STORMWATER REPORT

Atkins Road Cluster Subdivision

EAST SANDWICH, MASSACHUSETTS

FEBRUARY 5, 2014

Applicant/Developer:

Monomoy Properties, LLC
79 Cove Road
South Dennis, MA 02660

Owner:

Monomoy Properties, LLC
79 Cove Road
South Dennis, MA 02660

BSC Job Number: 4-9675.00

Prepared by:

BSC GROUP

349 Route 28, Unit D
West Yarmouth, MA 02673

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SECTION 1.0

PROJECT NARRATIVE

1.1 PROJECT DESCRIPTION

The project is located at the terminus of Atkins Road in Sandwich, Massachusetts. The property is bordered by the Mid-Cape Highway (Route 6) to the southwest, residential properties to the north and west, Fox Meadow Condominiums to the northeast and undeveloped land, owned by the Town of Sandwich, to the south and east. The site is undeveloped, with the exception of two isolated areas, where sand and gravel mining operations occurred at one point in time.

The proposed project entails the development of a 23-lot clustered subdivision. The development will be serviced by paved roads, underground utilities, municipal water, stormwater best management practices (BMPs), and individual septic systems with nitrogen reduction.

1.2 PRE-DEVELOPMENT DRAINAGE CONDITIONS

The project site is an undeveloped forested parcel of land in Sandwich, Massachusetts. The topography consists of undulating terrain with multiple peaks and valleys. The NRCS Web Soil Survey has identified three primary soil classifications underlying the project site. The Soil Map Units classified as 485C and 483D together account for approximately 90% of the project site. These soils belong to the Barnstable-Plymouth and Plymouth-Barnstable complexes, are typically located on the slopes and ridges of glacial moraines, and are excessively drained. The remaining 10% of the soils underlying the project site have been classified NRCS as belonging to Soil Map Unit 600 - Pits, sand and gravel. BSC conducted onsite soil testing in October 2012, which was witnessed by the Town of Sandwich. The results of the soil testing confirm the NRCS soil classifications for this property, and as such, have been modeled as Hydrologic Soil Group A.

Due to the nature of the existing soils, there is very little stormwater runoff to abutting properties from the subject site. BSC has modeled seven (7) subcatchments in the pre-development scenario. Of these subcatchments, four (4) of them do not generate offsite stormwater flow. Stormwater runoff in these areas is conveyed via overland flow to existing natural depressions, where it infiltrates the ground.

Stormwater runoff from Subcatchments 1S, 2S and 4S flows offsite to abutting properties. However, given nature of these soils, there is very little runoff even resulting from a 100-year storm.

1.3 POST-DEVELOPMENT DRAINAGE CONDITIONS

The proposed BMPs for this project have been designed in accordance with the DEP Stormwater Management Guidelines and the Town of Sandwich Zoning Bylaws.

Stormwater runoff in the post-development scenario will be collected by catchbasins and conveyed through stormdrains to infiltration basins located throughout the proposed development. In accordance with the Town of Sandwich Subdivision Rules & Regulations, an existing natural drainage area located centrally in the western portion of the project site will be utilized for the attenuation and infiltration of stormwater runoff from a large portion of the proposed development. This area is modeled as Pond 1P in the post-development HydroCAD

model. Stormwater runoff from Road A, Road B, and a small portion of Atkins Road will be conveyed to this area. Stormwater runoff from remaining portions of the proposed extension of Atkins Road will be conveyed to a proposed infiltration basin identified as Pond 3P, which is located in the northeast corner of the property, where sand and gravel mining operations once occurred. Stormwater runoff from western and southern areas of the project site will be conveyed to a proposed infiltration basin Pond 2P, which is located south of the proposed Atkins Road.

Stormwater runoff from the proposed lots located off the Road B cul-de-sac will be collected via field drains and conveyed to one of two leaching pit clusters, adjacent to the cul-de-sac. Similarly, stormwater runoff from the proposed lots located off the Road A cul-de-sac will be flow overland to one of two field drains and conveyed to a leaching pit cluster located near the western boundary of the project site.

All stormwater runoff from impervious surfaces will be treated prior to discharge in accordance with the Massachusetts DEP Stormwater Management Standards, which require 80% removal of Total Suspended Solids (TSS) prior to exfiltration. Treatment will be achieved via deep sump and hooded catchbasins, vegetated filter strips, and infiltration facilities.

Water Runoff Rates

The proposed drainage systems provide adequate detention to reduce peak flows from the site during the 2, 10, 25 and 100-year storms as follows:

Peak Flow Rates Summary

Node 1R

	Existing Flows (cfs)	Proposed Flows (cfs)	Peak Runoff Decrease (cfs)
2-year Peak Runoff	0	0	0
10-year Peak Runoff	0	0	0
25-year Peak Runoff	0.04	0.03	0.01
100-year Peak Runoff	0.25	0.19	0.06

Node 2R

	Existing Flows (cfs)	Proposed Flows (cfs)	Peak Runoff Decrease (cfs)
2-year Peak Runoff	0	0	0
10-year Peak Runoff	0	0	0
25-year Peak Runoff	0.03	0.02	0.01
100-year Peak Runoff	0.18	0.12	0.06

Node 3R

	Existing Flows (cfs)	Proposed Flows (cfs)	Peak Runoff Decrease (cfs)
2-year Peak Runoff	0	0	0
10-year Peak Runoff	0	0	0
25-year Peak Runoff	0.03	0.02	0.01
100-year Peak Runoff	0.18	0.12	0.06

Water Quality

The proposed drainage systems have been designed to exceed the recommended 80% TSS removal goal with the implementation of the following:

- Deep Sump (4-foot) and Hooded Catch Basins
- Vegetated Filter Strips (>25 feet)
- Infiltration Basins

Groundwater Recharge

The proposed project has been designed to make use of existing natural drainage areas for stormwater management, attenuation of peak discharge, and groundwater recharge, where feasible. In addition, the project includes two proposed man-made infiltration basins and two areas where leaching pit clusters are proposed to recharge stormwater runoff from the building lots. The groundwater recharge facilities, as proposed, comply with the requirements of both the Stormwater Management Standards and the Town of Sandwich.

Conclusions

The project has been designed in accordance with DEP Stormwater Management Standards and the Town of Sandwich Subdivision Rules & Regulations. Through the construction of the aforementioned stormwater systems, the project will provide peak rate attenuation, TSS removal and groundwater recharge. These systems have been designed to accommodate a 100-year storm, thereby exceeding the requirements of both DEP and the Town of Sandwich.

SECTION 2.0

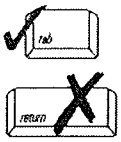
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION CHECKLIST FOR STORMWATER REPORT

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

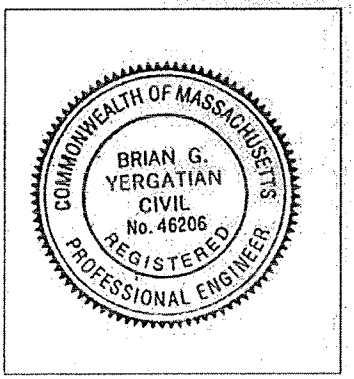
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date 2/5/14

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

SECTION 3.0

LONG-TERM POLLUTION PREVENTION PLAN & OPERATION AND MAINTENANCE PLAN

3.0 Long-Term Pollution Prevention & Operation and Maintenance Plan

As required by Standard 4 of the Massachusetts Stormwater Handbook, this Long-Term Pollution Prevention Plan has been developed for source control and pollution prevention at the site after construction.

Maintenance Responsibility

The enforcement of the Long-Term Operation and Maintenance Plan will be the responsibility of the owner of the property, Monomoy Properties LLC.

Good Housekeeping Practices

The site is to be kept clean of trash and debris at all times. Trash, junk, etc. is not to be left outside and will be subject to removal at the owner's expense.

Requirements for Routine Inspections and Maintenance of Stormwater Best Management Practices

All stormwater Best Management Practices (BMPs) are to be inspected and maintained as follows:

Stormceptor Water Quality Treatment Units

The water quality treatment structures require periodic inspection and cleaning to maintain operation and function. Owners should have these units inspected on a semi-annual basis and after periods of intense precipitation. Inspections can be done by using a clear Plexiglas tube ("sludge judge") to extract a water column sample. When sediment accumulation reaches 15% of storage capacity, cleaning of the unit is required.

These water quality structures must and will be checked and cleaned immediately after petroleum spills; contact appropriate regulatory agencies.

Maintenance of these units should be done by a vacuum truck that will remove the water, sediment, debris, floating hydrocarbons and other materials in unit. Proper cleaning and disposal of the removed materials and liquid must be followed.

Deep Sump & Hooded Catch Basins

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect or clean deep sump basins at least four times per year and at the end of the foliage and snow removal seasons. Sediment must also be removed four (4) times per year or whenever the depth of the deposits in the catch basin sump is greater than or equal to one (1) foot from the bottom of the basin.

Infiltration Systems

Maintenance is required for the proper operation of the underground infiltration and detention systems. This includes both the leaching pit clusters and the infiltration basins. Infiltration systems are prone to failure due to clogging if the upstream water quality units are not maintained. The use of pretreatment BMPs will minimize failure and maintenance requirements.

After construction, the infiltration systems should be inspected after every major storm for the first few months to ensure proper stabilization and function. Water levels in the access ports should be recorded over several days to check the drainage of the systems. It is recommended that a log book be maintained showing the depth of water in the detention/infiltration systems at each observation in order to determine the rate at which the system dewaters after runoff producing storm events. Once the performance characteristics of the infiltration systems have been verified, the monitoring schedule can be reduced to an annual basis, unless the performance data suggests that a more frequent schedule is required.

Preventive maintenance on the infiltration systems should be performed at least twice a year, and sediment should be removed from any and all pretreatment and collection structures. Sediment should be removed when deposits approach within six inches of the invert heights of connecting pipes between unit rows, or in sumped inlet structures. Removal of sediment should be performed by a vacuum truck.

SNOW DISPOSAL AND PLOWING

The purpose of the snow and snowmelt management plan is to provide guidelines regarding snow disposal site selection, site preparation and maintenance that are acceptable to the Department of Environmental Protection, Bureau of Resource Protection.

For the areas that require snow removal, snow storage onsite will largely be accomplished by using pervious upland areas away from paved areas for smaller storms. There are adequate snow storage areas located within parking lot islands and edges of paved areas away from the wetland resource areas for small, more frequent snowfall events. For larger snowfall events or for additional snow storage space, snowfall will be required to be hauled offsite to a snow stockpile area meeting DEP requirements.

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas away from water resources. At these locations, the snow melt water can filter in to the soil, leaving behind sand and debris, which can be removed in the springtime. The following areas should be avoided:

- Avoid dumping of snow into any water body, including rivers, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage

system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

WINTER ROAD SALT AND/OR SAND USE AND STORAGE RESTRICTIONS

The use of sodium chloride salts, fertilizers or pesticides is prohibited on this site.

STREET SWEEPING SCHEDULES

Effective sweeping requires access to the areas to be swept. It is essential that applicants or those responsible for stormwater maintenance have the ability to impose parking regulations to facilitate proper sweeping, particularly in densely populated or heavily traveled areas, so that sweepers can get as close to curbs as possible. Tenants are to be notified prior to street sweeping operations so that paved areas can be clear of vehicles and any other items.

There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter. Each has a different ability to remove TSS.

1) Mechanical: Mechanical sweepers use brooms or rotary brushes to scour the pavement. Although most of the sweepers currently in use in Massachusetts are mechanical sweepers, they are not effective at removing TSS (from 0% to 20% removal). Mechanical sweepers are especially ineffective at picking up fine particles ("fines") (less than 100 microns).
2) Regenerative Air: These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed. Regenerative air sweepers may blow fines off the vacuumed portion of the roadway or parking lot, where they contaminate stormwater when it rains.
3) Vacuum filter: These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression. Research indicates vacuum sweepers are highly effective in removing TSS.

Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem. The following table summarizes the frequency of the site street sweeping based on the type of sweeper used.

Reuse and Disposal of Street Sweepings

Once removed from paved surfaces, the sweepings must be handled and disposed of properly. Mass DEP's Bureau of Waste Prevention has issued a written policy regarding the reuse and disposal of street sweepings. These sweepings are regulated as a solid waste, and can be used in three ways:

- In one of the ways already approved by MassDEP (e.g., daily cover in a landfill, additive to compost, fill in a public way);
- If approved under a Beneficial Use Determination;

- Disposed in a landfill.

Training of Staff or Personnel Involved with Implementing Long-Term Pollution Prevention Plan

The Long-Term Pollution Prevention Plan is to be implemented by property owner of the site. Trained and, if required, licensed Professionals are to be hired by the owner as applicable to implement the Long-Term Pollution Prevention Plan.

List of Emergency Contacts for Implementing Long-Term Pollution Prevention Plan

The Owner will be required to maintain an updated list of Emergency Contacts for the site.

POST CONSTRUCTON PHASE INSPECTION SCHEDULE AND EVALUATION CHECKLIST

BMP	Inspection Schedule	Inspection/Maintenance Performed Date:	By:	Method	Notes / Remarks
Deep Sump & Hooded Catch Basins	March			• Visually inspect quarterly. • Clean when sediment exceeds 50% of the depth using clam shell or vacuum truck (preferred).	
	June				
	September				
	December				
Stormceptor Water Quality Units	March			• Inspect quarterly during initial year following installation. • Reduce to semi-annual inspections after first year. • Remove sediment by hand or vacuum truck (preferred).	
	June				
	September				
	December				
Leaching Pit Cluster Systems	March			• Monitor water level in the access ports for the first three (3) months after construction. • Inspect inlets semi-annually. • Remove debris that may clog the system.	
	September				
Sediment Forebays	Monthly			• Inspect sediment forebay monthly. • Clean quarterly and when sediment depth exceeds 3 feet.	
Infiltration Basins	March			• Inspect after major storm during first 3 months of operation & twice a year after. • Mow the buffer area, side slopes & basin floor, remove trash & debris, grass clippings & accumulated organic matter.	
	September				

1. Refer to the Massachusetts Stormwater Handbook Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspections and maintenance of specific BMP's

2. Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

3. The use of sodium chloride salts, fertilizers or pesticides is prohibited on this site.

Other Notes: (Include deviations from Conservation Commission Orders of Conditions, Planning Board Approvals and Approved Plans)

SECTION 4.0

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN (STORM WATER POLLUTION PREVENTION PLAN - SWPPP)

4.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

(STORM WATER POLLUTION PREVENTION PLAN - SWPPP)

This Section specifies requirements and suggestions for implementation of a Storm Water Pollution Prevention Plan (SWPPP) for the development of the **Atkins Road Cluster Subdivision** off Atkins Road in East Sandwich, Massachusetts. The SWPPP shall be provided and maintained on-site by the Contractor(s) during all construction activities. The SWPPP shall be updated as required to reflect changes to construction activity.

The storm water pollution prevention measures contained in the SWPPP shall be at least the minimum required by Local Regulations. The Contractor shall provide additional measures to prevent pollution from stormwater discharges in compliance with the National Pollution Discharge Elimination System (NPDES) Phase II permit requirements and all other local, state and federal requirements.

The SWPPP shall include provisions for, but not be limited to, the following:

1. Construction Trailers
2. Lay-down Areas
3. Equipment Storage Areas
4. Stockpile Areas
5. Disturbed Areas

The Contractor shall NOT begin construction without submitting evidence that a NPDES Notice of Intent (NOI) governing the discharge of storm water from the construction site for the entire construction period has been filed at least seven days prior to construction. It is the Contractor's responsibility to complete and file the NOI.

The cost of any fines, construction delays and remedial actions resulting from the Contractor's failure to comply with all provisions of local regulations and Federal NPDES permit requirements shall be paid for by the Contractor at no additional cost to the Owner.

As a requirement of the EPA's NPDES permitting program, each Contractor and Subcontractor responsible for implementing and maintaining stormwater Best Management Practices shall execute a Contractor's Certification form.

Erosion and Sedimentation Control

The Contractor shall be solely responsible for erosion and sedimentation control at the site. The Contractor shall utilize a system of operations and all necessary erosion and sedimentation control measures, even if not specified herein or elsewhere, to minimize erosion damage at the site to prevent the migration of sediment into environmentally sensitive areas. Environmentally sensitive areas include all wetland resource areas within, and downstream of, the site, and those areas of the site that are not being altered.

Erosion and sedimentation control shall be in accordance with this Section, the design drawings, and the following:

- "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices" (EPA 832-R92-005, Sept. 1992).
- "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices – Summary Guidance" (EPA 833-R92-001, Oct. 1992).
- Massachusetts Stormwater Management Policy Handbook (Volume I) and Technical Handbook (Volume II) issued by the Massachusetts Department of Environmental Protection, March 1997.
- Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, A Guide for Planners, Designers and Municipal Officials, March 1997.

The BMPs presented herein should be used as a guide for erosion and sedimentation control and are not intended to be considered specifications for construction. The most important BMP is maintaining a rapid construction process, resulting in prompt stabilization of surfaces, thereby reducing erosion potential. Given the primacy of rapid construction, these guidelines have been designed to allow construction to progress with essentially no hindrance by the erosion control methods prescribed. These guidelines have also been designed with sufficient flexibility to allow the contractor to modify the suggested methods as required to suit seasonal, atmospheric, and site-specific physical constraints.

Another important BMP is the prevention of concentrated water flow. Sheet flow does not have the erosive potential of a concentrated rivulet. These guidelines recommend construction methods that allow localized erosion control and a system of construction, which inhibits the development of shallow concentrated flow. These BMPs shall be maintained throughout the construction process.

CONTACT INFORMATION AND RESPONSIBLE PARTIES

The following is a list of all project-associated parties:

Owner
Monomoy Properties, LLC
79 Cove Road
South Dennis, MA 02660

Contact: Ray Caterino
Phone: (800) 287-9474
Email: raycat2013@yahoo.com

Contractor
To Be Determined

Environmental Consultant
BSC Group, Inc.
349 Route 28, Unit D
West Yarmouth, MA 02673

Contact: Brian G. Yergatian, P.E., LEED AP
Phone: (617) 896 – 4590
Email: byergatian@bscgroup.com

Procedural Conditions of the Construction General Permit (CGP)

The following list outlines the Stormwater responsibilities for all construction operators working on the Project. The operators below agree through a cooperative agreement to abide by the following conditions throughout the duration of the construction project, effective the date of signature of the required SWPPP. These conditions apply to all operators on the project site.

The project is subject to EPA's NPDES General Permit through the CGP. The goal of this permit is to prevent the discharge of pollutants associated with construction activity from entering the existing and proposed storm drain system or surface waters.

All contractors/operators involved in clearing, grading and excavation construction activities must sign the appropriate certification statement required, which will remain with the SWPPP. The owner must also sign a certification, which is to remain with the SWPPP in accordance with the signatory requirements of the SWPPP.

Once the SWPPP is finalized, a signed copy, plus supporting documents, must be held at the project site during construction. A copy must remain available to EPA, State and Local agencies, and other interested parties during normal business hours.

The following items associated with this SWPPP must be posted in a prominent place at the construction site until final stabilization has been achieved:

- The completed/submitted NOI form
- Location where the public can view the SWPPP during normal business hours
- A copy of the signed/submitted NOI, permit number issued by the EPA and a copy of the current CGP.

Project specific SWPPP documents are not submitted to the USEPA unless the agency specifically requests a copy for review. SWPPP documents requested by a permitting authority, the permittee(s) will submit it in a timely manner.

EPA inspectors will be allowed free and unrestricted access to the project site and all related documentation and records kept under the conditions of the permit.

The permitee is expected to keep all BMPs and Storm Water controls operating correctly and maintained regularly.

In all circumstances, you must immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.

> *In this context, the term "immediately" requires construction operators to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if the problem is identified at a time in the work day when it is too late to initiative corrective action, the initiation of corrective action must begin on the following work day.*

If you become aware that the stormwater controls you have installed and are maintaining are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in Part 3.1. In this case, you must notify your EPA Regional Office by the end of the next work day. You are required to submit your notification through EPA's electronic NOI system, or "eNOI", at www.epa.gov/npdes/cgpenoi.

Within 24 hours of discovering the occurrence of one of the triggering conditions in Part 5.2.1 at your site, you must complete a report of the following:

5.4.1.1 Which condition was identified at your site;
5.4.1.2 The nature of the condition identified; and
5.4.1.3 The date and time of the condition identified and how it was identified.

Within 7 calendar days of discovering the occurrence of one of the triggering conditions in Part 5.2.1 at your site, you must complete a report of the following:

5.4.2.1 Any follow-up actions taken to review the design, installation, and maintenance of stormwater controls, including the dates such actions occurred;
5.4.2.2 A summary of stormwater control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed; and
5.4.2.3 Notice of whether SWPPP modifications are required as a result of the condition identified or corrective action.

Please note that some of the items above are direct quotations from the February 16, 2012 National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Construction Activities (CGP).

It also needs to be noted that this SWPPP document shall be updated by the General Contractor before the start of construction.

In maintaining the SWPPP, all records and supporting documents will be compiled together in an orderly fashion. Inspection reports and amendments to the SWPPP must remain with the document. Federal regulations require permitee(s) to keep their Project Specific SWPPP and all reports and documents for at least three years after the project is complete.

Project Description and Intended Construction Sequence

The applicant is planning to develop the site. The site is currently a largely undeveloped and heavily forested site. The construction activities will include the following major components:

- Roadway construction
- The construction of stormwater management systems
- Installation of utilities
- Landscaping

Soil disturbing activities will include site demolition, installing stabilized construction exits, installation of erosion and sedimentation controls, grading, storm drain inlets, utilities, building foundations, construction of roadways and parking lots and preparation for final seeding, mulching and landscaping. Please refer to Table 1 for the projects anticipated construction timetable. A description of BMP's associated with project timetable and construction-phasing elements are provided in Section 4.2 of this SWPPP.

Table 1 – Anticipated Construction Timetable

Construction Phasing Activity	Anticipated Timetable
Demolition, Grubbing and Stripping of Limits of Construction	To be determined
Roadway Construction	To be determined
Construction of Stormwater Management Facilities	To be determined
Installation of Utilities	To be determined
Landscaping	To be determined
Final Clean-up	To be determined

Potential Sources of Pollution

Any project site activities that have the potential to add pollutants to runoff are subject to the requirements of this sample SWPPP. Listed below are a description of potential sources of pollution from both sedimentation to Storm Water runoff, and pollutants from sources other than sedimentation.

Table 2 – Potential Sources of Sediment to Storm Water Runoff

Potential Source	Activities/Comments
Construction Site Entrance	Vehicles leaving the site can track soils onto public

and Site Vehicles	roadways. Site Vehicles can readily transport exposed soils throughout the site and off-site areas.
Grading Operations	Exposed soils have the potential for erosion and discharge of sediment to off-site areas.
Material Excavation, Relocation, and Stockpiling	Stockpiling of materials during excavation and relocation of soils can contribute to erosion and sedimentation. In addition fugitive dust from stockpiled material, vehicle transport and site grading can be deposited in wetlands and waterway.
Landscaping Operations	Landscaping operations specifically associated with exposed soils can contribute to erosion and sedimentation. Hydroseeding if not properly applied can runoff to adjacent wetlands and waterways.

Table 3 – Potential Pollutants and Sources, other than Sediment to Storm Water Runoff

Potential Source	**Activities/Comments**
Staging Areas and Construction Vehicles	Vehicle refueling, minor equipment maintenance, sanitary facilities and hazardous waste storage
Materials Storage Area	General building materials, solvents, adhesives, paving materials, paints, aggregates, trash, etc.
Construction Activities	Construction, paving, curb/gutter installation, concrete pouring/mortar/stucco

Erosion and Sedimentation Control Best Management Practices

The project site is characterized by primarily impervious surface. All construction activities will implement Best Management Practices (BMPs) in order to minimize overall site disturbance and impacts to the sites natural features. Please refer to the following sections for a detailed description of site specific BMPs. In addition, an Erosion and Sedimentation Control Plan is provided in the Site Plans.

Timetable and Construction Phasing

This section provides the Owner and Contractor with a suggested order of construction that shall minimize erosion and the transport of sediments. The individual objectives of the construction techniques described herein shall be considered an integral component of the project design intent of each project phase. The construction sequence is not intended to prescribe definitive construction methods and should not be interpreted as a construction specification document. However, the Contractor shall follow the general construction phase principles provided below:

- Protect and maintain existing vegetation wherever possible.
- Minimize the area of disturbance.

- To the extent possible, route unpolluted flows around disturbed areas.
- Install mitigation devices as early as possible.
- Minimize the time disturbed areas are left unstabilized.
- Maintain siltation control devices in proper condition.
- The contractor should use the suggested sequence and techniques as a general guide and modify the suggested methods and procedures as required to best suit seasonal, atmospheric, and site specific physical constraints for the purpose of minimizing the environmental impact of construction.

Demolition, Grubbing and Stripping of Limits of Construction Phase

- Install TEC devices as required to prevent sediment transport into resource areas.
- Place a ring of silt socks and/or hay bales around stockpiles.
- Stabilize all exposed surfaces that will not be under immediate construction.
- Store and/or dispose all pavement and building demolition debris as indicated in accordance with all applicable local, state, and federal regulations.

Parking Areas Sub-base Construction

- Install temporary culverts and diversion ditches and additional TEC devices as required by individual construction area constraints to direct potential runoff toward detention areas designated for the current construction phase.
- Compact gravel as work progresses to control erosion potential.
- Apply water to control air suspension of dust.
- Avoid creating an erosive condition due to over-watering.
- Install piped utility systems as required as work progresses, keeping all inlets sealed until all downstream drainage system components are functional.

Binder Construction

- Fine grade gravel base and install processed gravel to the design grades.
- Compact pavement base as work progresses.
- Install pavement binder coat starting from the downhill end of the site and work toward the top.

Finish Paving

- Repair and stabilize damaged side slopes.
- Clean inverts of drainage structures.
- Install final top coat of pavement.

Final Clean-up

- Clean inverts of culverts and catch basins.
- Remove sediment and debris from rip-rap outlet areas.
- Remove TEC devices only after permanent vegetation and erosion control has been fully established.

Site Stabilization

Grubbing Stripping and Grading

- Erosion control devices shall be in place as shown on the design plans before grading commences.
- Stripping shall be done in a manner, which will not concentrate runoff. If precipitation is expected, earthen berms shall be constructed around the area being stripped, with a silt sock, silt fence or hay bale dike situated in an arc at the low point of the berm.
- If intense precipitation is anticipated, silt socks, hay bales, dikes and /or silt fences shall be used as required to prevent erosion and sediment transport. The materials required shall be stored on site at all time.
- If water is required for soil compaction, it shall be added in a uniform manner that does not allow excess water to flow off the area being compacted.
- Dust shall be held at a minimum by sprinkling exposed soil with an appropriate amount of water.

Maintenance of Disturbed Surfaces

- Runoff shall be diverted from disturbed side slopes in both cut and fill.
- Mulching may be used for temporary stabilization.
- Silt sock, hay bale or silt fences shall be set where required to trap products of erosion and shall be maintained on a continuing basis during the construction process.

Loaming and Seeding

- Loam shall not be placed unless it is to be seeded directly thereafter.
- All disturbed areas shall have a minimum of 4 inches of loam placed before seeded and mulched.
- Consideration shall be given to hydro-mulching, especially on slopes in excess of 3 to 1.
- Loamed and seeded slopes shall be protected from washout by mulching or other acceptable slope protection until vegetation begins to grow.

Storm Water Collection System Installation

- The Storm Water drainage system shall be installed from the downstream end up and in a manner which will not allow runoff from disturbed areas to enter pipes.
- Excavation for the drainage system shall not be left open when rainfall is expected overnight. If left open under other circumstances, pipe ends shall be closed by a staked board or by an equivalent method.
- All catch basin openings shall be covered by a silt bag between the grate and the frame or protected from sediment by silt fence surrounding the catch basin grate.
- The ADS detention system will remain off-line until all upgradient tributary areas have been fully stabilized.

Completion of Paved Areas

- During the placement of sub-base and pavement, the entrance to the Storm Water drainage systems shall be sealed when rain is expected. When these entrances are closed,

consideration must be given to the direction of run-off and measures shall be undertaken to minimize erosion and to provide for the collection of sediment.
- In some situations it may be necessary to keep catch basins open.
- Appropriate arrangements shall be made downstream to remove all sediment deposition.

Stabilization of Surfaces

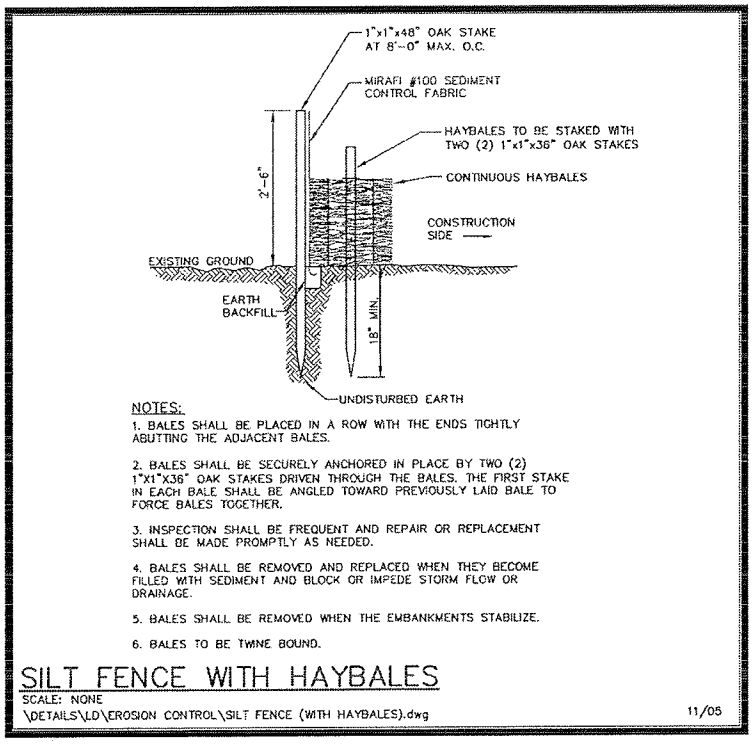
- Stabilization of surfaces includes the placement of pavement, rip-rap, wood bark mulch and the establishment of vegetated surfaces.
- Upon completion of construction, all surfaces shall be stabilized even though it is apparent that future construction efforts will cause their disturbance.
- Vegetated cover shall be established during the proper growing season and shall be enhanced by soil adjustment for proper pH, nutrients and moisture content.
- Surfaces that are disturbed by erosion processes or vandalism shall be stabilized as soon as possible.
- Areas where construction activities have permanently or temporarily ceased shall be stabilized within 7 days from the last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days).
- Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season.
- Hay mulch is an effective method of temporarily stabilizing surfaces, but only if it is properly secured by branches, weighted snow fences or weighted chicken wire.

Temporary Structural Erosion Control Measures

Temporary erosion control measures serve to minimize construction-associated impacts to wetland resource and undisturbed areas. Please refer to the following sections for a description of temporary erosion control measures implemented as part of the project and this sample SWPPP.

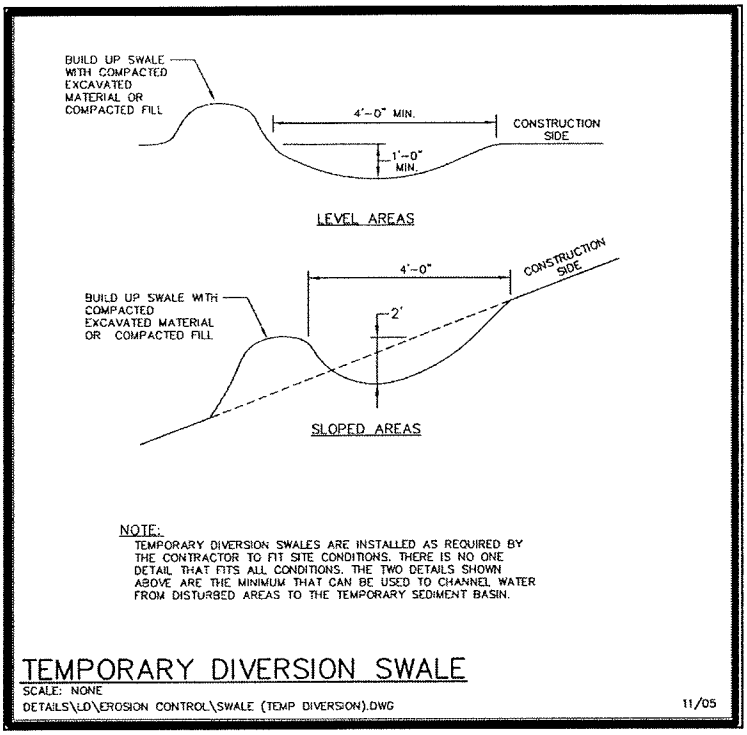
Silt Socks, Hay Bales, and Silt Fencing

Siltation barriers composed of silt socks and staked hay bales and trenched silt fence will be installed within the 100-foot buffer zone along the upland side of delineated wetland resources. The siltation barriers will demarcate the limit of work, form a work envelope and provide additional assurance that construction equipment will not enter the adjacent wetlands or undisturbed portions of the site. All barriers will remain in place until disturbed areas are stabilized.



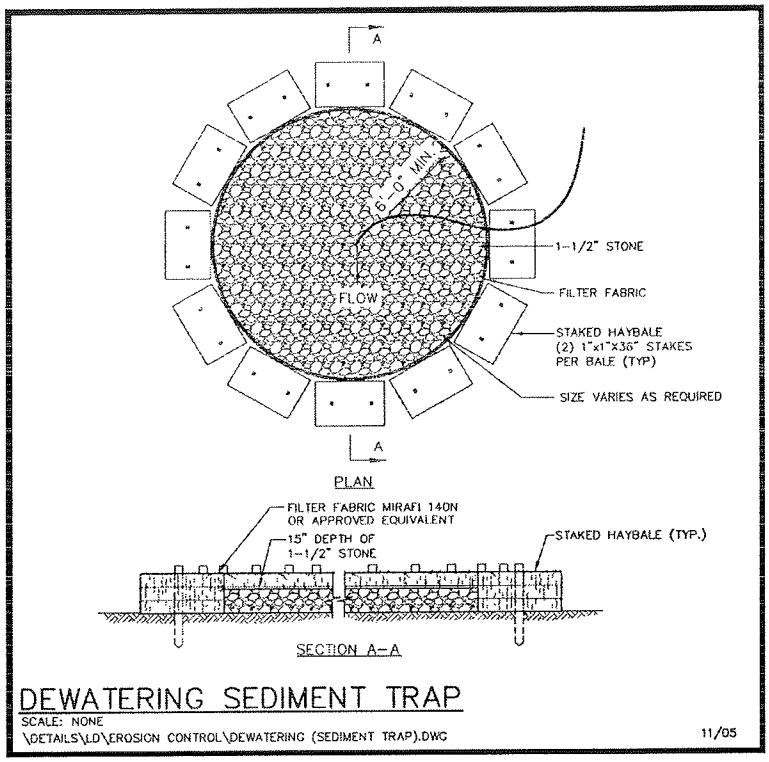
Temporary Storm Water Diversion Swale

A temporary diversion swale is an effective practice for temporarily diverting Storm Water flows and to reduce Storm Water runoff velocities during storm events. The swale channel can be installed before infrastructure construction begins at the site, or as needed throughout the construction process. The diversion swale should be routinely compacted or seeded to minimize the amount of exposed soil.



Dewatering Basins

Dewatering may be required during Storm Water system, foundation construction and utility installation. Should the need for dewatering arise, groundwater will be pumped directly into a temporary settling basin, which will act as a sediment trap during construction. All temporary settling basins will be located within close proximity of daily work activities. Prior to discharge, all groundwater will be treated by means of the settling basin or acceptable substitute. Discharges from sediment basins will be free of visible floating, suspended and settleable solids that would impair the functions of a wetland or degrade the chemical composition of the wetland resource area receiving ground or surface water flows and will be to the combined system.



Material Stockpiling Locations

There will be no storage of soil, gravel or construction debris within the 100-foot buffer zone to wetland resource areas. It is anticipated that all excavated material will be placed in a dump truck and stockpiled outside the 100-foot buffer zone during construction activities. Piping and trench excavate associated with the subsurface utility work will be contained with a single row of silt socks and/or hay bales.

Permanent Structural Erosion Control Measures

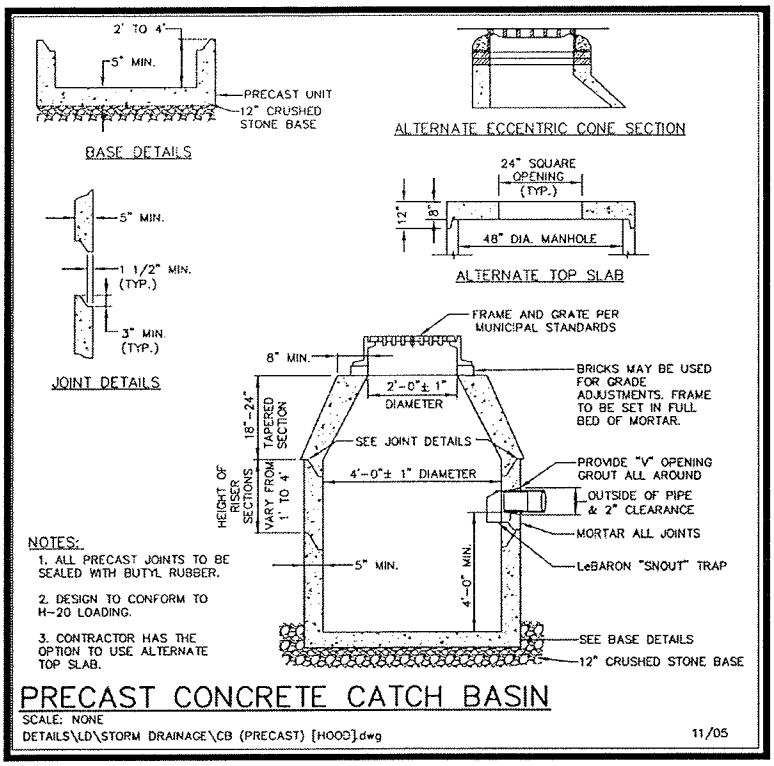
Permanent erosion control measures serve to minimize post-construction impacts to wetland resource areas and undisturbed areas. Please refer to the following sections for a description of permanent erosion control measures implemented as part of the project and this SWPPP.

Catch Basins with Deep Sumps and Hooded Traps

Parking lots will be bermed (or curbed) and provided with catch basins to collect runoff. The entire drainage system for each respective project phase will be installed during the initial phases of construction. The collection system will be installed from the downstream end up, and in a manner which will not allow runoff from disturbed areas to enter the pipes.

The catch basins will be inspected and cleaned as necessary (sediment depth of 12 inches) at least four (4) times per year. The optimum time for cleaning is during the period just after the snowmelt of late winter and prior to the onset of heavy spring precipitation. All sediments and

hydrocarbons will be properly handled and disposed of in accordance with local state and federal guidelines and regulations.



Good Housekeeping Best Management Practices

Material Handling and Waste Management

Solid waste generation during the construction period will be primarily construction debris. The debris will include scrap lumber (used forming and shoring pallets and other shipping containers), waste packaging materials (plastic sheeting and cardboard), scrap cable and wire, roll-off containers (or dumpsters) and will be removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exists the site. In addition to construction debris, the construction work force will generate some amount of household-type wastes (food packing, soft drink containers, and other paper). Trash containers for these wastes will be located around the site and will be emptied regularly so as to prevent wind-blown litter. This waste will also be removed by a contract hauler.

All hazardous waste material such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed shipping containers in the hazardous-materials storage area and segregated from other non-waste materials. Secondary containment will be provided for all materials in the hazardous materials storage area and will

consist of commercially available spill pallets. Additionally, all hazardous materials will be disposed of in accordance with federal, state and municipal regulations.

Two temporary sanitary facilities (portable toilets) will be provided at the site in the combined staging area. The toilets will be away from a concentrated flow path and traffic flow and will have collection pans underneath as secondary treatment. All sanitary waste will be collected from an approved party at a minimum of three times per week.

Building Material Staging Areas

Construction equipment and maintenance materials will be stored at the combined staging area and materials storage areas. Silt fence will be installed around the perimeter to designate the staging and materials storage area. A watertight shipping container will be used to store hand tools, small parts and other construction materials.

Non-hazardous building materials such as packaging material (wood, plastic and glass) and construction scrap material (brick, wood, steel, metal scraps, and pine cuttings) will be stored in a separate covered storage facility adjacent to other stored materials. All hazardous-waste materials such as oil filters, petroleum products, paint and equipment maintenance fluids will be stored in structurally sound and sealed containers under cover within the hazardous materials storage area.

Large items such as framing materials and stockpiled lumber will be stored in the open storage area. Such materials will be elevated on wood blocks to minimize contact with runoff.

The combined storage areas are expected to remain clean, well organized and equipped with ample cleaning supplies as appropriate for the materials being stored. Perimeter controls such as containment structures, covers and liners will be repaired or replaced as necessary to maintain proper function.

Designated Washout Areas

Designated temporary, below-ground concrete washout areas will be constructed, as required, to minimize the pollution potential associated with concrete, paint, stucco, mixers etc. Signs will, if required, be posted marking the location of the washout area to ensure that concrete equipment operators use the proper facility. Concrete pours will not be conducted during or before an anticipated precipitation event. All excess concrete and concrete washout slurries from the concrete mixer trucks and chutes will be discharged to the washout area or hauled off-site for disposal.

Equipment/Vehicle Maintenance and Fueling Areas

Several types of vehicles and equipment will be used on-site throughout the project including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes and forklifts. All major equipment/vehicle fueling and maintenance will be performed off-site. A small, 20-gallon pickup bed fuel tank will be kept on-site in the combined staging area. When vehicle fueling must occur on-site, the fueling activity will occur in the staging area. Only minor equipment maintenance will occur on-site. All equipment fluids generated from maintenance

activities will be disposed of into designated drums stored on spill pallets. Absorbent, spill-cleanup materials and spill kits will be available at the combined staging and materials storage area. Drip pans will be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.

Equipment/Vehicle Wash down Area

All equipment and vehicle washing will be performed off-site.

Spill Prevention Plan

A spill containment kit will be kept on-site in the Contractor's trailer and/or the designated staging area throughout the duration of construction. Should there be an accidental release of petroleum product into a wetland (or within 100-feet of a wetland), the appropriate agencies will be immediately notified.

Inspections

Maintenance of existing and proposed BMP's to address Storm Water management facilities during construction is an on-going process. The purpose of the inspections is to observe all sources of Storm Water or non-Storm Water discharge as identified in the SWPPP as well as the status of the receiving waters and fulfill the requirements of the Order of Conditions. The following sections describe the appropriate inspection measures to adequately implement the project's SWPPP. A blank inspection form is provided at the end of this section. Completed inspection forms are to be maintained on site.

Inspection Personnel

The owner's appointed representative will be responsible for performing regular inspections of erosion controls and ordering repairs as necessary.

Inspection Frequency

Inspections will be performed by qualified personnel once every 7 days and/or within 24-hours after a storm event of greater than one-quarter inch, in accordance with the CGP and as required by the OOC. The inspections must be documented on the inspection form provided at the end of this section, and completed forms will be provided to the on-site supervisor and maintained at the Owner's office throughout the entire duration of construction.

Inspection Reporting

Each inspection report will summarize the scope of the inspection, name(s) and qualifications of personnel making the inspection, and major observations relating to the implementation of the SWPPP, including compliance and non-compliance items. Completed inspection reports will remain with the completed SWPPP on site.

Amendment Requirements

The final SWPPP is intended to be a working document that is utilized regularly on the construction site, and provides guidance to the Contractor. It must reflect changes made to the originally proposed plan and will be updated to include project specific activities and ensure that they are in compliance with the NPDES General Permit and state and local laws and regulations. It should be amended whenever there is a change in design, construction, operation or maintenance that affects discharge of pollutants. The following items should be addressed should an amendment to the SWPPP occur:

- Dates of certain construction activities such as major grading activities, clearing and initiation of and completion of stabilization measures should be recorded.
- Future amendments to the SWPPP will be recorded as required. As this SWPPP is amended, all amendments will be kept on site and made part of the SWPPP.
- Upon completion of site stabilization (completed as designed and/or 70% background vegetative cover), it can be documented and marked on the plans. Inspections are no longer required at this time.
- Inspections often identify areas not included in the original SWPPP, which will require the SWPPP to be amended. These updates should be made within seven days of being recognized by the inspector.

SWPPP INSPECTION AND MAINTENANCE REPORT

Monomoy Properties LLC
East Sandwich, MA

TO BE COMPLETED AT LEAST EVERY 7 DAYS AND WITHIN 24 HOURS OF A STORM EVENT OF AT LEAST 0.5 INCHES. AFTER SITE STABILIZATION, TO BE COMPLETED AT LEAST ONCE PER MONTH FOR THREE YEARS OR UNTIL A NOTICE OF TERMINATION IS FILED.

INSPECTOR NAME /TITLE: _____ **DATE:** _____

START/END TIME:_____

Type of Inspection

☐ **Regular** ☐ **Pre-storm event** ☐ **During storm event** ☐ **Post-storm event (inches**_____**)**

Construction Activities: _____

_____

_____

Weather at Time of Inspection: _____

Has it rained since the last inspection?

☐Yes ☐No

If yes, provide:

Storm Start Date & Time:_____ **Storm Duration (hrs):**_____ **Approximate Rainfall (in):**_____

Do you suspect that discharges may have occurred since the last inspection?

☐Yes ☐No

Are there any discharges at the time of inspection?

☐Yes ☐No

BMP Description	In Conformance	Effective	Notes
Construction Entrance	☐Yes ☐No ☐NA	☐Yes ☐No ☐NA	
Haybales and Silt Fencing	☐Yes ☐No ☐NA	☐Yes ☐No ☐NA	
Storage/Disposal Areas	☐Yes ☐No ☐NA	☐Yes ☐No ☐NA	
Subsurface Infiltration System	☐Yes ☐No ☐NA	☐Yes ☐No ☐NA	
Catch Basins	☐Yes ☐No ☐NA	☐Yes ☐No ☐NA	
Other	☐Yes ☐No ☐NA	☐Yes ☐No	
Other	☐Yes ☐No ☐NA	☐Yes ☐No ☐NA	

SITE STABILIZATION STATUS:

BMP/Activity	Implemented	Maintained	Status/Actions Required
All Slopes and disturbed areas not actively being worked properly stabilized?	☐Yes ☐ No	☐Yes ☐ No	
Are natural resource areas e.g., stream, wetlands, mature trees, etc.) protected with barriers or similar BMP's?	☐Yes ☐ No	☐Yes ☐ No	
Are perimeter controls and sediment barriers adequately installed and maintained?	☐Yes ☐ No	☐Yes ☐ No	
Are discharge points and receiving waters free of sediment deposits?	☐Yes ☐ No	☐Yes ☐ No	
Are Storm drain inlets properly protected?	☐Yes ☐ No	☐Yes ☐ No	
Is there evidence of sediment being tracked into the street?	☐Yes ☐ No	☐Yes ☐ No	
Is trash/littler from work areas collected and placed in covered dumpsters?	☐Yes ☐ No	☐Yes ☐ No	
Are washout facilities available, clearly marked, and maintained?	☐Yes ☐ No	☐Yes ☐ No	
Are vehicle and equipment fueling, cleaning and maintenance areas free of spills, leaks or any other deleterious material?	☐Yes ☐ No	☐Yes ☐ No	
Are materials that are potential stormwater contaminants stored inside or under cover?	☐Yes ☐ No	☐Yes ☐ No	
Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	☐Yes ☐ No	☐Yes ☐ No	
Other - specify:	☐Yes ☐ No	☐Yes ☐ No	
Other - specify:	☐Yes ☐ No	☐Yes ☐ No	

ADDITIONAL OBSERVATIONS: _____

_____

_____

NEXT INSPECTON TO BE PERFORMED BY: _____ **ON OR BEFORE:** _____

Certification statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name: _____

Signature: _____ Date: _____

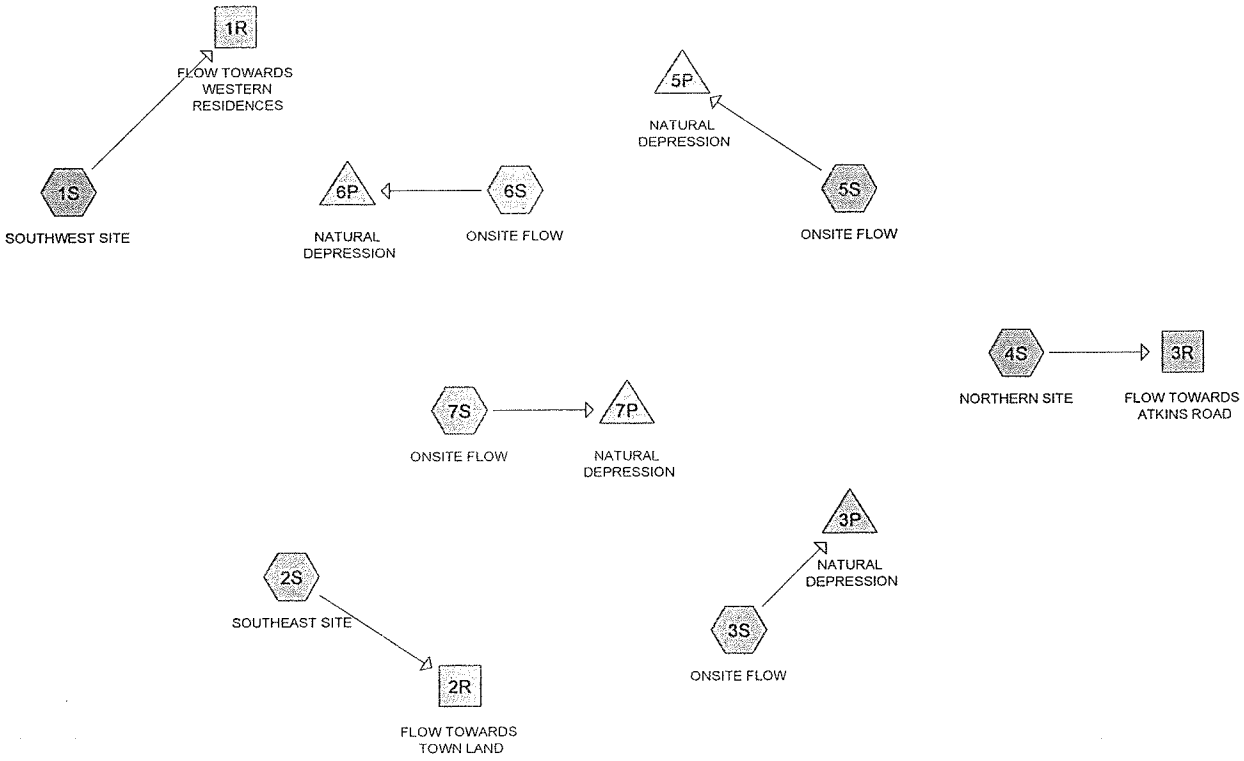
SECTION 5.0

DRAINAGE CALCULATIONS

5.1 EXISTING DRAINAGE CALCULATIONS AND WATERSHED PLAN

5.2 POST CONDITIONS DRAINAGE CALCULATIONS AND WATERSHED PLAN

5.1 Existing Drainage Calculations and Watershed Plan



Subcat Reach Pond Link

Routing Diagram for 4967500-PRE
Prepared by BSC Group, Printed 8/13/2013

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=8.029 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=5.604 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment3S: ONSITE FLOW Runoff Area=6.241 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=434' Tc=13.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment4S: NORTHERN SITE Runoff Area=5.597 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=437' Tc=13.1 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment5S: ONSITE FLOW Runoff Area=3.204 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=312' Tc=13.8 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment6S: ONSITE FLOW Runoff Area=5.008 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=504' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment7S: ONSITE FLOW Runoff Area=4.921 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=444' Tc=8.8 min CN=30 Runoff=0.00 cfs 0.000 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 3R: FLOW TOWARDS ATKINS ROAD Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 3P: NATURAL DEPRESSION Peak Elev=122.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 5P: NATURAL DEPRESSION Peak Elev=132.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 6P: NATURAL DEPRESSION Peak Elev=122.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 7P: NATURAL DEPRESSION Peak Elev=127.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 38.604 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

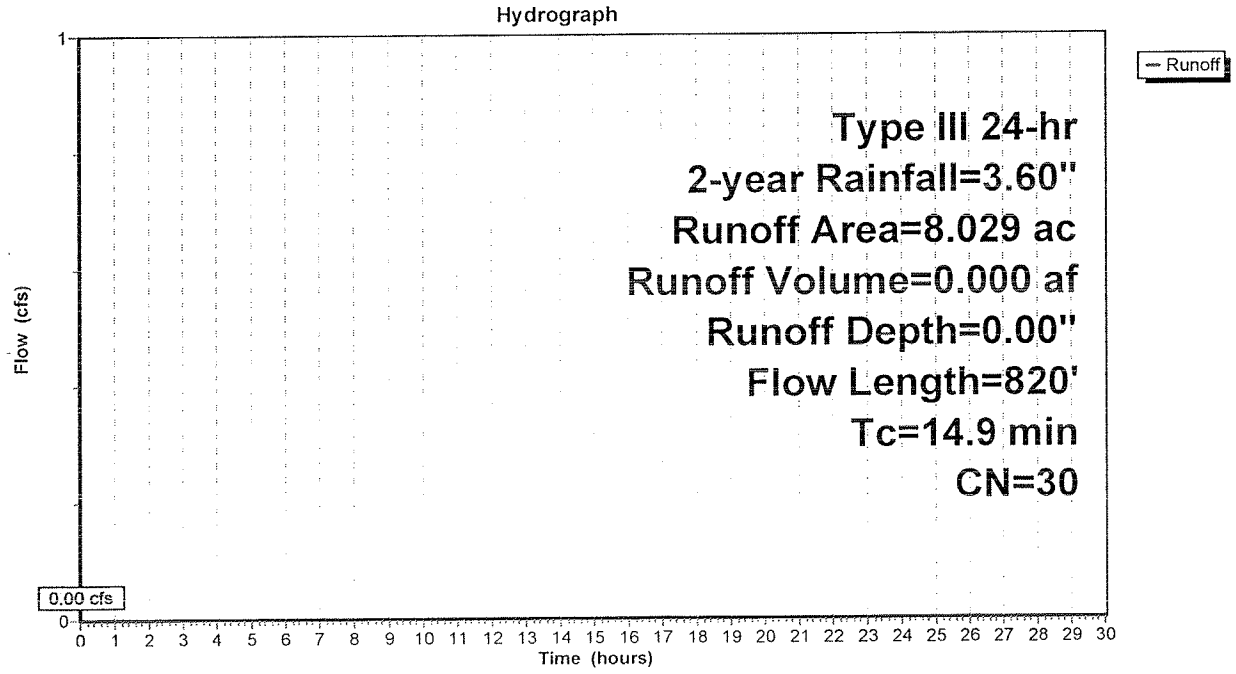
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
8.029	30	Woods, Good, HSG A
8.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

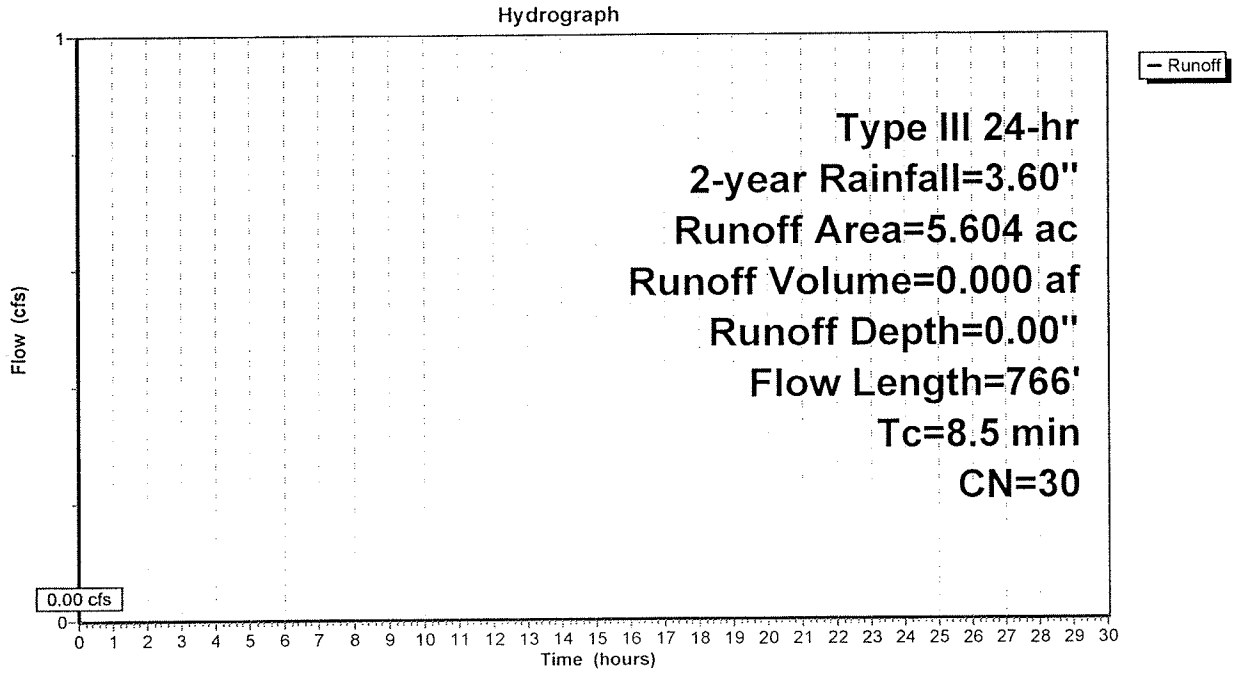
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
5.604	30	Woods, Good, HSG A
5.604		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 3S: ONSITE FLOW

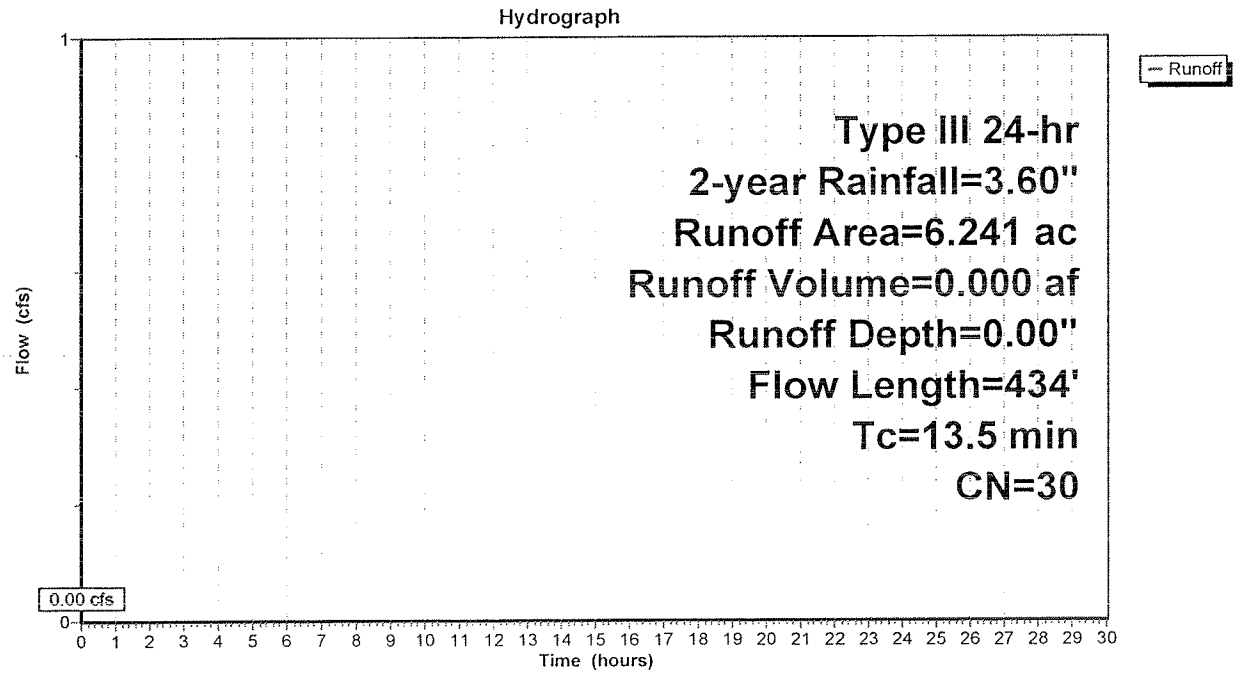
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
6.241	30	Woods, Good, HSG A
6.241		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.5	434	Total			

Subcatchment 3S: ONSITE FLOW



Summary for Subcatchment 4S: NORTHERN SITE

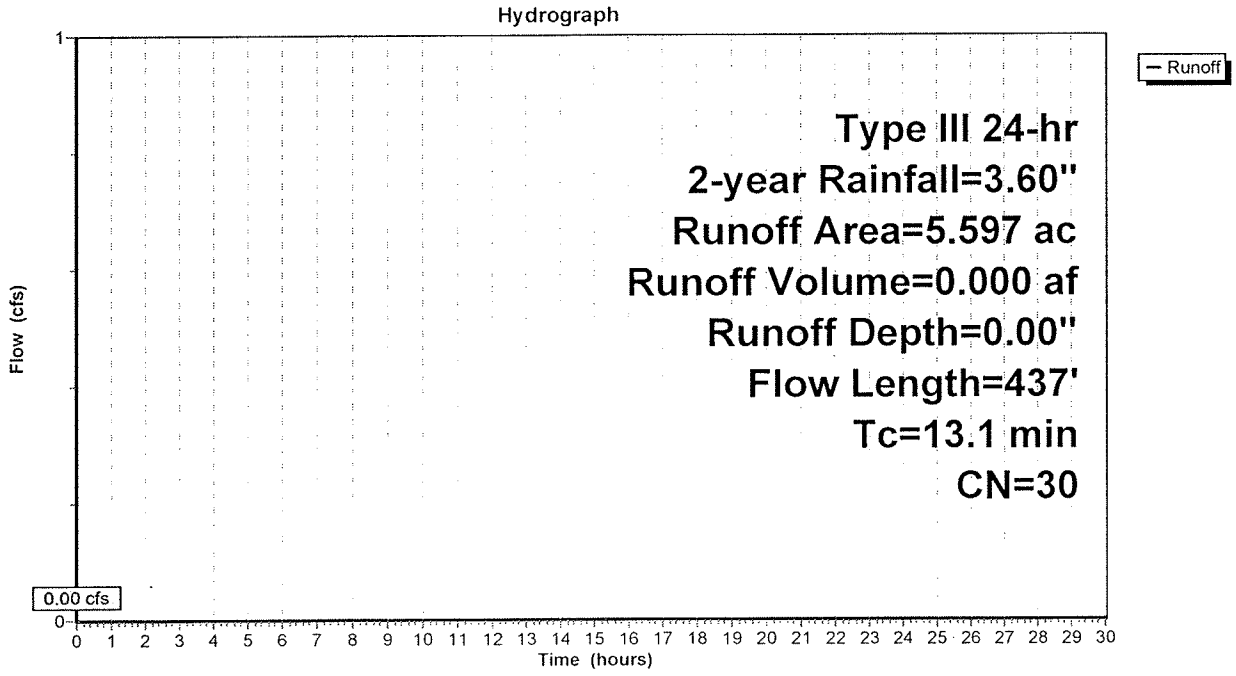
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
5.597	30	Woods, Good, HSG A
5.597		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.1	437	Total			

Subcatchment 4S: NORTHERN SITE



Summary for Subcatchment 5S: ONSITE FLOW

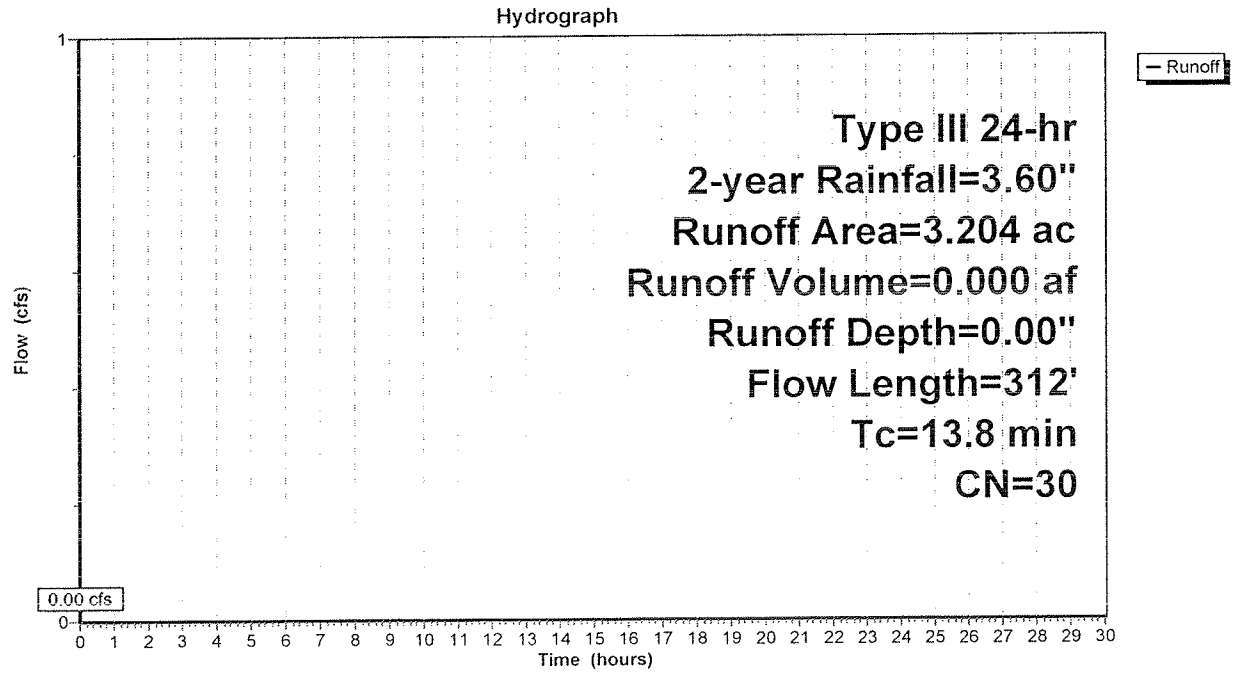
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
3.204	30	Woods, Good, HSG A
3.204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	312	Total			

Subcatchment 5S: ONSITE FLOW



Summary for Subcatchment 6S: ONSITE FLOW

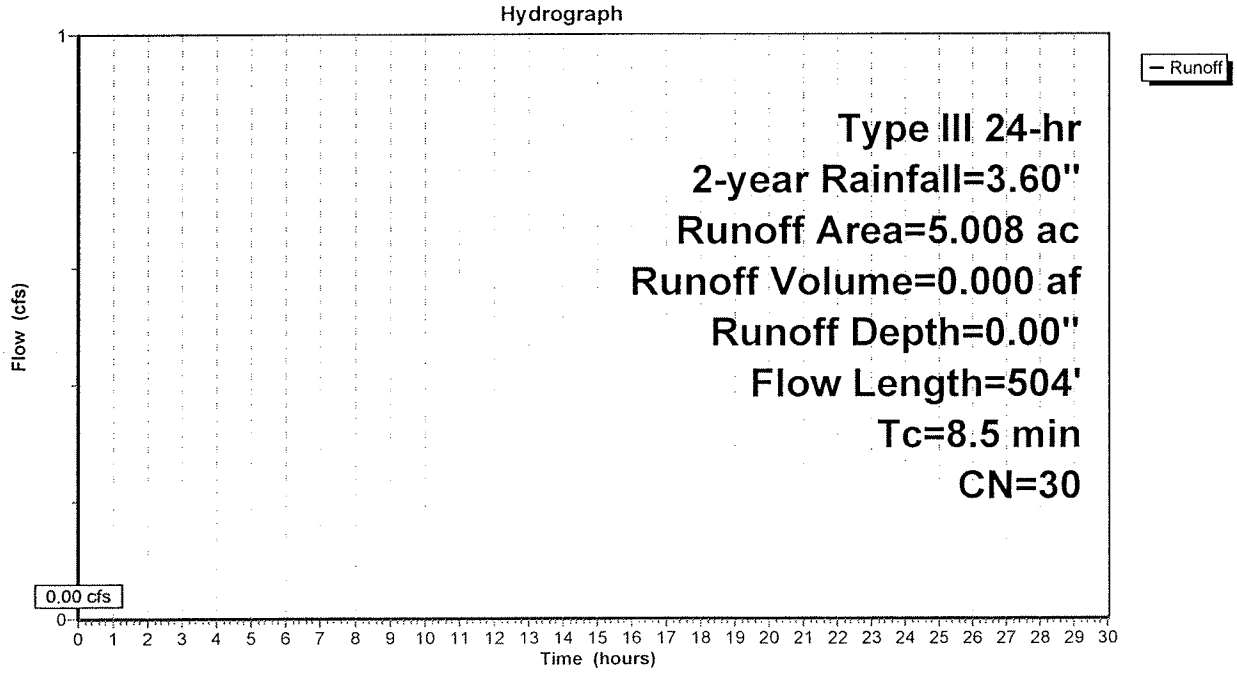
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
5.008	30	Woods, Good, HSG A
5.008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	504	Total			

Subcatchment 6S: ONSITE FLOW



Summary for Subcatchment 7S: ONSITE FLOW

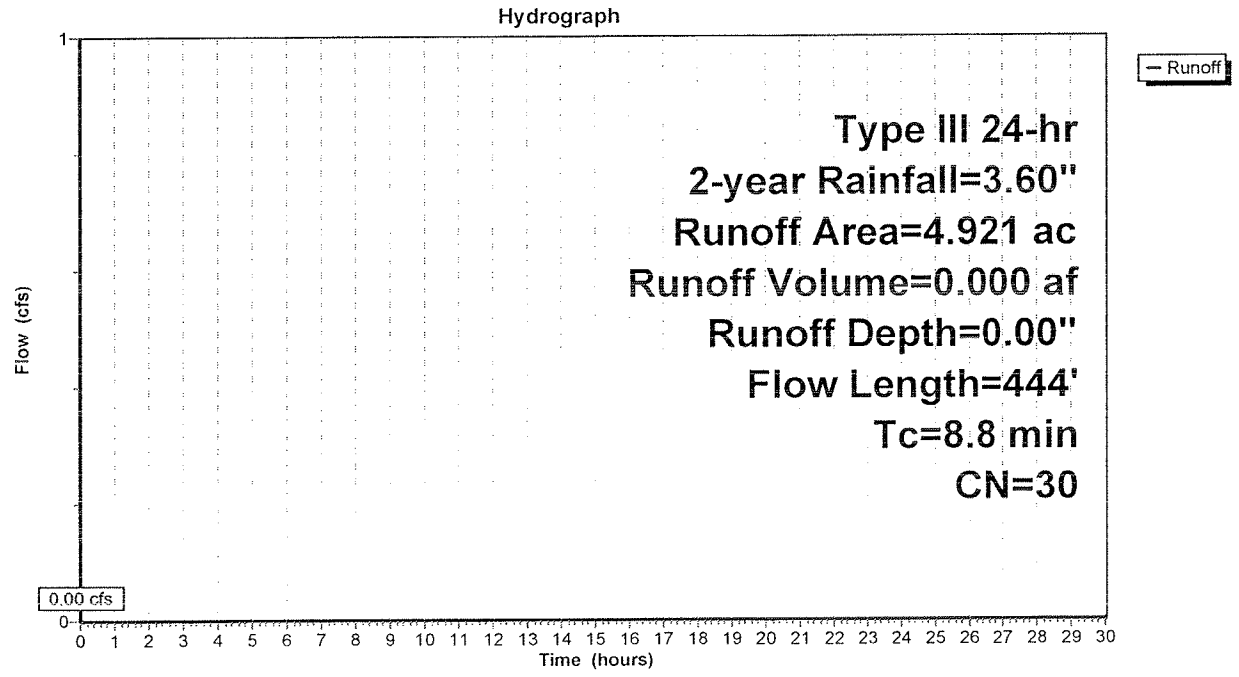
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (ac)	CN	Description
4.921	30	Woods, Good, HSG A
4.921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	40	0.0420	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0713	4.30		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.8	444	Total			

Subcatchment 7S: ONSITE FLOW

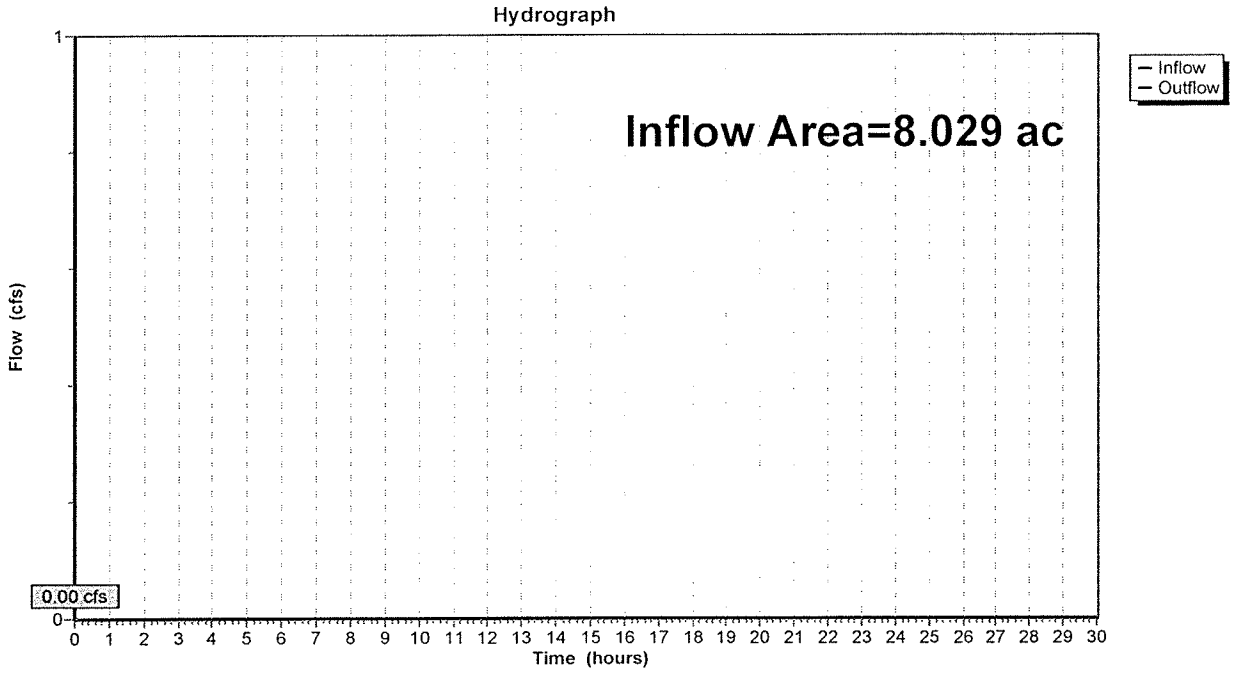


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

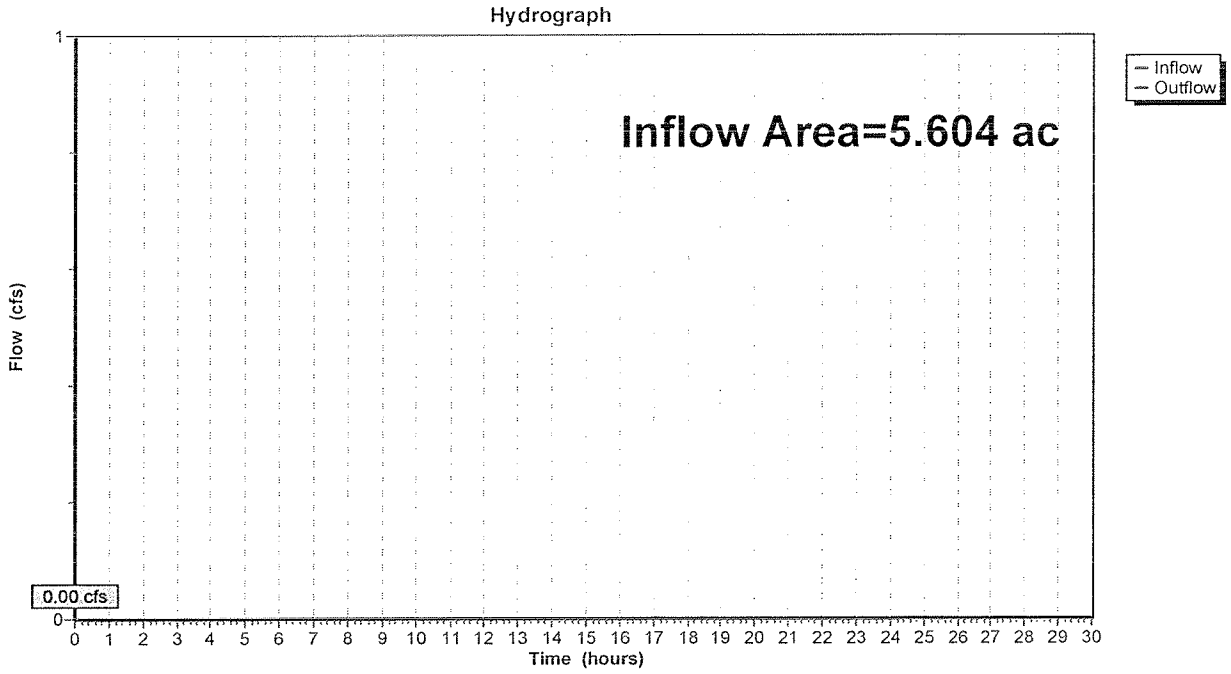


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

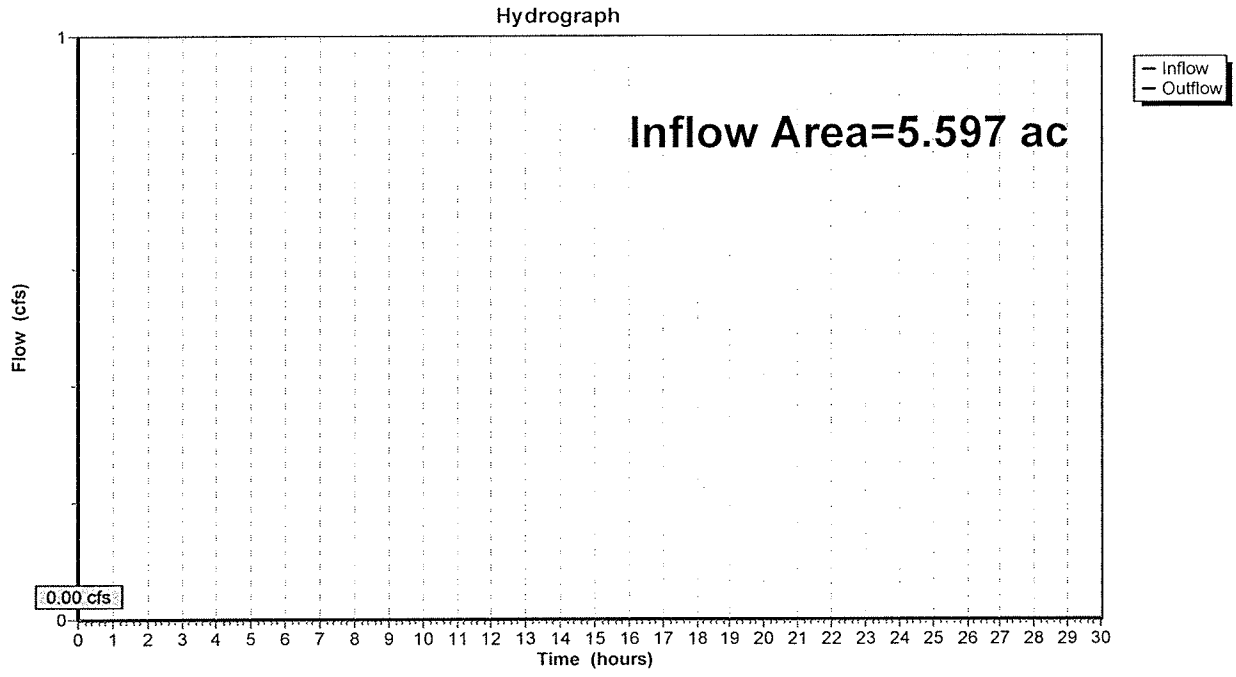


Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: FLOW TOWARDS ATKINS ROAD



Summary for Pond 3P: NATURAL DEPRESSION

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 957 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

