.00            | 0.26                | 0.00               | 0.00            | 51.00           | 4.04                | 1.63               | 0.00            |
| 5.00            | 0.35                | 0.00               | 0.00            | 52.00           | 4.04                | 1.63               | 0.00            |
| 6.00            | 0.45                | 0.00               | 0.00            | 53.00           | 4.04                | 1.63               | 0.00            |
| 7.00            | 0.56                | 0.00               | 0.00            | 54.00           | 4.04                | 1.63               | 0.00            |
| 8.00            | 0.67                | 0.00               | 0.00            | 55.00           | 4.04                | 1.63               | 0.00            |
| 9.00            | 0.80                | 0.00               | 0.00            | 56.00           | 4.04                | 1.63               | 0.00            |
| 10.00           | 0.97                | 0.02               | 0.00            | 57.00           | 4.04                | 1.63               | 0.00            |
| 11.00           | 1.20                | 0.06               | 0.00            | 58.00           | 4.04                | 1.63               | 0.00            |
| 12.00           | 1.91                | 0.31               | <b>0.03</b>     | 59.00           | 4.04                | 1.63               | 0.00            |
| 13.00           | 2.84                | 0.81               | <b>0.00</b>     | 60.00           | 4.04                | 1.63               | 0.00            |
| 14.00           | 3.07                | 0.95               | 0.00            | 61.00           | 4.04                | 1.63               | 0.00            |
| 15.00           | 3.24                | 1.07               | 0.00            | 62.00           | 4.04                | 1.63               | 0.00            |
| 16.00           | 3.37                | 1.15               | 0.00            | 63.00           | 4.04                | 1.63               | 0.00            |
| 17.00           | 3.48                | 1.23               | 0.00            | 64.00           | 4.04                | 1.63               | 0.00            |
| 18.00           | 3.59                | 1.30               | 0.00            | 65.00           | 4.04                | 1.63               | 0.00            |
| 19.00           | 3.69                | 1.37               | 0.00            | 66.00           | 4.04                | 1.63               | 0.00            |
| 20.00           | 3.78                | 1.43               | 0.00            | 67.00           | 4.04                | 1.63               | 0.00            |
| 21.00           | 3.85                | 1.49               | 0.00            | 68.00           | 4.04                | 1.63               | 0.00            |
| 22.00           | 3.93                | 1.54               | 0.00            | 69.00           | 4.04                | 1.63               | 0.00            |
| 23.00           | 3.99                | 1.59               | 0.00            | 70.00           | 4.04                | 1.63               | 0.00            |
| 24.00           | <b>4.04</b>         | <b>1.63</b>        | 0.00            | 71.00           | 4.04                | 1.63               | 0.00            |
| 25.00           | 4.04                | 1.63               | 0.00            | 72.00           | 4.04                | 1.63               | 0.00            |
| 26.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 27.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 28.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 29.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 30.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 31.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 32.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 33.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 34.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 35.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 36.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 37.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 38.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 39.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 40.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 41.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 42.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 43.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 44.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 45.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |
| 46.00           | 4.04                | 1.63               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Subcatchment 4S: Proposed Impervious

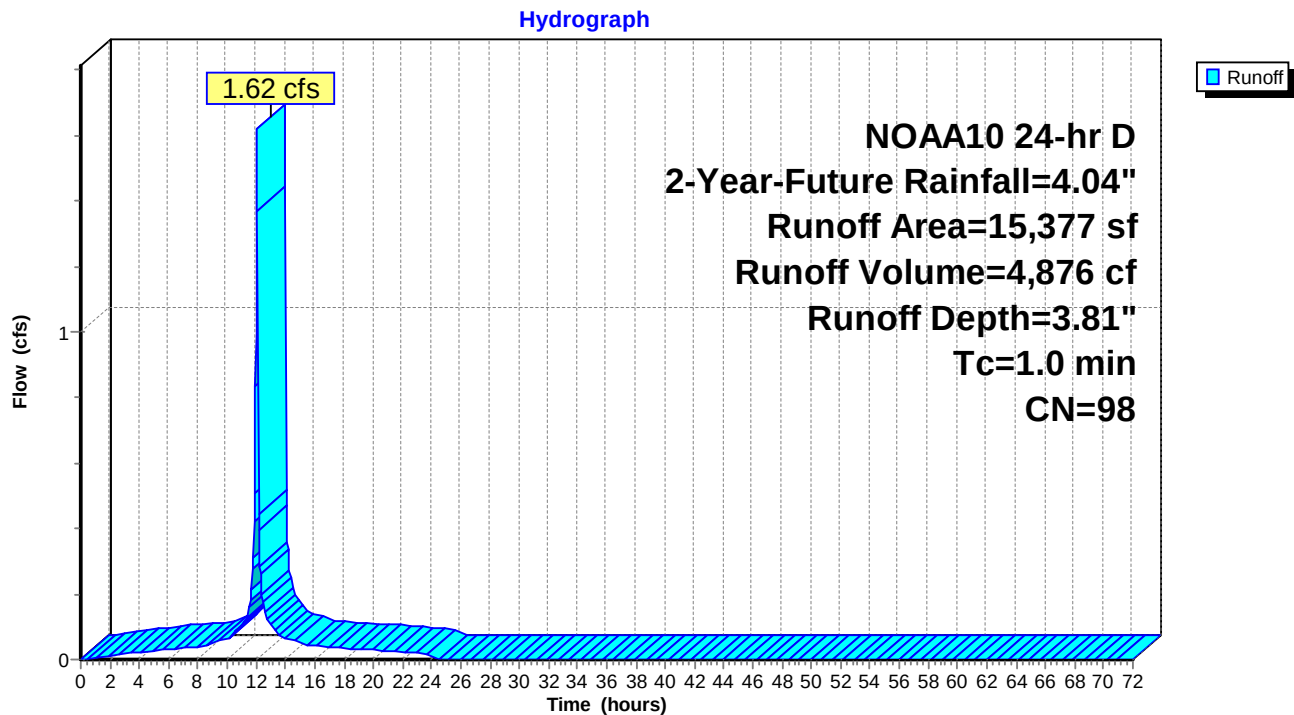
Runoff = 1.62 cfs @ 12.06 hrs, Volume= 4,876 cf, Depth= 3.81"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 15,377    | 98 | Paved parking, HSG C    |
| 15,377    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 4S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Subcatchment 4S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 4.04                | 3.81               | 0.00            |
| 1.00            | 0.05                | 0.00               | 0.00            | 48.00           | 4.04                | 3.81               | 0.00            |
| 2.00            | 0.11                | 0.02               | 0.01            | 49.00           | 4.04                | 3.81               | 0.00            |
| 3.00            | 0.19                | 0.06               | 0.02            | 50.00           | 4.04                | 3.81               | 0.00            |
| 4.00            | 0.26                | 0.12               | 0.02            | 51.00           | 4.04                | 3.81               | 0.00            |
| 5.00            | 0.35                | 0.19               | 0.03            | 52.00           | 4.04                | 3.81               | 0.00            |
| 6.00            | 0.45                | 0.27               | 0.03            | 53.00           | 4.04                | 3.81               | 0.00            |
| 7.00            | 0.56                | 0.37               | 0.04            | 54.00           | 4.04                | 3.81               | 0.00            |
| 8.00            | 0.67                | 0.48               | 0.04            | 55.00           | 4.04                | 3.81               | 0.00            |
| 9.00            | 0.80                | 0.59               | 0.05            | 56.00           | 4.04                | 3.81               | 0.00            |
| 10.00           | 0.97                | 0.76               | 0.06            | 57.00           | 4.04                | 3.81               | 0.00            |
| 11.00           | 1.20                | 0.98               | 0.11            | 58.00           | 4.04                | 3.81               | 0.00            |
| 12.00           | 1.91                | 1.69               | <b>1.00</b>     | 59.00           | 4.04                | 3.81               | 0.00            |
| 13.00           | 2.84                | 2.61               | <b>0.11</b>     | 60.00           | 4.04                | 3.81               | 0.00            |
| 14.00           | 3.07                | 2.84               | 0.06            | 61.00           | 4.04                | 3.81               | 0.00            |
| 15.00           | 3.24                | 3.01               | 0.06            | 62.00           | 4.04                | 3.81               | 0.00            |
| 16.00           | 3.37                | 3.14               | 0.04            | 63.00           | 4.04                | 3.81               | 0.00            |
| 17.00           | 3.48                | 3.25               | 0.04            | 64.00           | 4.04                | 3.81               | 0.00            |
| 18.00           | 3.59                | 3.36               | 0.04            | 65.00           | 4.04                | 3.81               | 0.00            |
| 19.00           | 3.69                | 3.45               | 0.03            | 66.00           | 4.04                | 3.81               | 0.00            |
| 20.00           | 3.78                | 3.54               | 0.03            | 67.00           | 4.04                | 3.81               | 0.00            |
| 21.00           | 3.85                | 3.62               | 0.03            | 68.00           | 4.04                | 3.81               | 0.00            |
| 22.00           | 3.93                | 3.69               | 0.02            | 69.00           | 4.04                | 3.81               | 0.00            |
| 23.00           | 3.99                | 3.75               | 0.02            | 70.00           | 4.04                | 3.81               | 0.00            |
| 24.00           | <b>4.04</b>         | <b>3.81</b>        | 0.01            | 71.00           | 4.04                | 3.81               | 0.00            |
| 25.00           | 4.04                | 3.81               | 0.00            | 72.00           | 4.04                | 3.81               | 0.00            |
| 26.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 27.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 28.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 29.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 30.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 31.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 32.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 33.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 34.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 35.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 36.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 37.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 38.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 39.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 40.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 41.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 42.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 43.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 44.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 45.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |
| 46.00           | 4.04                | 3.81               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Pond 2P: Basin A

Inflow Area = 13,934 sf, 100.00% Impervious, Inflow Depth = 3.81" for 2-Year-Future event  
Inflow = 1.47 cfs @ 12.06 hrs, Volume = 4,418 cf  
Outflow = 0.12 cfs @ 12.68 hrs, Volume = 4,418 cf, Atten = 92%, Lag = 37.2 min  
Discarded = 0.02 cfs @ 5.20 hrs, Volume = 3,042 cf  
Primary = 0.09 cfs @ 12.68 hrs, Volume = 1,376 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs  
Peak Elev = 97.01' @ 12.68 hrs Surf. Area = 2,143 sf Storage = 1,835 cf

Plug-Flow detention time = 346.5 min calculated for 4,415 cf (100% of inflow)  
Center-of-Mass det. time = 346.8 min ( 1,097.3 - 750.5 )

| Volume | Invert | Avail. Storage | Storage Description                                                                                                                                                                                                       |
|--------|--------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1A    | 95.70' | 1,544 cf       | <b>29.50'W x 72.63'L x 2.71'H Field A</b><br>5,803 cf Overall - 1,943 cf Embedded = 3,859 cf x 40.0% Voids                                                                                                                |
| #2A    | 96.20' | 1,943 cf       | <b>Cultec R-180HD</b> x 88 Inside #1<br>Effective Size = 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf<br>Overall Size = 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap<br>Row Length Adjustment = +1.00' x 3.44 sf x 8 rows |
|        |        | 3,487 cf       | Total Available Storage                                                                                                                                                                                                   |

Storage Group A created with Chamber Wizard

| Device | Routing   | Invert | Outlet Devices                                                                                                                                     |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.60' | <b>2.5" Vert. Orifice/Grate</b> C = 0.600 Limited to weir flow at low heads                                                                        |
| #2     | Primary   | 97.35' | <b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00<br>Coef. (English) 2.80 2.92 3.08 3.30 3.32 |
| #3     | Discarded | 95.70' | <b>0.500 in/hr Exfiltration over Surface area</b>                                                                                                  |

**Discarded OutFlow** Max = 0.02 cfs @ 5.20 hrs HW = 95.73' (Free Discharge)  
↑ **3 = Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max = 0.09 cfs @ 12.68 hrs HW = 97.01' (Free Discharge)  
↑ **1 = Orifice/Grate** (Orifice Controls 0.09 cfs @ 2.67 fps)  
↑ **2 = Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Pond 2P: Basin A - Chamber Wizard Field A

#### Chamber Model = Cultec R-180HD (For residential use only)

Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf

Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 3.44 sf x 8 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

11 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 70.63' Row Length +12.0" End Stone x 2 = 72.63' Base Length

8 Rows x 36.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 29.50' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

88 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 8 Rows = 1,943.5 cf Chamber Storage

5,802.8 cf Field - 1,943.5 cf Chambers = 3,859.4 cf Stone x 40.0% Voids = 1,543.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,487.2 cf = 0.080 af

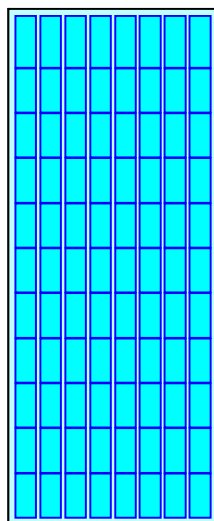
Overall Storage Efficiency = 60.1%

Overall System Size = 72.63' x 29.50' x 2.71'

88 Chambers

214.9 cy Field

142.9 cy Stone



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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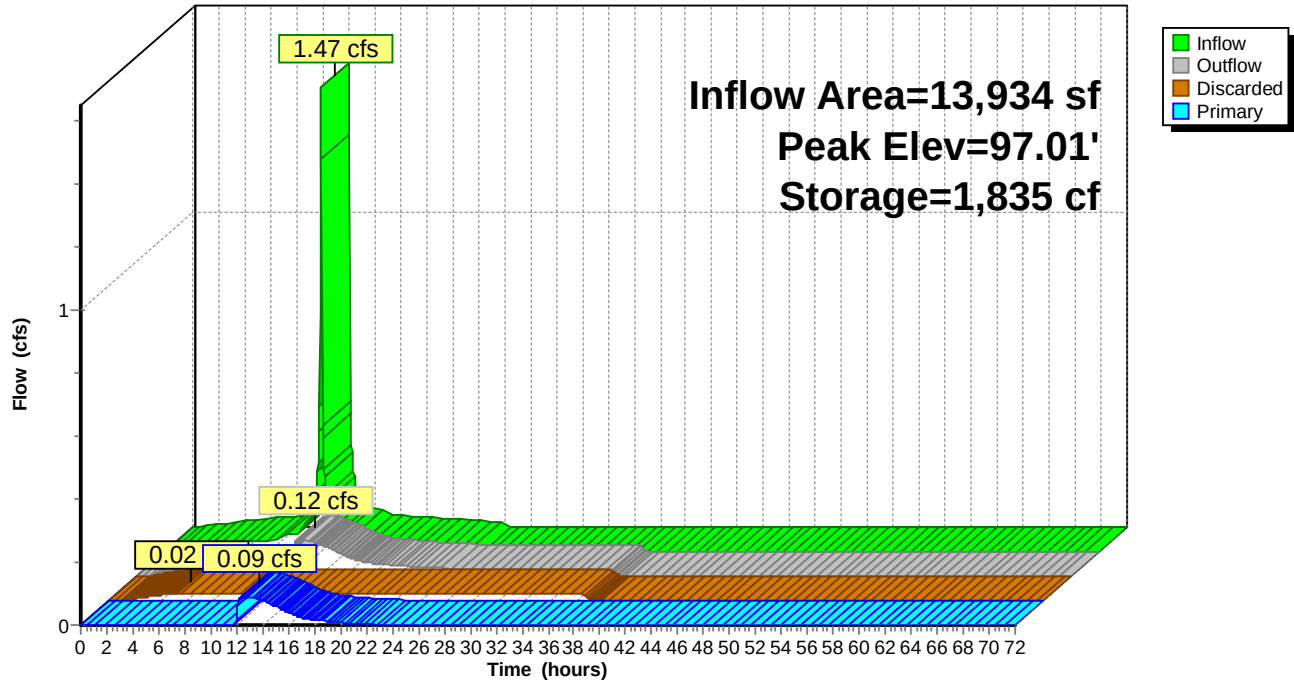
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### Pond 2P: Basin A

#### Hydrograph



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

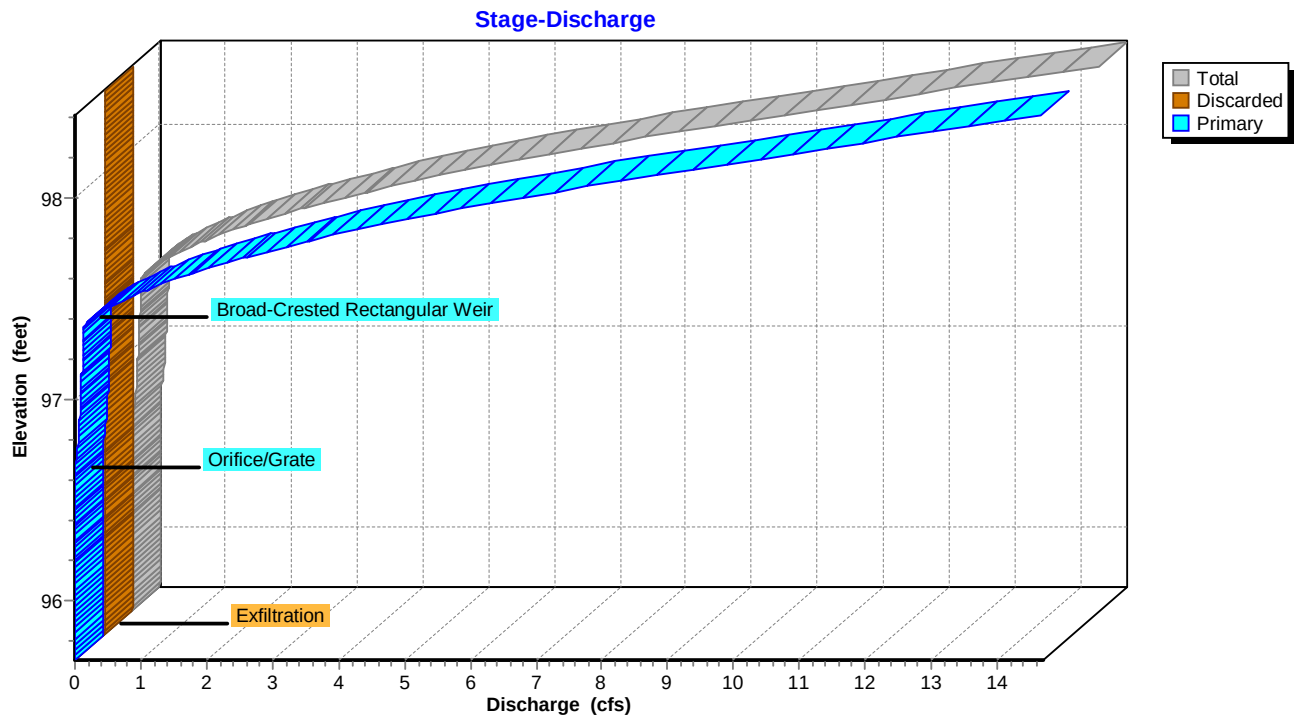
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

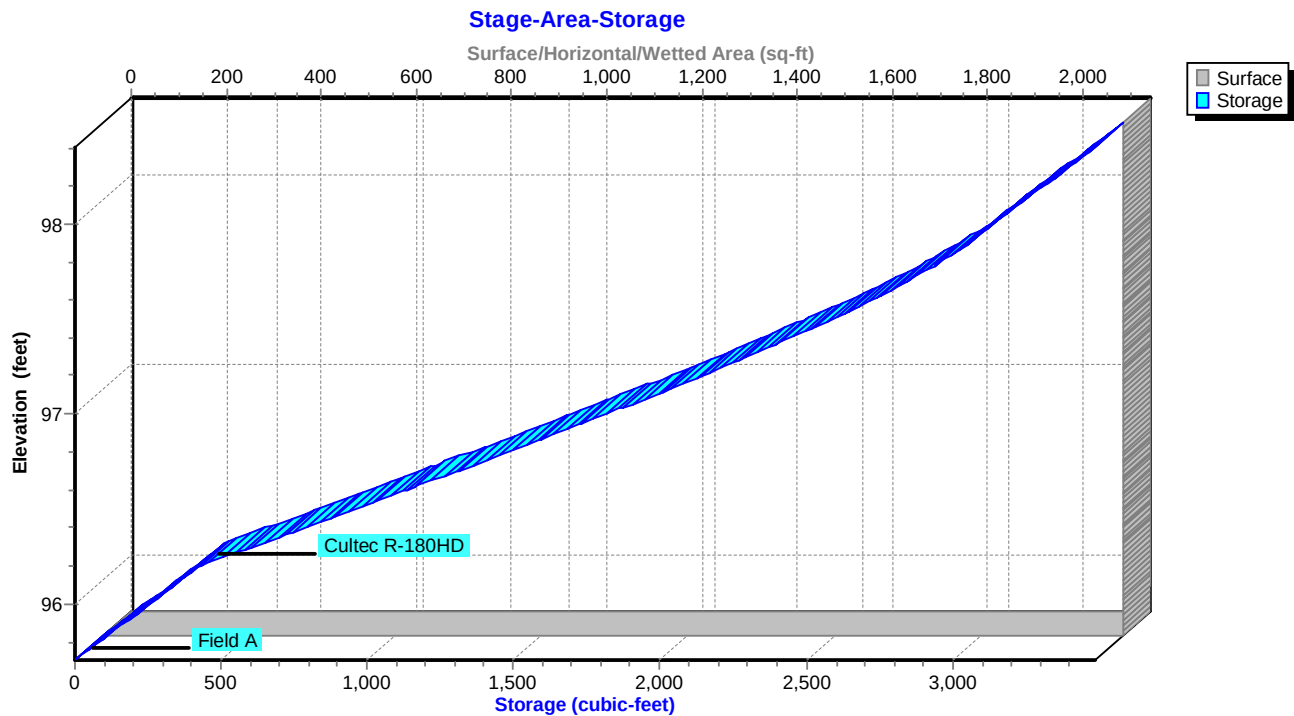
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Pond 2P: Basin A

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.01            | 11                      | 95.71               | 0.01             | 0.01               | 0.00             |
| 5.00            | 0.03            | 23                      | 95.73               | 0.02             | <b>0.02</b>        | 0.00             |
| 7.50            | 0.03            | 69                      | 95.78               | 0.02             | <b>0.02</b>        | 0.00             |
| 10.00           | <b>0.06</b>     | 237                     | 95.98               | 0.02             | 0.02               | 0.00             |
| 12.50           | <b>0.14</b>     | <b>1,830</b>            | <b>97.01</b>        | <b>0.12</b>      | 0.02               | <b>0.09</b>      |
| 15.00           | 0.05            | <b>1,556</b>            | <b>96.85</b>        | <b>0.09</b>      | 0.02               | <b>0.06</b>      |
| 17.50           | 0.03            | 1,328                   | 96.71               | 0.05             | 0.02               | 0.02             |
| 20.00           | 0.03            | 1,254                   | 96.67               | 0.03             | 0.02               | 0.01             |
| 22.50           | 0.02            | 1,194                   | 96.63               | 0.03             | 0.02               | 0.00             |
| 25.00           | 0.00            | 1,061                   | 96.56               | 0.02             | 0.02               | 0.00             |
| 27.50           | 0.00            | 838                     | 96.43               | 0.02             | 0.02               | 0.00             |
| 30.00           | 0.00            | 615                     | 96.30               | 0.02             | 0.02               | 0.00             |
| 32.50           | 0.00            | 392                     | 96.16               | 0.02             | 0.02               | 0.00             |
| 35.00           | 0.00            | 168                     | 95.90               | 0.02             | 0.02               | 0.00             |
| 37.50           | 0.00            | 1                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Summary for Pond 5P: Porous Pavement B

Inflow Area = 16,284 sf, 94.43% Impervious, Inflow Depth = 3.68" for 2-Year-Future event  
Inflow = 1.67 cfs @ 12.06 hrs, Volume= 4,999 cf  
Outflow = 0.09 cfs @ 13.43 hrs, Volume= 4,999 cf, Atten= 95%, Lag= 82.3 min  
Discarded = 0.07 cfs @ 10.65 hrs, Volume= 4,681 cf  
Primary = 0.02 cfs @ 13.43 hrs, Volume= 318 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.32' @ 13.43 hrs Surf.Area= 5,690 sf Storage= 1,820 cf

Plug-Flow detention time= 206.5 min calculated for 4,995 cf (100% of inflow)  
Center-of-Mass det. time= 206.6 min ( 960.2 - 753.7 )

| Volume | Invert | Avail.Storage | Storage Description                                        |
|--------|--------|---------------|------------------------------------------------------------|
| #1     | 97.00' | 14,225 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 97.00               | 5,690                | 0                         | 0                         |
| 98.00               | 5,690                | 5,690                     | 5,690                     |
| 99.00               | 5,690                | 5,690                     | 11,380                    |
| 99.50               | 5,690                | 2,845                     | 14,225                    |

| Device | Routing   | Invert | Outlet Devices                                                             |
|--------|-----------|--------|----------------------------------------------------------------------------|
| #1     | Primary   | 97.20' | <b>2.5" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads |
| #2     | Discarded | 97.00' | <b>0.500 in/hr Exfiltration over Surface area</b>                          |

**Discarded OutFlow** Max=0.07 cfs @ 10.65 hrs HW=97.03' (Free Discharge)  
↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.02 cfs @ 13.43 hrs HW=97.32' (Free Discharge)  
↑ **1=Orifice/Grate** (Orifice Controls 0.02 cfs @ 1.18 fps)

## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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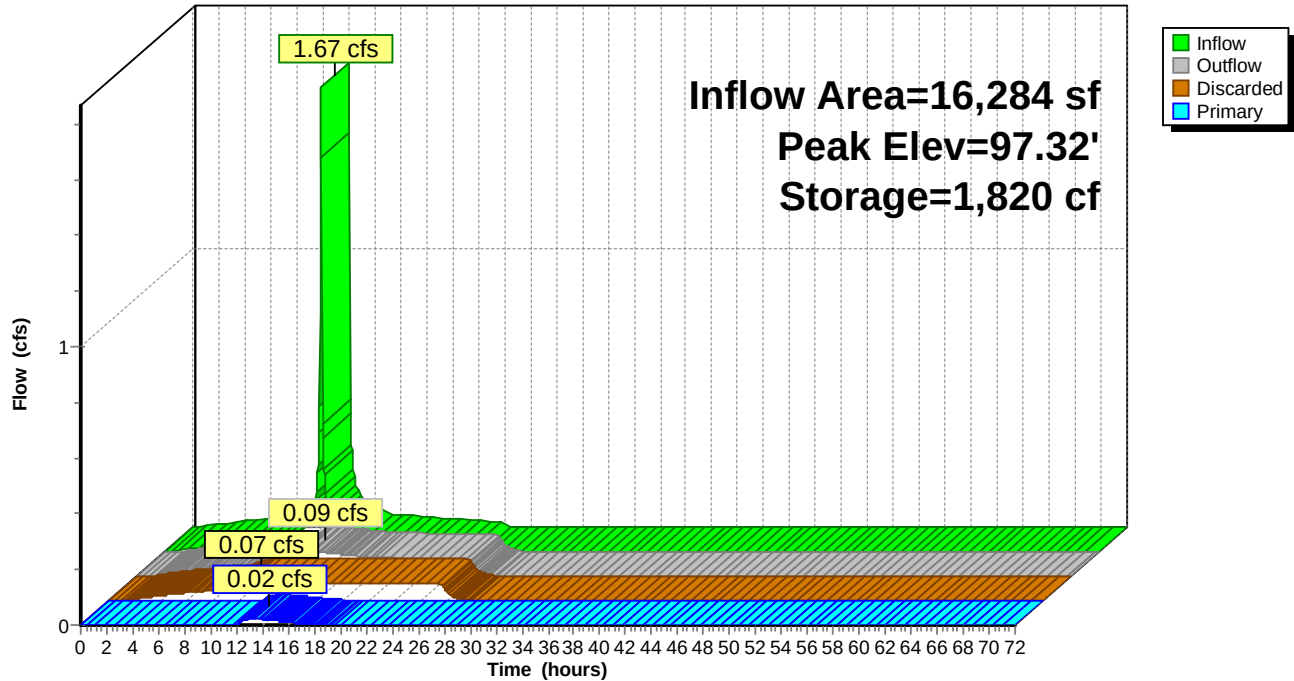
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### Pond 5P: Porous Pavement B

Hydrograph



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

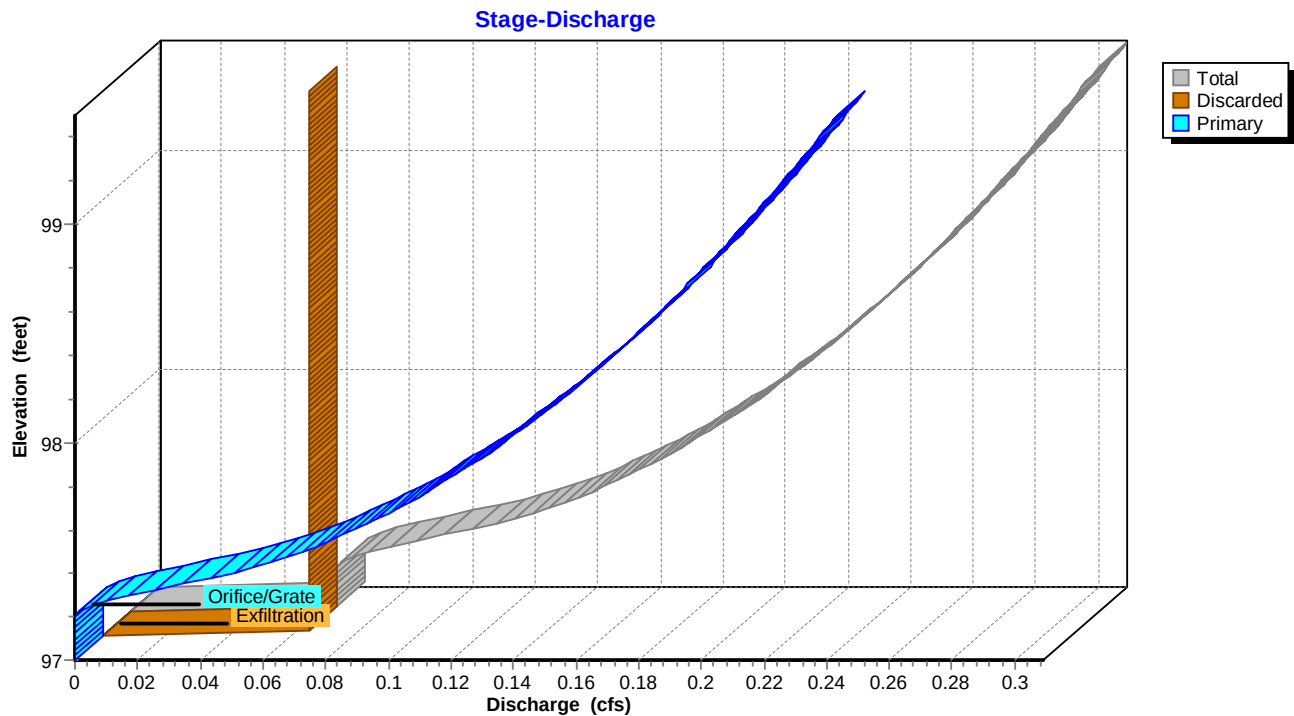
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

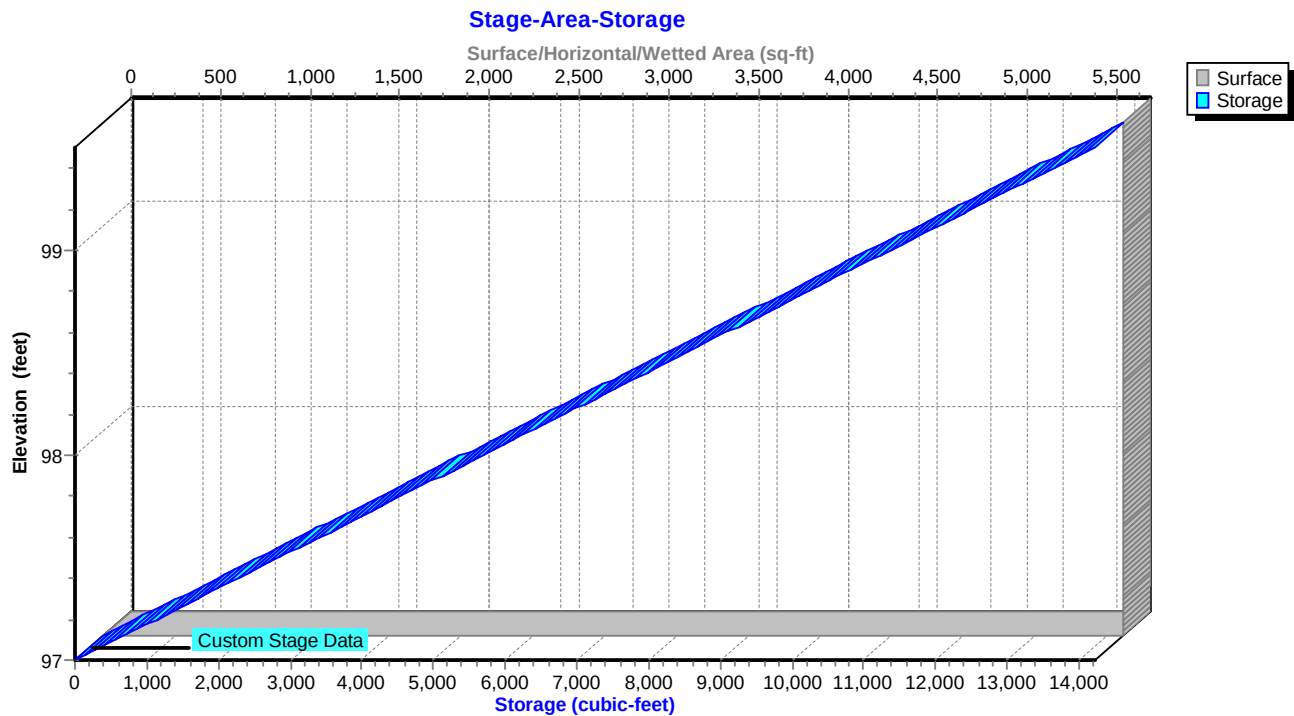
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 2-Year-Future Rainfall=4.04"

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### Hydrograph for Pond 5P: Porous Pavement B

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.01            | 22                      | 97.00               | 0.01             | 0.01               | 0.00             |
| 5.00            | 0.03            | 54                      | 97.01               | 0.02             | 0.02               | 0.00             |
| 7.50            | 0.04            | 77                      | 97.01               | 0.04             | 0.04               | 0.00             |
| 10.00           | <b>0.06</b>     | 122                     | 97.02               | 0.06             | <b>0.06</b>        | 0.00             |
| 12.50           | <b>0.16</b>     | <b>1,723</b>            | <b>97.30</b>        | <b>0.08</b>      | <b>0.07</b>        | <b>0.02</b>      |
| 15.00           | 0.06            | <b>1,704</b>            | <b>97.30</b>        | <b>0.08</b>      | 0.07               | <b>0.02</b>      |
| 17.50           | 0.04            | 1,410                   | 97.25               | 0.07             | 0.07               | 0.00             |
| 20.00           | 0.03            | 1,120                   | 97.20               | 0.07             | 0.07               | 0.00             |
| 22.50           | 0.02            | 770                     | 97.14               | 0.07             | 0.07               | 0.00             |
| 25.00           | 0.00            | 289                     | 97.05               | 0.07             | 0.07               | 0.00             |
| 27.50           | 0.00            | 6                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 30.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 32.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 35.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 37.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

Prepared by HydroCAD SAMPLER 1-800-927-7246 [www.hydrocad.net](http://www.hydrocad.net)

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Proposed Impervious**      Runoff Area=13,934 sf   100.00% Impervious   Runoff Depth=6.07"  
Tc=1.0 min   CN=98   Runoff=2.31 cfs   7,050 cf

**Subcatchment 3S: Proposed Pervious**      Runoff Area=907 sf   0.00% Impervious   Runoff Depth=3.45"  
Tc=1.0 min   CN=74   Runoff=0.10 cfs   261 cf

**Subcatchment 4S: Proposed Impervious**      Runoff Area=15,377 sf   100.00% Impervious   Runoff Depth=6.07"  
Tc=1.0 min   CN=98   Runoff=2.54 cfs   7,780 cf

**Pond 2P: Basin A**      Peak Elev=97.57'   Storage=2,678 cf   Inflow=2.31 cfs   7,050 cf  
Discarded=0.02 cfs   3,241 cf   Primary=1.27 cfs   3,809 cf   Outflow=1.30 cfs   7,050 cf

**Pond 5P: Porous Pavement B**      Peak Elev=97.56'   Storage=3,162 cf   Inflow=2.65 cfs   8,041 cf  
Discarded=0.07 cfs   6,043 cf   Primary=0.08 cfs   1,997 cf   Outflow=0.15 cfs   8,041 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 15,091 cf   Average Runoff Depth = 5.99"**  
**3.00% Pervious = 907 sf   97.00% Impervious = 29,311 sf**

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Subcatchment 1S: Proposed Impervious

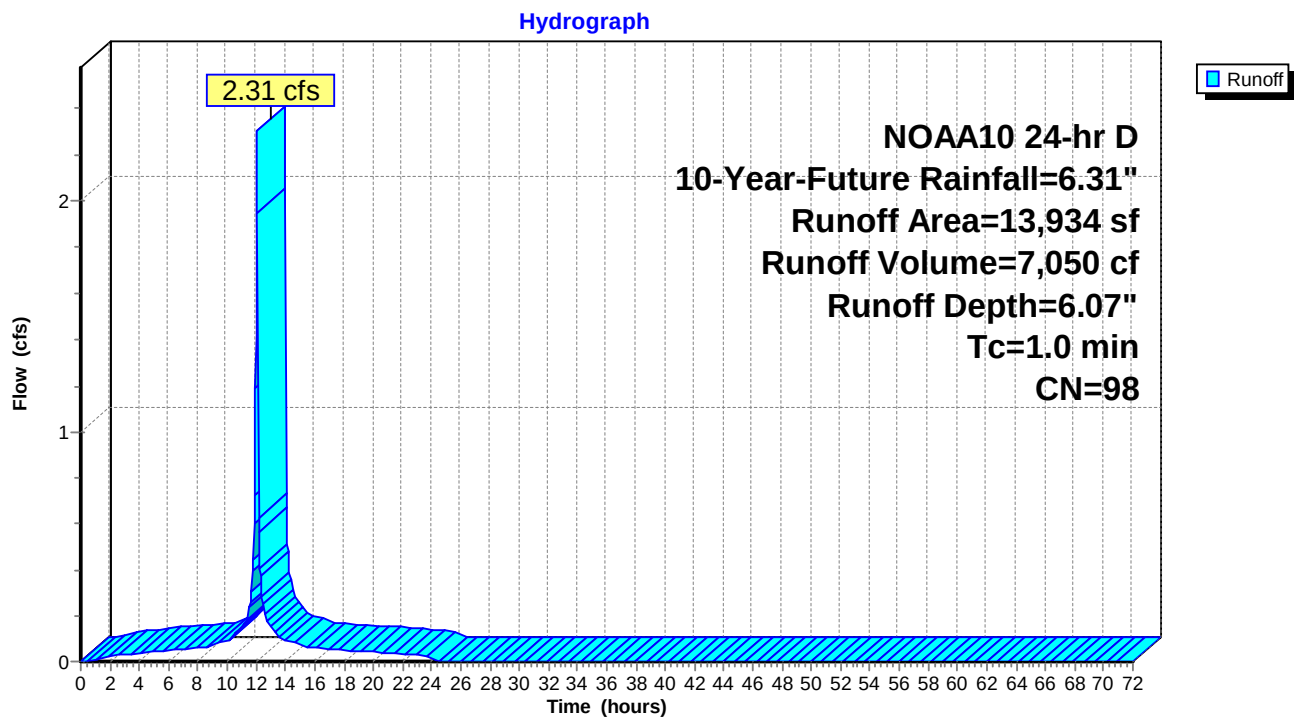
Runoff = 2.31 cfs @ 12.06 hrs, Volume= 7,050 cf, Depth= 6.07"  
Routed to Pond 2P : Basin A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 13,934    | 98 | Roofs, HSG C            |
| 13,934    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 6.31                | 6.07               | 0.00            |
| 1.00            | 0.08                | 0.01               | 0.01            | 48.00           | 6.31                | 6.07               | 0.00            |
| 2.00            | 0.18                | 0.06               | 0.02            | 49.00           | 6.31                | 6.07               | 0.00            |
| 3.00            | 0.29                | 0.14               | 0.03            | 50.00           | 6.31                | 6.07               | 0.00            |
| 4.00            | 0.41                | 0.24               | 0.04            | 51.00           | 6.31                | 6.07               | 0.00            |
| 5.00            | 0.55                | 0.37               | 0.04            | 52.00           | 6.31                | 6.07               | 0.00            |
| 6.00            | 0.70                | 0.51               | 0.05            | 53.00           | 6.31                | 6.07               | 0.00            |
| 7.00            | 0.87                | 0.66               | 0.05            | 54.00           | 6.31                | 6.07               | 0.00            |
| 8.00            | 1.05                | 0.84               | 0.06            | 55.00           | 6.31                | 6.07               | 0.00            |
| 9.00            | 1.24                | 1.03               | 0.07            | 56.00           | 6.31                | 6.07               | 0.00            |
| 10.00           | 1.51                | 1.29               | 0.09            | 57.00           | 6.31                | 6.07               | 0.00            |
| 11.00           | 1.87                | 1.64               | 0.15            | 58.00           | 6.31                | 6.07               | 0.00            |
| 12.00           | 2.99                | 2.75               | <b>1.42</b>     | 59.00           | 6.31                | 6.07               | 0.00            |
| 13.00           | 4.44                | 4.21               | <b>0.16</b>     | 60.00           | 6.31                | 6.07               | 0.00            |
| 14.00           | 4.80                | 4.56               | 0.09            | 61.00           | 6.31                | 6.07               | 0.00            |
| 15.00           | 5.07                | 4.83               | 0.08            | 62.00           | 6.31                | 6.07               | 0.00            |
| 16.00           | 5.26                | 5.02               | 0.06            | 63.00           | 6.31                | 6.07               | 0.00            |
| 17.00           | 5.44                | 5.20               | 0.06            | 64.00           | 6.31                | 6.07               | 0.00            |
| 18.00           | 5.61                | 5.37               | 0.05            | 65.00           | 6.31                | 6.07               | 0.00            |
| 19.00           | 5.76                | 5.52               | 0.05            | 66.00           | 6.31                | 6.07               | 0.00            |
| 20.00           | 5.90                | 5.66               | 0.04            | 67.00           | 6.31                | 6.07               | 0.00            |
| 21.00           | 6.02                | 5.78               | 0.04            | 68.00           | 6.31                | 6.07               | 0.00            |
| 22.00           | 6.13                | 5.89               | 0.03            | 69.00           | 6.31                | 6.07               | 0.00            |
| 23.00           | 6.23                | 5.99               | 0.03            | 70.00           | 6.31                | 6.07               | 0.00            |
| 24.00           | <b>6.31</b>         | <b>6.07</b>        | 0.02            | 71.00           | 6.31                | 6.07               | 0.00            |
| 25.00           | 6.31                | 6.07               | 0.00            | 72.00           | 6.31                | 6.07               | 0.00            |
| 26.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 27.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 28.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 29.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 30.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 31.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 32.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 33.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 34.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 35.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 36.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 37.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 38.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 39.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 40.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 41.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 42.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 43.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 44.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 45.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 46.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Subcatchment 3S: Proposed Pervious

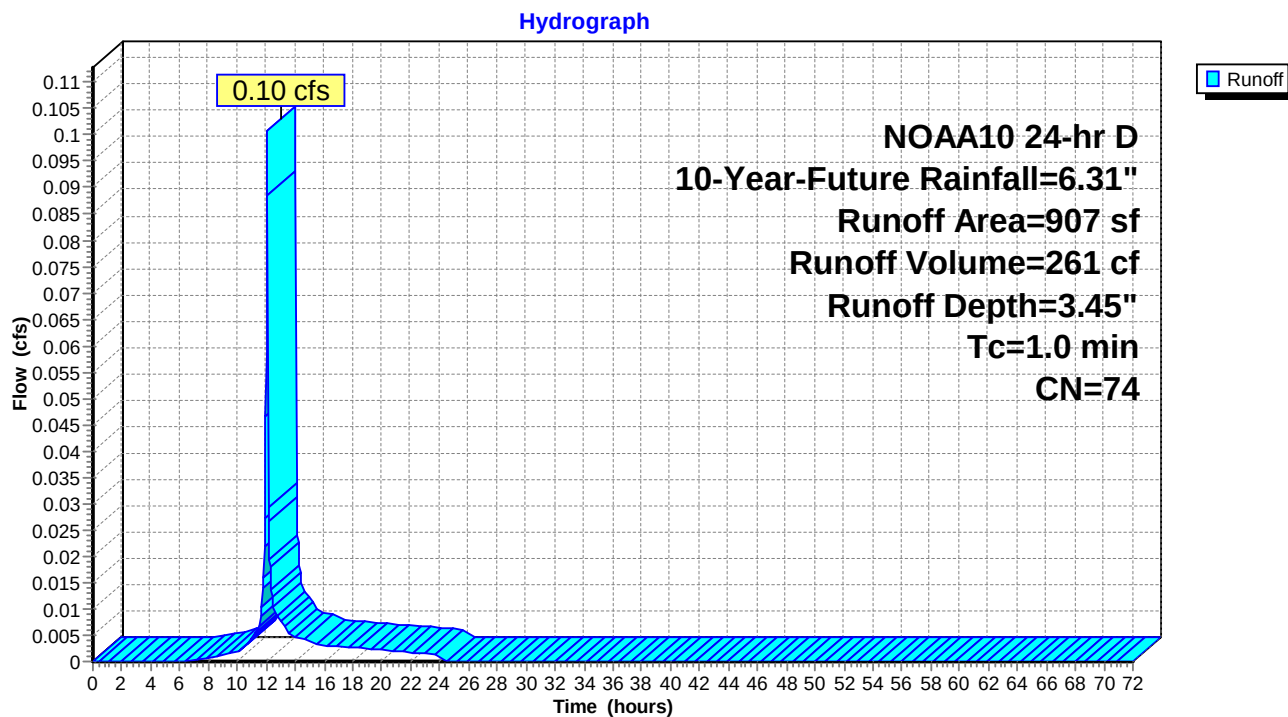
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 261 cf, Depth= 3.45"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 907       | 74 | >75% Grass cover, Good, HSG C |
| 907       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 3S: Proposed Pervious



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Hydrograph for Subcatchment 3S: Proposed Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 6.31                | 3.45               | 0.00            |
| 1.00            | 0.08                | 0.00               | 0.00            | 48.00           | 6.31                | 3.45               | 0.00            |
| 2.00            | 0.18                | 0.00               | 0.00            | 49.00           | 6.31                | 3.45               | 0.00            |
| 3.00            | 0.29                | 0.00               | 0.00            | 50.00           | 6.31                | 3.45               | 0.00            |
| 4.00            | 0.41                | 0.00               | 0.00            | 51.00           | 6.31                | 3.45               | 0.00            |
| 5.00            | 0.55                | 0.00               | 0.00            | 52.00           | 6.31                | 3.45               | 0.00            |
| 6.00            | 0.70                | 0.00               | 0.00            | 53.00           | 6.31                | 3.45               | 0.00            |
| 7.00            | 0.87                | 0.01               | 0.00            | 54.00           | 6.31                | 3.45               | 0.00            |
| 8.00            | 1.05                | 0.03               | 0.00            | 55.00           | 6.31                | 3.45               | 0.00            |
| 9.00            | 1.24                | 0.07               | 0.00            | 56.00           | 6.31                | 3.45               | 0.00            |
| 10.00           | 1.51                | 0.15               | 0.00            | 57.00           | 6.31                | 3.45               | 0.00            |
| 11.00           | 1.87                | 0.29               | 0.00            | 58.00           | 6.31                | 3.45               | 0.00            |
| 12.00           | 2.99                | 0.90               | <b>0.06</b>     | 59.00           | 6.31                | 3.45               | 0.00            |
| 13.00           | 4.44                | 1.93               | <b>0.01</b>     | 60.00           | 6.31                | 3.45               | 0.00            |
| 14.00           | 4.80                | 2.20               | 0.00            | 61.00           | 6.31                | 3.45               | 0.00            |
| 15.00           | 5.07                | 2.42               | 0.00            | 62.00           | 6.31                | 3.45               | 0.00            |
| 16.00           | 5.26                | 2.57               | 0.00            | 63.00           | 6.31                | 3.45               | 0.00            |
| 17.00           | 5.44                | 2.72               | 0.00            | 64.00           | 6.31                | 3.45               | 0.00            |
| 18.00           | 5.61                | 2.86               | 0.00            | 65.00           | 6.31                | 3.45               | 0.00            |
| 19.00           | 5.76                | 2.98               | 0.00            | 66.00           | 6.31                | 3.45               | 0.00            |
| 20.00           | 5.90                | 3.10               | 0.00            | 67.00           | 6.31                | 3.45               | 0.00            |
| 21.00           | 6.02                | 3.20               | 0.00            | 68.00           | 6.31                | 3.45               | 0.00            |
| 22.00           | 6.13                | 3.30               | 0.00            | 69.00           | 6.31                | 3.45               | 0.00            |
| 23.00           | 6.23                | 3.38               | 0.00            | 70.00           | 6.31                | 3.45               | 0.00            |
| 24.00           | <b>6.31</b>         | <b>3.45</b>        | 0.00            | 71.00           | 6.31                | 3.45               | 0.00            |
| 25.00           | 6.31                | 3.45               | 0.00            | 72.00           | 6.31                | 3.45               | 0.00            |
| 26.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 27.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 28.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 29.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 30.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 31.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 32.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 33.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 34.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 35.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 36.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 37.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 38.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 39.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 40.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 41.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 42.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 43.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 44.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 45.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |
| 46.00           | 6.31                | 3.45               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Subcatchment 4S: Proposed Impervious

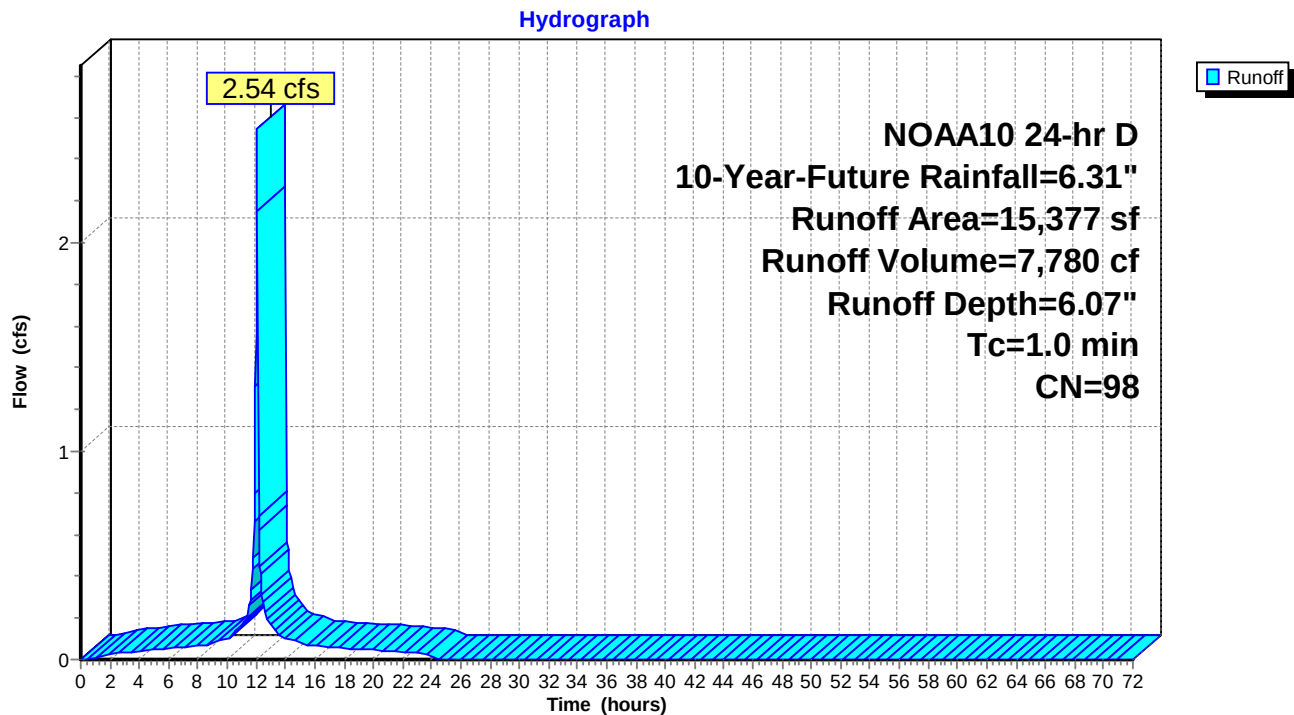
Runoff = 2.54 cfs @ 12.06 hrs, Volume= 7,780 cf, Depth= 6.07"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 15,377    | 98 | Paved parking, HSG C    |
| 15,377    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 4S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Hydrograph for Subcatchment 4S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 6.31                | 6.07               | 0.00            |
| 1.00            | 0.08                | 0.01               | 0.01            | 48.00           | 6.31                | 6.07               | 0.00            |
| 2.00            | 0.18                | 0.06               | 0.02            | 49.00           | 6.31                | 6.07               | 0.00            |
| 3.00            | 0.29                | 0.14               | 0.03            | 50.00           | 6.31                | 6.07               | 0.00            |
| 4.00            | 0.41                | 0.24               | 0.04            | 51.00           | 6.31                | 6.07               | 0.00            |
| 5.00            | 0.55                | 0.37               | 0.05            | 52.00           | 6.31                | 6.07               | 0.00            |
| 6.00            | 0.70                | 0.51               | 0.05            | 53.00           | 6.31                | 6.07               | 0.00            |
| 7.00            | 0.87                | 0.66               | 0.06            | 54.00           | 6.31                | 6.07               | 0.00            |
| 8.00            | 1.05                | 0.84               | 0.06            | 55.00           | 6.31                | 6.07               | 0.00            |
| 9.00            | 1.24                | 1.03               | 0.07            | 56.00           | 6.31                | 6.07               | 0.00            |
| 10.00           | 1.51                | 1.29               | 0.10            | 57.00           | 6.31                | 6.07               | 0.00            |
| 11.00           | 1.87                | 1.64               | 0.17            | 58.00           | 6.31                | 6.07               | 0.00            |
| 12.00           | 2.99                | 2.75               | <b>1.57</b>     | 59.00           | 6.31                | 6.07               | 0.00            |
| 13.00           | 4.44                | 4.21               | <b>0.17</b>     | 60.00           | 6.31                | 6.07               | 0.00            |
| 14.00           | 4.80                | 4.56               | 0.10            | 61.00           | 6.31                | 6.07               | 0.00            |
| 15.00           | 5.07                | 4.83               | 0.09            | 62.00           | 6.31                | 6.07               | 0.00            |
| 16.00           | 5.26                | 5.02               | 0.07            | 63.00           | 6.31                | 6.07               | 0.00            |
| 17.00           | 5.44                | 5.20               | 0.06            | 64.00           | 6.31                | 6.07               | 0.00            |
| 18.00           | 5.61                | 5.37               | 0.06            | 65.00           | 6.31                | 6.07               | 0.00            |
| 19.00           | 5.76                | 5.52               | 0.05            | 66.00           | 6.31                | 6.07               | 0.00            |
| 20.00           | 5.90                | 5.66               | 0.05            | 67.00           | 6.31                | 6.07               | 0.00            |
| 21.00           | 6.02                | 5.78               | 0.04            | 68.00           | 6.31                | 6.07               | 0.00            |
| 22.00           | 6.13                | 5.89               | 0.04            | 69.00           | 6.31                | 6.07               | 0.00            |
| 23.00           | 6.23                | 5.99               | 0.03            | 70.00           | 6.31                | 6.07               | 0.00            |
| 24.00           | <b>6.31</b>         | <b>6.07</b>        | 0.02            | 71.00           | 6.31                | 6.07               | 0.00            |
| 25.00           | 6.31                | 6.07               | 0.00            | 72.00           | 6.31                | 6.07               | 0.00            |
| 26.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 27.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 28.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 29.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 30.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 31.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 32.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 33.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 34.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 35.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 36.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 37.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 38.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 39.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 40.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 41.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 42.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 43.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 44.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 45.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |
| 46.00           | 6.31                | 6.07               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Pond 2P: Basin A