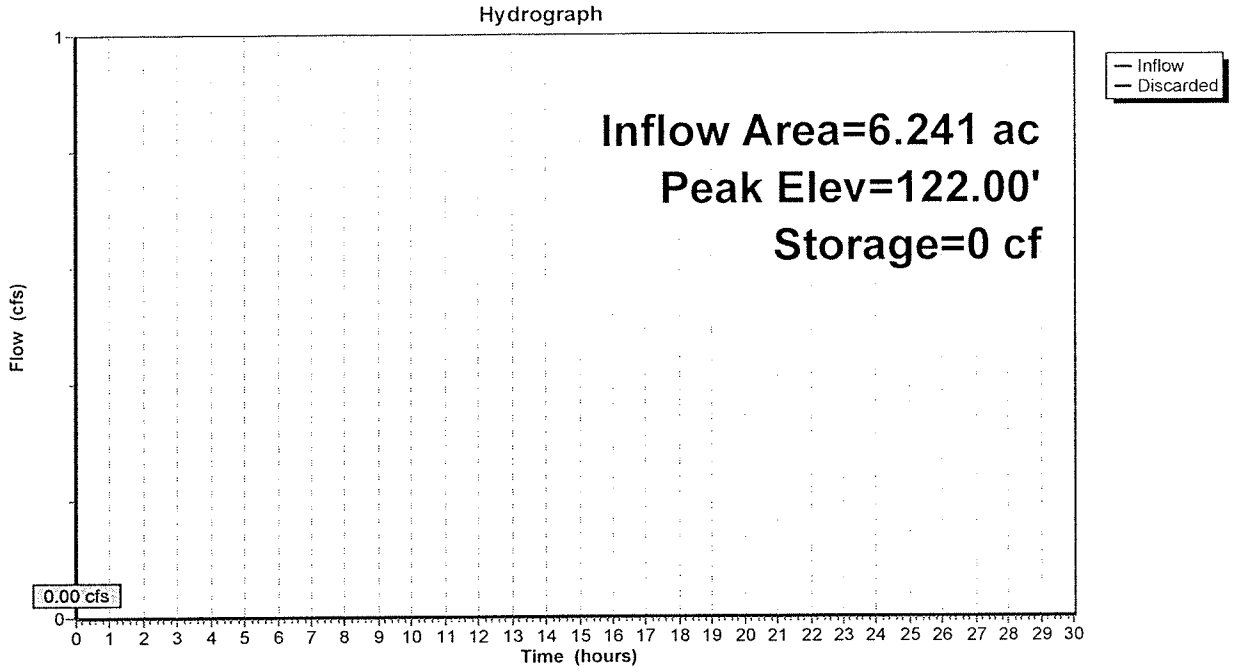
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	34,720 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.18 cfs potential flow)

Pond 3P: NATURAL DEPRESSION



Summary for Pond 5P: NATURAL DEPRESSION

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 132.00' @ 0.00 hrs Surf.Area= 76 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

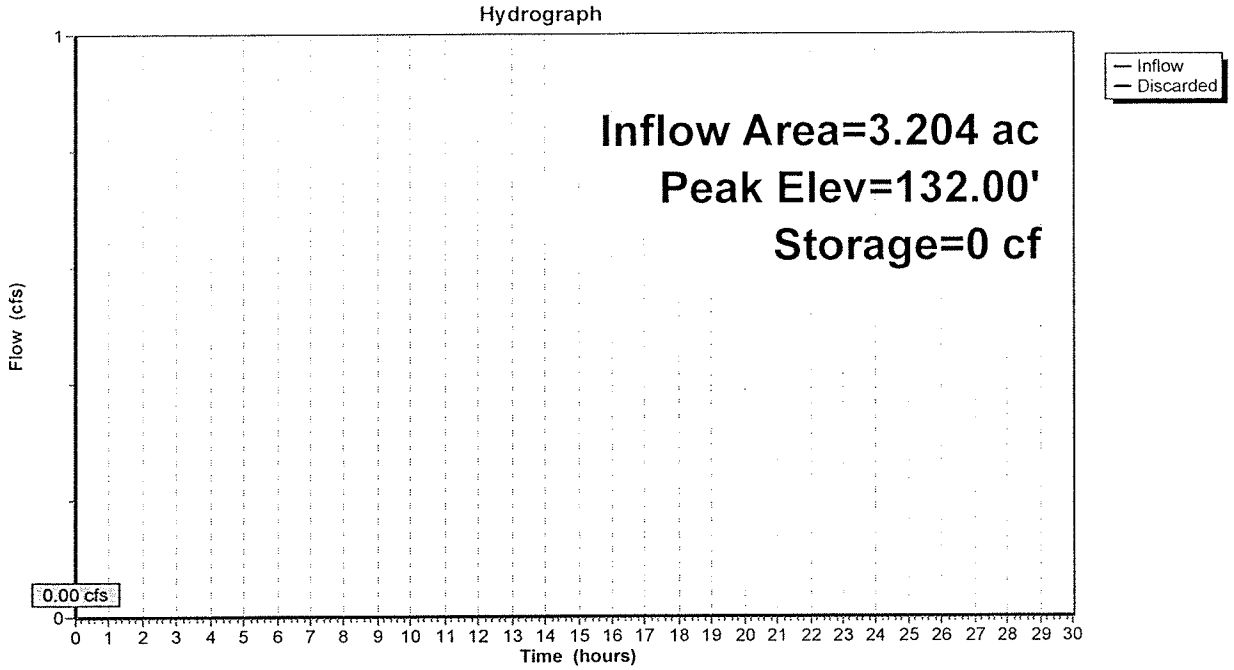
Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	5,089 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=132.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

Pond 5P: NATURAL DEPRESSION



Summary for Pond 6P: NATURAL DEPRESSION

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 1,489 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

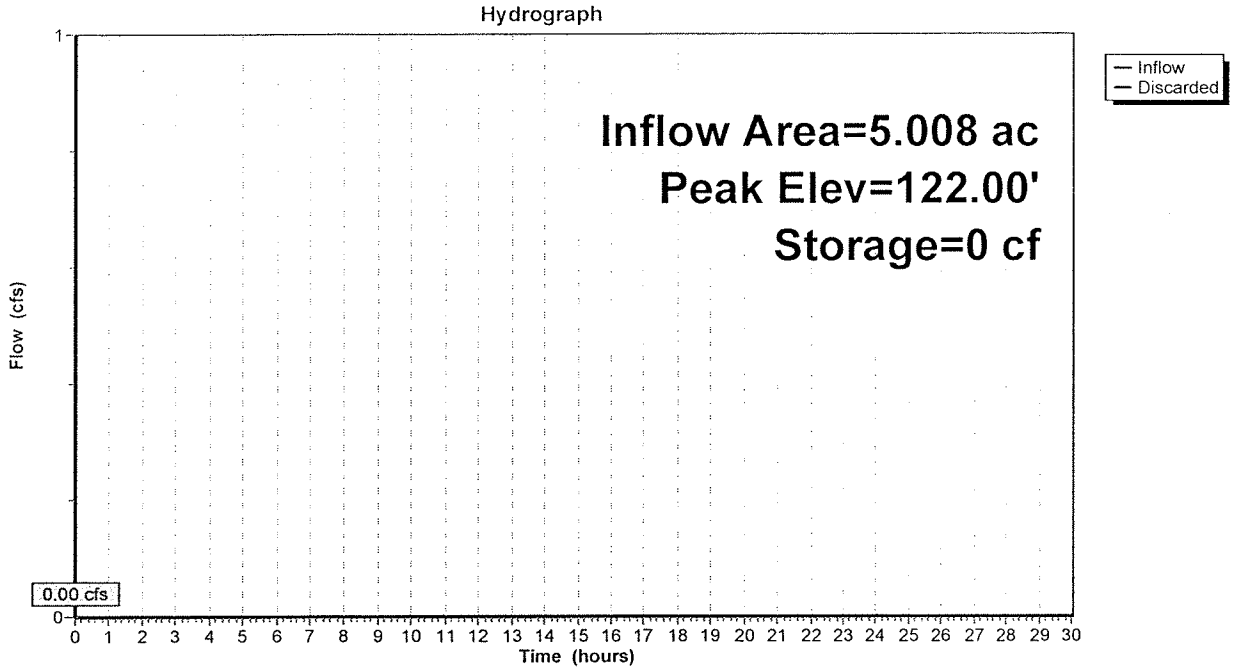
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	41,899 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.29 cfs potential flow)

Pond 6P: NATURAL DEPRESSION



Summary for Pond 7P: NATURAL DEPRESSION

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 127.50' @ 0.00 hrs Surf.Area= 2,227 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

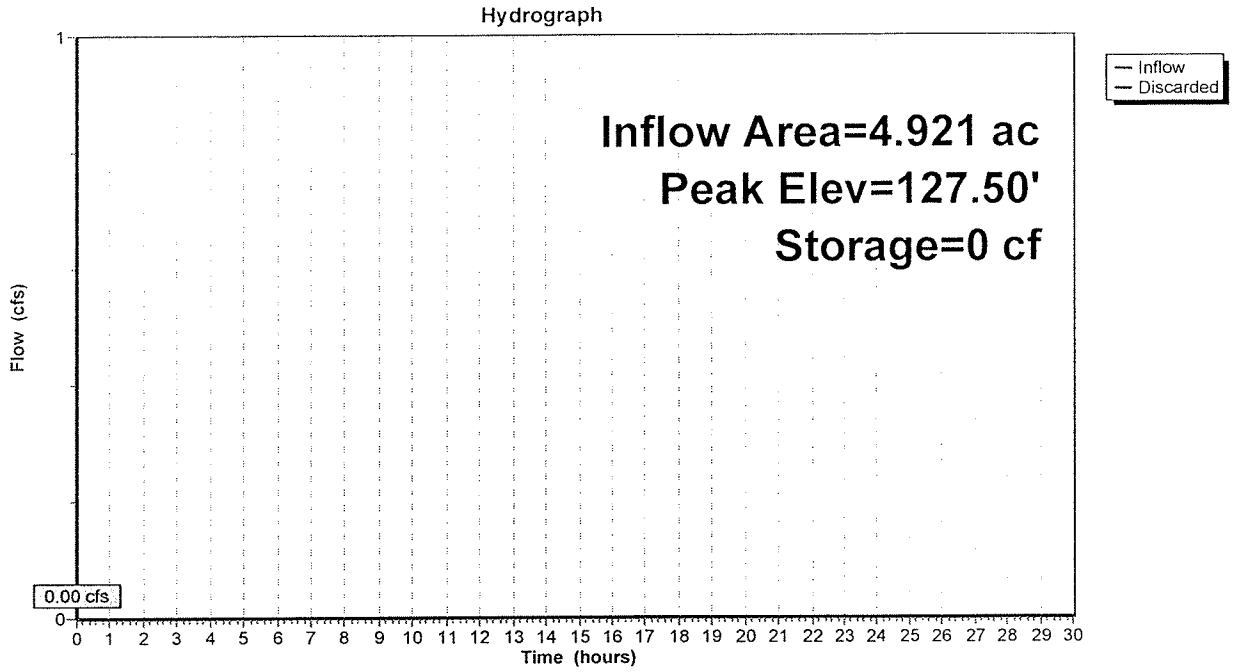
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	25,103 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=127.50' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.43 cfs potential flow)

Pond 7P: NATURAL DEPRESSION



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 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: SOUTHWEST SITE Runoff Area=8.029 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 2S: SOUTHEAST SITE Runoff Area=5.604 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: ONSITE FLOW Runoff Area=6.241 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=434' Tc=13.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: NORTHERN SITE Runoff Area=5.597 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=437' Tc=13.1 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 5S: ONSITE FLOW Runoff Area=3.204 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=312' Tc=13.8 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 6S: ONSITE FLOW Runoff Area=5.008 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=504' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 7S: ONSITE FLOW Runoff Area=4.921 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=444' Tc=8.8 min CN=30 Runoff=0.00 cfs 0.000 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 3R: FLOW TOWARDS ATKINS ROAD Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 3P: NATURAL DEPRESSION Peak Elev=122.00' Storage=1 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 5P: NATURAL DEPRESSION Peak Elev=132.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 6P: NATURAL DEPRESSION Peak Elev=122.00' Storage=1 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 7P: NATURAL DEPRESSION Peak Elev=127.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 38.604 ac Runoff Volume = 0.002 af Average Runoff Depth = 0.00"
100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

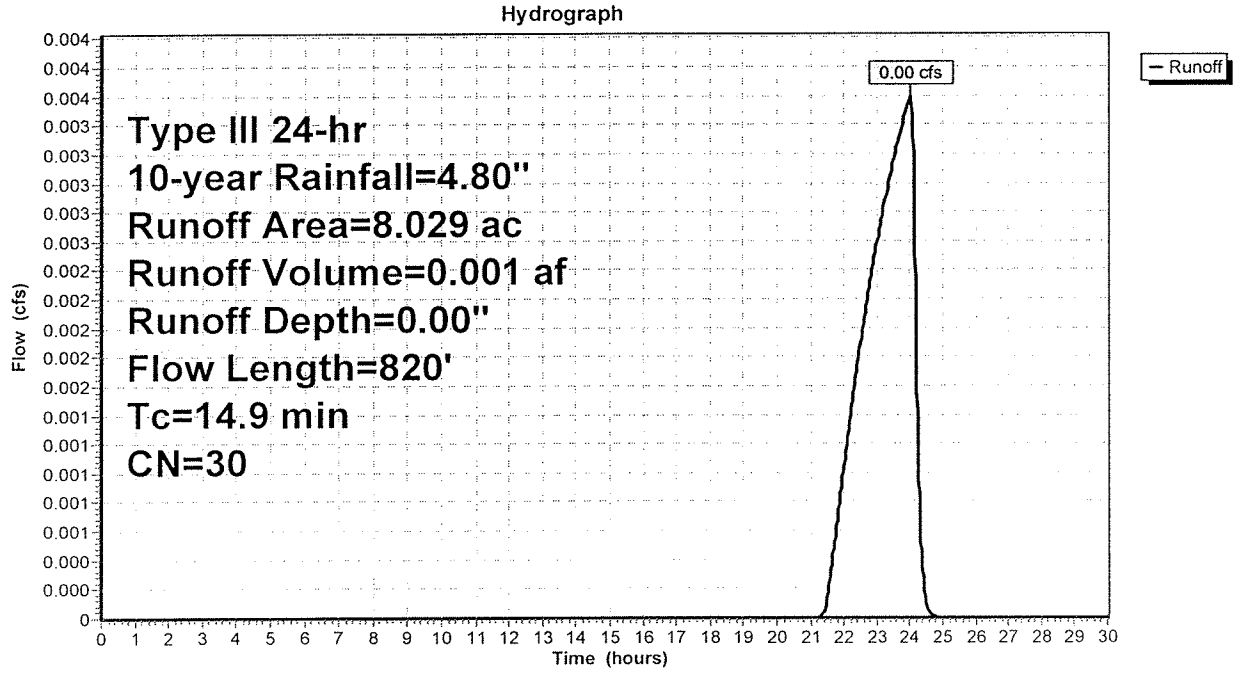
Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
8.029	30	Woods, Good, HSG A
8.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

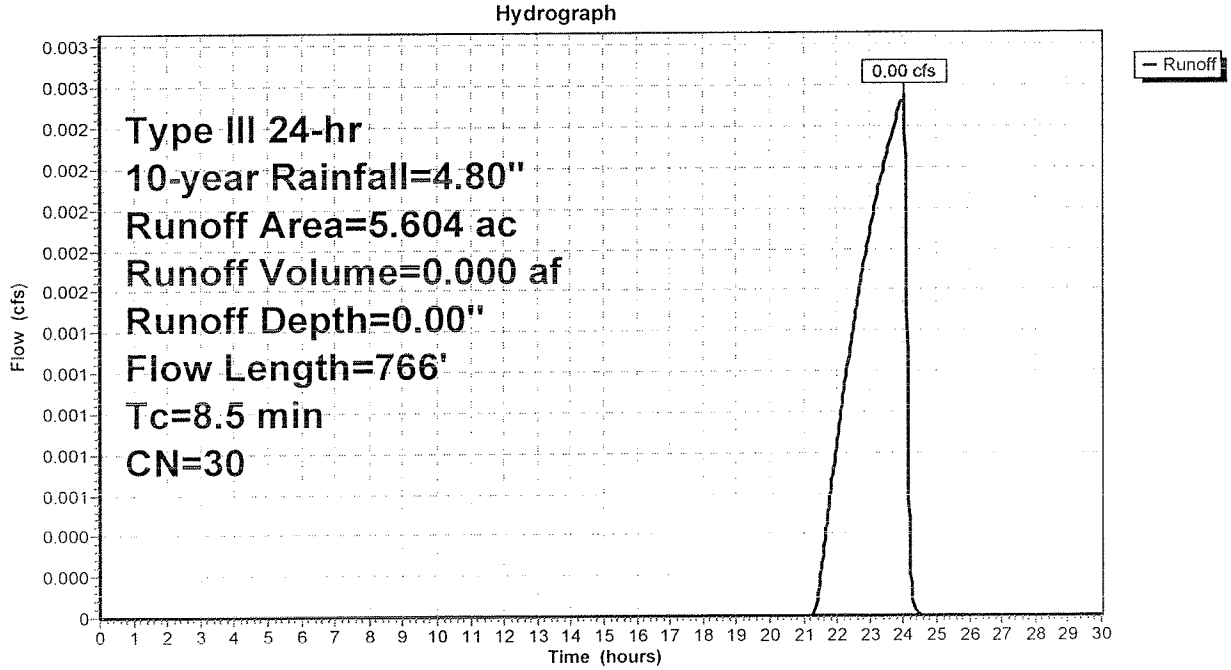
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
5.604	30	Woods, Good, HSG A
5.604		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 3S: ONSITE FLOW

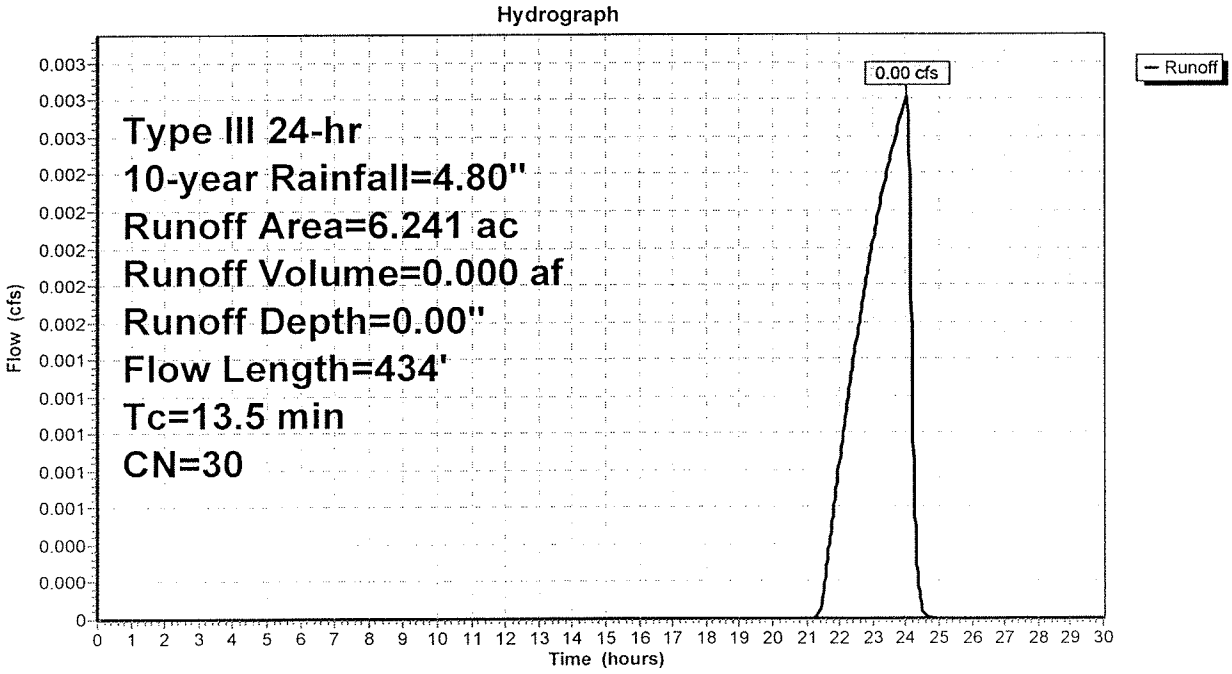
Runoff = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
6.241	30	Woods, Good, HSG A
6.241		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.5	434	Total			

Subcatchment 3S: ONSITE FLOW



Summary for Subcatchment 4S: NORTHERN SITE

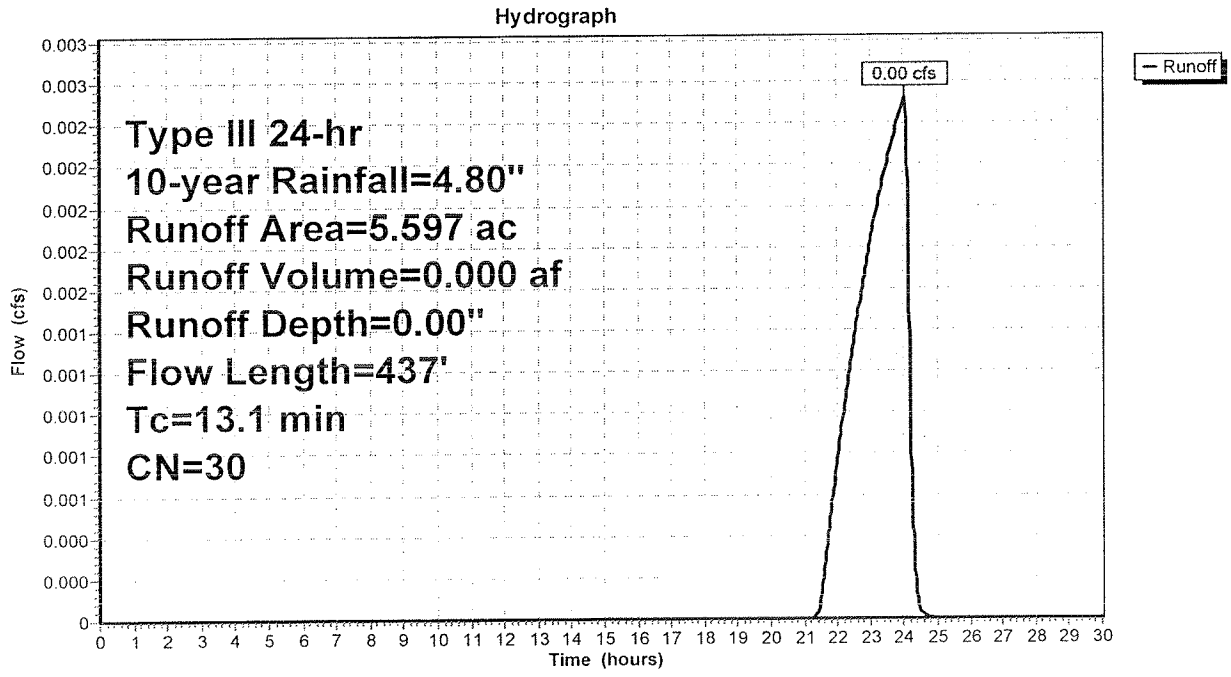
Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
5.597	30	Woods, Good, HSG A
5.597		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.1	437	Total			

Subcatchment 4S: NORTHERN SITE



Summary for Subcatchment 5S: ONSITE FLOW

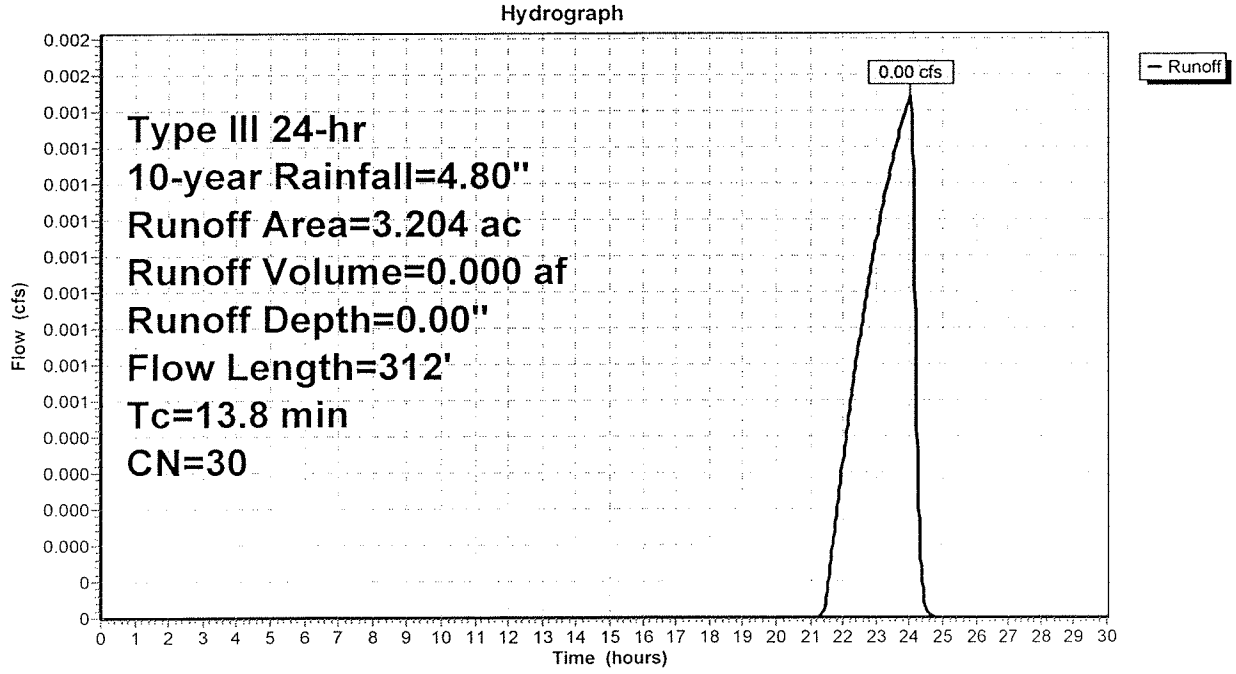
Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
3.204	30	Woods, Good, HSG A
3.204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	312	Total			

Subcatchment 5S: ONSITE FLOW



Summary for Subcatchment 6S: ONSITE FLOW

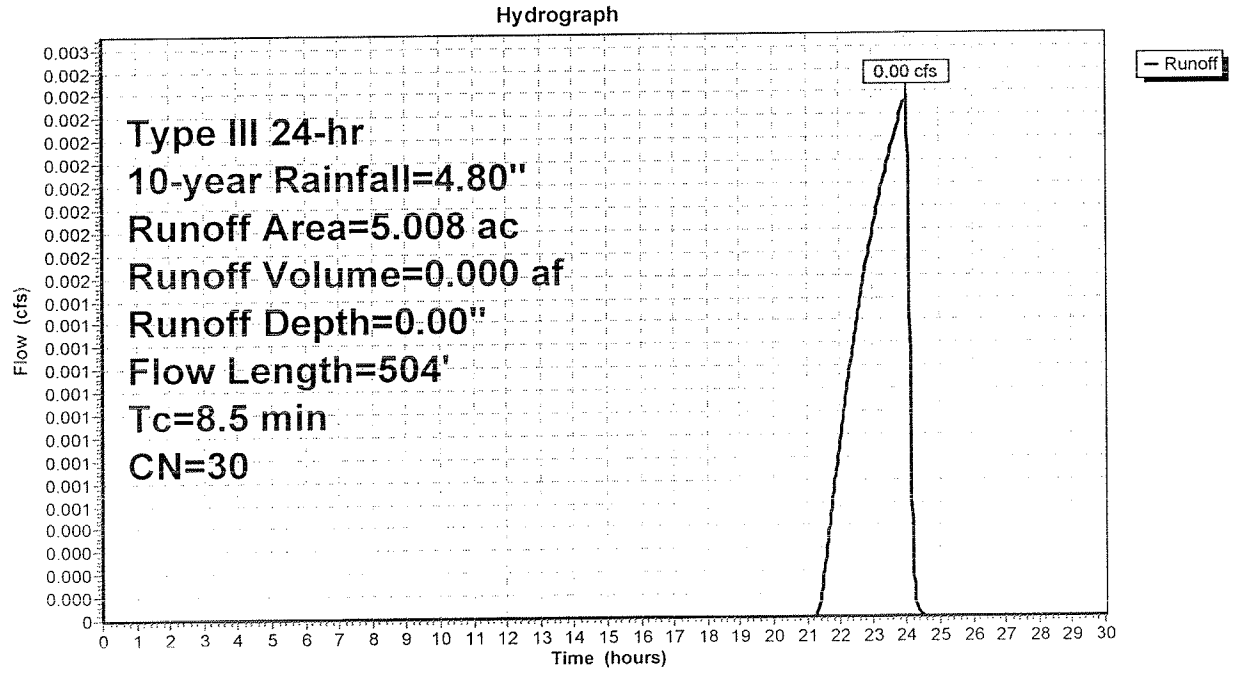
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
5.008	30	Woods, Good, HSG A
5.008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	504	Total			

Subcatchment 6S: ONSITE FLOW



Summary for Subcatchment 7S: ONSITE FLOW

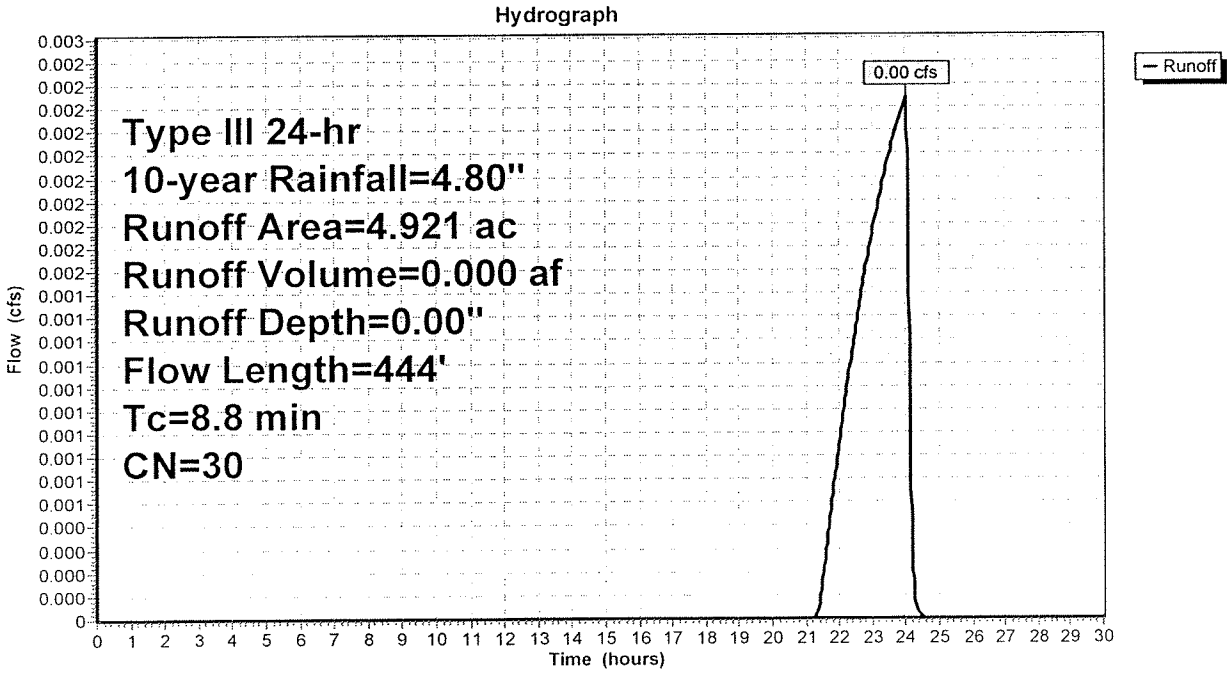
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (ac)	CN	Description
4.921	30	Woods, Good, HSG A
4.921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	40	0.0420	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0713	4.30		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.8	444	Total			

Subcatchment 7S: ONSITE FLOW

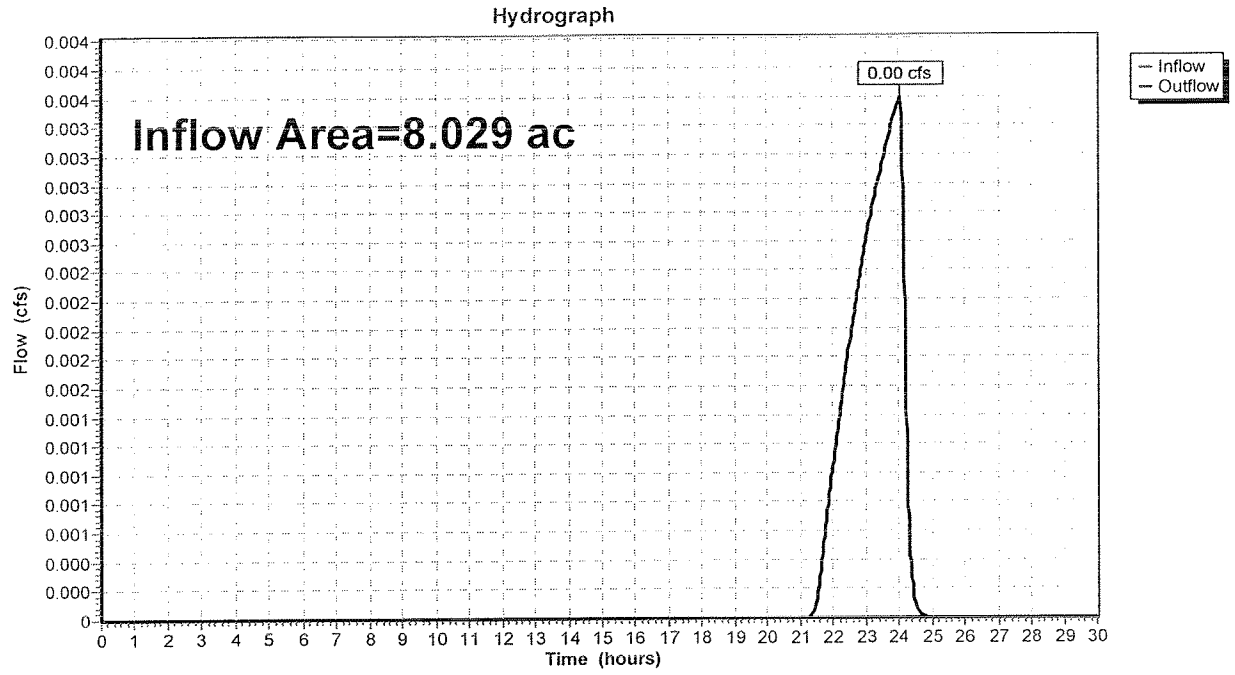


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

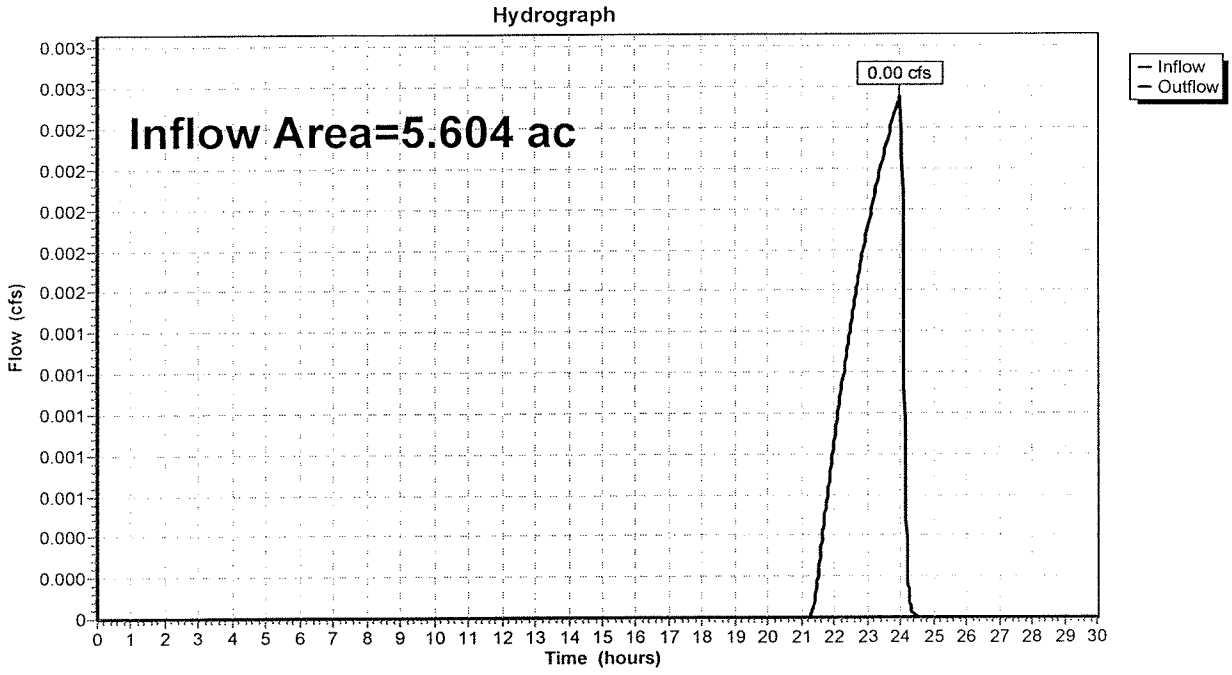


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

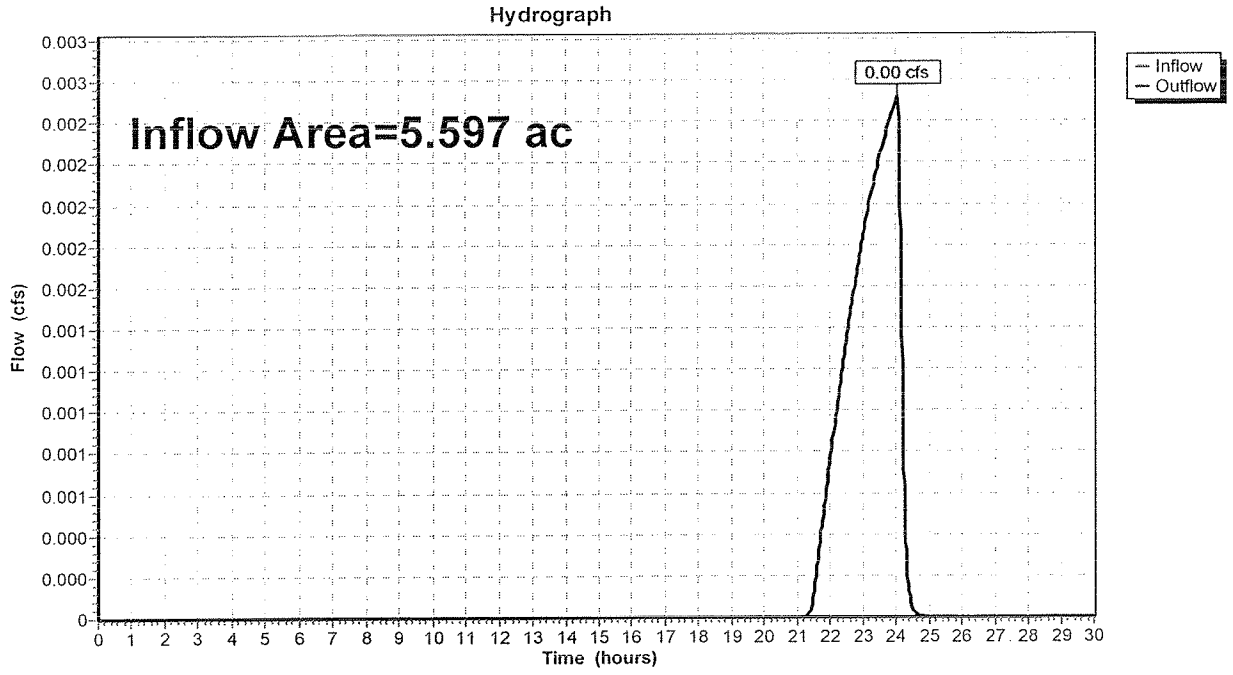


Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: FLOW TOWARDS ATKINS ROAD



Summary for Pond 3P: NATURAL DEPRESSION

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.06 hrs, Volume= 0.000 af, Atten= 1%, Lag= 1.3 min
Discarded = 0.00 cfs @ 24.06 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 24.06 hrs Surf.Area= 958 sf Storage= 1 cf

Plug-Flow detention time= 3.3 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (1,396.1 - 1,392.8)

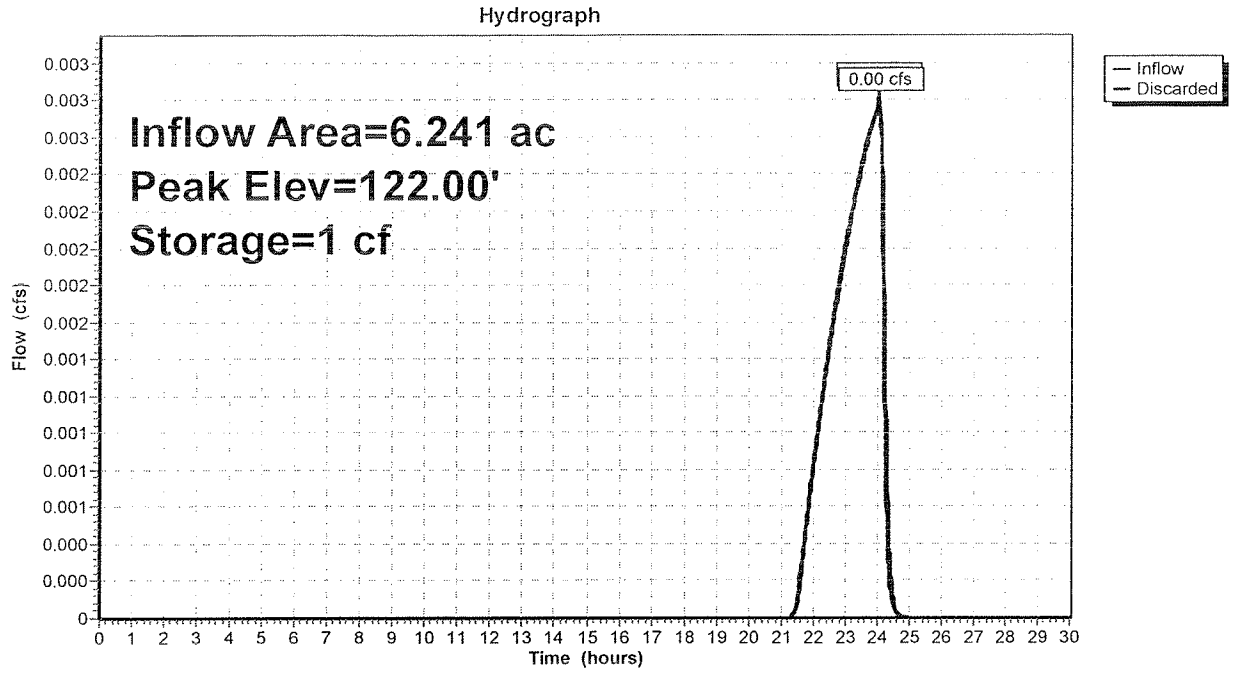
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	34,720 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.18 cfs @ 24.06 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Controls 0.18 cfs)

Pond 3P: NATURAL DEPRESSION



Summary for Pond 5P: NATURAL DEPRESSION

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.05 hrs, Volume= 0.000 af, Atten= 1%, Lag= 1.3 min
Discarded = 0.00 cfs @ 24.05 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 132.00' @ 24.05 hrs Surf.Area= 77 sf Storage= 0 cf

Plug-Flow detention time= 2.5 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 2.5 min (1,395.5 - 1,393.1)

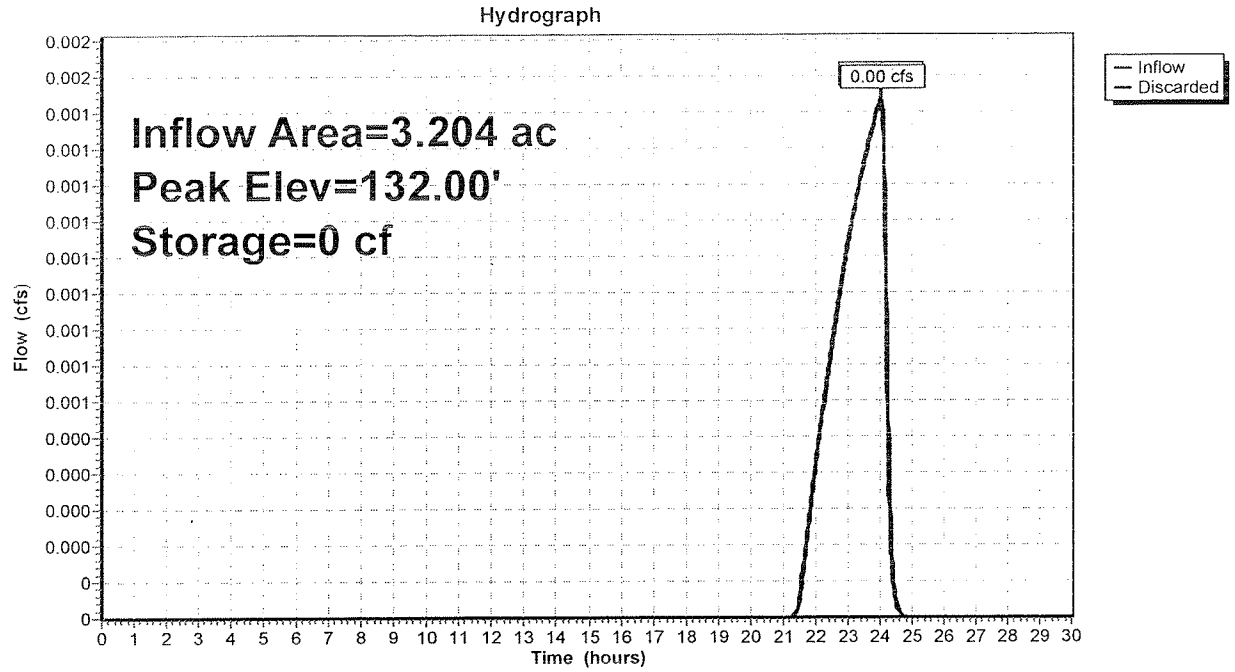
Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	5,089 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.01 cfs @ 24.05 hrs HW=132.00' (Free Discharge)
↳**1=Exfiltration** (Controls 0.01 cfs)

Pond 5P: NATURAL DEPRESSION



Summary for Pond 6P: NATURAL DEPRESSION

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af, Atten= 1%, Lag= 1.4 min
Discarded = 0.00 cfs @ 24.04 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 24.04 hrs Surf.Area= 1,490 sf Storage= 1 cf

Plug-Flow detention time= 5.1 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (1,393.2 - 1,388.1)

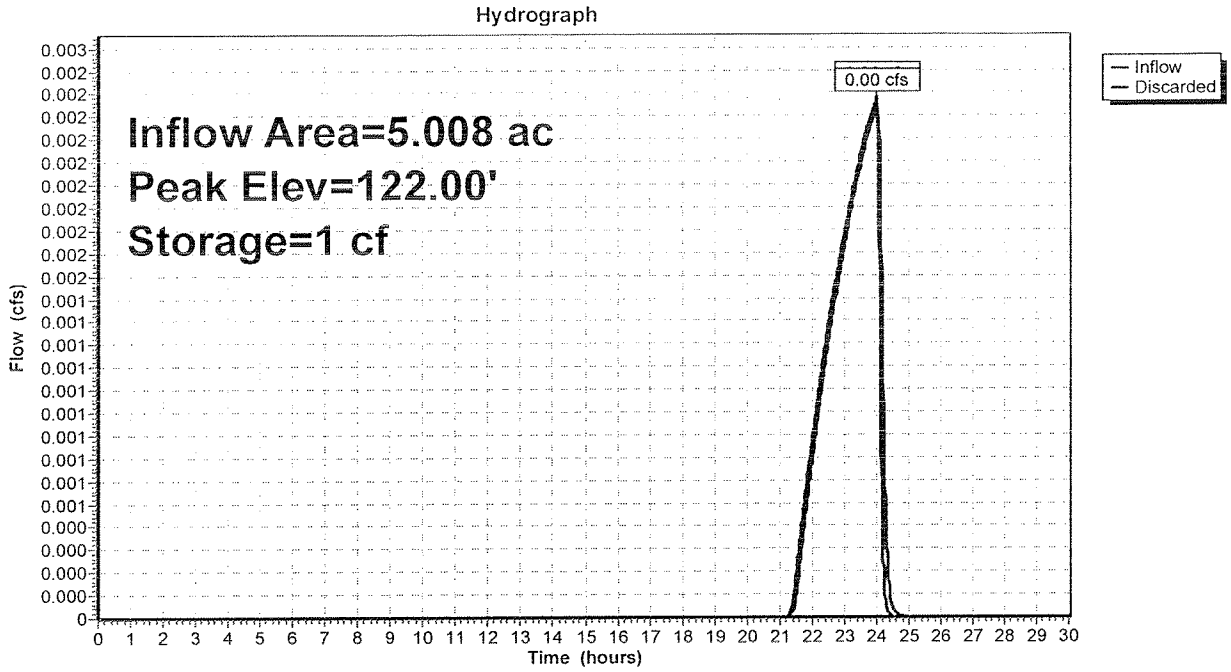
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	41,899 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.29 cfs @ 24.04 hrs HW=122.00' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.29 cfs)

Pond 6P: NATURAL DEPRESSION



Summary for Pond 7P: NATURAL DEPRESSION

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.7 min
Discarded = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 127.50' @ 24.03 hrs Surf.Area= 2,228 sf Storage= 0 cf

Plug-Flow detention time= 1.7 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (1,390.1 - 1,388.4)

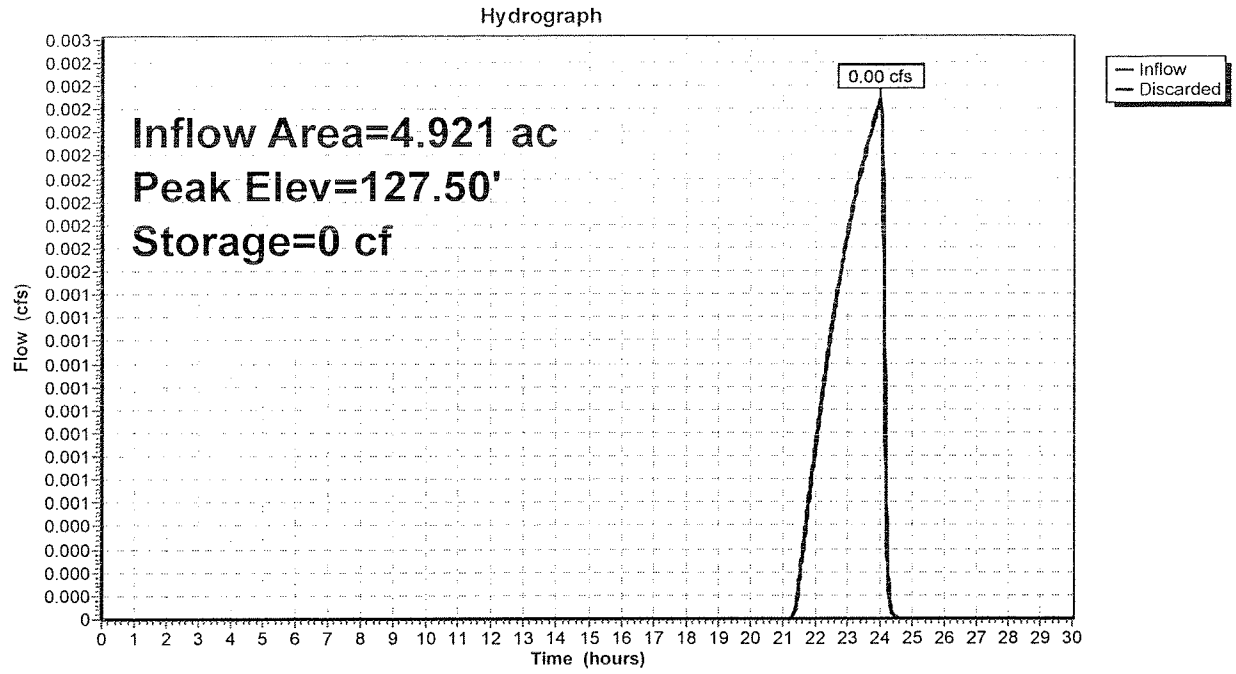
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	25,103 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.43 cfs @ 24.03 hrs HW=127.50' (Free Discharge)
↑**1=Exfiltration** (Controls 0.43 cfs)

Pond 7P: NATURAL DEPRESSION



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=8.029 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.04 cfs 0.029 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=5.604 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.03 cfs 0.020 af

Subcatchment3S: ONSITE FLOW Runoff Area=6.241 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=434' Tc=13.5 min CN=30 Runoff=0.03 cfs 0.023 af

Subcatchment4S: NORTHERN SITE Runoff Area=5.597 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=437' Tc=13.1 min CN=30 Runoff=0.03 cfs 0.020 af

Subcatchment5S: ONSITE FLOW Runoff Area=3.204 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=312' Tc=13.8 min CN=30 Runoff=0.02 cfs 0.012 af

Subcatchment6S: ONSITE FLOW Runoff Area=5.008 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=504' Tc=8.5 min CN=30 Runoff=0.03 cfs 0.018 af

Subcatchment7S: ONSITE FLOW Runoff Area=4.921 ac 0.00% Impervious Runoff Depth=0.04"
Flow Length=444' Tc=8.8 min CN=30 Runoff=0.03 cfs 0.018 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.04 cfs 0.029 af
Outflow=0.04 cfs 0.029 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.03 cfs 0.020 af
Outflow=0.03 cfs 0.020 af

Reach 3R: FLOW TOWARDS ATKINS ROAD Inflow=0.03 cfs 0.020 af
Outflow=0.03 cfs 0.020 af

Pond 3P: NATURAL DEPRESSION Peak Elev=122.01' Storage=6 cf Inflow=0.03 cfs 0.023 af
Outflow=0.03 cfs 0.023 af

Pond 5P: NATURAL DEPRESSION Peak Elev=132.03' Storage=2 cf Inflow=0.02 cfs 0.012 af
Outflow=0.02 cfs 0.012 af

Pond 6P: NATURAL DEPRESSION Peak Elev=122.01' Storage=8 cf Inflow=0.03 cfs 0.018 af
Outflow=0.03 cfs 0.018 af

Pond 7P: NATURAL DEPRESSION Peak Elev=127.50' Storage=3 cf Inflow=0.03 cfs 0.018 af
Outflow=0.03 cfs 0.018 af

Total Runoff Area = 38.604 ac Runoff Volume = 0.141 af Average Runoff Depth = 0.04"
100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

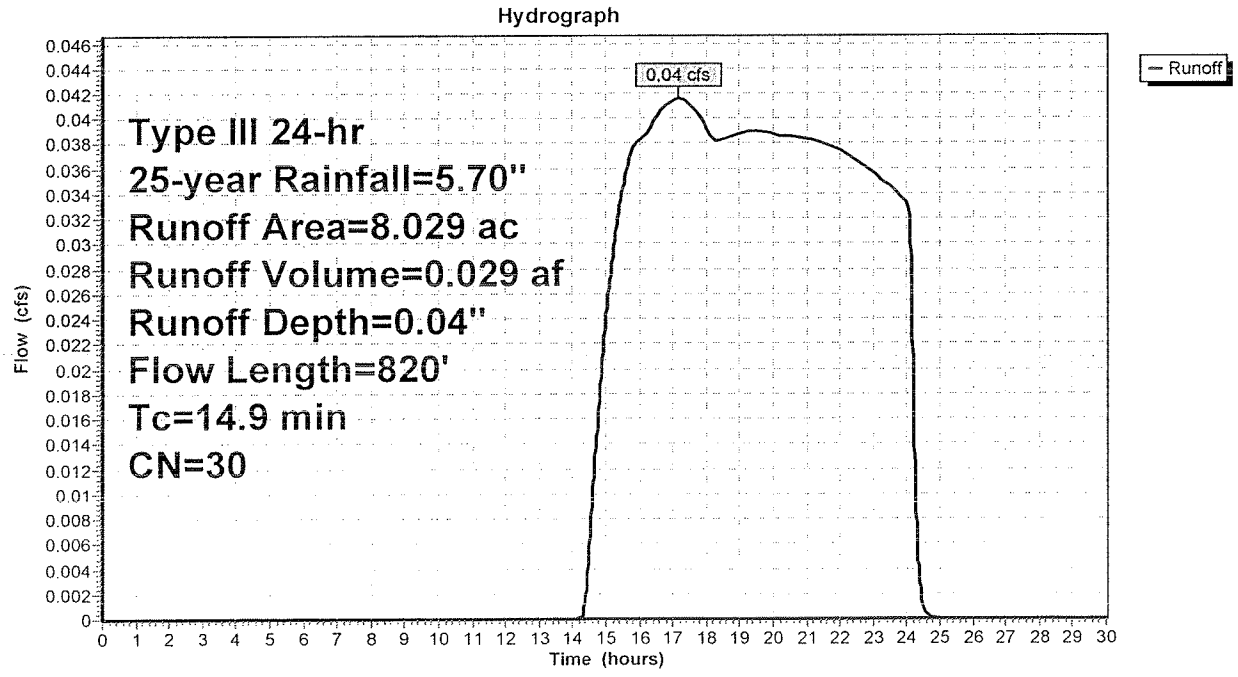
Runoff = 0.04 cfs @ 17.17 hrs, Volume= 0.029 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
8.029	30	Woods, Good, HSG A
8.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

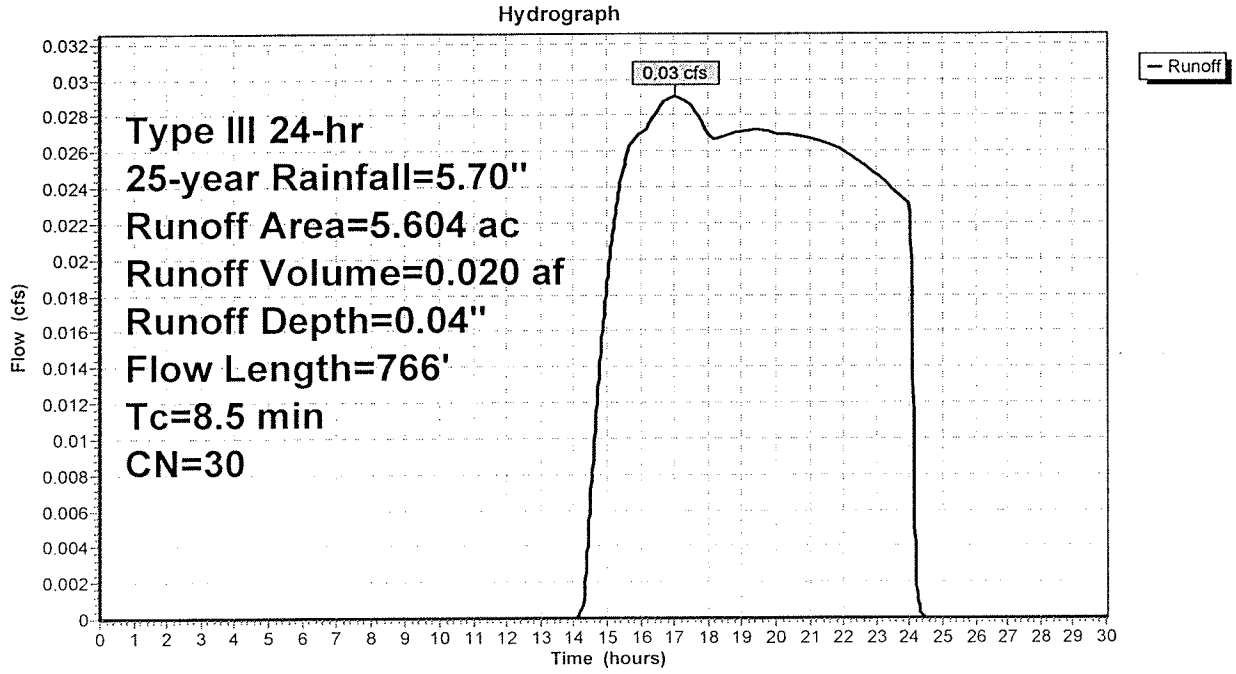
Runoff = 0.03 cfs @ 17.03 hrs, Volume= 0.020 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
5.604	30	Woods, Good, HSG A
5.604		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 3S: ONSITE FLOW

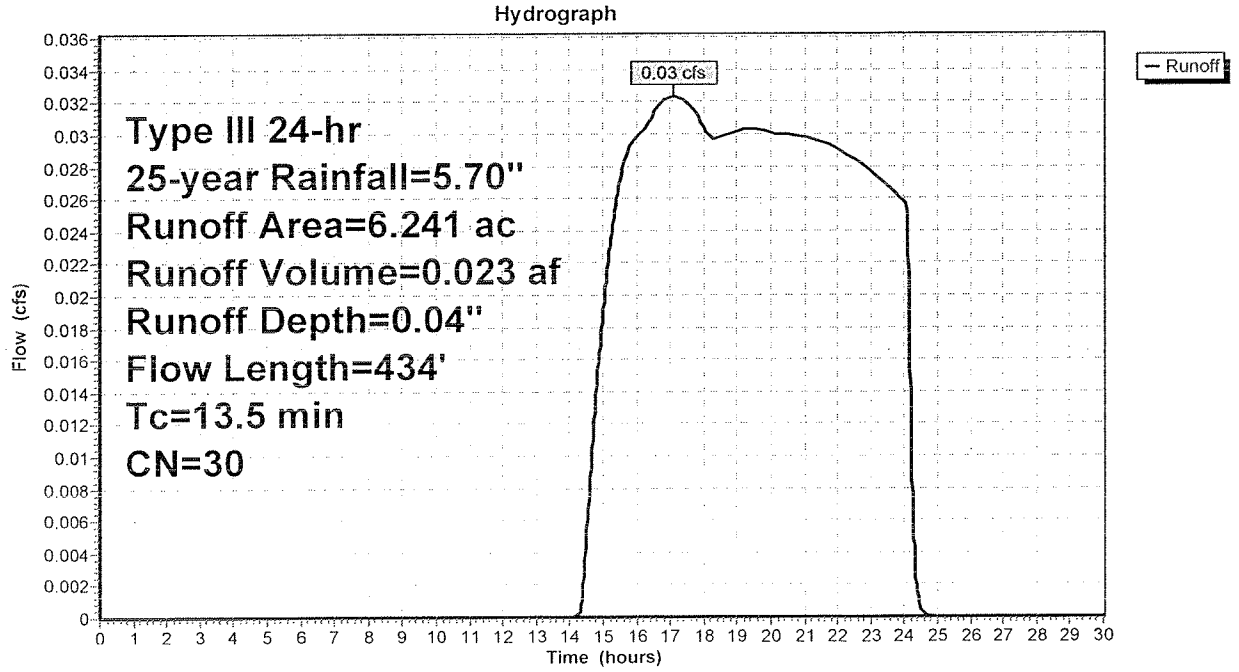
Runoff = 0.03 cfs @ 17.12 hrs, Volume= 0.023 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
6.241	30	Woods, Good, HSG A
6.241		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.5	434	Total			

Subcatchment 3S: ONSITE FLOW



Summary for Subcatchment 4S: NORTHERN SITE

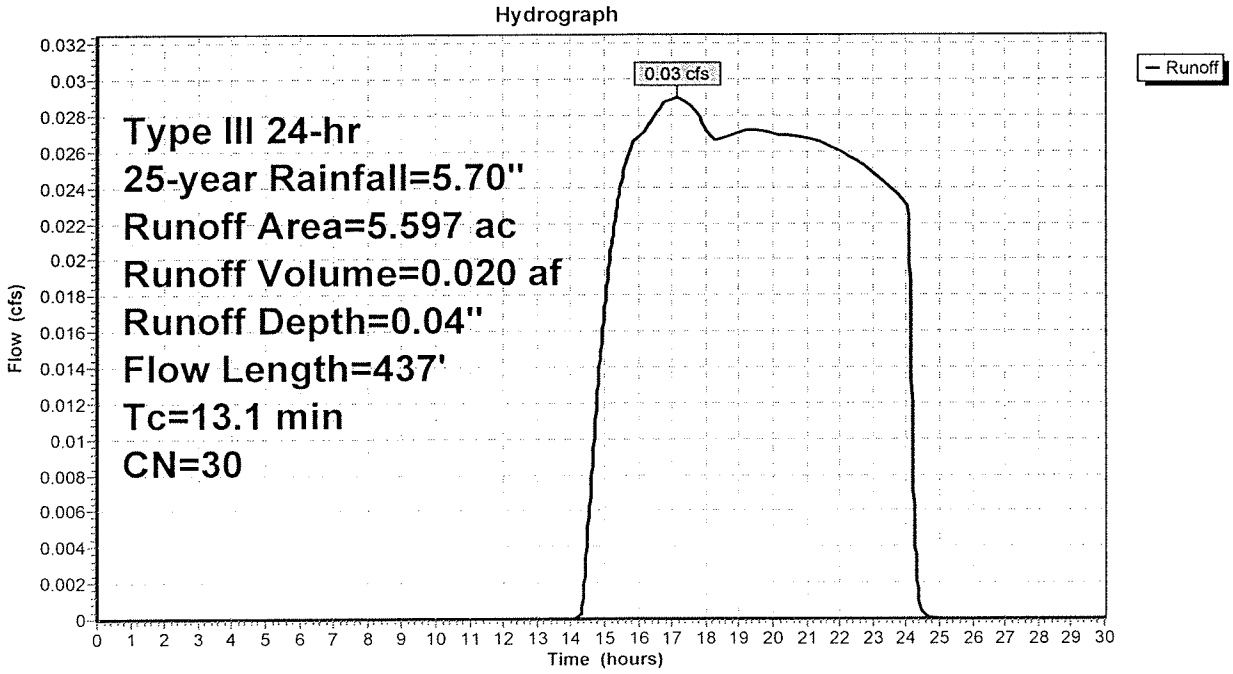
Runoff = 0.03 cfs @ 17.13 hrs, Volume= 0.020 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
5.597	30	Woods, Good, HSG A
5.597		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.1	437	Total			

Subcatchment 4S: NORTHERN SITE



Summary for Subcatchment 5S: ONSITE FLOW

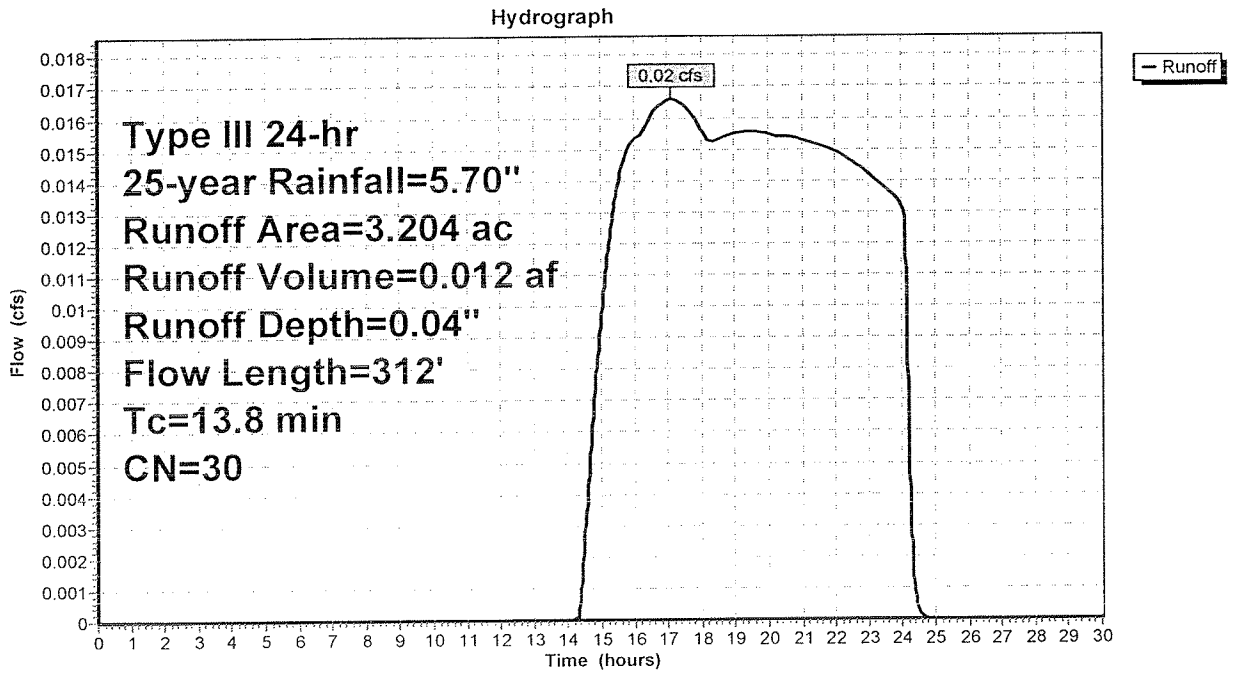
Runoff = 0.02 cfs @ 17.13 hrs, Volume= 0.012 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
3.204	30	Woods, Good, HSG A
3.204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	312	Total			

Subcatchment 5S: ONSITE FLOW



Summary for Subcatchment 6S: ONSITE FLOW

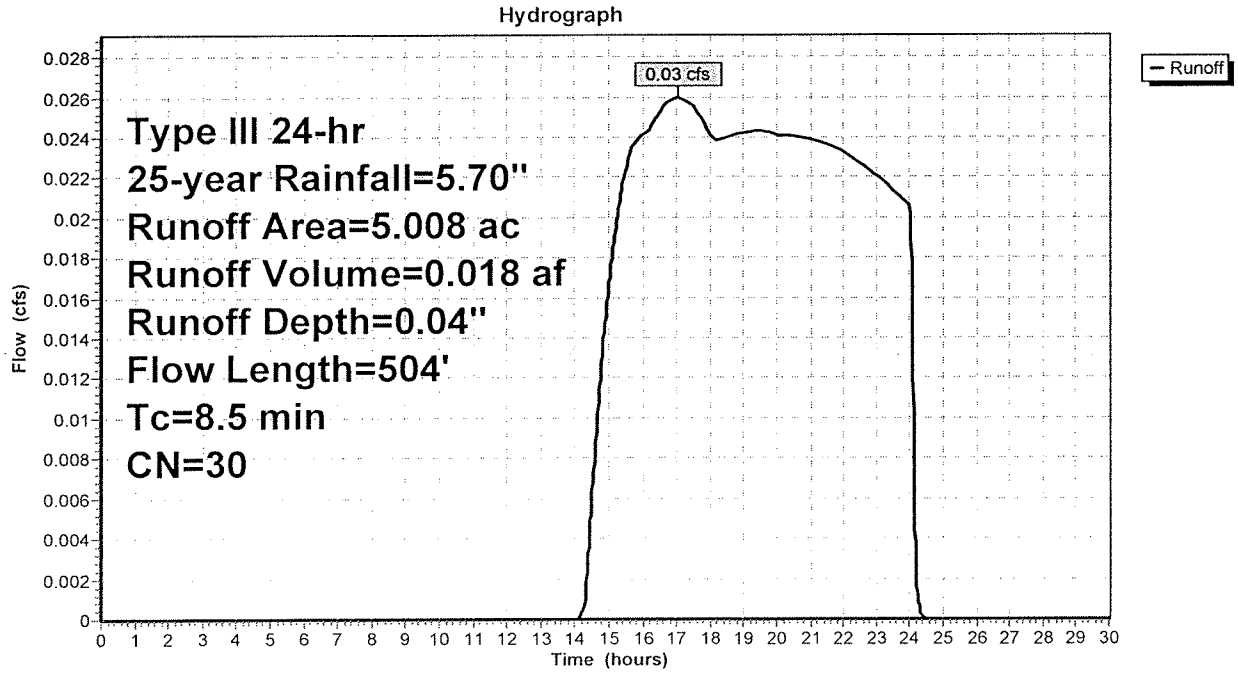
Runoff = 0.03 cfs @ 17.03 hrs, Volume= 0.018 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
5.008	30	Woods, Good, HSG A
5.008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	504	Total			

Subcatchment 6S: ONSITE FLOW



Summary for Subcatchment 7S: ONSITE FLOW

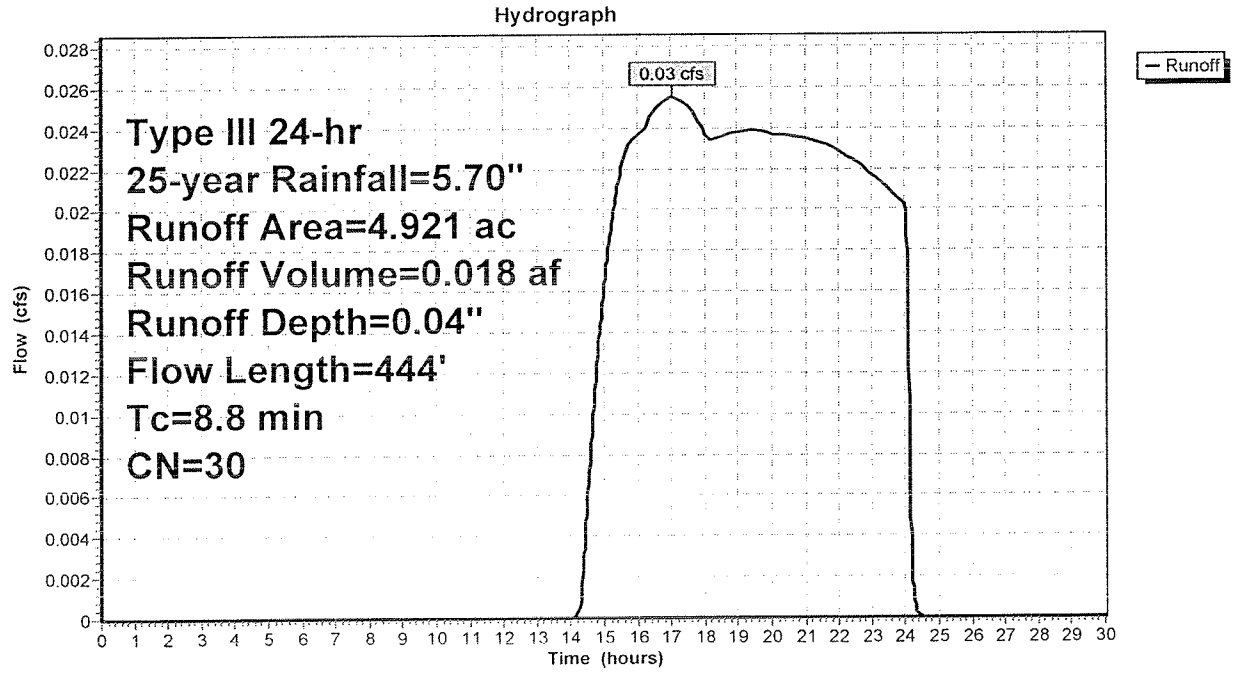
Runoff = 0.03 cfs @ 17.06 hrs, Volume= 0.018 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (ac)	CN	Description
4.921	30	Woods, Good, HSG A
4.921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	40	0.0420	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0713	4.30		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.8	444	Total			