Inflow Area = 13,934 sf, 100.00% Impervious, Inflow Depth = 6.07" for 10-Year-Future event  
Inflow = 2.31 cfs @ 12.06 hrs, Volume = 7,050 cf  
Outflow = 1.30 cfs @ 12.13 hrs, Volume = 7,050 cf, Atten = 44%, Lag = 4.2 min  
Discarded = 0.02 cfs @ 2.65 hrs, Volume = 3,241 cf  
Primary = 1.27 cfs @ 12.13 hrs, Volume = 3,809 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs  
Peak Elev = 97.57' @ 12.13 hrs Surf. Area = 2,143 sf Storage = 2,678 cf

Plug-Flow detention time = 281.2 min calculated for 7,045 cf (100% of inflow)  
Center-of-Mass det. time = 281.6 min (1,023.4 - 741.8)

| Volume | Invert | Avail. Storage | Storage Description                                                                                                                                                                                                       |
|--------|--------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1A    | 95.70' | 1,544 cf       | <b>29.50'W x 72.63'L x 2.71'H Field A</b><br>5,803 cf Overall - 1,943 cf Embedded = 3,859 cf x 40.0% Voids                                                                                                                |
| #2A    | 96.20' | 1,943 cf       | <b>Cultec R-180HD</b> x 88 Inside #1<br>Effective Size = 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf<br>Overall Size = 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap<br>Row Length Adjustment = +1.00' x 3.44 sf x 8 rows |
|        |        | 3,487 cf       | Total Available Storage                                                                                                                                                                                                   |

Storage Group A created with Chamber Wizard

| Device | Routing   | Invert | Outlet Devices                                                                                                                                     |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.60' | <b>2.5" Vert. Orifice/Grate</b> C = 0.600 Limited to weir flow at low heads                                                                        |
| #2     | Primary   | 97.35' | <b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00<br>Coef. (English) 2.80 2.92 3.08 3.30 3.32 |
| #3     | Discarded | 95.70' | <b>0.500 in/hr Exfiltration over Surface area</b>                                                                                                  |

**Discarded OutFlow** Max = 0.02 cfs @ 2.65 hrs HW = 95.73' (Free Discharge)  
↑ **3 = Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max = 1.21 cfs @ 12.13 hrs HW = 97.56' (Free Discharge)  
↑ **1 = Orifice/Grate** (Orifice Controls 0.15 cfs @ 4.45 fps)  
↑ **2 = Broad-Crested Rectangular Weir** (Weir Controls 1.06 cfs @ 1.28 fps)

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Pond 2P: Basin A - Chamber Wizard Field A

#### Chamber Model = Cultec R-180HD (For residential use only)

Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf

Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 3.44 sf x 8 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

11 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 70.63' Row Length +12.0" End Stone x 2 = 72.63' Base Length

8 Rows x 36.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 29.50' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

88 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 8 Rows = 1,943.5 cf Chamber Storage

5,802.8 cf Field - 1,943.5 cf Chambers = 3,859.4 cf Stone x 40.0% Voids = 1,543.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,487.2 cf = 0.080 af

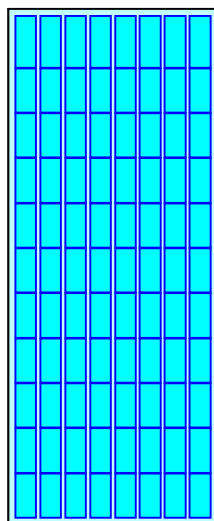
Overall Storage Efficiency = 60.1%

Overall System Size = 72.63' x 29.50' x 2.71'

88 Chambers

214.9 cy Field

142.9 cy Stone



## Proposed Flows

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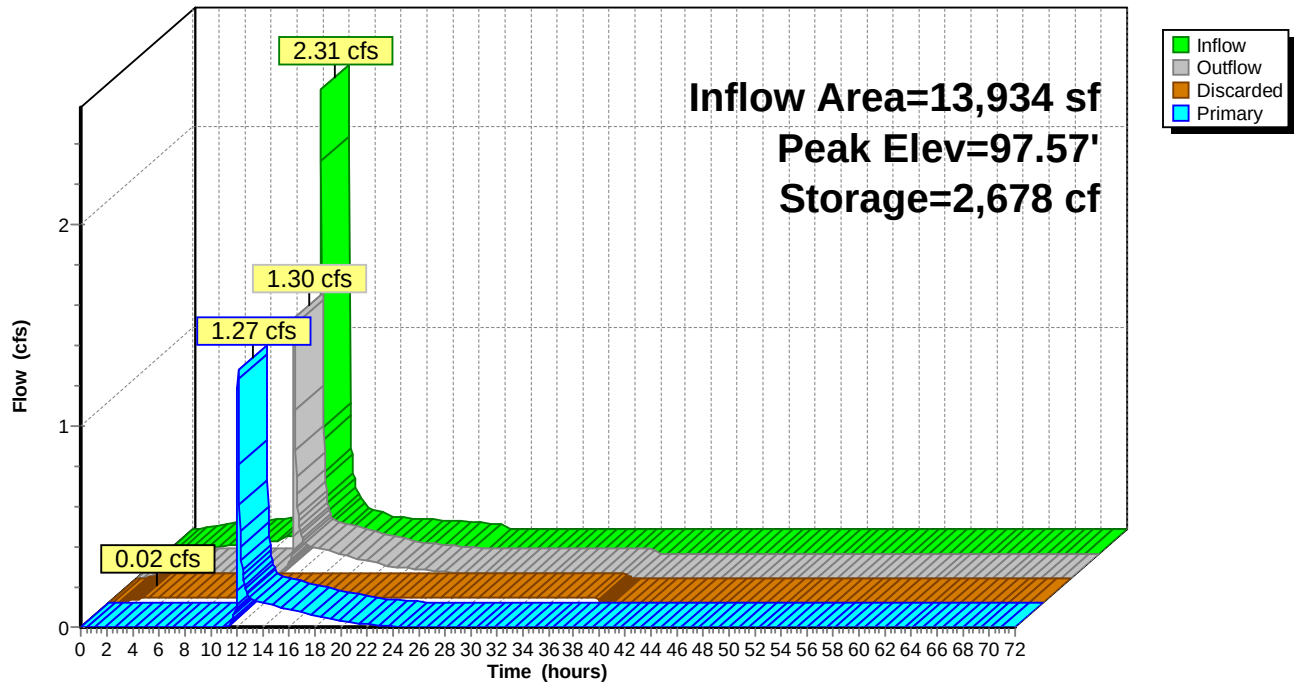
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### Pond 2P: Basin A

#### Hydrograph



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

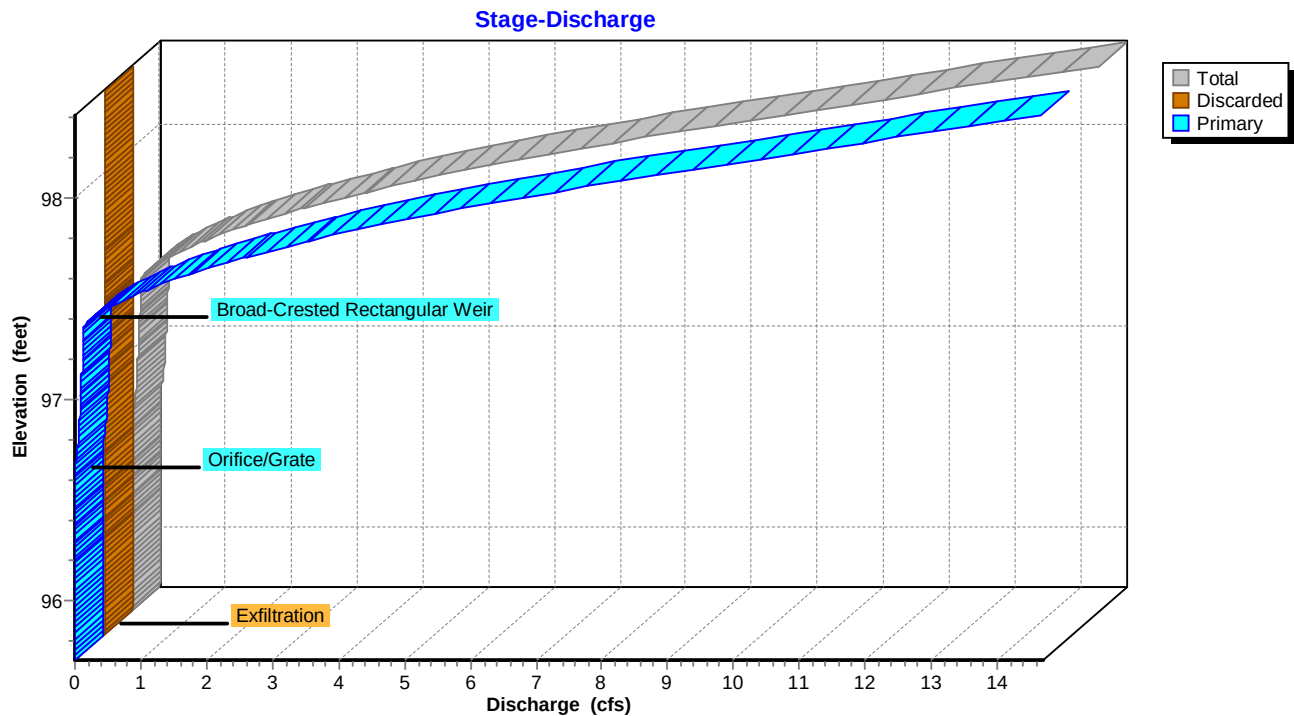
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### Pond 2P: Basin A



**Proposed Flows**

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

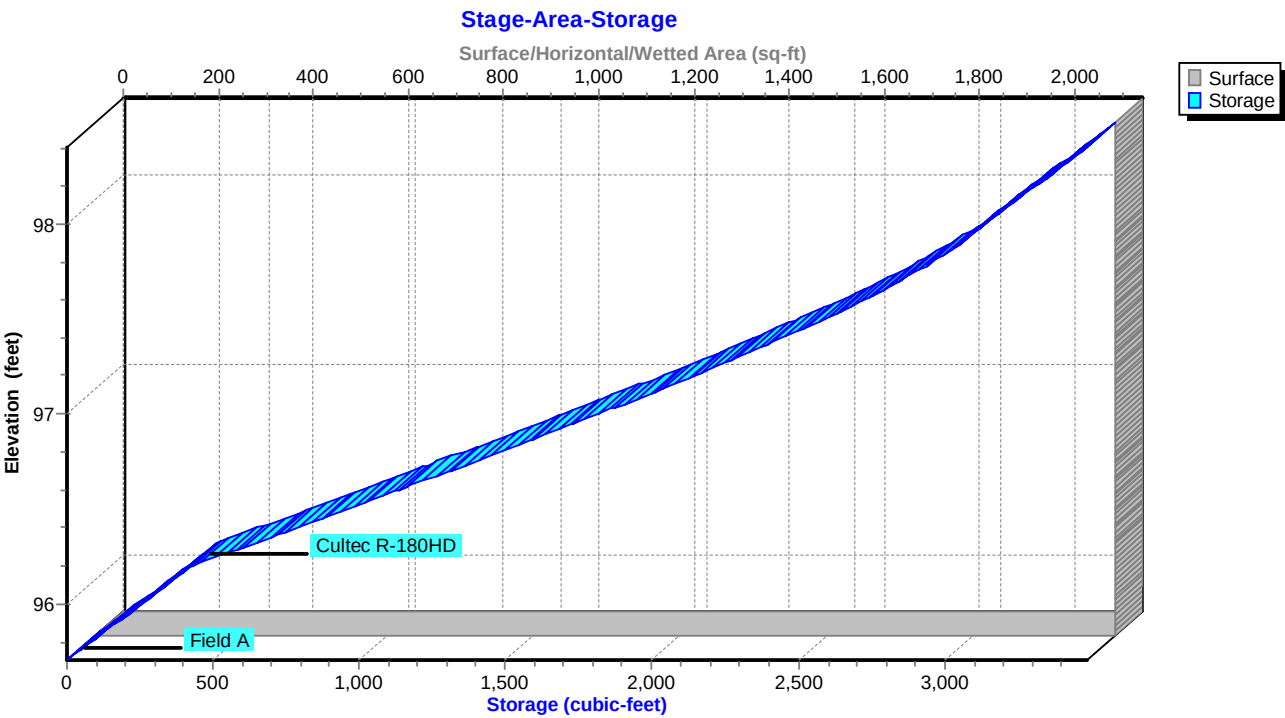
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**Pond 2P: Basin A**



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Hydrograph for Pond 2P: Basin A

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.03            | 22                      | 95.73               | 0.02             | <b>0.02</b>        | 0.00             |
| 5.00            | 0.04            | 114                     | 95.83               | 0.02             | <b>0.02</b>        | 0.00             |
| 7.50            | 0.06            | 337                     | 96.09               | 0.02             | 0.02               | 0.00             |
| 10.00           | <b>0.09</b>     | <b>741</b>              | <b>96.38</b>        | <b>0.02</b>      | 0.02               | <b>0.00</b>      |
| 12.50           | <b>0.23</b>     | <b>2,442</b>            | <b>97.40</b>        | <b>0.28</b>      | 0.02               | <b>0.26</b>      |
| 15.00           | 0.08            | 2,048                   | 97.14               | 0.13             | 0.02               | 0.11             |
| 17.50           | 0.05            | 1,582                   | 96.86               | 0.09             | 0.02               | 0.06             |
| 20.00           | 0.04            | 1,373                   | 96.74               | 0.05             | 0.02               | 0.03             |
| 22.50           | 0.03            | 1,290                   | 96.69               | 0.04             | 0.02               | 0.01             |
| 25.00           | 0.00            | 1,148                   | 96.61               | 0.03             | 0.02               | 0.00             |
| 27.50           | 0.00            | 925                     | 96.48               | 0.02             | 0.02               | 0.00             |
| 30.00           | 0.00            | 702                     | 96.35               | 0.02             | 0.02               | 0.00             |
| 32.50           | 0.00            | 478                     | 96.23               | 0.02             | 0.02               | 0.00             |
| 35.00           | 0.00            | 255                     | 96.00               | 0.02             | 0.02               | 0.00             |
| 37.50           | 0.00            | 32                      | 95.74               | 0.02             | 0.02               | 0.00             |
| 40.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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### Summary for Pond 5P: Porous Pavement B

Inflow Area = 16,284 sf, 94.43% Impervious, Inflow Depth = 5.93" for 10-Year-Future event  
Inflow = 2.65 cfs @ 12.06 hrs, Volume= 8,041 cf  
Outflow = 0.15 cfs @ 13.37 hrs, Volume= 8,041 cf, Atten= 94%, Lag= 78.3 min  
Discarded = 0.07 cfs @ 8.75 hrs, Volume= 6,043 cf  
Primary = 0.08 cfs @ 13.37 hrs, Volume= 1,997 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.56' @ 13.37 hrs Surf.Area= 5,690 sf Storage= 3,162 cf

Plug-Flow detention time= 246.7 min calculated for 8,035 cf (100% of inflow)  
Center-of-Mass det. time= 246.8 min ( 992.1 - 745.3 )

| Volume | Invert | Avail.Storage | Storage Description                                        |
|--------|--------|---------------|------------------------------------------------------------|
| #1     | 97.00' | 14,225 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 97.00               | 5,690                | 0                         | 0                         |
| 98.00               | 5,690                | 5,690                     | 5,690                     |
| 99.00               | 5,690                | 5,690                     | 11,380                    |
| 99.50               | 5,690                | 2,845                     | 14,225                    |

| Device | Routing   | Invert | Outlet Devices                                                             |
|--------|-----------|--------|----------------------------------------------------------------------------|
| #1     | Primary   | 97.20' | <b>2.5" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads |
| #2     | Discarded | 97.00' | <b>0.500 in/hr Exfiltration over Surface area</b>                          |

**Discarded OutFlow** Max=0.07 cfs @ 8.75 hrs HW=97.03' (Free Discharge)  
↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.08 cfs @ 13.37 hrs HW=97.56' (Free Discharge)  
↑ **1=Orifice/Grate** (Orifice Controls 0.08 cfs @ 2.42 fps)

## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

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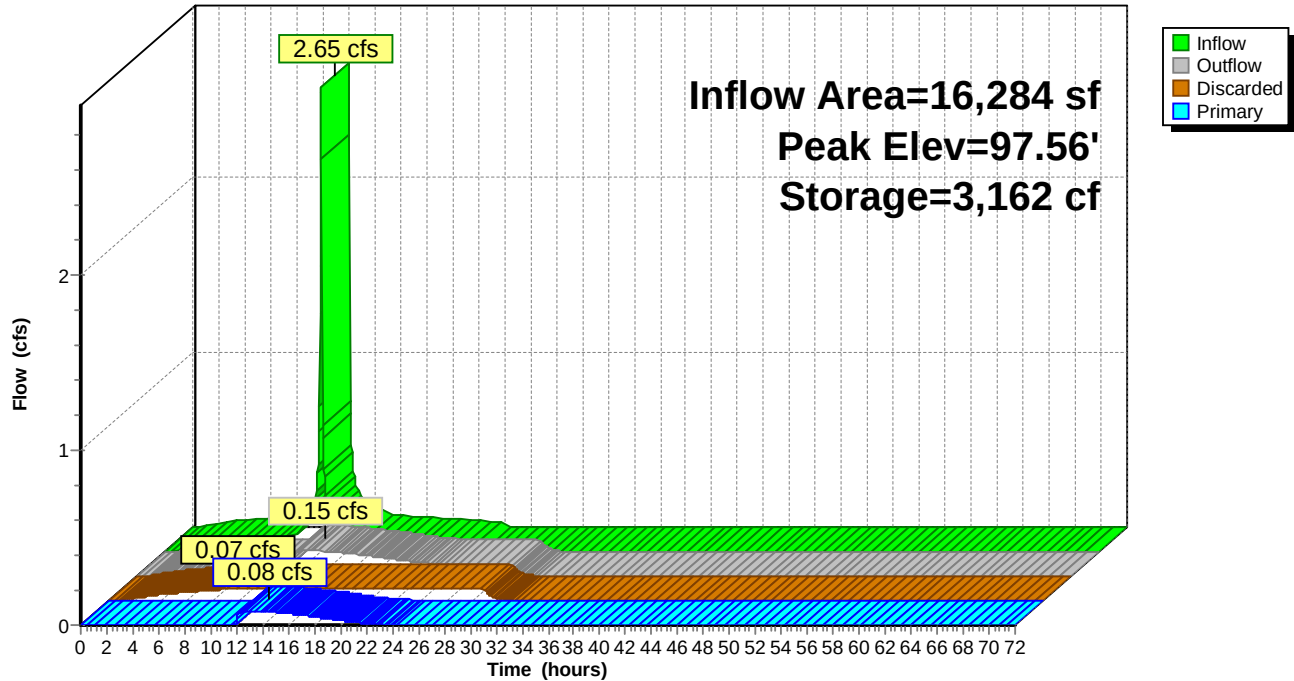
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### Pond 5P: Porous Pavement B

Hydrograph



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

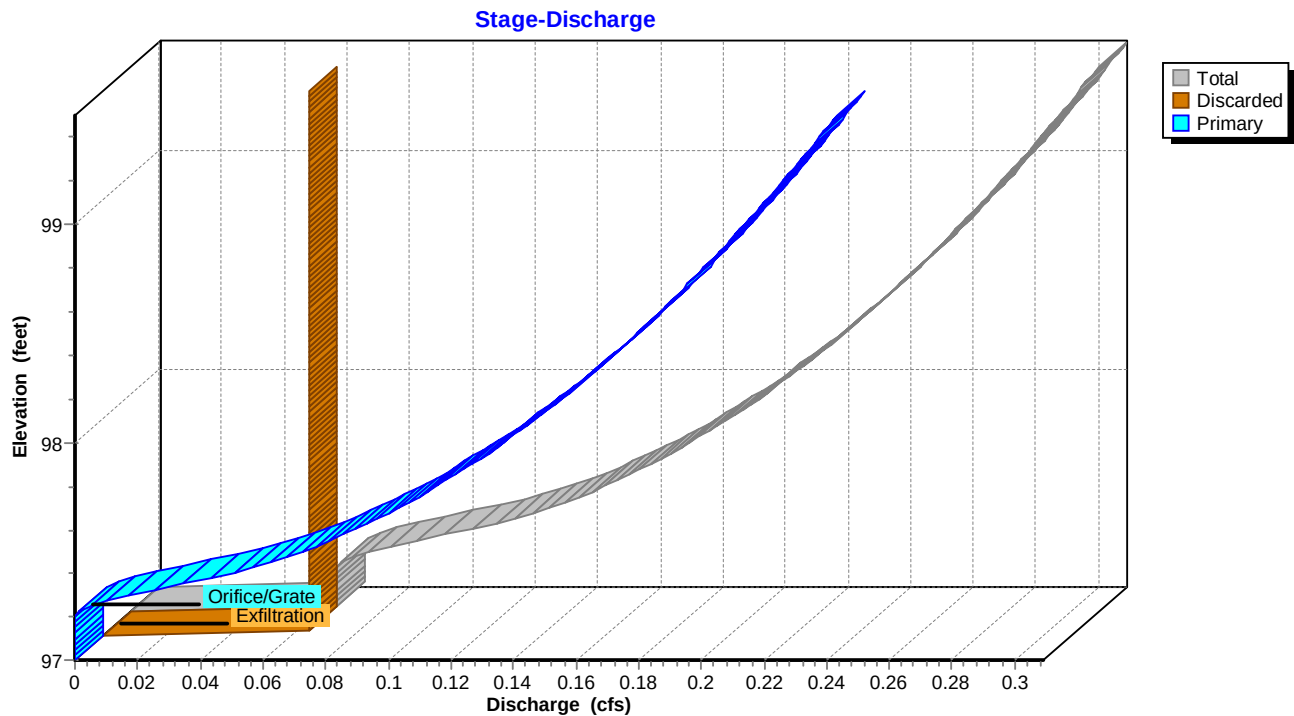
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 10-Year-Future Rainfall=6.31"

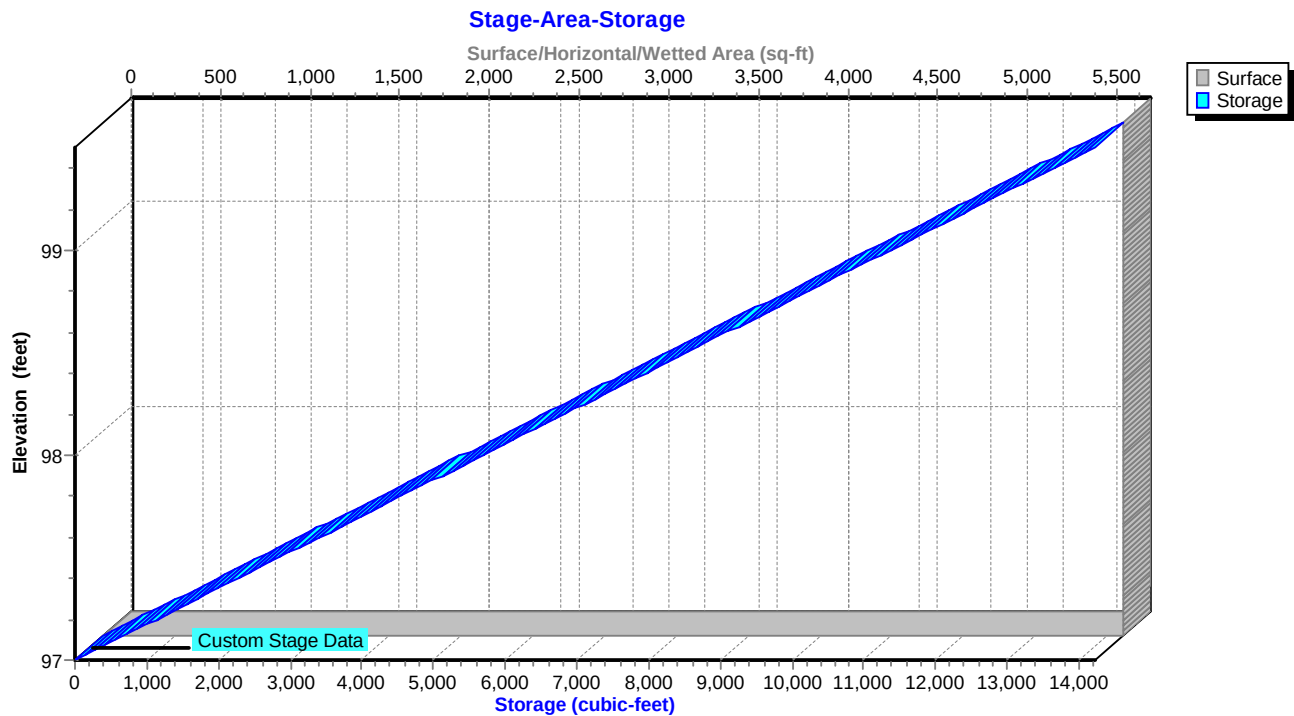
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### Pond 5P: Porous Pavement B



## Proposed Flows

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### Hydrograph for Pond 5P: Porous Pavement B

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.03            | 47                      | 97.01               | 0.02             | 0.02               | 0.00             |
| 5.00            | 0.05            | 93                      | 97.02               | 0.04             | 0.04               | 0.00             |
| 7.50            | 0.06            | 127                     | 97.02               | 0.06             | <b>0.06</b>        | 0.00             |
| 10.00           | <b>0.10</b>     | 252                     | 97.04               | 0.07             | <b>0.07</b>        | 0.00             |
| 12.50           | <b>0.26</b>     | <b>3,035</b>            | <b>97.53</b>        | <b>0.14</b>      | 0.07               | <b>0.08</b>      |
| 15.00           | 0.09            | <b>2,933</b>            | <b>97.52</b>        | <b>0.14</b>      | 0.07               | <b>0.08</b>      |
| 17.50           | 0.06            | 2,367                   | 97.42               | 0.12             | 0.07               | 0.05             |
| 20.00           | 0.05            | 1,894                   | 97.33               | 0.09             | 0.07               | 0.03             |
| 22.50           | 0.04            | 1,525                   | 97.27               | 0.07             | 0.07               | 0.01             |
| 25.00           | 0.00            | 1,078                   | 97.19               | 0.07             | 0.07               | 0.00             |
| 27.50           | 0.00            | 486                     | 97.09               | 0.07             | 0.07               | 0.00             |
| 30.00           | 0.00            | 25                      | 97.00               | 0.01             | 0.01               | 0.00             |
| 32.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 35.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 37.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Proposed Impervious**      Runoff Area=13,934 sf   100.00% Impervious   Runoff Depth=11.28"  
Tc=1.0 min   CN=98   Runoff=4.22 cfs   13,096 cf