Subcatchment 7S: ONSITE FLOW

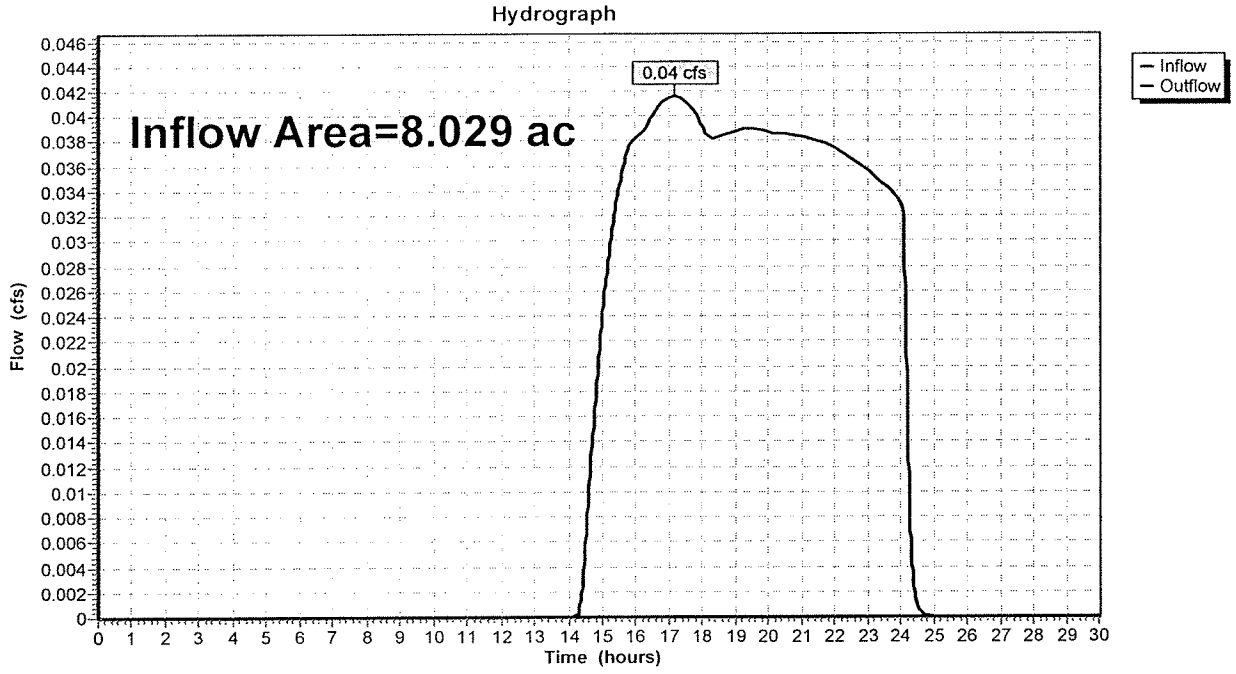


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.04 cfs @ 17.17 hrs, Volume= 0.029 af
Outflow = 0.04 cfs @ 17.17 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

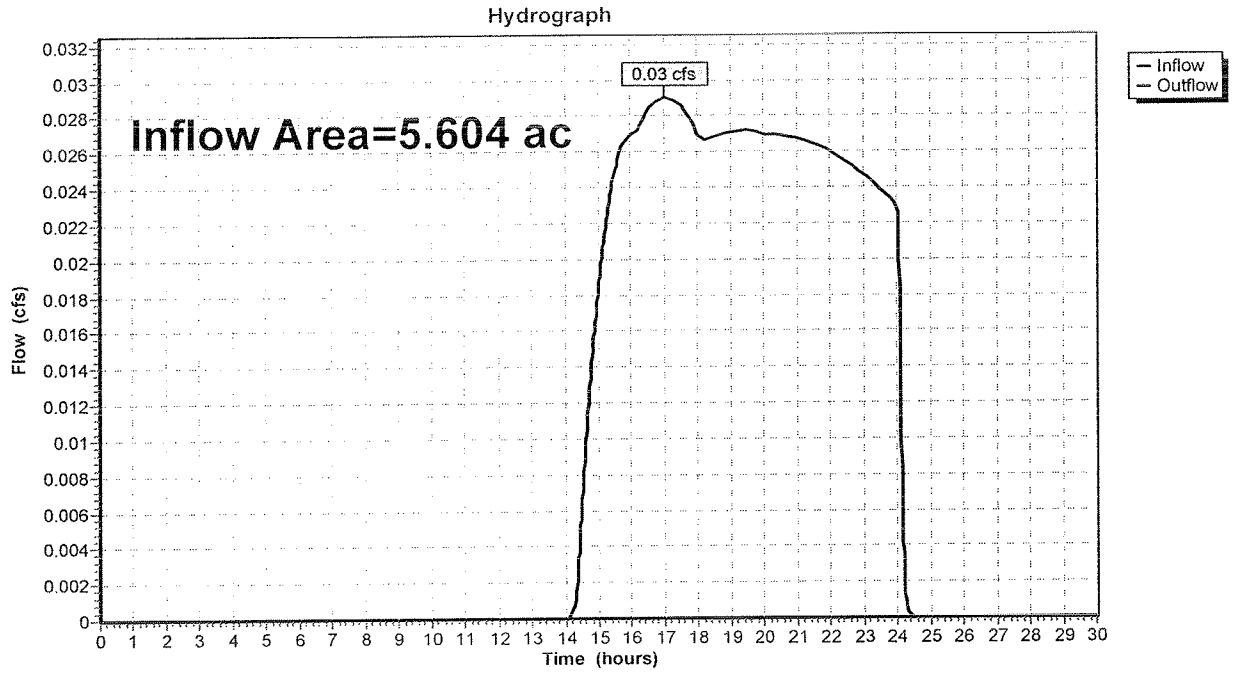


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.03 cfs @ 17.03 hrs, Volume= 0.020 af
Outflow = 0.03 cfs @ 17.03 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

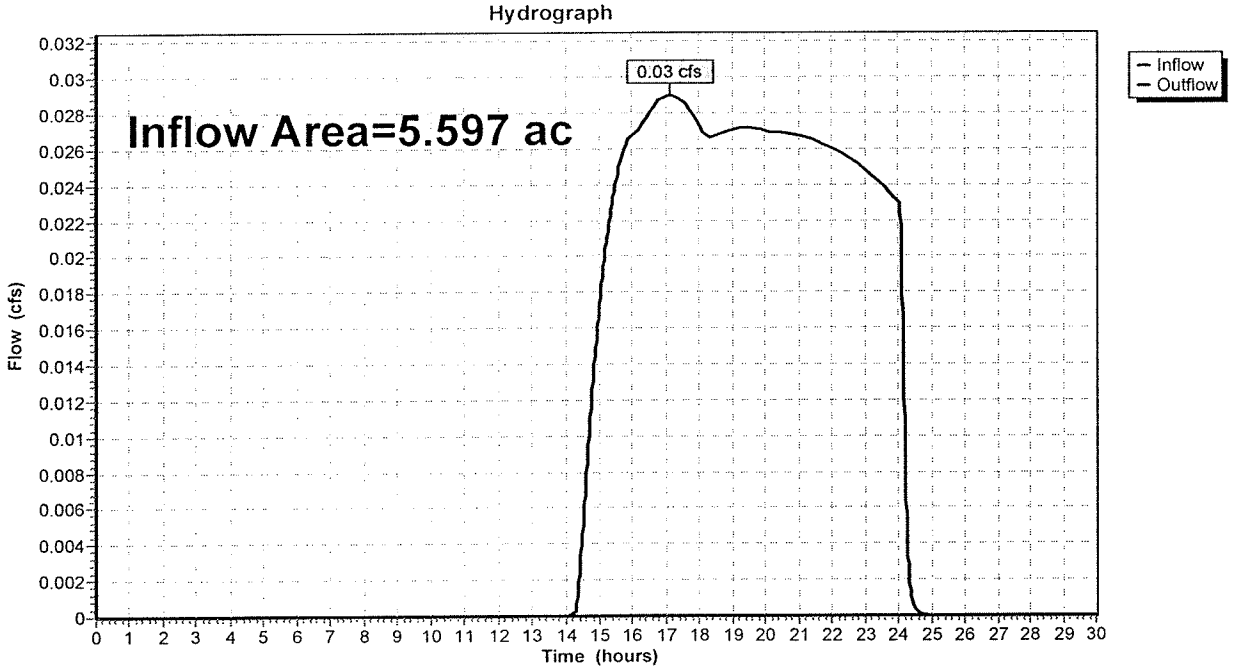


Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.03 cfs @ 17.13 hrs, Volume= 0.020 af
Outflow = 0.03 cfs @ 17.13 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: FLOW TOWARDS ATKINS ROAD



Summary for Pond 3P: NATURAL DEPRESSION

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.03 cfs @ 17.12 hrs, Volume= 0.023 af
Outflow = 0.03 cfs @ 17.18 hrs, Volume= 0.023 af, Atten= 0%, Lag= 3.7 min
Discarded = 0.03 cfs @ 17.18 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.01' @ 17.18 hrs Surf.Area= 969 sf Storage= 6 cf

Plug-Flow detention time= 3.3 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (1,169.8 - 1,166.5)

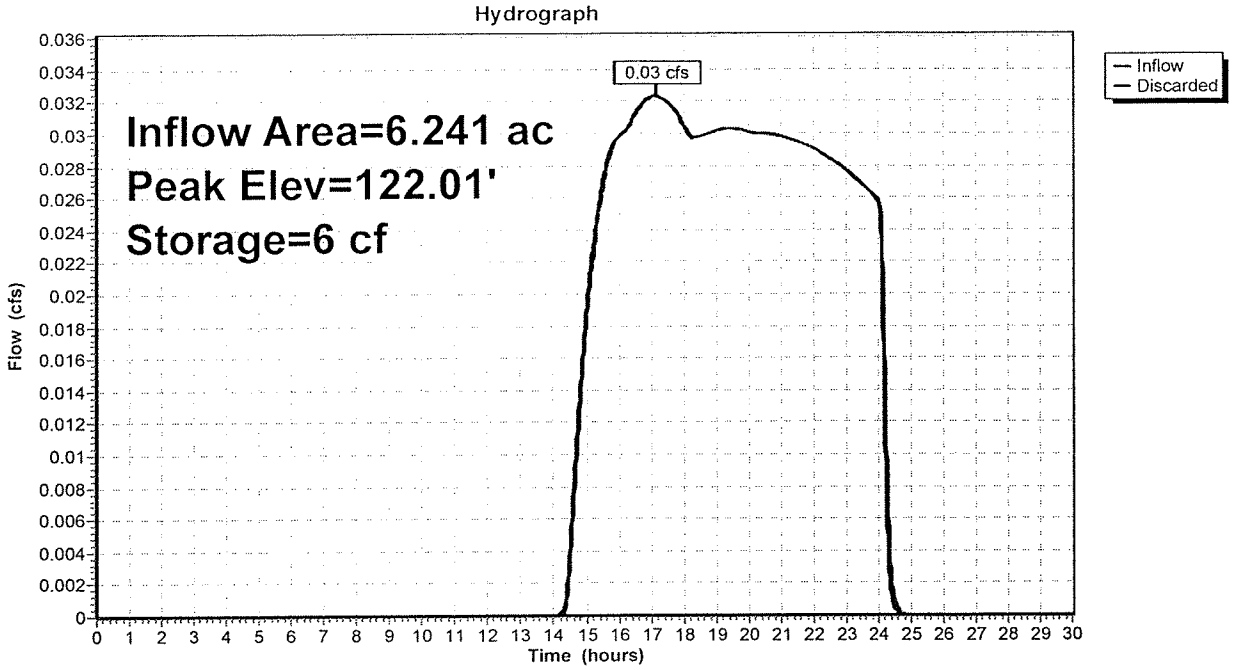
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	34,720 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.19 cfs @ 17.18 hrs HW=122.01' (Free Discharge)
↑**1=Exfiltration** (Controls 0.19 cfs)

Pond 3P: NATURAL DEPRESSION



Summary for Pond 5P: NATURAL DEPRESSION

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.02 cfs @ 17.13 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 17.29 hrs, Volume= 0.012 af, Atten= 0%, Lag= 9.8 min
Discarded = 0.02 cfs @ 17.29 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 132.03' @ 17.29 hrs Surf.Area= 86 sf Storage= 2 cf

Plug-Flow detention time= 2.5 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 2.5 min (1,169.2 - 1,166.7)

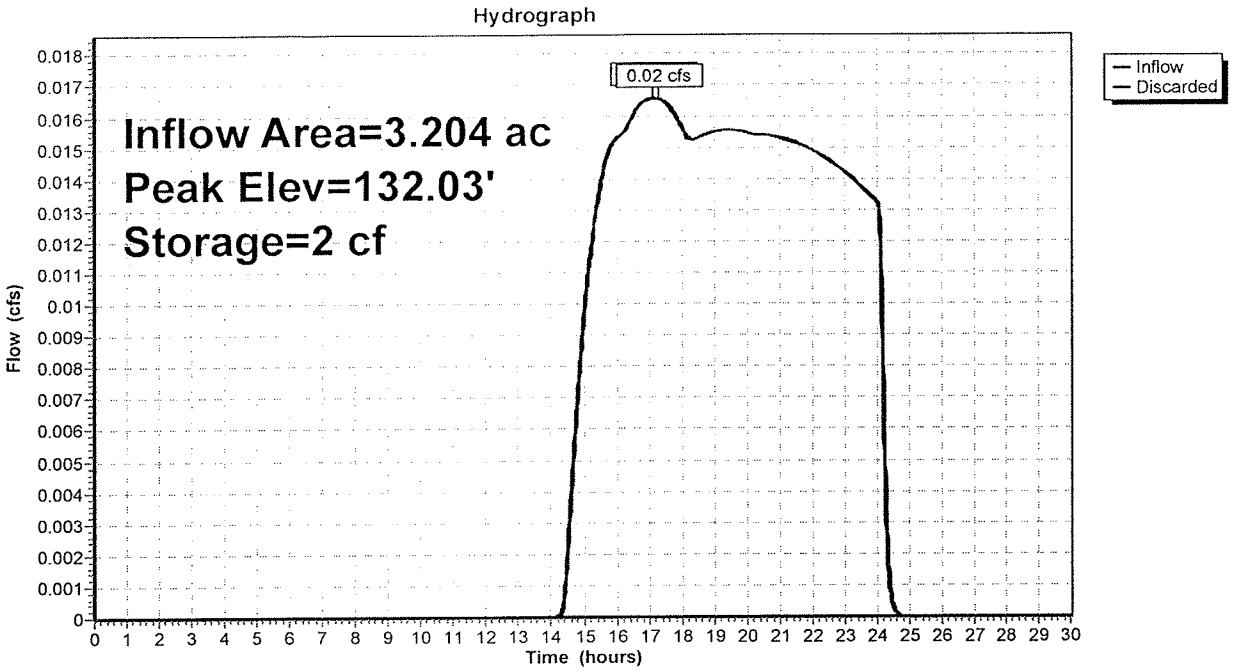
Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	5,089 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.02 cfs @ 17.29 hrs HW=132.03' (Free Discharge)
↑**1=Exfiltration** (Controls 0.02 cfs)

Pond 5P: NATURAL DEPRESSION



Summary for Pond 6P: NATURAL DEPRESSION

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.03 cfs @ 17.03 hrs, Volume= 0.018 af
Outflow = 0.03 cfs @ 17.13 hrs, Volume= 0.018 af, Atten= 0%, Lag= 6.1 min
Discarded = 0.03 cfs @ 17.13 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.01' @ 17.13 hrs Surf.Area= 1,496 sf Storage= 8 cf

Plug-Flow detention time= 5.1 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (1,166.9 - 1,161.8)

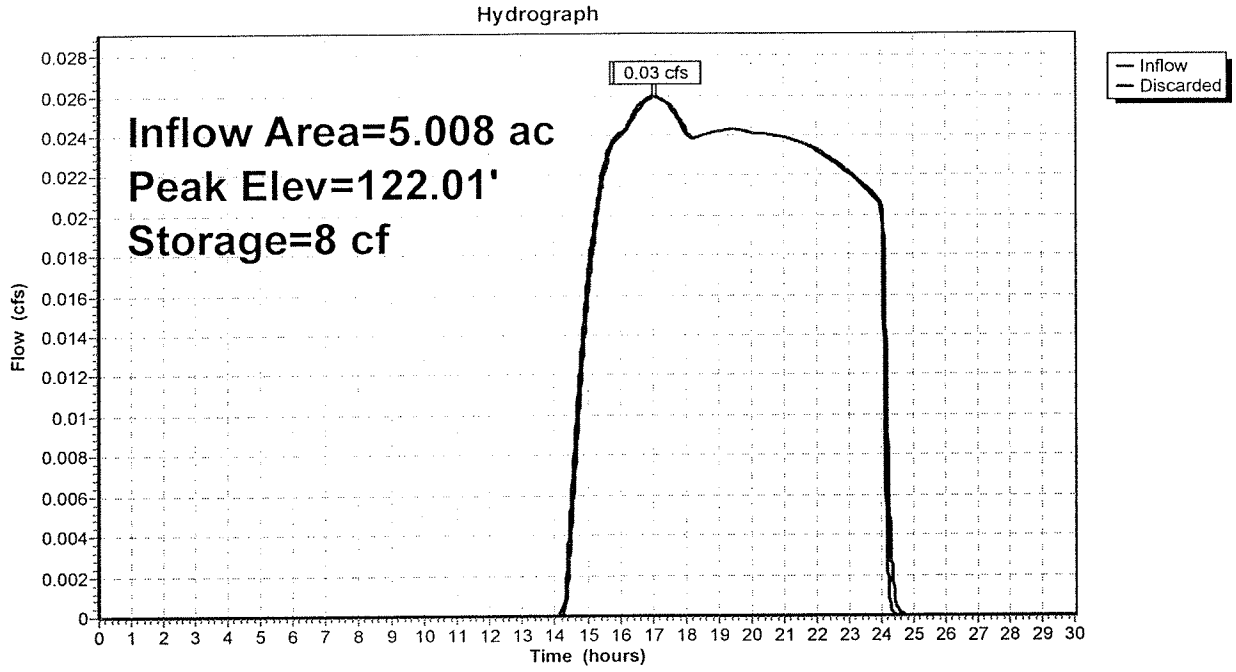
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	41,899 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.29 cfs @ 17.13 hrs HW=122.01' (Free Discharge)
↑**1=Exfiltration** (Controls 0.29 cfs)

Pond 6P: NATURAL DEPRESSION



Summary for Pond 7P: NATURAL DEPRESSION

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.03 cfs @ 17.06 hrs, Volume= 0.018 af
Outflow = 0.03 cfs @ 17.08 hrs, Volume= 0.018 af, Atten= 0%, Lag= 1.1 min
Discarded = 0.03 cfs @ 17.08 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 127.50' @ 17.08 hrs Surf.Area= 2,234 sf Storage= 3 cf

Plug-Flow detention time= 1.7 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (1,163.8 - 1,162.1)

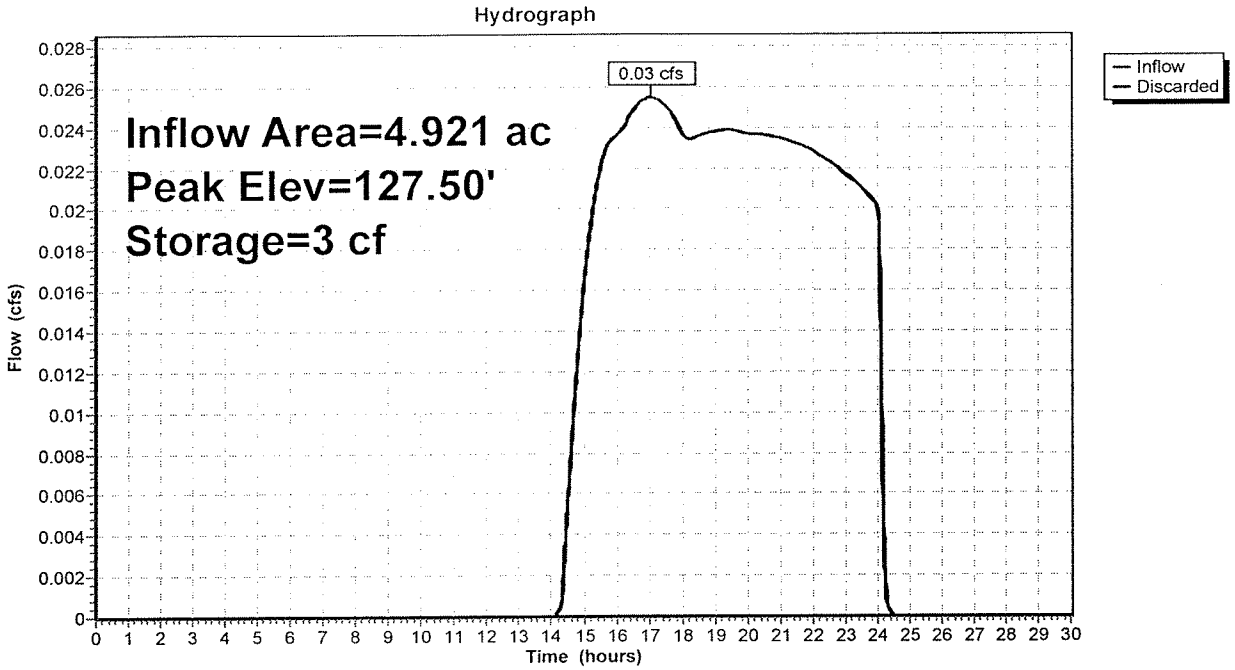
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	25,103 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.43 cfs @ 17.08 hrs HW=127.50' (Free Discharge)
↑**1=Exfiltration** (Controls 0.43 cfs)

Pond 7P: NATURAL DEPRESSION



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=8.029 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.25 cfs 0.154 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=5.604 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.18 cfs 0.107 af

Subcatchment3S: ONSITE FLOW Runoff Area=6.241 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=434' Tc=13.5 min CN=30 Runoff=0.20 cfs 0.120 af

Subcatchment4S: NORTHERN SITE Runoff Area=5.597 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=437' Tc=13.1 min CN=30 Runoff=0.18 cfs 0.107 af

Subcatchment5S: ONSITE FLOW Runoff Area=3.204 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=312' Tc=13.8 min CN=30 Runoff=0.10 cfs 0.061 af

Subcatchment6S: ONSITE FLOW Runoff Area=5.008 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=504' Tc=8.5 min CN=30 Runoff=0.16 cfs 0.096 af

Subcatchment7S: ONSITE FLOW Runoff Area=4.921 ac 0.00% Impervious Runoff Depth=0.23"
Flow Length=444' Tc=8.8 min CN=30 Runoff=0.16 cfs 0.094 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.25 cfs 0.154 af
Outflow=0.25 cfs 0.154 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.18 cfs 0.107 af
Outflow=0.18 cfs 0.107 af

Reach 3R: FLOW TOWARDS ATKINS ROAD Inflow=0.18 cfs 0.107 af
Outflow=0.18 cfs 0.107 af

Pond 3P: NATURAL DEPRESSION Peak Elev=122.04' Storage=40 cf Inflow=0.20 cfs 0.120 af
Outflow=0.20 cfs 0.120 af

Pond 5P: NATURAL DEPRESSION Peak Elev=132.71' Storage=182 cf Inflow=0.10 cfs 0.061 af
Outflow=0.10 cfs 0.061 af

Pond 6P: NATURAL DEPRESSION Peak Elev=122.03' Storage=48 cf Inflow=0.16 cfs 0.096 af
Outflow=0.16 cfs 0.096 af

Pond 7P: NATURAL DEPRESSION Peak Elev=127.51' Storage=16 cf Inflow=0.16 cfs 0.094 af
Outflow=0.16 cfs 0.094 af

Total Runoff Area = 38.604 ac Runoff Volume = 0.739 af Average Runoff Depth = 0.23"
100.00% Pervious = 38.604 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

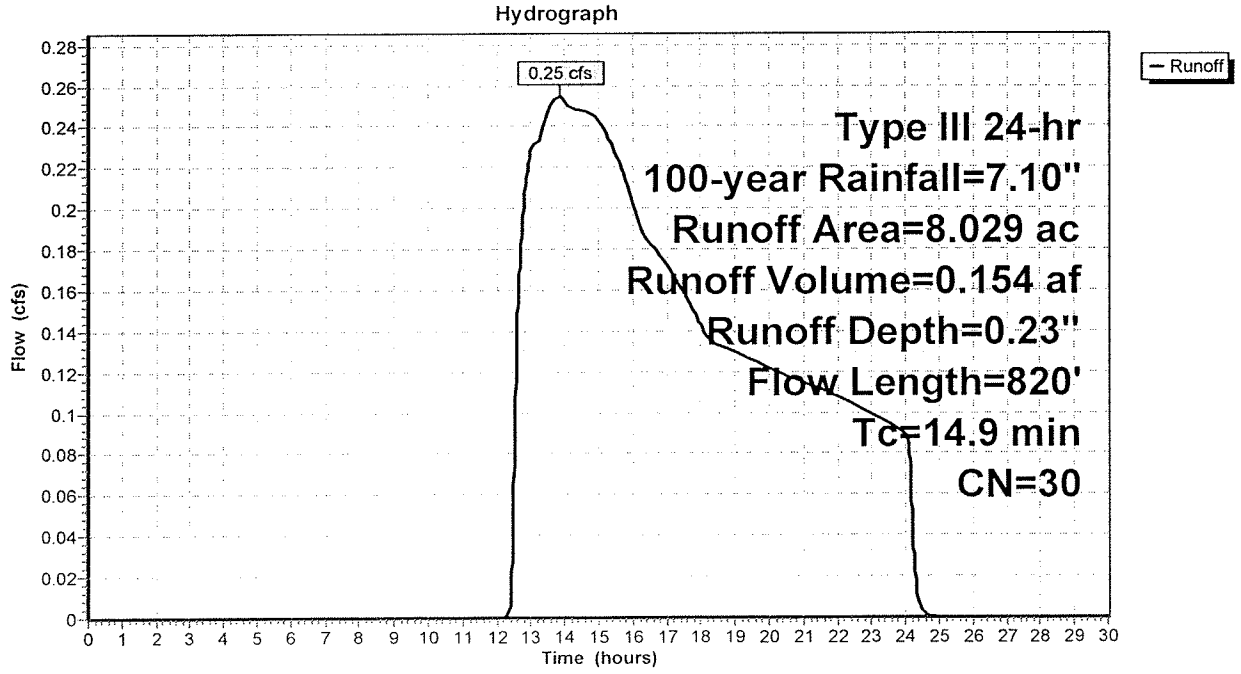
Runoff = 0.25 cfs @ 13.86 hrs, Volume= 0.154 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
8.029	30	Woods, Good, HSG A
8.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

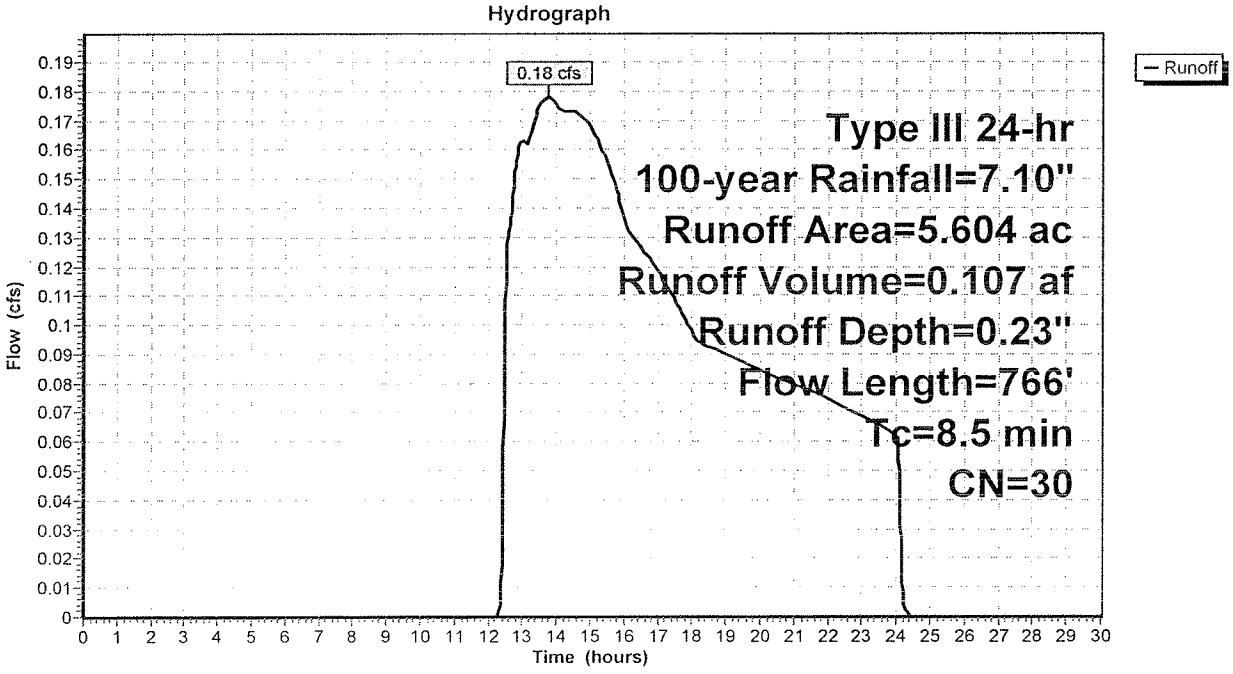
Runoff = 0.18 cfs @ 13.76 hrs, Volume= 0.107 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
5.604	30	Woods, Good, HSG A
5.604		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 3S: ONSITE FLOW

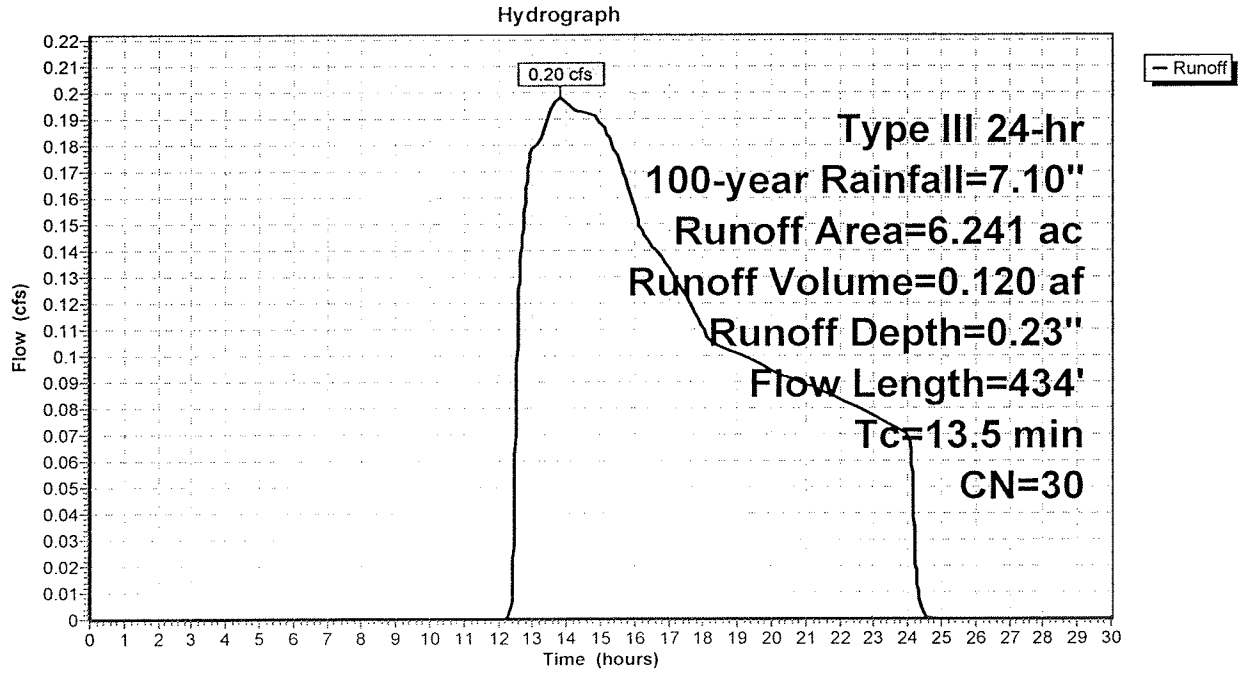
Runoff = 0.20 cfs @ 13.82 hrs, Volume= 0.120 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
6.241	30	Woods, Good, HSG A
6.241		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.9	384	0.0443	3.39		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.5	434	Total			

Subcatchment 3S: ONSITE FLOW



Summary for Subcatchment 4S: NORTHERN SITE

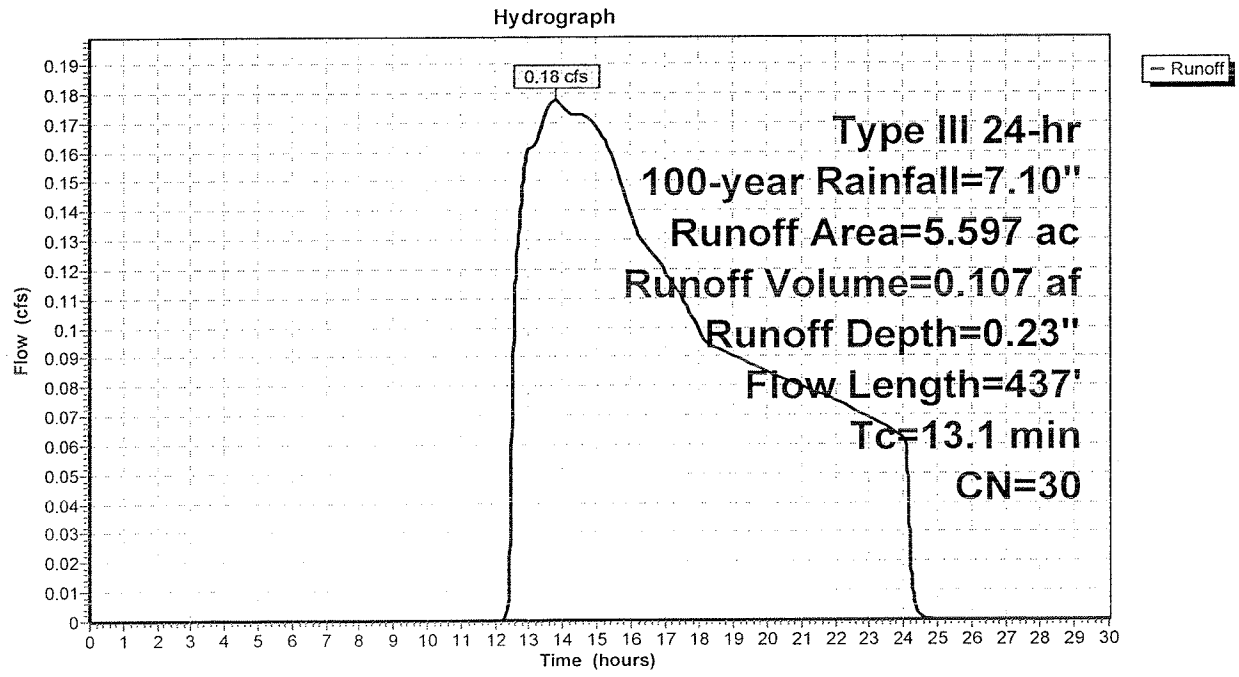
Runoff = 0.18 cfs @ 13.81 hrs, Volume= 0.107 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
5.597	30	Woods, Good, HSG A
5.597		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.5	387	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.1	437	Total			

Subcatchment 4S: NORTHERN SITE



Summary for Subcatchment 5S: ONSITE FLOW

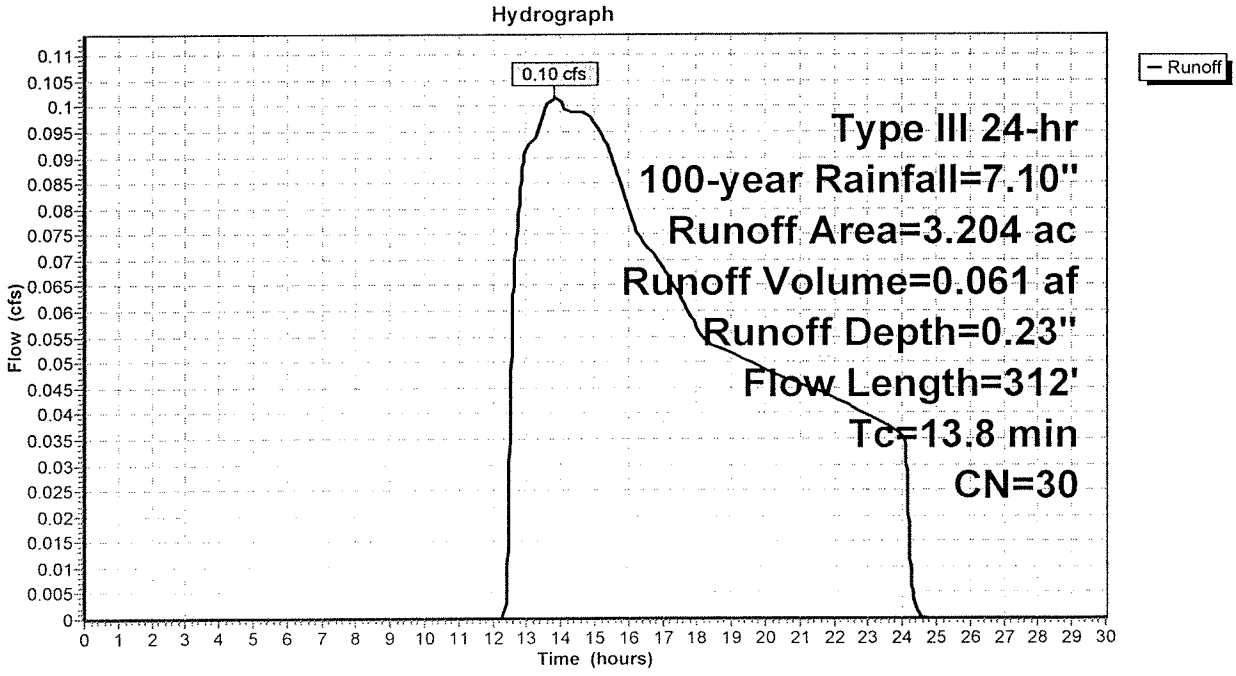
Runoff = 0.10 cfs @ 13.85 hrs, Volume= 0.061 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
3.204	30	Woods, Good, HSG A
3.204		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0160	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	262	0.0616	4.00		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
13.8	312	Total			

Subcatchment 5S: ONSITE FLOW



Summary for Subcatchment 6S: ONSITE FLOW

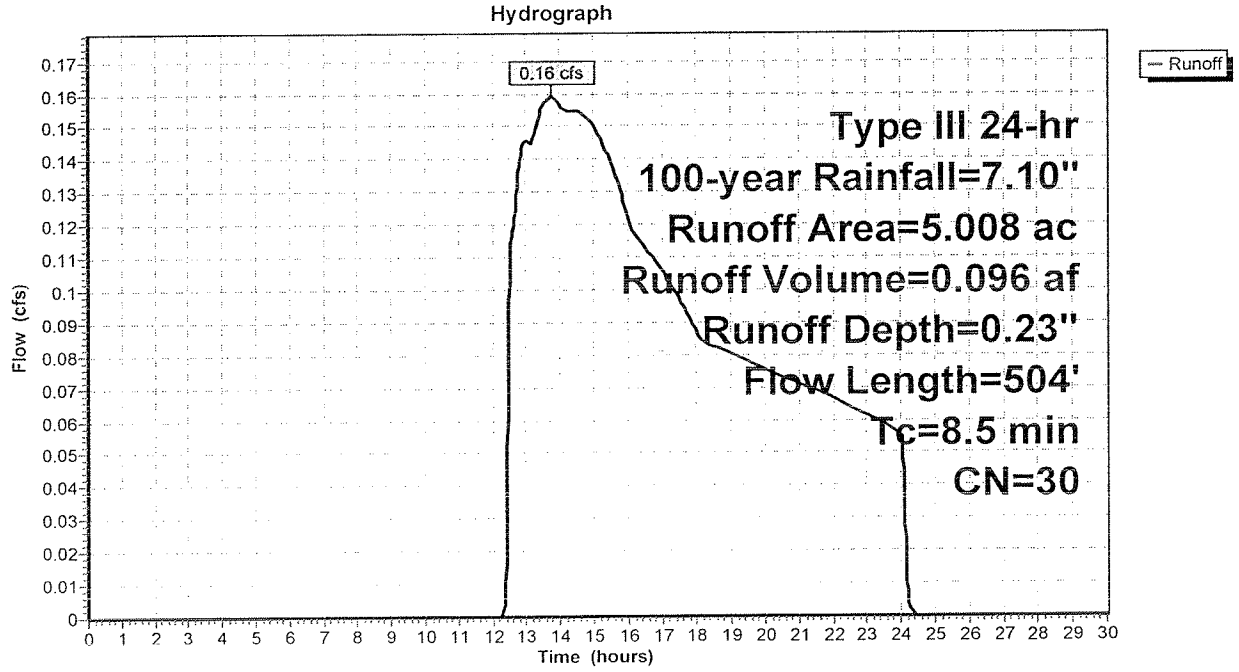
Runoff = 0.16 cfs @ 13.76 hrs, Volume= 0.096 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
5.008	30	Woods, Good, HSG A
5.008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0760	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.7	454	0.0750	4.41		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	504	Total			

Subcatchment 6S: ONSITE FLOW



Summary for Subcatchment 7S: ONSITE FLOW

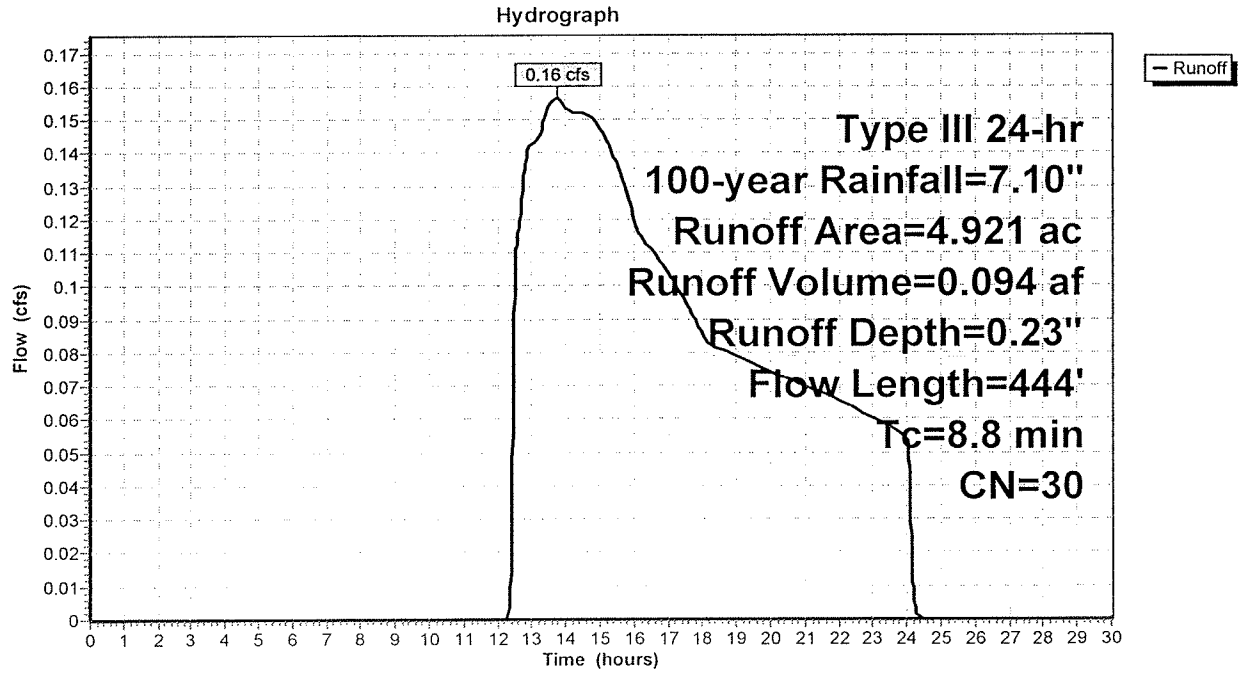
Runoff = 0.16 cfs @ 13.74 hrs, Volume= 0.094 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (ac)	CN	Description
4.921	30	Woods, Good, HSG A
4.921		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	40	0.0420	0.09		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
1.6	404	0.0713	4.30		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.8	444	Total			

Subcatchment 7S: ONSITE FLOW

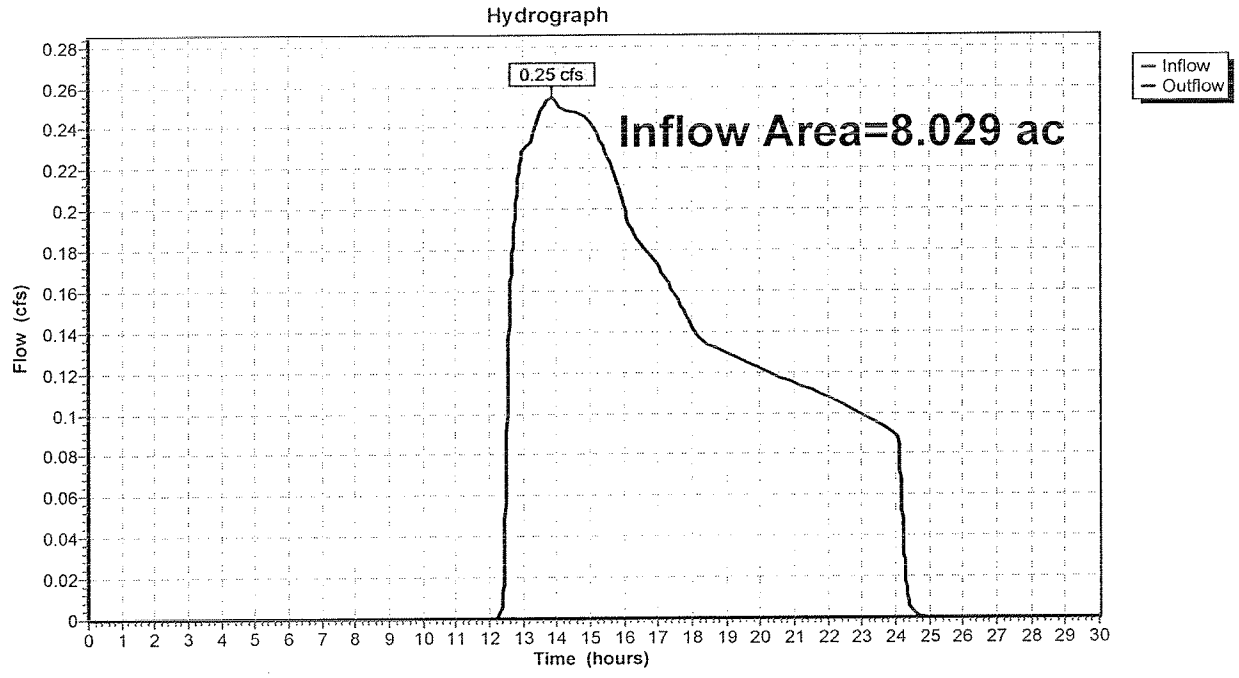


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 8.029 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.25 cfs @ 13.86 hrs, Volume= 0.154 af
Outflow = 0.25 cfs @ 13.86 hrs, Volume= 0.154 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

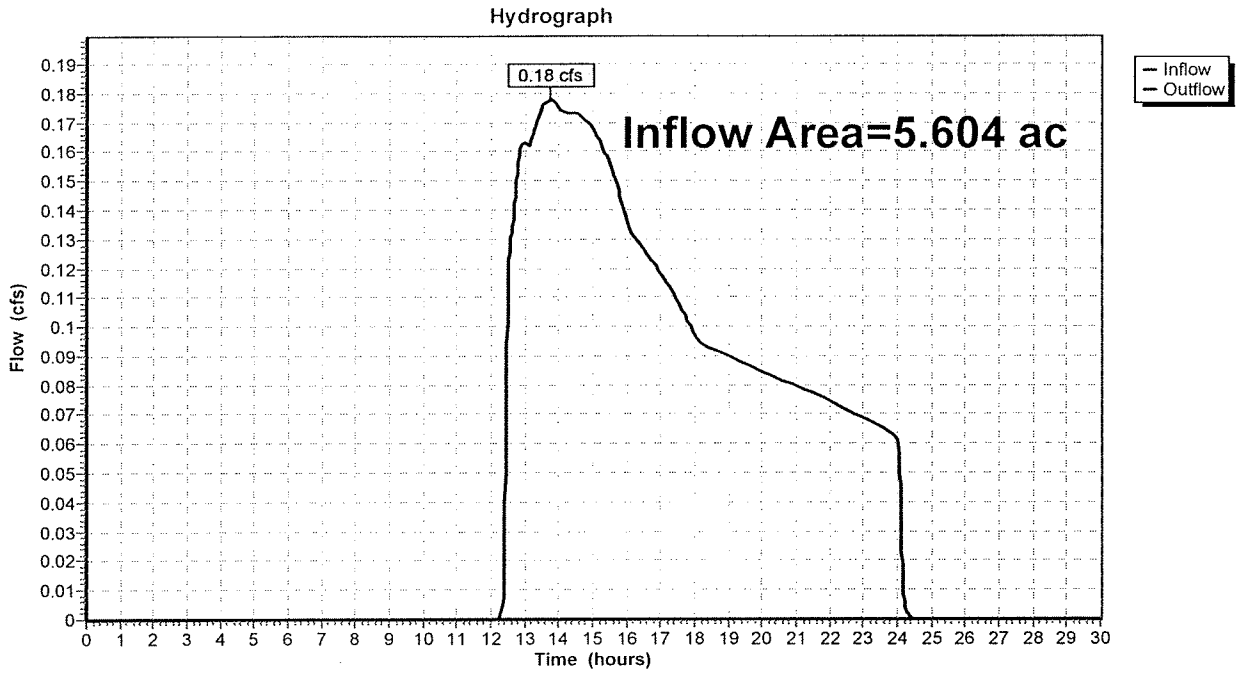


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 5.604 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.18 cfs @ 13.76 hrs, Volume= 0.107 af
Outflow = 0.18 cfs @ 13.76 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

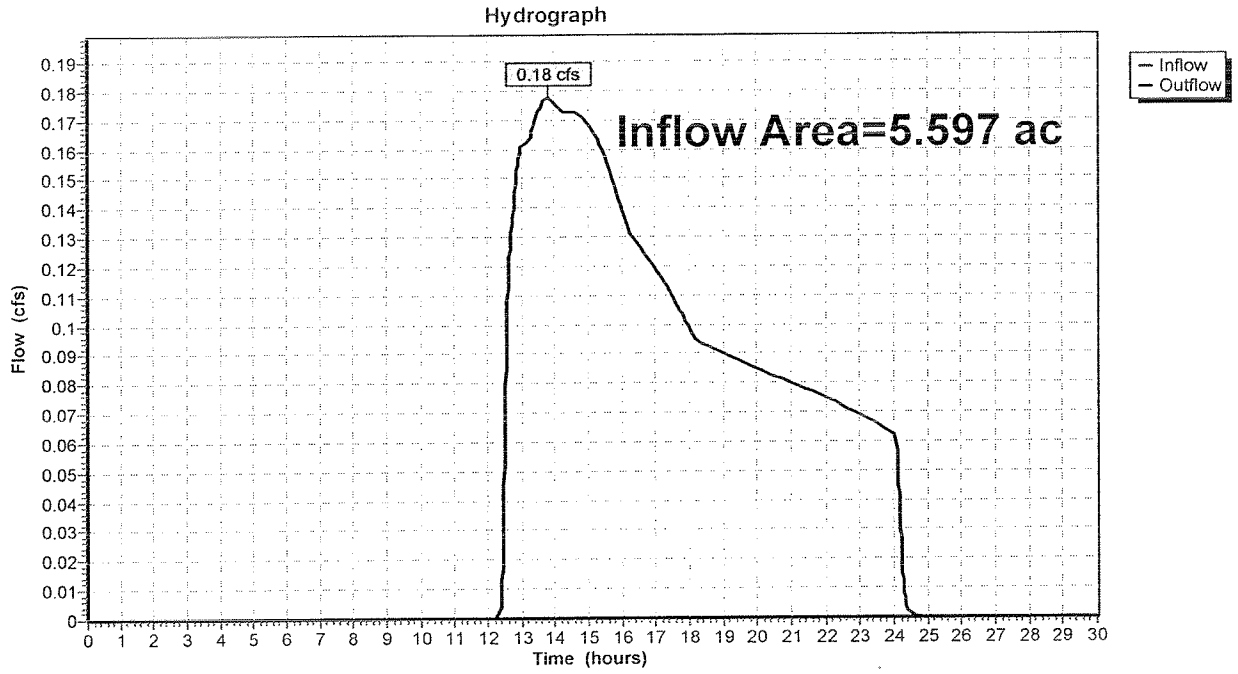


Summary for Reach 3R: FLOW TOWARDS ATKINS ROAD

Inflow Area = 5.597 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.18 cfs @ 13.81 hrs, Volume= 0.107 af
Outflow = 0.18 cfs @ 13.81 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: FLOW TOWARDS ATKINS ROAD



Summary for Pond 3P: NATURAL DEPRESSION

Inflow Area = 6.241 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.20 cfs @ 13.82 hrs, Volume= 0.120 af
Outflow = 0.20 cfs @ 13.88 hrs, Volume= 0.120 af, Atten= 0%, Lag= 3.7 min
Discarded = 0.20 cfs @ 13.88 hrs, Volume= 0.120 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.04' @ 13.88 hrs Surf.Area= 1,034 sf Storage= 40 cf

Plug-Flow detention time= 3.3 min calculated for 0.119 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (1,039.3 - 1,035.9)

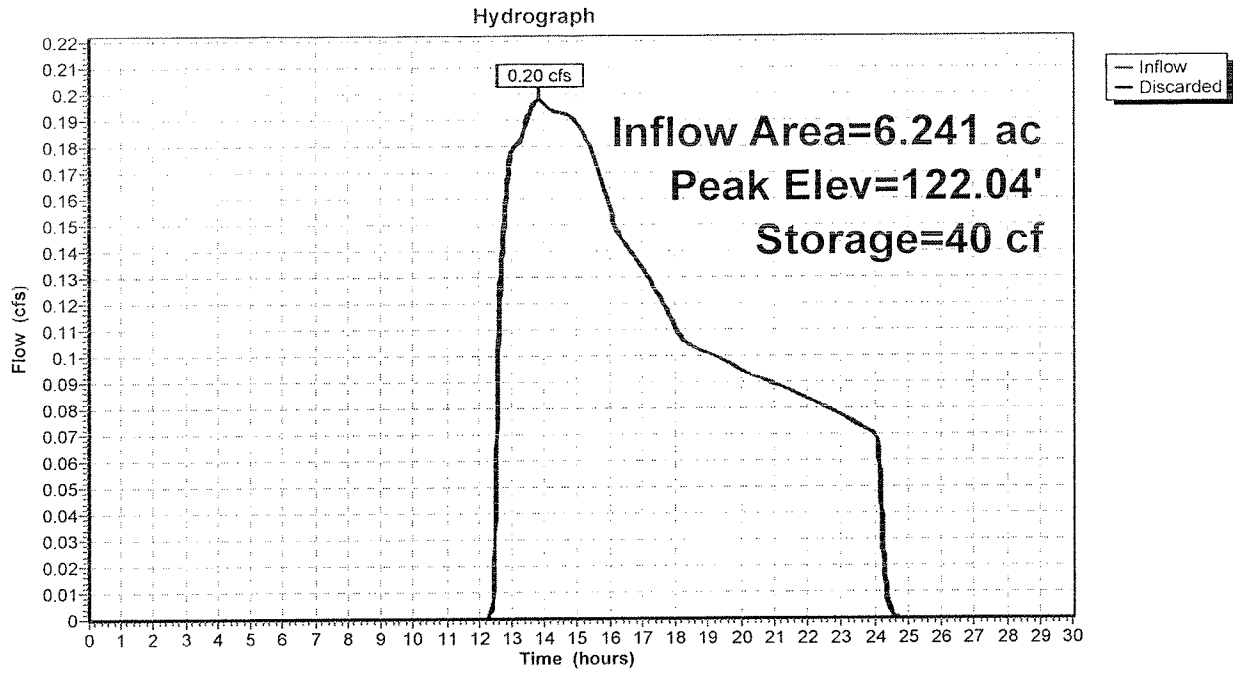
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	34,720 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	957	209.0	0	0	957
124.00	8,534	596.0	8,233	8,233	25,761
126.00	18,599	872.8	26,488	34,720	58,148

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.20 cfs @ 13.88 hrs HW=122.04' (Free Discharge)
↑**1=Exfiltration** (Controls 0.20 cfs)

Pond 3P: NATURAL DEPRESSION



Summary for Pond 5P: NATURAL DEPRESSION

Inflow Area = 3.204 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.10 cfs @ 13.85 hrs, Volume= 0.061 af
Outflow = 0.10 cfs @ 15.14 hrs, Volume= 0.061 af, Atten= 6%, Lag= 77.9 min
Discarded = 0.10 cfs @ 15.14 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 132.71' @ 15.14 hrs Surf.Area= 496 sf Storage= 182 cf

Plug-Flow detention time= 25.2 min calculated for 0.061 af (100% of inflow)
Center-of-Mass det. time= 25.2 min (1,061.4 - 1,036.2)

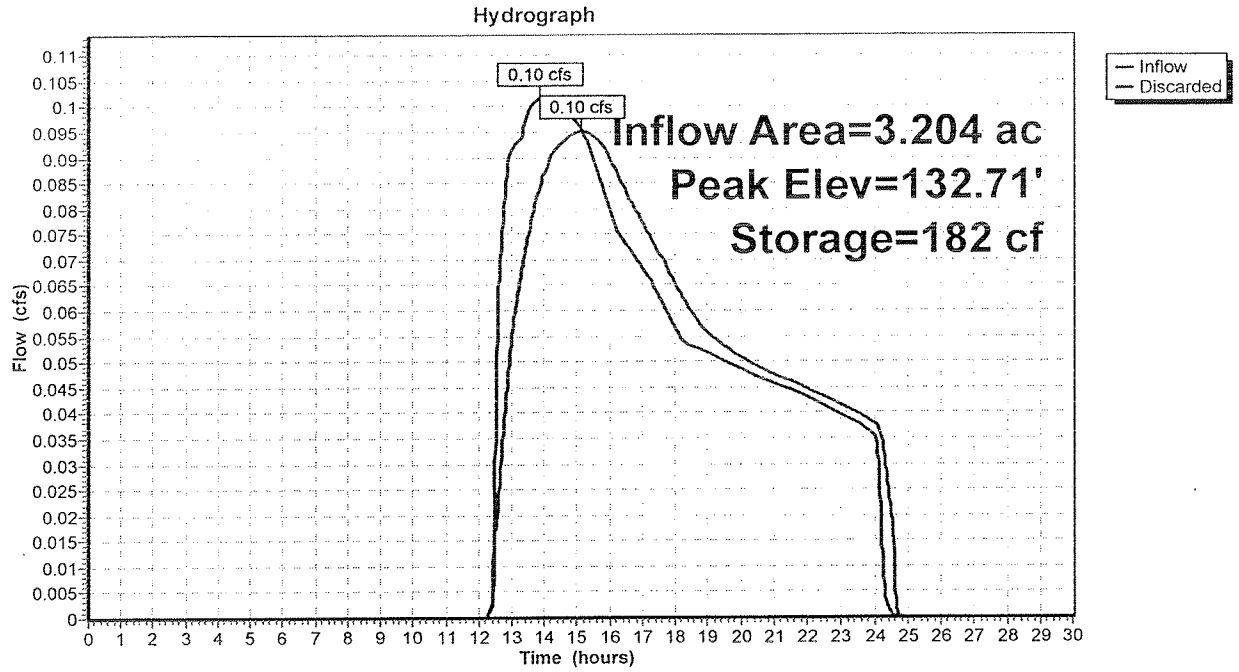
Volume	Invert	Avail.Storage	Storage Description
#1	132.00'	5,089 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
132.00	76	35.4	0	0	76
134.00	2,183	290.8	1,778	1,778	6,714
135.00	4,588	340.9	3,312	5,089	9,252

Device	Routing	Invert	Outlet Devices
#1	Discarded	132.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.10 cfs @ 15.14 hrs HW=132.71' (Free Discharge)
↑**1=Exfiltration** (Controls 0.10 cfs)

Pond 5P: NATURAL DEPRESSION



Summary for Pond 6P: NATURAL DEPRESSION

Inflow Area = 5.008 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.16 cfs @ 13.76 hrs, Volume= 0.096 af
Outflow = 0.16 cfs @ 13.83 hrs, Volume= 0.096 af, Atten= 0%, Lag= 4.4 min
Discarded = 0.16 cfs @ 13.83 hrs, Volume= 0.096 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.03' @ 13.83 hrs Surf.Area= 1,531 sf Storage= 48 cf

Plug-Flow detention time= 5.1 min calculated for 0.096 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (1,036.4 - 1,031.3)

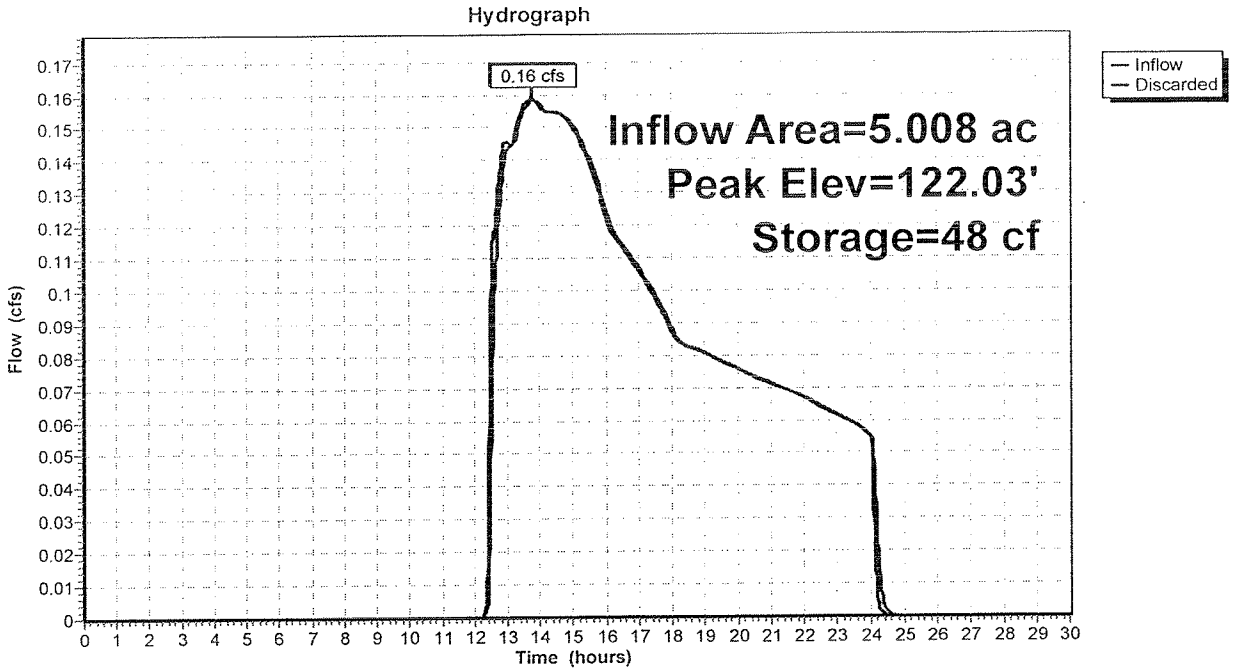
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	41,899 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,243	280.2	6,351	6,351	5,395
126.00	9,052	366.1	14,123	20,473	9,860
128.00	12,464	423.5	21,425	41,899	13,552

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.29 cfs @ 13.83 hrs HW=122.03' (Free Discharge)
↑**1=Exfiltration** (Controls 0.29 cfs)

Pond 6P: NATURAL DEPRESSION



Summary for Pond 7P: NATURAL DEPRESSION

Inflow Area = 4.921 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.16 cfs @ 13.74 hrs, Volume= 0.094 af
Outflow = 0.16 cfs @ 13.78 hrs, Volume= 0.094 af, Atten= 0%, Lag= 2.4 min
Discarded = 0.16 cfs @ 13.78 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 127.51' @ 13.78 hrs Surf.Area= 2,273 sf Storage= 16 cf

Plug-Flow detention time= 1.7 min calculated for 0.094 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (1,033.3 - 1,031.6)

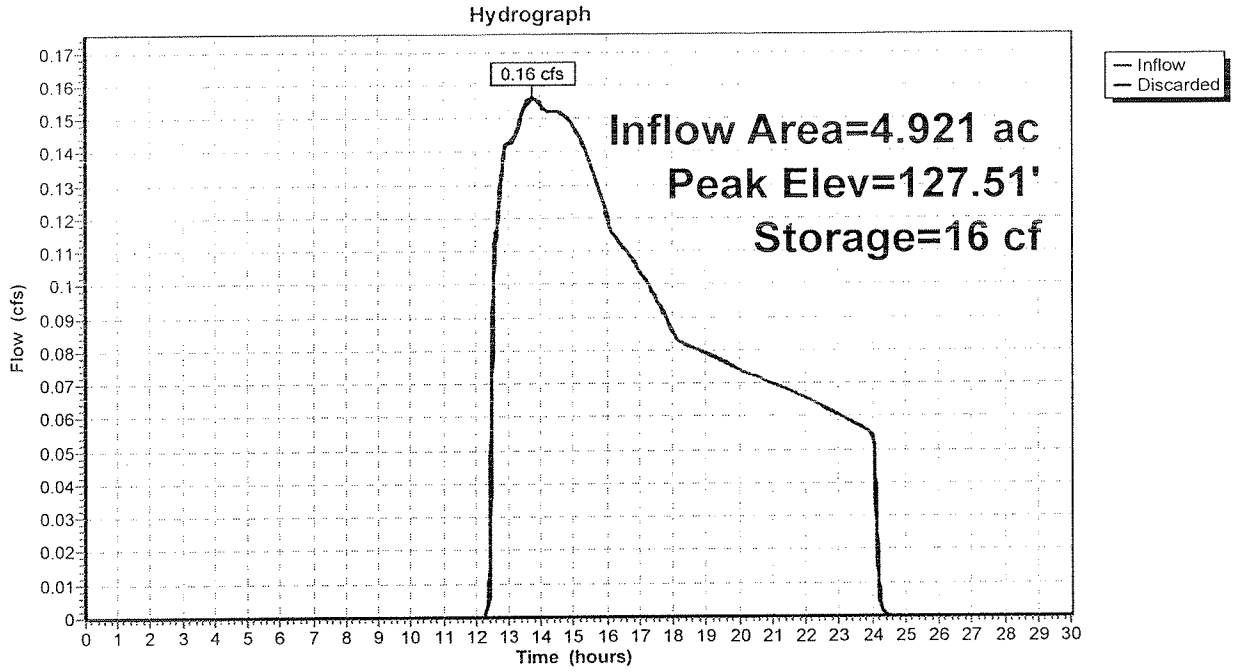
Volume	Invert	Avail.Storage	Storage Description
#1	127.50'	25,103 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

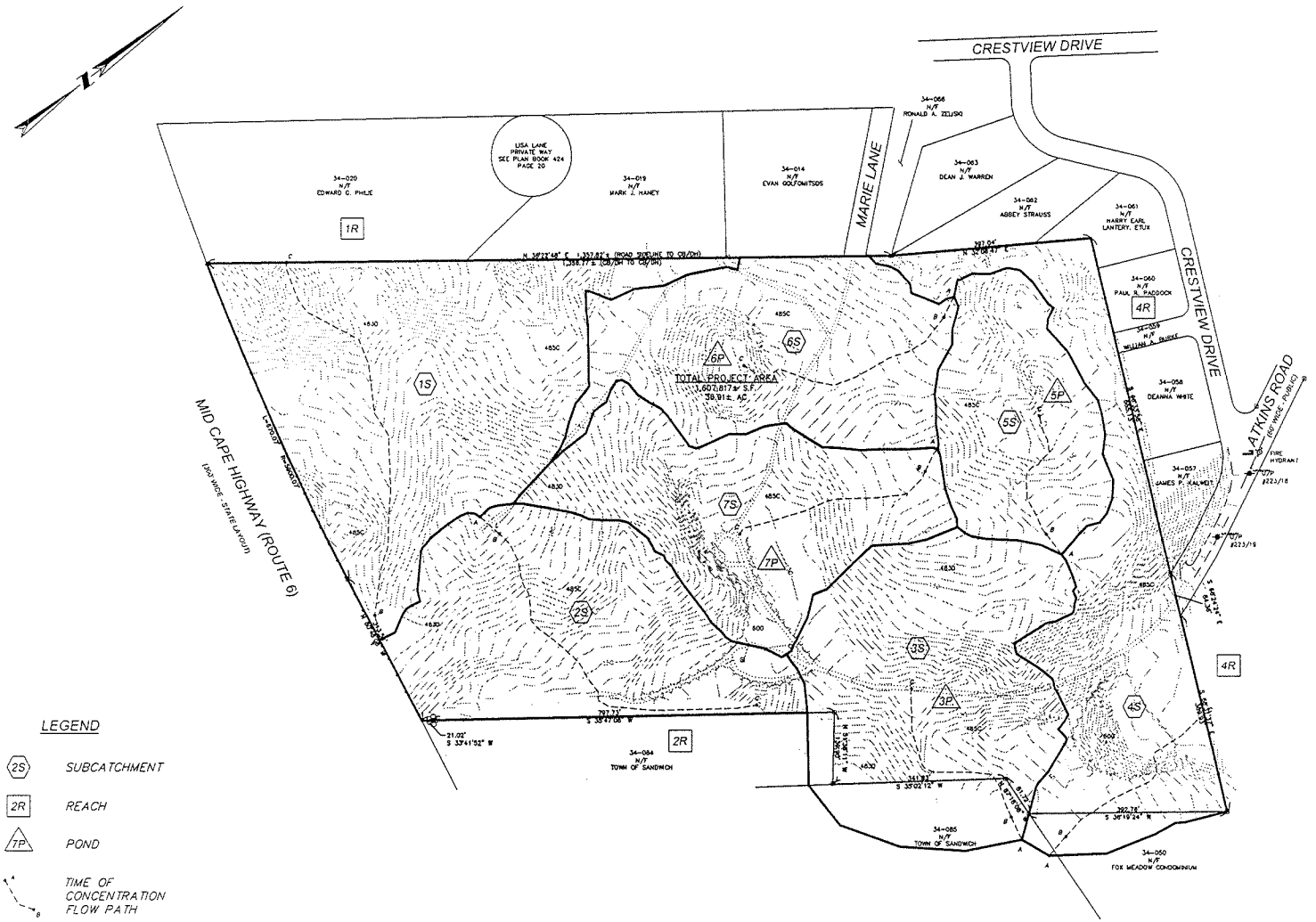
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
127.50	2,227	413.7	0	0	2,227
128.00	6,758	523.5	2,144	2,144	10,419
129.50	25,924	895.2	22,959	25,103	52,396

Device	Routing	Invert	Outlet Devices
#1	Discarded	127.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.44 cfs @ 13.78 hrs HW=127.51' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.44 cfs)

Pond 7P: NATURAL DEPRESSION





LEGEND

- 2S — SUBCATCHMENT
- 2R — REACH
- 7P — POND
- TIME OF CONCENTRATION FLOW PATH
- 483D — NRCS SOIL CLASSIFICATION

BRIAN C. YERGATIAN, PROFESSIONAL ENGINEER — DATE

ATKINS ROAD CLUSTER SUBDIVISION

ATKINS ROAD

IN

EAST SANDWICH
MASSACHUSETTS
(BARNSTABLE COUNTY)

PRE-DEVELOPMENT WATERSHED PLAN

FEBRUARY 5, 2014

REVISIONS:

NO.	DATE	DESC.