**Subcatchment 3S: Proposed Pervious**      Runoff Area=907 sf   0.00% Impervious   Runoff Depth=8.17"  
Tc=1.0 min   CN=74   Runoff=0.23 cfs   617 cf

**Subcatchment 4S: Proposed Impervious**      Runoff Area=15,377 sf   100.00% Impervious   Runoff Depth=11.28"  
Tc=1.0 min   CN=98   Runoff=4.66 cfs   14,453 cf

**Pond 2P: Basin A**      Peak Elev=97.81'   Storage=2,970 cf   Inflow=4.22 cfs   13,096 cf  
Discarded=0.02 cfs   3,400 cf   Primary=3.91 cfs   9,697 cf   Outflow=3.94 cfs   13,096 cf

**Pond 5P: Porous Pavement B**      Peak Elev=98.25'   Storage=7,105 cf   Inflow=4.89 cfs   15,070 cf  
Discarded=0.07 cfs   7,967 cf   Primary=0.16 cfs   7,103 cf   Outflow=0.23 cfs   15,070 cf

**Total Runoff Area = 30,218 sf   Runoff Volume = 28,166 cf   Average Runoff Depth = 11.19"**  
**3.00% Pervious = 907 sf   97.00% Impervious = 29,311 sf**

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Subcatchment 1S: Proposed Impervious

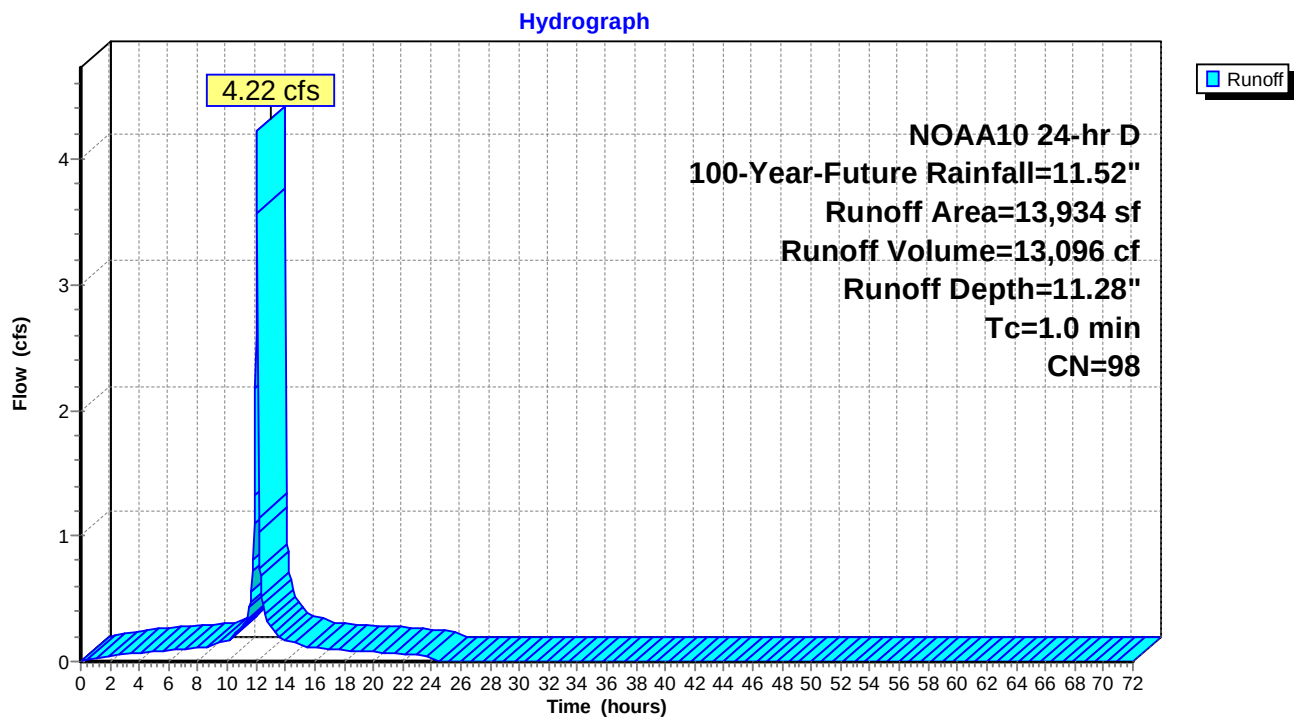
Runoff = 4.22 cfs @ 12.06 hrs, Volume= 13,096 cf, Depth=11.28"  
Routed to Pond 2P : Basin A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 13,934    | 98 | Roofs, HSG C            |
| 13,934    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 11.52               | 11.28              | 0.00            |
| 1.00            | 0.15                | 0.04               | 0.03            | 48.00           | 11.52               | 11.28              | 0.00            |
| 2.00            | 0.33                | 0.17               | 0.05            | 49.00           | 11.52               | 11.28              | 0.00            |
| 3.00            | 0.53                | 0.34               | 0.06            | 50.00           | 11.52               | 11.28              | 0.00            |
| 4.00            | 0.76                | 0.56               | 0.07            | 51.00           | 11.52               | 11.28              | 0.00            |
| 5.00            | 1.01                | 0.80               | 0.08            | 52.00           | 11.52               | 11.28              | 0.00            |
| 6.00            | 1.28                | 1.07               | 0.09            | 53.00           | 11.52               | 11.28              | 0.00            |
| 7.00            | 1.59                | 1.37               | 0.10            | 54.00           | 11.52               | 11.28              | 0.00            |
| 8.00            | 1.92                | 1.69               | 0.11            | 55.00           | 11.52               | 11.28              | 0.00            |
| 9.00            | 2.27                | 2.04               | 0.12            | 56.00           | 11.52               | 11.28              | 0.00            |
| 10.00           | 2.76                | 2.53               | 0.17            | 57.00           | 11.52               | 11.28              | 0.00            |
| 11.00           | 3.41                | 3.18               | 0.28            | 58.00           | 11.52               | 11.28              | 0.00            |
| 12.00           | 5.45                | 5.21               | <b>2.60</b>     | 59.00           | 11.52               | 11.28              | 0.00            |
| 13.00           | 8.11                | 7.87               | <b>0.29</b>     | 60.00           | 11.52               | 11.28              | 0.00            |
| 14.00           | 8.76                | 8.52               | 0.17            | 61.00           | 11.52               | 11.28              | 0.00            |
| 15.00           | 9.25                | 9.01               | 0.14            | 62.00           | 11.52               | 11.28              | 0.00            |
| 16.00           | 9.60                | 9.36               | 0.11            | 63.00           | 11.52               | 11.28              | 0.00            |
| 17.00           | 9.93                | 9.69               | 0.10            | 64.00           | 11.52               | 11.28              | 0.00            |
| 18.00           | 10.24               | 9.99               | 0.09            | 65.00           | 11.52               | 11.28              | 0.00            |
| 19.00           | 10.51               | 10.27              | 0.09            | 66.00           | 11.52               | 11.28              | 0.00            |
| 20.00           | 10.76               | 10.52              | 0.08            | 67.00           | 11.52               | 11.28              | 0.00            |
| 21.00           | 10.99               | 10.75              | 0.07            | 68.00           | 11.52               | 11.28              | 0.00            |
| 22.00           | 11.19               | 10.95              | 0.06            | 69.00           | 11.52               | 11.28              | 0.00            |
| 23.00           | 11.37               | 11.13              | 0.05            | 70.00           | 11.52               | 11.28              | 0.00            |
| 24.00           | <b>11.52</b>        | <b>11.28</b>       | 0.04            | 71.00           | 11.52               | 11.28              | 0.00            |
| 25.00           | 11.52               | 11.28              | 0.00            | 72.00           | 11.52               | 11.28              | 0.00            |
| 26.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 27.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 28.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 29.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 30.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 31.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 32.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 33.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 34.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 35.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 36.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 37.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 38.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 39.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 40.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 41.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 42.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 43.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 44.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 45.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 46.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Subcatchment 3S: Proposed Pervious

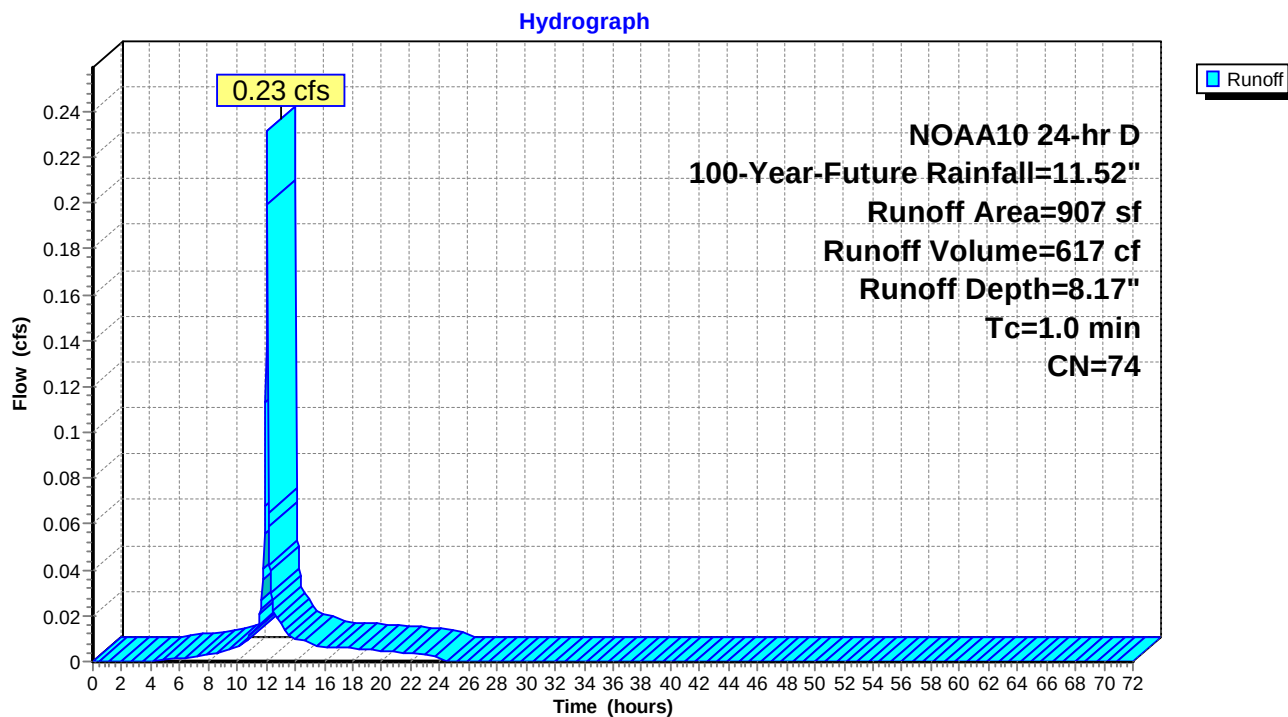
Runoff = 0.23 cfs @ 12.06 hrs, Volume= 617 cf, Depth= 8.17"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 907       | 74 | >75% Grass cover, Good, HSG C |
| 907       |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 3S: Proposed Pervious



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Hydrograph for Subcatchment 3S: Proposed Pervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 11.52               | 8.17               | 0.00            |
| 1.00            | 0.15                | 0.00               | 0.00            | 48.00           | 11.52               | 8.17               | 0.00            |
| 2.00            | 0.33                | 0.00               | 0.00            | 49.00           | 11.52               | 8.17               | 0.00            |
| 3.00            | 0.53                | 0.00               | 0.00            | 50.00           | 11.52               | 8.17               | 0.00            |
| 4.00            | 0.76                | 0.00               | 0.00            | 51.00           | 11.52               | 8.17               | 0.00            |
| 5.00            | 1.01                | 0.02               | 0.00            | 52.00           | 11.52               | 8.17               | 0.00            |
| 6.00            | 1.28                | 0.08               | 0.00            | 53.00           | 11.52               | 8.17               | 0.00            |
| 7.00            | 1.59                | 0.18               | 0.00            | 54.00           | 11.52               | 8.17               | 0.00            |
| 8.00            | 1.92                | 0.31               | 0.00            | 55.00           | 11.52               | 8.17               | 0.00            |
| 9.00            | 2.27                | 0.48               | 0.00            | 56.00           | 11.52               | 8.17               | 0.00            |
| 10.00           | 2.76                | 0.76               | 0.01            | 57.00           | 11.52               | 8.17               | 0.00            |
| 11.00           | 3.41                | 1.18               | 0.01            | 58.00           | 11.52               | 8.17               | 0.00            |
| 12.00           | 5.45                | 2.73               | <b>0.14</b>     | 59.00           | 11.52               | 8.17               | 0.00            |
| 13.00           | 8.11                | 5.02               | <b>0.02</b>     | 60.00           | 11.52               | 8.17               | 0.00            |
| 14.00           | 8.76                | 5.61               | 0.01            | 61.00           | 11.52               | 8.17               | 0.00            |
| 15.00           | 9.25                | 6.06               | 0.01            | 62.00           | 11.52               | 8.17               | 0.00            |
| 16.00           | 9.60                | 6.38               | 0.01            | 63.00           | 11.52               | 8.17               | 0.00            |
| 17.00           | 9.93                | 6.69               | 0.01            | 64.00           | 11.52               | 8.17               | 0.00            |
| 18.00           | 10.24               | 6.97               | 0.01            | 65.00           | 11.52               | 8.17               | 0.00            |
| 19.00           | 10.51               | 7.22               | 0.01            | 66.00           | 11.52               | 8.17               | 0.00            |
| 20.00           | 10.76               | 7.46               | 0.00            | 67.00           | 11.52               | 8.17               | 0.00            |
| 21.00           | 10.99               | 7.67               | 0.00            | 68.00           | 11.52               | 8.17               | 0.00            |
| 22.00           | 11.19               | 7.86               | 0.00            | 69.00           | 11.52               | 8.17               | 0.00            |
| 23.00           | 11.37               | 8.02               | 0.00            | 70.00           | 11.52               | 8.17               | 0.00            |
| 24.00           | <b>11.52</b>        | <b>8.17</b>        | 0.00            | 71.00           | 11.52               | 8.17               | 0.00            |
| 25.00           | 11.52               | 8.17               | 0.00            | 72.00           | 11.52               | 8.17               | 0.00            |
| 26.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 27.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 28.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 29.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 30.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 31.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 32.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 33.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 34.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 35.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 36.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 37.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 38.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 39.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 40.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 41.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 42.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 43.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 44.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 45.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |
| 46.00           | 11.52               | 8.17               | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Subcatchment 4S: Proposed Impervious

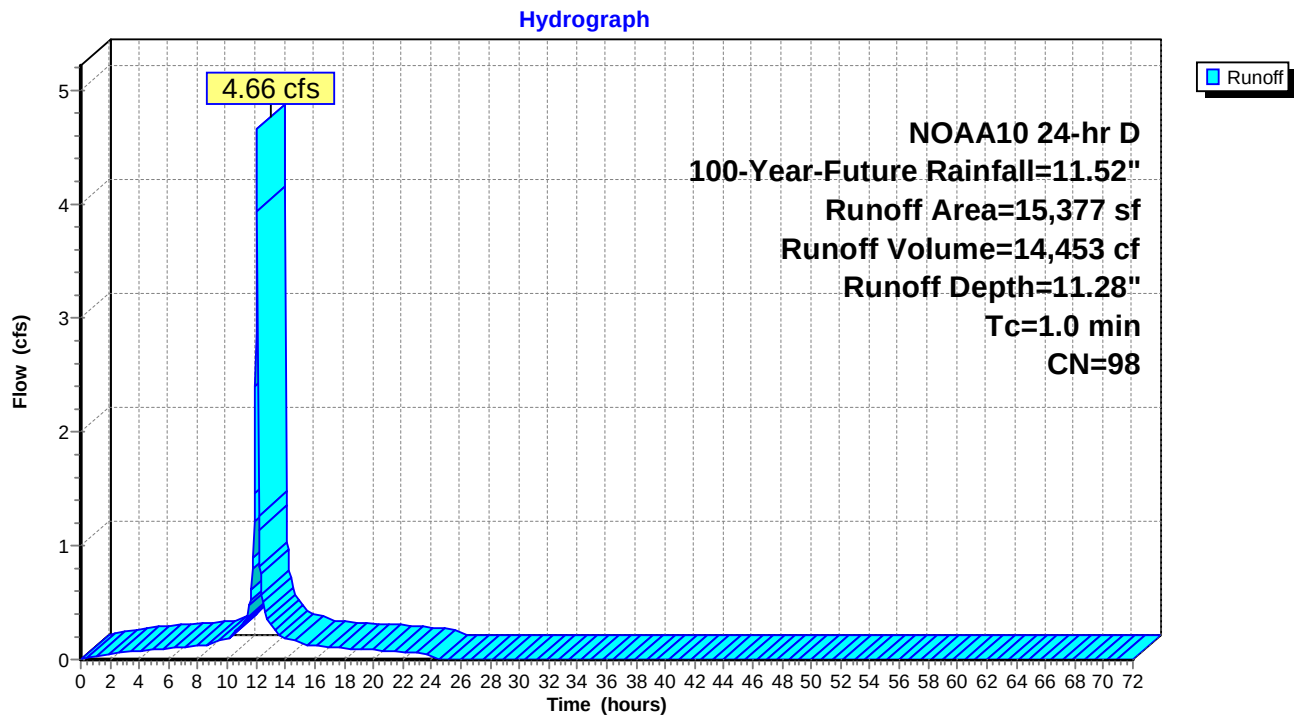
Runoff = 4.66 cfs @ 12.06 hrs, Volume= 14,453 cf, Depth=11.28"  
Routed to Pond 5P : Porous Pavement B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 15,377    | 98 | Paved parking, HSG C    |
| 15,377    |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 4S: Proposed Impervious



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Hydrograph for Subcatchment 4S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 11.52               | 11.28              | 0.00            |
| 1.00            | 0.15                | 0.04               | 0.03            | 48.00           | 11.52               | 11.28              | 0.00            |
| 2.00            | 0.33                | 0.17               | 0.06            | 49.00           | 11.52               | 11.28              | 0.00            |
| 3.00            | 0.53                | 0.34               | 0.07            | 50.00           | 11.52               | 11.28              | 0.00            |
| 4.00            | 0.76                | 0.56               | 0.08            | 51.00           | 11.52               | 11.28              | 0.00            |
| 5.00            | 1.01                | 0.80               | 0.09            | 52.00           | 11.52               | 11.28              | 0.00            |
| 6.00            | 1.28                | 1.07               | 0.10            | 53.00           | 11.52               | 11.28              | 0.00            |
| 7.00            | 1.59                | 1.37               | 0.11            | 54.00           | 11.52               | 11.28              | 0.00            |
| 8.00            | 1.92                | 1.69               | 0.12            | 55.00           | 11.52               | 11.28              | 0.00            |
| 9.00            | 2.27                | 2.04               | 0.14            | 56.00           | 11.52               | 11.28              | 0.00            |
| 10.00           | 2.76                | 2.53               | 0.18            | 57.00           | 11.52               | 11.28              | 0.00            |
| 11.00           | 3.41                | 3.18               | 0.31            | 58.00           | 11.52               | 11.28              | 0.00            |
| 12.00           | 5.45                | 5.21               | <b>2.87</b>     | 59.00           | 11.52               | 11.28              | 0.00            |
| 13.00           | 8.11                | 7.87               | <b>0.32</b>     | 60.00           | 11.52               | 11.28              | 0.00            |
| 14.00           | 8.76                | 8.52               | 0.18            | 61.00           | 11.52               | 11.28              | 0.00            |
| 15.00           | 9.25                | 9.01               | 0.16            | 62.00           | 11.52               | 11.28              | 0.00            |
| 16.00           | 9.60                | 9.36               | 0.12            | 63.00           | 11.52               | 11.28              | 0.00            |
| 17.00           | 9.93                | 9.69               | 0.11            | 64.00           | 11.52               | 11.28              | 0.00            |
| 18.00           | 10.24               | 9.99               | 0.10            | 65.00           | 11.52               | 11.28              | 0.00            |
| 19.00           | 10.51               | 10.27              | 0.09            | 66.00           | 11.52               | 11.28              | 0.00            |
| 20.00           | 10.76               | 10.52              | 0.09            | 67.00           | 11.52               | 11.28              | 0.00            |
| 21.00           | 10.99               | 10.75              | 0.08            | 68.00           | 11.52               | 11.28              | 0.00            |
| 22.00           | 11.19               | 10.95              | 0.07            | 69.00           | 11.52               | 11.28              | 0.00            |
| 23.00           | 11.37               | 11.13              | 0.06            | 70.00           | 11.52               | 11.28              | 0.00            |
| 24.00           | <b>11.52</b>        | <b>11.28</b>       | 0.04            | 71.00           | 11.52               | 11.28              | 0.00            |
| 25.00           | 11.52               | 11.28              | 0.00            | 72.00           | 11.52               | 11.28              | 0.00            |
| 26.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 27.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 28.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 29.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 30.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 31.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 32.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 33.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 34.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 35.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 36.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 37.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 38.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 39.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 40.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 41.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 42.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 43.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 44.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 45.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |
| 46.00           | 11.52               | 11.28              | 0.00            |                 |                     |                    |                 |

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Pond 2P: Basin A

Inflow Area = 13,934 sf, 100.00% Impervious, Inflow Depth = 11.28" for 100-Year-Future event  
Inflow = 4.22 cfs @ 12.06 hrs, Volume = 13,096 cf  
Outflow = 3.94 cfs @ 12.09 hrs, Volume = 13,096 cf, Atten = 7%, Lag = 1.7 min  
Discarded = 0.02 cfs @ 1.15 hrs, Volume = 3,400 cf  
Primary = 3.91 cfs @ 12.09 hrs, Volume = 9,697 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs  
Peak Elev = 97.81' @ 12.09 hrs Surf. Area = 2,143 sf Storage = 2,970 cf

Plug-Flow detention time = 203.4 min calculated for 13,087 cf (100% of inflow)  
Center-of-Mass det. time = 203.9 min ( 937.5 - 733.6 )

| Volume | Invert | Avail. Storage | Storage Description                                                                                                                                                                                                       |
|--------|--------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1A    | 95.70' | 1,544 cf       | <b>29.50'W x 72.63'L x 2.71'H Field A</b><br>5,803 cf Overall - 1,943 cf Embedded = 3,859 cf x 40.0% Voids                                                                                                                |
| #2A    | 96.20' | 1,943 cf       | <b>Cultec R-180HD</b> x 88 Inside #1<br>Effective Size = 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf<br>Overall Size = 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap<br>Row Length Adjustment = +1.00' x 3.44 sf x 8 rows |
|        |        | 3,487 cf       | Total Available Storage                                                                                                                                                                                                   |

Storage Group A created with Chamber Wizard

| Device | Routing   | Invert | Outlet Devices                                                                                                                                     |
|--------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary   | 96.60' | <b>2.5" Vert. Orifice/Grate</b> C = 0.600 Limited to weir flow at low heads                                                                        |
| #2     | Primary   | 97.35' | <b>4.0' long x 0.5' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00<br>Coef. (English) 2.80 2.92 3.08 3.30 3.32 |
| #3     | Discarded | 95.70' | <b>0.500 in/hr Exfiltration over Surface area</b>                                                                                                  |

**Discarded OutFlow** Max = 0.02 cfs @ 1.15 hrs HW = 95.73' (Free Discharge)  
↑ **3 = Exfiltration** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max = 3.73 cfs @ 12.09 hrs HW = 97.80' (Free Discharge)  
↑ **1 = Orifice/Grate** (Orifice Controls 0.17 cfs @ 5.04 fps)  
↑ **2 = Broad-Crested Rectangular Weir** (Weir Controls 3.56 cfs @ 1.98 fps)

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Pond 2P: Basin A - Chamber Wizard Field A

#### Chamber Model = Cultec R-180HD (For residential use only)

Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf

Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap

Row Length Adjustment= +1.00' x 3.44 sf x 8 rows

36.0" Wide + 6.0" Spacing = 42.0" C-C Row Spacing

11 Chambers/Row x 6.33' Long +1.00' Row Adjustment = 70.63' Row Length +12.0" End Stone x 2 = 72.63' Base Length

8 Rows x 36.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 29.50' Base Width

6.0" Stone Base + 20.5" Chamber Height + 6.0" Stone Cover = 2.71' Field Height

88 Chambers x 21.8 cf +1.00' Row Adjustment x 3.44 sf x 8 Rows = 1,943.5 cf Chamber Storage

5,802.8 cf Field - 1,943.5 cf Chambers = 3,859.4 cf Stone x 40.0% Voids = 1,543.8 cf Stone Storage

Chamber Storage + Stone Storage = 3,487.2 cf = 0.080 af

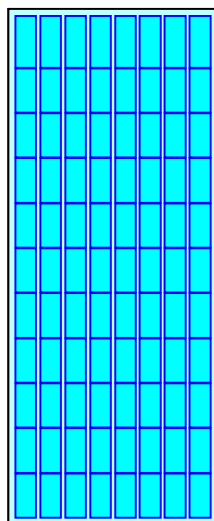
Overall Storage Efficiency = 60.1%

Overall System Size = 72.63' x 29.50' x 2.71'

88 Chambers

214.9 cy Field

142.9 cy Stone



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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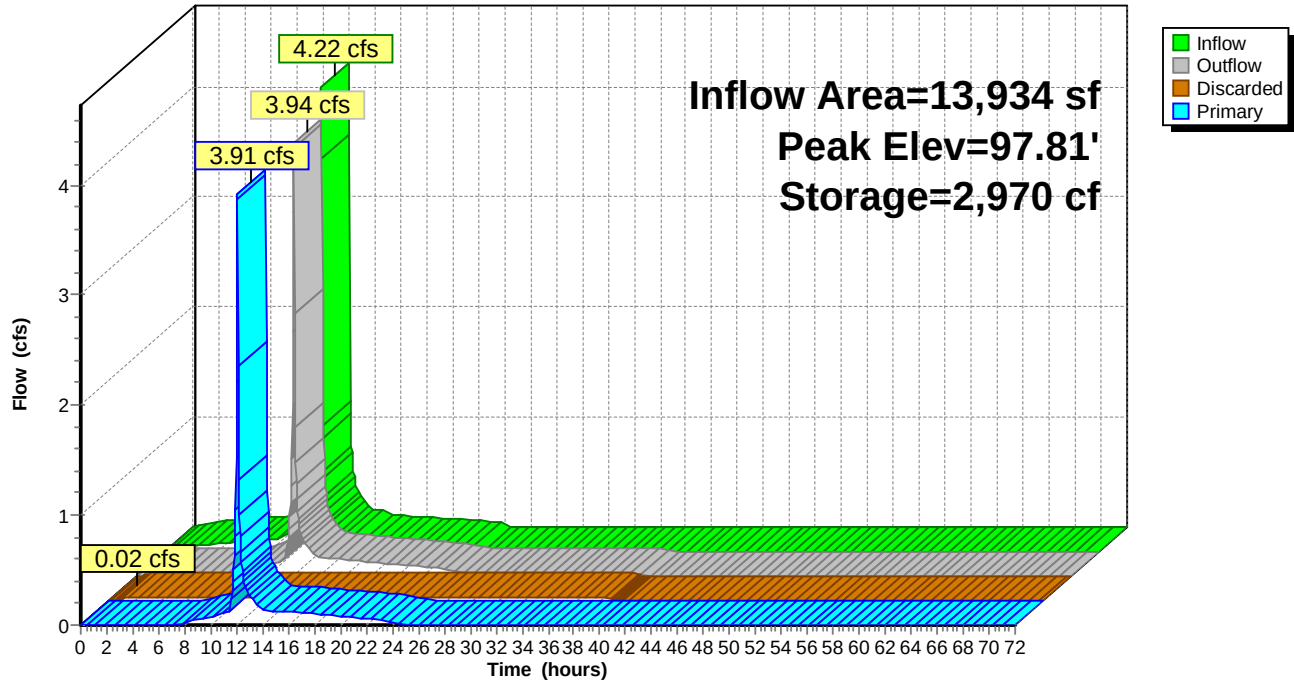
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### Pond 2P: Basin A