ISSUED FOR PERMITTING
NOT FOR CONSTRUCTION

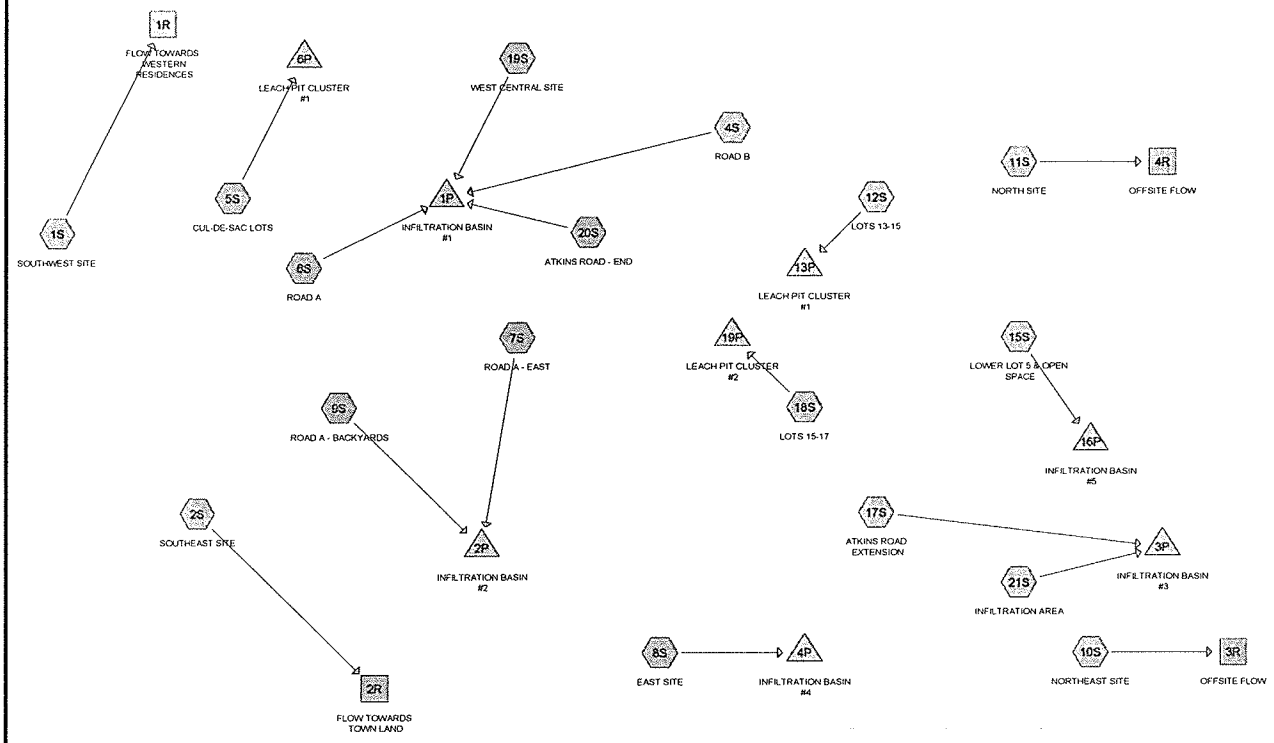
PREPARED FOR:
MONOMOY PROPERTIES, LLC
79 COVE ROAD
SOUTH DENNIS, MA 02660

BSC GROUP
349 Route 28, Unit D
W. Yarmouth, Massachusetts
02673
508 778 8919

SCALE: 1" = 100'
0 50 100 200 Feet

FILE 4967500-WS.dwg
DWG. NO.
JOB NO. 4-9675.00
SHEET 1 OF 1

5.2 Proposed Drainage Calculations and Watershed Plan



Subcat Reach Pond Link

Routing Diagram for 4967500-POST
Prepared by BSC Group, Printed 8/13/2013
HydroCAD® 10.00 s/n 00906 © 2013 HydroCAD Software Solutions LLC

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=266,088 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=158,607 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment4S: ROAD B Runoff Area=78,529 sf 35.80% Impervious Runoff Depth=0.58"
Tc=6.0 min CN=60 Runoff=0.86 cfs 0.086 af

Subcatchment5S: CUL-DE-SAC LOTS Runoff Area=72,895 sf 17.83% Impervious Runoff Depth=0.08"
Tc=6.0 min UI Adjusted CN=44 Runoff=0.02 cfs 0.011 af

Subcatchment6S: ROAD A Runoff Area=24,709 sf 62.40% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=76 Runoff=0.94 cfs 0.068 af

Subcatchment7S: ROAD A - EAST Runoff Area=139,417 sf 20.00% Impervious Runoff Depth=0.25"
Tc=6.0 min CN=51 Runoff=0.30 cfs 0.067 af

Subcatchment8S: EAST SITE Runoff Area=170,221 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=32 Runoff=0.00 cfs 0.000 af

Subcatchment9S: ROAD A - BACKYARDS Runoff Area=85,522 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment10S: NORTHEAST SITE Runoff Area=40,166 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=233' Tc=12.3 min CN=32 Runoff=0.00 cfs 0.000 af

Subcatchment11S: NORTH SITE Runoff Area=92,697 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=302' Tc=7.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment12S: LOTS 13-15 Runoff Area=48,974 sf 12.00% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=46 Runoff=0.02 cfs 0.011 af

Subcatchment15S: LOWER LOT 5 & OPEN Runoff Area=34,036 sf 6.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment17S: ATKINS ROAD Runoff Area=190,434 sf 26.69% Impervious Runoff Depth=0.38"
Tc=6.0 min CN=55 Runoff=0.88 cfs 0.138 af

Subcatchment18S: LOTS 15-17 Runoff Area=69,633 sf 12.00% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=46 Runoff=0.03 cfs 0.016 af

Subcatchment19S: WEST CENTRAL SITE Runoff Area=150,928 sf 12.00% Impervious Runoff Depth=0.12"
Tc=6.0 min CN=46 Runoff=0.06 cfs 0.035 af

Subcatchment20S: ATKINS ROAD - END Runoff Area=19,175 sf 41.30% Impervious Runoff Depth=0.76"
Tc=6.0 min CN=64 Runoff=0.32 cfs 0.028 af

Subcatchment 21S: INFILTRATION AREA Runoff Area=39,560 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.001 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 3R: OFFSITE FLOW Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 4R: OFFSITE FLOW Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: INFILTRATION BASIN #1 Peak Elev=122.83' Storage=1,747 cf Inflow=2.10 cfs 0.217 af
Outflow=0.53 cfs 0.217 af

Pond 2P: INFILTRATION BASIN #2 Peak Elev=126.00' Storage=0 cf Inflow=0.30 cfs 0.067 af
Outflow=0.30 cfs 0.067 af

Pond 3P: INFILTRATION BASIN #3 Peak Elev=102.45' Storage=728 cf Inflow=0.88 cfs 0.140 af
Discarded=0.37 cfs 0.140 af Primary=0.00 cfs 0.000 af Outflow=0.37 cfs 0.140 af

Pond 4P: INFILTRATION BASIN #4 Peak Elev=122.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 6P: LEACH PIT CLUSTER #1 Peak Elev=124.00' Storage=0 cf Inflow=0.02 cfs 0.011 af
Outflow=0.02 cfs 0.011 af

Pond 13P: LEACH PIT CLUSTER #1 Peak Elev=124.00' Storage=0 cf Inflow=0.02 cfs 0.011 af
Outflow=0.02 cfs 0.011 af

Pond 16P: INFILTRATION BASIN #5 Peak Elev=113.00' Storage=0 cf Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Pond 19P: LEACH PIT CLUSTER #2 Peak Elev=124.00' Storage=0 cf Inflow=0.03 cfs 0.016 af
Outflow=0.03 cfs 0.016 af

Total Runoff Area = 38.604 ac Runoff Volume = 0.463 af Average Runoff Depth = 0.14"
89.44% Pervious = 34.528 ac 10.56% Impervious = 4.076 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

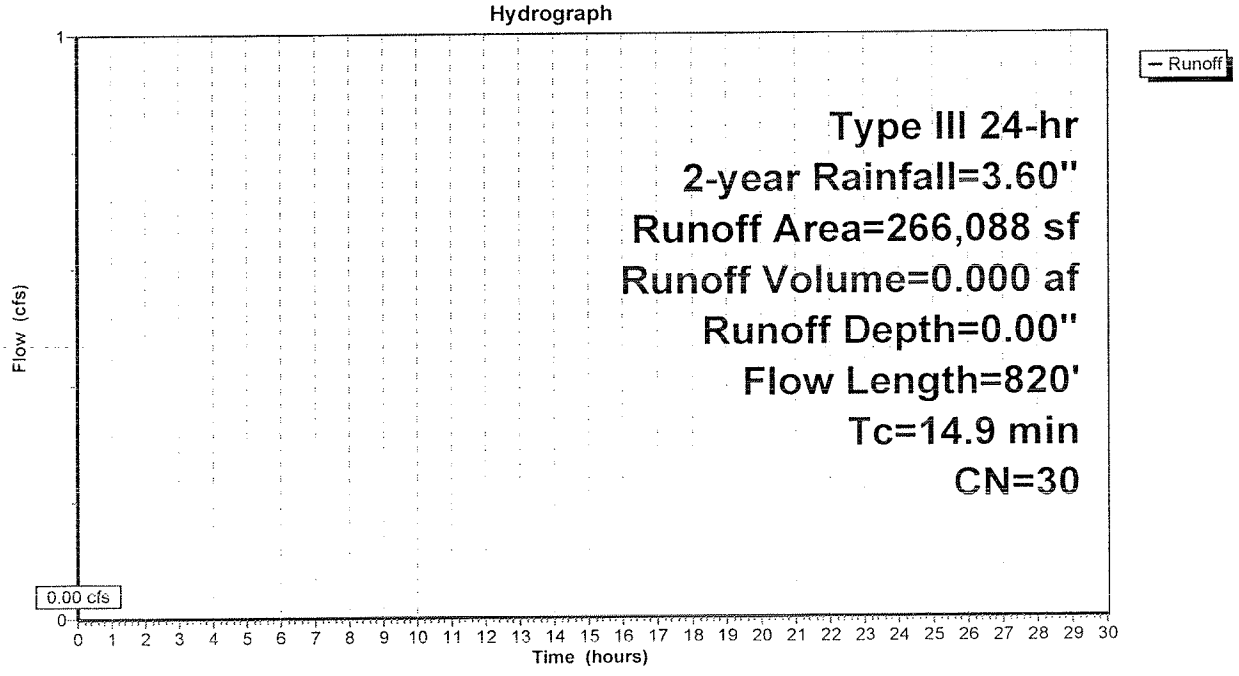
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
266,088	30	Woods, Good, HSG A
266,088		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

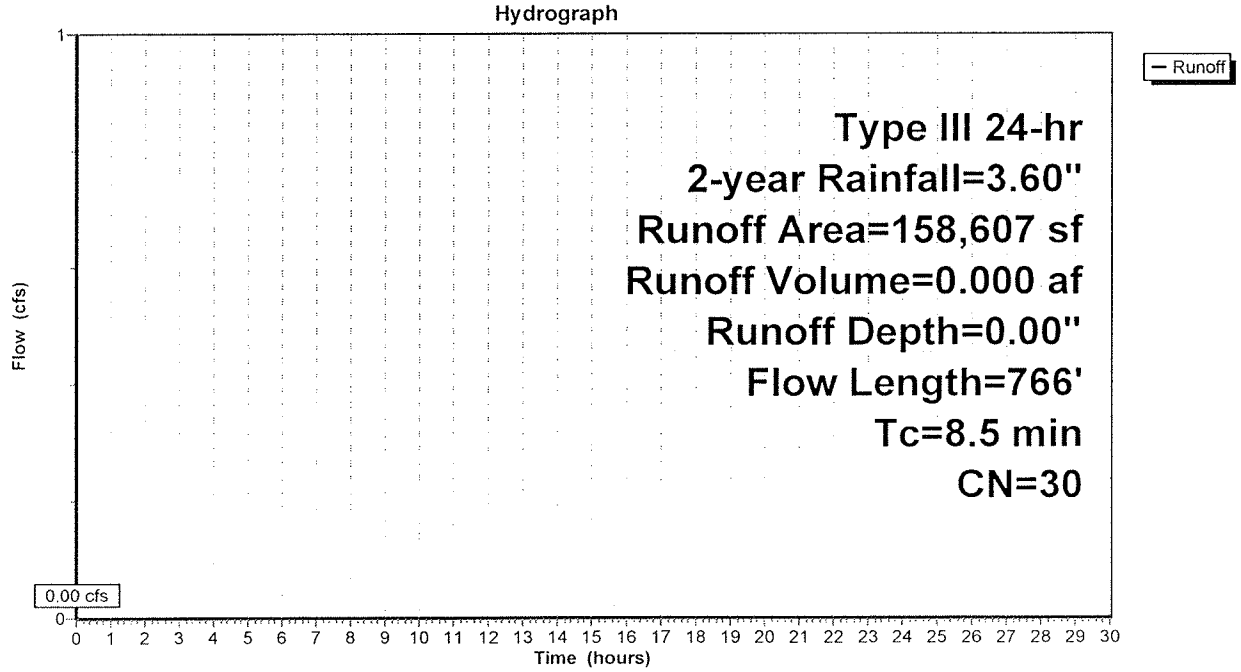
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
158,607	30	Woods, Good, HSG A
158,607		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 4S: ROAD B

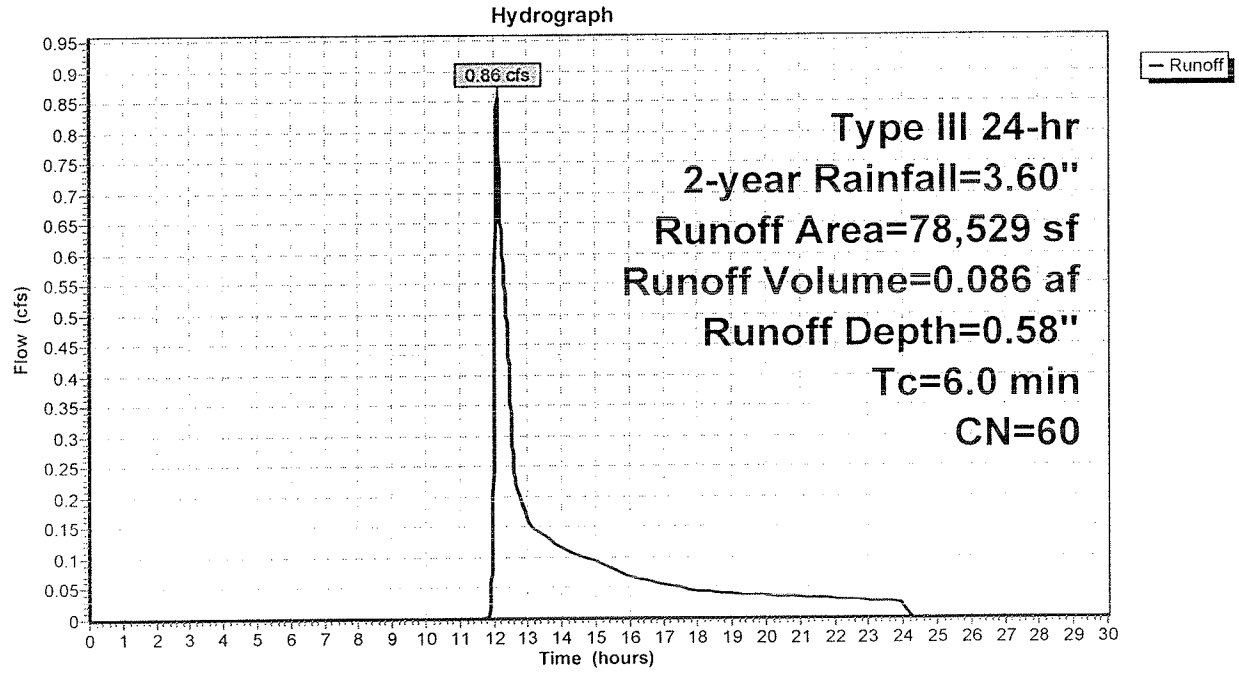
Runoff = 0.86 cfs @ 12.11 hrs, Volume= 0.086 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
16,195	98	Paved roads w/curbs & sewers, HSG A
59,600	51	1 acre lots, 20% imp, HSG A
2,734	39	>75% Grass cover, Good, HSG A
78,529	60	Weighted Average
50,414		64.20% Pervious Area
28,115		35.80% Impervious Area

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

Subcatchment 4S: ROAD B



Summary for Subcatchment 5S: CUL-DE-SAC LOTS

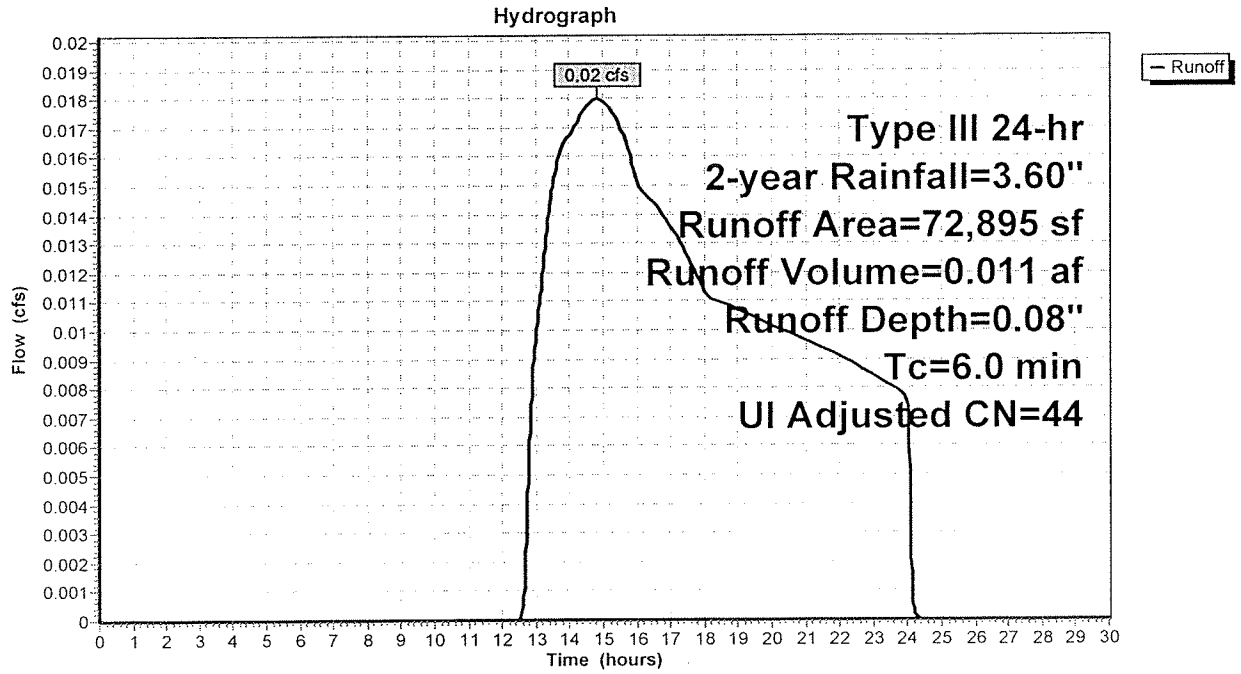
Runoff = 0.02 cfs @ 14.82 hrs, Volume= 0.011 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Adj	Description
59,895	39		>75% Grass cover, Good, HSG A
13,000	98		Unconnected pavement, HSG A
72,895	50	44	Weighted Average, UI Adjusted
59,895			82.17% Pervious Area
13,000			17.83% Impervious Area
13,000			100.00% Unconnected

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

Subcatchment 5S: CUL-DE-SAC LOTS



Summary for Subcatchment 6S: ROAD A

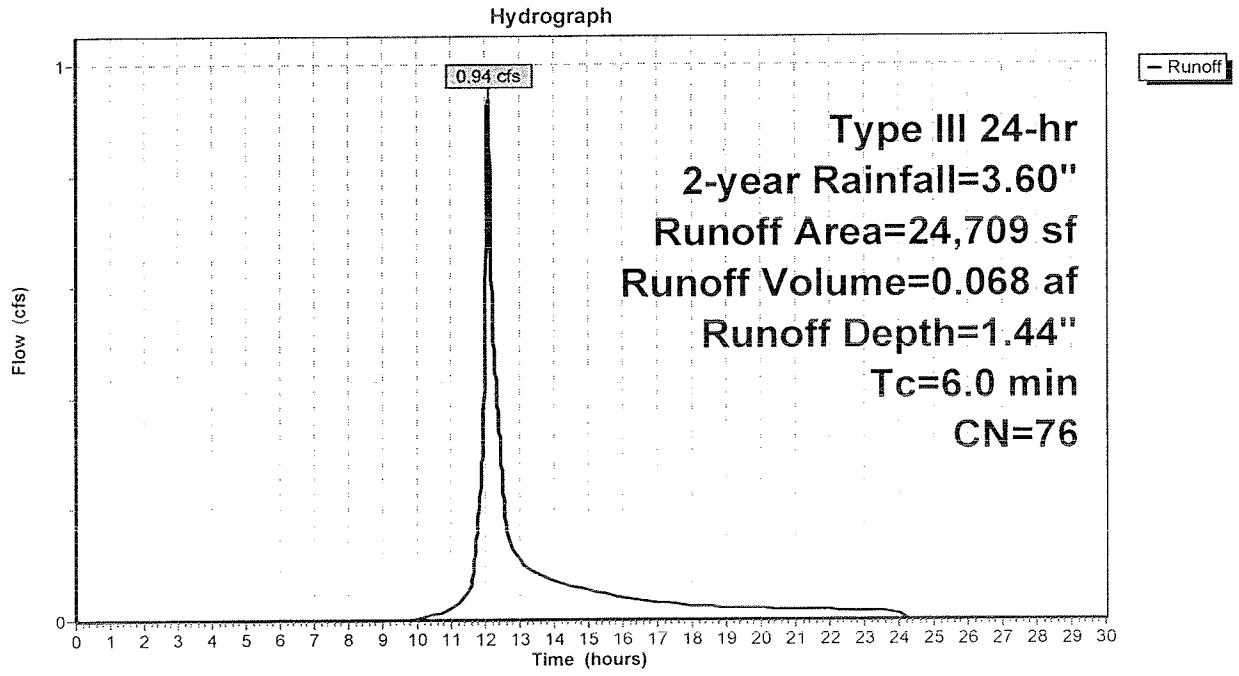
Runoff = 0.94 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
15,418	98	Paved parking, HSG A
9,291	39	>75% Grass cover, Good, HSG A
24,709	76	Weighted Average
9,291		37.60% Pervious Area
15,418		62.40% Impervious Area

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

Subcatchment 6S: ROAD A



Summary for Subcatchment 7S: ROAD A - EAST

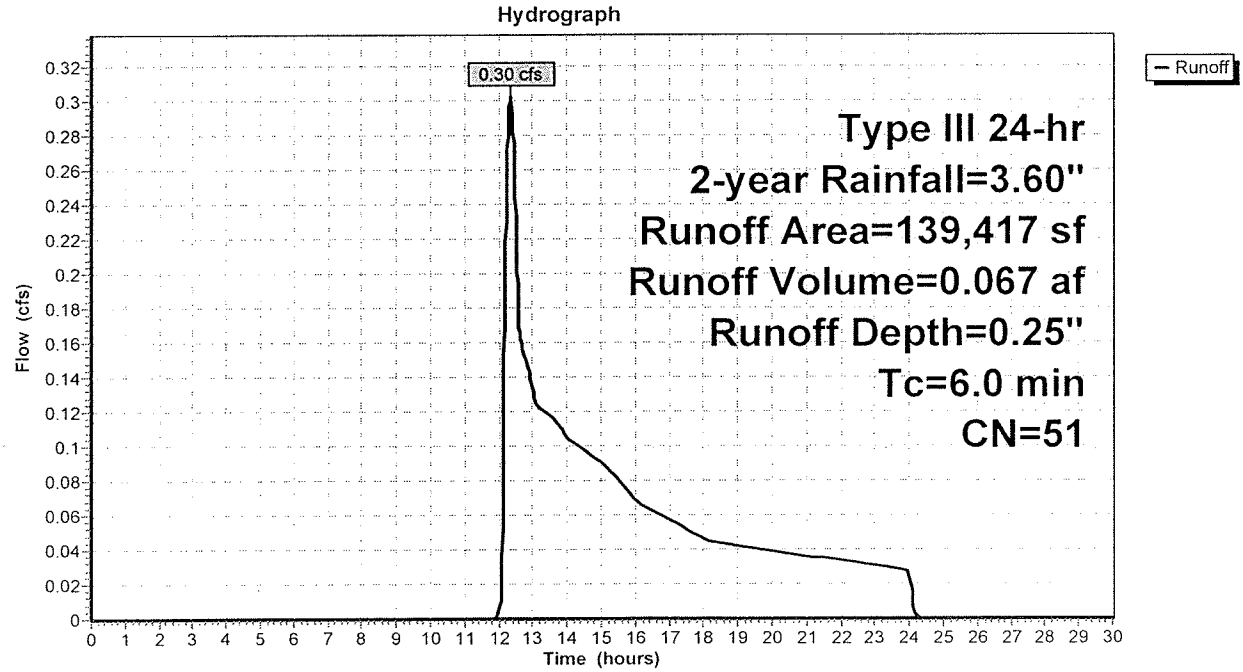
Runoff = 0.30 cfs @ 12.36 hrs, Volume= 0.067 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
139,417	51	1 acre lots, 20% imp, HSG A
111,534		80.00% Pervious Area
27,883		20.00% Impervious Area

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

Subcatchment 7S: ROAD A - EAST



Summary for Subcatchment 8S: EAST SITE

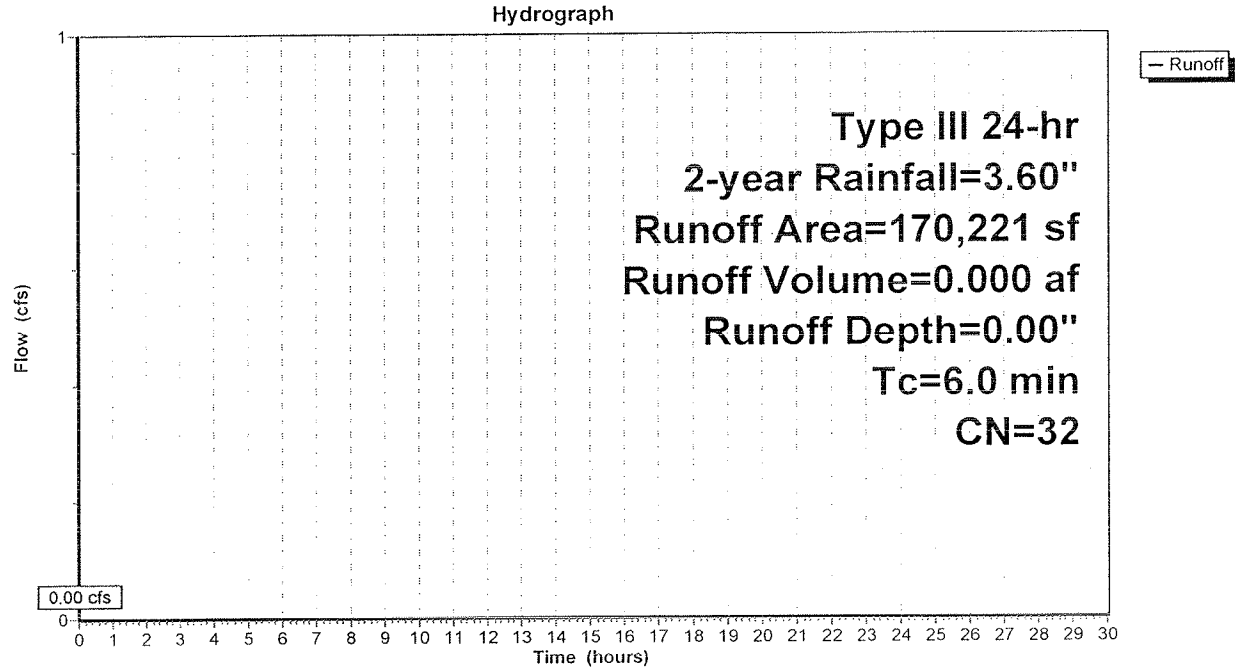
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
170,221	32	Woods/grass comb., Good, HSG A
170,221		100.00% Pervious Area

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

Subcatchment 8S: EAST SITE



Summary for Subcatchment 9S: ROAD A - BACKYARDS

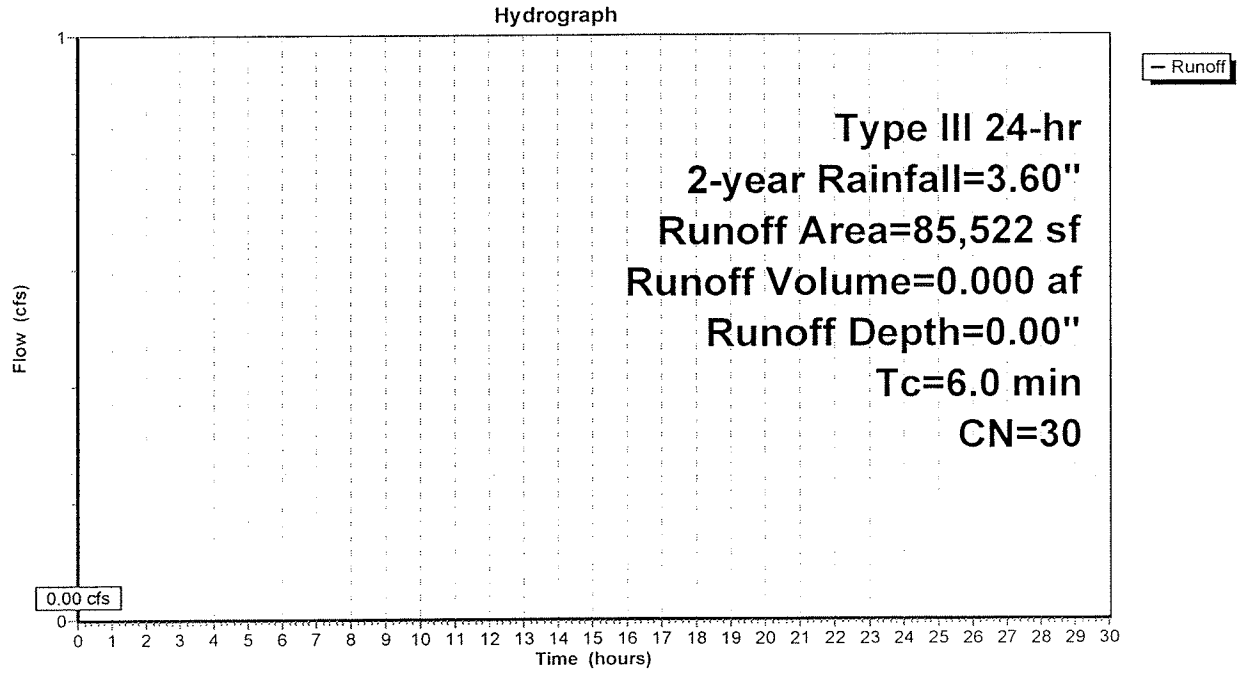
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
85,522	30	Woods, Good, HSG A
85,522		100.00% Pervious Area

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

Subcatchment 9S: ROAD A - BACKYARDS



Summary for Subcatchment 10S: NORTHEAST SITE

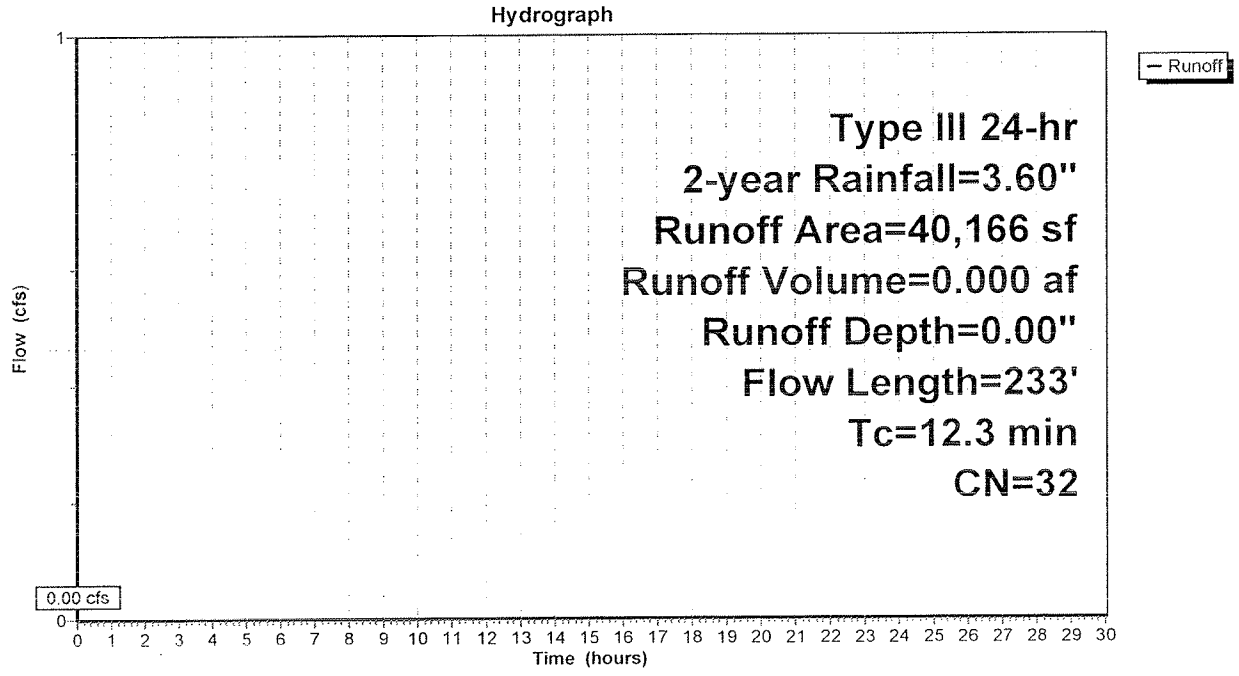
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
40,166	32	Woods/grass comb., Good, HSG A
40,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.7	183	0.0765	4.45		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.3	233	Total			

Subcatchment 10S: NORTHEAST SITE



Summary for Subcatchment 11S: NORTH SITE

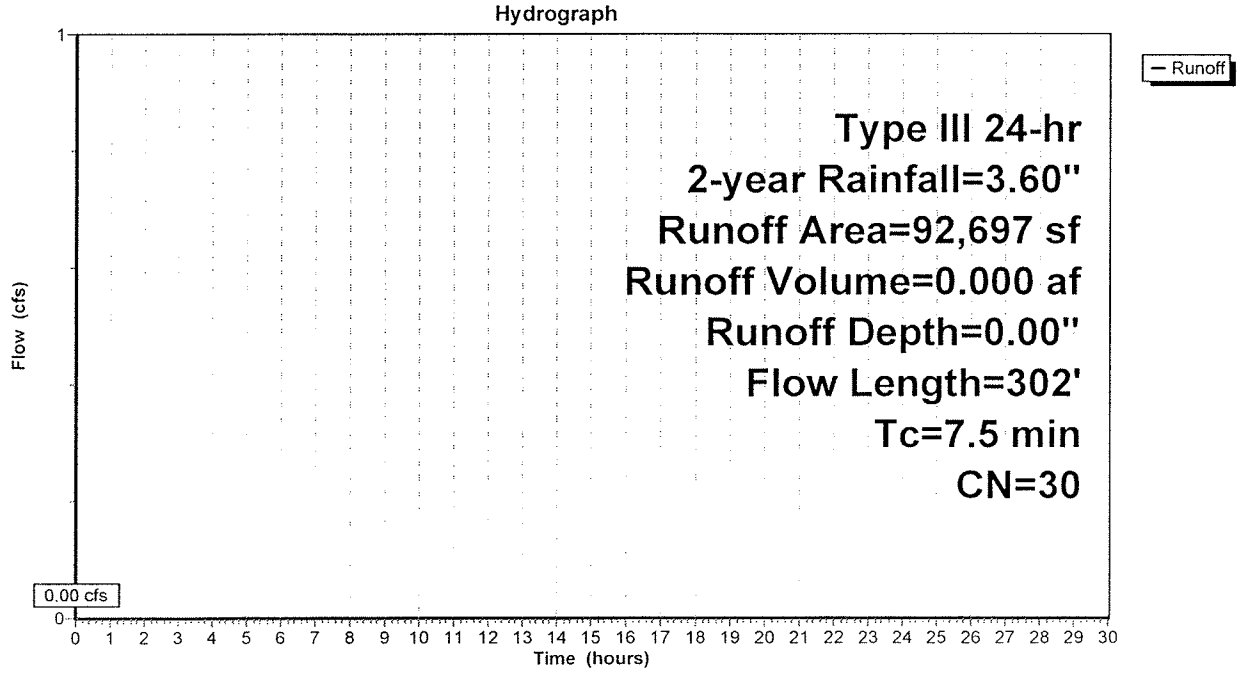
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
92,697	30	Woods, Good, HSG A
92,697		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
0.8	252	0.1000	5.09		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
7.5	302	Total			

Subcatchment 11S: NORTH SITE



Summary for Subcatchment 12S: LOTS 13-15

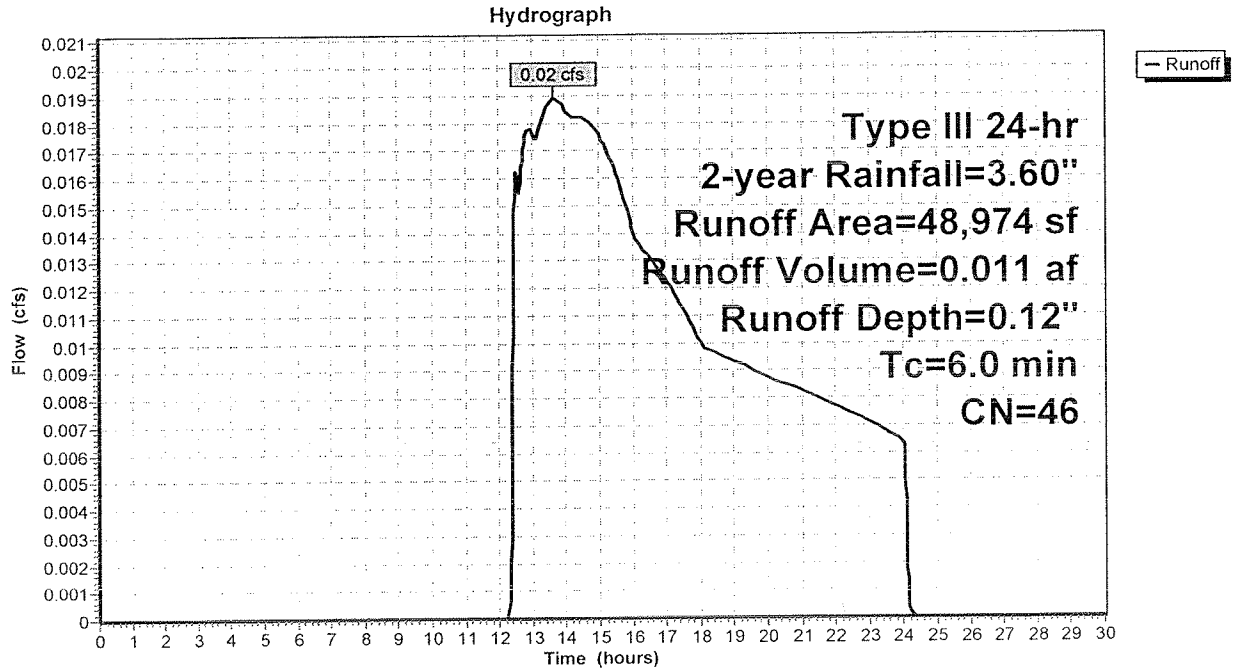
Runoff = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
48,974	46	2 acre lots, 12% imp, HSG A
43,097		88.00% Pervious Area
5,877		12.00% Impervious Area

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

Subcatchment 12S: LOTS 13-15



Summary for Subcatchment 15S: LOWER LOT 5 & OPEN SPACE

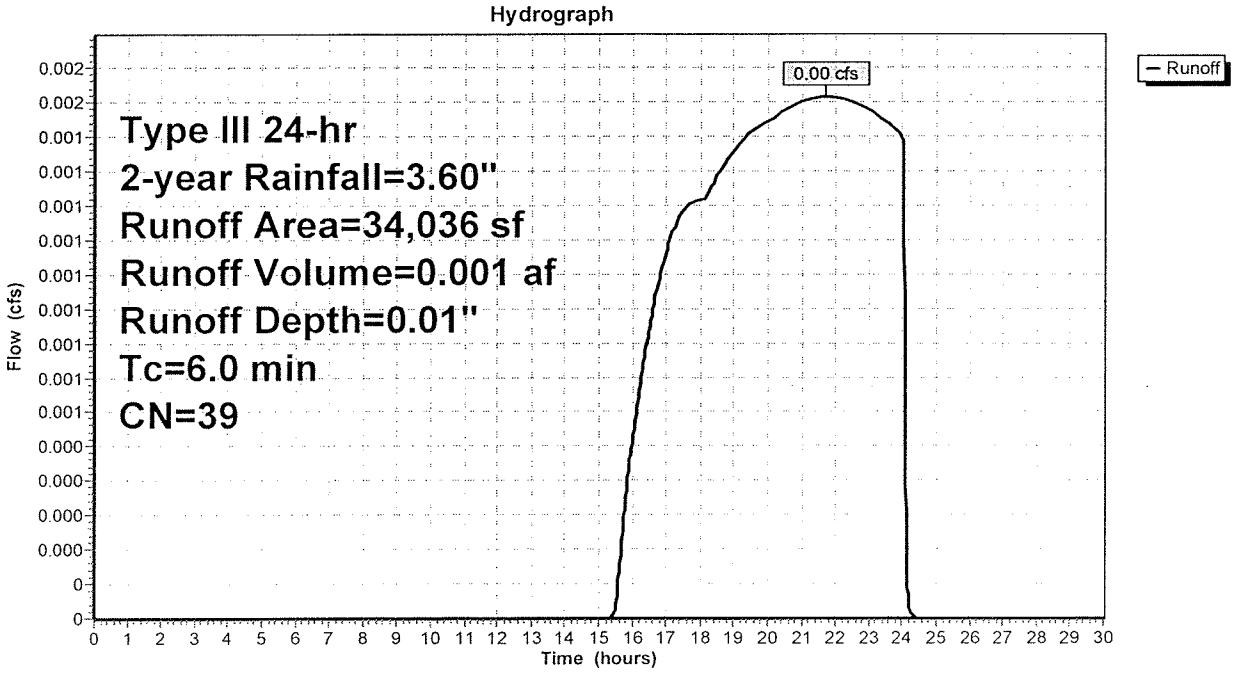
Runoff = 0.00 cfs @ 21.70 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
17,018	32	Woods/grass comb., Good, HSG A
17,018	46	2 acre lots, 12% imp, HSG A
34,036	39	Weighted Average
31,994		94.00% Pervious Area
2,042		6.00% Impervious Area

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

Subcatchment 15S: LOWER LOT 5 & OPEN SPACE



Summary for Subcatchment 17S: ATKINS ROAD EXTENSION

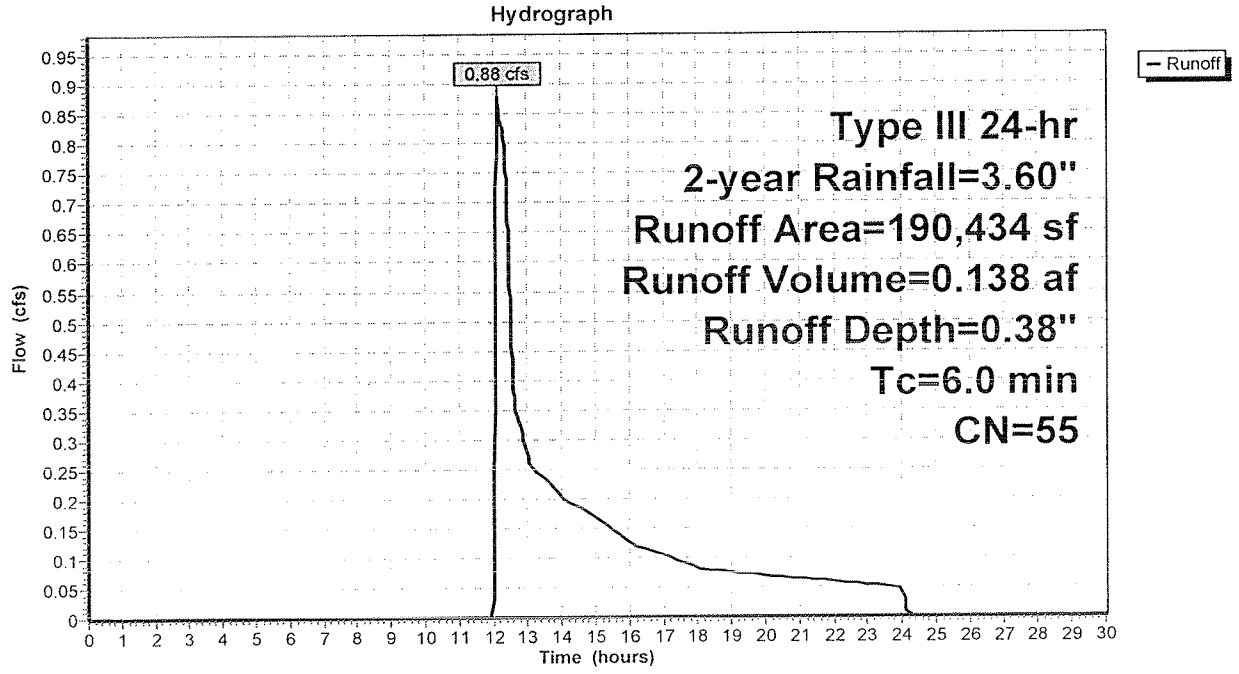
Runoff = 0.88 cfs @ 12.15 hrs, Volume= 0.138 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
21,495	98	Paved roads w/curbs & sewers, HSG A
17,804	39	>75% Grass cover, Good, HSG A
146,656	51	1 acre lots, 20% imp, HSG A
4,479	30	Woods, Good, HSG A
190,434	55	Weighted Average
139,608		73.31% Pervious Area
50,826		26.69% Impervious Area

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

Subcatchment 17S: ATKINS ROAD EXTENSION



Summary for Subcatchment 18S: LOTS 15-17

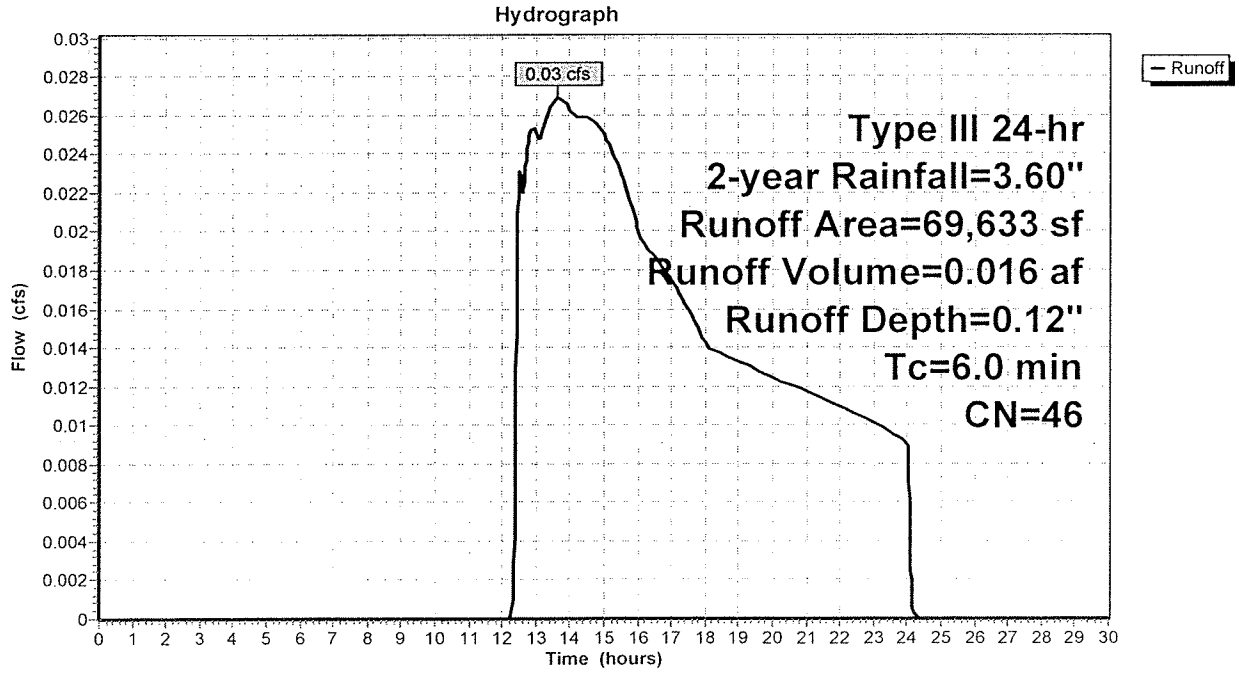
Runoff = 0.03 cfs @ 13.66 hrs, Volume= 0.016 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
69,633	46	2 acre lots, 12% imp, HSG A
61,277		88.00% Pervious Area
8,356		12.00% Impervious Area

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

Subcatchment 18S: LOTS 15-17



Summary for Subcatchment 19S: WEST CENTRAL SITE

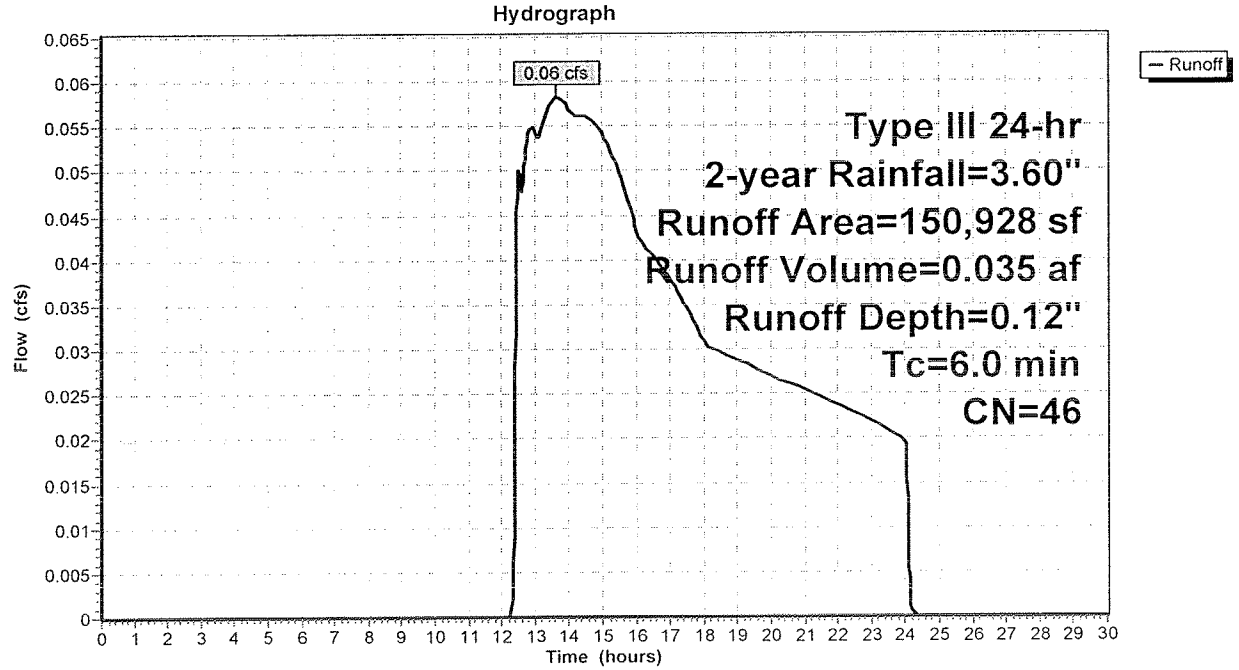
Runoff = 0.06 cfs @ 13.66 hrs, Volume= 0.035 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
150,928	46	2 acre lots, 12% imp, HSG A
132,817		88.00% Pervious Area
18,111		12.00% Impervious Area

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

Subcatchment 19S: WEST CENTRAL SITE



Summary for Subcatchment 20S: ATKINS ROAD - END

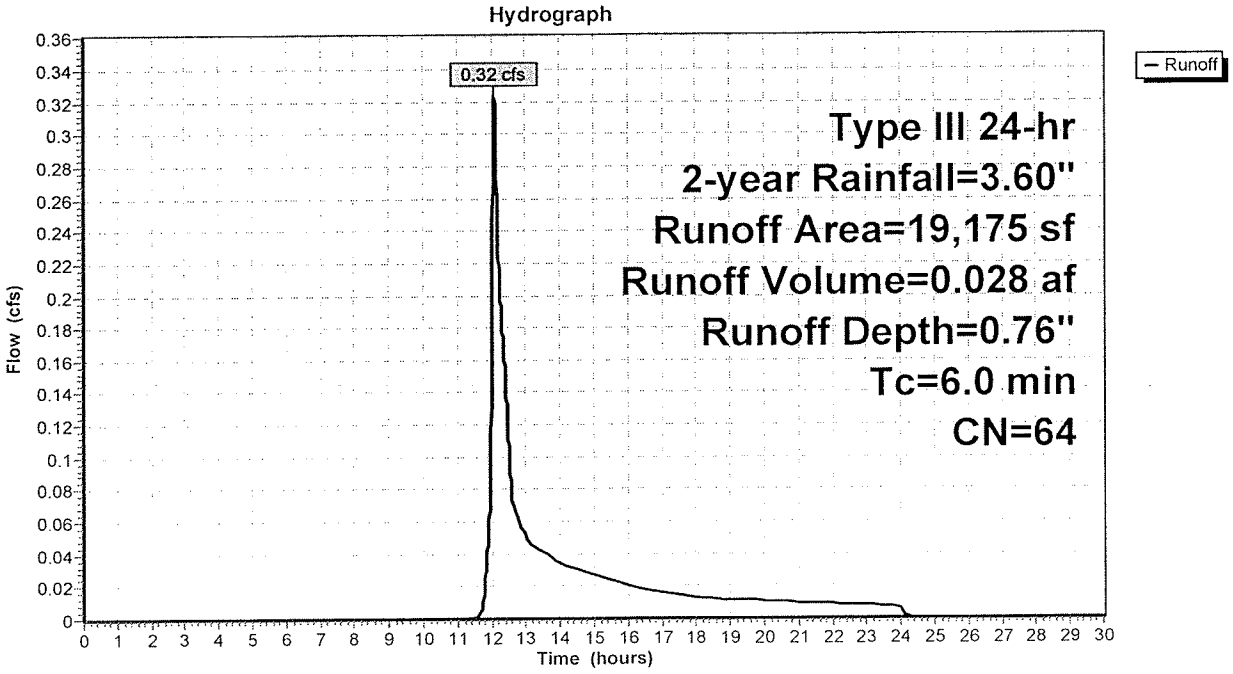
Runoff = 0.32 cfs @ 12.10 hrs, Volume= 0.028 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
14,070	51	1 acre lots, 20% imp, HSG A
5,105	98	Paved roads w/curbs & sewers, HSG A
19,175	64	Weighted Average
11,256		58.70% Pervious Area
7,919		41.30% Impervious Area

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

Subcatchment 20S: ATKINS ROAD - END



Summary for Subcatchment 21S: INFILTRATION AREA

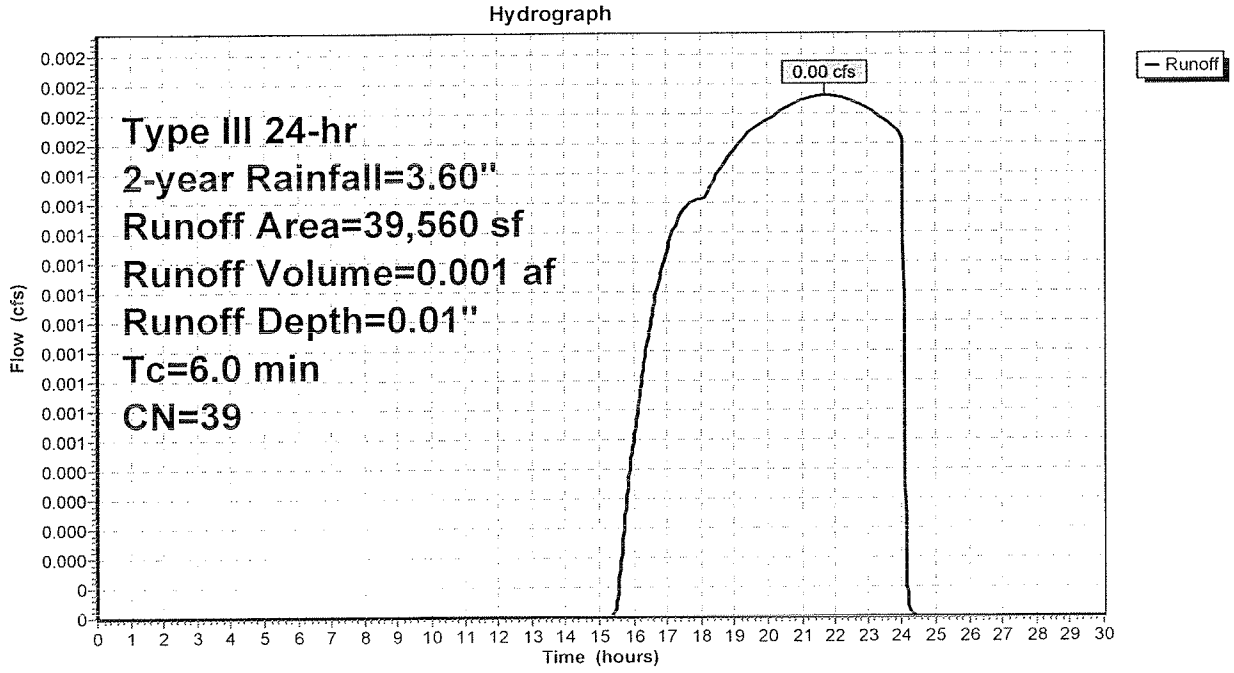
Runoff = 0.00 cfs @ 21.70 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.60"

Area (sf)	CN	Description
39,560	39	>75% Grass cover, Good, HSG A
39,560		100.00% Pervious Area

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

Subcatchment 21S: INFILTRATION AREA

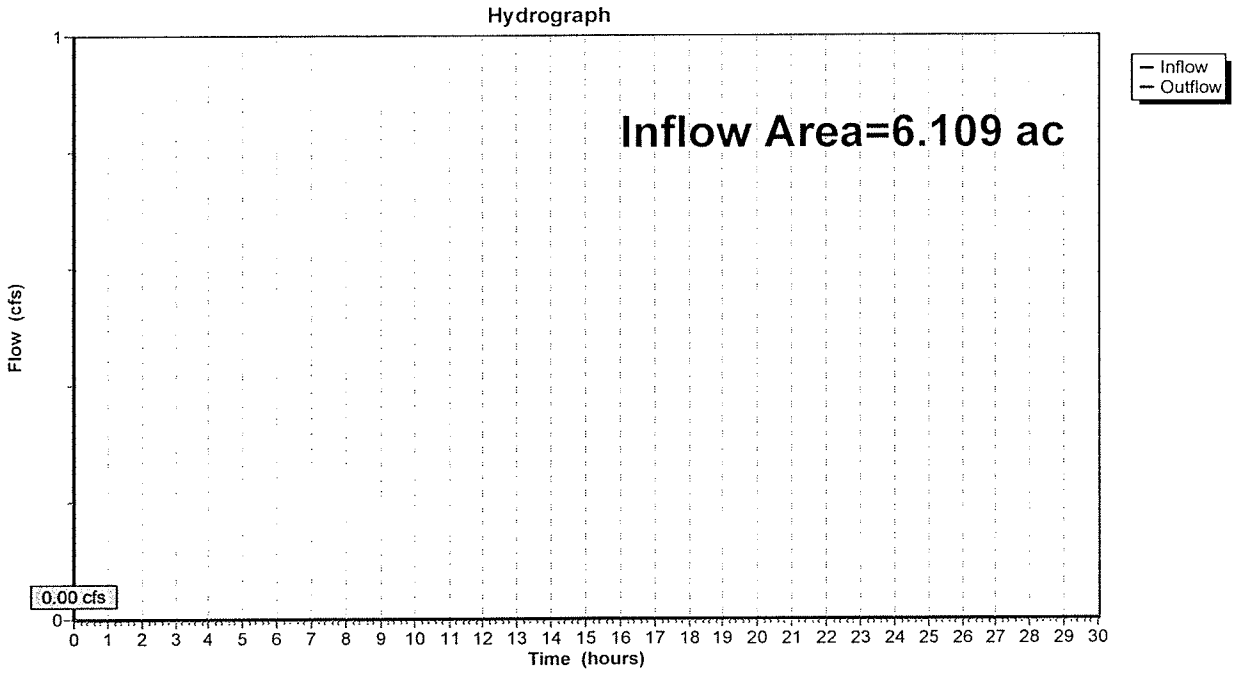


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 6.109 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

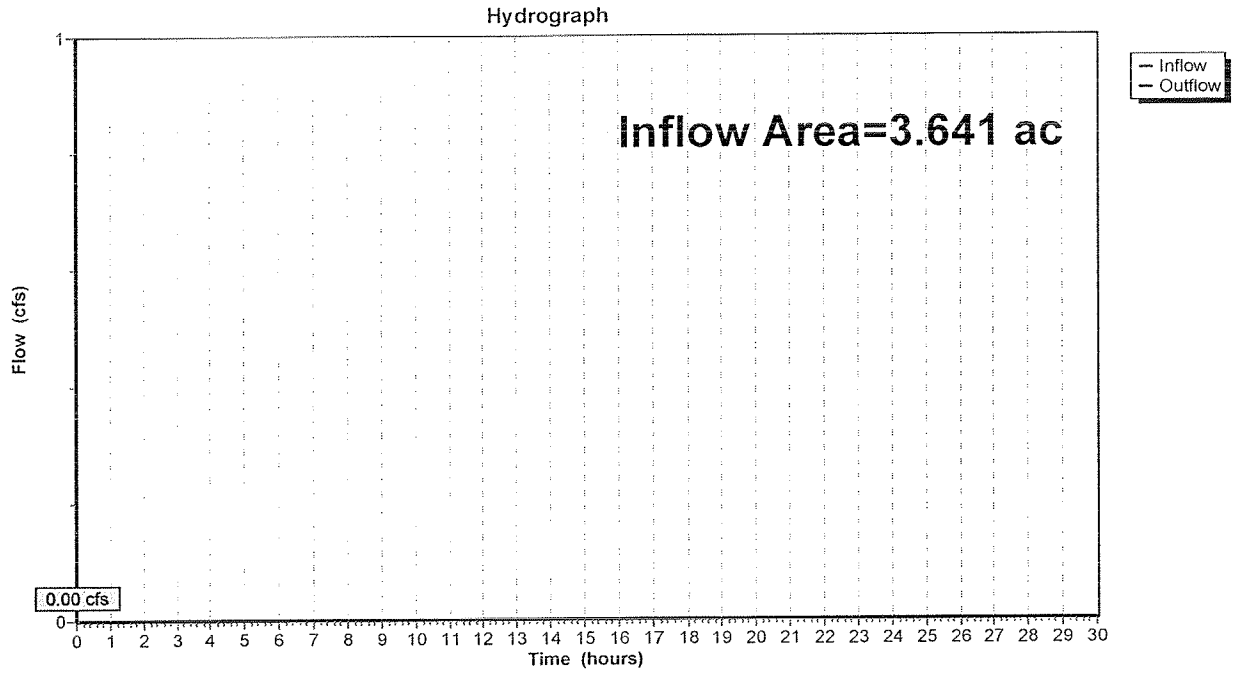


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 3.641 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

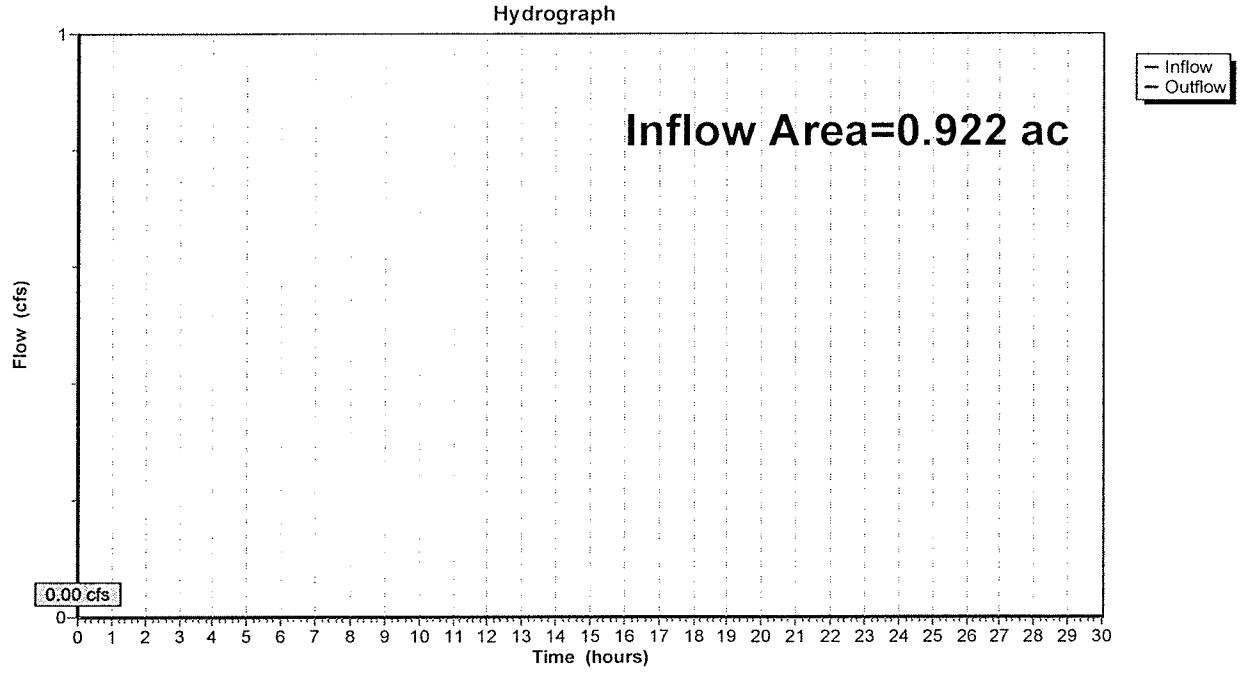


Summary for Reach 3R: OFFSITE FLOW

Inflow Area = 0.922 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: OFFSITE FLOW

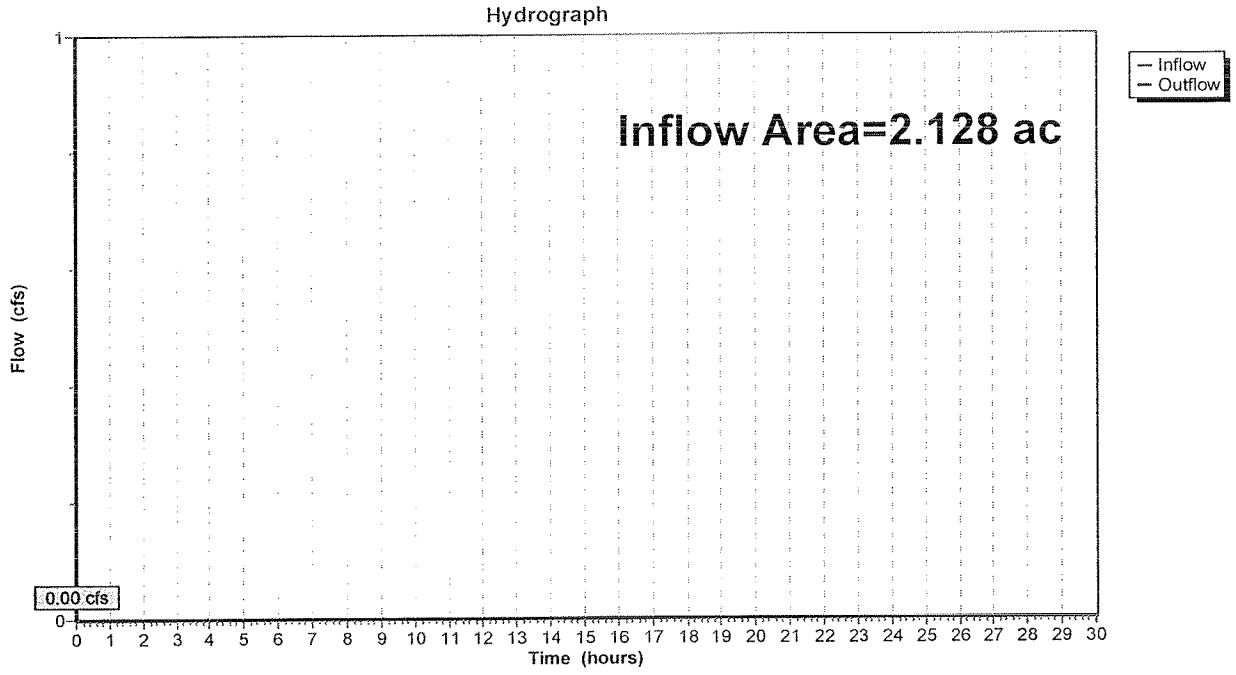


Summary for Reach 4R: OFFSITE FLOW

Inflow Area = 2.128 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 4R: OFFSITE FLOW



Summary for Pond 1P: INFILTRATION BASIN #1

Inflow Area = 6.275 ac, 25.45% Impervious, Inflow Depth = 0.41" for 2-year event
Inflow = 2.10 cfs @ 12.10 hrs, Volume= 0.217 af
Outflow = 0.53 cfs @ 12.59 hrs, Volume= 0.217 af, Atten= 75%, Lag= 29.3 min
Discarded = 0.53 cfs @ 12.59 hrs, Volume= 0.217 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.83' @ 12.59 hrs Surf.Area= 2,767 sf Storage= 1,747 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 23.9 min (928.8 - 904.9)

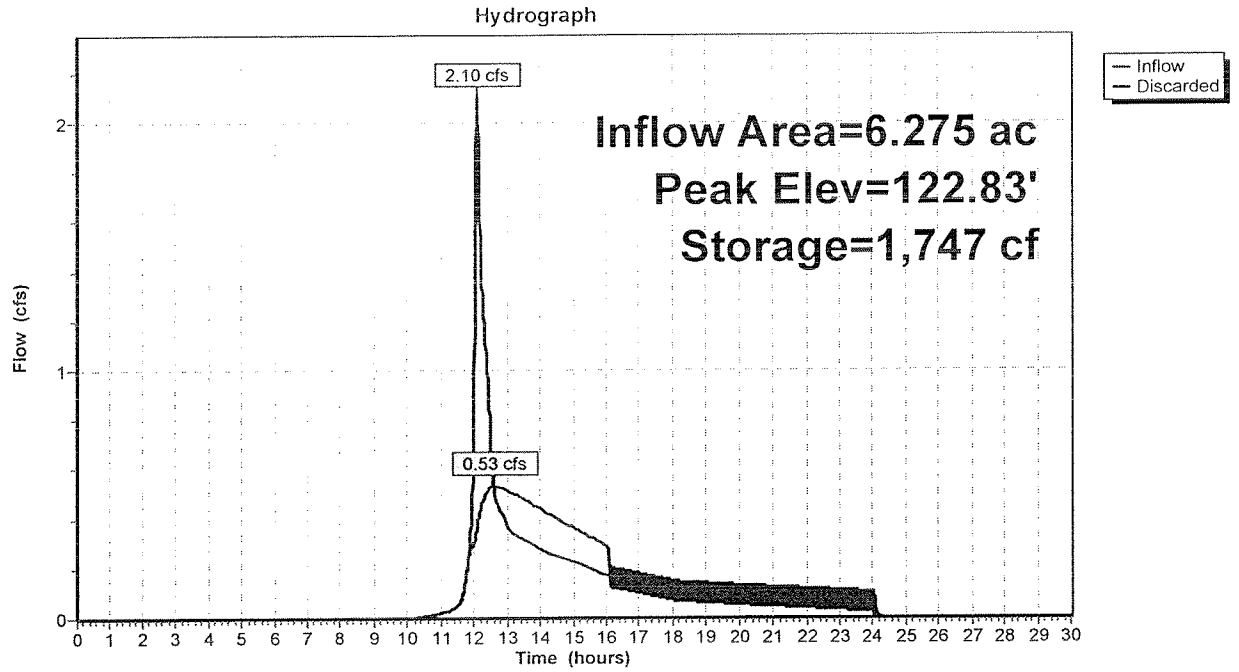
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	148,508 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,214	297.7	6,326	6,326	6,197
126.00	9,048	366.0	14,087	20,413	9,865
128.00	12,464	423.5	21,421	41,834	13,563
130.00	15,821	475.5	28,218	70,053	17,390
132.00	19,556	527.2	35,311	105,364	21,635
134.00	23,653	581.4	43,144	148,508	26,544

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.53 cfs @ 12.59 hrs HW=122.83' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.53 cfs)

Pond 1P: INFILTRATION BASIN #1



Summary for Pond 2P: INFILTRATION BASIN #2

Inflow Area = 5.164 ac, 12.40% Impervious, Inflow Depth = 0.15" for 2-year event
Inflow = 0.30 cfs @ 12.36 hrs, Volume= 0.067 af
Outflow = 0.30 cfs @ 12.36 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.30 cfs @ 12.36 hrs, Volume= 0.067 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 126.00' @ 12.33 hrs Surf.Area= 3,499 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (964.9 - 964.9)

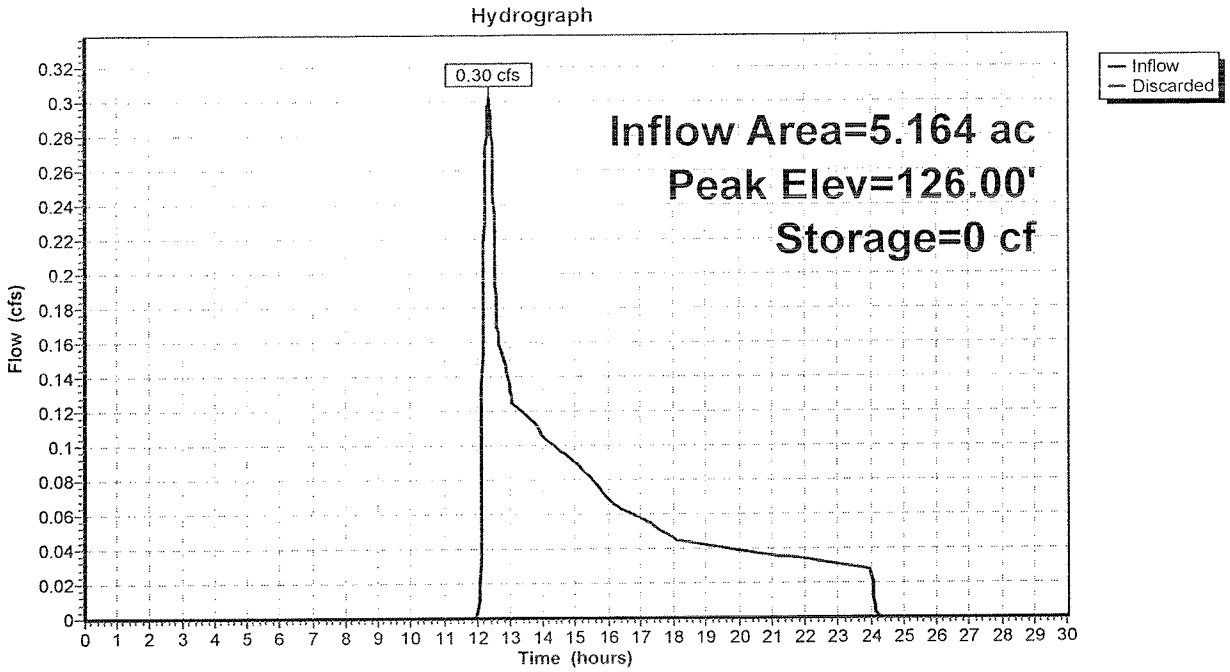
Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	18,639 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.00	3,499	259.8	0	0	3,499
127.00	5,185	302.1	4,314	4,314	5,411
128.00	7,124	344.3	6,129	10,443	7,606
129.00	9,316	386.5	8,196	18,639	10,087

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.67 cfs @ 12.36 hrs HW=126.00' (Free Discharge)
↑**1=Exfiltration** (Controls 0.67 cfs)

Pond 2P: INFILTRATION BASIN #2



Summary for Pond 3P: INFILTRATION BASIN #3

Inflow Area = 5.280 ac, 22.10% Impervious, Inflow Depth = 0.32" for 2-year event
Inflow = 0.88 cfs @ 12.15 hrs, Volume= 0.140 af
Outflow = 0.37 cfs @ 12.61 hrs, Volume= 0.140 af, Atten= 57%, Lag= 27.8 min
Discarded = 0.37 cfs @ 12.61 hrs, Volume= 0.140 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 102.45' @ 12.61 hrs Surf.Area= 1,950 sf Storage= 728 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.1 min (946.8 - 935.6)

Volume	Invert	Avail.Storage	Storage Description
#1	102.00'	35,433 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

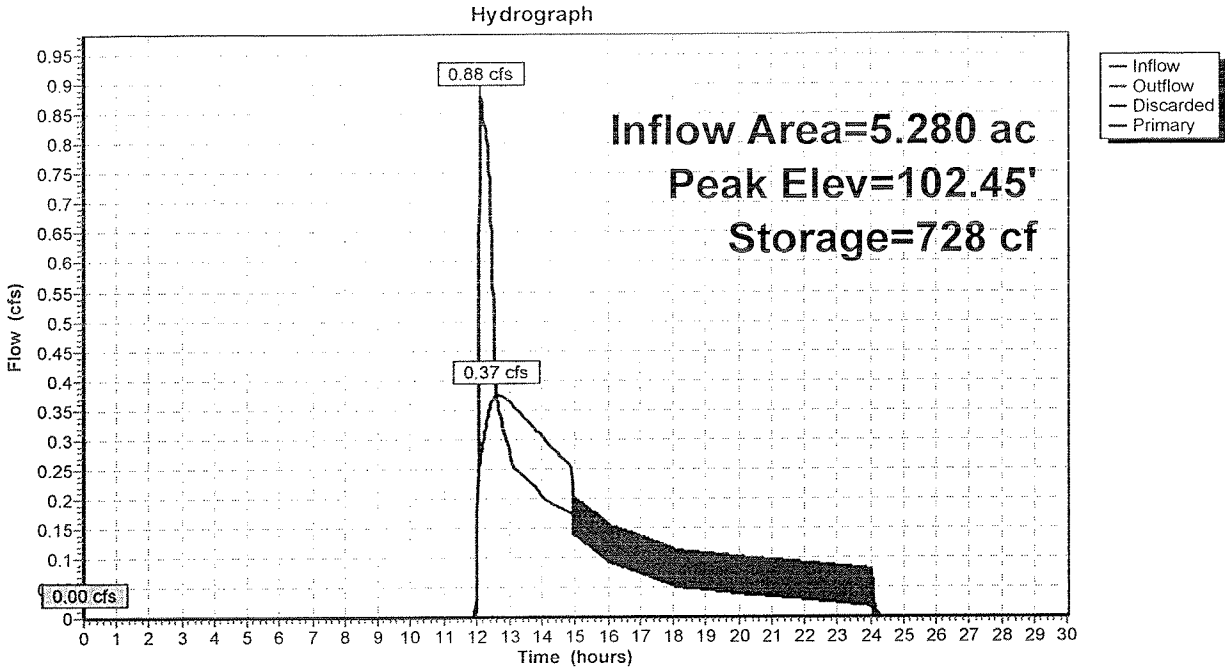
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.00	1,310	193.4	0	0	1,310
103.00	2,907	252.7	2,056	2,056	3,427
104.00	3,697	274.0	3,294	5,350	4,358
105.00	4,551	295.2	4,117	9,467	5,359
106.00	5,469	316.5	5,003	14,470	6,440
107.00	6,450	337.8	5,953	20,423	7,597
108.00	7,496	359.1	6,966	27,389	8,828
109.00	8,605	380.4	8,044	35,433	10,135

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	108.00'	**10.0' long x 34.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.37 cfs @ 12.61 hrs HW=102.45' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.37 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=102.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: INFILTRATION BASIN #3



Summary for Pond 4P: INFILTRATION BASIN #4

Inflow Area = 3.908 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 441 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

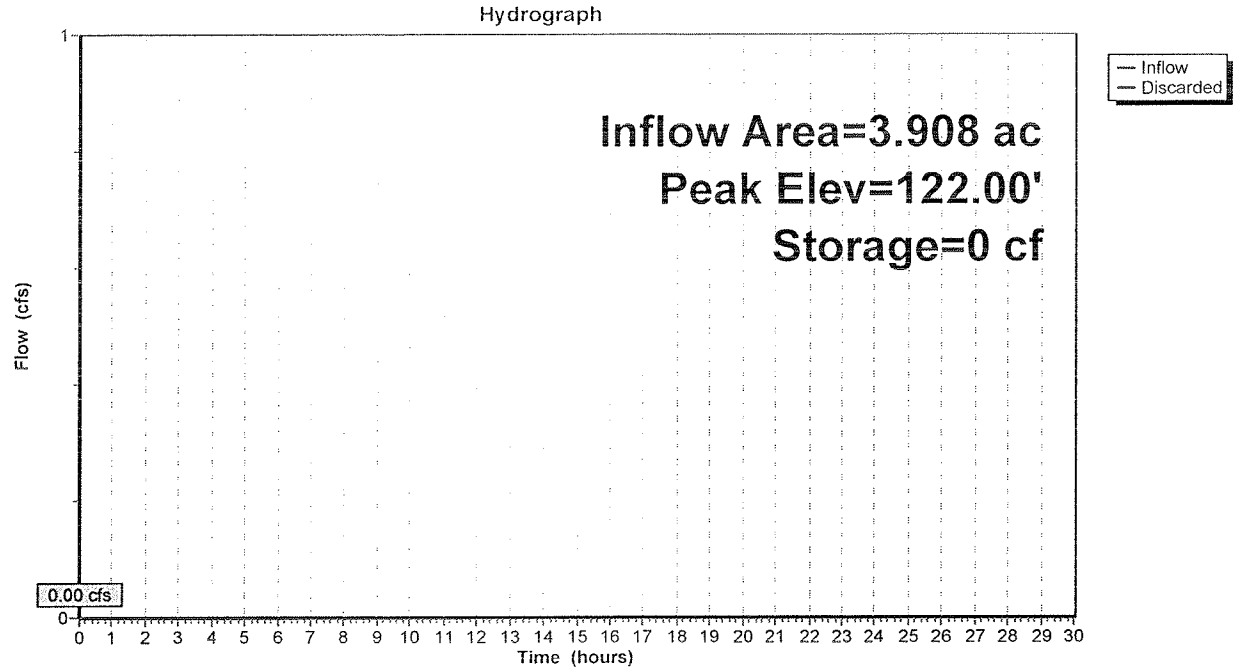
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	4,855 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	441	87.4	0	0	441
123.00	1,950	200.7	1,106	1,106	3,043
124.00	5,903	443.5	3,749	4,855	15,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.08 cfs potential flow)

Pond 4P: INFILTRATION BASIN #4



Summary for Pond 6P: LEACH PIT CLUSTER #1

Inflow Area = 1.673 ac, 17.83% Impervious, Inflow Depth = 0.08" for 2-year event
Inflow = 0.02 cfs @ 14.82 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 14.82 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 14.82 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.00' @ 0.00 hrs Surf.Area= 864 sf Storage= 0 cf

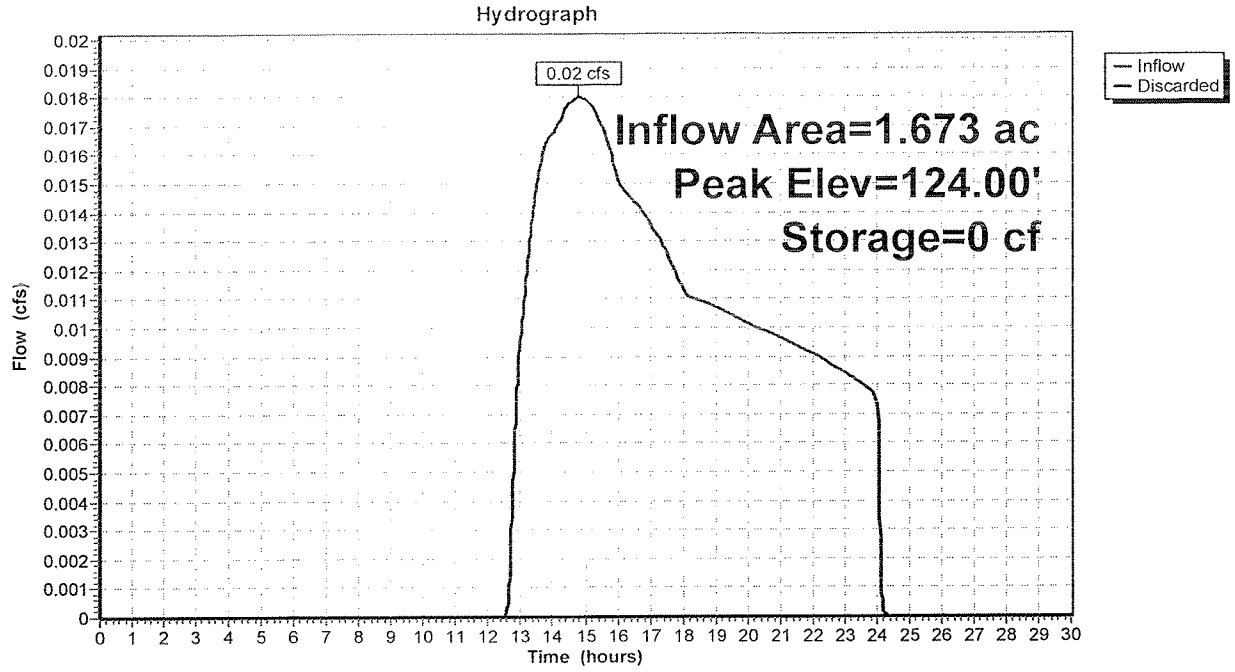
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,062.2 - 1,062.2)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 14.82 hrs HW=124.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.17 cfs potential flow)

Pond 6P: LEACH PIT CLUSTER #1



Summary for Pond 13P: LEACH PIT CLUSTER #1

Inflow Area = 1.124 ac, 12.00% Impervious, Inflow Depth = 0.12" for 2-year event
Inflow = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.00' @ 0.00 hrs Surf.Area= 864 sf Storage= 0 cf

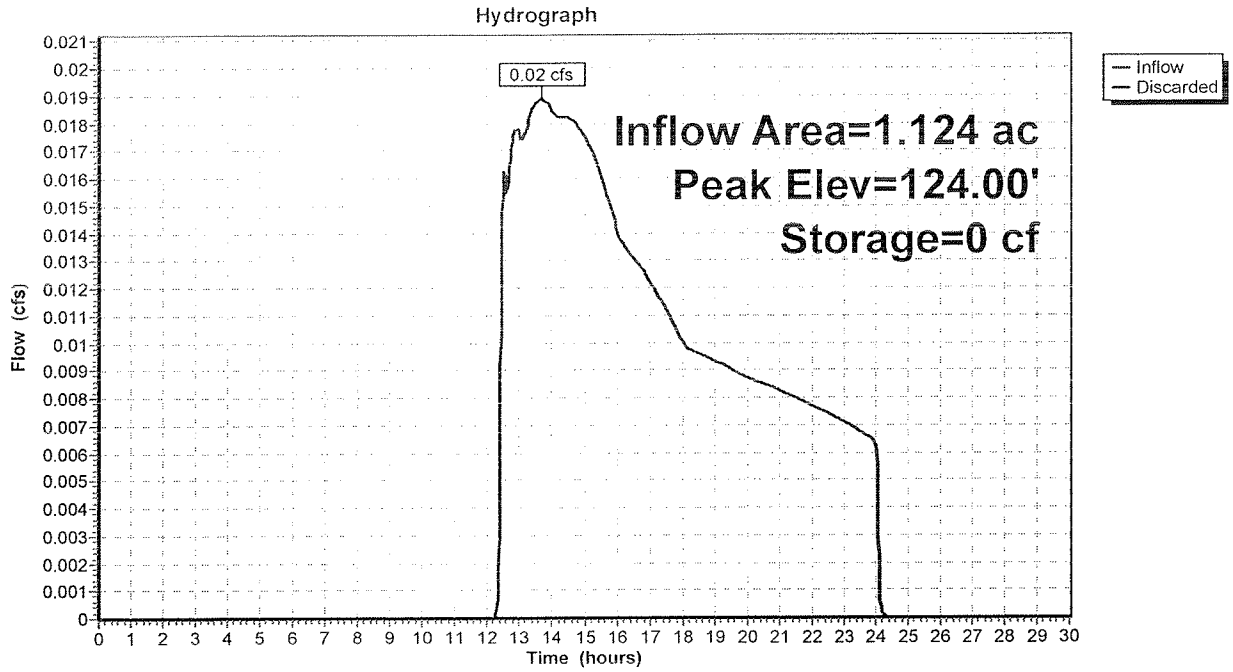
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,025.9 - 1,025.9)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 13.66 hrs HW=124.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.17 cfs potential flow)

Pond 13P: LEACH PIT CLUSTER #1



Summary for Pond 16P: INFILTRATION BASIN #5

Inflow Area = 0.781 ac, 6.00% Impervious, Inflow Depth = 0.01" for 2-year event
Inflow = 0.00 cfs @ 21.70 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 21.70 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 21.70 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 113.00' @ 0.00 hrs Surf.Area= 366 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,218.6 - 1,218.6)

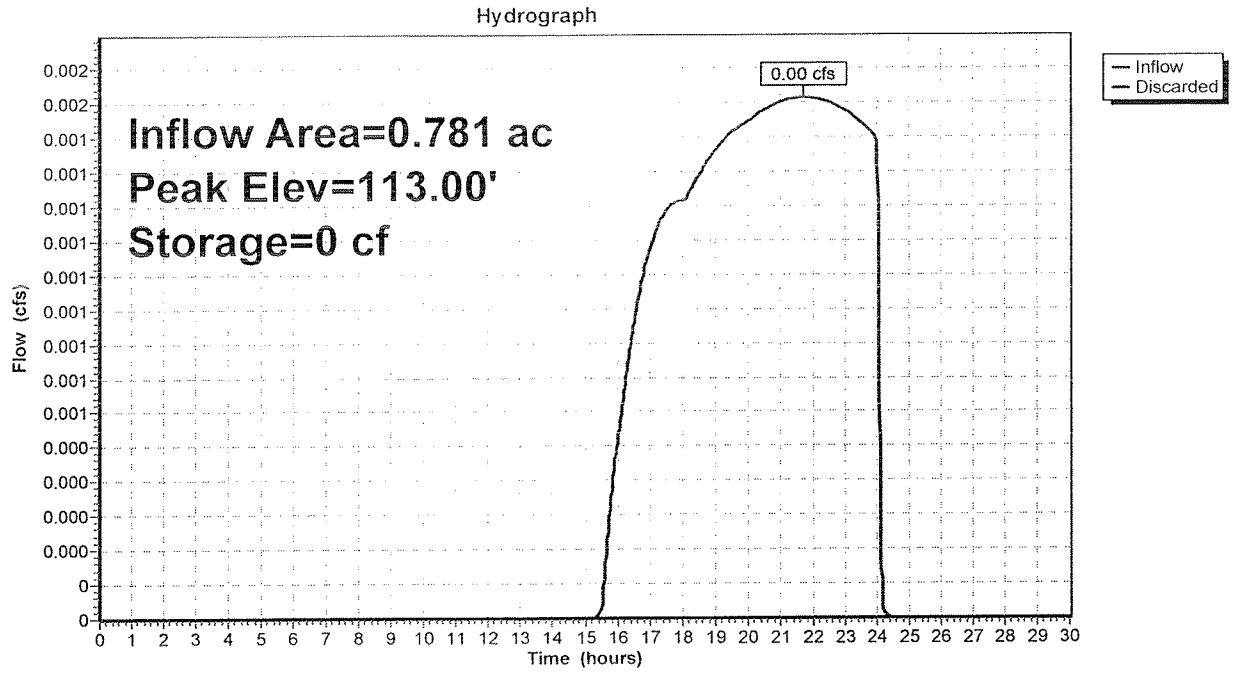
Volume	Invert	Avail.Storage	Storage Description
#1	113.00'	1,555 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
113.00	366	86.9	0	0	366
114.00	756	124.9	549	549	1,015
115.00	1,278	165.7	1,006	1,555	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	113.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 21.70 hrs HW=113.00' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.07 cfs potential flow)

Pond 16P: INFILTRATION BASIN #5



Summary for Pond 19P: LEACH PIT CLUSTER #2

Inflow Area = 1.599 ac, 12.00% Impervious, Inflow Depth = 0.12" for 2-year event
Inflow = 0.03 cfs @ 13.66 hrs, Volume= 0.016 af
Outflow = 0.03 cfs @ 13.66 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.03 cfs @ 13.66 hrs, Volume= 0.016 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.00' @ 0.00 hrs Surf.Area= 1,152 sf Storage= 0 cf

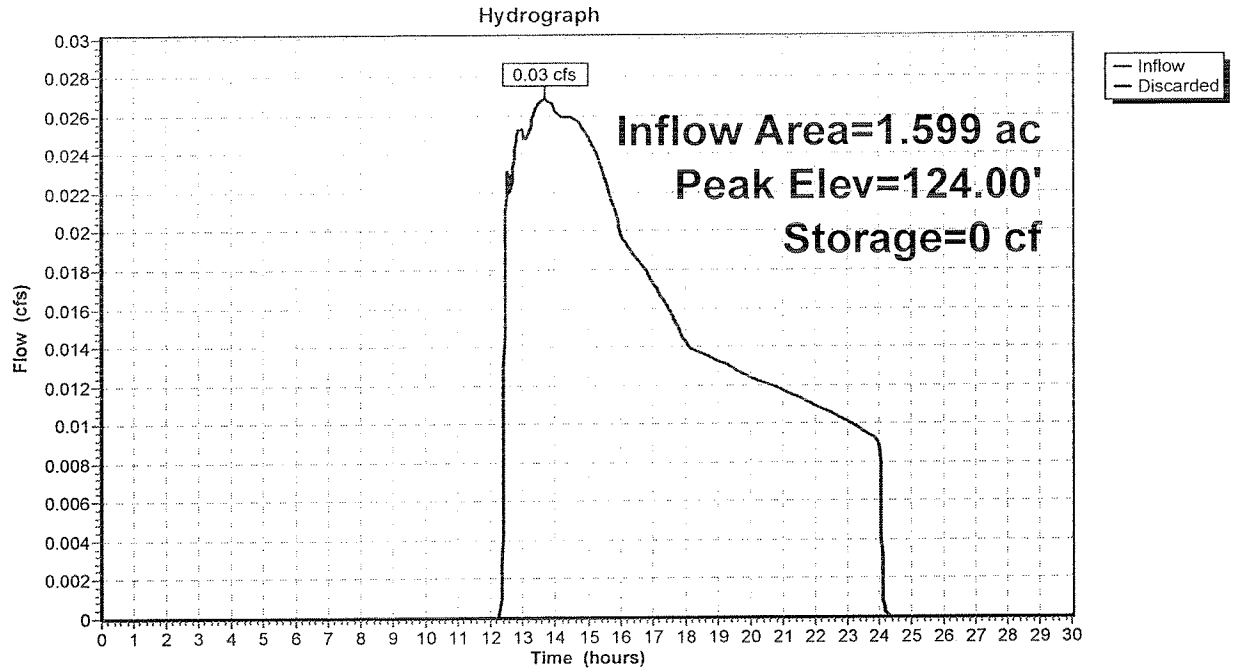
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,025.9 - 1,025.9)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	2,261 cf	**24.00'W x 48.00'L x 7.00'H Prismatoid** 8,064 cf Overall - 2,413 cf Embedded = 5,651 cf x 40.0% Voids
#2	125.00'	1,847 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 8 Inside #1 2,413 cf Overall - 6.0" Wall Thickness = 1,847 cf
		4,108 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 13.66 hrs HW=124.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.22 cfs potential flow)

Pond 19P: LEACH PIT CLUSTER #2



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=266,088 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=158,607 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment4S: ROAD B Runoff Area=78,529 sf 35.80% Impervious Runoff Depth=1.19"
Tc=6.0 min CN=60 Runoff=2.21 cfs 0.178 af

Subcatchment5S: CUL-DE-SAC LOTS Runoff Area=72,895 sf 17.83% Impervious Runoff Depth=0.34"
Tc=6.0 min UI Adjusted CN=44 Runoff=0.22 cfs 0.047 af

Subcatchment6S: ROAD A Runoff Area=24,709 sf 62.40% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=76 Runoff=1.57 cfs 0.112 af

Subcatchment7S: ROAD A - EAST Runoff Area=139,417 sf 20.00% Impervious Runoff Depth=0.66"
Tc=6.0 min CN=51 Runoff=1.55 cfs 0.177 af

Subcatchment8S: EAST SITE Runoff Area=170,221 sf 0.00% Impervious Runoff Depth=0.01"
Tc=6.0 min CN=32 Runoff=0.01 cfs 0.005 af

Subcatchment9S: ROAD A - BACKYARDS Runoff Area=85,522 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment10S: NORTHEAST SITE Runoff Area=40,166 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=233' Tc=12.3 min CN=32 Runoff=0.00 cfs 0.001 af

Subcatchment11S: NORTH SITE Runoff Area=92,697 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=302' Tc=7.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment12S: LOTS 13-15 Runoff Area=48,974 sf 12.00% Impervious Runoff Depth=0.42"
Tc=6.0 min CN=46 Runoff=0.21 cfs 0.040 af

Subcatchment15S: LOWER LOT 5 & OPEN Runoff Area=34,036 sf 6.00% Impervious Runoff Depth=0.16"
Tc=6.0 min CN=39 Runoff=0.02 cfs 0.011 af

Subcatchment17S: ATKINS ROAD Runoff Area=190,434 sf 26.69% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=55 Runoff=3.49 cfs 0.321 af

Subcatchment18S: LOTS 15-17 Runoff Area=69,633 sf 12.00% Impervious Runoff Depth=0.42"
Tc=6.0 min CN=46 Runoff=0.30 cfs 0.056 af

Subcatchment19S: WEST CENTRAL SITE Runoff Area=150,928 sf 12.00% Impervious Runoff Depth=0.42"
Tc=6.0 min CN=46 Runoff=0.66 cfs 0.122 af

Subcatchment20S: ATKINS ROAD - END Runoff Area=19,175 sf 41.30% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=64 Runoff=0.70 cfs 0.053 af

Subcatchment 21S: INFILTRATION AREA Runoff Area=39,560 sf 0.00% Impervious Runoff Depth=0.16"
Tc=6.0 min CN=39 Runoff=0.02 cfs 0.012 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 3R: OFFSITE FLOW Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach 4R: OFFSITE FLOW Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: INFILTRATION BASIN #1 Peak Elev=123.83' Storage=5,463 cf Inflow=4.84 cfs 0.466 af
Outflow=0.93 cfs 0.466 af

Pond 2P: INFILTRATION BASIN #2 Peak Elev=126.20' Storage=725 cf Inflow=1.55 cfs 0.177 af
Outflow=0.73 cfs 0.177 af

Pond 3P: INFILTRATION BASIN #3 Peak Elev=103.51' Storage=3,648 cf Inflow=3.49 cfs 0.334 af
Discarded=0.64 cfs 0.334 af Primary=0.00 cfs 0.000 af Outflow=0.64 cfs 0.334 af

Pond 4P: INFILTRATION BASIN #4 Peak Elev=122.00' Storage=0 cf Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 6P: LEACH PIT CLUSTER #1 Peak Elev=124.11' Storage=37 cf Inflow=0.22 cfs 0.047 af
Outflow=0.17 cfs 0.047 af

Pond 13P: LEACH PIT CLUSTER #1 Peak Elev=124.12' Storage=41 cf Inflow=0.21 cfs 0.040 af
Outflow=0.17 cfs 0.040 af

Pond 16P: INFILTRATION BASIN #5 Peak Elev=113.00' Storage=0 cf Inflow=0.02 cfs 0.011 af
Outflow=0.02 cfs 0.011 af

Pond 19P: LEACH PIT CLUSTER #2 Peak Elev=124.17' Storage=78 cf Inflow=0.30 cfs 0.056 af
Outflow=0.22 cfs 0.056 af

Total Runoff Area = 38.604 ac Runoff Volume = 1.137 af Average Runoff Depth = 0.35"
89.44% Pervious = 34.528 ac 10.56% Impervious = 4.076 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

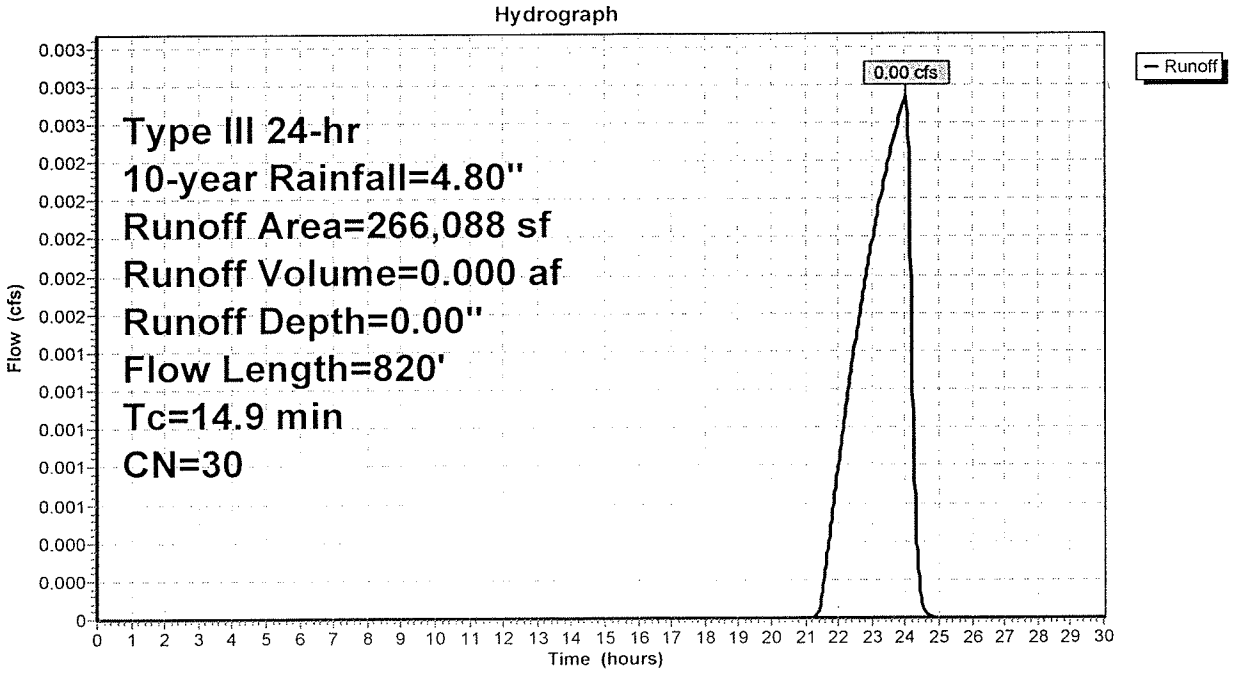
Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
266,088	30	Woods, Good, HSG A
266,088		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

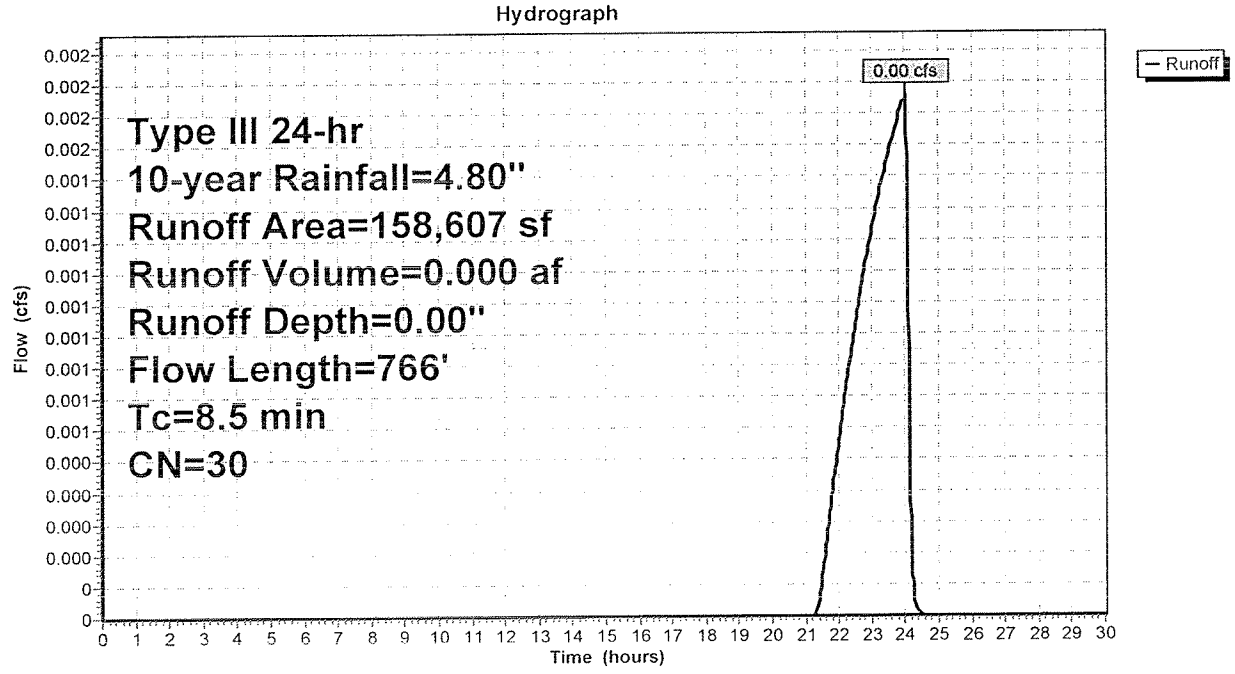
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
158,607	30	Woods, Good, HSG A
158,607		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 4S: ROAD B

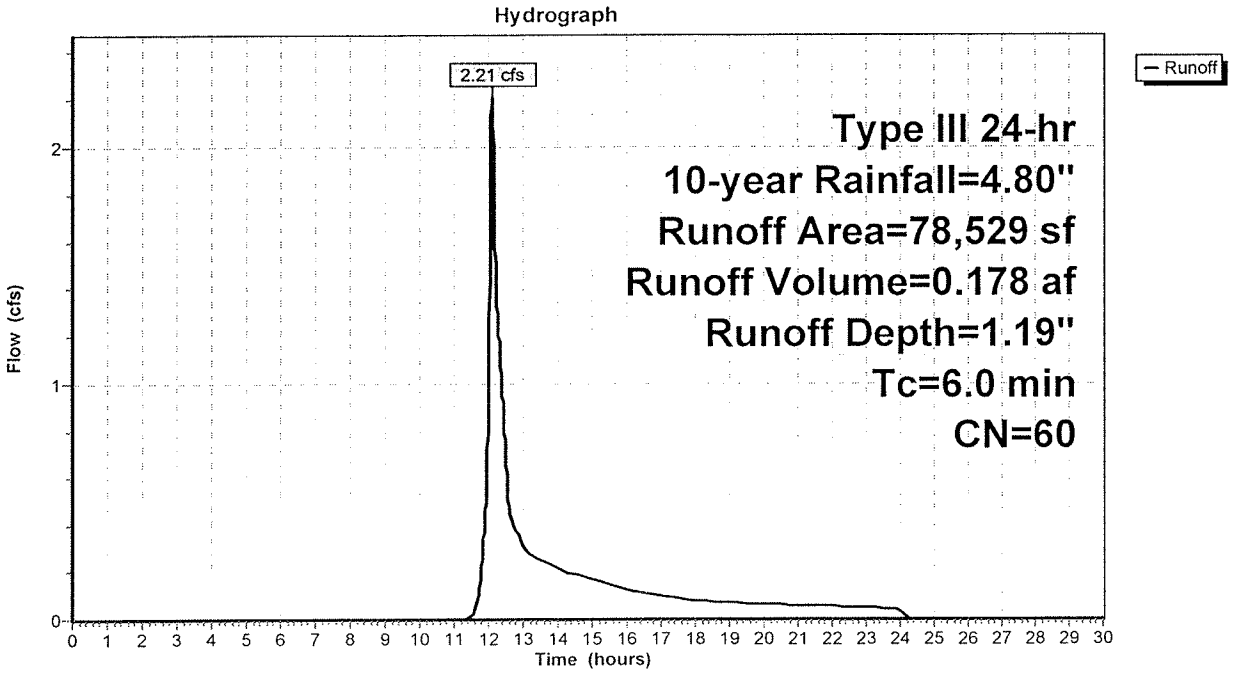
Runoff = 2.21 cfs @ 12.10 hrs, Volume= 0.178 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
16,195	98	Paved roads w/curbs & sewers, HSG A
59,600	51	1 acre lots, 20% imp, HSG A
2,734	39	>75% Grass cover, Good, HSG A
78,529	60	Weighted Average
50,414		64.20% Pervious Area
28,115		35.80% Impervious Area

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

Subcatchment 4S: ROAD B



Summary for Subcatchment 5S: CUL-DE-SAC LOTS

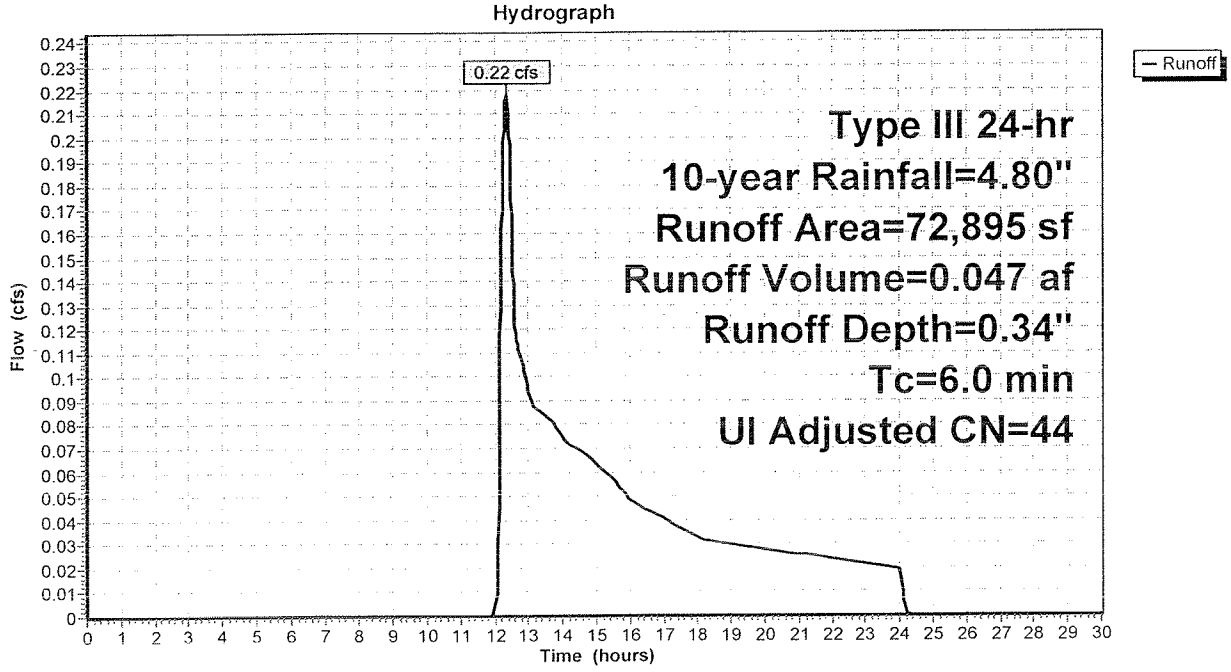
Runoff = 0.22 cfs @ 12.35 hrs, Volume= 0.047 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Adj	Description
59,895	39		>75% Grass cover, Good, HSG A
13,000	98		Unconnected pavement, HSG A
72,895	50	44	Weighted Average, UI Adjusted
59,895			82.17% Pervious Area
13,000			17.83% Impervious Area
13,000			100.00% Unconnected

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

Subcatchment 5S: CUL-DE-SAC LOTS



Summary for Subcatchment 6S: ROAD A

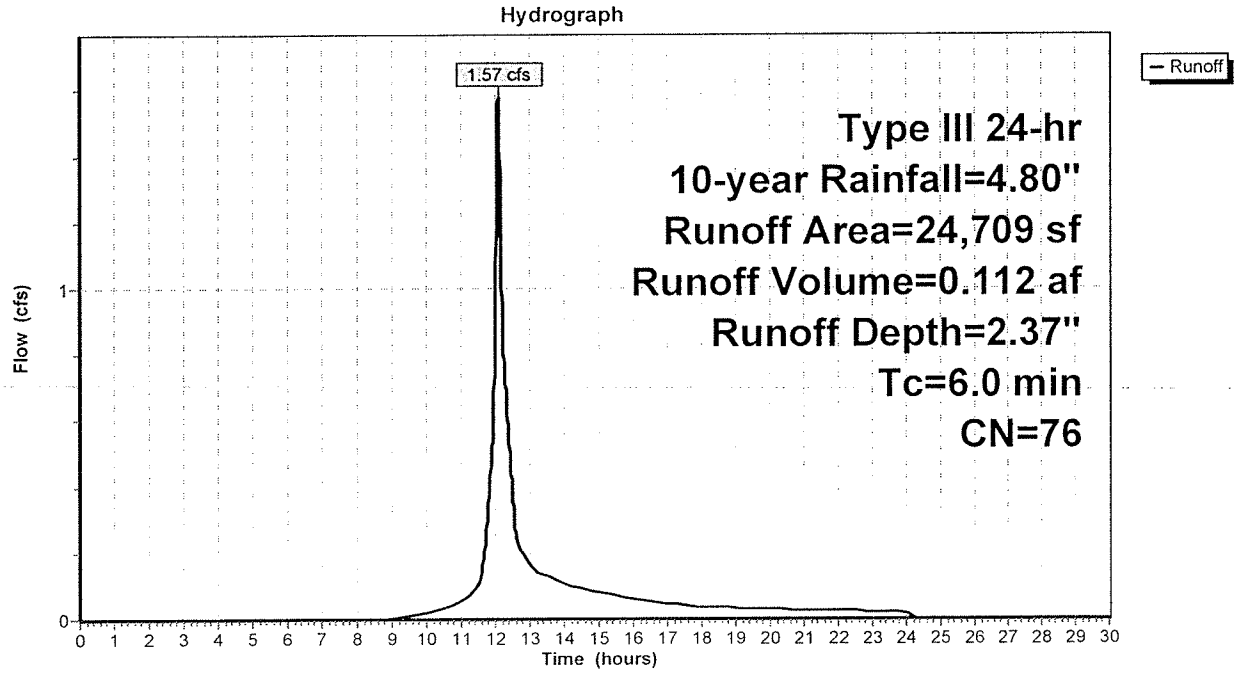
Runoff = 1.57 cfs @ 12.09 hrs, Volume= 0.112 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
15,418	98	Paved parking, HSG A
9,291	39	>75% Grass cover, Good, HSG A
24,709	76	Weighted Average
9,291		37.60% Pervious Area
15,418		62.40% Impervious Area

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

Subcatchment 6S: ROAD A



Summary for Subcatchment 7S: ROAD A - EAST

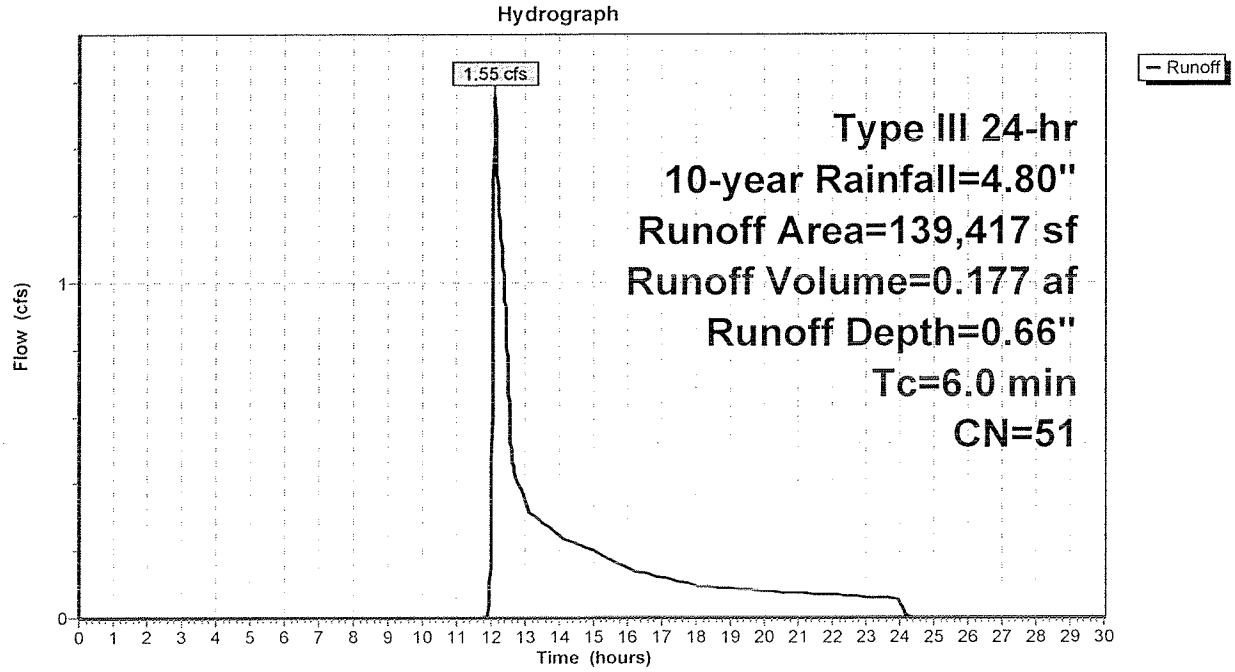
Runoff = 1.55 cfs @ 12.12 hrs, Volume= 0.177 af, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
139,417	51	1 acre lots, 20% imp, HSG A
111,534		80.00% Pervious Area
27,883		20.00% Impervious Area

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

Subcatchment 7S: ROAD A - EAST



Summary for Subcatchment 8S: EAST SITE

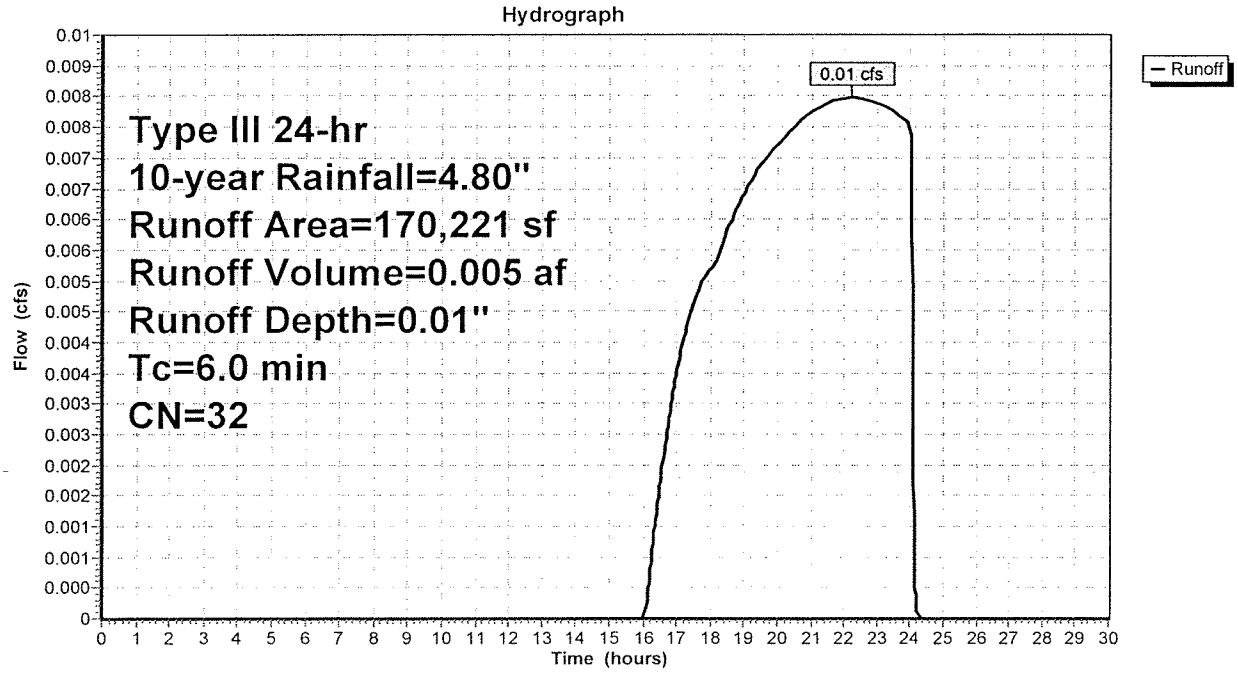
Runoff = 0.01 cfs @ 22.22 hrs, Volume= 0.005 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
170,221	32	Woods/grass comb., Good, HSG A
170,221		100.00% Pervious Area

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

Subcatchment 8S: EAST SITE



Summary for Subcatchment 9S: ROAD A - BACKYARDS

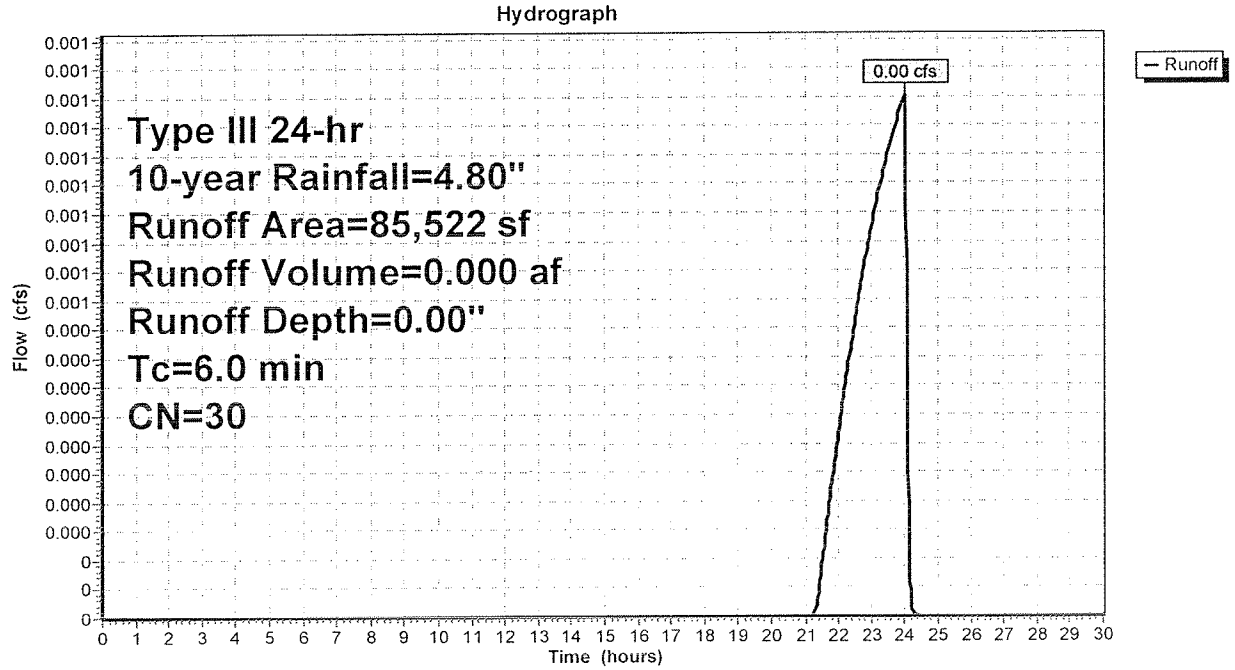
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
85,522	30	Woods, Good, HSG A
85,522		100.00% Pervious Area

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

Subcatchment 9S: ROAD A - BACKYARDS



Summary for Subcatchment 10S: NORTHEAST SITE

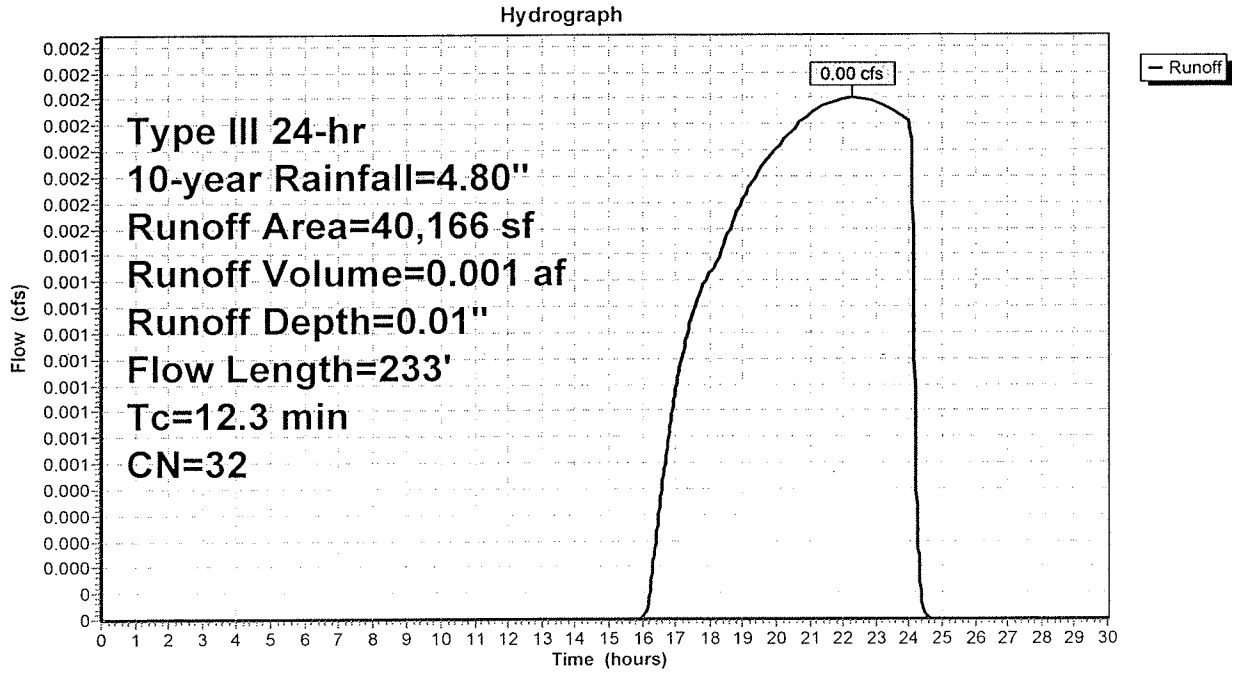
Runoff = 0.00 cfs @ 22.29 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
40,166	32	Woods/grass comb., Good, HSG A
40,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.7	183	0.0765	4.45		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.3	233	Total			

Subcatchment 10S: NORTHEAST SITE



Summary for Subcatchment 11S: NORTH SITE

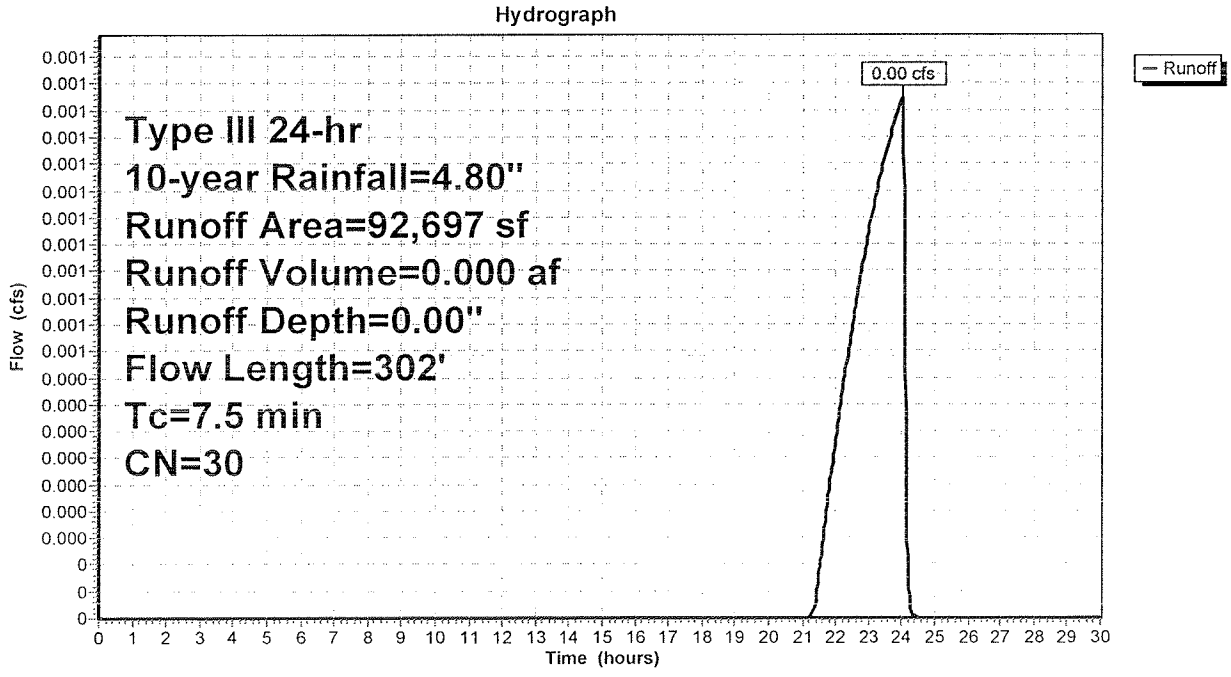
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
92,697	30	Woods, Good, HSG A
92,697		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
0.8	252	0.1000	5.09		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
7.5	302	Total			

Subcatchment 11S: NORTH SITE



Summary for Subcatchment 12S: LOTS 13-15

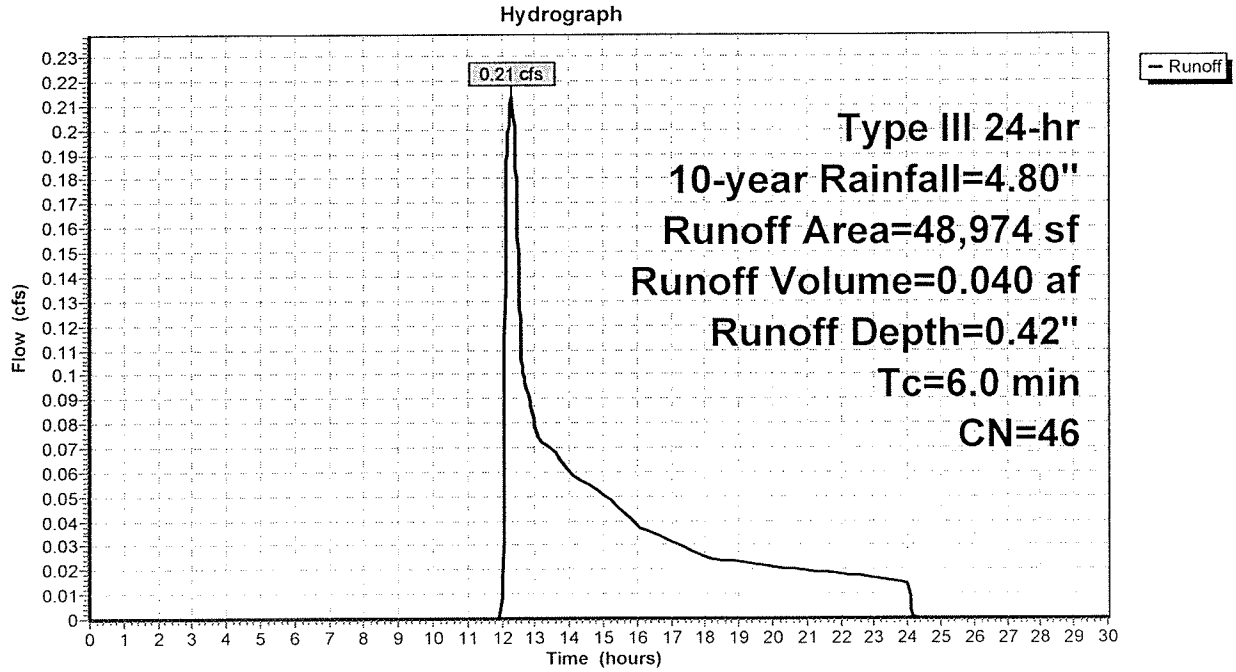
Runoff = 0.21 cfs @ 12.30 hrs, Volume= 0.040 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
48,974	46	2 acre lots, 12% imp, HSG A
43,097		88.00% Pervious Area
5,877		12.00% Impervious Area

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

Subcatchment 12S: LOTS 13-15



Summary for Subcatchment 15S: LOWER LOT 5 & OPEN SPACE

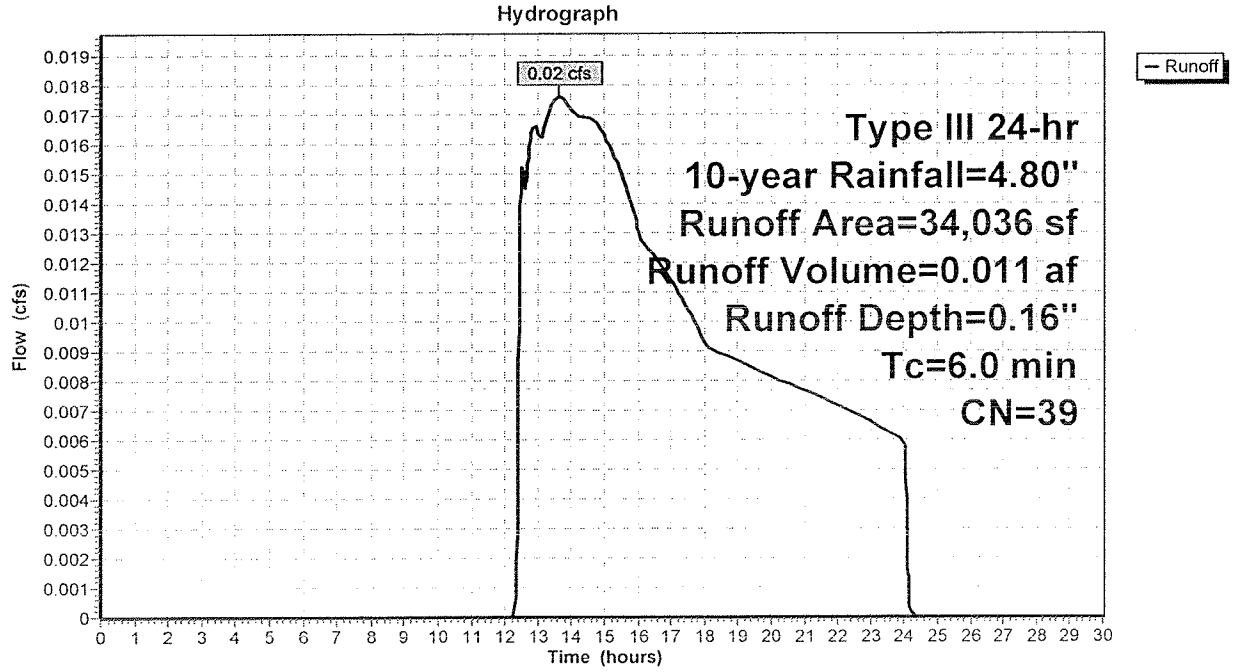
Runoff = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
17,018	32	Woods/grass comb., Good, HSG A
17,018	46	2 acre lots, 12% imp, HSG A
34,036	39	Weighted Average
31,994		94.00% Pervious Area
2,042		6.00% Impervious Area

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

Subcatchment 15S: LOWER LOT 5 & OPEN SPACE



Summary for Subcatchment 17S: ATKINS ROAD EXTENSION

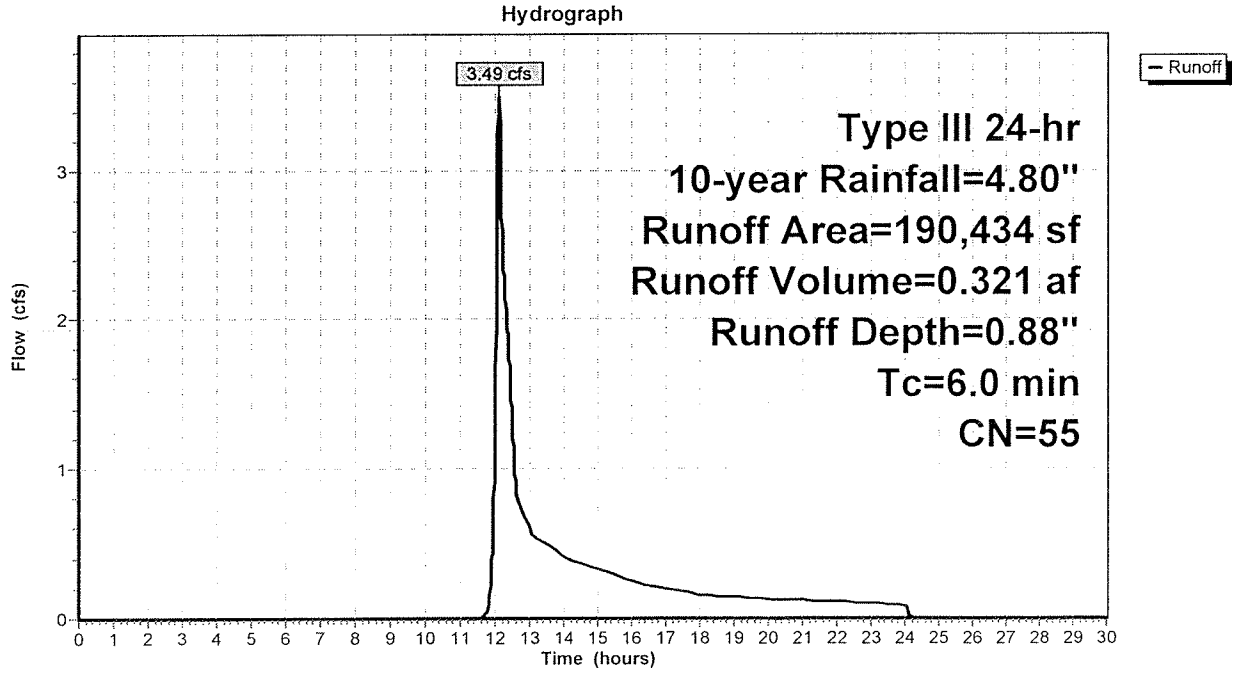
Runoff = 3.49 cfs @ 12.11 hrs, Volume= 0.321 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
21,495	98	Paved roads w/curbs & sewers, HSG A
17,804	39	>75% Grass cover, Good, HSG A
146,656	51	1 acre lots, 20% imp, HSG A
4,479	30	Woods, Good, HSG A
190,434	55	Weighted Average
139,608		73.31% Pervious Area
50,826		26.69% Impervious Area

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

Subcatchment 17S: ATKINS ROAD EXTENSION



Summary for Subcatchment 18S: LOTS 15-17

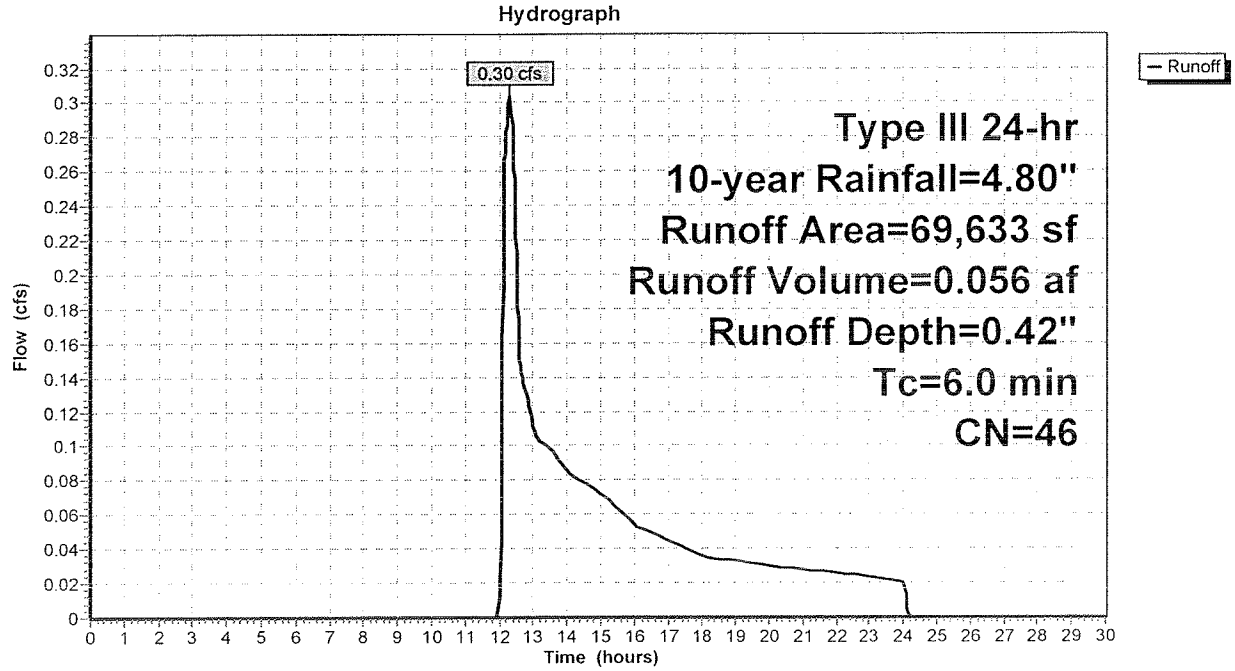
Runoff = 0.30 cfs @ 12.30 hrs, Volume= 0.056 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
69,633	46	2 acre lots, 12% imp, HSG A
61,277		88.00% Pervious Area
8,356		12.00% Impervious Area

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

Subcatchment 18S: LOTS 15-17



Summary for Subcatchment 19S: WEST CENTRAL SITE

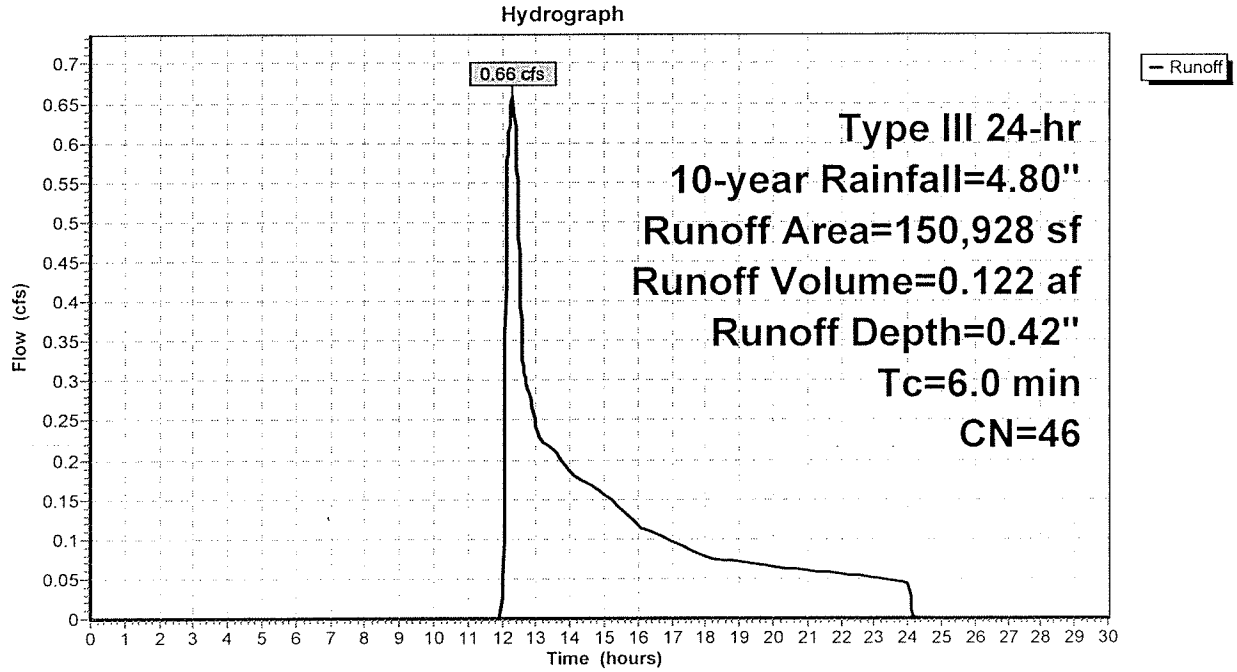
Runoff = 0.66 cfs @ 12.30 hrs, Volume= 0.122 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
150,928	46	2 acre lots, 12% imp, HSG A
132,817		88.00% Pervious Area
18,111		12.00% Impervious Area

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

Subcatchment 19S: WEST CENTRAL SITE



Summary for Subcatchment 20S: ATKINS ROAD - END

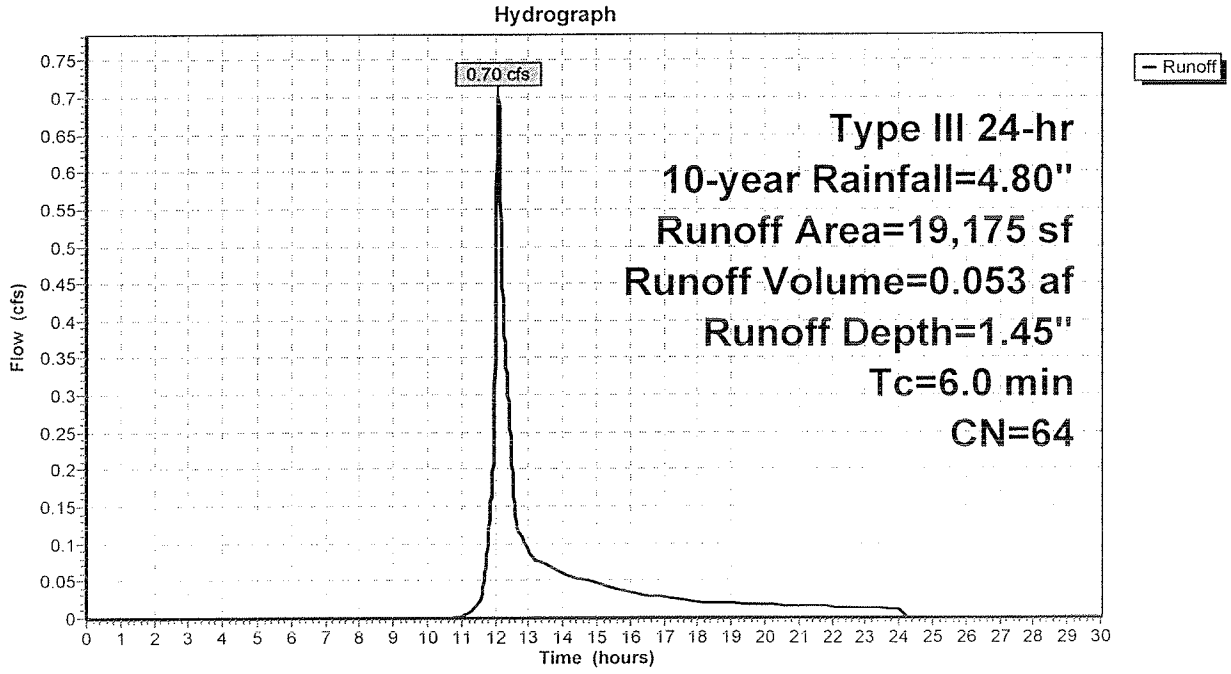
Runoff = 0.70 cfs @ 12.10 hrs, Volume= 0.053 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
14,070	51	1 acre lots, 20% imp, HSG A
5,105	98	Paved roads w/curbs & sewers, HSG A
19,175	64	Weighted Average
11,256		58.70% Pervious Area
7,919		41.30% Impervious Area

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

Subcatchment 20S: ATKINS ROAD - END



Summary for Subcatchment 21S: INFILTRATION AREA

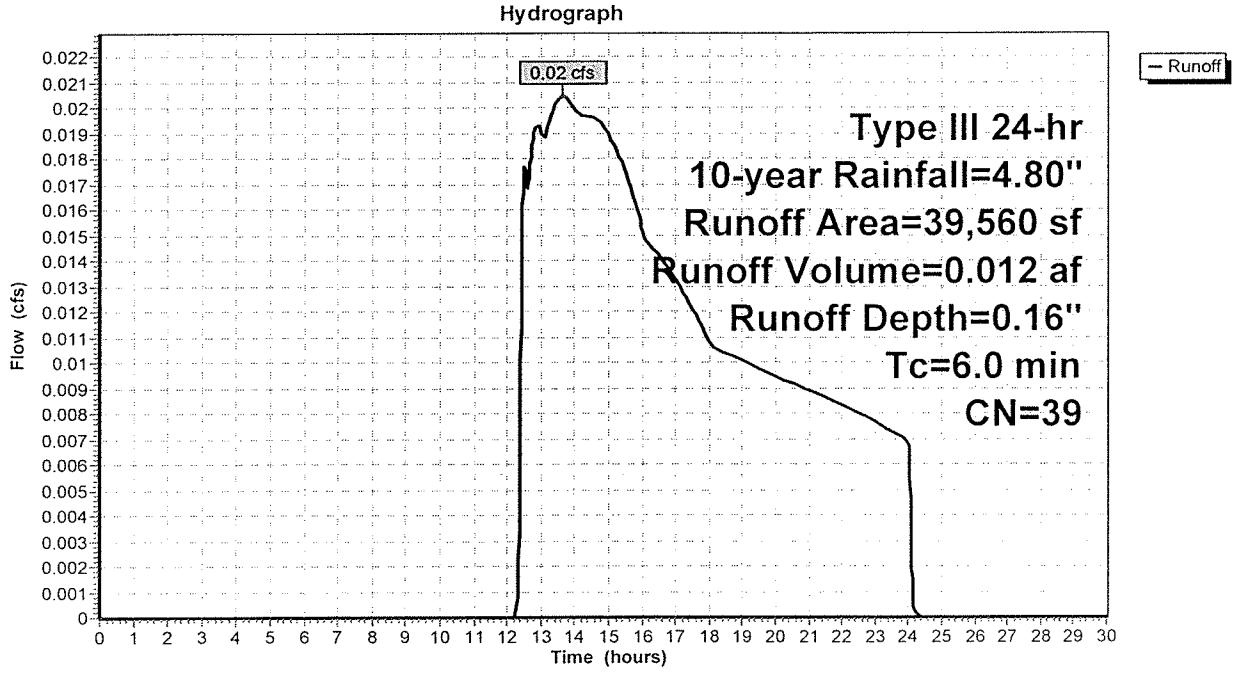
Runoff = 0.02 cfs @ 13.66 hrs, Volume= 0.012 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
39,560	39	>75% Grass cover, Good, HSG A
39,560		100.00% Pervious Area

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

Subcatchment 21S: INFILTRATION AREA

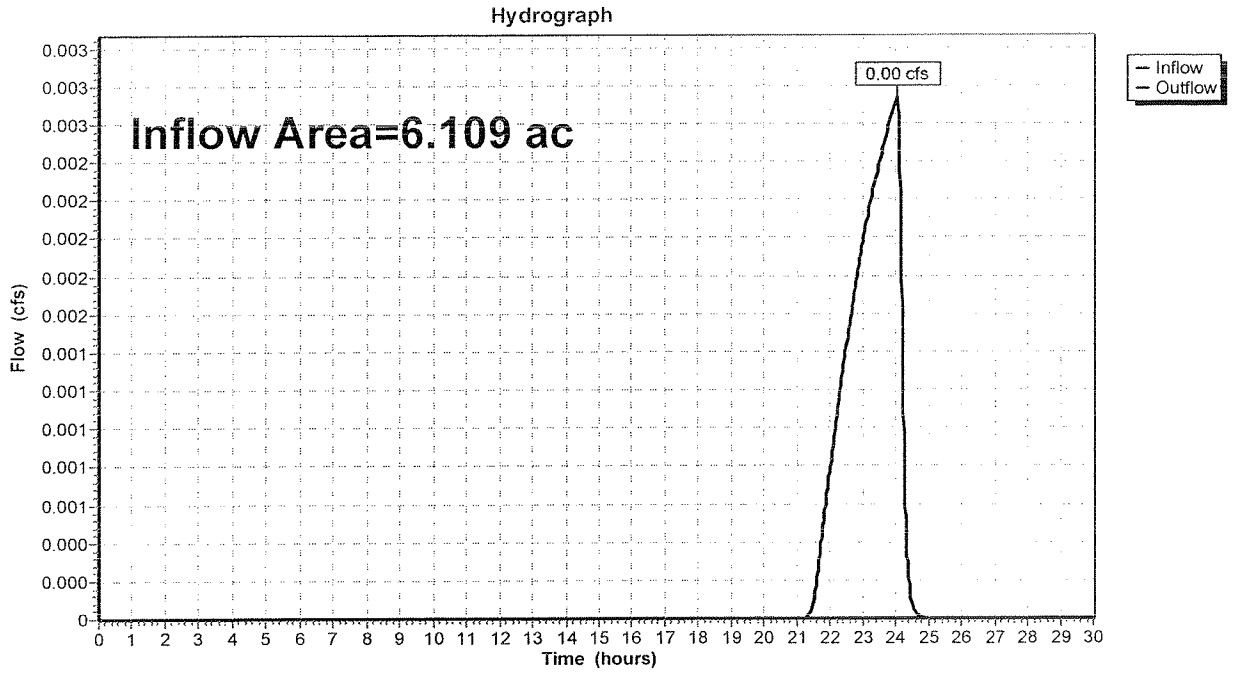


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 6.109 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

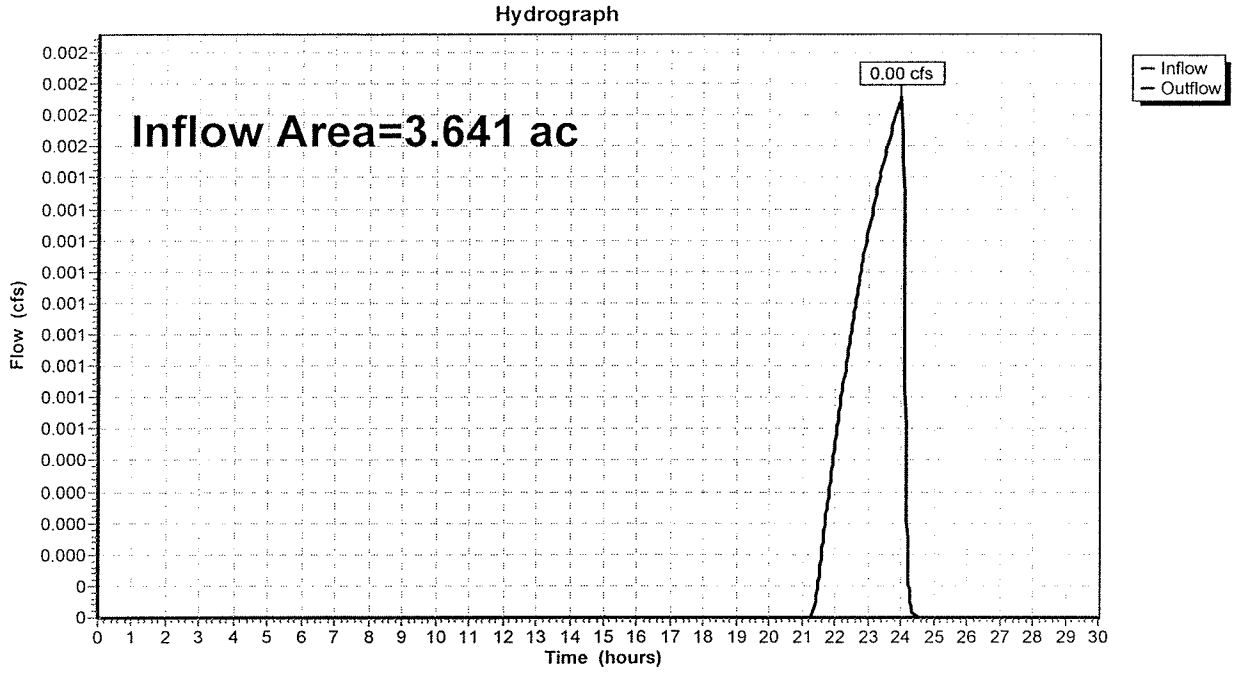


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 3.641 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

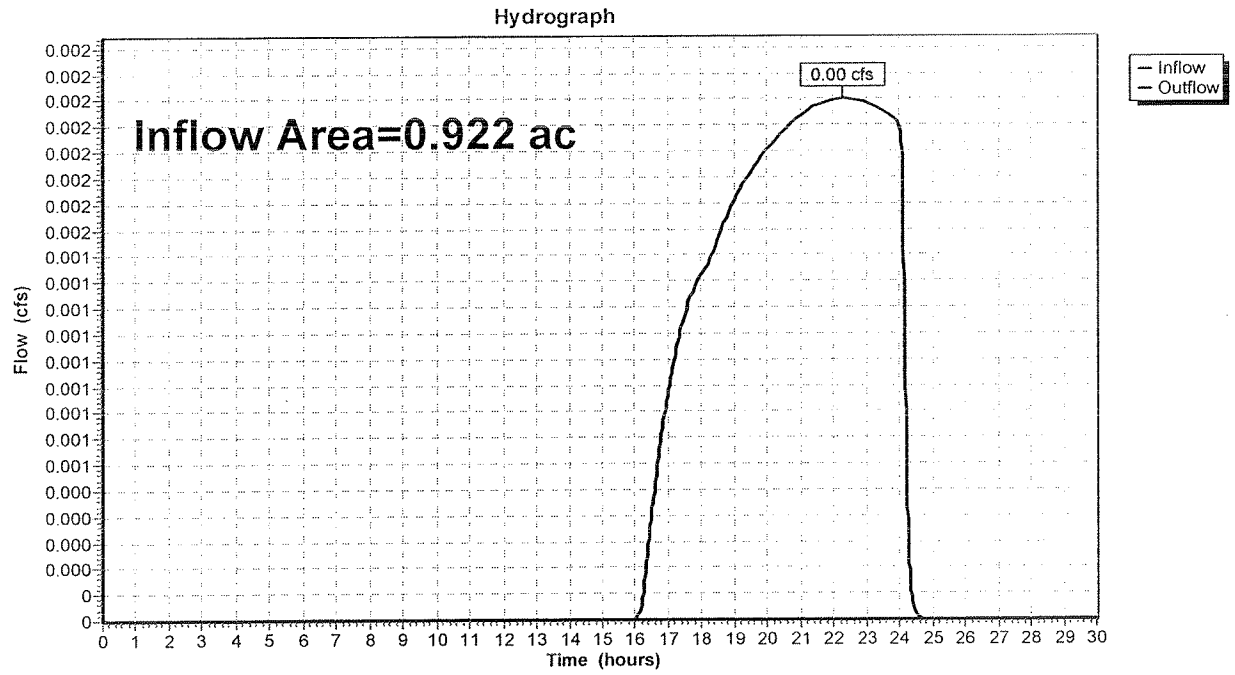


Summary for Reach 3R: OFFSITE FLOW

Inflow Area = 0.922 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10-year event
Inflow = 0.00 cfs @ 22.29 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 22.29 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: OFFSITE FLOW

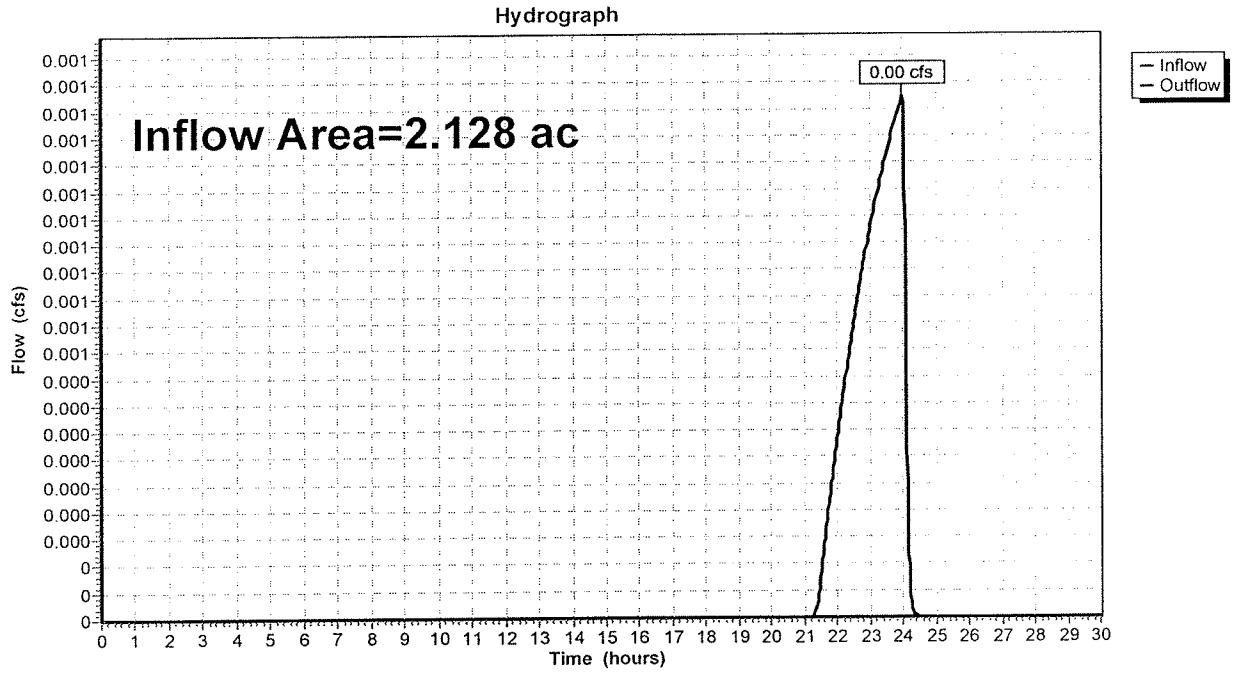


Summary for Reach 4R: OFFSITE FLOW

Inflow Area = 2.128 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 4R: OFFSITE FLOW