#### Hydrograph



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

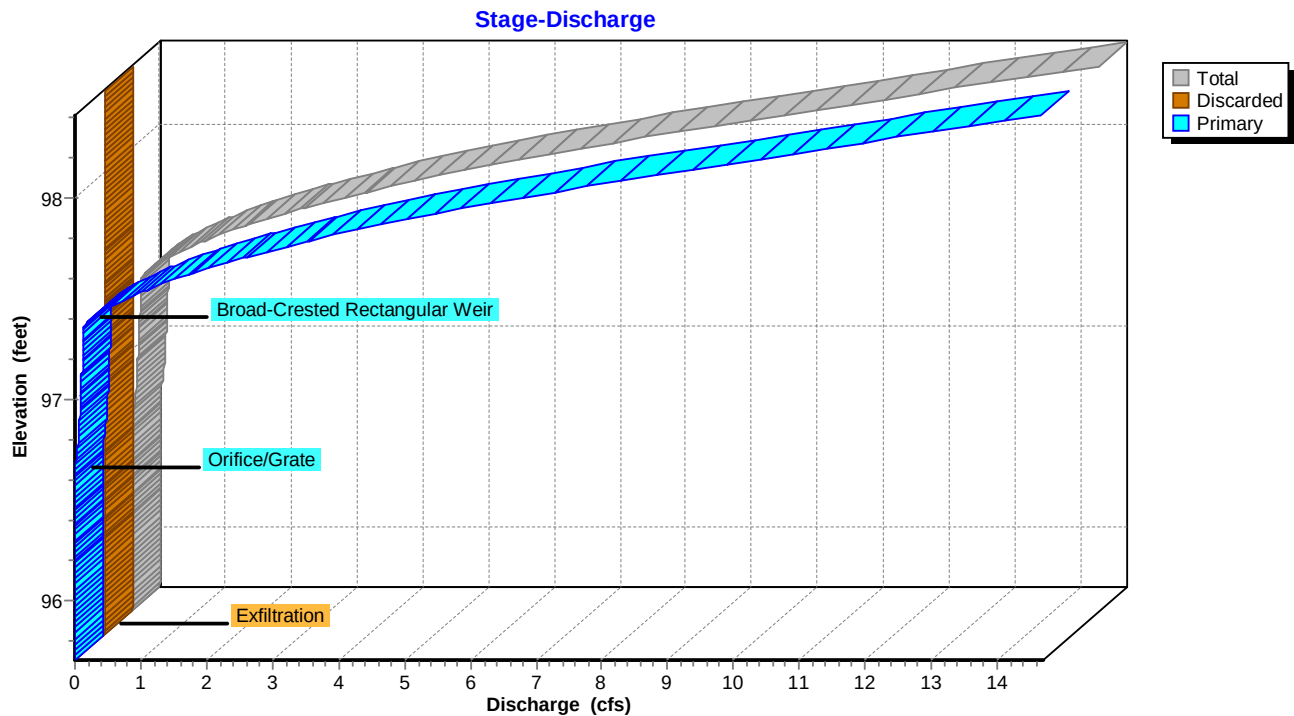
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

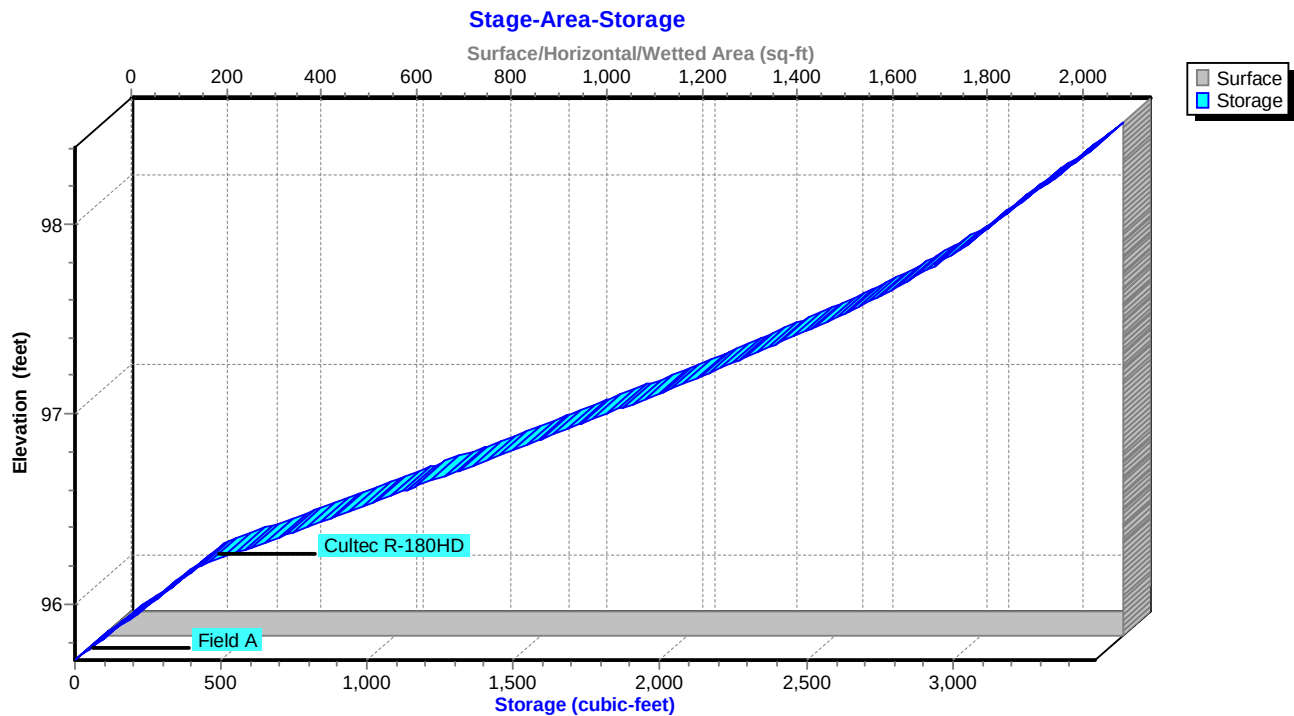
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### Pond 2P: Basin A



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Hydrograph for Pond 2P: Basin A

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 95.70               | 0.00             | <b>0.00</b>        | 0.00             |
| 2.50            | 0.06            | 131                     | 95.85               | 0.02             | <b>0.02</b>        | 0.00             |
| 5.00            | 0.08            | 543                     | 96.26               | 0.02             | 0.02               | 0.00             |
| 7.50            | 0.10            | 1,162                   | 96.62               | 0.03             | 0.02               | 0.00             |
| 10.00           | <b>0.17</b>     | <b>1,719</b>            | <b>96.94</b>        | <b>0.10</b>      | 0.02               | <b>0.08</b>      |
| 12.50           | <b>0.41</b>     | <b>2,504</b>            | <b>97.44</b>        | <b>0.47</b>      | 0.02               | <b>0.45</b>      |
| 15.00           | 0.14            | 2,369                   | 97.35               | 0.16             | 0.02               | 0.13             |
| 17.50           | 0.10            | 2,039                   | 97.14               | 0.13             | 0.02               | 0.11             |
| 20.00           | 0.08            | 1,745                   | 96.96               | 0.11             | 0.02               | 0.08             |
| 22.50           | 0.06            | 1,506                   | 96.82               | 0.08             | 0.02               | 0.05             |
| 25.00           | 0.00            | 1,244                   | 96.66               | 0.03             | 0.02               | 0.01             |
| 27.50           | 0.00            | 1,011                   | 96.53               | 0.02             | 0.02               | 0.00             |
| 30.00           | 0.00            | 788                     | 96.40               | 0.02             | 0.02               | 0.00             |
| 32.50           | 0.00            | 565                     | 96.28               | 0.02             | 0.02               | 0.00             |
| 35.00           | 0.00            | 342                     | 96.10               | 0.02             | 0.02               | 0.00             |
| 37.50           | 0.00            | 118                     | 95.84               | 0.02             | 0.02               | 0.00             |
| 40.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 95.70               | 0.00             | 0.00               | 0.00             |

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Summary for Pond 5P: Porous Pavement B

Inflow Area = 16,284 sf, 94.43% Impervious, Inflow Depth = 11.11" for 100-Year-Future event  
Inflow = 4.89 cfs @ 12.06 hrs, Volume= 15,070 cf  
Outflow = 0.23 cfs @ 13.52 hrs, Volume= 15,070 cf, Atten= 95%, Lag= 87.6 min  
Discarded = 0.07 cfs @ 3.40 hrs, Volume= 7,967 cf  
Primary = 0.16 cfs @ 13.52 hrs, Volume= 7,103 cf  
Routed to nonexistent node 6L

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
Peak Elev= 98.25' @ 13.52 hrs Surf.Area= 5,690 sf Storage= 7,105 cf

Plug-Flow detention time= 372.3 min calculated for 15,059 cf (100% of inflow)  
Center-of-Mass det. time= 372.6 min ( 1,109.5 - 736.9 )

| Volume | Invert | Avail.Storage | Storage Description                                        |
|--------|--------|---------------|------------------------------------------------------------|
| #1     | 97.00' | 14,225 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 97.00               | 5,690                | 0                         | 0                         |
| 98.00               | 5,690                | 5,690                     | 5,690                     |
| 99.00               | 5,690                | 5,690                     | 11,380                    |
| 99.50               | 5,690                | 2,845                     | 14,225                    |

| Device | Routing   | Invert | Outlet Devices                                                             |
|--------|-----------|--------|----------------------------------------------------------------------------|
| #1     | Primary   | 97.20' | <b>2.5" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads |
| #2     | Discarded | 97.00' | <b>0.500 in/hr Exfiltration over Surface area</b>                          |

**Discarded OutFlow** Max=0.07 cfs @ 3.40 hrs HW=97.03' (Free Discharge)  
↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

**Primary OutFlow** Max=0.16 cfs @ 13.52 hrs HW=98.25' (Free Discharge)  
↑ **1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 4.68 fps)

## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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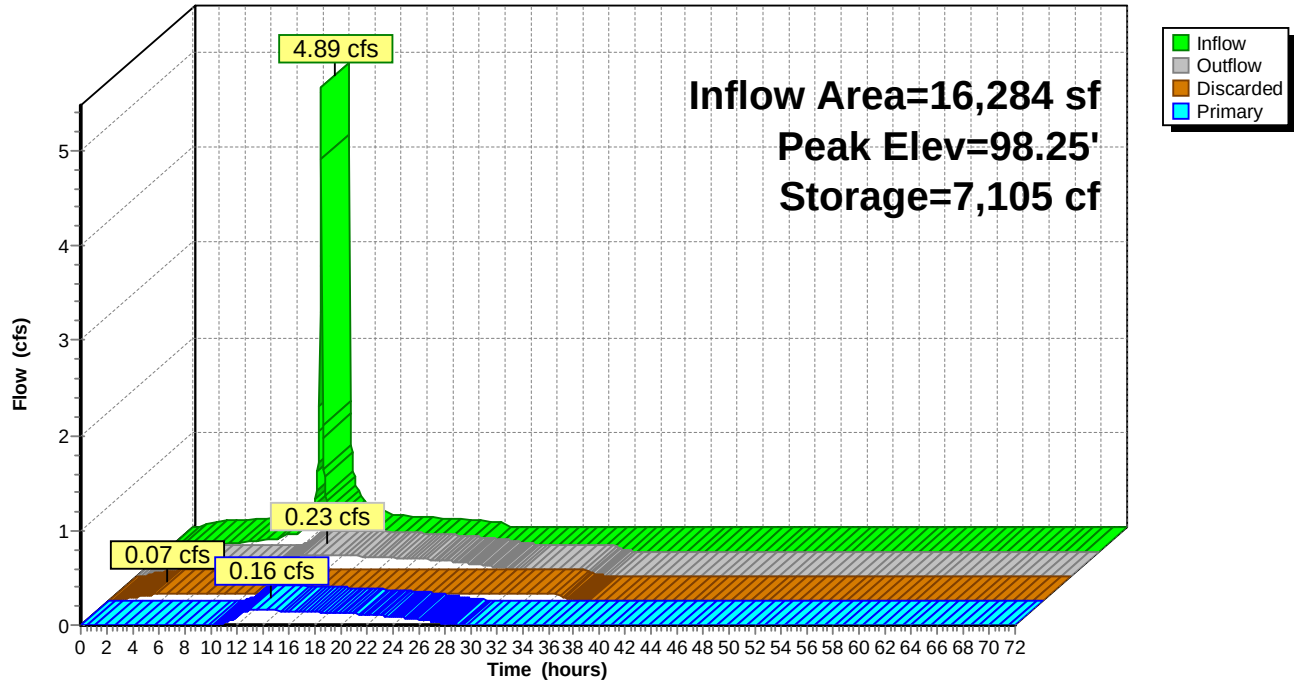
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### Pond 5P: Porous Pavement B

Hydrograph



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

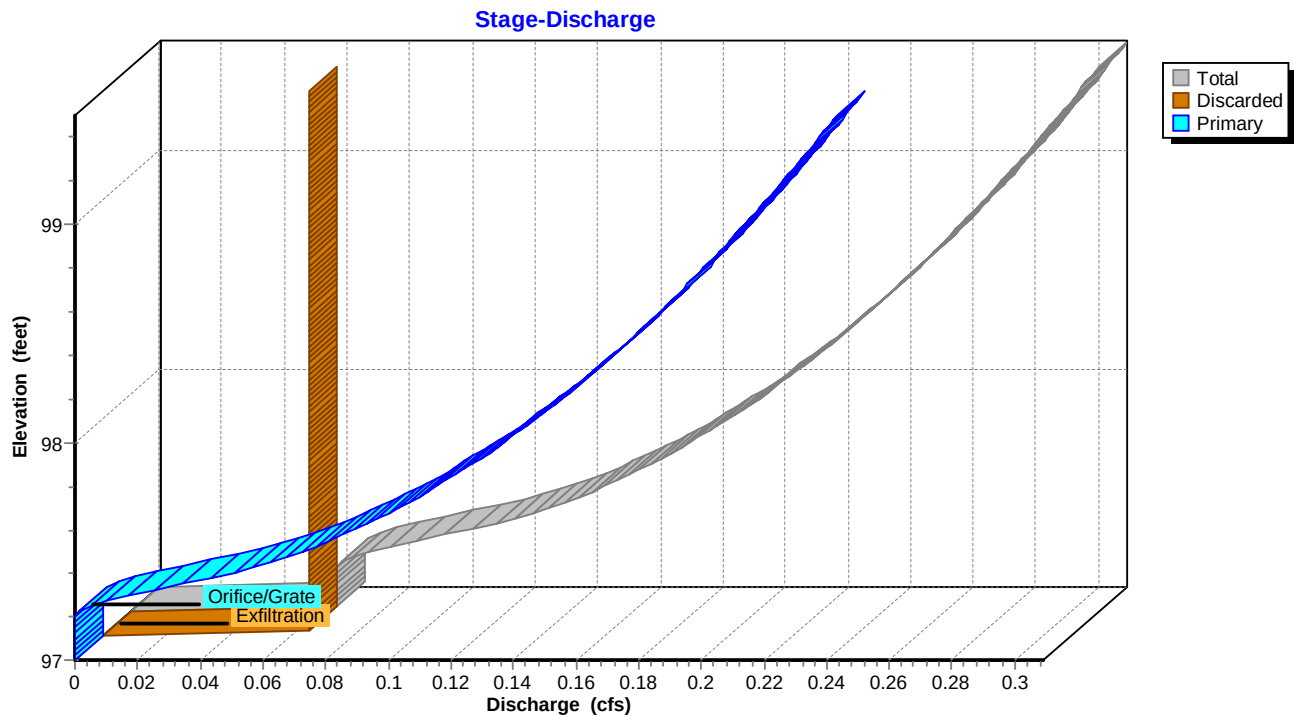
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

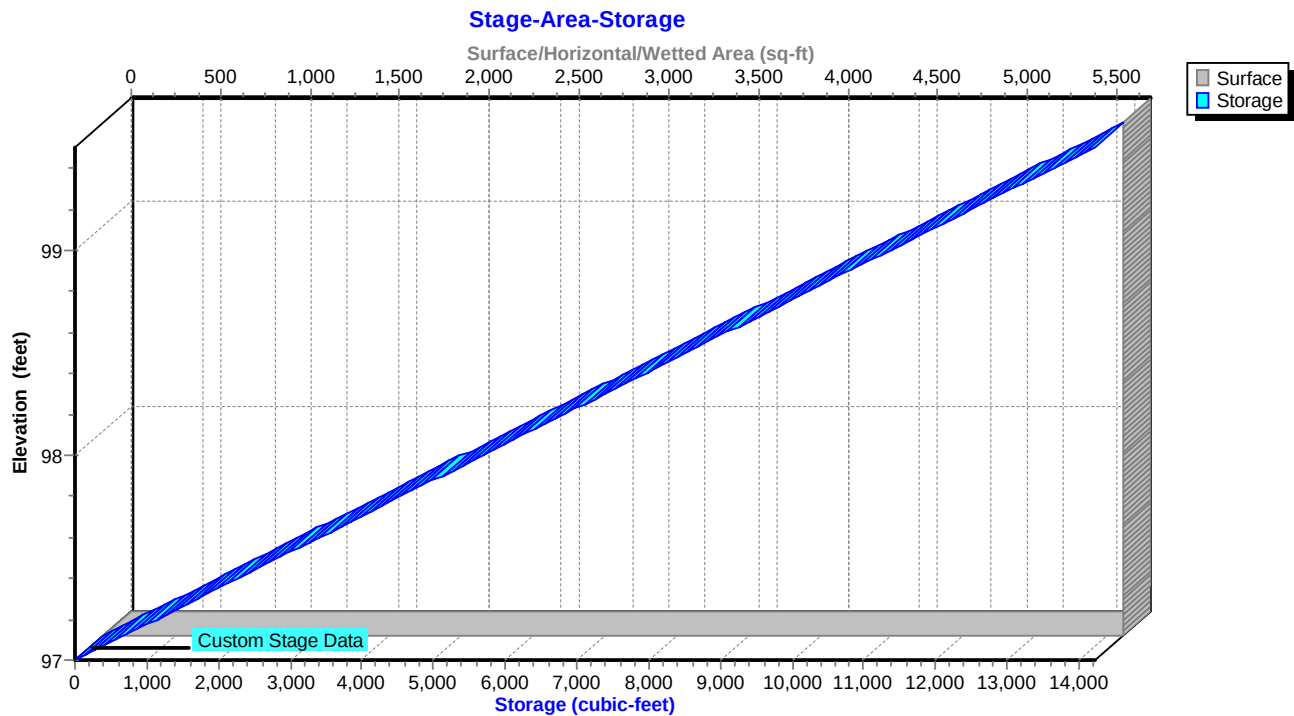
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### Pond 5P: Porous Pavement B



## Proposed Flows

NOAA10 24-hr D 100-Year-Future Rainfall=11.52"

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### Hydrograph for Pond 5P: Porous Pavement B

| Time<br>(hours) | Inflow<br>(cfs) | Storage<br>(cubic-feet) | Elevation<br>(feet) | Outflow<br>(cfs) | Discarded<br>(cfs) | Primary<br>(cfs) |
|-----------------|-----------------|-------------------------|---------------------|------------------|--------------------|------------------|
| 0.00            | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 2.50            | 0.06            | 112                     | 97.02               | 0.05             | <b>0.05</b>        | 0.00             |
| 5.00            | 0.09            | 243                     | 97.04               | 0.07             | <b>0.07</b>        | 0.00             |
| 7.50            | 0.12            | 596                     | 97.10               | 0.07             | 0.07               | 0.00             |
| 10.00           | <b>0.19</b>     | 1,324                   | 97.23               | 0.07             | 0.07               | 0.00             |
| 12.50           | <b>0.48</b>     | <b>6,705</b>            | <b>98.18</b>        | <b>0.22</b>      | 0.07               | <b>0.15</b>      |
| 15.00           | 0.17            | <b>6,918</b>            | <b>98.22</b>        | <b>0.22</b>      | 0.07               | <b>0.16</b>      |
| 17.50           | 0.11            | 6,103                   | 98.07               | 0.21             | 0.07               | 0.14             |
| 20.00           | 0.09            | 5,201                   | 97.91               | 0.19             | 0.07               | 0.13             |
| 22.50           | 0.07            | 4,241                   | 97.75               | 0.17             | 0.07               | 0.11             |
| 25.00           | 0.00            | 3,101                   | 97.55               | 0.15             | 0.07               | 0.08             |
| 27.50           | 0.00            | 1,977                   | 97.35               | 0.10             | 0.07               | 0.03             |
| 30.00           | 0.00            | 1,264                   | 97.22               | 0.07             | 0.07               | 0.00             |
| 32.50           | 0.00            | 670                     | 97.12               | 0.07             | 0.07               | 0.00             |
| 35.00           | 0.00            | 90                      | 97.02               | 0.04             | 0.04               | 0.00             |
| 37.50           | 0.00            | 1                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 40.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 42.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 45.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 47.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 50.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 52.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 55.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 57.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 60.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 62.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 65.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 67.50           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |
| 70.00           | 0.00            | 0                       | 97.00               | 0.00             | 0.00               | 0.00             |

## **Appendix E: Geotechnical Report**

Project: **262-270 Main St Geotechnical Investigation**  
 Project Location: **262-270 Main St, West Orange, NJ 07052**  
 Project Number: **JMA02P003.06**

**Log of Boring B1**  
**Sheet 1 of 1**

|                                                                 |                                                    |                                                     |
|-----------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
| Date(s) Drilled<br><b>5/29/2025</b>                             | Logged By<br><b>A.G.</b>                           | Checked By<br><b>J.C.</b>                           |
| Drilling Method<br><b>Standard Penetration Test (SPT)</b>       | Drill Bit Size/Type<br><b>4" Hollow Stem Auger</b> | Total Depth of Borehole<br><b>30 feet bgs</b>       |
| Drill Rig Type<br><b>Track Rig</b>                              | Drilling Contractor<br><b>SANO Drilling</b>        | Approximate Surface Elevation<br><b>99.7</b>        |
| Groundwater Level and Date Measured<br><b>18 FT Below Grade</b> | Sampling Method(s)<br><b>SPT</b>                   | Hammer Data<br><b>1.38" 140 lb Automatic Hammer</b> |
| Borehole Backfill<br><b>Cuttings</b>                            | Location<br><b>SouthWest of existing Lot</b>       |                                                     |

| Elevation (feet) | Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | Material Type | Graphic Log | MATERIAL DESCRIPTION                                                                               | REMARKS AND OTHER TESTS |
|------------------|--------------|-------------|---------------|-------------------------------|---------------|-------------|----------------------------------------------------------------------------------------------------|-------------------------|
| 99.7             | 0            |             | S1            | 0-8<br>2-2                    | ML            |             | Silt                                                                                               | 6" Asphalt              |
|                  |              |             | S2            | 2-2<br>2-2                    | Cuttings      |             | Cuttings                                                                                           |                         |
| 94.7             | 5            |             | S3            | 4-10<br>18-17                 | GM            |             | Brown fine (-) Gravel, and (-) medium to fine Sand, little (-) fine Silt; (GM).                    |                         |
|                  |              |             | S4            | 8-14<br>14-16                 | GM            |             | Brown fine (-) Gravel, and (-) medium to fine Sand, little (-) fine Silt; (GM).                    |                         |
|                  |              |             |               | 19-22<br>27-31                | GM            |             | Brown fine (-) Gravel, and (-) medium to fine Sand, little (-) fine Silt; (GM).                    |                         |
| 89.7             | 10           |             | S5            | 15-19<br>24-24                | GM            |             | Brown fine (-) Gravel, and (-) medium to fine Sand, little (-) fine Silt; (GM).                    |                         |
|                  |              |             |               | 7-18<br>19-14                 | GM            |             | Brown fine (-) Gravel, and (-) medium to fine Sand, little (-) fine Silt; (GM).                    |                         |
| 84.7             | 15           |             |               |                               |               |             |                                                                                                    |                         |
|                  |              |             | S6            | 10-25<br>12-8                 | SP-SM         |             | Brown (+) medium to fine SAND, and (-) coarse to fine Gravel, trace (-) Silt; (SP-SM).             |                         |
| 79.7             | 20           |             |               |                               |               |             |                                                                                                    |                         |
|                  |              |             | S7            | 29-50/0                       | SM            |             | Brown (-) fine Sand, some (-) medium to fine Gravel, some (-) fine Silt, trace (-) fine Clay; (SM) |                         |
| 74.7             | 25           |             |               |                               |               |             |                                                                                                    |                         |
|                  |              |             |               | 50/2                          |               |             | No Recovery. Refusal at 30 ft below grade. End of Boring.                                          |                         |
| 69.7             | 30           |             |               |                               |               |             |                                                                                                    |                         |

Project: **262-270 Main St Geotechnical Investigation**  
 Project Location: **262-270 Main St, West Orange, NJ 07052**  
 Project Number: **JMA02P003.06**

## Key to Log of Boring Sheet 1 of 1

| Elevation (feet) | Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | Material Type | Graphic Log | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|------------------|--------------|-------------|---------------|-------------------------------|---------------|-------------|----------------------|-------------------------|
| 1                | 2            | 3           | 4             | 5                             | 6             | 7           | 8                    | 9                       |

### COLUMN DESCRIPTIONS

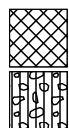
- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1</b> Elevation (feet): Elevation (MSL, feet).</p> <p><b>2</b> Depth (feet): Depth in feet below the ground surface.</p> <p><b>3</b> Sample Type: Type of soil sample collected at the depth interval shown.</p> <p><b>4</b> Sample Number: Sample identification number.</p> <p><b>5</b> Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.</p> | <p><b>6</b> Material Type: Type of material encountered.</p> <p><b>7</b> Graphic Log: Graphic depiction of the subsurface material encountered.</p> <p><b>8</b> MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.</p> <p><b>9</b> REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity  
 COMP: Compaction test  
 CONS: One-dimensional consolidation test  
 LL: Liquid Limit, percent

PI: Plasticity Index, percent  
 SA: Sieve analysis (percent passing No. 200 Sieve)  
 UC: Unconfined compressive strength test,  $Q_u$ , in ksf  
 WA: Wash sieve (percent passing No. 200 Sieve)

### MATERIAL GRAPHIC SYMBOLS



Cuttings

Silty GRAVEL (GM)



SILT, SILT w/SAND, SANDY SILT (ML)

Silty SAND (SM)

Poorly graded SAND with Silt (SP-SM)