Summary for Pond 1P: INFILTRATION BASIN #1

Inflow Area = 6.275 ac, 25.45% Impervious, Inflow Depth = 0.89" for 10-year event
Inflow = 4.84 cfs @ 12.11 hrs, Volume= 0.466 af
Outflow = 0.93 cfs @ 12.84 hrs, Volume= 0.466 af, Atten= 81%, Lag= 44.3 min
Discarded = 0.93 cfs @ 12.84 hrs, Volume= 0.466 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 123.83' @ 12.84 hrs Surf.Area= 4,804 sf Storage= 5,463 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 60.4 min (944.7 - 884.3)

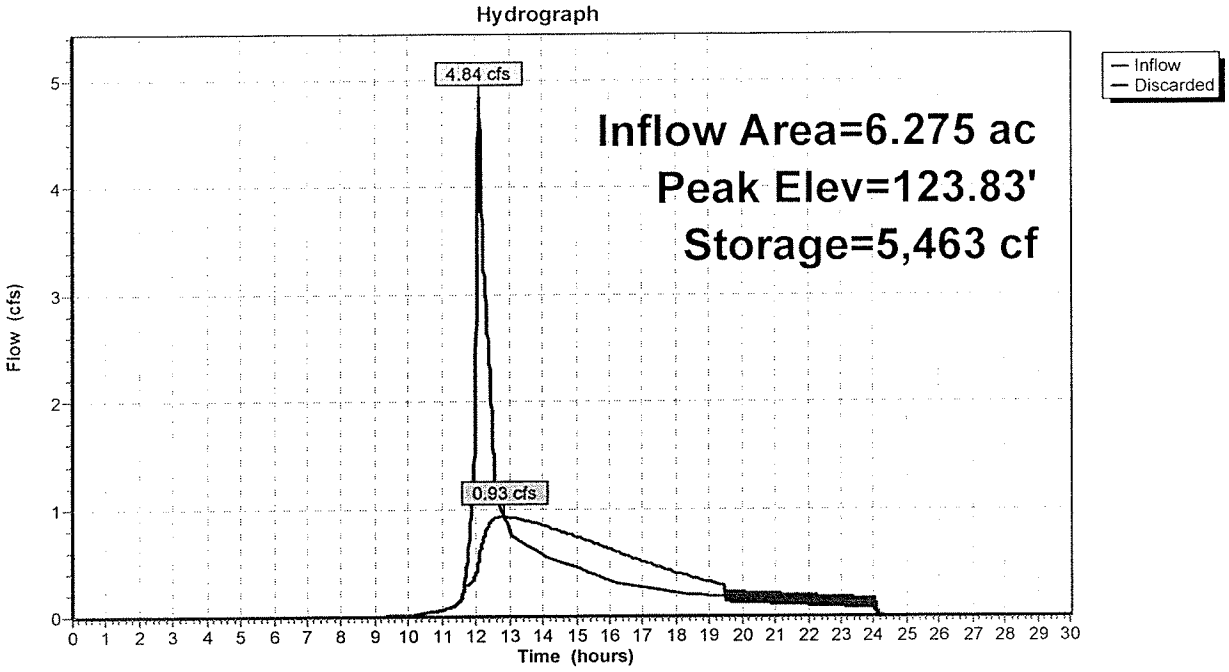
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	148,508 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,214	297.7	6,326	6,326	6,197
126.00	9,048	366.0	14,087	20,413	9,865
128.00	12,464	423.5	21,421	41,834	13,563
130.00	15,821	475.5	28,218	70,053	17,390
132.00	19,556	527.2	35,311	105,364	21,635
134.00	23,653	581.4	43,144	148,508	26,544

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.93 cfs @ 12.84 hrs HW=123.83' (Free Discharge)
↑**1=Exfiltration** (Controls 0.93 cfs)

Pond 1P: INFILTRATION BASIN #1



Summary for Pond 2P: INFILTRATION BASIN #2

Inflow Area = 5.164 ac, 12.40% Impervious, Inflow Depth = 0.41" for 10-year event
Inflow = 1.55 cfs @ 12.12 hrs, Volume= 0.177 af
Outflow = 0.73 cfs @ 12.50 hrs, Volume= 0.177 af, Atten= 53%, Lag= 22.5 min
Discarded = 0.73 cfs @ 12.50 hrs, Volume= 0.177 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 126.20' @ 12.50 hrs Surf.Area= 3,807 sf Storage= 725 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.9 min (919.2 - 915.3)

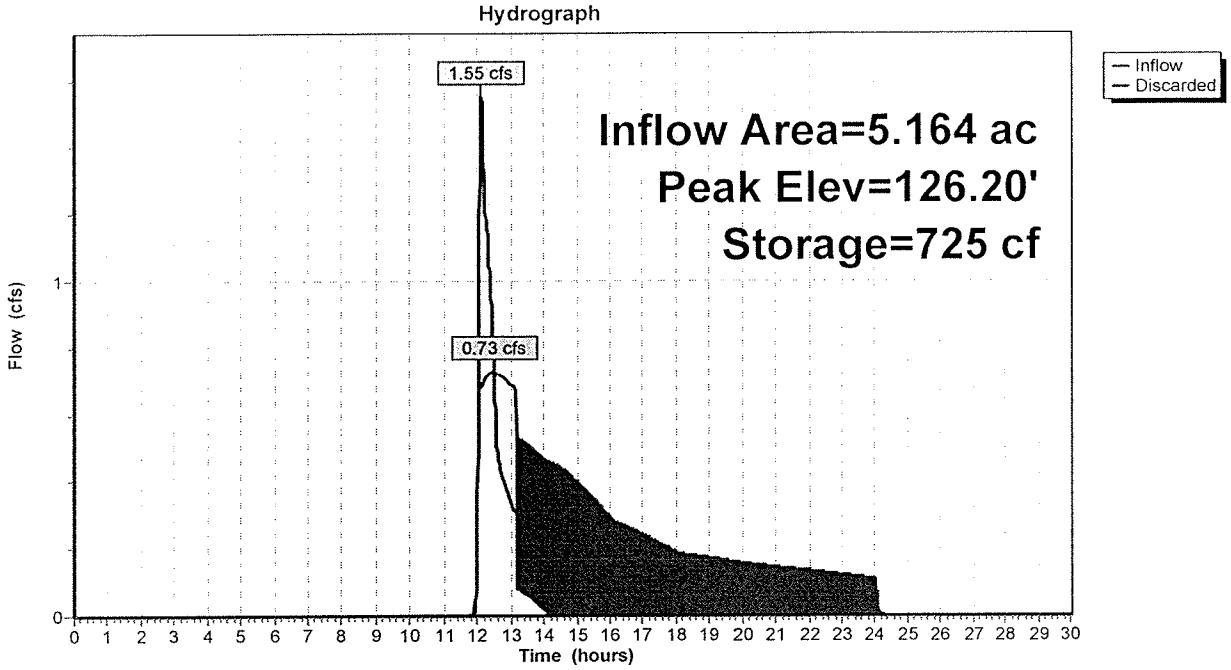
Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	18,639 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.00	3,499	259.8	0	0	3,499
127.00	5,185	302.1	4,314	4,314	5,411
128.00	7,124	344.3	6,129	10,443	7,606
129.00	9,316	386.5	8,196	18,639	10,087

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.73 cfs @ 12.50 hrs HW=126.20' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.73 cfs)

Pond 2P: INFILTRATION BASIN #2



Summary for Pond 3P: INFILTRATION BASIN #3

Inflow Area = 5.280 ac, 22.10% Impervious, Inflow Depth = 0.76" for 10-year event
Inflow = 3.49 cfs @ 12.11 hrs, Volume= 0.334 af
Outflow = 0.64 cfs @ 12.96 hrs, Volume= 0.334 af, Atten= 82%, Lag= 51.0 min
Discarded = 0.64 cfs @ 12.96 hrs, Volume= 0.334 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 103.51' @ 12.96 hrs Surf.Area= 3,300 sf Storage= 3,648 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 53.6 min (954.9 - 901.4)

Volume	Invert	Avail.Storage	Storage Description
#1	102.00'	35,433 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

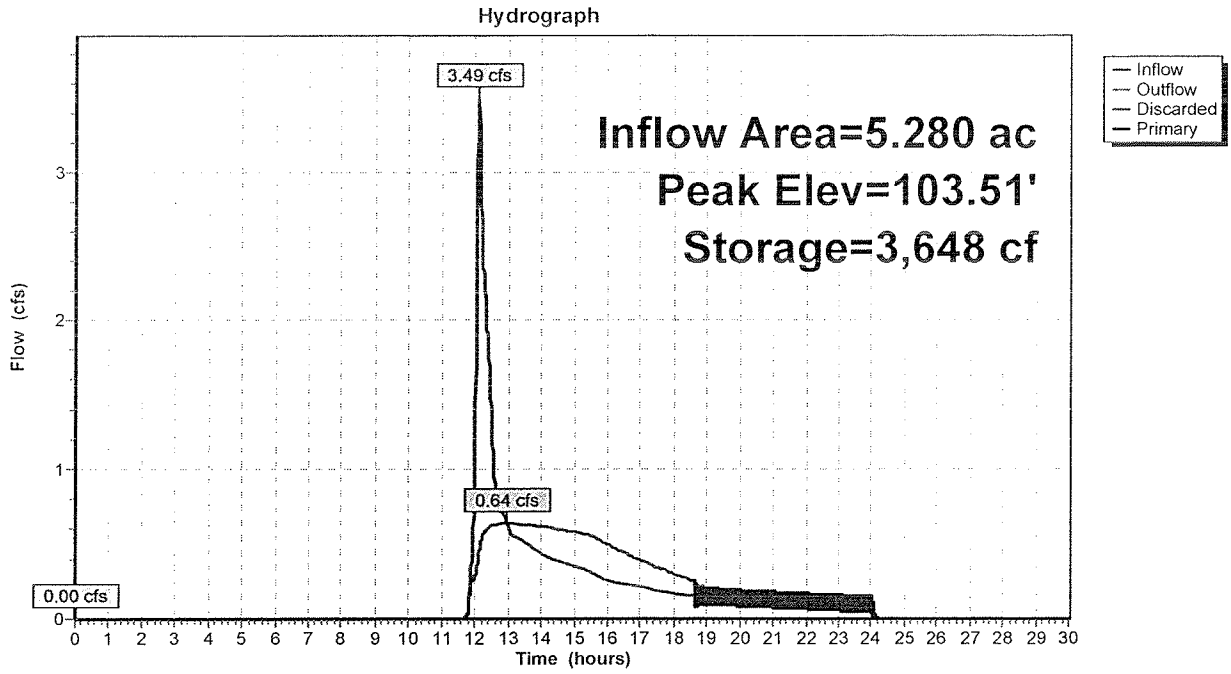
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.00	1,310	193.4	0	0	1,310
103.00	2,907	252.7	2,056	2,056	3,427
104.00	3,697	274.0	3,294	5,350	4,358
105.00	4,551	295.2	4,117	9,467	5,359
106.00	5,469	316.5	5,003	14,470	6,440
107.00	6,450	337.8	5,953	20,423	7,597
108.00	7,496	359.1	6,966	27,389	8,828
109.00	8,605	380.4	8,044	35,433	10,135

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	108.00'	**10.0' long x 34.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.64 cfs @ 12.96 hrs HW=103.51' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.64 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=102.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: INFILTRATION BASIN #3



Summary for Pond 4P: INFILTRATION BASIN #4

Inflow Area = 3.908 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10-year event
Inflow = 0.01 cfs @ 22.22 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 22.22 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 22.22 hrs, Volume= 0.005 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 0.00 hrs Surf.Area= 441 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,240.9 - 1,240.9)

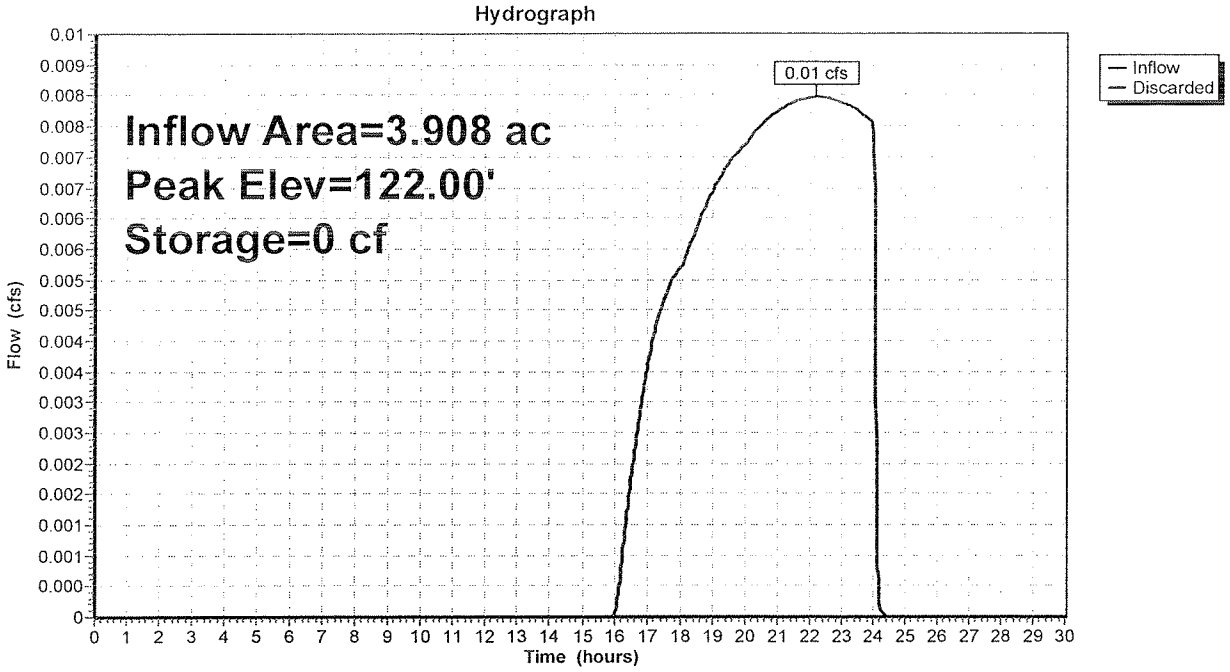
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	4,855 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	441	87.4	0	0	441
123.00	1,950	200.7	1,106	1,106	3,043
124.00	5,903	443.5	3,749	4,855	15,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 22.22 hrs HW=122.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.08 cfs potential flow)

Pond 4P: INFILTRATION BASIN #4



Summary for Pond 6P: LEACH PIT CLUSTER #1

Inflow Area = 1.673 ac, 17.83% Impervious, Inflow Depth = 0.34" for 10-year event
Inflow = 0.22 cfs @ 12.35 hrs, Volume= 0.047 af
Outflow = 0.17 cfs @ 12.51 hrs, Volume= 0.047 af, Atten= 24%, Lag= 9.6 min
Discarded = 0.17 cfs @ 12.51 hrs, Volume= 0.047 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.11' @ 12.51 hrs Surf.Area= 864 sf Storage= 37 cf

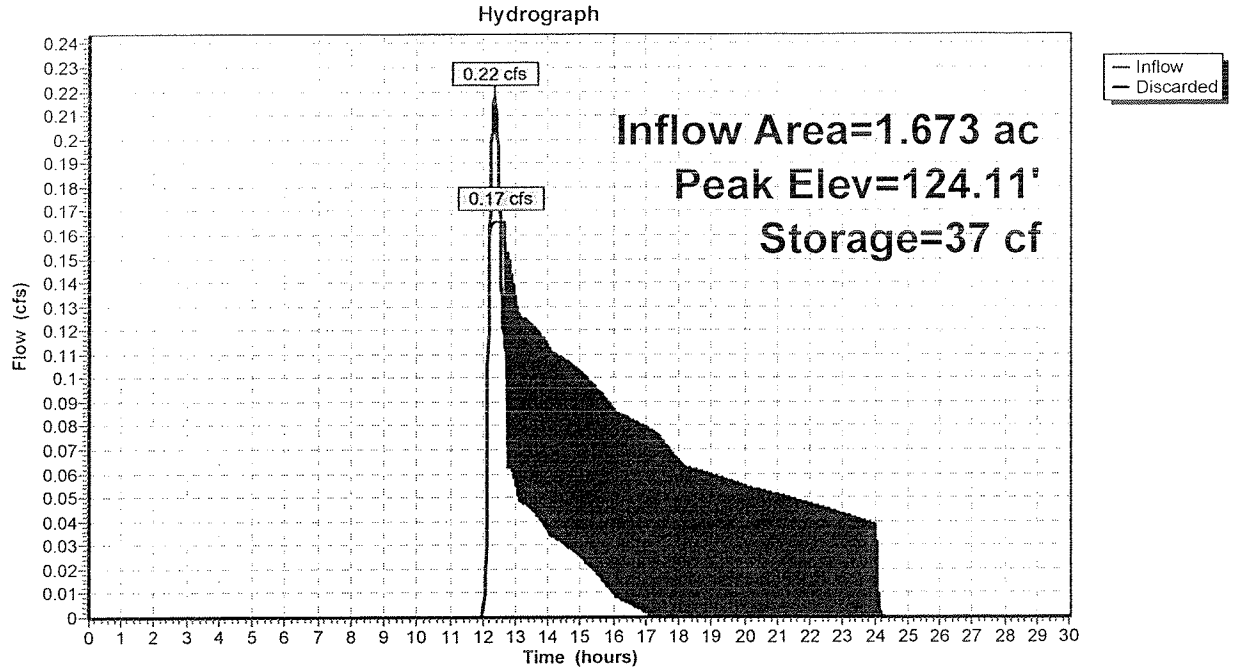
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (963.8 - 963.4)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.17 cfs @ 12.51 hrs HW=124.11' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.17 cfs)

Pond 6P: LEACH PIT CLUSTER #1



Summary for Pond 13P: LEACH PIT CLUSTER #1

Inflow Area = 1.124 ac, 12.00% Impervious, Inflow Depth = 0.42" for 10-year event
Inflow = 0.21 cfs @ 12.30 hrs, Volume= 0.040 af
Outflow = 0.17 cfs @ 12.48 hrs, Volume= 0.040 af, Atten= 22%, Lag= 10.5 min
Discarded = 0.17 cfs @ 12.48 hrs, Volume= 0.040 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.12' @ 12.48 hrs Surf.Area= 864 sf Storage= 41 cf

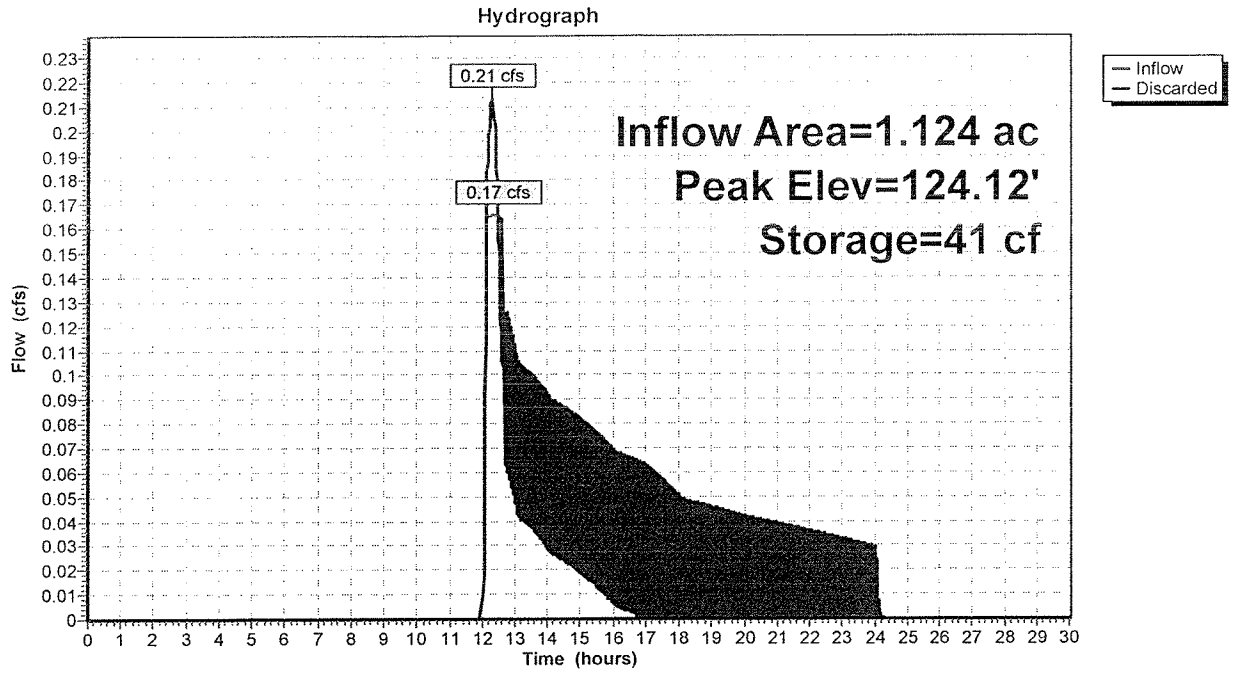
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (947.1 - 946.5)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.17 cfs @ 12.48 hrs HW=124.12' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.17 cfs)

Pond 13P: LEACH PIT CLUSTER #1



Summary for Pond 16P: INFILTRATION BASIN #5

Inflow Area = 0.781 ac, 6.00% Impervious, Inflow Depth = 0.16" for 10-year event
Inflow = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af
Outflow = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 13.66 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 113.00' @ 0.00 hrs Surf.Area= 366 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,025.6 - 1,025.6)

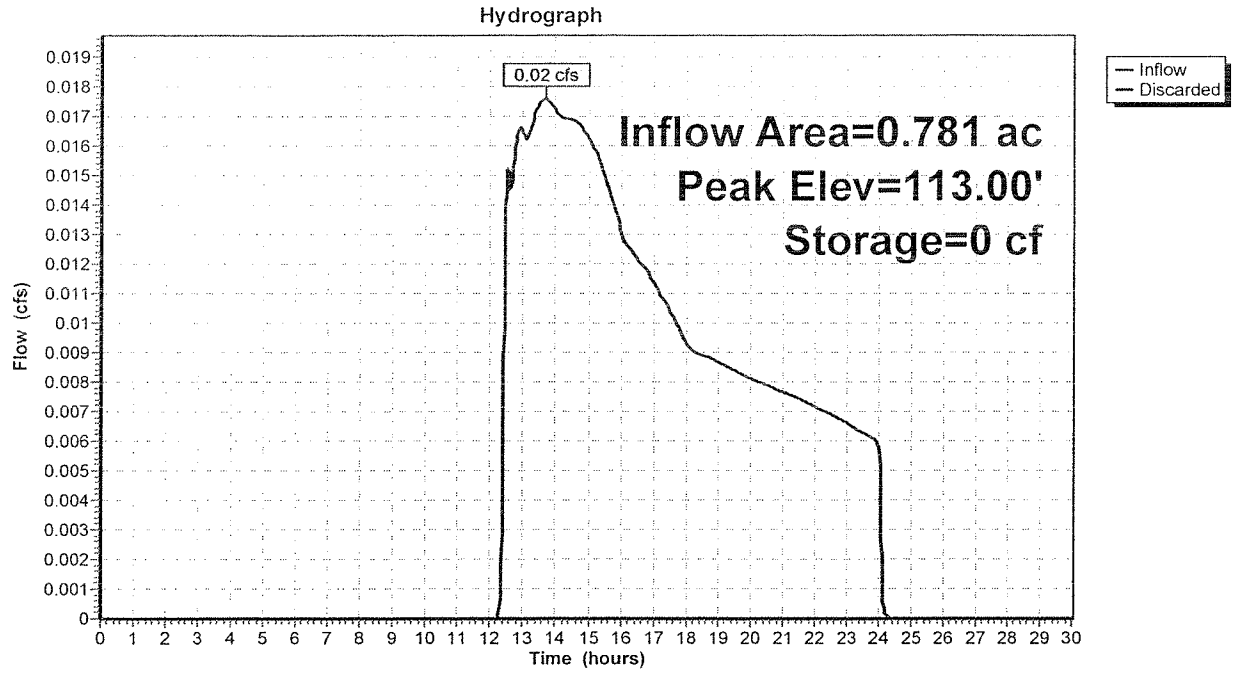
Volume	Invert	Avail.Storage	Storage Description
#1	113.00'	1,555 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
113.00	366	86.9	0	0	366
114.00	756	124.9	549	549	1,015
115.00	1,278	165.7	1,006	1,555	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	113.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 13.66 hrs HW=113.00' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.07 cfs potential flow)

Pond 16P: INFILTRATION BASIN #5



Summary for Pond 19P: LEACH PIT CLUSTER #2

Inflow Area = 1.599 ac, 12.00% Impervious, Inflow Depth = 0.42" for 10-year event
Inflow = 0.30 cfs @ 12.30 hrs, Volume= 0.056 af
Outflow = 0.22 cfs @ 12.50 hrs, Volume= 0.056 af, Atten= 27%, Lag= 11.7 min
Discarded = 0.22 cfs @ 12.50 hrs, Volume= 0.056 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.17' @ 12.50 hrs Surf.Area= 1,152 sf Storage= 78 cf

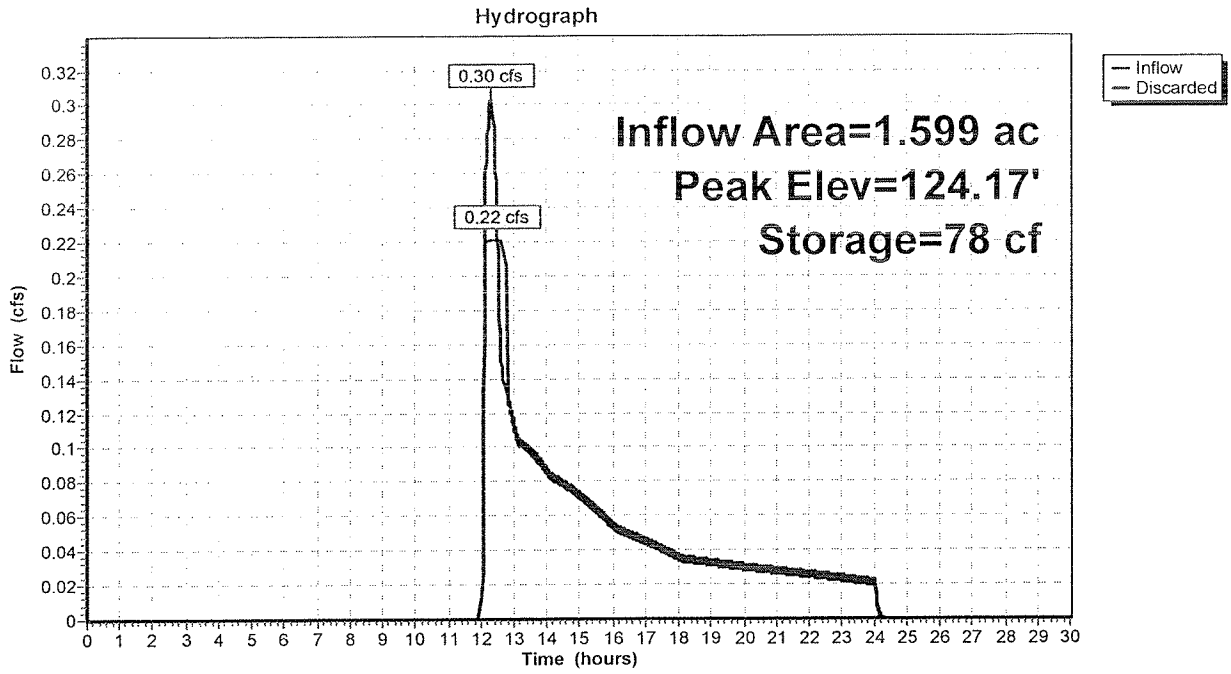
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.7 min (947.2 - 946.5)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	2,261 cf	**24.00'W x 48.00'L x 7.00'H Prismatoid** 8,064 cf Overall - 2,413 cf Embedded = 5,651 cf x 40.0% Voids
#2	125.00'	1,847 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 8 Inside #1 2,413 cf Overall - 6.0" Wall Thickness = 1,847 cf
		4,108 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.22 cfs @ 12.50 hrs HW=124.17' (Free Discharge)
↑**1=Exfiltration** (Controls 0.22 cfs)

Pond 19P: LEACH PIT CLUSTER #2



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=266,088 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.03 cfs 0.022 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=158,607 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.02 cfs 0.013 af

Subcatchment4S: ROAD B Runoff Area=78,529 sf 35.80% Impervious Runoff Depth=1.73"
Tc=6.0 min CN=60 Runoff=3.41 cfs 0.260 af

Subcatchment5S: CUL-DE-SAC LOTS Runoff Area=72,895 sf 17.83% Impervious Runoff Depth=0.63"
Tc=6.0 min UI Adjusted CN=44 Runoff=0.59 cfs 0.087 af

Subcatchment6S: ROAD A Runoff Area=24,709 sf 62.40% Impervious Runoff Depth=3.12"
Tc=6.0 min CN=76 Runoff=2.08 cfs 0.148 af

Subcatchment7S: ROAD A - EAST Runoff Area=139,417 sf 20.00% Impervious Runoff Depth=1.07"
Tc=6.0 min CN=51 Runoff=3.12 cfs 0.284 af

Subcatchment8S: EAST SITE Runoff Area=170,221 sf 0.00% Impervious Runoff Depth=0.09"
Tc=6.0 min CN=32 Runoff=0.05 cfs 0.030 af

Subcatchment9S: ROAD A - BACKYARDS Runoff Area=85,522 sf 0.00% Impervious Runoff Depth=0.04"
Tc=6.0 min CN=30 Runoff=0.01 cfs 0.007 af

Subcatchment10S: NORTHEAST SITE Runoff Area=40,166 sf 0.00% Impervious Runoff Depth=0.09"
Flow Length=233' Tc=12.3 min CN=32 Runoff=0.01 cfs 0.007 af

Subcatchment11S: NORTH SITE Runoff Area=92,697 sf 0.00% Impervious Runoff Depth=0.04"
Flow Length=302' Tc=7.5 min CN=30 Runoff=0.01 cfs 0.008 af

Subcatchment12S: LOTS 13-15 Runoff Area=48,974 sf 12.00% Impervious Runoff Depth=0.74"
Tc=6.0 min CN=46 Runoff=0.58 cfs 0.070 af

Subcatchment15S: LOWER LOT 5 & OPEN Runoff Area=34,036 sf 6.00% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=39 Runoff=0.10 cfs 0.024 af

Subcatchment17S: ATKINS ROAD Runoff Area=190,434 sf 26.69% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=55 Runoff=6.00 cfs 0.491 af

Subcatchment18S: LOTS 15-17 Runoff Area=69,633 sf 12.00% Impervious Runoff Depth=0.74"
Tc=6.0 min CN=46 Runoff=0.82 cfs 0.099 af

Subcatchment19S: WEST CENTRAL SITE Runoff Area=150,928 sf 12.00% Impervious Runoff Depth=0.74"
Tc=6.0 min CN=46 Runoff=1.78 cfs 0.215 af

Subcatchment20S: ATKINS ROAD - END Runoff Area=19,175 sf 41.30% Impervious Runoff Depth=2.05"
Tc=6.0 min CN=64 Runoff=1.02 cfs 0.075 af

Subcatchment 21S: INFILTRATION AREA Runoff Area=39,560 sf 0.00% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=39 Runoff=0.12 cfs 0.027 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.03 cfs 0.022 af
Outflow=0.03 cfs 0.022 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.02 cfs 0.013 af
Outflow=0.02 cfs 0.013 af

Reach 3R: OFFSITE FLOW Inflow=0.01 cfs 0.007 af
Outflow=0.01 cfs 0.007 af

Reach 4R: OFFSITE FLOW Inflow=0.01 cfs 0.008 af
Outflow=0.01 cfs 0.008 af

Pond 1P: INFILTRATION BASIN #1 Peak Elev=124.58' Storage=9,638 cf Inflow=8.17 cfs 0.698 af
Outflow=1.20 cfs 0.698 af

Pond 2P: INFILTRATION BASIN #2 Peak Elev=126.59' Storage=2,329 cf Inflow=3.12 cfs 0.292 af
Outflow=0.86 cfs 0.292 af

Pond 3P: INFILTRATION BASIN #3 Peak Elev=104.49' Storage=7,269 cf Inflow=6.01 cfs 0.519 af
Discarded=0.80 cfs 0.519 af Primary=0.00 cfs 0.000 af Outflow=0.80 cfs 0.519 af

Pond 4P: INFILTRATION BASIN #4 Peak Elev=122.00' Storage=0 cf Inflow=0.05 cfs 0.030 af
Outflow=0.05 cfs 0.030 af

Pond 6P: LEACH PIT CLUSTER #1 Peak Elev=125.59' Storage=615 cf Inflow=0.59 cfs 0.087 af
Outflow=0.17 cfs 0.087 af

Pond 13P: LEACH PIT CLUSTER #1 Peak Elev=125.29' Storage=478 cf Inflow=0.58 cfs 0.070 af
Outflow=0.17 cfs 0.070 af

Pond 16P: INFILTRATION BASIN #5 Peak Elev=113.05' Storage=20 cf Inflow=0.10 cfs 0.024 af
Outflow=0.07 cfs 0.024 af

Pond 19P: LEACH PIT CLUSTER #2 Peak Elev=125.43' Storage=719 cf Inflow=0.82 cfs 0.099 af
Outflow=0.22 cfs 0.099 af

Total Runoff Area = 38.604 ac Runoff Volume = 1.869 af Average Runoff Depth = 0.58"
89.44% Pervious = 34.528 ac 10.56% Impervious = 4.076 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

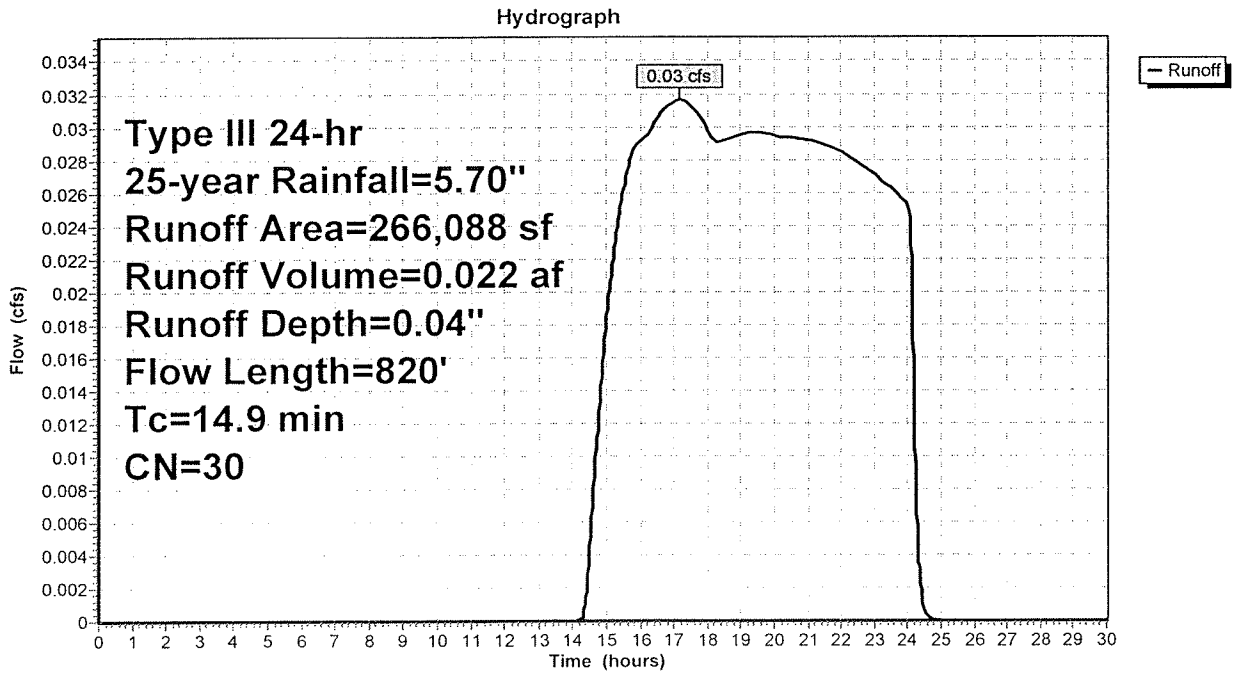
Runoff = 0.03 cfs @ 17.17 hrs, Volume= 0.022 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
266,088	30	Woods, Good, HSG A
266,088		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

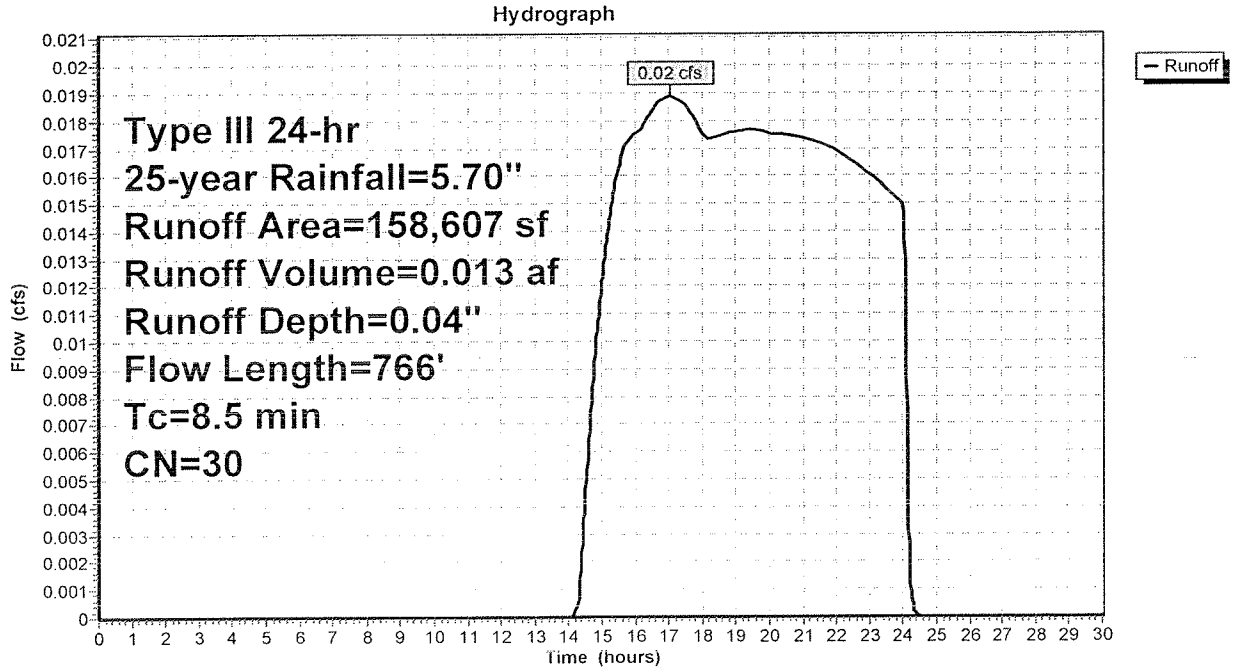
Runoff = 0.02 cfs @ 17.03 hrs, Volume= 0.013 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
158,607	30	Woods, Good, HSG A
158,607		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 4S: ROAD B

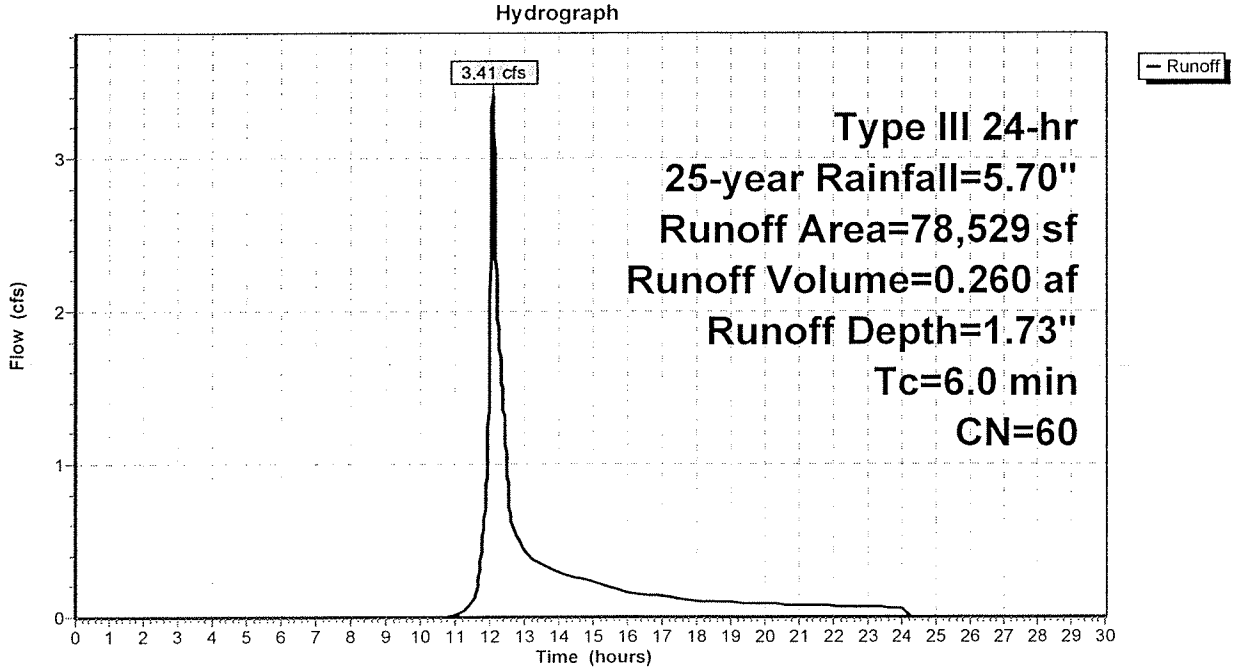
Runoff = 3.41 cfs @ 12.10 hrs, Volume= 0.260 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
16,195	98	Paved roads w/curbs & sewers, HSG A
59,600	51	1 acre lots, 20% imp, HSG A
2,734	39	>75% Grass cover, Good, HSG A
78,529	60	Weighted Average
50,414		64.20% Pervious Area
28,115		35.80% Impervious Area

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

Subcatchment 4S: ROAD B



Summary for Subcatchment 5S: CUL-DE-SAC LOTS

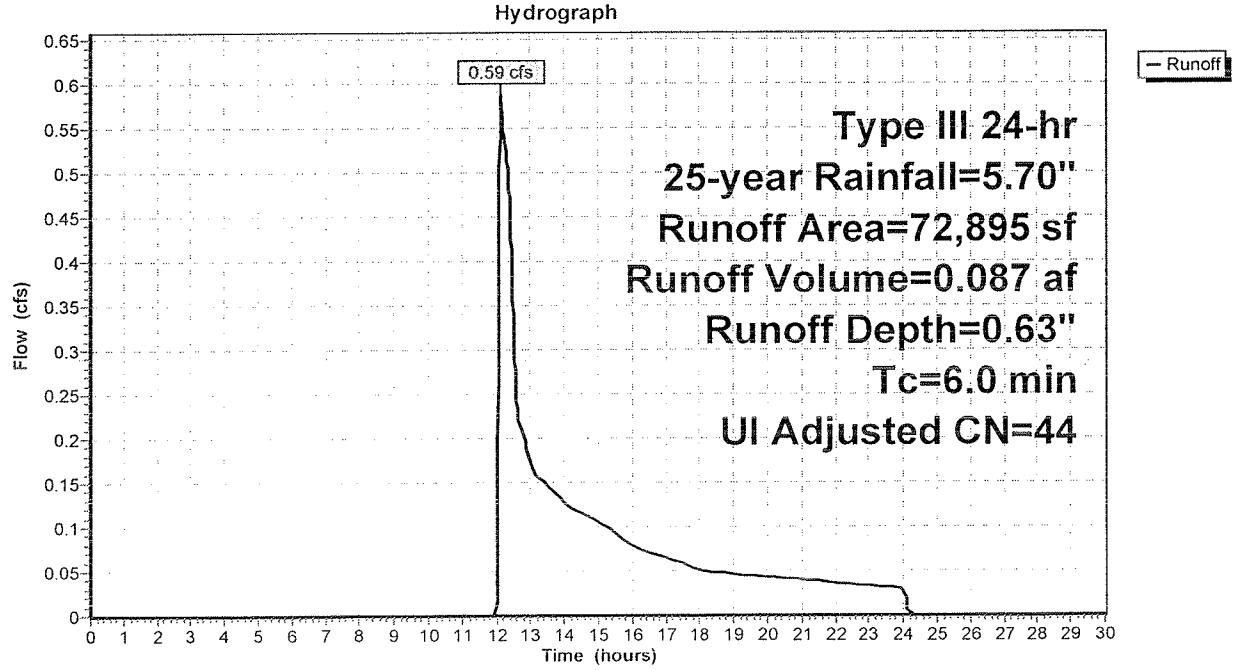
Runoff = 0.59 cfs @ 12.14 hrs, Volume= 0.087 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Adj	Description
59,895	39		>75% Grass cover, Good, HSG A
13,000	98		Unconnected pavement, HSG A
72,895	50	44	Weighted Average, UI Adjusted
59,895			82.17% Pervious Area
13,000			17.83% Impervious Area
13,000			100.00% Unconnected

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

Subcatchment 5S: CUL-DE-SAC LOTS



Summary for Subcatchment 6S: ROAD A

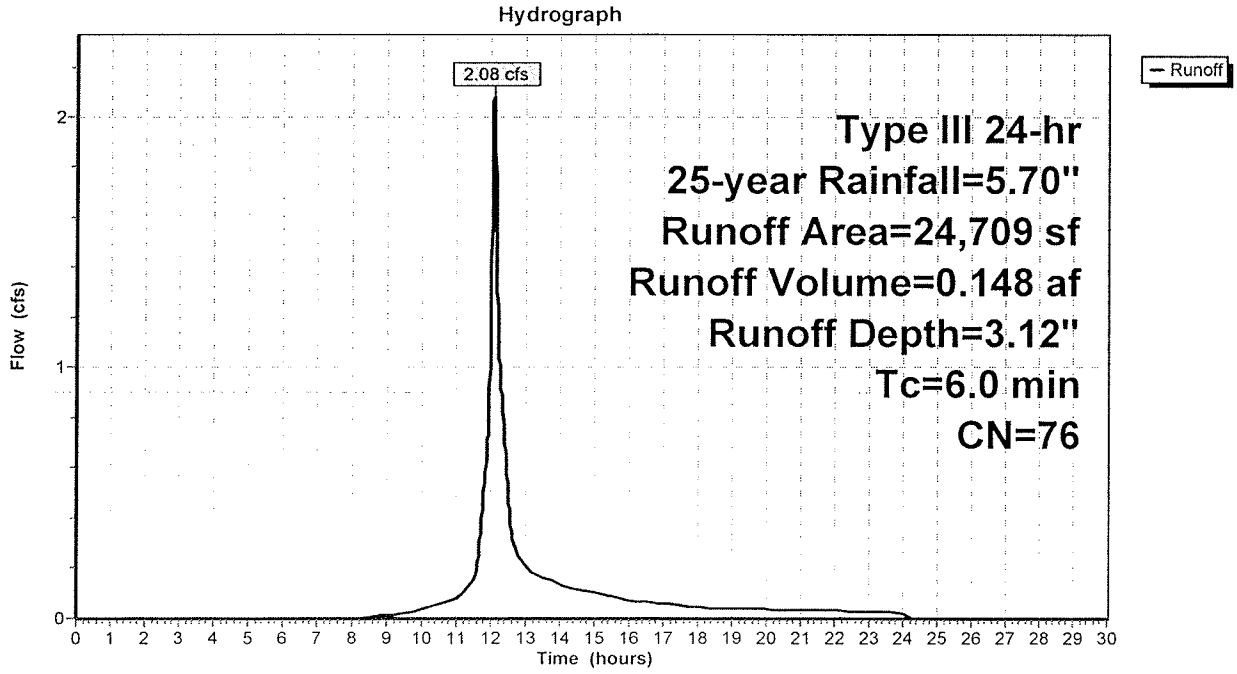
Runoff = 2.08 cfs @ 12.09 hrs, Volume= 0.148 af, Depth= 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
15,418	98	Paved parking, HSG A
9,291	39	>75% Grass cover, Good, HSG A
24,709	76	Weighted Average
9,291		37.60% Pervious Area
15,418		62.40% Impervious Area

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

Subcatchment 6S: ROAD A



Summary for Subcatchment 7S: ROAD A - EAST

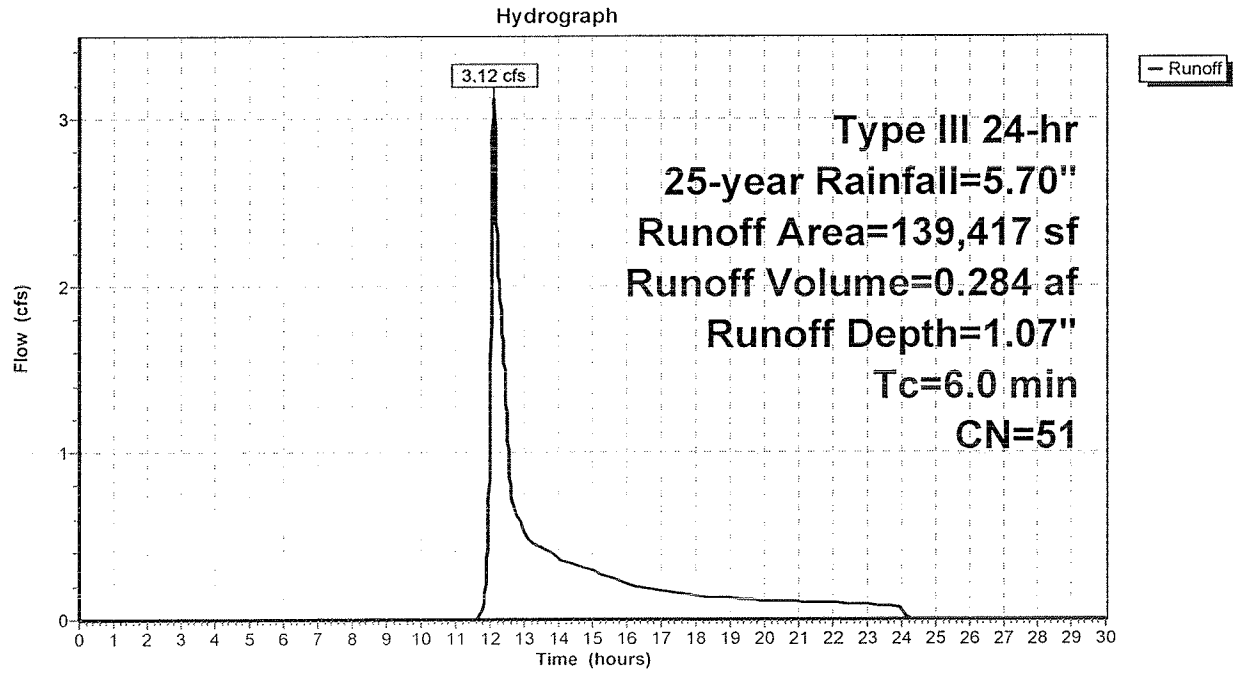
Runoff = 3.12 cfs @ 12.11 hrs, Volume= 0.284 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
139,417	51	1 acre lots, 20% imp, HSG A
111,534		80.00% Pervious Area
27,883		20.00% Impervious Area

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

Subcatchment 7S: ROAD A - EAST



Summary for Subcatchment 8S: EAST SITE

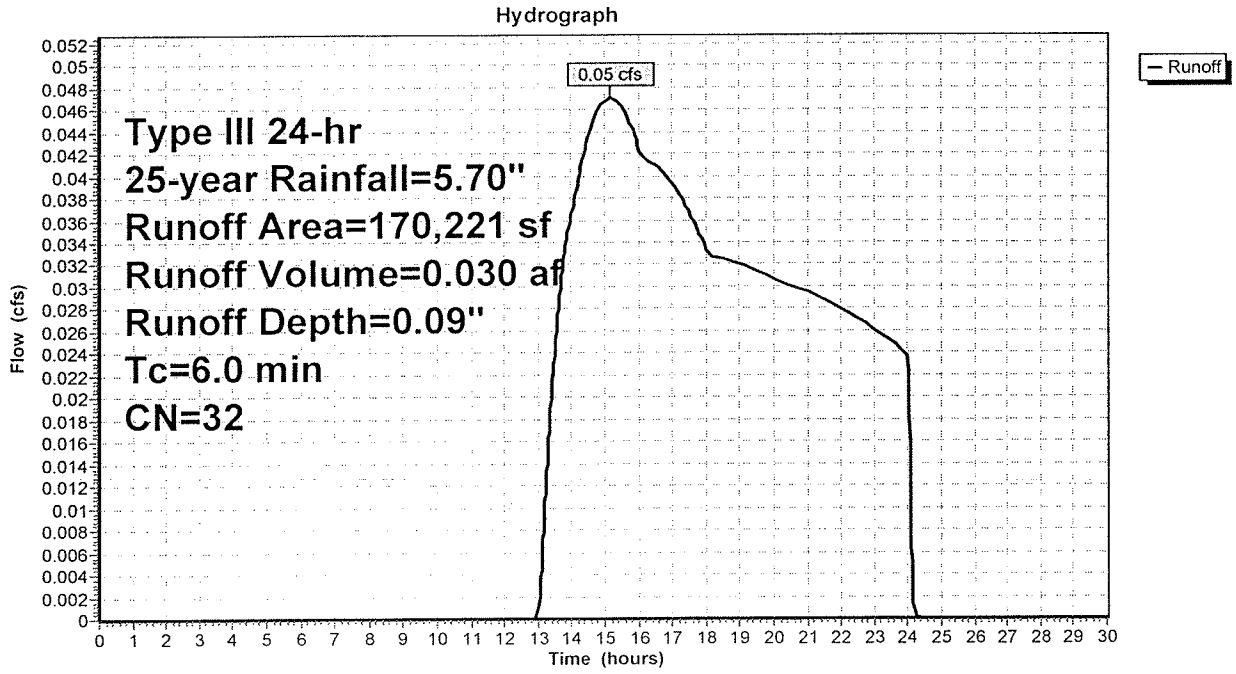
Runoff = 0.05 cfs @ 15.18 hrs, Volume= 0.030 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
170,221	32	Woods/grass comb., Good, HSG A
170,221		100.00% Pervious Area

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

Subcatchment 8S: EAST SITE



Summary for Subcatchment 9S: ROAD A - BACKYARDS

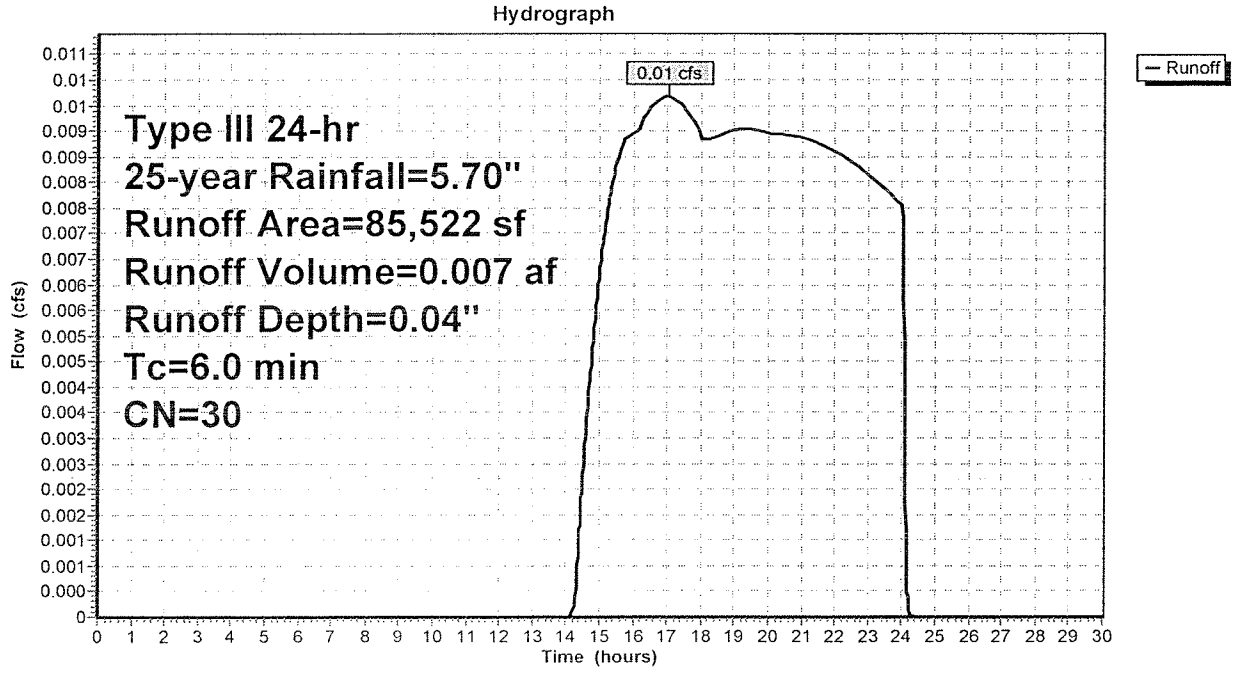
Runoff = 0.01 cfs @ 17.02 hrs, Volume= 0.007 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
85,522	30	Woods, Good, HSG A
85,522		100.00% Pervious Area

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

Subcatchment 9S: ROAD A - BACKYARDS



Summary for Subcatchment 10S: NORTHEAST SITE

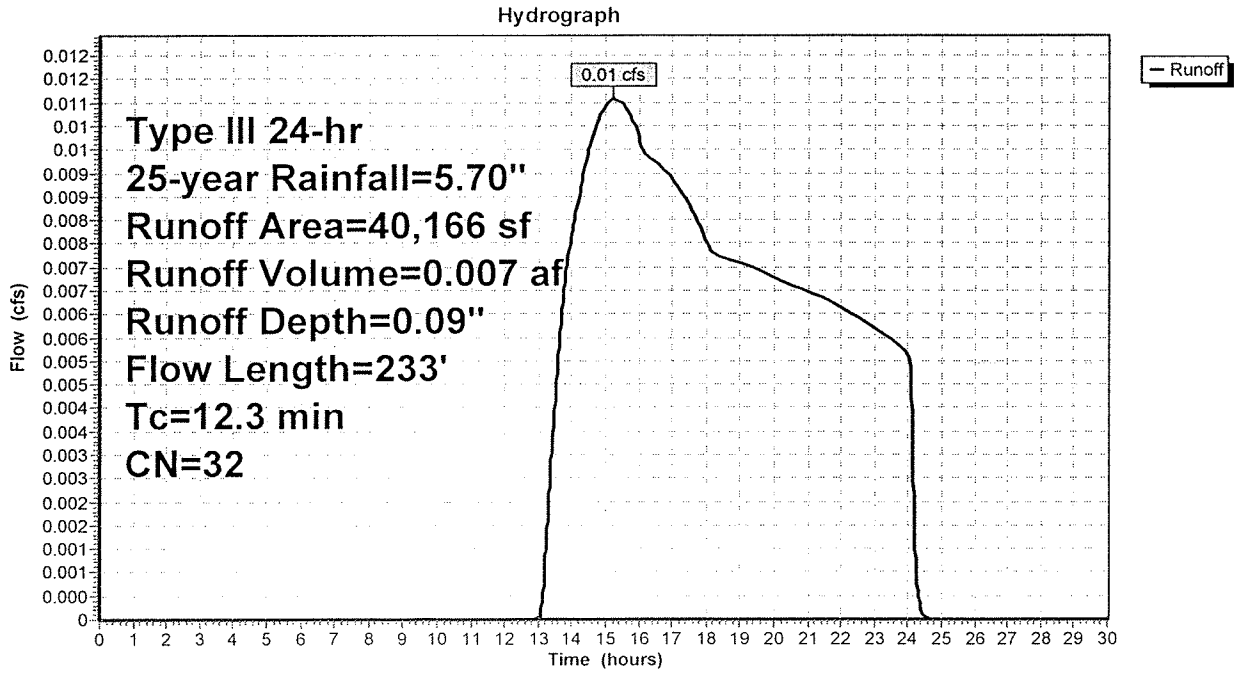
Runoff = 0.01 cfs @ 15.24 hrs, Volume= 0.007 af, Depth= 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
40,166	32	Woods/grass comb., Good, HSG A
40,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.7	183	0.0765	4.45		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.3	233	Total			

Subcatchment 10S: NORTHEAST SITE



Summary for Subcatchment 11S: NORTH SITE

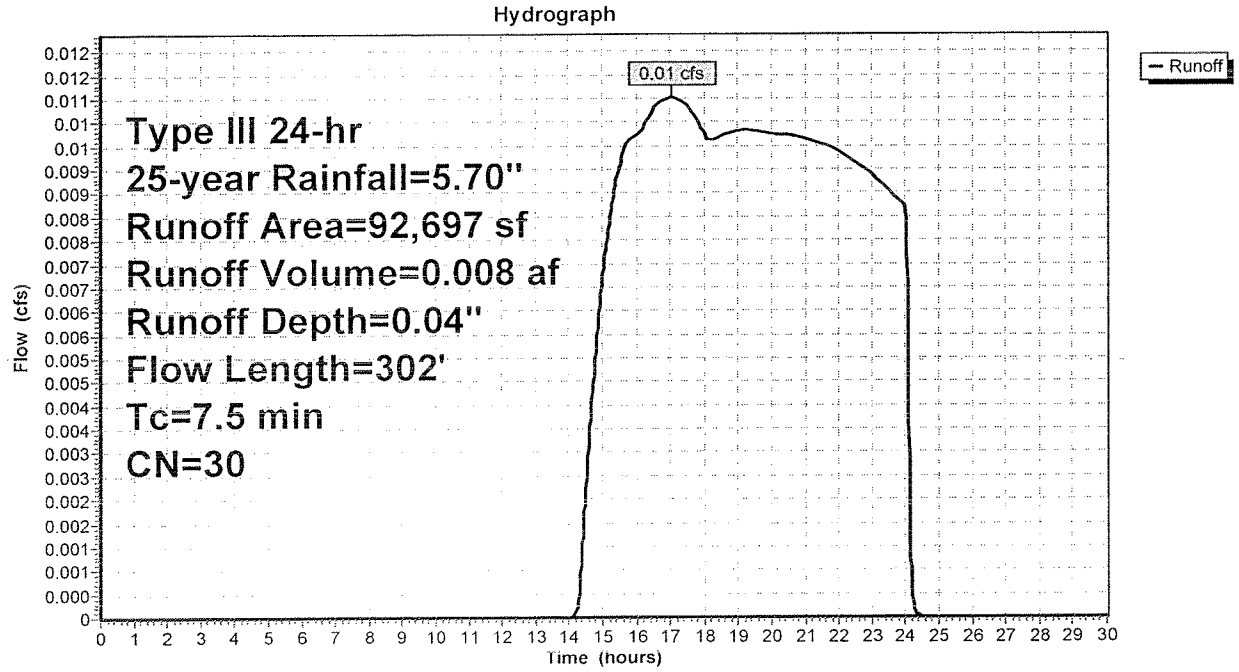
Runoff = 0.01 cfs @ 17.04 hrs, Volume= 0.008 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
92,697	30	Woods, Good, HSG A
92,697		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
0.8	252	0.1000	5.09		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
7.5	302	Total			

Subcatchment 11S: NORTH SITE



Summary for Subcatchment 12S: LOTS 13-15

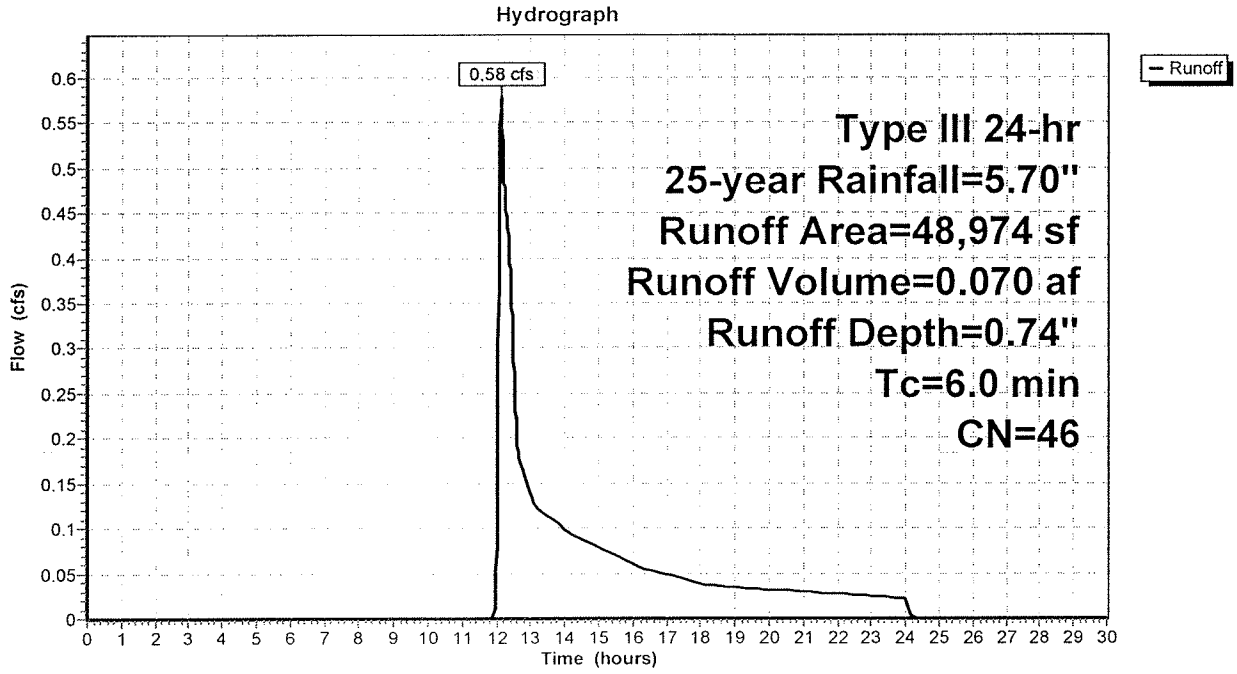
Runoff = 0.58 cfs @ 12.13 hrs, Volume= 0.070 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
48,974	46	2 acre lots, 12% imp, HSG A
43,097		88.00% Pervious Area
5,877		12.00% Impervious Area

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

Subcatchment 12S: LOTS 13-15



Summary for Subcatchment 15S: LOWER LOT 5 & OPEN SPACE

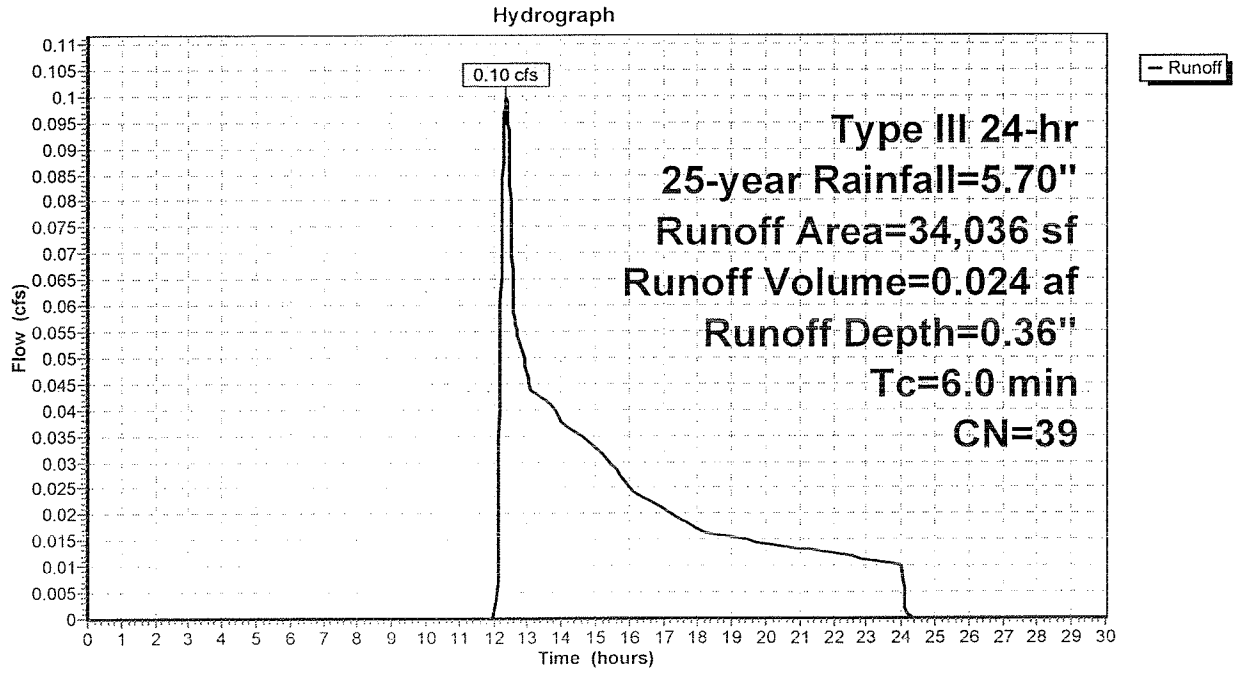
Runoff = 0.10 cfs @ 12.38 hrs, Volume= 0.024 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
17,018	32	Woods/grass comb., Good, HSG A
17,018	46	2 acre lots, 12% imp, HSG A
34,036	39	Weighted Average
31,994		94.00% Pervious Area
2,042		6.00% Impervious Area

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

Subcatchment 15S: LOWER LOT 5 & OPEN SPACE



Summary for Subcatchment 17S: ATKINS ROAD EXTENSION

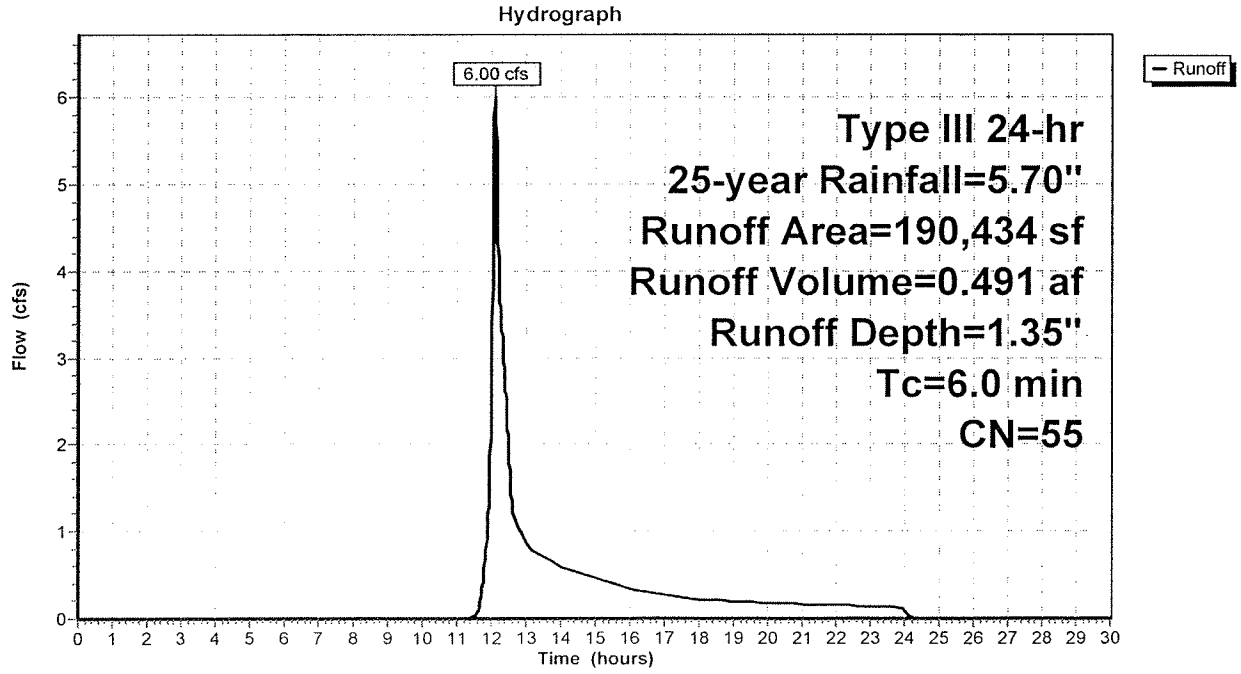
Runoff = 6.00 cfs @ 12.10 hrs, Volume= 0.491 af, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
21,495	98	Paved roads w/curbs & sewers, HSG A
17,804	39	>75% Grass cover, Good, HSG A
146,656	51	1 acre lots, 20% imp, HSG A
4,479	30	Woods, Good, HSG A
190,434	55	Weighted Average
139,608		73.31% Pervious Area
50,826		26.69% Impervious Area

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

Subcatchment 17S: ATKINS ROAD EXTENSION



Summary for Subcatchment 18S: LOTS 15-17

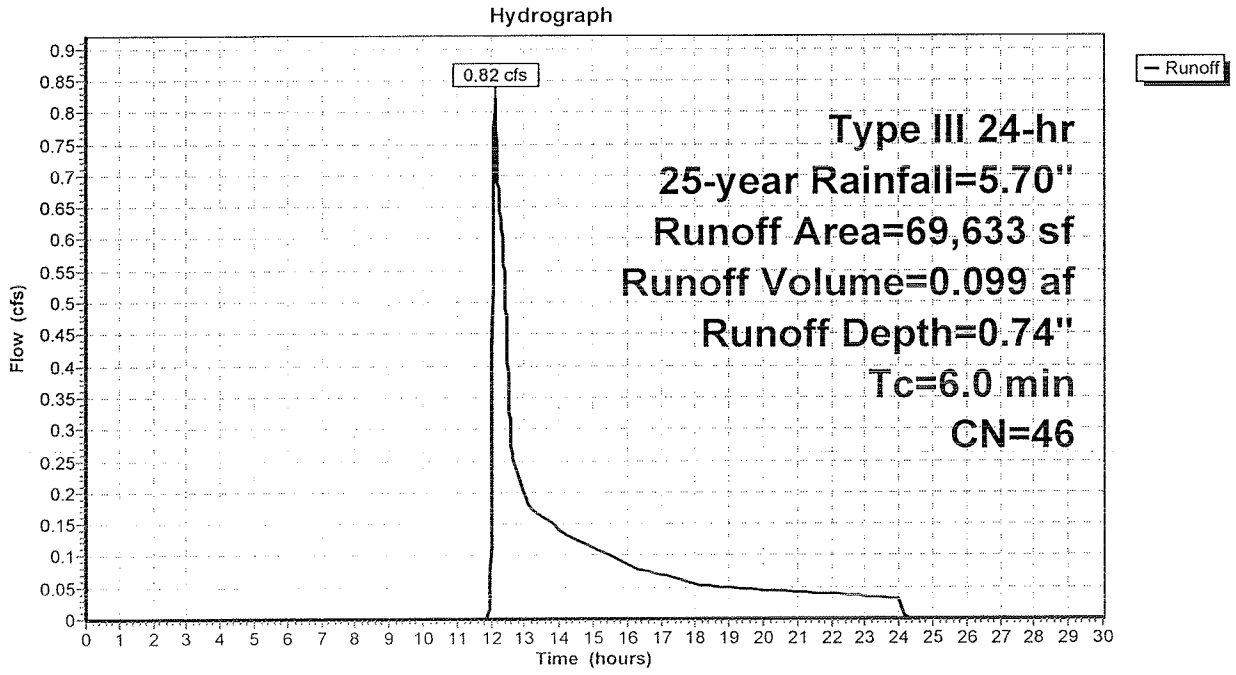
Runoff = 0.82 cfs @ 12.13 hrs, Volume= 0.099 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
69,633	46	2 acre lots, 12% imp, HSG A
61,277		88.00% Pervious Area
8,356		12.00% Impervious Area

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

Subcatchment 18S: LOTS 15-17



Summary for Subcatchment 19S: WEST CENTRAL SITE

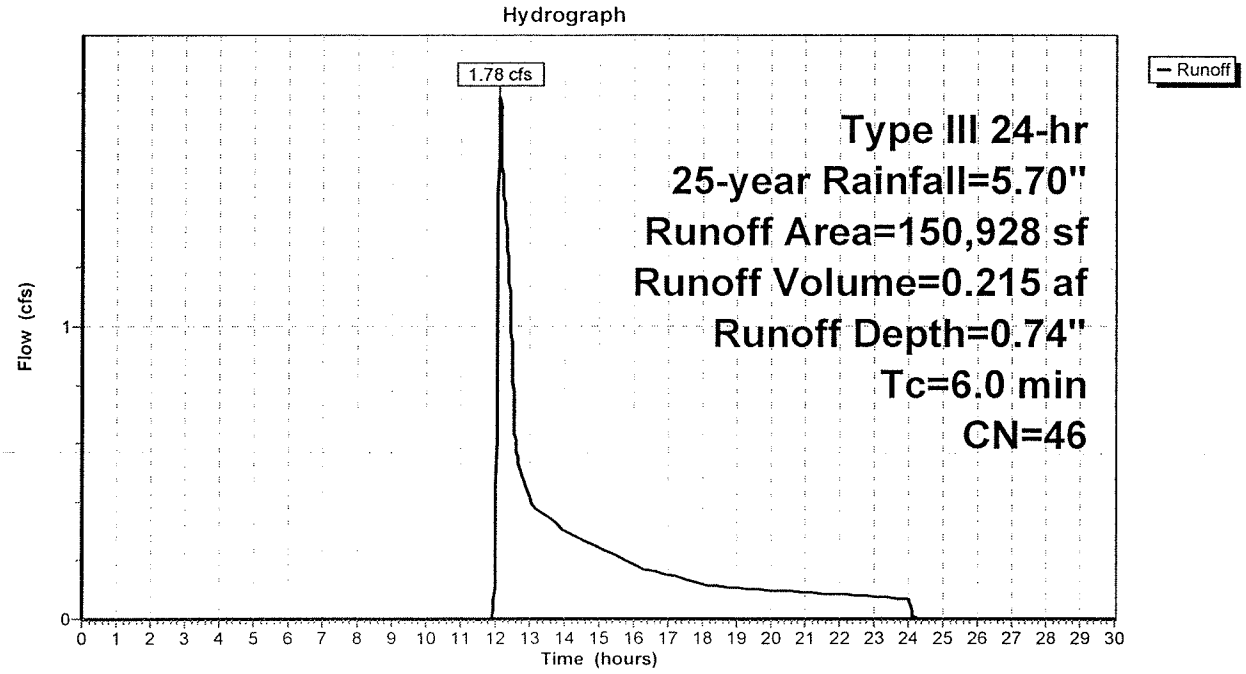
Runoff = 1.78 cfs @ 12.13 hrs, Volume= 0.215 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
150,928	46	2 acre lots, 12% imp, HSG A
132,817		88.00% Pervious Area
18,111		12.00% Impervious Area

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

Subcatchment 19S: WEST CENTRAL SITE



Summary for Subcatchment 20S: ATKINS ROAD - END

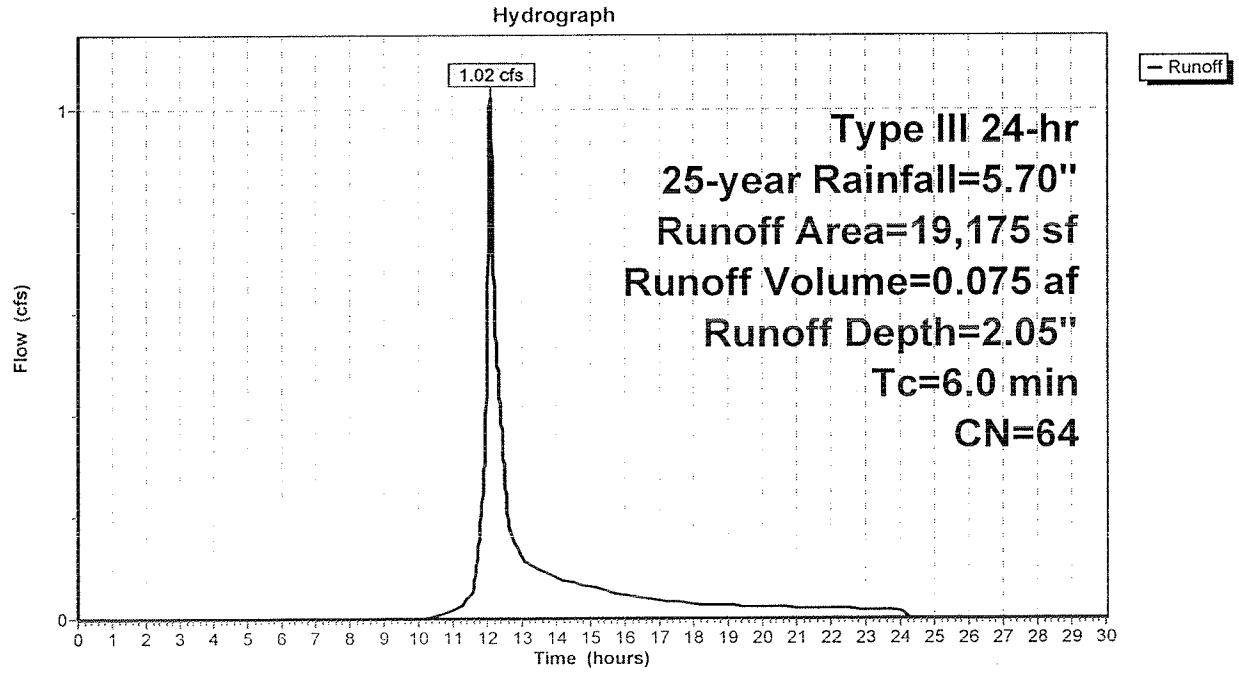
Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
14,070	51	1 acre lots, 20% imp, HSG A
5,105	98	Paved roads w/curbs & sewers, HSG A
19,175	64	Weighted Average
11,256		58.70% Pervious Area
7,919		41.30% Impervious Area

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

Subcatchment 20S: ATKINS ROAD - END



Summary for Subcatchment 21S: INFILTRATION AREA

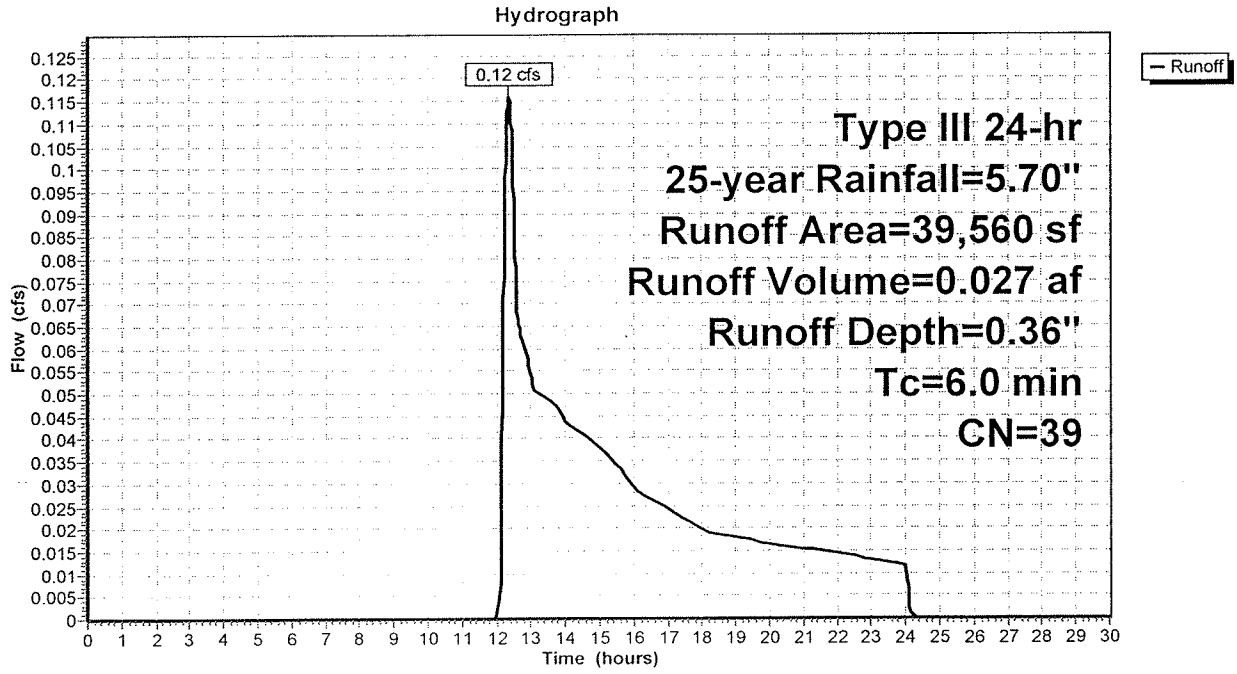
Runoff = 0.12 cfs @ 12.38 hrs, Volume= 0.027 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=5.70"

Area (sf)	CN	Description
39,560	39	>75% Grass cover, Good, HSG A
39,560		100.00% Pervious Area

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

Subcatchment 21S: INFILTRATION AREA

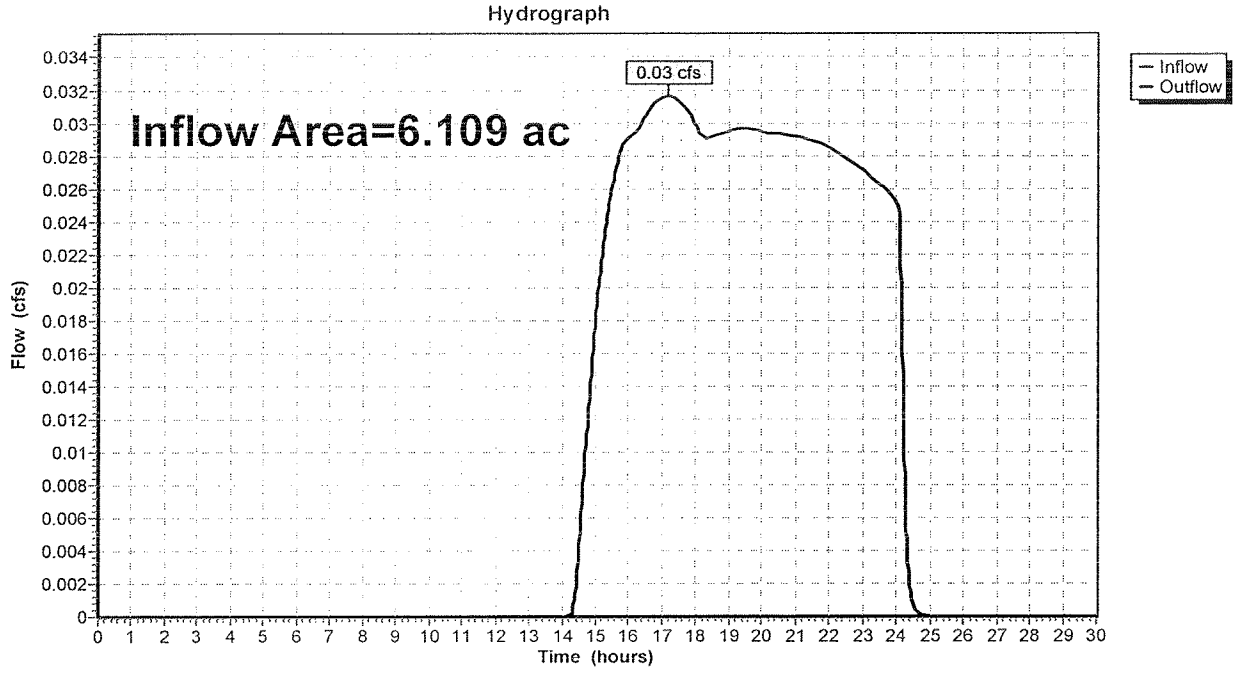


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 6.109 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.03 cfs @ 17.17 hrs, Volume= 0.022 af
Outflow = 0.03 cfs @ 17.17 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

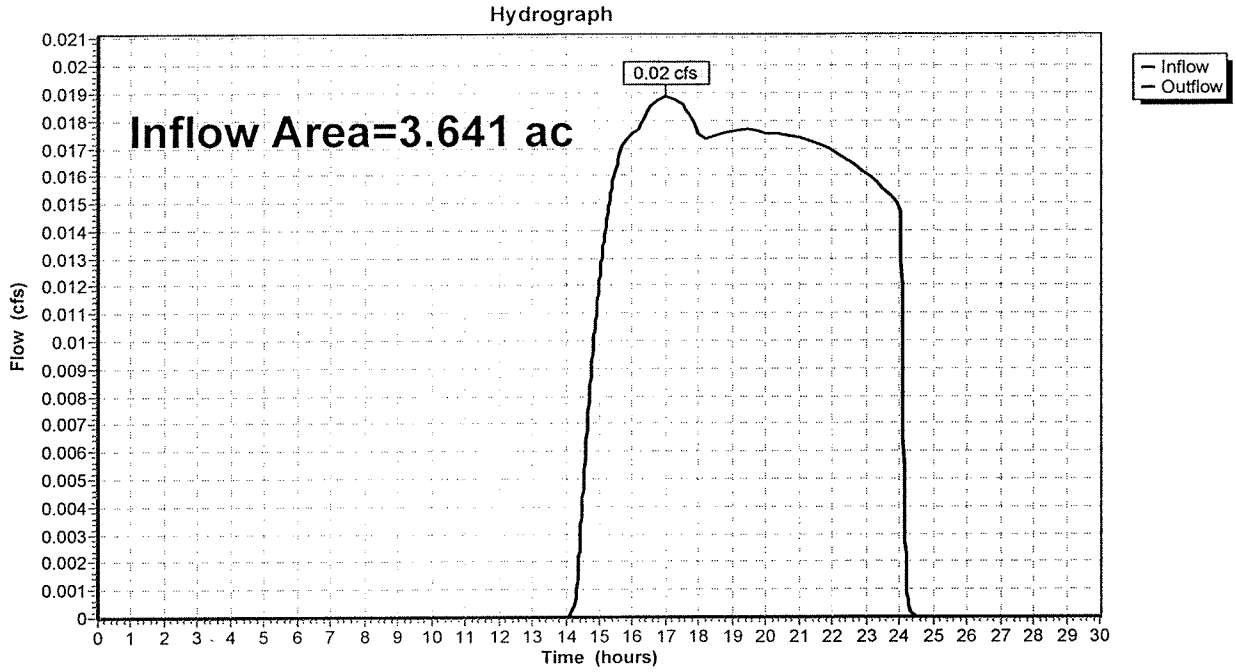


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 3.641 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.02 cfs @ 17.03 hrs, Volume= 0.013 af
Outflow = 0.02 cfs @ 17.03 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

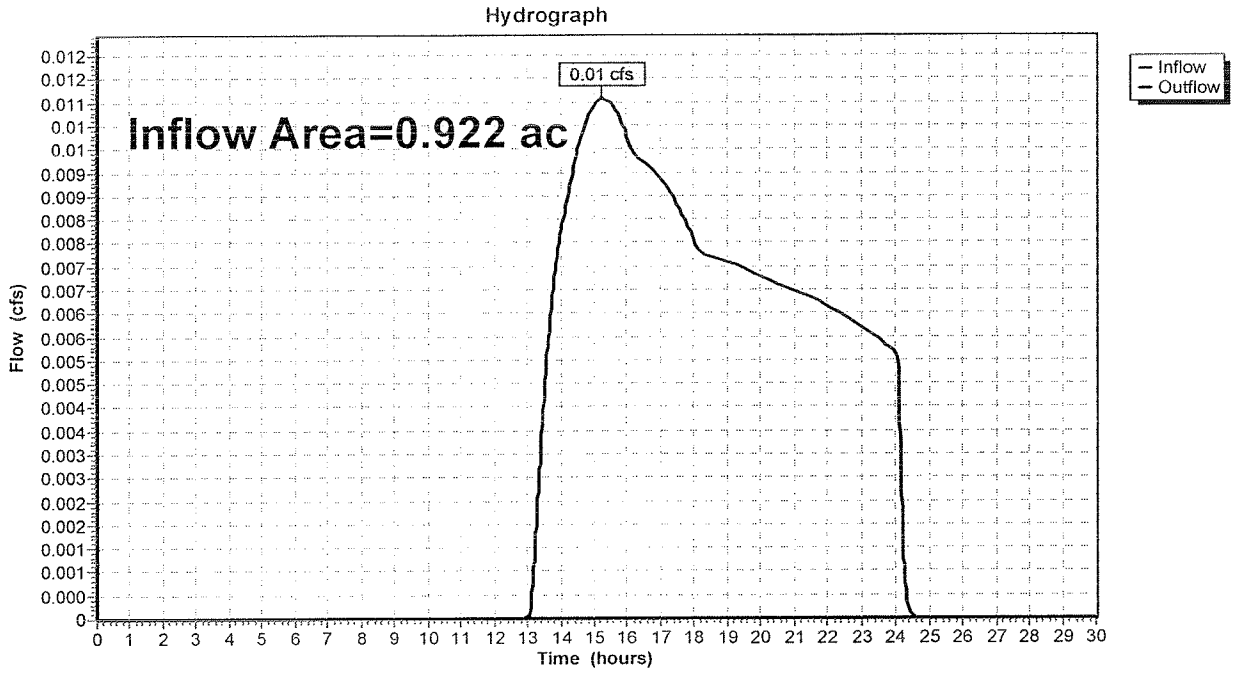


Summary for Reach 3R: OFFSITE FLOW

Inflow Area = 0.922 ac, 0.00% Impervious, Inflow Depth = 0.09" for 25-year event
Inflow = 0.01 cfs @ 15.24 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 15.24 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: OFFSITE FLOW

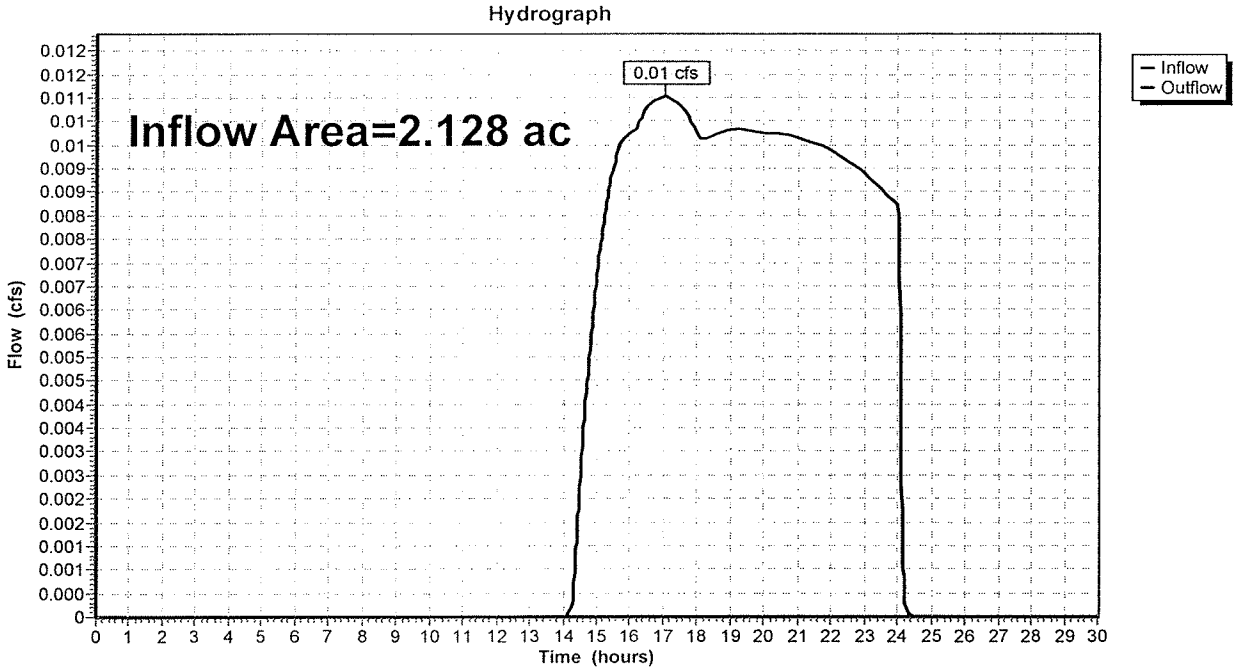


Summary for Reach 4R: OFFSITE FLOW

Inflow Area = 2.128 ac, 0.00% Impervious, Inflow Depth = 0.04" for 25-year event
Inflow = 0.01 cfs @ 17.04 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 17.04 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 4R: OFFSITE FLOW



Summary for Pond 1P: INFILTRATION BASIN #1

Inflow Area = 6.275 ac, 25.45% Impervious, Inflow Depth = 1.33" for 25-year event
Inflow = 8.17 cfs @ 12.10 hrs, Volume= 0.698 af
Outflow = 1.20 cfs @ 12.98 hrs, Volume= 0.698 af, Atten= 85%, Lag= 52.7 min
Discarded = 1.20 cfs @ 12.98 hrs, Volume= 0.698 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 124.58' @ 12.98 hrs Surf.Area= 6,218 sf Storage= 9,638 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 87.4 min (960.2 - 872.8)

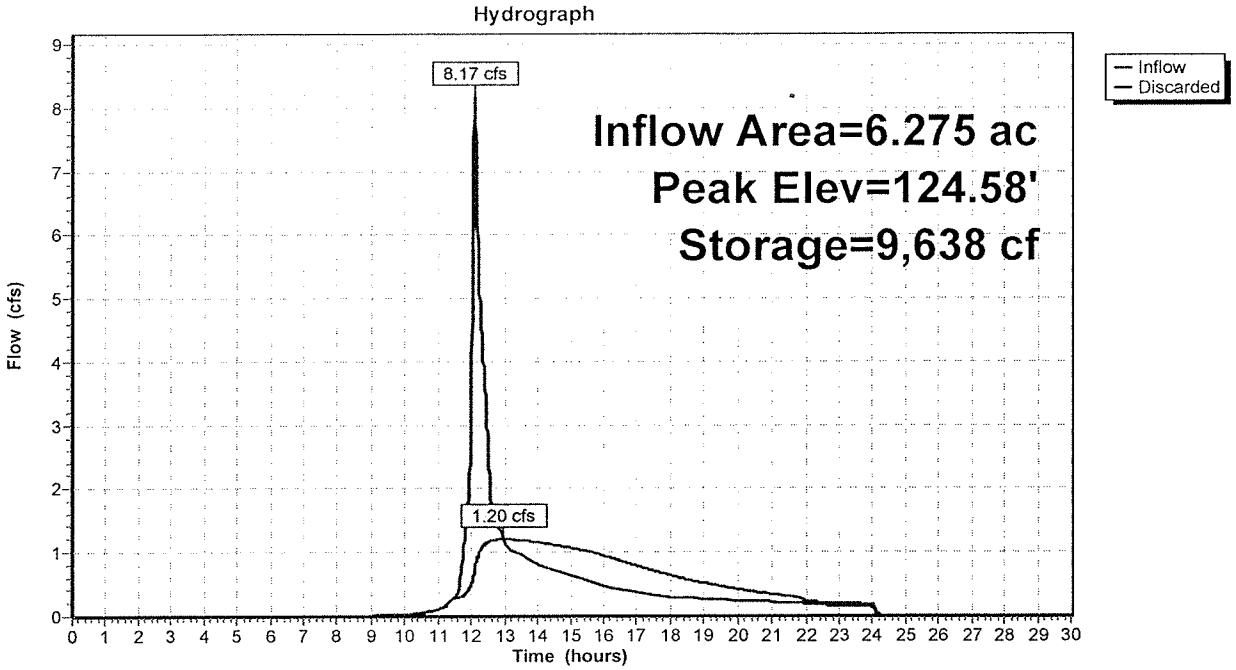
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	148,508 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,214	297.7	6,326	6,326	6,197
126.00	9,048	366.0	14,087	20,413	9,865
128.00	12,464	423.5	21,421	41,834	13,563
130.00	15,821	475.5	28,218	70,053	17,390
132.00	19,556	527.2	35,311	105,364	21,635
134.00	23,653	581.4	43,144	148,508	26,544

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.20 cfs @ 12.98 hrs HW=124.58' (Free Discharge)
↑**1=Exfiltration** (Controls 1.20 cfs)

Pond 1P: INFILTRATION BASIN #1



Summary for Pond 2P: INFILTRATION BASIN #2

Inflow Area = 5.164 ac, 12.40% Impervious, Inflow Depth = 0.68" for 25-year event
Inflow = 3.12 cfs @ 12.11 hrs, Volume= 0.292 af
Outflow = 0.86 cfs @ 12.57 hrs, Volume= 0.292 af, Atten= 73%, Lag= 27.6 min
Discarded = 0.86 cfs @ 12.57 hrs, Volume= 0.292 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 126.59' @ 12.57 hrs Surf.Area= 4,449 sf Storage= 2,329 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 16.2 min (918.2 - 902.0)

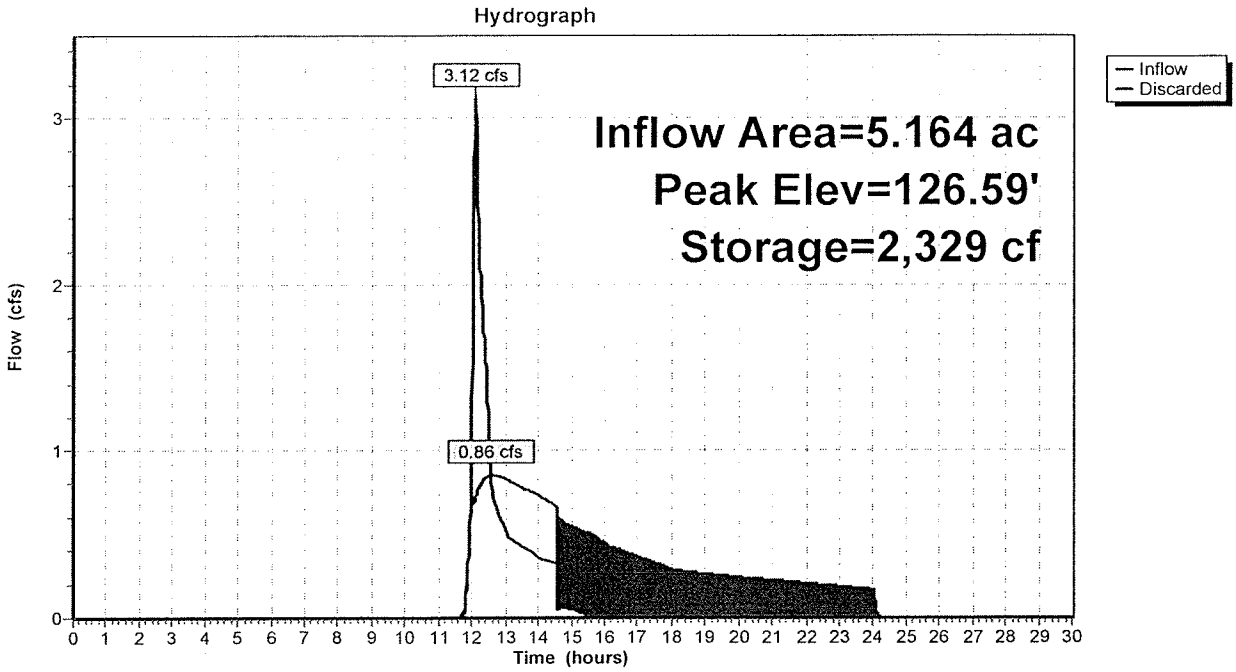
Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	18,639 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.00	3,499	259.8	0	0	3,499
127.00	5,185	302.1	4,314	4,314	5,411
128.00	7,124	344.3	6,129	10,443	7,606
129.00	9,316	386.5	8,196	18,639	10,087

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.86 cfs @ 12.57 hrs HW=126.59' (Free Discharge)
↑**1=Exfiltration** (Controls 0.86 cfs)

Pond 2P: INFILTRATION BASIN #2



Summary for Pond 3P: INFILTRATION BASIN #3

Inflow Area = 5.280 ac, 22.10% Impervious, Inflow Depth = 1.18" for 25-year event
Inflow = 6.01 cfs @ 12.10 hrs, Volume= 0.519 af
Outflow = 0.80 cfs @ 13.29 hrs, Volume= 0.519 af, Atten= 87%, Lag= 71.0 min
Discarded = 0.80 cfs @ 13.29 hrs, Volume= 0.519 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 104.49' @ 13.29 hrs Surf.Area= 4,106 sf Storage= 7,269 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 98.2 min (984.2 - 885.9)

Volume	Invert	Avail.Storage	Storage Description
#1	102.00'	35,433 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

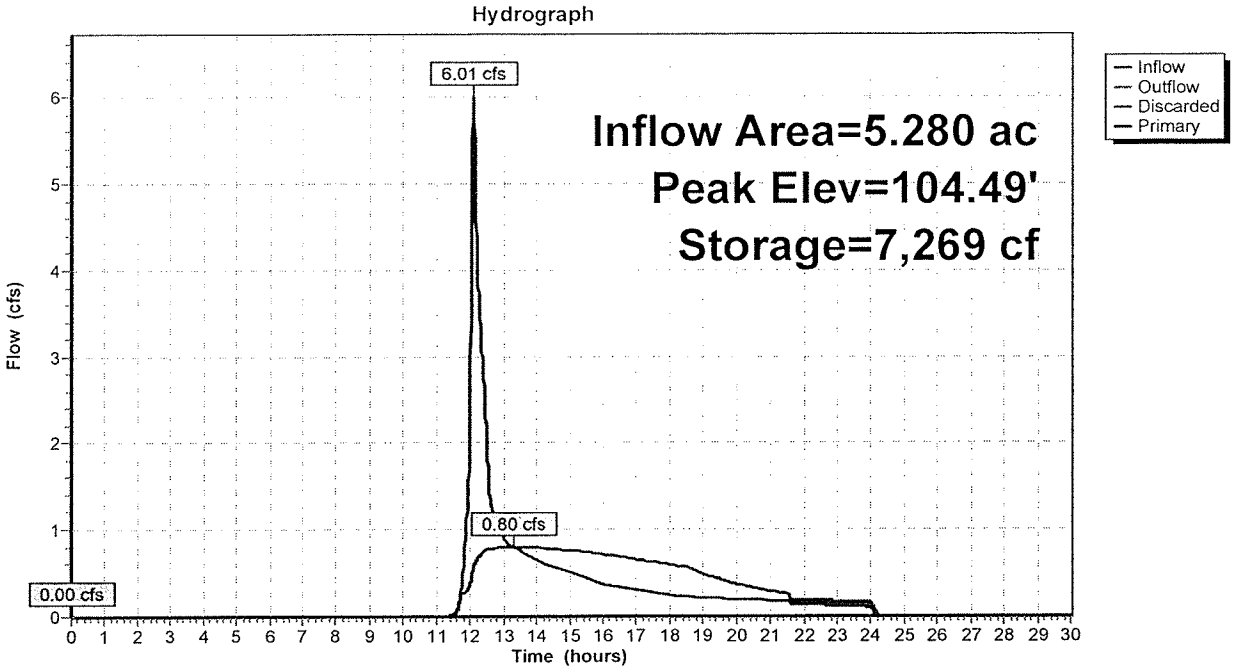
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.00	1,310	193.4	0	0	1,310
103.00	2,907	252.7	2,056	2,056	3,427
104.00	3,697	274.0	3,294	5,350	4,358
105.00	4,551	295.2	4,117	9,467	5,359
106.00	5,469	316.5	5,003	14,470	6,440
107.00	6,450	337.8	5,953	20,423	7,597
108.00	7,496	359.1	6,966	27,389	8,828
109.00	8,605	380.4	8,044	35,433	10,135

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	108.00'	**10.0' long x 34.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.80 cfs @ 13.29 hrs HW=104.49' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.80 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=102.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: INFILTRATION BASIN #3



Summary for Pond 4P: INFILTRATION BASIN #4

Inflow Area = 3.908 ac, 0.00% Impervious, Inflow Depth = 0.09" for 25-year event
Inflow = 0.05 cfs @ 15.18 hrs, Volume= 0.030 af
Outflow = 0.05 cfs @ 15.18 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.05 cfs @ 15.18 hrs, Volume= 0.030 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.00' @ 15.18 hrs Surf.Area= 441 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,091.7 - 1,091.7)

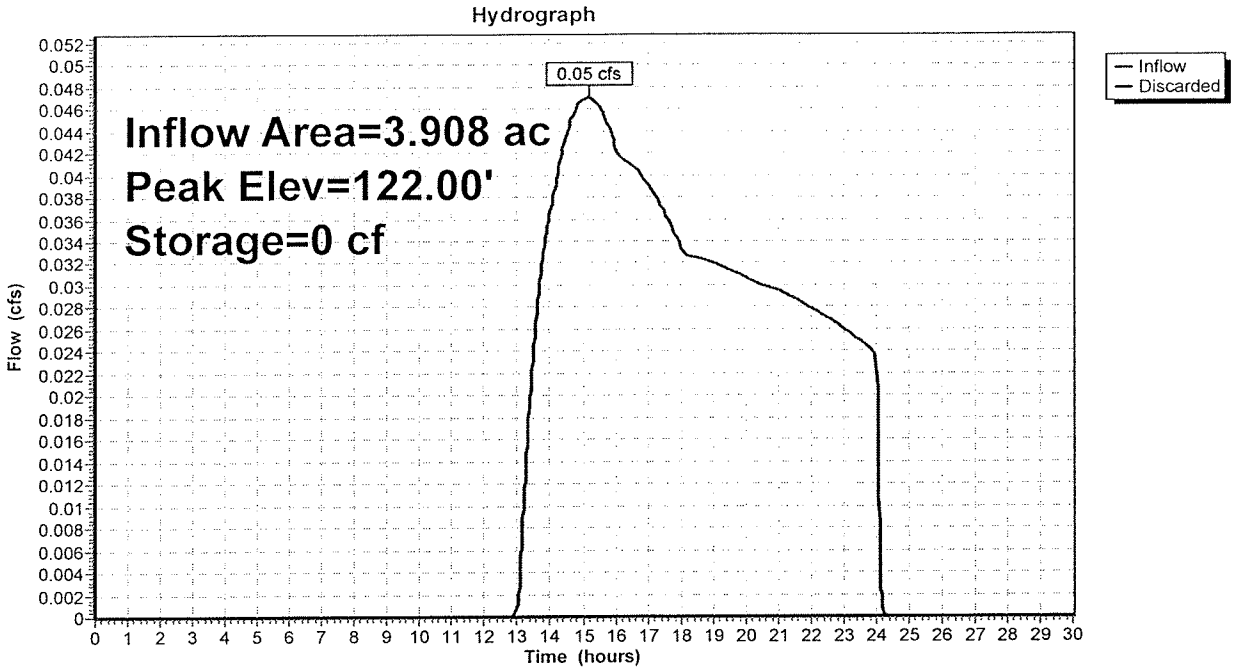
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	4,855 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	441	87.4	0	0	441
123.00	1,950	200.7	1,106	1,106	3,043
124.00	5,903	443.5	3,749	4,855	15,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.08 cfs @ 15.18 hrs HW=122.00' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.08 cfs)

Pond 4P: INFILTRATION BASIN #4



Summary for Pond 6P: LEACH PIT CLUSTER #1

Inflow Area = 1.673 ac, 17.83% Impervious, Inflow Depth = 0.63" for 25-year event
Inflow = 0.59 cfs @ 12.14 hrs, Volume= 0.087 af
Outflow = 0.17 cfs @ 13.03 hrs, Volume= 0.087 af, Atten= 71%, Lag= 53.5 min
Discarded = 0.17 cfs @ 13.03 hrs, Volume= 0.087 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 125.59' @ 13.03 hrs Surf.Area= 864 sf Storage= 615 cf

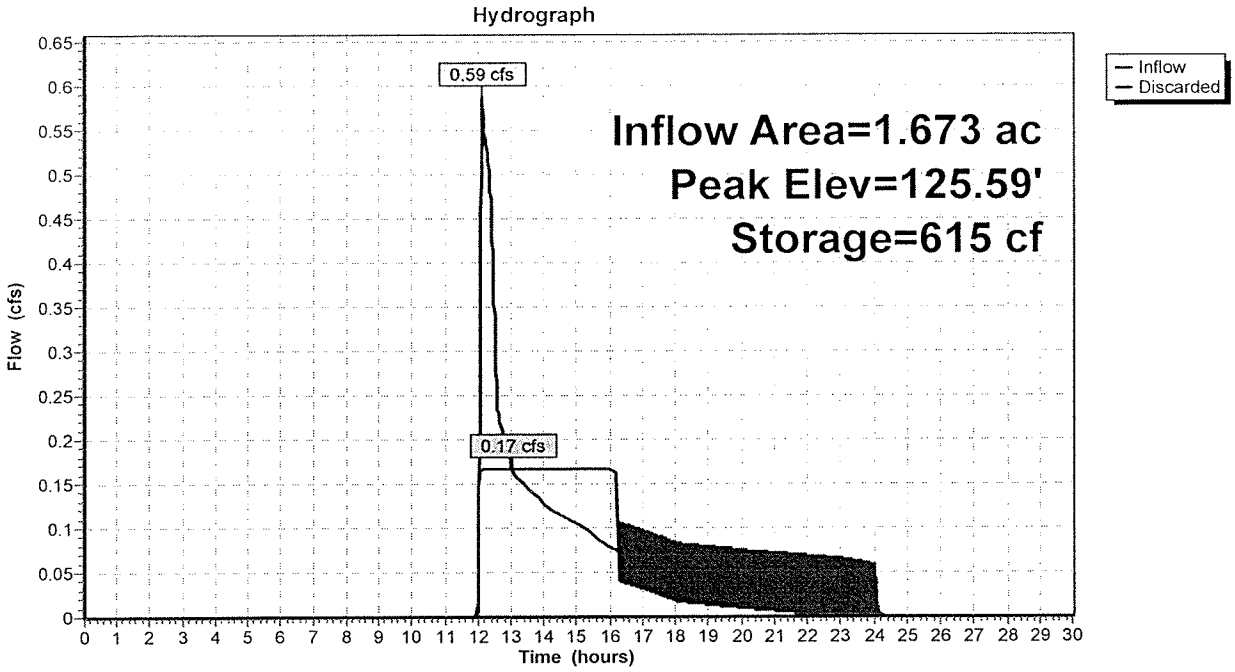
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.8 min (957.4 - 930.7)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.17 cfs @ 13.03 hrs HW=125.59' (Free Discharge)
↑**1=Exfiltration** (Controls 0.17 cfs)

Pond 6P: LEACH PIT CLUSTER #1



Summary for Pond 13P: LEACH PIT CLUSTER #1

Inflow Area = 1.124 ac, 12.00% Impervious, Inflow Depth = 0.74" for 25-year event
Inflow = 0.58 cfs @ 12.13 hrs, Volume= 0.070 af
Outflow = 0.17 cfs @ 12.72 hrs, Volume= 0.070 af, Atten= 71%, Lag= 35.9 min
Discarded = 0.17 cfs @ 12.72 hrs, Volume= 0.070 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 125.29' @ 12.72 hrs Surf.Area= 864 sf Storage= 478 cf

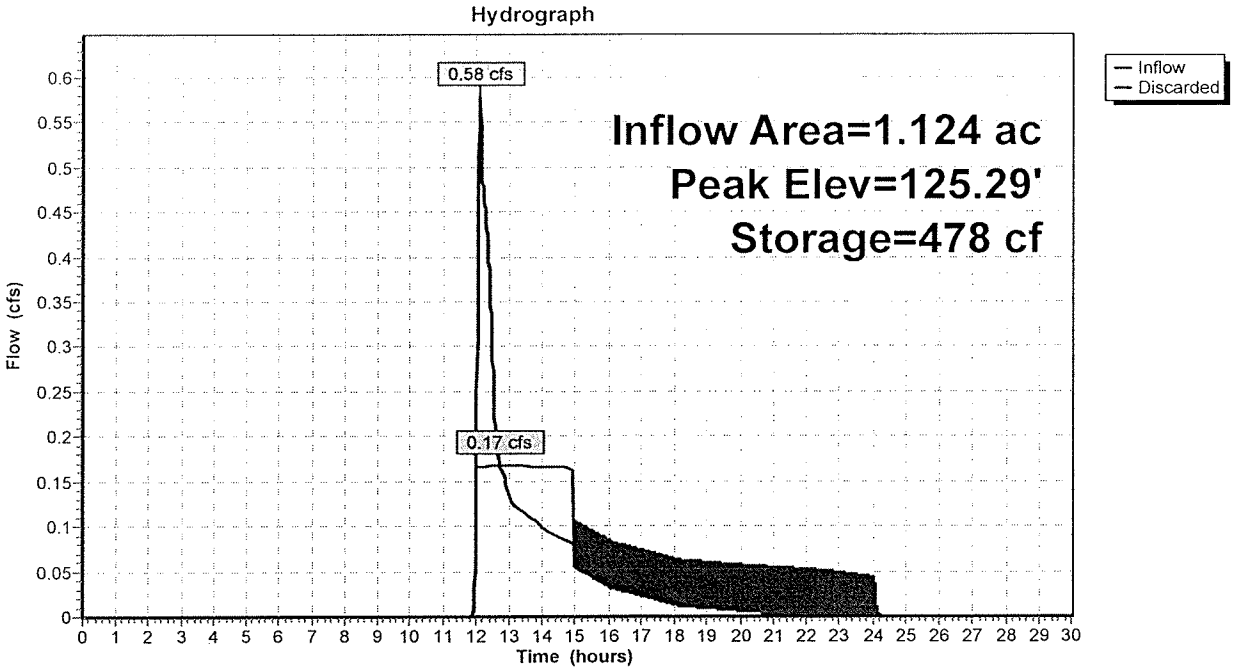
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 17.2 min (936.0 - 918.8)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.17 cfs @ 12.72 hrs HW=125.29' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.17 cfs)

Pond 13P: LEACH PIT CLUSTER #1



Summary for Pond 16P: INFILTRATION BASIN #5

Inflow Area = 0.781 ac, 6.00% Impervious, Inflow Depth = 0.36" for 25-year event
Inflow = 0.10 cfs @ 12.38 hrs, Volume= 0.024 af
Outflow = 0.07 cfs @ 12.53 hrs, Volume= 0.024 af, Atten= 26%, Lag= 9.5 min
Discarded = 0.07 cfs @ 12.53 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 113.05' @ 12.53 hrs Surf.Area= 383 sf Storage= 20 cf

Plug-Flow detention time= 0.4 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (972.0 - 971.5)

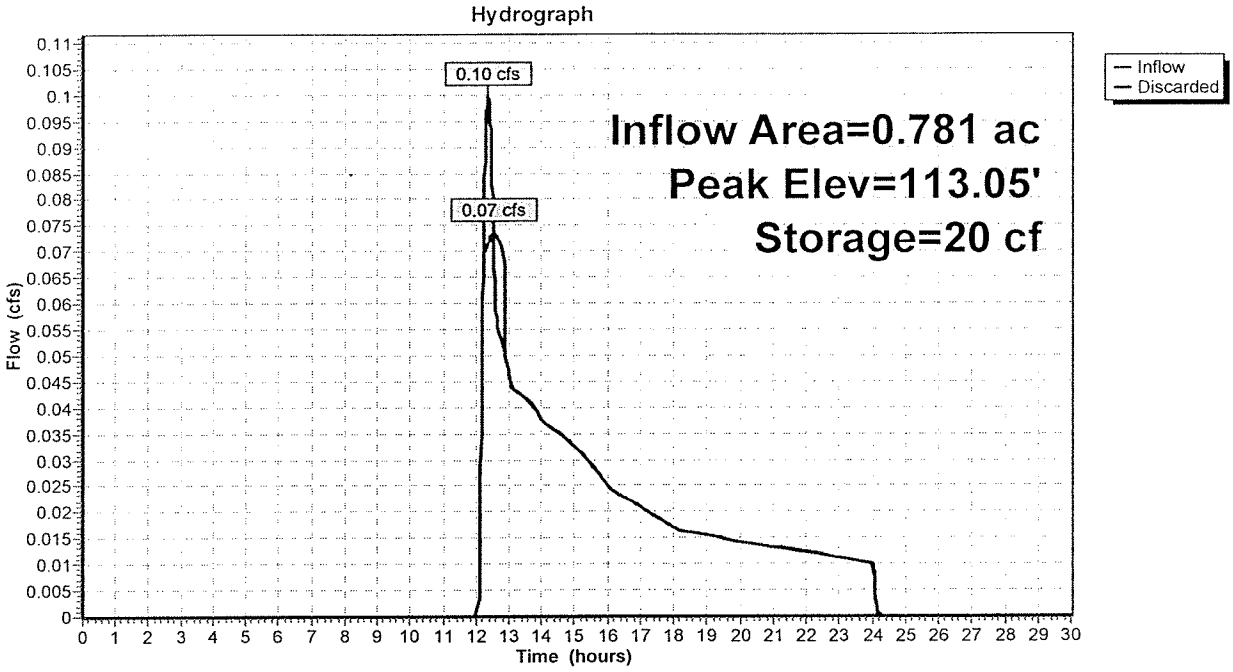
Volume	Invert	Avail.Storage	Storage Description
#1	113.00'	1,555 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
113.00	366	86.9	0	0	366
114.00	756	124.9	549	549	1,015
115.00	1,278	165.7	1,006	1,555	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	113.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.07 cfs @ 12.53 hrs HW=113.05' (Free Discharge)
↑**1=Exfiltration** (Controls 0.07 cfs)

Pond 16P: INFILTRATION BASIN #5



Summary for Pond 19P: LEACH PIT CLUSTER #2

Inflow Area = 1.599 ac, 12.00% Impervious, Inflow Depth = 0.74" for 25-year event
Inflow = 0.82 cfs @ 12.13 hrs, Volume= 0.099 af
Outflow = 0.22 cfs @ 12.82 hrs, Volume= 0.099 af, Atten= 73%, Lag= 41.6 min
Discarded = 0.22 cfs @ 12.82 hrs, Volume= 0.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 125.43' @ 12.82 hrs Surf.Area= 1,152 sf Storage= 719 cf

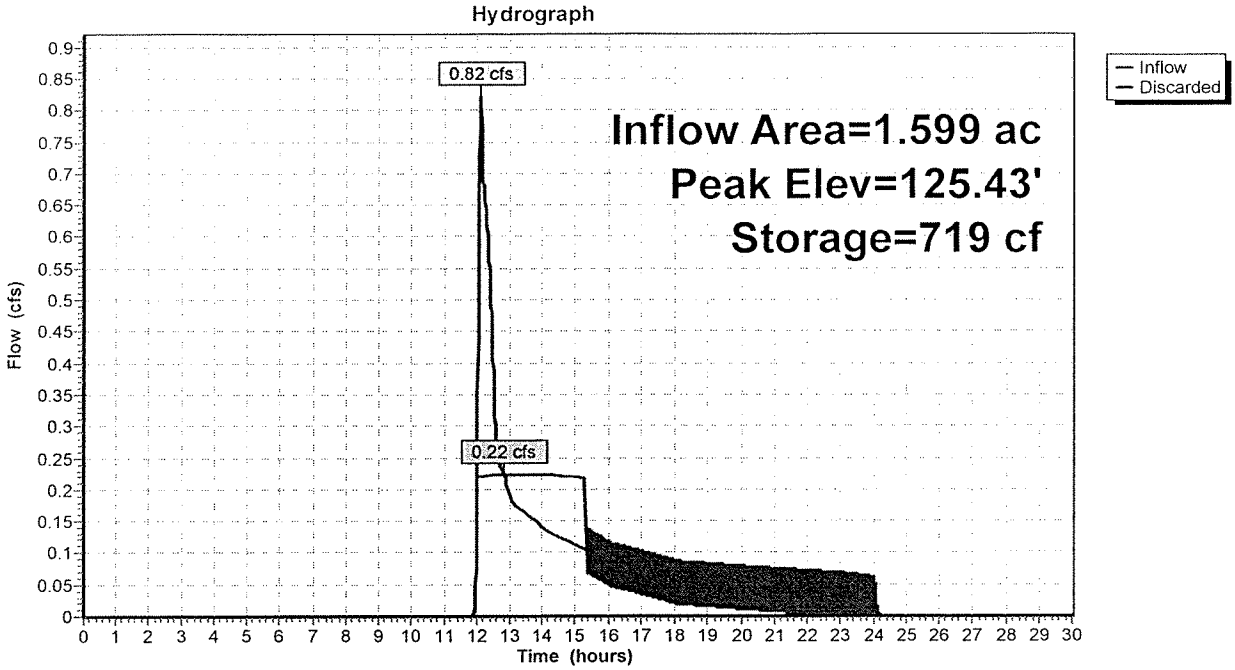
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 20.7 min (939.5 - 918.8)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	2,261 cf	**24.00'W x 48.00'L x 7.00'H Prismatoid** 8,064 cf Overall - 2,413 cf Embedded = 5,651 cf x 40.0% Voids
#2	125.00'	1,847 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 8 Inside #1 2,413 cf Overall - 6.0" Wall Thickness = 1,847 cf
		4,108 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.22 cfs @ 12.82 hrs HW=125.43' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.22 cfs)

Pond 19P: LEACH PIT CLUSTER #2



Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SOUTHWEST SITE Runoff Area=266,088 sf 0.00% Impervious Runoff Depth=0.23"
Flow Length=820' Tc=14.9 min CN=30 Runoff=0.19 cfs 0.117 af

Subcatchment2S: SOUTHEAST SITE Runoff Area=158,607 sf 0.00% Impervious Runoff Depth=0.23"
Flow Length=766' Tc=8.5 min CN=30 Runoff=0.12 cfs 0.070 af

Subcatchment4S: ROAD B Runoff Area=78,529 sf 35.80% Impervious Runoff Depth=2.67"
Tc=6.0 min CN=60 Runoff=5.50 cfs 0.402 af

Subcatchment5S: CUL-DE-SAC LOTS Runoff Area=72,895 sf 17.83% Impervious Runoff Depth=1.20"
Tc=6.0 min UI Adjusted CN=44 Runoff=1.73 cfs 0.167 af

Subcatchment6S: ROAD A Runoff Area=24,709 sf 62.40% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=76 Runoff=2.88 cfs 0.205 af

Subcatchment7S: ROAD A - EAST Runoff Area=139,417 sf 20.00% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=51 Runoff=6.07 cfs 0.484 af

Subcatchment8S: EAST SITE Runoff Area=170,221 sf 0.00% Impervious Runoff Depth=0.34"
Tc=6.0 min CN=32 Runoff=0.33 cfs 0.110 af

Subcatchment9S: ROAD A - BACKYARDS Runoff Area=85,522 sf 0.00% Impervious Runoff Depth=0.23"
Tc=6.0 min CN=30 Runoff=0.06 cfs 0.038 af

Subcatchment10S: NORTHEAST SITE Runoff Area=40,166 sf 0.00% Impervious Runoff Depth=0.34"
Flow Length=233' Tc=12.3 min CN=32 Runoff=0.07 cfs 0.026 af

Subcatchment11S: NORTH SITE Runoff Area=92,697 sf 0.00% Impervious Runoff Depth=0.23"
Flow Length=302' Tc=7.5 min CN=30 Runoff=0.07 cfs 0.041 af

Subcatchment12S: LOTS 13-15 Runoff Area=48,974 sf 12.00% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=46 Runoff=1.43 cfs 0.128 af

Subcatchment15S: LOWER LOT 5 & OPEN Runoff Area=34,036 sf 6.00% Impervious Runoff Depth=0.80"
Tc=6.0 min CN=39 Runoff=0.37 cfs 0.052 af

Subcatchment17S: ATKINS ROAD Runoff Area=190,434 sf 26.69% Impervious Runoff Depth=2.19"
Tc=6.0 min CN=55 Runoff=10.51 cfs 0.797 af

Subcatchment18S: LOTS 15-17 Runoff Area=69,633 sf 12.00% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=46 Runoff=2.03 cfs 0.182 af

Subcatchment19S: WEST CENTRAL SITE Runoff Area=150,928 sf 12.00% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=46 Runoff=4.41 cfs 0.395 af

Subcatchment20S: ATKINS ROAD - END Runoff Area=19,175 sf 41.30% Impervious Runoff Depth=3.08"
Tc=6.0 min CN=64 Runoff=1.57 cfs 0.113 af

Subcatchment 21S: INFILTRATION AREA Runoff Area=39,560 sf 0.00% Impervious Runoff Depth=0.80"
Tc=6.0 min CN=39 Runoff=0.43 cfs 0.061 af

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES Inflow=0.19 cfs 0.117 af
Outflow=0.19 cfs 0.117 af

Reach 2R: FLOW TOWARDS TOWN LAND Inflow=0.12 cfs 0.070 af
Outflow=0.12 cfs 0.070 af

Reach 3R: OFFSITE FLOW Inflow=0.07 cfs 0.026 af
Outflow=0.07 cfs 0.026 af

Reach 4R: OFFSITE FLOW Inflow=0.07 cfs 0.041 af
Outflow=0.07 cfs 0.041 af

Pond 1P: INFILTRATION BASIN #1 Peak Elev=125.73' Storage=18,062 cf Inflow=14.30 cfs 1.116 af
Outflow=1.65 cfs 1.116 af

Pond 2P: INFILTRATION BASIN #2 Peak Elev=127.27' Storage=5,798 cf Inflow=6.07 cfs 0.521 af
Outflow=1.10 cfs 0.521 af

Pond 3P: INFILTRATION BASIN #3 Peak Elev=106.04' Storage=14,686 cf Inflow=10.88 cfs 0.858 af
Discarded=1.08 cfs 0.858 af Primary=0.00 cfs 0.000 af Outflow=1.08 cfs 0.858 af

Pond 4P: INFILTRATION BASIN #4 Peak Elev=122.44' Storage=300 cf Inflow=0.33 cfs 0.110 af
Outflow=0.19 cfs 0.110 af

Pond 6P: LEACH PIT CLUSTER #1 Peak Elev=130.04' Storage=2,645 cf Inflow=1.73 cfs 0.167 af
Outflow=0.17 cfs 0.167 af

Pond 13P: LEACH PIT CLUSTER #1 Peak Elev=128.09' Storage=1,756 cf Inflow=1.43 cfs 0.128 af
Outflow=0.17 cfs 0.128 af

Pond 16P: INFILTRATION BASIN #5 Peak Elev=113.72' Storage=355 cf Inflow=0.37 cfs 0.052 af
Outflow=0.12 cfs 0.052 af

Pond 19P: LEACH PIT CLUSTER #2 Peak Elev=128.53' Storage=2,606 cf Inflow=2.03 cfs 0.182 af
Outflow=0.23 cfs 0.182 af

Total Runoff Area = 38.604 ac Runoff Volume = 3.388 af Average Runoff Depth = 1.05"
89.44% Pervious = 34.528 ac 10.56% Impervious = 4.076 ac

Summary for Subcatchment 1S: SOUTHWEST SITE

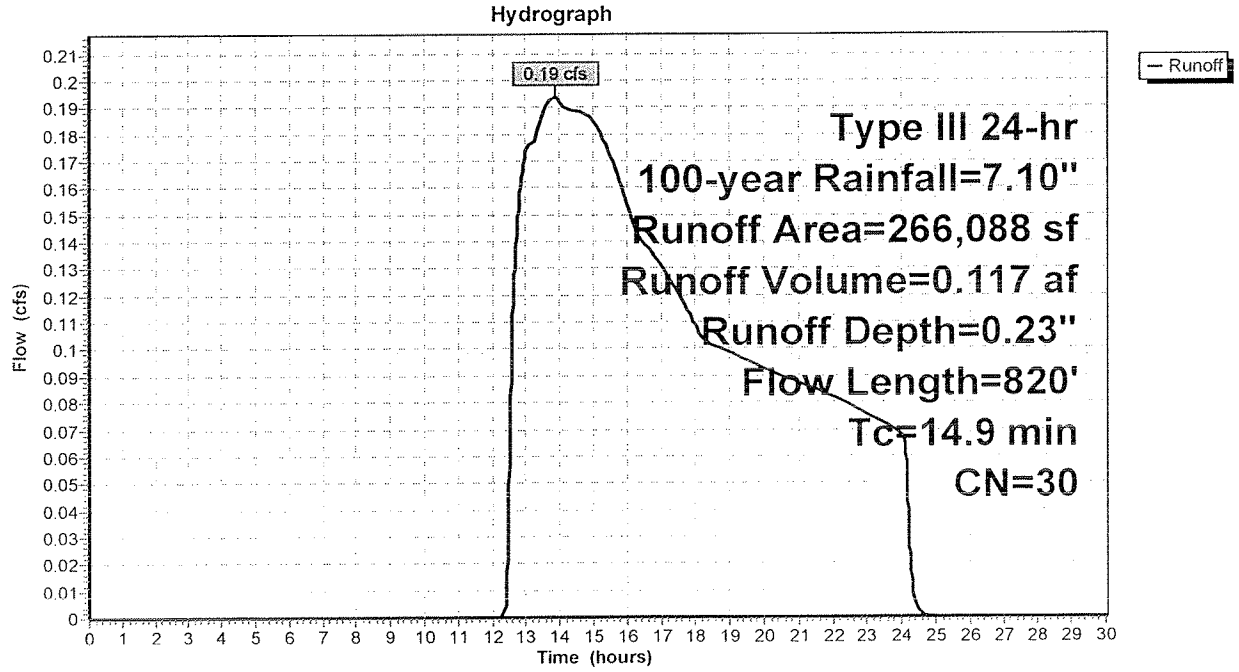
Runoff = 0.19 cfs @ 13.86 hrs, Volume= 0.117 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
266,088	30	Woods, Good, HSG A
266,088		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
3.3	770	0.0590	3.91		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
14.9	820	Total			

Subcatchment 1S: SOUTHWEST SITE



Summary for Subcatchment 2S: SOUTHEAST SITE

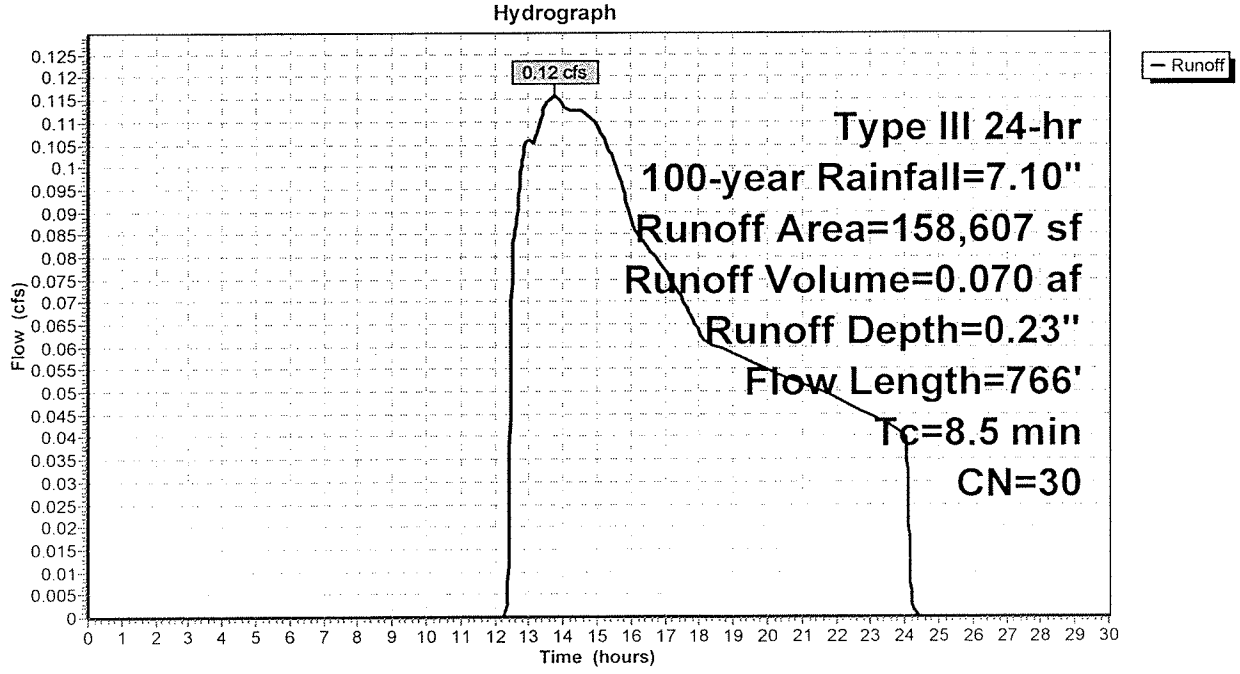
Runoff = 0.12 cfs @ 13.76 hrs, Volume= 0.070 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
158,607	30	Woods, Good, HSG A
158,607		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1000	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	716	0.0980	5.04		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
8.5	766	Total			

Subcatchment 2S: SOUTHEAST SITE



Summary for Subcatchment 4S: ROAD B

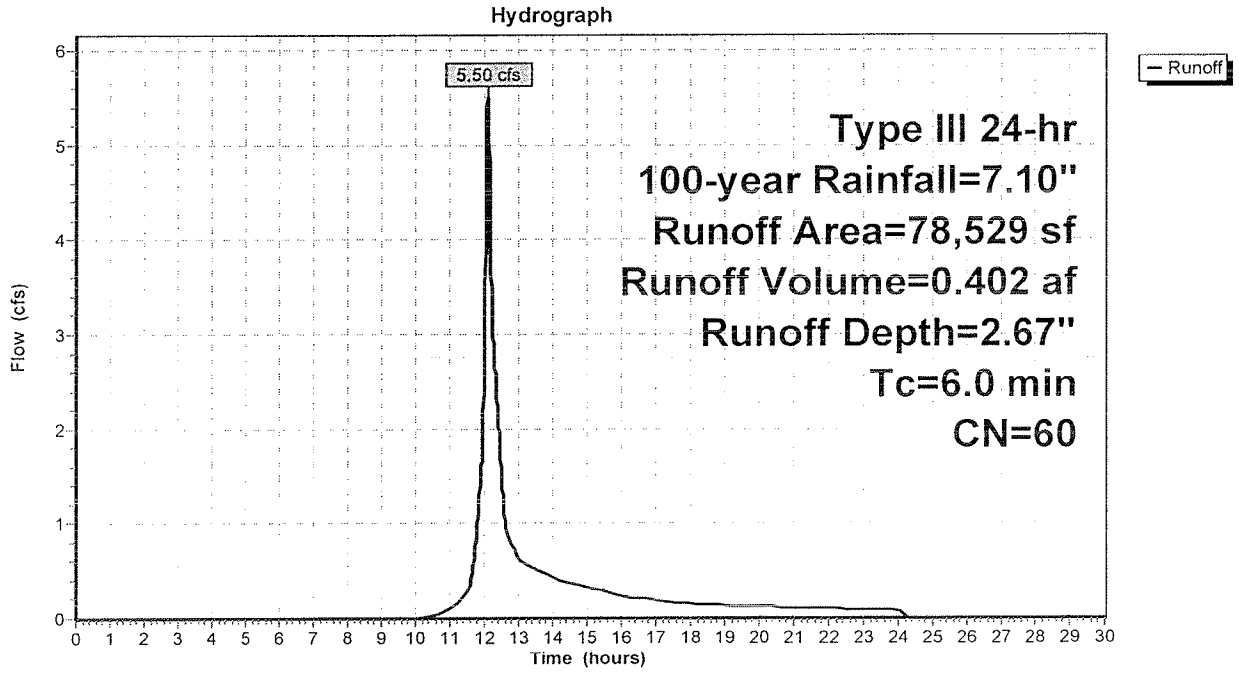
Runoff = 5.50 cfs @ 12.09 hrs, Volume= 0.402 af, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
16,195	98	Paved roads w/curbs & sewers, HSG A
59,600	51	1 acre lots, 20% imp, HSG A
2,734	39	>75% Grass cover, Good, HSG A
78,529	60	Weighted Average
50,414		64.20% Pervious Area
28,115		35.80% Impervious Area

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

Subcatchment 4S: ROAD B



Summary for Subcatchment 5S: CUL-DE-SAC LOTS

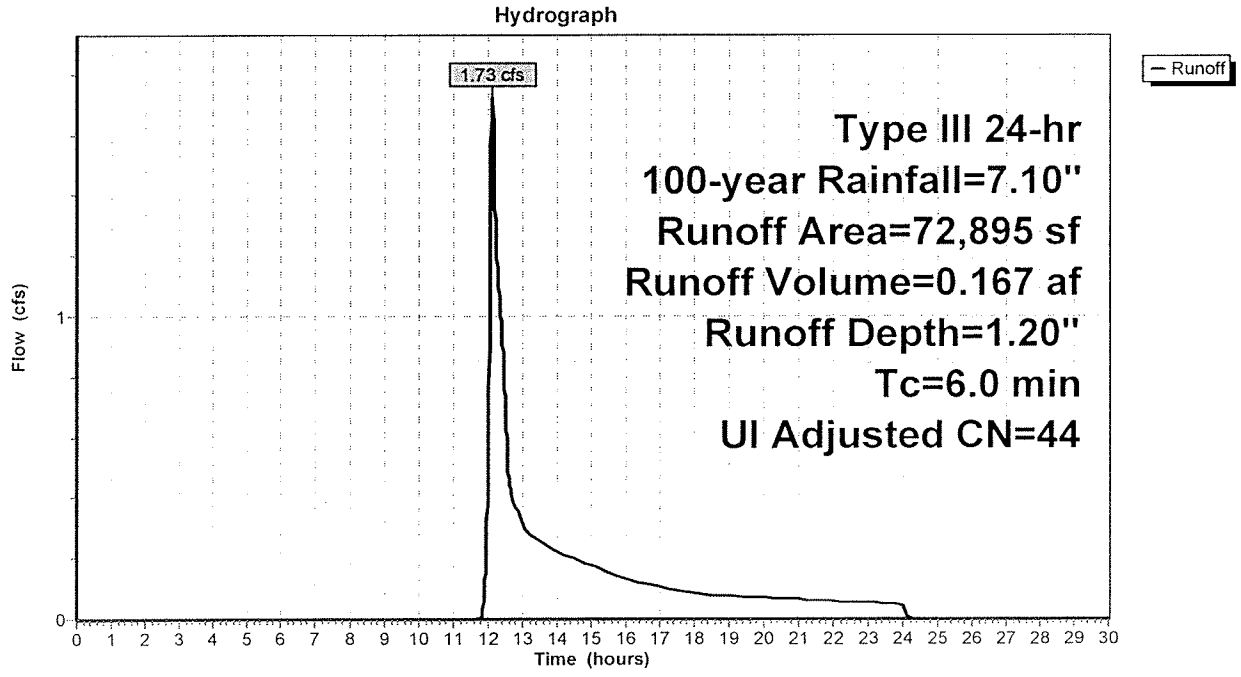
Runoff = 1.73 cfs @ 12.11 hrs, Volume= 0.167 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Adj	Description
59,895	39		>75% Grass cover, Good, HSG A
13,000	98		Unconnected pavement, HSG A
72,895	50	44	Weighted Average, UI Adjusted
59,895			82.17% Pervious Area
13,000			17.83% Impervious Area
13,000			100.00% Unconnected

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

Subcatchment 5S: CUL-DE-SAC LOTS



Summary for Subcatchment 6S: ROAD A

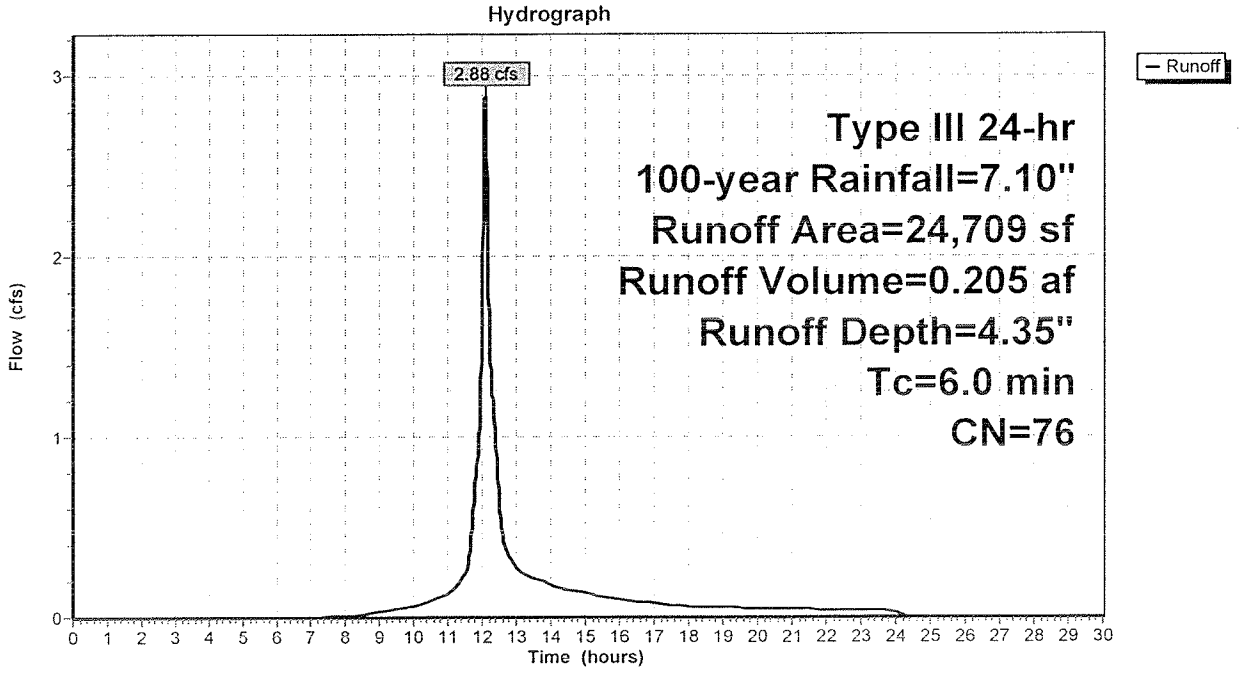
Runoff = 2.88 cfs @ 12.09 hrs, Volume= 0.205 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
15,418	98	Paved parking, HSG A
9,291	39	>75% Grass cover, Good, HSG A
24,709	76	Weighted Average
9,291		37.60% Pervious Area
15,418		62.40% Impervious Area

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

Subcatchment 6S: ROAD A



Summary for Subcatchment 7S: ROAD A - EAST

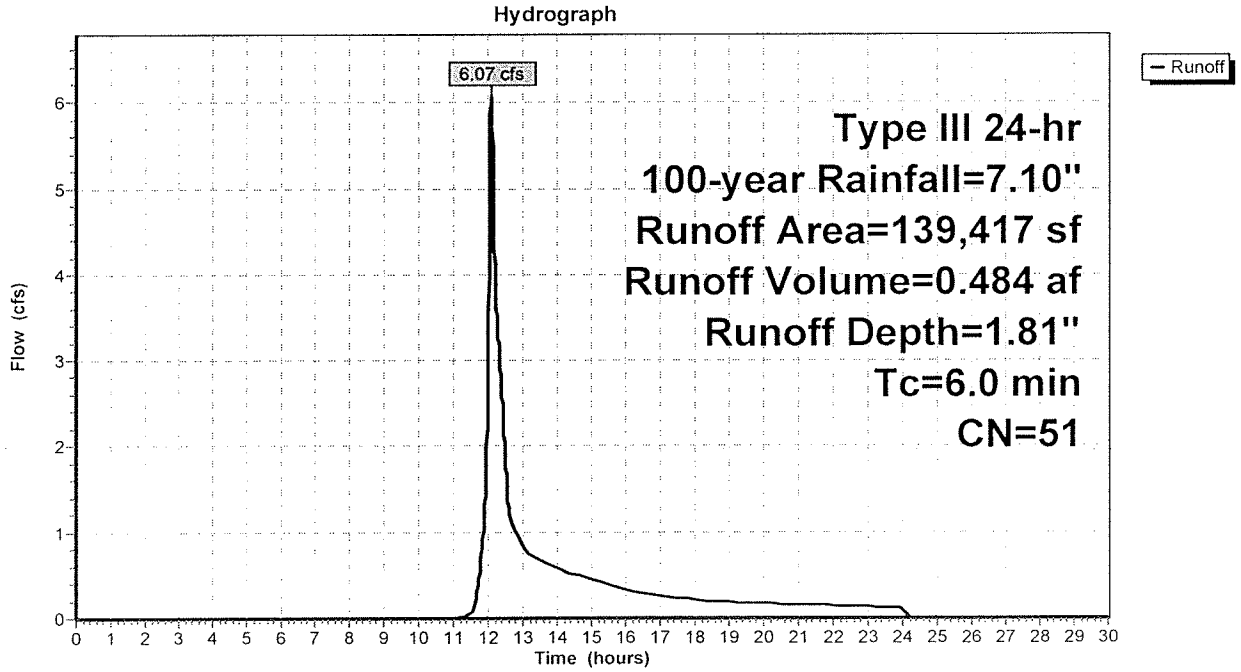
Runoff = 6.07 cfs @ 12.10 hrs, Volume= 0.484 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
139,417	51	1 acre lots, 20% imp, HSG A
111,534		80.00% Pervious Area
27,883		20.00% Impervious Area

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

Subcatchment 7S: ROAD A - EAST



Summary for Subcatchment 8S: EAST SITE

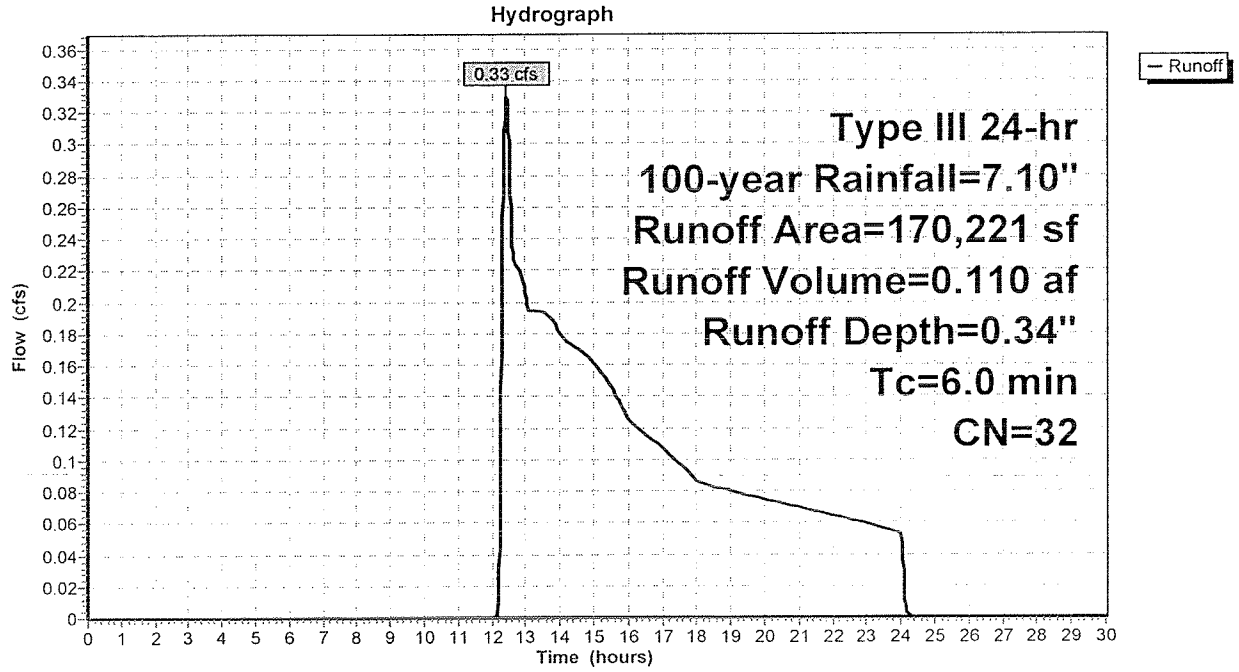
Runoff = 0.33 cfs @ 12.44 hrs, Volume= 0.110 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
170,221	32	Woods/grass comb., Good, HSG A
170,221		100.00% Pervious Area

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

Subcatchment 8S: EAST SITE



Summary for Subcatchment 9S: ROAD A - BACKYARDS

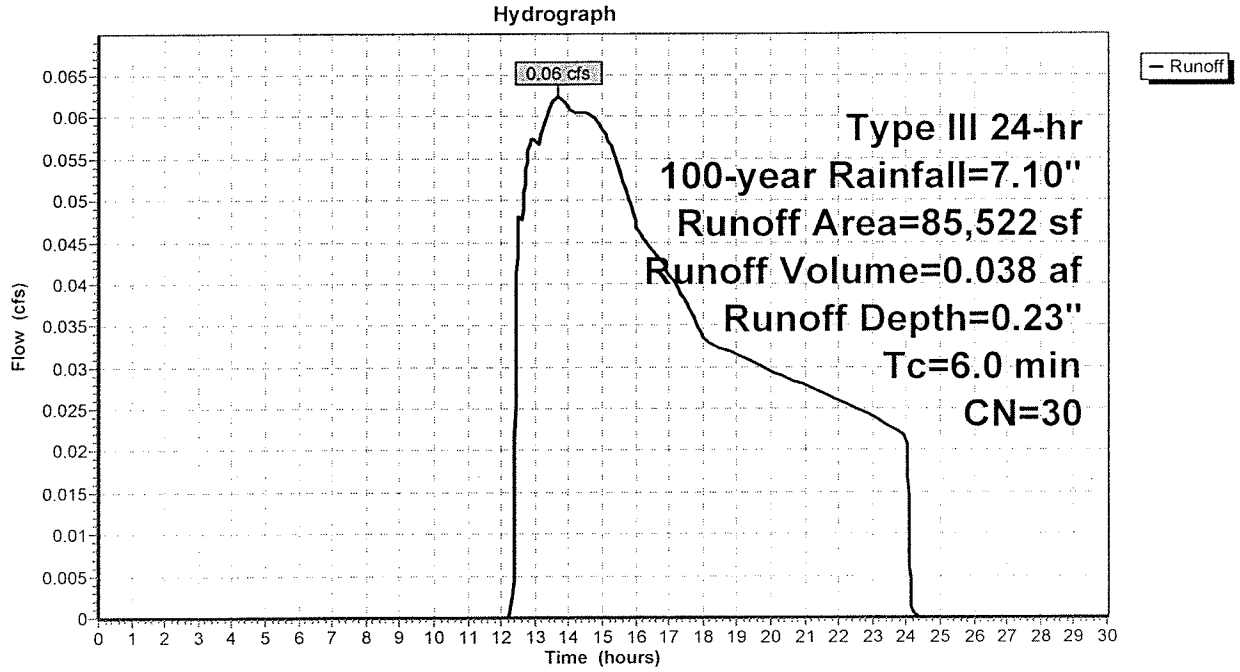
Runoff = 0.06 cfs @ 13.70 hrs, Volume= 0.038 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
85,522	30	Woods, Good, HSG A
85,522		100.00% Pervious Area