### TYPICAL SAMPLER GRAPHIC SYMBOLS



Auger sampler

Bulk Sample

3-inch-OD California w/ brass rings



CME Sampler

Grab Sample

2.5-inch-OD Modified California w/ brass liners



Pitcher Sample

2-inch-OD unlined split spoon (SPT)

Shelby Tube (Thin-walled, fixed head)

### OTHER GRAPHIC SYMBOLS

- ▽ Water level (at time of drilling, ATD)
- ▽ Water level (after waiting, AW)
- Minor change in material properties within a stratum
- Inferred/gradational contact between strata
- ?— Queried contact between strata

### GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Project: **262-270 Main St Geotechnical Investigation**  
 Project Location: **262-270 Main St, West Orange, NJ 07052**  
 Project Number: **JMA02P003.06**

**Log of Boring B2**  
**Sheet 1 of 1**

|                                                                 |                                                    |                                                     |
|-----------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
| Date(s) Drilled<br><b>5/29/2025</b>                             | Logged By<br><b>A.G.</b>                           | Checked By<br><b>J.C.</b>                           |
| Drilling Method<br><b>Standard Penetration Test (SPT)</b>       | Drill Bit Size/Type<br><b>4" Hollow Stem Auger</b> | Total Depth of Borehole                             |
| Drill Rig Type<br><b>Track Rig</b>                              | Drilling Contractor<br><b>SANO Drilling</b>        | Approximate Surface Elevation<br><b>99.7</b>        |
| Groundwater Level and Date Measured<br><b>18 FT Below Grade</b> | Sampling Method(s)                                 | Hammer Data<br><b>1.38" 140 lb Automatic Hammer</b> |
| Borehole Backfill<br><b>Cuttings</b>                            | Location<br><b>NorthWest of existing Lot</b>       |                                                     |

| Elevation (feet) | Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | Material Type | Graphic Log | MATERIAL DESCRIPTION                                                                      | REMARKS AND OTHER TESTS |
|------------------|--------------|-------------|---------------|-------------------------------|---------------|-------------|-------------------------------------------------------------------------------------------|-------------------------|
| 99.7             | 0            |             |               | 0-8<br>9-5                    | SP-SM         |             | Reddish-Brown (+) coarse to fine SAND, and (-) fine Gravel, little (-) fine Silt; (SP-SM) |                         |
|                  |              |             |               | 6-9<br>12-22                  | SP-SM         |             | Reddish-Brown (+) coarse to fine SAND, and (-) fine Gravel, little (-) fine Silt; (SP-SM) |                         |
| 94.7             | 5            |             | S1            | 25-14<br>14-10                | SP-SM         |             | Reddish-Brown (+) coarse to fine SAND, and (-) fine Gravel, little (-) fine Silt; (SP-SM) |                         |
|                  |              |             | S2            | 10-11<br>18-18                | SP-SM         |             | Reddish-Brown (+) coarse to fine SAND, and (-) fine Gravel, little (-) fine Silt; (SP-SM) |                         |
|                  |              |             | S3            | 12-12<br>50/2                 | SP-SM         |             | Reddish-Brown (+) coarse to fine SAND, and (-) fine Gravel, little (-) fine Silt; (SP-SM) |                         |
| 89.7             | 10           |             |               |                               |               |             | Refusal at 9.5ft Below Grade Soil                                                         |                         |
| 84.7             | 15           |             |               |                               |               |             |                                                                                           |                         |
| 79.7             | 20           |             |               |                               |               |             |                                                                                           |                         |
| 74.7             | 25           |             |               |                               |               |             |                                                                                           |                         |
| 69.7             | 30           |             |               |                               |               |             |                                                                                           |                         |

Project: **262-270 Main St Geotechnical Investigation**  
 Project Location: **262-270 Main St, West Orange, NJ 07052**  
 Project Number: **JMA02P003.06**

## Key to Log of Boring Sheet 1 of 1

| Elevation (feet) | Depth (feet) | Sample Type | Sample Number | Sampling Resistance, blows/ft | Material Type | Graphic Log | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|------------------|--------------|-------------|---------------|-------------------------------|---------------|-------------|----------------------|-------------------------|
| 1                | 2            | 3           | 4             | 5                             | 6             | 7           | 8                    | 9                       |

### COLUMN DESCRIPTIONS

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1</b> Elevation (feet): Elevation (MSL, feet).</p> <p><b>2</b> Depth (feet): Depth in feet below the ground surface.</p> <p><b>3</b> Sample Type: Type of soil sample collected at the depth interval shown.</p> <p><b>4</b> Sample Number: Sample identification number.</p> <p><b>5</b> Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.</p> | <p><b>6</b> Material Type: Type of material encountered.</p> <p><b>7</b> Graphic Log: Graphic depiction of the subsurface material encountered.</p> <p><b>8</b> MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.</p> <p><b>9</b> REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity  
 COMP: Compaction test  
 CONS: One-dimensional consolidation test  
 LL: Liquid Limit, percent

PI: Plasticity Index, percent  
 SA: Sieve analysis (percent passing No. 200 Sieve)  
 UC: Unconfined compressive strength test,  $Q_u$ , in ksf  
 WA: Wash sieve (percent passing No. 200 Sieve)

### MATERIAL GRAPHIC SYMBOLS

 Poorly graded SAND with Silt (SP-SM)

### TYPICAL SAMPLER GRAPHIC SYMBOLS

|                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p> Auger sampler</p> <p> Bulk Sample</p> <p> 3-inch-OD California w/ brass rings</p> | <p> CME Sampler</p> <p> Grab Sample</p> <p> 2.5-inch-OD Modified California w/ brass liners</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p> Pitcher Sample</p> <p> 2-inch-OD unlined split spoon (SPT)</p> <p> Shelby Tube (Thin-walled, fixed head)</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### OTHER GRAPHIC SYMBOLS

 Water level (at time of drilling, ATD)

 Water level (after waiting, AW)

 Minor change in material properties within a stratum

 Inferred/gradational contact between strata

 Queried contact between strata

### GENERAL NOTES

- Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
- Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

**Figure B-1**

## **Appendix C: Laboratory Testing Results**



**CONSULTANTS, INC.**  
4405 South Clinton Avenue  
South Plainfield, NJ 07080

**Tel: (800) 545-ATUL**  
**(908) 754-8383**  
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**NJ EDA Approved Testing Laboratory • MBE/DBE Certified • NJ DEP Certified**  
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Soil, Concrete, Masonry, Rebar, Asphalt, Structural Steel, Precast, Piles, Caissons, Fire-proofing, Roofing, Soil Boring, Concrete/Rock Coring, UST Removal, Environmental Testing & Reports

**CLIENT :** Hudson Engineering  
437 Palisade Avenue  
Passaic, NJ

**DATE :** 06/05//2025

**FILE NO. :** AOF-6133

**Attn. : Mr. Jorden Cecinini**

**PROJECT :** JMA02P003  
262 Main Street  
West Orange, NJ

**REPORT No. : 01**

**TEST REQUIRED :** Unconfined Compression Strength of intact Rock Core  
AS PER ASTM D 2938

**DATE RECEIVED:** 06/03/2025

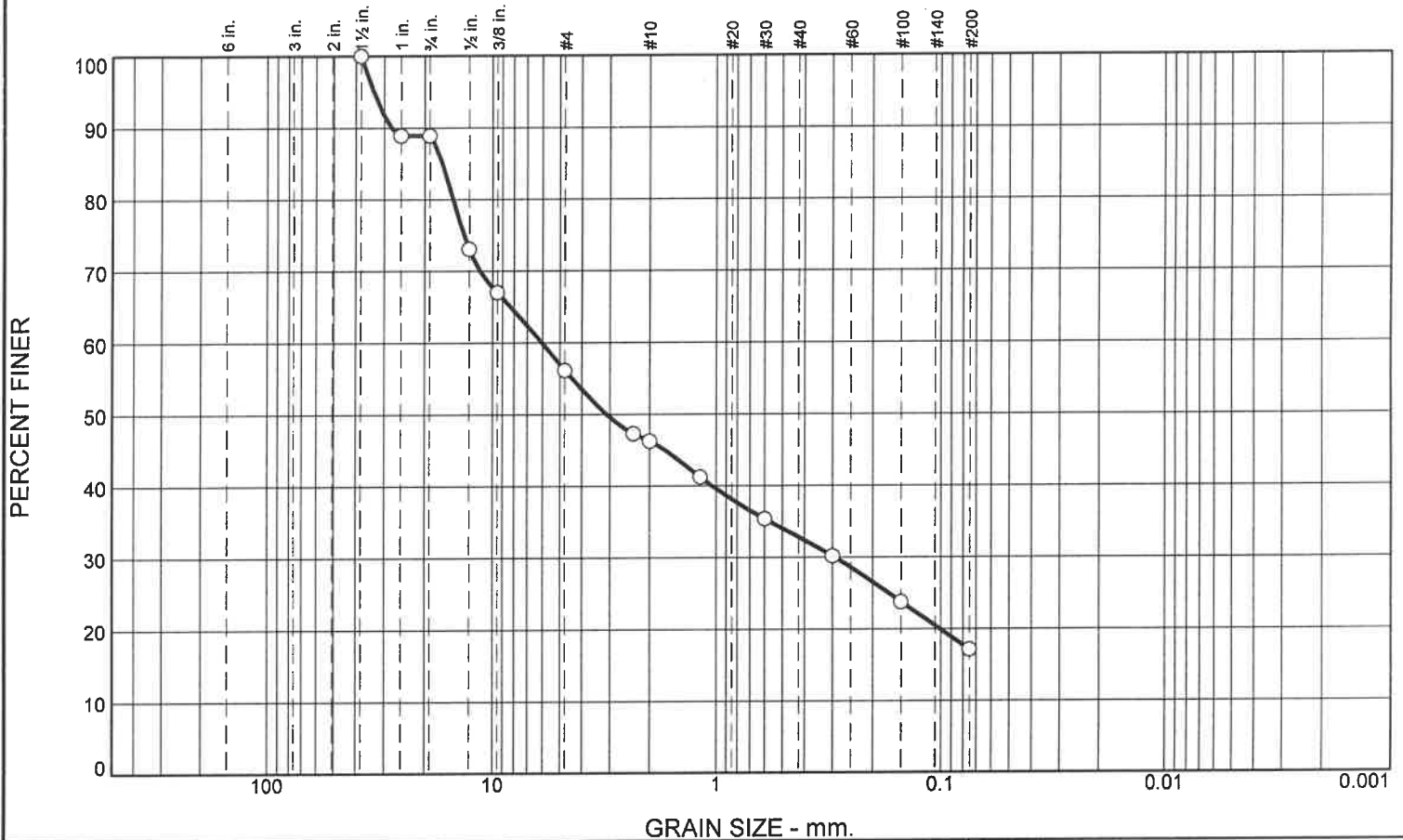
**DATE TESTED : 06/05/2025**

| IDENTIFICATION                 | C - 1  |  |  |  |
|--------------------------------|--------|--|--|--|
| DEPTH                          | N/A    |  |  |  |
| Date obtained                  | N/A    |  |  |  |
| Length of Core Drilled (in) :  | 9.5000 |  |  |  |
| Length of Core Prepared (in) : | 3.8370 |  |  |  |
| Diameter (in) :                | 1.9960 |  |  |  |
| Area (sq. in.)                 | 3.1294 |  |  |  |
| Ratio H to D :                 | 2.0000 |  |  |  |
| Correction Factor :            | 1.0000 |  |  |  |
| Crushing Load (lbs) :          | 26,990 |  |  |  |
| P. S. I. :                     | 8,625  |  |  |  |
| Corrected P. S. I. :           | 8,620  |  |  |  |
| Density pcf                    | 158.15 |  |  |  |

**REMARKS :**

1. Compressive strength of one (1) core was 8,620 psi.
2. Density of Rock core (unit weight) was 158.15 lb./ft<sup>3</sup>.
3. Compression testing machine of 500,000 lb. Capacity, manufactured by Test Mark Industries, Sr No. 10897, Model # CM-5000 EBS (Extended Frame) was utilized for testing cores.

# Particle Size Distribution Report As per ASTM D 6913



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 11.1     | 32.7 | 9.9    | 13.5   | 15.7 | 17.1    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 88.9          |                |              |
| 3/4        | 88.9          |                |              |
| 1/2        | 73.0          |                |              |
| 3/8        | 67.0          |                |              |
| #4         | 56.2          |                |              |
| #8         | 47.3          |                |              |
| #10        | 46.3          |                |              |
| #16        | 41.2          |                |              |
| #30        | 35.4          |                |              |
| #50        | 30.2          |                |              |
| #100       | 23.8          |                |              |
| #200       | 17.1          |                |              |

\* (no specification provided)

## Material Description

Brown in color. silty gravel with sand

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 27.8796

D<sub>85</sub>= 16.6778

D<sub>60</sub>= 6.0316

D<sub>50</sub>= 3.1095

D<sub>30</sub>= 0.2943

D<sub>15</sub>=

D<sub>10</sub>=

C<sub>u</sub>=

C<sub>c</sub>=

## Classification

USCS= GM

AASHTO= A-1-b

## Remarks

Sample was dropped off by client on 06/03/25 and tested on 06/05/25. In-Situ %MC=6.8  
F.M.=4.10

Location: B-1, S-3  
Sample Number: S-1

Depth: 4'-6'

Date: 06/05/2025

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**South Plainfield, New Jersey**

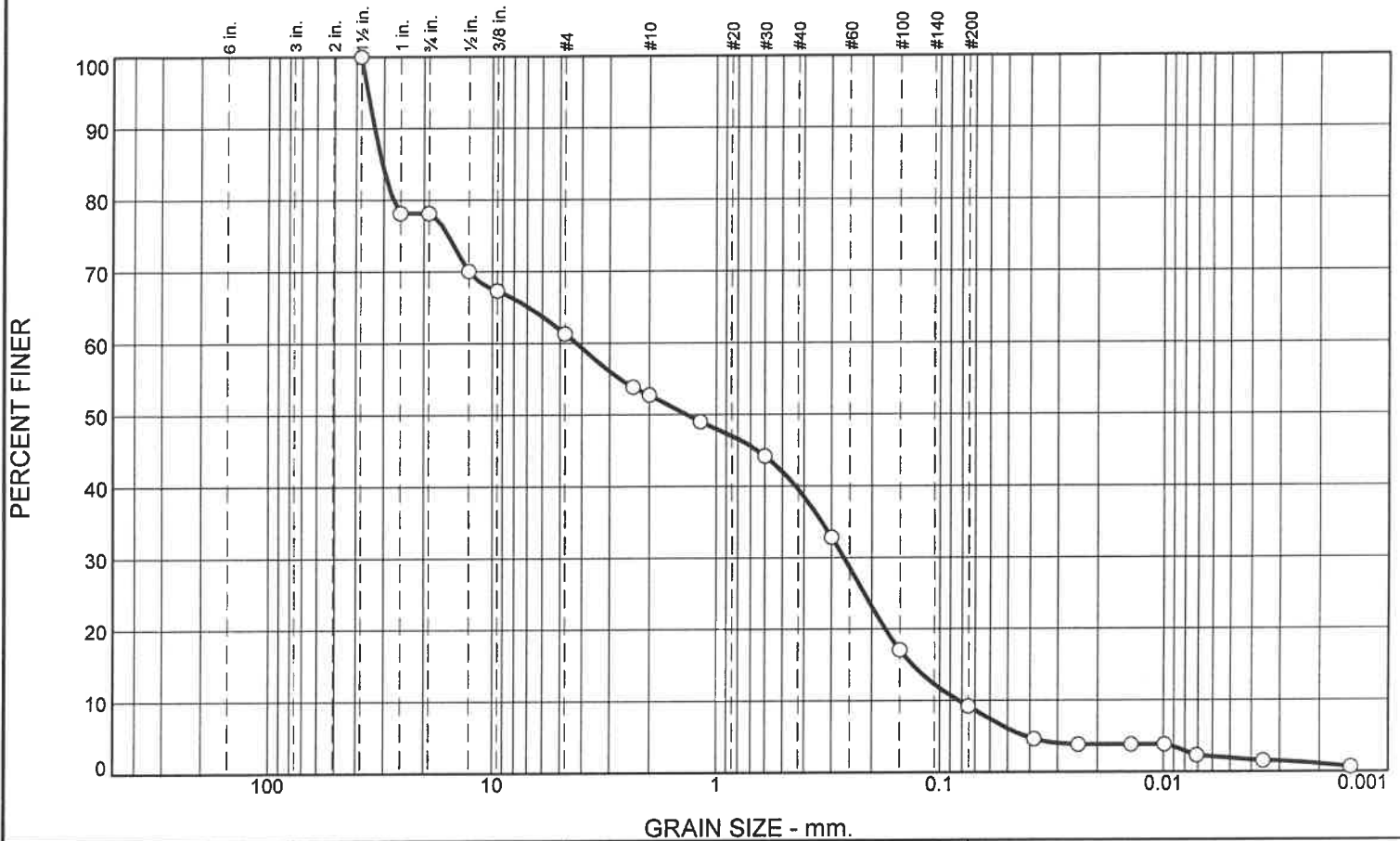
Client: Hudson Engineering LLC

Project: JMA02P003, 262 Main Street, West Orange, NJ

Project No: AOF-6133

Figure 1 F 1

# Particle Size Distribution Report As per ASTM D 6913, D-7928



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 21.9     | 16.8 | 8.6    | 13.1   | 30.4 | 7.3     | 1.9  |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1.5        | 100.0         |                |              |
| 1          | 78.1          |                |              |
| 3/4        | 78.1          |                |              |
| 1/2        | 70.1          |                |              |
| 3/8        | 67.3          |                |              |
| #4         | 61.3          |                |              |
| #8         | 53.8          |                |              |
| #10        | 52.7          |                |              |
| #16        | 49.0          |                |              |
| #30        | 44.2          |                |              |
| #50        | 32.8          |                |              |
| #100       | 17.0          |                |              |
| #200       | 9.2           |                |              |

\* (no specification provided)

## Material Description

Brown in color, poorly graded sand with silt and gravel. Sand

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 33.0166

D<sub>85</sub>= 30.4032

D<sub>60</sub>= 4.2394

D<sub>50</sub>= 1.3660

D<sub>30</sub>= 0.2653

D<sub>15</sub>= 0.1322

D<sub>10</sub>= 0.0828

C<sub>u</sub>= 51.22

C<sub>c</sub>= 0.20

## Classification

USCS= SP-SM

AASHTO= A-1-b

## Remarks

Sample was dropped off by client on 06/03/25 and tested on 06/05/25. In-Situ %MC=12.7

F.M.=3.96

Location: B-1, S-6  
Sample Number: S-2

Depth: 18'-20'

Date: 06/05/2025

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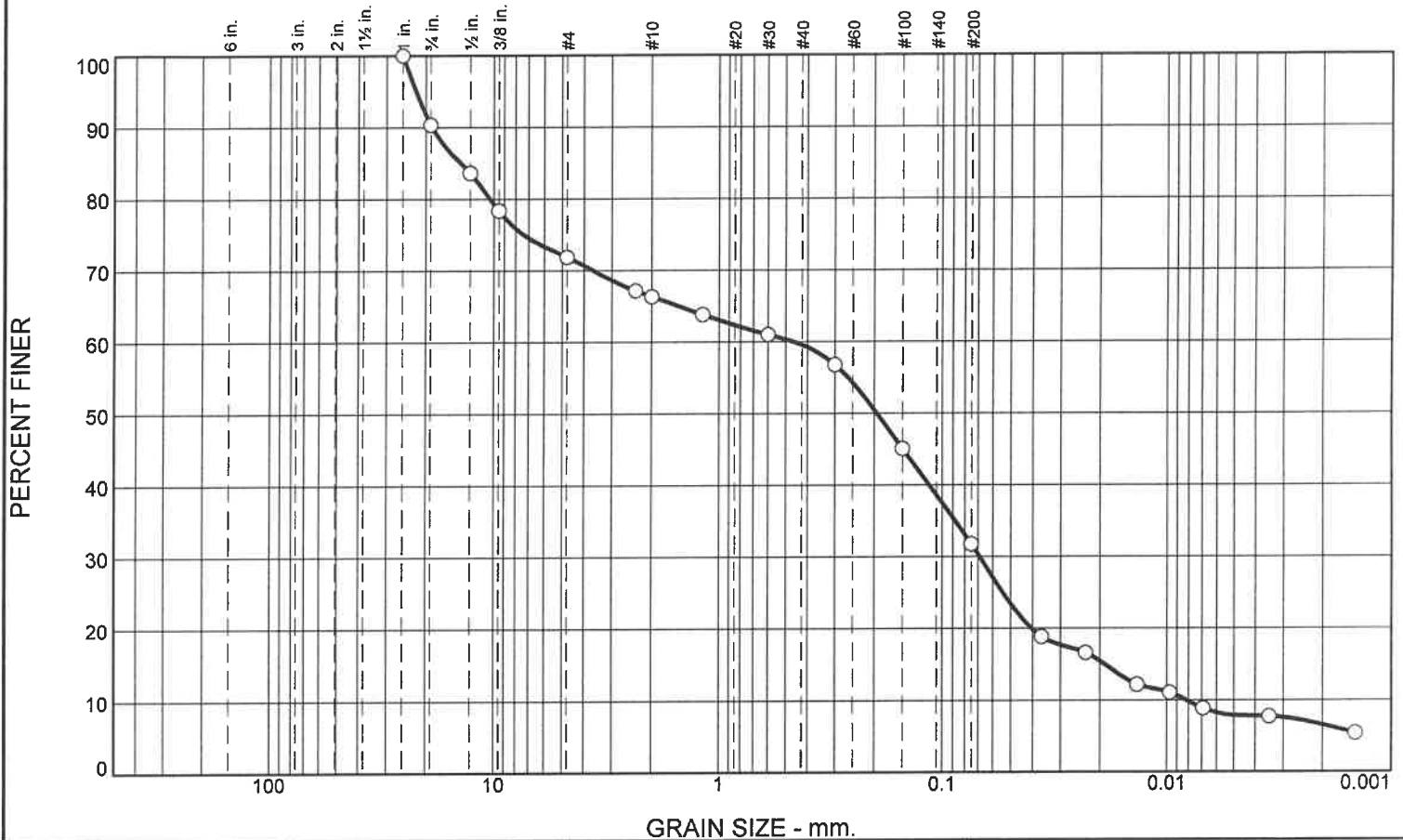
Client: Hudson Engineering LLC

Project: JMA02P003, 262 Main Street, West Orange, NJ

Project No: AOF-6133

Figure 2 F 1

# Particle Size Distribution Report As per ASTM D 6913, D-7928



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 9.6      | 18.5 | 5.6    | 6.7    | 27.8 | 23.9    | 7.9  |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1          | 100.0         |                |              |
| 3/4        | 90.4          |                |              |
| 1/2        | 83.7          |                |              |
| 3/8        | 78.4          |                |              |
| #4         | 71.9          |                |              |
| #8         | 67.1          |                |              |
| #10        | 66.3          |                |              |
| #16        | 63.8          |                |              |
| #30        | 61.0          |                |              |
| #50        | 56.8          |                |              |
| #100       | 45.0          |                |              |
| #200       | 31.8          |                |              |

\* (no specification provided)

## Material Description

Reddish brown in color. silty sand with gravel. Sandy loam.

## Atterberg Limits

PL= NP

LL= NV

PI= NP

## Coefficients

D<sub>90</sub>= 18.7733

D<sub>85</sub>= 13.8957

D<sub>60</sub>= 0.4644

D<sub>50</sub>= 0.1949

D<sub>30</sub>= 0.0689

D<sub>15</sub>= 0.0191

D<sub>10</sub>= 0.0082

C<sub>u</sub>= 56.79

C<sub>c</sub>= 1.25

## Classification

USCS= SM

AASHTO= A-2-4(0)

## Remarks

Sample was dropped off by client on 06/03/25 and tested on 06/05/25. In-Situ %MC=12.7  
F.M.=2.66

Location: B-1, S-7  
Sample Number: S-3

Depth: 23'-25'

Date: 06/05/2025

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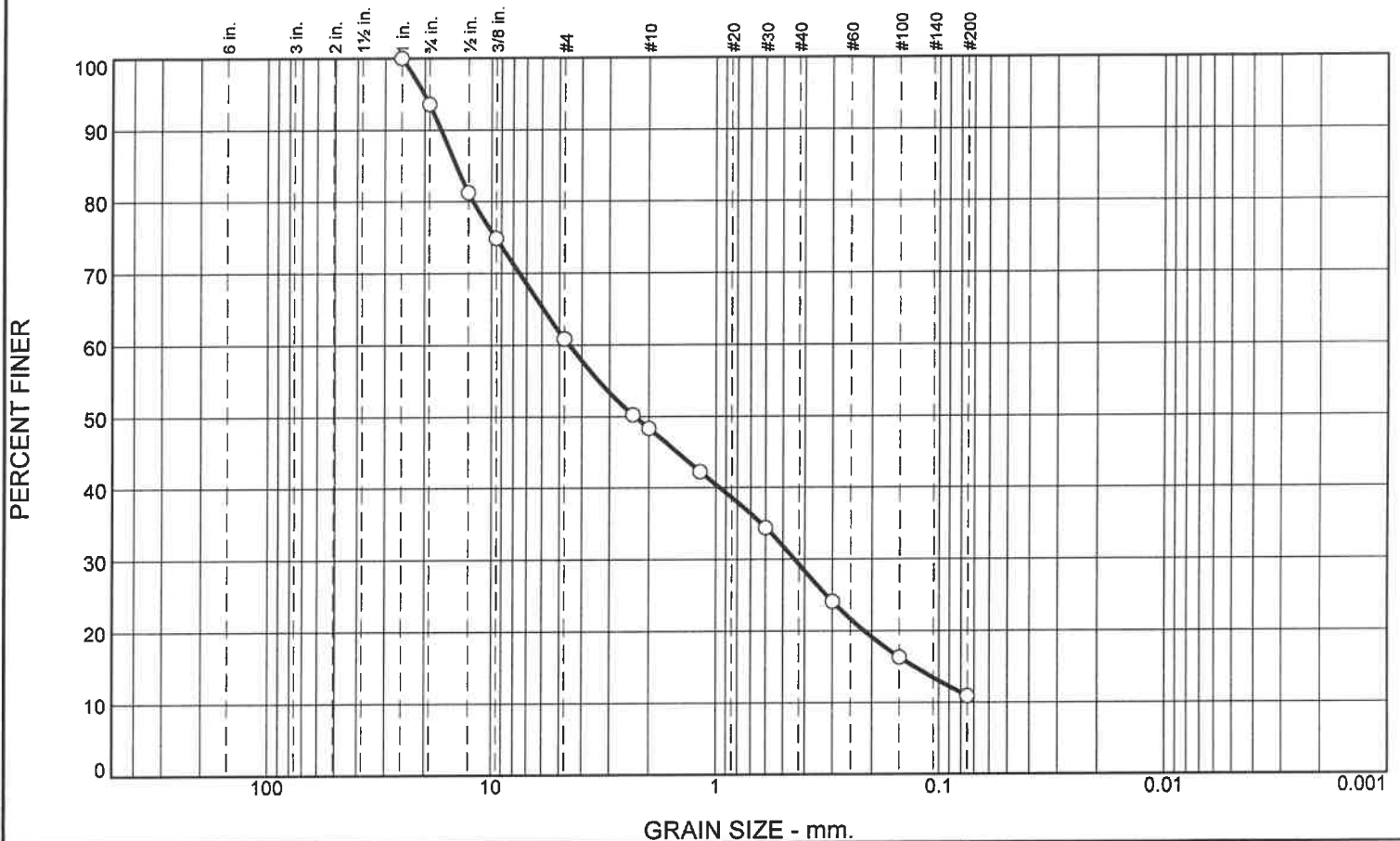
Client: Hudson Engineering LLC

Project: JMA02P003, 262 Main Street, West Orange, NJ

Project No: AOF-6133

Figure 3 F 1

# Particle Size Distribution Report As per ASTM D 6913,



| % +3" | % Gravel |      | % Sand |        |      | % Fines |      |
|-------|----------|------|--------|--------|------|---------|------|
|       | Coarse   | Fine | Coarse | Medium | Fine | Silt    | Clay |
| 0.0   | 6.4      | 32.7 | 12.6   | 19.0   | 18.4 | 10.9    |      |

| SIEVE SIZE | PERCENT FINER | SPEC.* PERCENT | PASS? (X=NO) |
|------------|---------------|----------------|--------------|
| 1          | 100.0         |                |              |
| 3/4        | 93.6          |                |              |
| 1/2        | 81.3          |                |              |
| 3/8        | 74.8          |                |              |
| #4         | 60.9          |                |              |
| #8         | 50.2          |                |              |
| #10        | 48.3          |                |              |
| #16        | 42.3          |                |              |
| #30        | 34.4          |                |              |
| #50        | 24.1          |                |              |
| #100       | 16.3          |                |              |
| #200       | 10.9          |                |              |

\* (no specification provided)

## Material Description

Reddish brown in color. poorly graded sand with silt and gravel

PL= NP      Atterberg Limits      LL= NV      PI= NP

Coefficients  
D<sub>90</sub>= 16.8733      D<sub>85</sub>= 14.4169      D<sub>60</sub>= 4.5337  
D<sub>50</sub>= 2.3156      D<sub>30</sub>= 0.4448      D<sub>15</sub>= 0.1288  
D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

Classification  
USCS= SP-SM      AASHTO= A-1-a

## Remarks

Sample was dropped off by client on 06/03/25 and tested on 06/05/25. In-Situ %MC=5.8  
F.M.=4.03

Location: B-2, S-3  
Sample Number: S-4

Depth: 8'-10'

Date: 06/05/2025

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**South Plainfield, New Jersey**

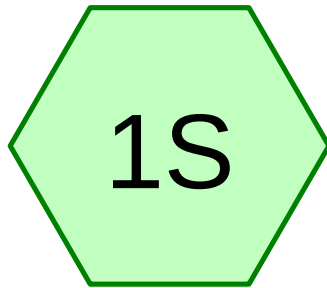
Client: Hudson Engineering LLC

Project: JMA02P003, 262 Main Street, West Orange, NJ

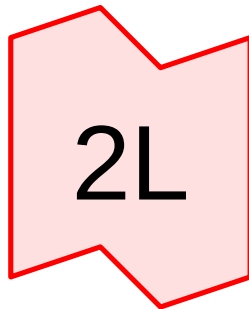
Project No: AOF-6133

Figure 4 F 1

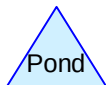
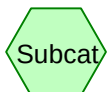
## **Appendix F: Water Quality Analysis**



Proposed Impervious



Aqua-Ponic Treatment  
Unit



**Routing Diagram for Water Quality**

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## Water Quality

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### Rainfall Events Listing

| Event# | Event Name | Storm Type  | Curve | Mode    | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|------------|-------------|-------|---------|------------------|-----|----------------|-----|
| 1      | WQ         | NJ DEP 2-hr |       | Default | 2.00             | 1   | 1.25           | 2   |

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### Area Listing (all nodes)

| Area<br>(sq-ft) | CN        | Description<br>(subcatchment-numbers) |
|-----------------|-----------|---------------------------------------|
| 6,132           | 98        | Paved parking, HSG C (1S)             |
| <b>6,132</b>    | <b>98</b> | <b>TOTAL AREA</b>                     |

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### Soil Listing (all nodes)

| Area<br>(sq-ft) | Soil<br>Group | Subcatchment<br>Numbers |
|-----------------|---------------|-------------------------|
| 0               | HSG A         |                         |
| 0               | HSG B         |                         |
| 6,132           | HSG C         | 1S                      |
| 0               | HSG D         |                         |
| 0               | Other         |                         |
| <b>6,132</b>    |               | <b>TOTAL AREA</b>       |

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### Ground Covers (all nodes)

| HSG-A<br>(sq-ft) | HSG-B<br>(sq-ft) | HSG-C<br>(sq-ft) | HSG-D<br>(sq-ft) | Other<br>(sq-ft) | Total<br>(sq-ft) | Ground<br>Cover   | Subcatchment<br>Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------------|
| 0                | 0                | 6,132            | 0                | 0                | 6,132            | Paved parking     | 1S                      |
| <b>0</b>         | <b>0</b>         | <b>6,132</b>     | <b>0</b>         | <b>0</b>         | <b>6,132</b>     | <b>TOTAL AREA</b> |                         |

## Water Quality

NJ DEP 2-hr WQ Rainfall=1.25"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

### Subcatchment 1S: Proposed Impervious

Runoff Area=6,132 sf 100.00% Impervious Runoff Depth=1.03"  
Tc=1.0 min CN=98 Runoff=0.44 cfs 529 cf

### Link 2L: Aqua-Ponic Treatment Unit

Inflow=0.44 cfs 529 cf  
Primary=0.44 cfs 529 cf

**Total Runoff Area = 6,132 sf   Runoff Volume = 529 cf   Average Runoff Depth = 1.03"**  
**0.00% Pervious = 0 sf   100.00% Impervious = 6,132 sf**

## Water Quality

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NJ DEP 2-hr WQ Rainfall=1.25"

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### Summary for Subcatchment 1S: Proposed Impervious

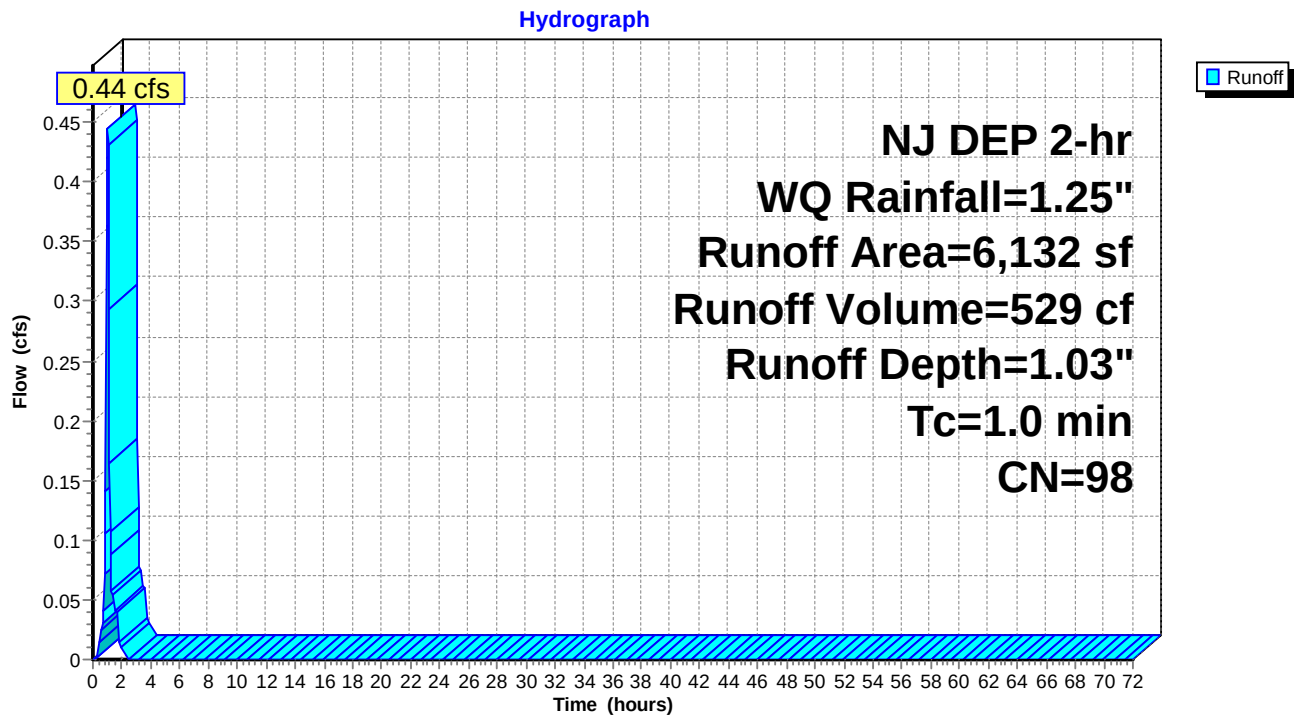
Runoff = 0.44 cfs @ 1.03 hrs, Volume= 529 cf, Depth= 1.03"  
Routed to Link 2L : Aqua-Ponic Treatment Unit

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs  
NJ DEP 2-hr WQ Rainfall=1.25"

| Area (sf) | CN | Description             |
|-----------|----|-------------------------|
| 6,132     | 98 | Paved parking, HSG C    |
| 6,132     |    | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 1.0      |               |               |                   |                | Direct Entry, |

### Subcatchment 1S: Proposed Impervious



## Water Quality

NJ DEP 2-hr WQ Rainfall=1.25"

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### Hydrograph for Subcatchment 1S: Proposed Impervious

| Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) | Time<br>(hours) | Precip.<br>(inches) | Excess<br>(inches) | Runoff<br>(cfs) |
|-----------------|---------------------|--------------------|-----------------|-----------------|---------------------|--------------------|-----------------|
| 0.00            | 0.00                | 0.00               | 0.00            | 47.00           | 1.25                | 1.03               | 0.00            |
| 1.00            | 0.63                | 0.43               | <b>0.42</b>     | 48.00           | 1.25                | 1.03               | 0.00            |
| 2.00            | <b>1.25</b>         | <b>1.03</b>        | <b>0.01</b>     | 49.00           | 1.25                | 1.03               | 0.00            |
| 3.00            | 1.25                | 1.03               | 0.00            | 50.00           | 1.25                | 1.03               | 0.00            |
| 4.00            | 1.25                | 1.03               | 0.00            | 51.00           | 1.25                | 1.03               | 0.00            |
| 5.00            | 1.25                | 1.03               | 0.00            | 52.00           | 1.25                | 1.03               | 0.00            |
| 6.00            | 1.25                | 1.03               | 0.00            | 53.00           | 1.25                | 1.03               | 0.00            |
| 7.00            | 1.25                | 1.03               | 0.00            | 54.00           | 1.25                | 1.03               | 0.00            |
| 8.00            | 1.25                | 1.03               | 0.00            | 55.00           | 1.25                | 1.03               | 0.00            |
| 9.00            | 1.25                | 1.03               | 0.00            | 56.00           | 1.25                | 1.03               | 0.00            |
| 10.00           | 1.25                | 1.03               | 0.00            | 57.00           | 1.25                | 1.03               | 0.00            |
| 11.00           | 1.25                | 1.03               | 0.00            | 58.00           | 1.25                | 1.03               | 0.00            |
| 12.00           | 1.25                | 1.03               | 0.00            | 59.00           | 1.25                | 1.03               | 0.00            |
| 13.00           | 1.25                | 1.03               | 0.00            | 60.00           | 1.25                | 1.03               | 0.00            |
| 14.00           | 1.25                | 1.03               | 0.00            | 61.00           | 1.25                | 1.03               | 0.00            |
| 15.00           | 1.25                | 1.03               | 0.00            | 62.00           | 1.25                | 1.03               | 0.00            |
| 16.00           | 1.25                | 1.03               | 0.00            | 63.00           | 1.25                | 1.03               | 0.00            |
| 17.00           | 1.25                | 1.03               | 0.00            | 64.00           | 1.25                | 1.03               | 0.00            |
| 18.00           | 1.25                | 1.03               | 0.00            | 65.00           | 1.25                | 1.03               | 0.00            |
| 19.00           | 1.25                | 1.03               | 0.00            | 66.00           | 1.25                | 1.03               | 0.00            |
| 20.00           | 1.25                | 1.03               | 0.00            | 67.00           | 1.25                | 1.03               | 0.00            |
| 21.00           | 1.25                | 1.03               | 0.00            | 68.00           | 1.25                | 1.03               | 0.00            |
| 22.00           | 1.25                | 1.03               | 0.00            | 69.00           | 1.25                | 1.03               | 0.00            |
| 23.00           | 1.25                | 1.03               | 0.00            | 70.00           | 1.25                | 1.03               | 0.00            |
| 24.00           | 1.25                | 1.03               | 0.00            | 71.00           | 1.25                | 1.03               | 0.00            |
| 25.00           | 1.25                | 1.03               | 0.00            | 72.00           | 1.25                | 1.03               | 0.00            |
| 26.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 27.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 28.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 29.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 30.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 31.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 32.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 33.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 34.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 35.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 36.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 37.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 38.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 39.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 40.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 41.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 42.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 43.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 44.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 45.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |
| 46.00           | 1.25                | 1.03               | 0.00            |                 |                     |                    |                 |

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NJ DEP 2-hr WQ Rainfall=1.25"

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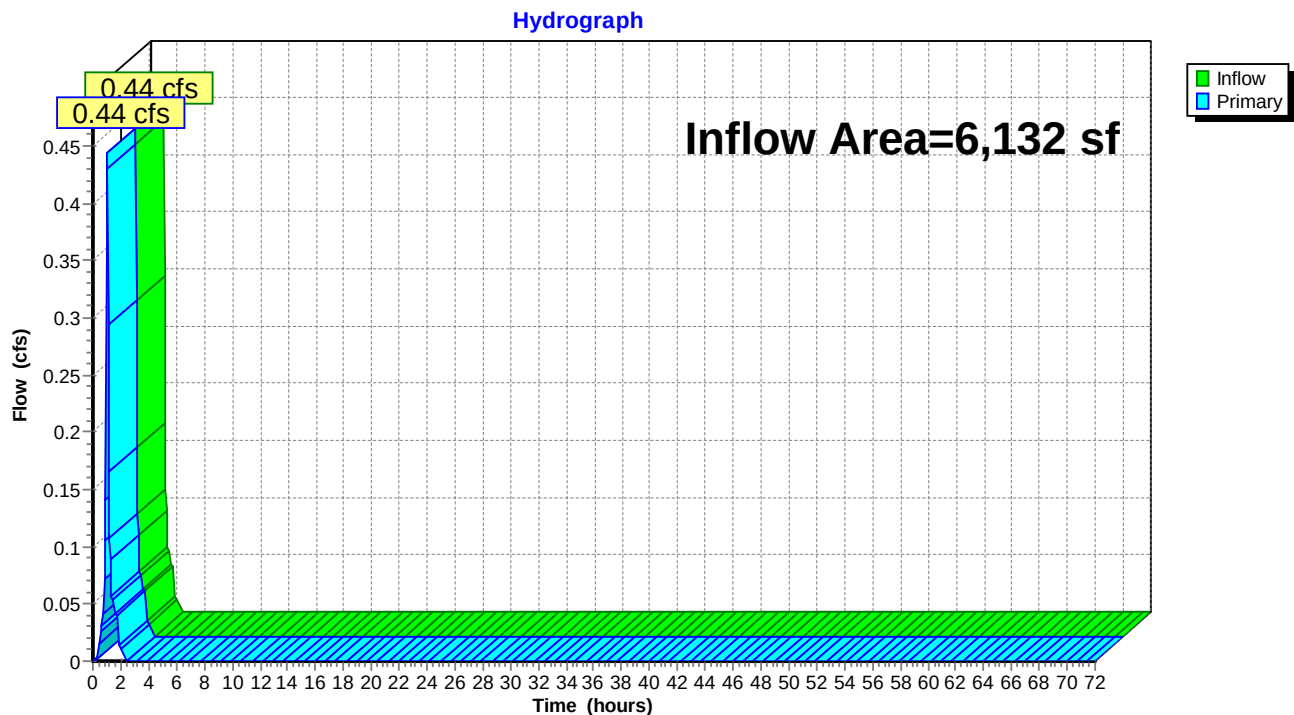
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### Summary for Link 2L: Aqua-Ponic Treatment Unit

Inflow Area = 6,132 sf, 100.00% Impervious, Inflow Depth = 1.03" for WQ event  
Inflow = 0.44 cfs @ 1.03 hrs, Volume = 529 cf  
Primary = 0.44 cfs @ 1.03 hrs, Volume = 529 cf, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs

### Link 2L: Aqua-Ponic Treatment Unit



## Water Quality

NJ DEP 2-hr WQ Rainfall=1.25"

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### Hydrograph for Link 2L: Aqua-Ponic Treatment Unit

| Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) | Time<br>(hours) | Inflow<br>(cfs) | Elevation<br>(feet) | Primary<br>(cfs) |
|-----------------|-----------------|---------------------|------------------|-----------------|-----------------|---------------------|------------------|
| 0.00            | 0.00            | 0.00                | 0.00             | 47.00           | 0.00            | 0.00                | 0.00             |
| 1.00            | 0.42            | 0.00                | 0.42             | 48.00           | 0.00            | 0.00                | 0.00             |
| 2.00            | 0.01            | 0.00                | 0.01             | 49.00           | 0.00            | 0.00                | 0.00             |
| 3.00            | 0.00            | 0.00                | 0.00             | 50.00           | 0.00            | 0.00                | 0.00             |
| 4.00            | 0.00            | 0.00                | 0.00             | 51.00           | 0.00            | 0.00                | 0.00             |
| 5.00            | 0.00            | 0.00                | 0.00             | 52.00           | 0.00            | 0.00                | 0.00             |
| 6.00            | 0.00            | 0.00                | 0.00             | 53.00           | 0.00            | 0.00                | 0.00             |
| 7.00            | 0.00            | 0.00                | 0.00             | 54.00           | 0.00            | 0.00                | 0.00             |
| 8.00            | 0.00            | 0.00                | 0.00             | 55.00           | 0.00            | 0.00                | 0.00             |
| 9.00            | 0.00            | 0.00                | 0.00             | 56.00           | 0.00            | 0.00                | 0.00             |
| 10.00           | 0.00            | 0.00                | 0.00             | 57.00           | 0.00            | 0.00                | 0.00             |
| 11.00           | 0.00            | 0.00                | 0.00             | 58.00           | 0.00            | 0.00                | 0.00             |
| 12.00           | 0.00            | 0.00                | 0.00             | 59.00           | 0.00            | 0.00                | 0.00             |
| 13.00           | 0.00            | 0.00                | 0.00             | 60.00           | 0.00            | 0.00                | 0.00             |
| 14.00           | 0.00            | 0.00                | 0.00             | 61.00           | 0.00            | 0.00                | 0.00             |
| 15.00           | 0.00            | 0.00                | 0.00             | 62.00           | 0.00            | 0.00                | 0.00             |
| 16.00           | 0.00            | 0.00                | 0.00             | 63.00           | 0.00            | 0.00                | 0.00             |
| 17.00           | 0.00            | 0.00                | 0.00             | 64.00           | 0.00            | 0.00                | 0.00             |
| 18.00           | 0.00            | 0.00                | 0.00             | 65.00           | 0.00            | 0.00                | 0.00             |
| 19.00           | 0.00            | 0.00                | 0.00             | 66.00           | 0.00            | 0.00                | 0.00             |
| 20.00           | 0.00            | 0.00                | 0.00             | 67.00           | 0.00            | 0.00                | 0.00             |
| 21.00           | 0.00            | 0.00                | 0.00             | 68.00           | 0.00            | 0.00                | 0.00             |
| 22.00           | 0.00            | 0.00                | 0.00             | 69.00           | 0.00            | 0.00                | 0.00             |
| 23.00           | 0.00            | 0.00                | 0.00             | 70.00           | 0.00            | 0.00                | 0.00             |
| 24.00           | 0.00            | 0.00                | 0.00             | 71.00           | 0.00            | 0.00                | 0.00             |
| 25.00           | 0.00            | 0.00                | 0.00             | 72.00           | 0.00            | 0.00                | 0.00             |
| 26.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 27.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 28.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 29.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 30.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 31.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 32.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 33.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 34.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 35.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 36.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 37.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 38.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 39.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 40.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 41.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 42.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 43.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 44.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 45.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |
| 46.00           | 0.00            | 0.00                | 0.00             |                 |                 |                     |                  |



## State of New Jersey

### DEPARTMENT OF ENVIRONMENTAL PROTECTION

#### DIVISION OF WATERSHED PROTECTION AND RESTORATION

##### BUREAU OF NJPDES STORMWATER PERMITTING

P.O. Box 420 Mail Code 501-02A

Trenton, New Jersey 08625-0420

609-633-7021 / Fax: 609-777-0432

<https://dep.nj.gov/stormwater/>

**MIKIE SHERILL**  
*Governor*

**DALE G. CALDWELL**  
*Lt. Governor*

**ED POTOSNAK**  
*Acting Commissioner*

**April 22, 2026**

Mark B. Miller, Sr. Research Scientist  
Komline-AquaShield  
2733 Kanasita Drive, Suite 111  
Chattanooga, TN 37343

Re: MTD Lab Certification – Revised Certification  
Aqua-Ponic Stormwater Biofiltration System  
Offline Installation

#### **TSS Removal Rate 80%**

Dear Mr. Miller:

This revised certification letter supersedes the Department's prior certification dated January 21, 2021. This revision was completed as a result of the manufacturer's upgrades to slightly larger-sized models than those originally included in the aforementioned certification letter and the change in the name of the company from AquaShield, Inc. to Komline-AquaShield. Furthermore, in accordance with the July 17, 2023, amendments to the Stormwater Management rules at N.J.A.C. 7:8, the rational method was removed as an allowable calculation method for compliance with the Stormwater Management rules in New Jersey. As a result, this revised certification also updates the example sizing calculation to utilize NRCS methodology, rather than the rational method. No other modifications were made to this certification.

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Komline-AquaShield has requested a Laboratory Certification for the Aqua-Ponic Stormwater Biofiltration System.

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated November 2020 and last revised April 2026) for this device is published online at <http://www.njcat.org/verification-process/technology-verification-database.html>.

**The NJDEP certifies the use of the Aqua-Ponic Stormwater Biofiltration System by Komline-AquaShield at a TSS removal rate of 80% when designed, operated and maintained in accordance with the information provided in the Verification Appendix and the following conditions:**

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5. The MTFR is calculated based on a verified loading rate of 7.0 gpm/ft<sup>2</sup> of effective filtration treatment area.
2. The Aqua-Ponic Stormwater Biofiltration System shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in item 6 below.
3. This Aqua-Ponic Stormwater Biofiltration System cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in Chapter 9.5 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found on-line at <https://dep.nj.gov/stormwater/>.
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Aqua-Ponic Stormwater Biofiltration System. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at: <https://www.aquashieldinc.com/ap-maintenance.html> any changes to the maintenance requirements.
6. For an MTD to be considered “green infrastructure” in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) infiltrate into the subsoil; (2) treat stormwater runoff through filtration by vegetation or soil; and/or (3) store stormwater for reuse.

In order for an Aqua-Ponic Stormwater Biofiltration System to meet the definition of GI, the Aqua-Ponic Stormwater Biofiltration System must treat stormwater runoff through filtration by vegetation. To this end, consistent with the vegetative cover requirement for bioretention systems, the minimum vegetative cover in an Aqua-Ponic Stormwater Biofiltration System is 85% in order to qualify as GI under the Stormwater Management rules at N.J.A.C. 7:8. The vegetative cover should be determined based on the expected coverage of the proposed plantings when matured. Plant death or damage shall require replanting to maintain this 85% coverage requirement if the system is installed as GI.

7. Sizing Requirements:

The example below demonstrates the sizing procedure for the Aqua-Ponic Stormwater Biofiltration System:

Example: A 0.25-acre impervious site with a slope of 5% is to be treated to 80% TSS removal using an Aqua-Ponic Stormwater Biofiltration System. The hydraulically most distant point to the inlet of the Aqua-Ponic stormwater treatment unit is 110 feet. The site is located in an area for which the projected 2-year storm rainfall depth was calculated to be 3.84 inches.

The selection of the appropriate model of an Aqua-Ponic Stormwater Biofiltration System is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the Aqua-Ponic Stormwater Biofiltration System in this example is 0.25 acres. Based upon the information in Table 1 below, one Aqua-Ponic Stormwater Biofiltration System model AP-5 would be able to treat the runoff without exceeding the maximum allowable drainage area.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

CN = 98 (Curve Number for impervious)  
 Dimensionless Unit Hydrograph (DUH) = SCS Standard DUH (peak rate factor of 484)  
 Time of concentration = 0.8 minutes  
 Q = 0.77 cfs

Given the site runoff is 0.77 cfs and based on Table 1 below, one Aqua-Ponic Stormwater Biofiltration System AP-8 with an MTFR of 0.885 cfs would be required to remove 80% of the TSS from the impervious area without exceeding the MTFR.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system model is noted below and on the following page. Additional specifications regarding the Aqua-Ponic Stormwater Biofiltration System can be found in the Verification Appendix.

Table 1: Aqua-Ponic Stormwater Biofiltration System Models and Associated MTFRs and Maximum Inflow Drainage Areas

| Aqua-Ponic Model Designation | Diameter (ft) | Effective Filtration Treatment Area (EFTA) (sf) | Maximum Treatment Flow Rate (cfs) | Maximum Inflow Drainage Area (acres) |
|------------------------------|---------------|-------------------------------------------------|-----------------------------------|--------------------------------------|
| AP-2                         | 2.5           | 4.91                                            | 0.077                             | 0.07                                 |
| AP-3                         | 3.5           | 9.62                                            | 0.150                             | 0.15                                 |
| AP-4                         | 4.5           | 15.90                                           | 0.248                             | 0.24                                 |
| AP-5                         | 5.5           | 23.76                                           | 0.371                             | 0.36                                 |
| AP-6                         | 6.5           | 33.18                                           | 0.518                             | 0.51                                 |
| AP-7                         | 7.5           | 44.18                                           | 0.689                             | 0.67                                 |

| Aqua-Ponic Model Designation | Diameter (ft) | Effective Filtration Treatment Area (EFTA) (sf) | Maximum Treatment Flow Rate (cfs) | Maximum Inflow Drainage Area (acres) |
|------------------------------|---------------|-------------------------------------------------|-----------------------------------|--------------------------------------|
| AP-8                         | 8.5           | 56.75                                           | 0.885                             | 0.87                                 |
| AP-9                         | 9.5           | 70.88                                           | 1.105                             | 1.08                                 |
| AP-10                        | 10.5          | 86.59                                           | 1.350                             | 1.32                                 |
| AP-11                        | 11.5          | 103.87                                          | 1.620                             | 1.59                                 |
| AP-12                        | 12.5          | 122.72                                          | 1.914                             | 1.87                                 |
| AP-13                        | 13            | 132.73                                          | 2.070                             | 2.03                                 |
| Custom                       | —             | —                                               | EFTA x 0.016                      | EFTA x 0.015                         |

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Lisa Schaefer of my office at [lisa.schaefer@dep.nj.gov](mailto:lisa.schaefer@dep.nj.gov).

Sincerely,



Gabriel Mahon, Chief  
Bureau of NJPDES Stormwater Permitting  
Division of Watershed Protection and Restoration  
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

c: Richard Magee, NJCAT

# INSPECTION & MAINTENANCE MANUAL

## Aqua-Ponic™ Stormwater Biofiltration System



Manufactured by:

**Komline-AquaShield**

2733 Kanasita Drive  
Suite 111  
Chattanooga, TN 37343  
(423) 870-8888 | (888) 344-9044  
[www.aquashieldinc.com](http://www.aquashieldinc.com)  
[www.komline.com](http://www.komline.com)

**April 2026**



## INTRODUCTION

As the stormwater industry has matured there has been an ever-increasing movement toward the implementation of Low Impact Development (LID) products and practices as the preferred means to implement stormwater control measures within “green infrastructure” (GI) stormwater management programs. The Aqua-Ponic™ Stormwater Biofiltration System is now offered by Komline-AquaShield to meet the design challenges of LID principles along with enhanced aesthetics in an urban environment.

This Inspection & Maintenance (I&M) Manual includes information to better assist stakeholders with understanding the importance of implementing an effective program to ensure long-term functionality of an Aqua-Ponic™ system installation. The following aspects of an Aqua-Ponic™ system are described in this I&M manual:

- Aqua-Ponic™ Basics
- Mode of Operation
- Inspection and Maintenance.

## AQUA-PONIC™ BASICS

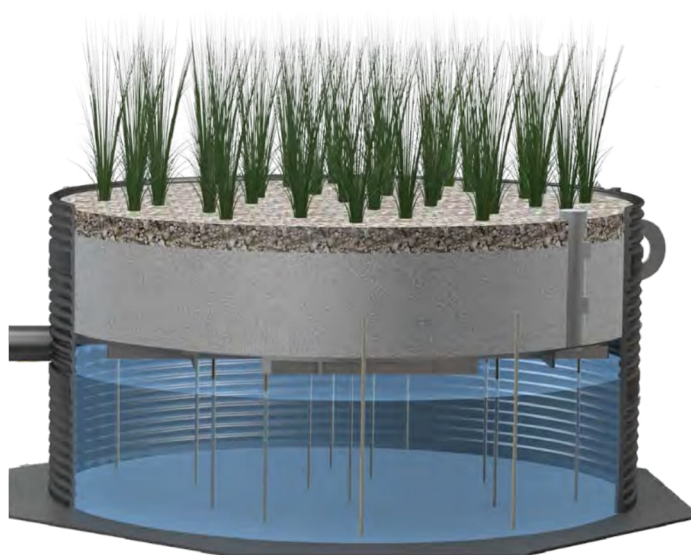
Aqua-Ponic™ technology is a modular proprietary, permanent, post-construction biofiltration system designed to remove sediments, nutrients, and associated contaminants from stormwater runoff. A distinguishing feature of the Aqua-Ponic™ is its combination of filtration with the principles of *hydroponics*-a method of hydroculture for growing plants without soil by instead using mineral nutrient solutions in a water solvent. That is, the Aqua-Ponic™ uses stormwater runoff as a nutrient asset instead of a liability. Terrestrial plants are grown with only their roots exposed to nutrient liquid while being physically supported by a plant stabilization filter medium. The hydroponic design provides a sustainable water supply to the vegetation during those periods of time when hot and/or dry conditions may prevail.

The Aqua-Ponic™ system utilizes hardy low-profile perennial vegetation such as native grasses, shrub grasses and/or ornamental flowering plants. A facility can utilize a single type or multiple types of plants to enhance the viewscape. It is important to specify plants that demonstrate viability within the climatic zone of a site installation.

## MODE of OPERATION

The minimum 12-inch plant stabilization media layer within the Aqua-Ponic™ serves three operational roles by providing (1) pollutant filtration, (2) plant stabilization and (3) nutrient uptake. **Figure 1** is an illustration of the Aqua-Ponic™ Biofiltration System. Design elements include a three (3)-inch top layer of pea gravel underlain by the plant stabilization filter bed. Water enters the system as sheet flow and then flows downward under gravity flow conditions through the pea gravel, filter bed and the associated root systems of the vegetation. The pea gravel layer serves to protect the underlying plant stabilization filter bed while dispersing the influent stormwater runoff across the treatment area. The filtered water then percolates further downward into the underlying water sump. A supporting and removeable perforated stainless-steel sheet underlies the filter bed. A post-filtration flow control orifice

is placed across the outlet pipe opening to facilitate an even distribution of influent runoff across the filter treatment area. Crushed recycled landscaping glass can be used as an alternative to the top pea gravel layer which further enhances colorful viewscape options for the Aqua-Ponic™.



**Figure 1. Diagram of Aqua-Ponic™ Biofiltration System showing the top pea gravel layer, plant stabilization filter media, wicks, sump, effluent stubout pipe, and observation port.**

The sump serves as a water reservoir for the vegetation during quiescent periods. A series of wicks are suspended from the base of the plant stabilization bed via rubber grommets (eyelets). The wicks extend downward to near the base of the sump. Using capillary action, water is wicked up to the plant stabilization filter bed which serves to provide a sustainable supply of water and any soluble nutrients and metals not trapped in the filter bed during a runoff event. Treated water in excess of the sump storage volume exits the system via the outlet opening just below the base of the filter bed.

Each Aqua-Ponic™ unit is constructed of lightweight and durable Polymer Coated Steel (PCS) to provide long term operational and structural functionality. Aqua-Ponic™ units are shipped with all internal components in place according to the model size. For aesthetic reasons it is the responsibility of others to choose either the pea gravel or any recycled glass landscaping stone for the top bed layer. It is also the responsibility of others to specify, acquire and plant the vegetation. AquaShield™ does not specify the plants for Aqua-Ponic™ systems but can assist where warranted.

## **INSPECTION & MAINTENANCE**

Maintenance frequency for the Aqua-Ponic™ will ultimately be determined by site-specific pollutant loading conditions. Inspections of plants, top gravel layer and the upper portion of the plant stabilization filter media can be accomplished from the surface without special tools. It is recommended that periodic inspections following installation determine a site-specific maintenance cycle to ensure functionality of the media and the vegetation.

We recommend that periodic system inspections be performed to determine the pollutant and trash loading characteristics. In general, quarterly inspections should be performed during the first year of operation to better anticipate maintenance frequency in the first year and subsequent years of operation.

An Aqua-Ponic™ maintenance event should first determine any obvious signs of degradation, displacement, sediment or trash accumulation, or oil in the upper layers of the unit. The top gravel layer should be completely replaced and can be removed by shoveling or vacuuming. The top several inches of the underlying plant stabilization filter media may be replaced at the same time if warranted. Care should be taken not to damage the plants or disturb rootballs during limited media replacement. Care should also be taken when replacing a plant to avoid disturbing remaining plants.

Depending on site conditions, it may be necessary to remove all the media and all the plants and completely replace these components of the system. It is recommended that the wicks be replaced if the system is fully replaced with stabilization media and plants.

Sediment can accumulate in the base of the water supply sump over time. After removing the pea gravel layer, the plants and the plant stabilization filter media bed, the perforated metal plate should be removed to access the water supply sump from the surface for the purpose of vacuuming water and any accumulated sediment. The wicking ropes should also be replaced at this time. The perforated metal plate with the new wicking ropes should be set in place prior to installing the plant stabilization filter media on top of the plate.

Komline-AquaShield can provide plant stabilization filter media, wicks and any associated grommets. Although unlikely, the supporting stainless-steel plate can also be supplied by Komline-AquaShield. While we recommend that the pea gravel be replaced as warranted, it may be feasible to wash the gravel during a maintenance event. However, in most cases it is more efficient to replace the pea gravel or any landscaping glass to avoid disposal of water that was used to clean either of those materials.

All I&M activities can be performed from the surface without the need for Komline-AquaShield personnel to be present. We recommend that all materials removed during the maintenance process be handled and disposed of in accordance with all applicable federal, state and local guidelines. Depending on the influent pollutant characteristics of the facility drainage area, it may be appropriate to perform Toxicity Characteristics Leaching Procedure (TCLP) analyses on representative samples of the spent filter media to ensure that the handling and disposition of materials complies with any applicable environmental regulations and practices.

Attached is a two-page Aqua-Ponic™ I&M Log to document service provider(s), activities and scheduling.

**Next two pages include I&M Logs**

## AQUA-PONIC™ INSPECTION & MAINTENANCE LOG

### MAINTENANCE COMPANY INFORMATION

Company Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State/Prov.: \_\_\_\_\_ Zip/Postal Code: \_\_\_\_\_

Contact: \_\_\_\_\_ Title: \_\_\_\_\_

Office Phone: \_\_\_\_\_ Cell Phone: \_\_\_\_\_

### ACTIVITY LOG

Date of Cleaning: \_\_\_\_\_

Time of Cleaning: Start: \_\_\_\_\_ End: \_\_\_\_\_

Date of Next Inspection: \_\_\_\_\_

Floatable debris present:      Yes                  No      Action taken: \_\_\_\_\_

\_\_\_\_\_

Oil present:      Yes                  No      Action taken: \_\_\_\_\_

Filter Media Needs Replacement:      Yes                  No

Structural damage:      Yes      No      Where: \_\_\_\_\_

Clogging:      Yes      No      Describe: \_\_\_\_\_

| Additional Comments and/or Actions to be Taken | Time Frame |
|------------------------------------------------|------------|
|                                                |            |
|                                                |            |
|                                                |            |
|                                                |            |

## Inspection & Maintenance Schedule Log

### First Year Post-Construction

*Date Installed/Activated:* \_\_\_\_\_

| Activity                                    | Month |   |   |   |   |   |   |   |   |    |    |    |
|---------------------------------------------|-------|---|---|---|---|---|---|---|---|----|----|----|
|                                             | 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Inspect and Clean<br>as needed              |       |   | X |   |   | X |   |   | X |    |    | X  |
| Inspect Bypass<br>and maintain as<br>needed |       |   | X |   |   | X |   |   | X |    |    | X  |
| Clean System*                               |       |   |   |   |   |   |   |   |   |    |    | X  |

### Second and Subsequent Years Post-Construction

| Activity                                 | Month |   |   |   |   |   |   |   |   |    |    |    |
|------------------------------------------|-------|---|---|---|---|---|---|---|---|----|----|----|
|                                          | 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Inspect and Clean<br>as needed           |       |   |   |   |   |   |   |   |   |    |    | X  |
| Inspect Bypass,<br>maintain as<br>needed |       |   |   |   |   |   |   |   |   |    |    | X  |
| Clean System                             |       |   |   |   |   |   |   |   |   |    |    | X  |



## **Appendix G: Groundwater Recharge**

## Annual Groundwater Recharge Analysis (based on GSR-32)

|                                       |  |  |  |
|---------------------------------------|--|--|--|
| <b>Project Name:</b> JMA02P003.04     |  |  |  |
| <b>Description:</b> Stormwater Design |  |  |  |
| <b>Analysis Date:</b> 04/22/26        |  |  |  |

| Post-Developed Conditions                                   |                 |                  |         |                            |                               |
|-------------------------------------------------------------|-----------------|------------------|---------|----------------------------|-------------------------------|
| Land Segment                                                | Area (acres)    | TR-55 Land Cover | Soil    | Annual Recharge (in)       | Annual Recharge (cu.ft)       |
| 1                                                           | 0.68            | Impervious areas | Boonton | 0.0                        | -                             |
| 2                                                           | 0.02            | Open space       | Boonton | 14.9                       | 1,085                         |
| 3                                                           | 0               |                  |         |                            |                               |
| 4                                                           | 0               |                  |         |                            |                               |
| 5                                                           | 0               |                  |         |                            |                               |
| 6                                                           | 0               |                  |         |                            |                               |
| 7                                                           | 0               |                  |         |                            |                               |
| 8                                                           | 0               |                  |         |                            |                               |
| 9                                                           | 0               |                  |         |                            |                               |
| 10                                                          | 0               |                  |         |                            |                               |
| 11                                                          | 0               |                  |         |                            |                               |
| 12                                                          | 0               |                  |         |                            |                               |
| 13                                                          | 0               |                  |         |                            |                               |
| 14                                                          | 0               |                  |         |                            |                               |
| 15                                                          | 0               |                  |         |                            |                               |
| Total =                                                     | 0.7             |                  |         | Total Annual Recharge (in) | Total Annual Recharge (cu.ft) |
| Annual Recharge Requirements Calculation ↓                  |                 |                  |         |                            |                               |
| % of Pre-Developed Annual Recharge to Preserve =            |                 |                  |         |                            |                               |
| 100%                                                        |                 |                  |         |                            |                               |
| Post-Development Annual Recharge Deficit= -543 (cubic feet) |                 |                  |         |                            |                               |
| Recharge Efficiency Parameters Calculations (area averages) |                 |                  |         |                            |                               |
| RWC= 3.34 (in)                                              | DRWC= 3.34 (in) |                  |         |                            |                               |
| ERWC= 0.55 (in)                                             | EDRW= 0.55 (in) |                  |         |                            |                               |

| Pre-Developed Conditions                   |              |                  |         |                            |                               |
|--------------------------------------------|--------------|------------------|---------|----------------------------|-------------------------------|
| Land Segment                               | Area (acres) | TR-55 Land Cover | Soil    | Annual Recharge (in)       | Annual Recharge (cu.ft)       |
| 1                                          | 0.69         | Impervious areas | Boonton | 0.0                        | -                             |
| 2                                          | 0.01         | Open space       | Boonton | 14.9                       | 543                           |
| 3                                          | 0            |                  |         |                            |                               |
| 4                                          | 0            |                  |         |                            |                               |
| 5                                          | 0            |                  |         |                            |                               |
| 6                                          | 0            |                  |         |                            |                               |
| 7                                          | 0            |                  |         |                            |                               |
| 8                                          | 0            |                  |         |                            |                               |
| 9                                          | 0            |                  |         |                            |                               |
| 10                                         | 0            |                  |         |                            |                               |
| 11                                         | 0            |                  |         |                            |                               |
| 12                                         | 0            |                  |         |                            |                               |
| 13                                         | 0            |                  |         |                            |                               |
| 14                                         | 0            |                  |         |                            |                               |
| 15                                         | 0            |                  |         |                            |                               |
| Total =                                    | 0.7          |                  |         | Total Annual Recharge (in) | Total Annual Recharge (cu.ft) |
| Annual Recharge Requirements Calculation ↓ |              |                  |         |                            |                               |
| 543                                        |              |                  |         |                            |                               |

### Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

## **Appendix H: Groundwater Mounding**

## Basin A

### Input Values

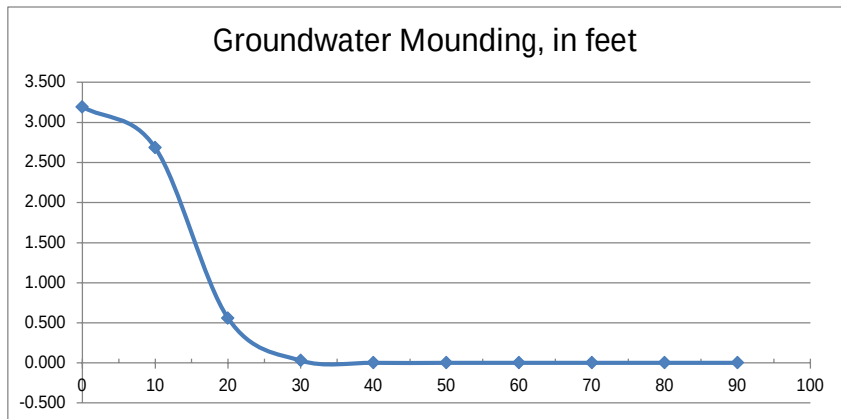
|        |       |                                                                                                                            |
|--------|-------|----------------------------------------------------------------------------------------------------------------------------|
| 0.50   | R     | Recharge rate (permeability rate) (in/hr)                                                                                  |
| 0.150  | Sy    | Specific yield, Sy (dimensionless)<br>default value is 0.15; max value is 0.2 provided that a lab test data is submitted   |
| 0.50   | Kh    | Horizontal hydraulic conductivity (in/hr)<br>Kh = 5xRecharge Rate (R) in the coastal plain; Kh=R outside the coastal plain |
| 14.750 | x     | 1/2 length of basin (x direction, in feet)                                                                                 |
| 36.320 | y     | 1/2 width of basin (y direction, in feet)                                                                                  |
| 11.79  | t     | Duration of infiltration period (hours)                                                                                    |
| 10.00  | hi(0) | Initial thickness of saturated zone (feet)                                                                                 |

|                                                       |                  |                                                                                             |
|-------------------------------------------------------|------------------|---------------------------------------------------------------------------------------------|
| 13.192                                                | h(max)           | Maximum thickness of saturated zone (beneath center of basin at end of infiltration period) |
| 3.192                                                 | $\Delta h(\max)$ | Maximum groundwater mounding (beneath center of basin at end of infiltration period)        |
| Distance from center of basin in x direction, in feet |                  |                                                                                             |

|       |    |
|-------|----|
| 3.192 | 0  |
| 2.685 | 10 |
| 0.558 | 20 |
| 0.030 | 30 |
| 0.002 | 40 |
| 0.001 | 50 |
| 0.001 | 60 |
| 0.001 | 70 |
| 0.001 | 80 |
| 0.001 | 90 |



Re-Calculate Now



### Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

## Porous Pavement B

### Input Values

|         |
|---------|
| 0.50    |
| 0.150   |
| 0.50    |
| 9.000   |
| 121.170 |
| 5.61    |
| 10.00   |

|              |                                                                                    |
|--------------|------------------------------------------------------------------------------------|
| <b>R</b>     | Recharge rate (permeability rate) (in/hr)                                          |
| <b>Sy</b>    | Specific yield, Sy (dimensionless)                                                 |
|              | default value is 0.15; max value is 0.2 provided that a lab test data is submitted |
| <b>Kh</b>    | Horizontal hydraulic conductivity (in/hr)                                          |
|              | Kh = 5xRecharge Rate (R) in the coastal plain; Kh=R outside the coastal plain      |
| <b>x</b>     | 1/2 length of basin (x direction, in feet)                                         |
| <b>y</b>     | 1/2 width of basin (y direction, in feet)                                          |
| <b>t</b>     | Duration of infiltration period (hours)                                            |
| <b>hi(0)</b> | Initial thickness of saturated zone (feet)                                         |

|        |
|--------|
| 13.996 |
| 3.996  |

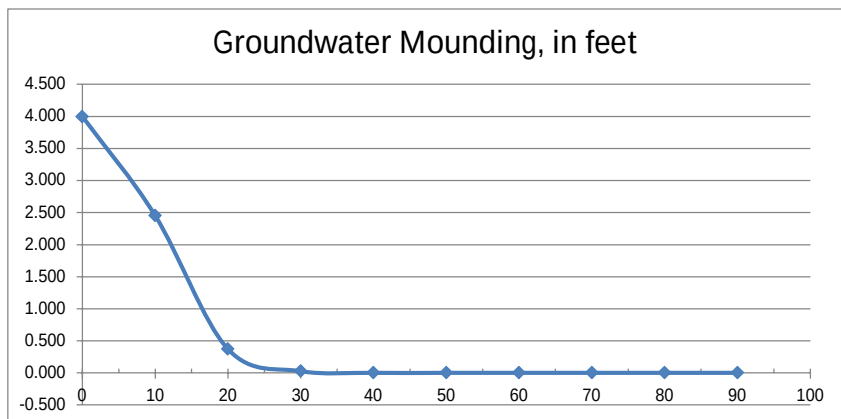
|                |                                                                                             |
|----------------|---------------------------------------------------------------------------------------------|
| <b>h(max)</b>  | Maximum thickness of saturated zone (beneath center of basin at end of infiltration period) |
| <b>Δh(max)</b> | Maximum groundwater mounding (beneath center of basin at end of infiltration period)        |

Ground-water center of basin in x  
Mounding, in feet direction, in feet

|       |    |
|-------|----|
| 3.996 | 0  |
| 2.455 | 10 |
| 0.372 | 20 |
| 0.028 | 30 |
| 0.002 | 40 |
| 0.002 | 50 |
| 0.002 | 60 |
| 0.002 | 70 |
| 0.002 | 80 |
| 0.002 | 90 |



Re-Calculate Now



### Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

## **Appendix I: Low Impact Development Checklist**

# New Jersey Stormwater Best Management Practices Manual

February 2004

## A P P E N D I X A

# Low Impact Development Checklist

### **A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development**

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

# Low Impact Development Checklist

**A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development**

Municipality: West Orange

County: Essex Date: 5/15/2026

Review board or agency: Township of West Orange Planning Board

Proposed land development name: 262-270 Main St Site Redevelopment

Lot(s): 50 & 55 Block(s): 114

Project or application number: \_\_\_\_\_

Applicant's name: Jorge Mastropietro Architects

Applicant's address: 36 Newark Street, Suite 202, Hoboken, NJ 07030

Telephone: (646) 248-6664 Fax: \_\_\_\_\_

Email address: jm@jmapc.com

Designer's name: Hudson Engineering, LLC.

Designer's address: 25 W 8th Street, Suite B, Bayonne, NJ 07002

Telephone: (201) 589-0906 Fax: \_\_\_\_\_

Email address: info@hudsoneng.com

## Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

The existing site consists of mostly impervious area. The total impervious area  
decreased by approximately 900 square feet and replaced with lawn area and  
landscaping, which is the only measure that can be practically taken given the  
site's conditions.

## Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

N.J.A.C. 7:8

Do regulations include nonstructural requirements? Yes: \_\_\_\_\_ No: X

If yes, briefly describe: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

List LID-BMPs prohibited by local regulations: N/A

\_\_\_\_\_

\_\_\_\_\_

Pre-design meeting held? Yes: \_\_\_\_\_ Date: \_\_\_\_\_ No: X

Meeting held with: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Pre-design site walk held? Yes: \_\_\_\_\_ Date: \_\_\_\_\_ No: X

Site walk held with: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other agencies with stormwater review jurisdiction:

Name: Township of West Orange Planning Board

Required approval: \_\_\_\_\_

Name: \_\_\_\_\_

Required approval: \_\_\_\_\_

Name: \_\_\_\_\_

Required approval: \_\_\_\_\_

## Part 3: Nonstructural Strategies and LID-BMPs in Design

### 3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: \_\_\_\_\_ No: X

If yes, was this inventory a factor in the site's layout and design? Yes: \_\_\_\_\_ No: \_\_\_\_\_

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: \_\_\_\_\_ No: X If yes, specify % of site: \_\_\_\_\_

Native ground cover? Yes: \_\_\_\_\_ No: X If yes, specify % of site: \_\_\_\_\_

Vegetated buffers? Yes: \_\_\_\_\_ No: X If yes, specify % of site: \_\_\_\_\_

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: \_\_\_\_\_ No: X If yes, specify % of site: \_\_\_\_\_

Native ground cover? Yes: \_\_\_\_\_ No: X If yes, specify % of site: \_\_\_\_\_

Vegetated buffers? Yes: \_\_\_\_\_ No: X If yes, specify % of site: \_\_\_\_\_

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: \_\_\_\_\_ No: \_\_\_\_\_

Reduce runoff pollutant loads through runoff treatment: Yes: \_\_\_\_\_ No: \_\_\_\_\_

Maintain groundwater recharge by preserving natural areas: Yes: \_\_\_\_\_ No: \_\_\_\_\_

### 3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

- A. Have inventories of existing site soils and slopes been performed? Yes: X No: \_\_\_\_\_

If yes, were these inventories factors in the site's layout and design? Yes:   X   No:           

- B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: \_\_\_\_\_ No: X

If yes, how: \_\_\_\_\_

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Restrict temporary site disturbance during construction? Yes: \_\_\_\_\_ No:   X  

If yes, how: \_\_\_\_\_

Consider soils and slopes in selecting disturbance limits? Yes: \_\_\_\_\_ No: X

If yes, how: \_\_\_\_\_

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- C. Specify percentage of site to be cleared: 0% Regraded: 100%

- D. Specify percentage of cleared areas done so for buildings: N/A

For driveways and parking: \_\_\_\_\_ For roadways: \_\_\_\_\_

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

**The parking area would need to roughly match the existing driveway slope,**

**which isn't practical since this would make it difficult to comply with ADA**

**requirements.**

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: \_\_\_\_\_ HSG B: \_\_\_\_\_ HSG C: **100%** HSG D: \_\_\_\_\_

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: \_\_\_\_\_ HSG B: \_\_\_\_\_ HSG C: **100%** HSG D: \_\_\_\_\_

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

**None**

I. Does the site include Karst topography?

Yes: \_\_\_\_\_ No: **X**

If yes, discuss measures taken to limit Karst impacts:

### 3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 99% Proposed: 97%

B. Specify maximum site impervious coverage allowed by regulations: 75%

C. Compare proposed street cartway widths with those required by regulations:

| Type of Street                                      | Proposed Cartway Width (feet) | Required Cartway Width (feet) |
|-----------------------------------------------------|-------------------------------|-------------------------------|
| Residential access – low intensity                  |                               |                               |
| Residential access – medium intensity               |                               |                               |
| Residential access – high intensity with parking    |                               |                               |
| Residential access – high intensity without parking |                               |                               |
| Neighborhood                                        |                               |                               |
| Minor collector – low intensity without parking     |                               |                               |
| Minor collector – with one parking lane             |                               |                               |
| Minor collector – with two parking lanes            | 24                            | 24                            |
| Minor collector – without parking                   |                               |                               |
| Major collector                                     |                               |                               |

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: 9' x 18' Regulations: 9' x 18'

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: 43 Regulations: 48

F. Specify percentage of total site impervious cover created by buildings: **47.5%**

By driveways and parking: **52.5%** By roadways: \_\_\_\_\_

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

**Reducing the square footage of the building and decreasing the size of the parking lot.**

H. Specify percentage of total impervious area that will be unconnected:

Total site: **0%** Buildings: \_\_\_\_\_ Driveways and parking: \_\_\_\_\_ Roads: \_\_\_\_\_

I. Specify percentage of total impervious area that will be porous:

Total site: \_\_\_\_\_ Buildings: \_\_\_\_\_ Driveways and parking: **19.4%** Roads: \_\_\_\_\_

J. Specify percentage of total building roof area that will be vegetated: **0%**

K. Specify percentage of total parking area located beneath buildings: **0%**

L. Specify percentage of total parking located within multi-level parking deck: **0%**

### 3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: \_\_\_\_\_ Vegetated swale: \_\_\_\_\_ Natural channel: \_\_\_\_\_

Stormwater management facility: \_\_\_\_\_ Other: \_\_\_\_\_

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

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C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: \_\_\_\_\_

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Increase overland flow roughness: \_\_\_\_\_

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### 3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

#### A. Trash Receptacles

Specify the number of trash receptacles provided: 1

Specify the spacing between the trash receptacles: \_\_\_\_\_

Compare trash receptacles proposed with those required by regulations:

Proposed: 1 Regulations: 1

#### B. Pet Waste Stations

Specify the number of pet waste stations provided: \_\_\_\_\_

Specify the spacing between the pet waste stations: \_\_\_\_\_

Compare pet waste stations proposed with those required by regulations:

Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

#### C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: \_\_\_\_\_

#### D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

Litter collection: Proposed: \_\_\_\_\_ Regulations: \_\_\_\_\_

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

\_\_\_\_\_  
\_\_\_\_\_

E. Prevention and Containment of Spills

Identify locations where pollutants are located on the site, and the features that prevent these pollutants from being exposed to stormwater runoff:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

Feature utilized to prevent pollutant exposure, harmful accumulation, or contain spills:

Pollutant: \_\_\_\_\_ Location: \_\_\_\_\_

## Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

| No. | Nonstructural Strategy                                                                                                                                       | Yes | No |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|
| 1.  | Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.                                            | X   |    |
| 2.  | Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.                                                         | X   |    |
| 3.  | Maximize the protection of natural drainage features and vegetation.                                                                                         |     | X  |
| 4.  | Minimize the decrease in the pre-construction time of concentration.                                                                                         | X   |    |
| 5.  | Minimize land disturbance including clearing and grading.                                                                                                    | X   |    |
| 6.  | Minimize soil compaction.                                                                                                                                    | X   |    |
| 7.  | Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides. | X   |    |
| 8.  | Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.                                                         |     | X  |
| 9.  | Provide preventative source controls.                                                                                                                        | X   |    |

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

There is no natural vegetation onsite. It is not possible to protect vegetation

that is not present. There were also no areas on site where it was feasible to

have vegetated open-channel systems.