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

Subcatchment 9S: ROAD A - BACKYARDS



Summary for Subcatchment 10S: NORTHEAST SITE

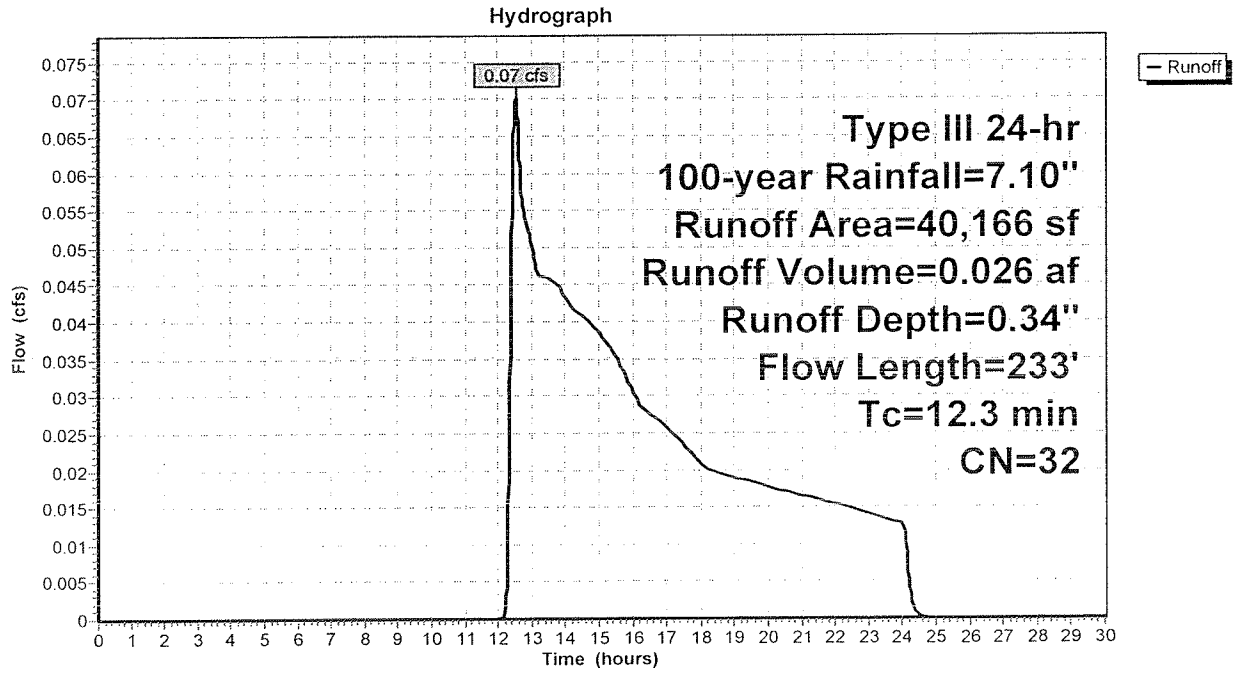
Runoff = 0.07 cfs @ 12.53 hrs, Volume= 0.026 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
40,166	32	Woods/grass comb., Good, HSG A
40,166		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.7	183	0.0765	4.45		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
12.3	233	Total			

Subcatchment 10S: NORTHEAST SITE



Summary for Subcatchment 11S: NORTH SITE

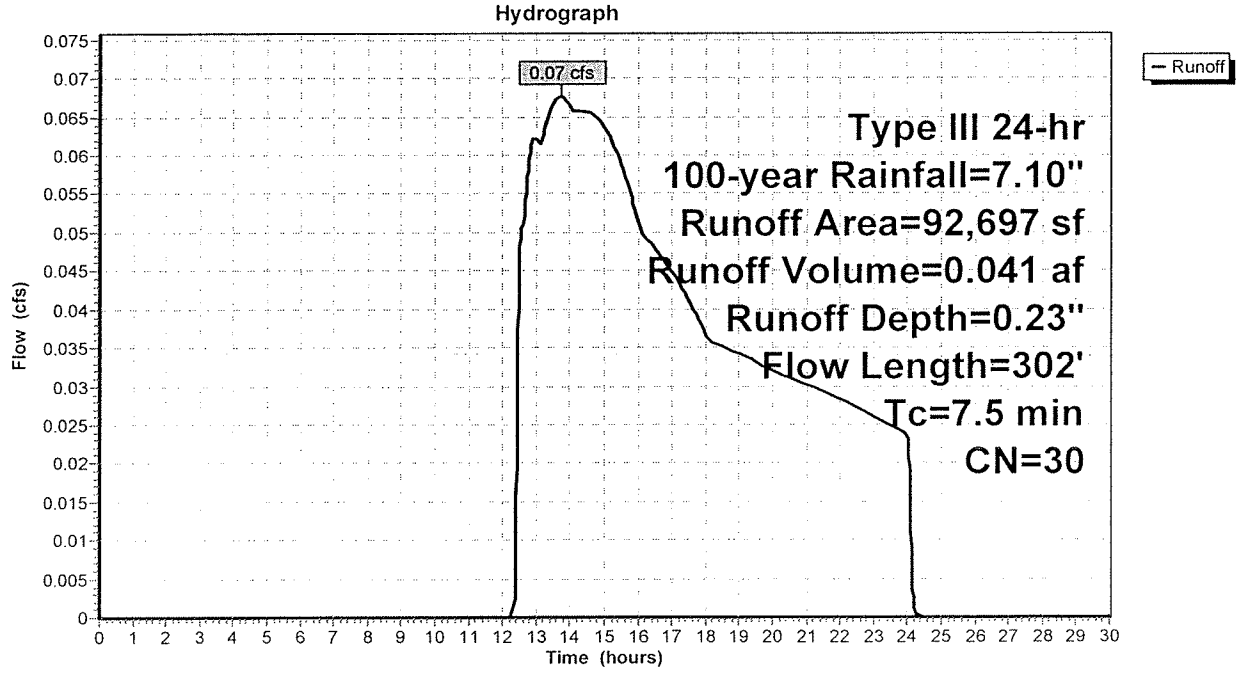
Runoff = 0.07 cfs @ 13.74 hrs, Volume= 0.041 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
92,697	30	Woods, Good, HSG A
92,697		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.0800	0.12		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.60"
0.8	252	0.1000	5.09		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
7.5	302	Total			

Subcatchment 11S: NORTH SITE



Summary for Subcatchment 12S: LOTS 13-15

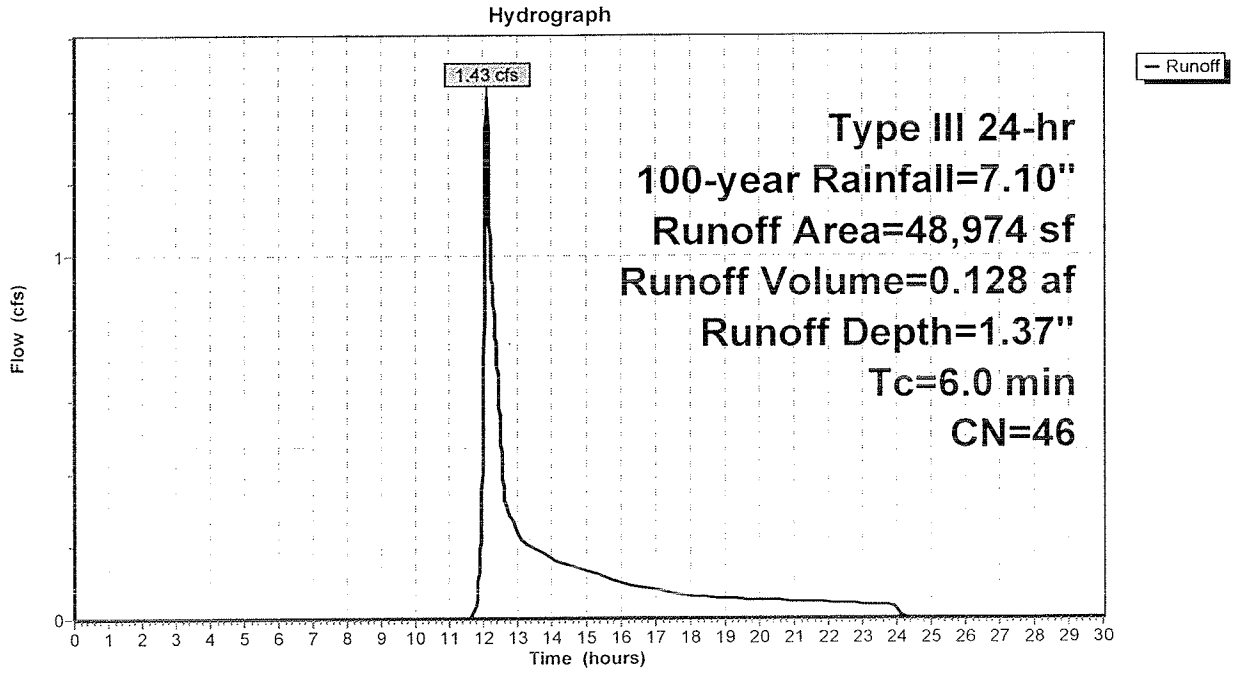
Runoff = 1.43 cfs @ 12.11 hrs, Volume= 0.128 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
48,974	46	2 acre lots, 12% imp, HSG A
43,097		88.00% Pervious Area
5,877		12.00% Impervious Area

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

Subcatchment 12S: LOTS 13-15



Summary for Subcatchment 15S: LOWER LOT 5 & OPEN SPACE

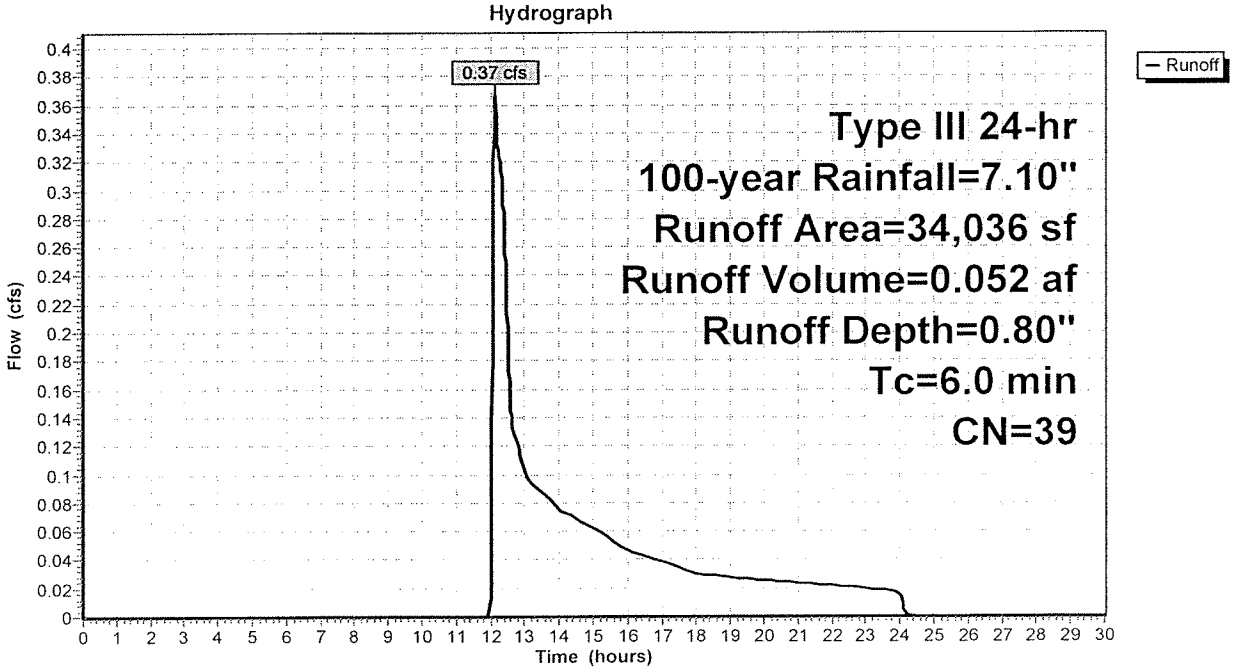
Runoff = 0.37 cfs @ 12.14 hrs, Volume= 0.052 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
17,018	32	Woods/grass comb., Good, HSG A
17,018	46	2 acre lots, 12% imp, HSG A
34,036	39	Weighted Average
31,994		94.00% Pervious Area
2,042		6.00% Impervious Area

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

Subcatchment 15S: LOWER LOT 5 & OPEN SPACE



Summary for Subcatchment 17S: ATKINS ROAD EXTENSION

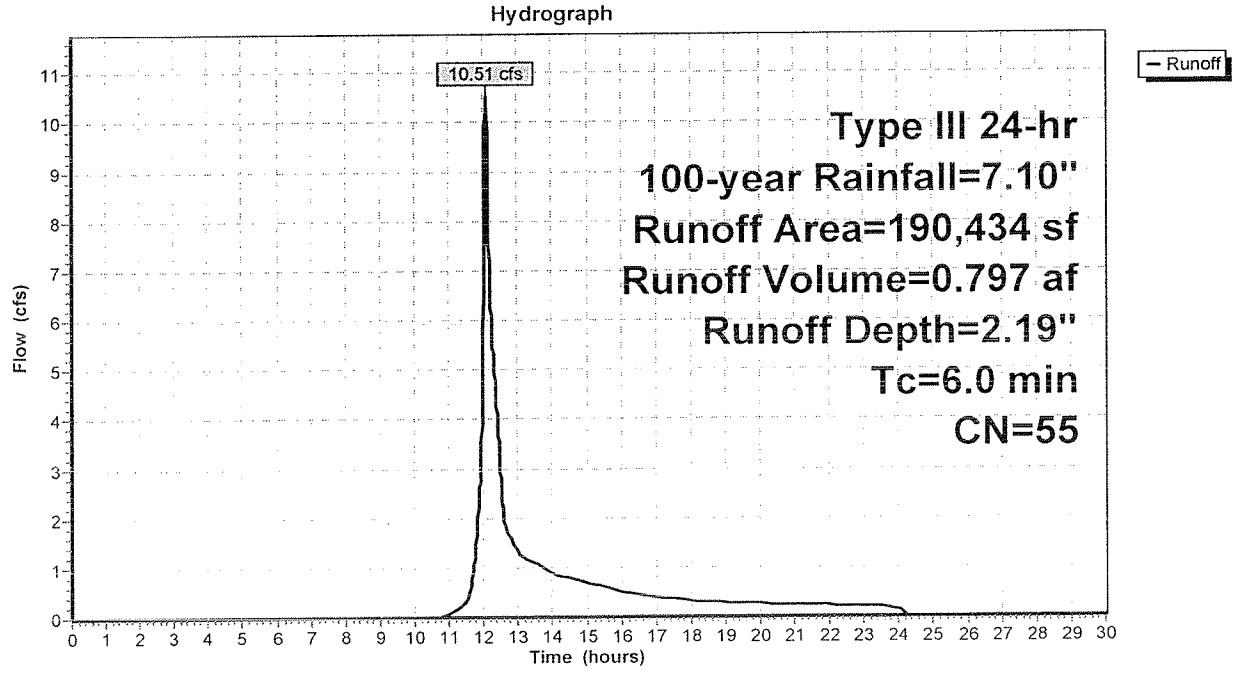
Runoff = 10.51 cfs @ 12.10 hrs, Volume= 0.797 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
21,495	98	Paved roads w/curbs & sewers, HSG A
17,804	39	>75% Grass cover, Good, HSG A
146,656	51	1 acre lots, 20% imp, HSG A
4,479	30	Woods, Good, HSG A
190,434	55	Weighted Average
139,608		73.31% Pervious Area
50,826		26.69% Impervious Area

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

Subcatchment 17S: ATKINS ROAD EXTENSION



Summary for Subcatchment 18S: LOTS 15-17

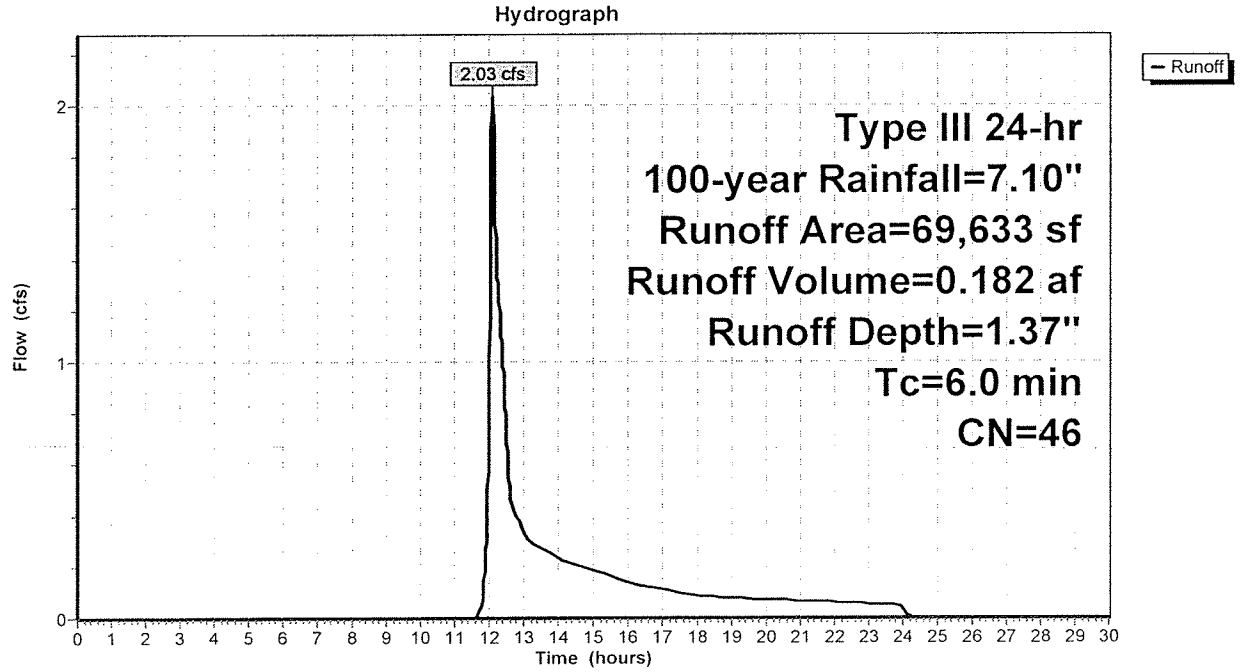
Runoff = 2.03 cfs @ 12.11 hrs, Volume= 0.182 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
69,633	46	2 acre lots, 12% imp, HSG A
61,277		88.00% Pervious Area
8,356		12.00% Impervious Area

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

Subcatchment 18S: LOTS 15-17



Summary for Subcatchment 19S: WEST CENTRAL SITE

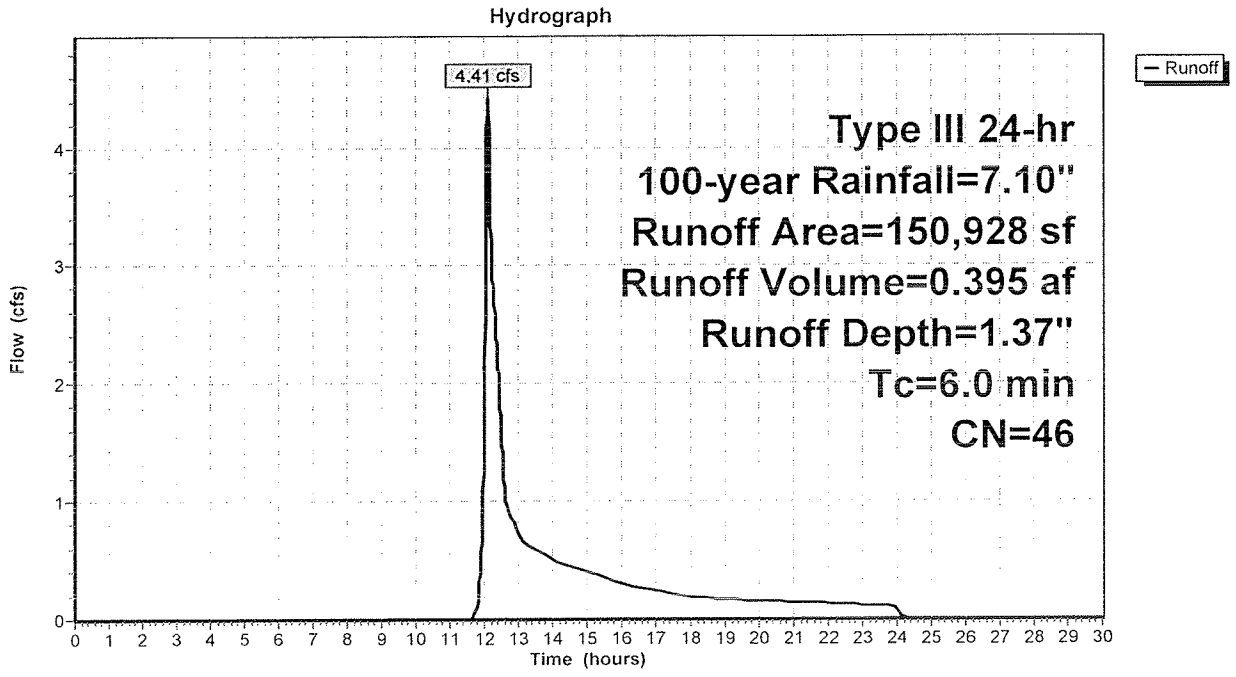
Runoff = 4.41 cfs @ 12.11 hrs, Volume= 0.395 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
150,928	46	2 acre lots, 12% imp, HSG A
132,817		88.00% Pervious Area
18,111		12.00% Impervious Area

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

Subcatchment 19S: WEST CENTRAL SITE



Summary for Subcatchment 20S: ATKINS ROAD - END

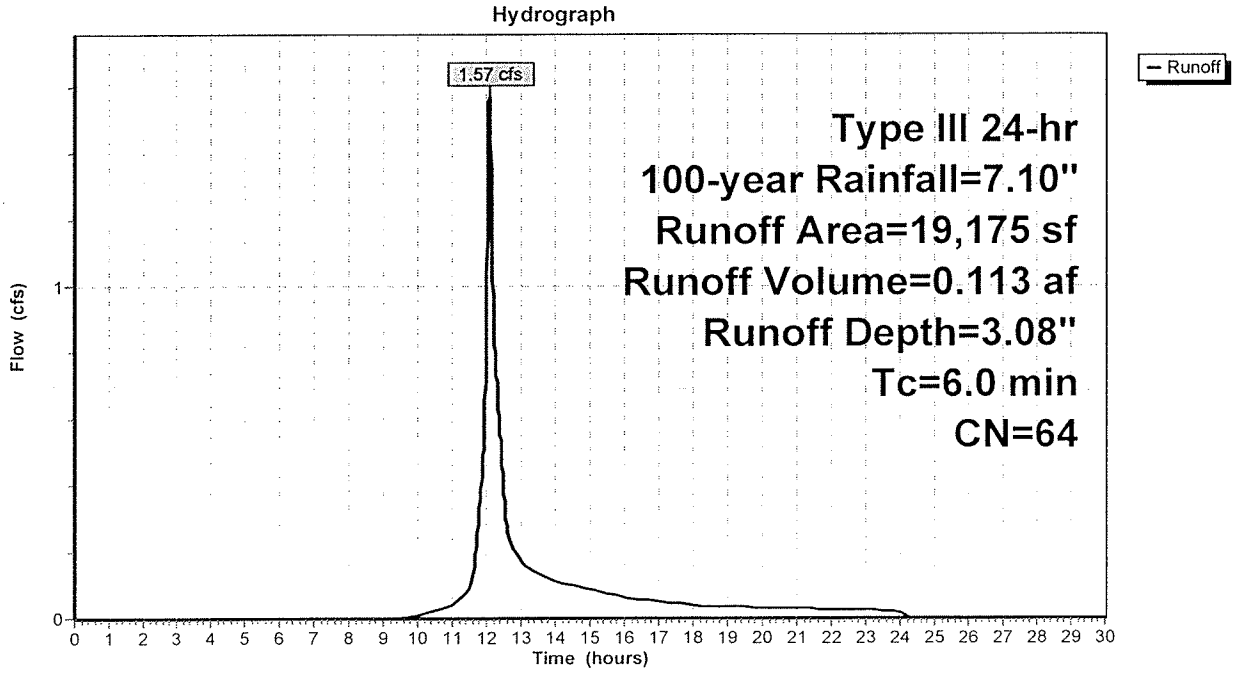
Runoff = 1.57 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
14,070	51	1 acre lots, 20% imp, HSG A
5,105	98	Paved roads w/curbs & sewers, HSG A
19,175	64	Weighted Average
11,256		58.70% Pervious Area
7,919		41.30% Impervious Area

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

Subcatchment 20S: ATKINS ROAD - END



Summary for Subcatchment 21S: INFILTRATION AREA

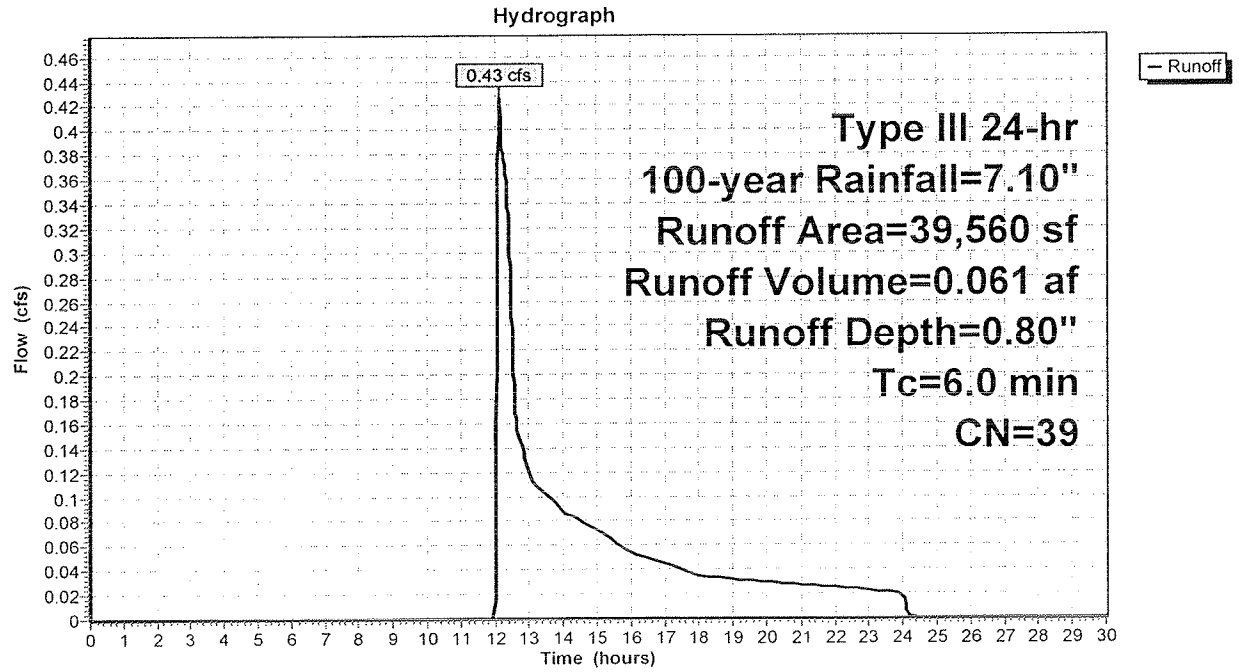
Runoff = 0.43 cfs @ 12.14 hrs, Volume= 0.061 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.10"

Area (sf)	CN	Description
39,560	39	>75% Grass cover, Good, HSG A
39,560		100.00% Pervious Area

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

Subcatchment 21S: INFILTRATION AREA

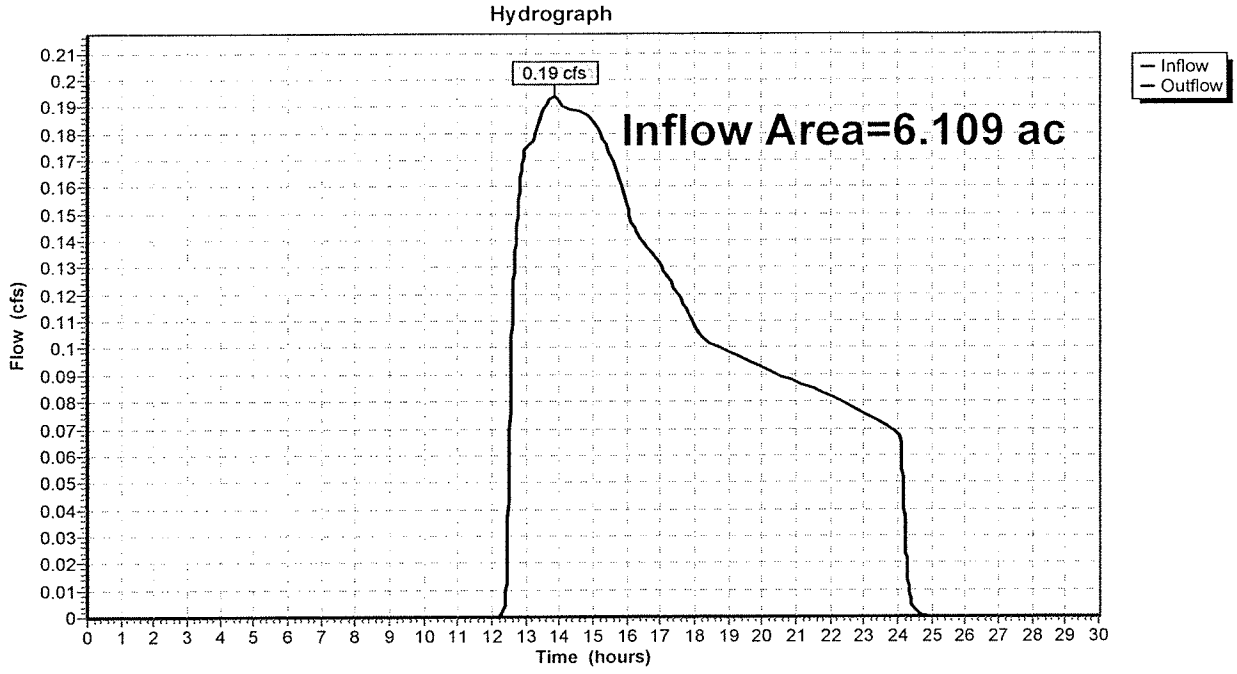


Summary for Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

Inflow Area = 6.109 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.19 cfs @ 13.86 hrs, Volume= 0.117 af
Outflow = 0.19 cfs @ 13.86 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 1R: FLOW TOWARDS WESTERN RESIDENCES

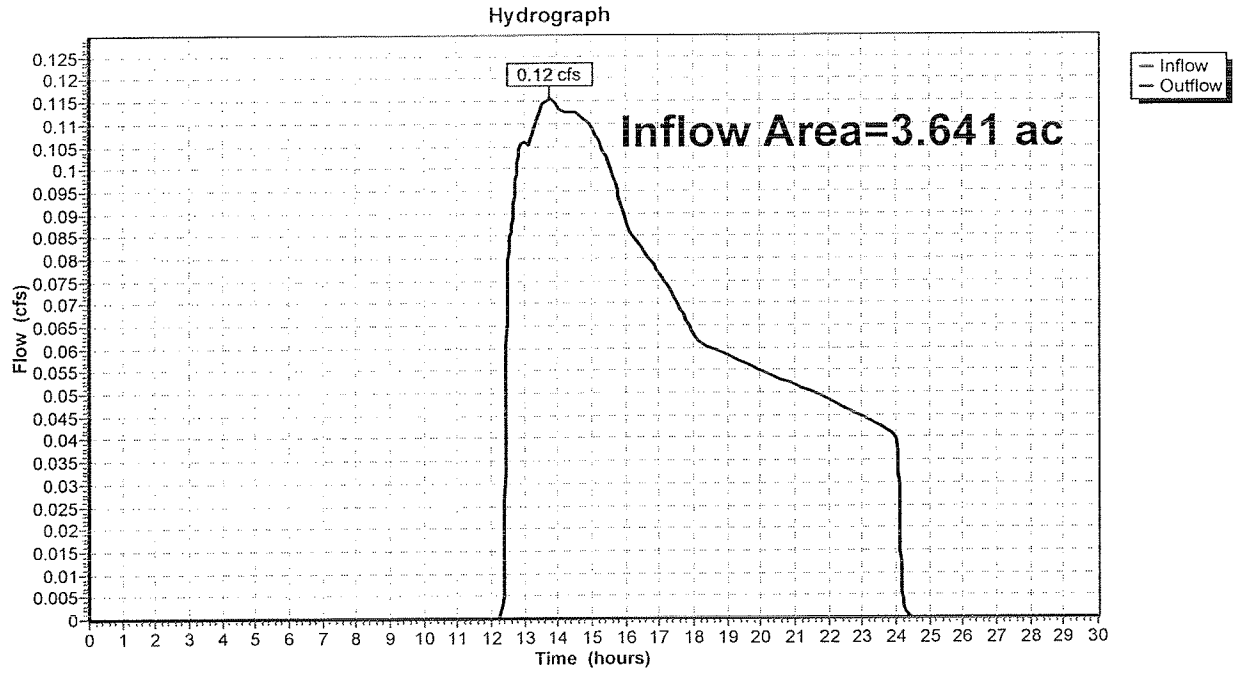


Summary for Reach 2R: FLOW TOWARDS TOWN LAND

Inflow Area = 3.641 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.12 cfs @ 13.76 hrs, Volume= 0.070 af
Outflow = 0.12 cfs @ 13.76 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 2R: FLOW TOWARDS TOWN LAND

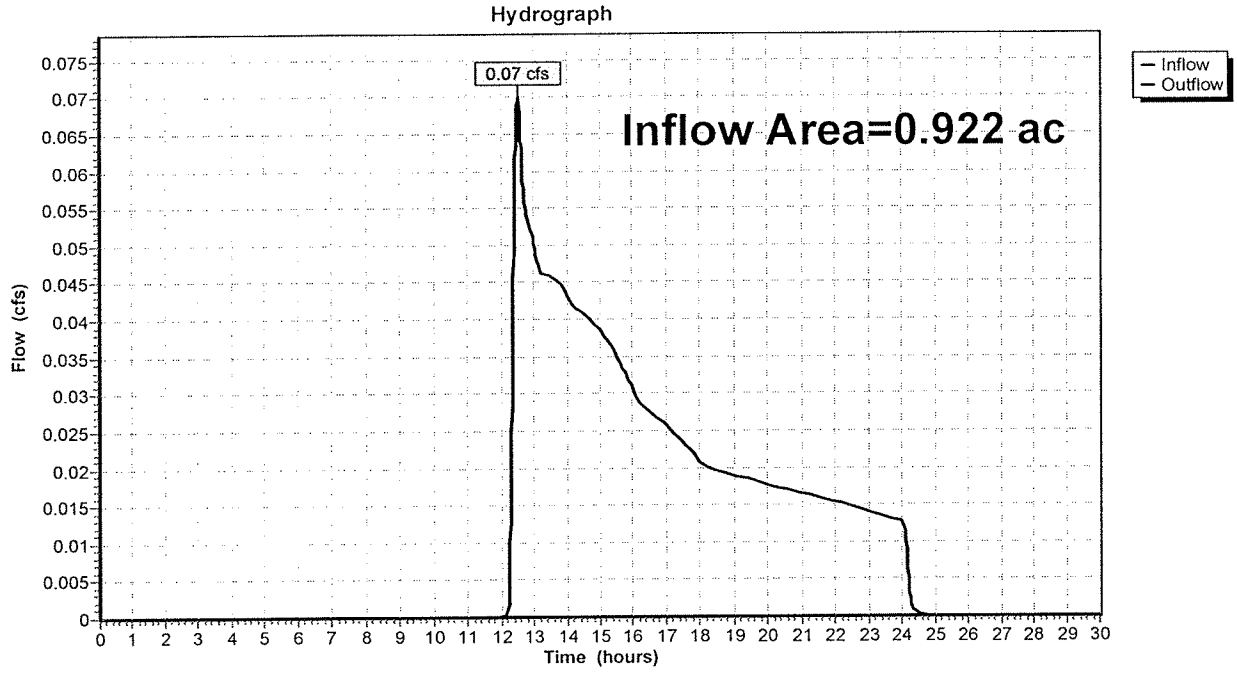


Summary for Reach 3R: OFFSITE FLOW

Inflow Area = 0.922 ac, 0.00% Impervious, Inflow Depth = 0.34" for 100-year event
Inflow = 0.07 cfs @ 12.53 hrs, Volume= 0.026 af
Outflow = 0.07 cfs @ 12.53 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 3R: OFFSITE FLOW

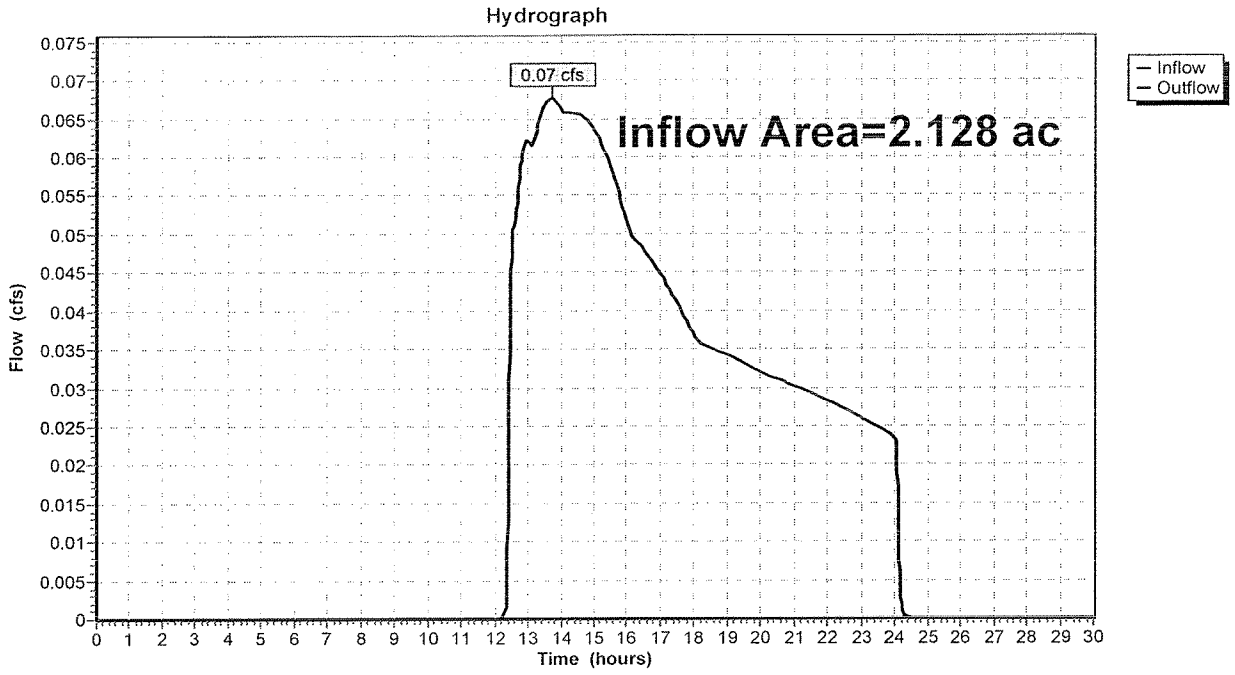


Summary for Reach 4R: OFFSITE FLOW

Inflow Area = 2.128 ac, 0.00% Impervious, Inflow Depth = 0.23" for 100-year event
Inflow = 0.07 cfs @ 13.74 hrs, Volume= 0.041 af
Outflow = 0.07 cfs @ 13.74 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach 4R: OFFSITE FLOW



Summary for Pond 1P: INFILTRATION BASIN #1

Inflow Area = 6.275 ac, 25.45% Impervious, Inflow Depth = 2.13" for 100-year event
Inflow = 14.30 cfs @ 12.10 hrs, Volume= 1.116 af
Outflow = 1.65 cfs @ 13.10 hrs, Volume= 1.116 af, Atten= 88%, Lag= 60.5 min
Discarded = 1.65 cfs @ 13.10 hrs, Volume= 1.116 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 125.73' @ 13.10 hrs Surf.Area= 8,472 sf Storage= 18,062 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 129.5 min (989.2 - 859.7)

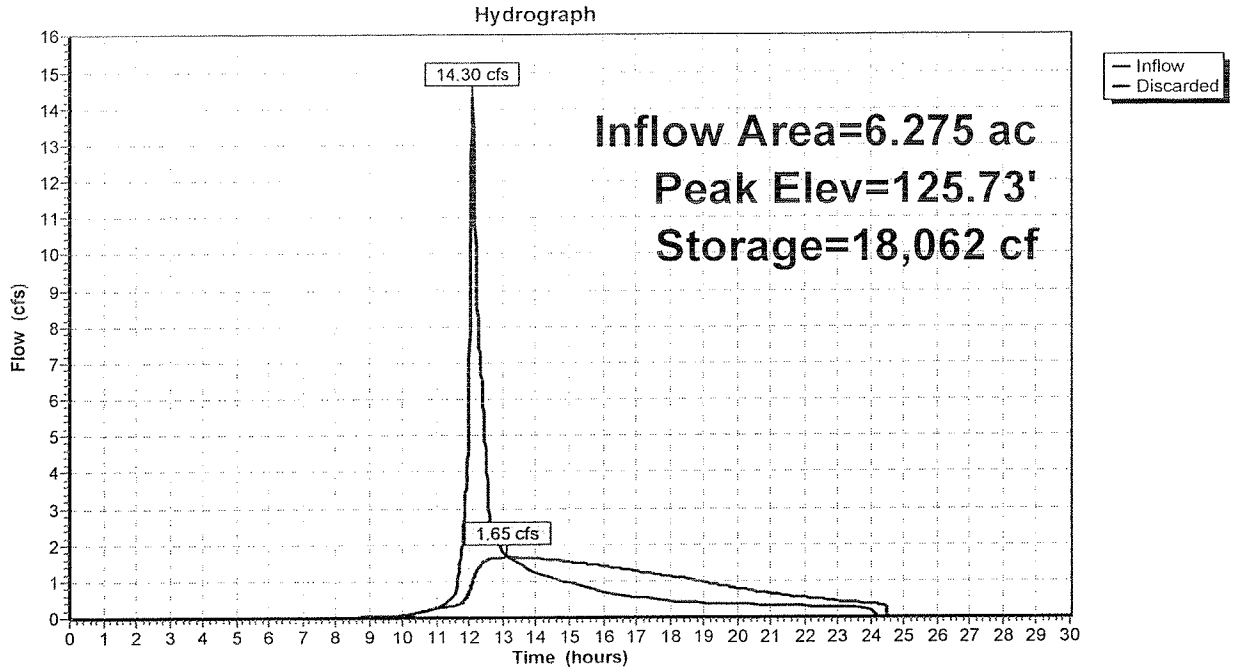
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	148,508 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	1,489	172.5	0	0	1,489
124.00	5,214	297.7	6,326	6,326	6,197
126.00	9,048	366.0	14,087	20,413	9,865
128.00	12,464	423.5	21,421	41,834	13,563
130.00	15,821	475.5	28,218	70,053	17,390
132.00	19,556	527.2	35,311	105,364	21,635
134.00	23,653	581.4	43,144	148,508	26,544

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.65 cfs @ 13.10 hrs HW=125.73' (Free Discharge)
↑**1=Exfiltration** (Controls 1.65 cfs)

Pond 1P: INFILTRATION BASIN #1



Summary for Pond 2P: INFILTRATION BASIN #2

Inflow Area = 5.164 ac, 12.40% Impervious, Inflow Depth = 1.21" for 100-year event
Inflow = 6.07 cfs @ 12.10 hrs, Volume= 0.521 af
Outflow = 1.10 cfs @ 12.75 hrs, Volume= 0.521 af, Atten= 82%, Lag= 39.2 min
Discarded = 1.10 cfs @ 12.75 hrs, Volume= 0.521 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 127.27' @ 12.75 hrs Surf.Area= 5,684 sf Storage= 5,798 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 45.2 min (932.7 - 887.5)

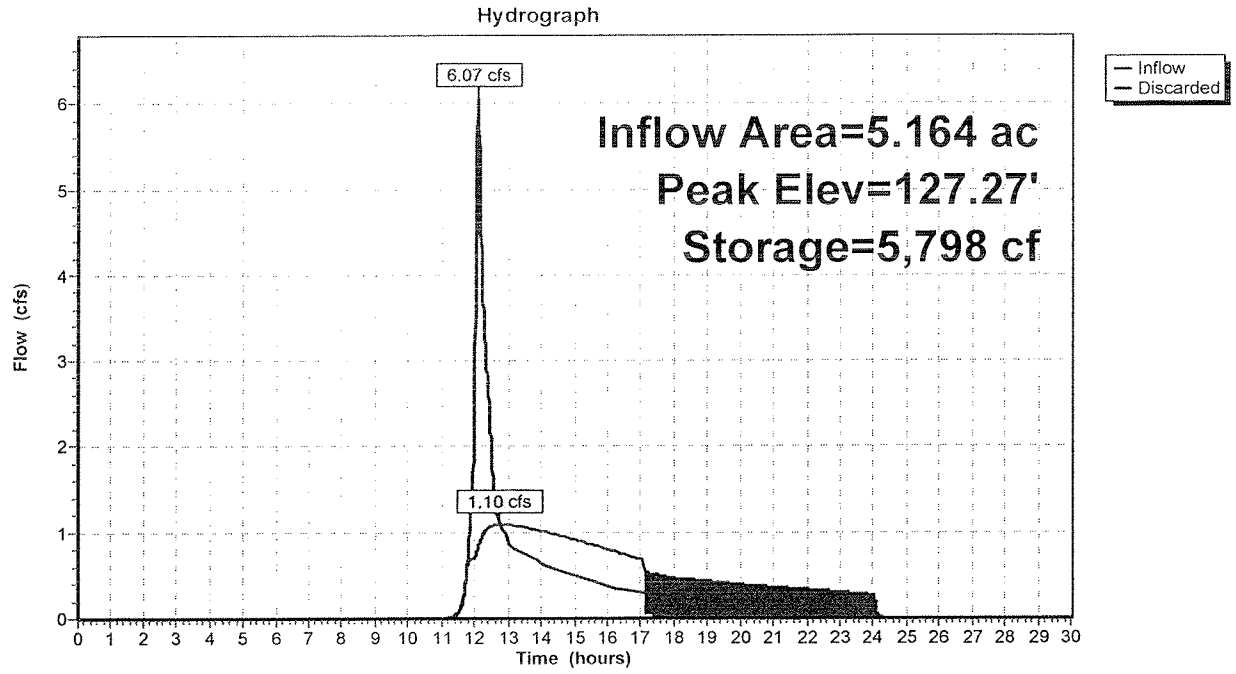
Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	18,639 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
126.00	3,499	259.8	0	0	3,499
127.00	5,185	302.1	4,314	4,314	5,411
128.00	7,124	344.3	6,129	10,443	7,606
129.00	9,316	386.5	8,196	18,639	10,087

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.10 cfs @ 12.75 hrs HW=127.27' (Free Discharge)
↑—**1=Exfiltration** (Controls 1.10 cfs)

Pond 2P: INFILTRATION BASIN #2



Summary for Pond 3P: INFILTRATION BASIN #3

Inflow Area = 5.280 ac, 22.10% Impervious, Inflow Depth = 1.95" for 100-year event
Inflow = 10.88 cfs @ 12.10 hrs, Volume= 0.858 af
Outflow = 1.08 cfs @ 13.74 hrs, Volume= 0.858 af, Atten= 90%, Lag= 98.5 min
Discarded = 1.08 cfs @ 13.74 hrs, Volume= 0.858 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 106.04' @ 13.74 hrs Surf.Area= 5,506 sf Storage= 14,686 cf

Plug-Flow detention time= 163.0 min calculated for 0.858 af (100% of inflow)
Center-of-Mass det. time= 163.0 min (1,032.7 - 869.7)

Volume	Invert	Avail.Storage	Storage Description
#1	102.00'	35,433 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

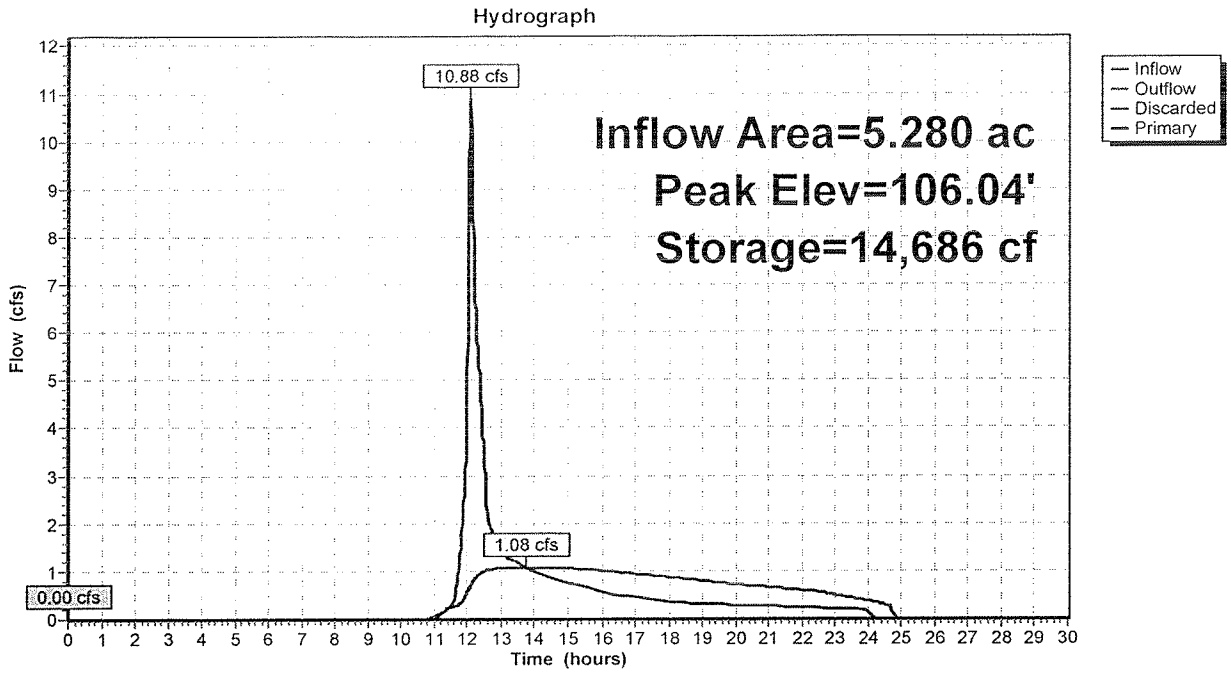
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
102.00	1,310	193.4	0	0	1,310
103.00	2,907	252.7	2,056	2,056	3,427
104.00	3,697	274.0	3,294	5,350	4,358
105.00	4,551	295.2	4,117	9,467	5,359
106.00	5,469	316.5	5,003	14,470	6,440
107.00	6,450	337.8	5,953	20,423	7,597
108.00	7,496	359.1	6,966	27,389	8,828
109.00	8,605	380.4	8,044	35,433	10,135

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	108.00'	**10.0' long x 34.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=1.08 cfs @ 13.74 hrs HW=106.04' (Free Discharge)
↑—**1=Exfiltration** (Controls 1.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=102.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: INFILTRATION BASIN #3



Summary for Pond 4P: INFILTRATION BASIN #4

Inflow Area = 3.908 ac, 0.00% Impervious, Inflow Depth = 0.34" for 100-year event
Inflow = 0.33 cfs @ 12.44 hrs, Volume= 0.110 af
Outflow = 0.19 cfs @ 13.85 hrs, Volume= 0.110 af, Atten= 44%, Lag= 84.9 min
Discarded = 0.19 cfs @ 13.85 hrs, Volume= 0.110 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 122.44' @ 13.85 hrs Surf.Area= 968 sf Storage= 300 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.8 min (1,010.5 - 995.7)

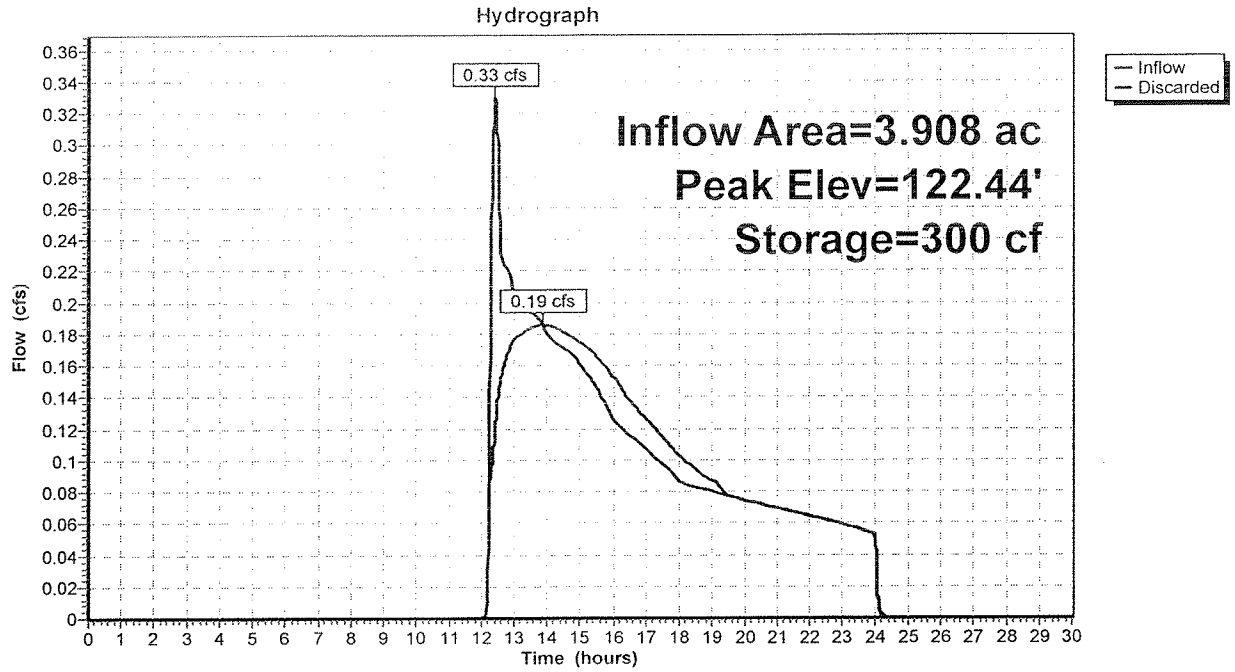
Volume	Invert	Avail.Storage	Storage Description
#1	122.00'	4,855 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
122.00	441	87.4	0	0	441
123.00	1,950	200.7	1,106	1,106	3,043
124.00	5,903	443.5	3,749	4,855	15,494

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.19 cfs @ 13.85 hrs HW=122.44' (Free Discharge)
↑**1=Exfiltration** (Controls 0.19 cfs)

Pond 4P: INFILTRATION BASIN #4



Summary for Pond 6P: LEACH PIT CLUSTER #1

Inflow Area = 1.673 ac, 17.83% Impervious, Inflow Depth = 1.20" for 100-year event
Inflow = 1.73 cfs @ 12.11 hrs, Volume= 0.167 af
Outflow = 0.17 cfs @ 15.10 hrs, Volume= 0.167 af, Atten= 90%, Lag= 179.0 min
Discarded = 0.17 cfs @ 15.10 hrs, Volume= 0.167 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 130.04' @ 15.10 hrs Surf.Area= 864 sf Storage= 2,645 cf

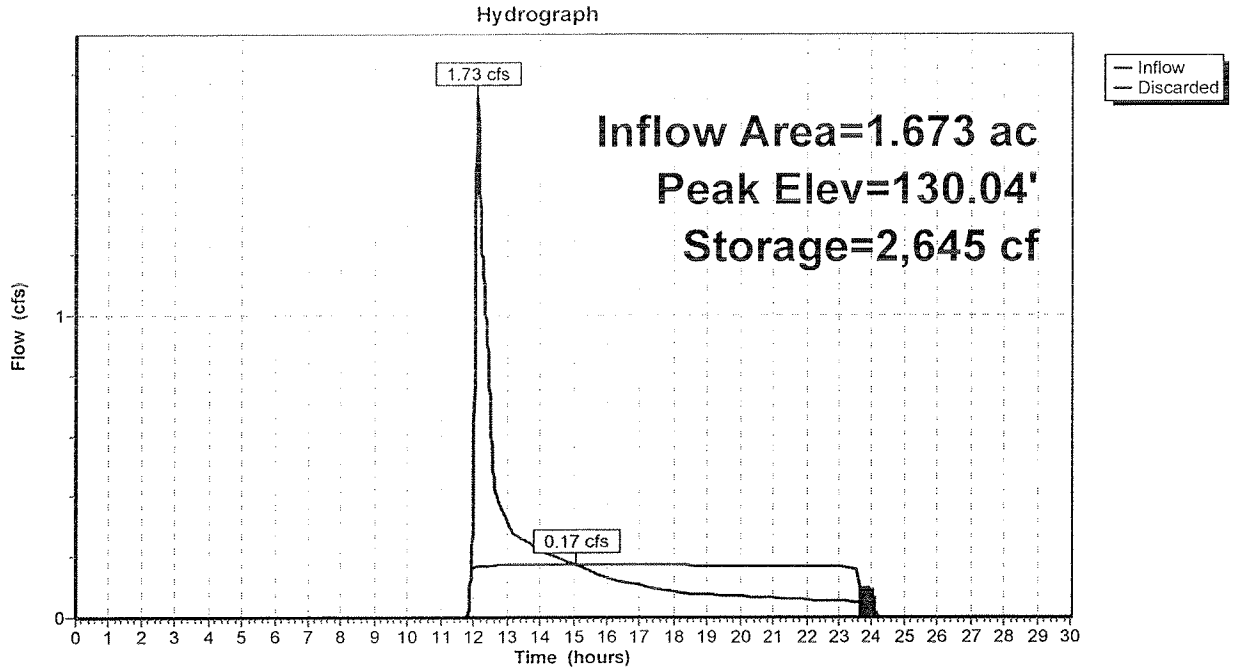
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 165.1 min (1,067.0 - 901.9)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.17 cfs @ 15.10 hrs HW=130.04' (Free Discharge)
↑**1=Exfiltration** (Controls 0.17 cfs)

Pond 6P: LEACH PIT CLUSTER #1



Summary for Pond 13P: LEACH PIT CLUSTER #1

Inflow Area = 1.124 ac, 12.00% Impervious, Inflow Depth = 1.37" for 100-year event
Inflow = 1.43 cfs @ 12.11 hrs, Volume= 0.128 af
Outflow = 0.17 cfs @ 13.89 hrs, Volume= 0.128 af, Atten= 88%, Lag= 106.7 min
Discarded = 0.17 cfs @ 13.89 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 128.09' @ 13.89 hrs Surf.Area= 864 sf Storage= 1,756 cf

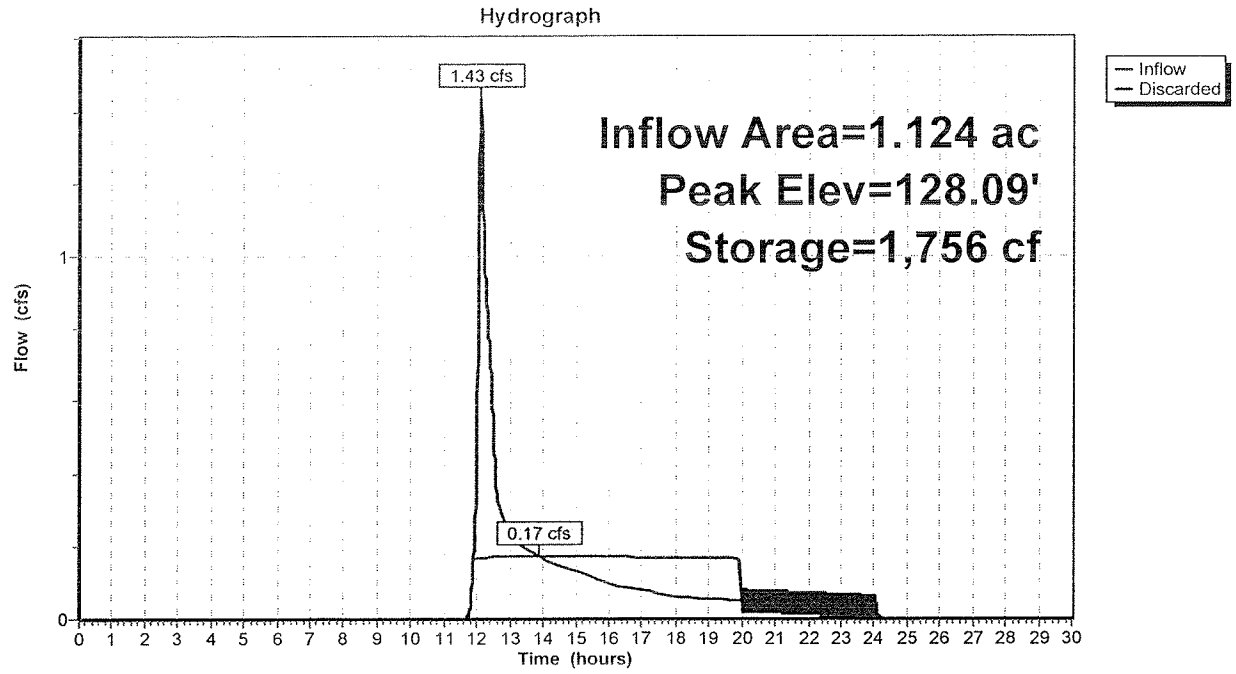
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 100.4 min (994.0 - 893.6)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,695 cf	**24.00'W x 36.00'L x 7.00'H Prismatoid** 6,048 cf Overall - 1,810 cf Embedded = 4,238 cf x 40.0% Voids
#2	125.00'	1,385 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 6 Inside #1 1,810 cf Overall - 6.0" Wall Thickness = 1,385 cf
		3,081 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.17 cfs @ 13.89 hrs HW=128.09' (Free Discharge)
↑**1=Exfiltration** (Controls 0.17 cfs)

Pond 13P: LEACH PIT CLUSTER #1



Summary for Pond 16P: INFILTRATION BASIN #5

Inflow Area = 0.781 ac, 6.00% Impervious, Inflow Depth = 0.80" for 100-year event
Inflow = 0.37 cfs @ 12.14 hrs, Volume= 0.052 af
Outflow = 0.12 cfs @ 12.78 hrs, Volume= 0.052 af, Atten= 67%, Lag= 38.7 min
Discarded = 0.12 cfs @ 12.78 hrs, Volume= 0.052 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 113.72' @ 12.78 hrs Surf.Area= 632 sf Storage= 355 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 22.2 min (950.8 - 928.6)

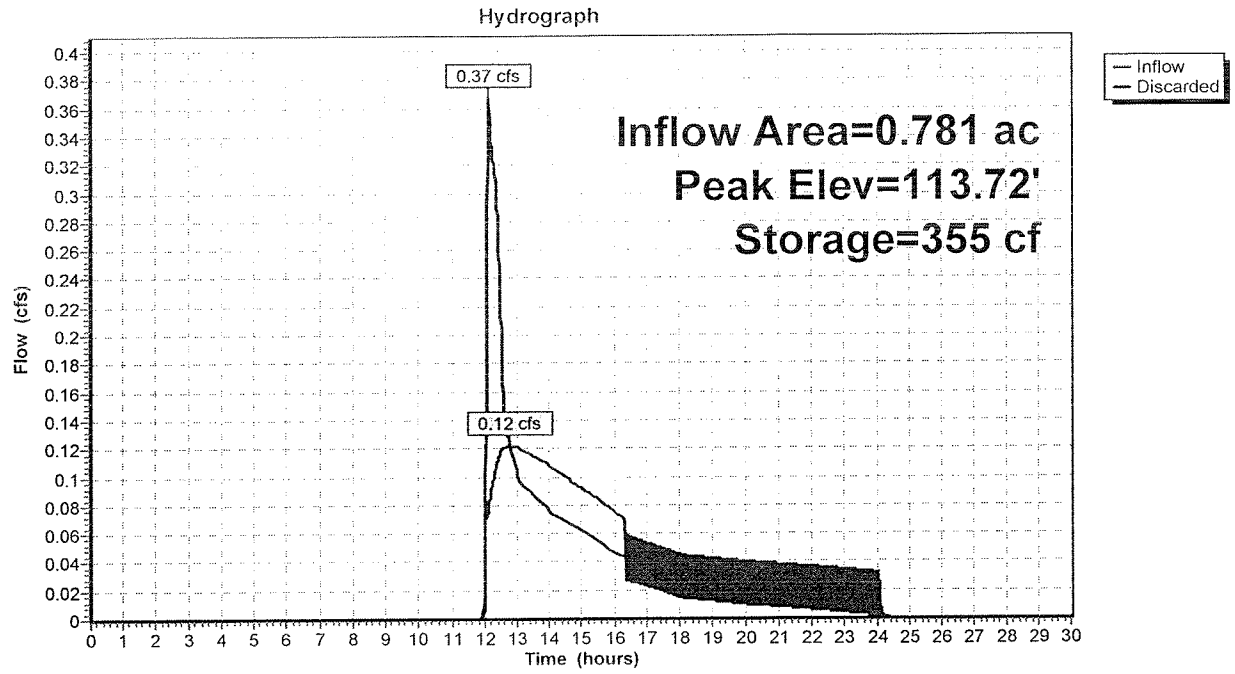
Volume	Invert	Avail.Storage	Storage Description
#1	113.00'	1,555 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
113.00	366	86.9	0	0	366
114.00	756	124.9	549	549	1,015
115.00	1,278	165.7	1,006	1,555	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	113.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.12 cfs @ 12.78 hrs HW=113.72' (Free Discharge)
↑**1=Exfiltration** (Controls 0.12 cfs)

Pond 16P: INFILTRATION BASIN #5



Summary for Pond 19P: LEACH PIT CLUSTER #2

Inflow Area = 1.599 ac, 12.00% Impervious, Inflow Depth = 1.37" for 100-year event
Inflow = 2.03 cfs @ 12.11 hrs, Volume= 0.182 af
Outflow = 0.23 cfs @ 14.04 hrs, Volume= 0.182 af, Atten= 89%, Lag= 116.2 min
Discarded = 0.23 cfs @ 14.04 hrs, Volume= 0.182 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 128.53' @ 14.04 hrs Surf.Area= 1,152 sf Storage= 2,606 cf

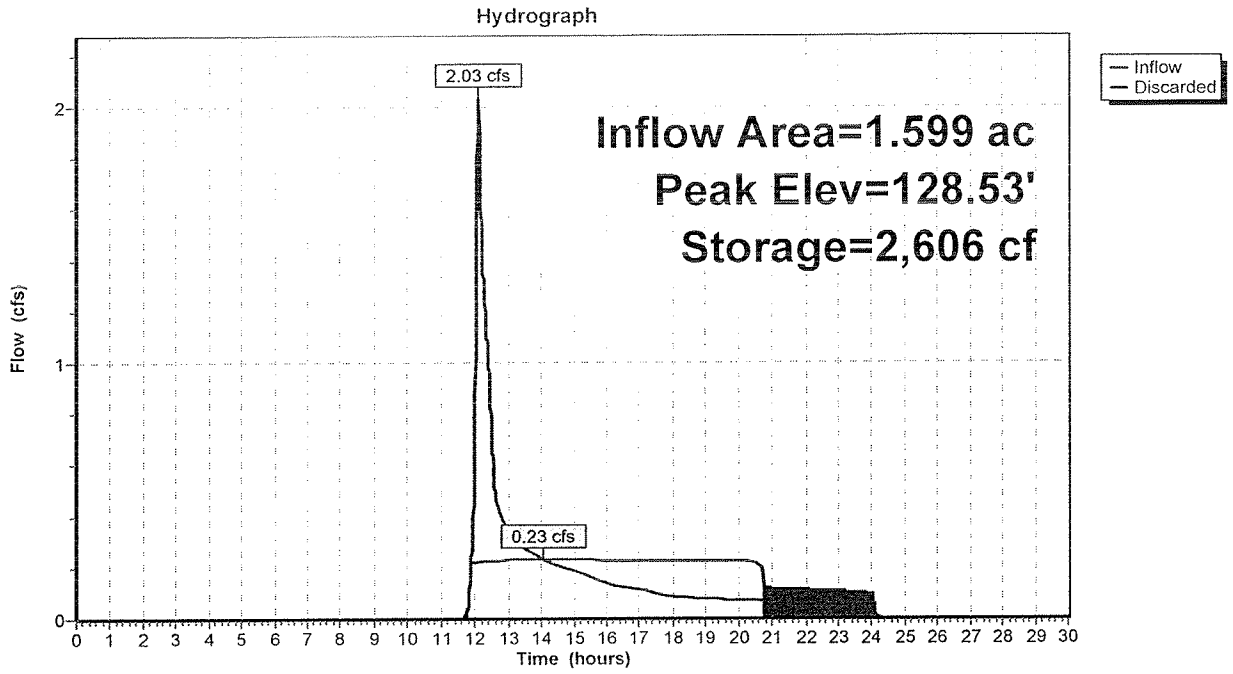
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 114.3 min (1,007.9 - 893.6)

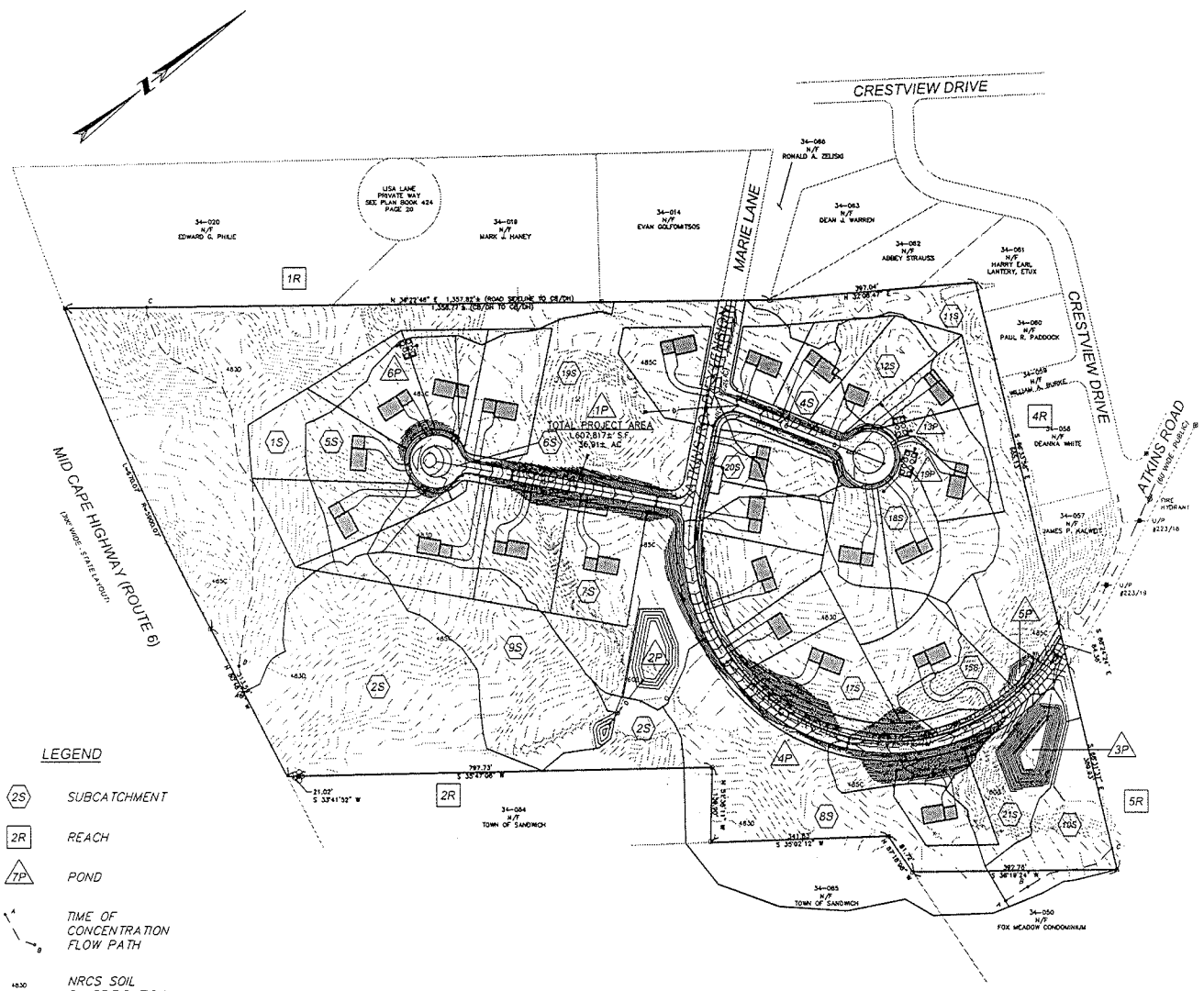
Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	2,261 cf	**24.00'W x 48.00'L x 7.00'H Prismatoid** 8,064 cf Overall - 2,413 cf Embedded = 5,651 cf x 40.0% Voids
#2	125.00'	1,847 cf	**7.00'D x 6.00'H Vertical Cone/Cylinder** x 8 Inside #1 2,413 cf Overall - 6.0" Wall Thickness = 1,847 cf
		4,108 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.23 cfs @ 14.04 hrs HW=128.53' (Free Discharge)
↑**1=Exfiltration** (Controls 0.23 cfs)

Pond 19P: LEACH PIT CLUSTER #2





BRIAN G. YERGATIAN
PROFESSIONAL ENGINEER
DATE

RESIDENTIAL CLUSTER SUBDIVISION

ATKINS ROAD

IN

EAST SANDWICH
MASSACHUSETTS
(BARNSTABLE COUNTY)

POST DEVELOPMENT WATERSHED PLAN

FEBRUARY 5, 2014

REVISIONS:

NO.	DATE	DESC.

ISSUED FOR PERMITTING
NOT FOR CONSTRUCTION

PREPARED FOR:
MONOMOY PROPERTIES LLC
79 COVE ROAD
SOUTH DENNIS, MA 02660

BSC GROUP
349 Route 28, Unit D
W. Yarmouth, Massachusetts
02673
508 778 8919

SCALE: 1" = 100'
0 50 100 200 FEET

FILE: 4967500-PP.dwg
DWG. NO:
JOB. NO: 4-9675.00
SHEET 1 OF 1

SECTION 6.0

ADDITIONAL DRAINAGE CALCULATIONS

6.1 TOTAL SUSPENDED SOLIDS REMOVAL (TSS)

6.2 REQUIRED RECHARGE CALCULATIONS

6.3 WATER QUALITY VOLUME CALCULATIONS

INSTRUCTIONS:

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

Version 1, Automated: Mar. 4, 2008

Location: FES-1

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Vegetated Filter Strip >25 feet	0.10	0.75	0.08	0.68
Infiltration Basin	0.80	0.68	0.54	0.14
	0.00	0.14	0.00	0.14
	0.00	0.14	0.00	0.14

Total TSS Removal = 87%

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

Project: Atkins Road Cluster Subdivision

Prepared By: BSC Group, Inc.

Date: 2/5/2014

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

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

1. From MassDEP Stormwater Handbook Vol. 1

6.1 Total Suspended Solids Removal (TSS)

INSTRUCTIONS:

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

Version 1, Automated: Mar. 4, 2008

Location: FES-4

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Infiltration Basin	0.80	0.75	0.60	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal = 85%

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

Project: Atkins Road Cluster Subdivision

Prepared By: BSC Group, Inc.

Date: 2/5/2014

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

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

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

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

Version 1, Automated: Mar. 4, 2008

Location: FES-2

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Vegetated Filter Strip >25 feet	0.10	0.75	0.08	0.68
Infiltration Basin	0.80	0.68	0.54	0.14
	0.00	0.14	0.00	0.14
	0.00	0.14	0.00	0.14

Total TSS Removal = 87%

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

Project: Atkins Road Cluster Subdivision

Prepared By: BSC Group, Inc.

Date: 2/5/2014

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

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

1. From MassDEP Stormwater Handbook Vol. 1

6.2 Required Recharge Calculations

Required Recharge Volume

$R_v = F \times Impervious\ Area$

R_v = *Required Recharge Volume (ft^3)*
F = *Target Depth Factor (0.6 inches for Hydrologic Soil Group A)*
Impervious Area = *Pavement and rooftop area on site*

Infiltration Basin #1

$R_v = (0.6\ inches \times ft/12\ inches) \times 123{,}710\ ft^2$
$R_v = 6{,}186\ ft^3$

Infiltration Basin #2

$R_v = (0.6\ inches \times ft/12\ inches) \times 27{,}884\ ft^2$
$R_v = 1{,}395\ ft^3$

Infiltration Basin #3

$R_v = (0.6\ inches \times ft/12\ inches) \times 50{,}827\ ft^2$
$R_v = 2{,}542\ ft^3$

Infiltration Basin #5

$R_v = (0.6\ inches \times ft/12\ inches) \times 2{,}043\ ft^2$
$R_v = 103\ ft^3$

Leach Pit Cluster #1

$R_v = (0.6\ inches \times ft/12\ inches) \times 5{,}877\ ft^2$
$R_v = 294\ ft^3$

Leach Pit Cluster #2

$R_v = (0.6\ inches \times ft/12\ inches) \times 8{,}356\ ft^2$
$R_v = 418\ ft^3$

Leach Pit Cluster #3

$R_v = (0.6\ inches \times ft/12\ inches) \times 13{,}000\ ft^2$
$R_v = 650\ ft^3$

Drawdown within 72 Hours

$$T_{drawdown} = \frac{S_v}{(K)(Bottom\ Area)}$$

S_v = *Storage Volume in Porous Pavement (100-year storm)*
K = *Saturated Hydraulic Conductivity (inches/hour)*

Infiltration Basin #1

$$T_{drawdown} = \frac{18{,}062\ ft^3}{(8.27\ in/hr\ x\ ft/12\ in)(1{,}489\ ft^2)}$$

$T_{drawdown}$ = *17.6 hours*

Infiltration Basin #2

$$T_{drawdown} = \frac{5{,}798\ ft^3}{(8.27\ in/hr\ x\ ft/12\ in)(3{,}499\ ft^2)}$$

$T_{drawdown}$ = *2.4 hours*

Infiltration Basin #3

$$T_{drawdown} = \frac{14{,}686\ ft^3}{(8.27\ in/hr\ x\ ft/12\ in)(1{,}310\ ft^2)}$$

$T_{drawdown}$ = *16.3 hours*

Infiltration Basin #5

$$T_{drawdown} = \frac{355\ ft^3}{(8.27\ in/hr\ x\ ft/12\ in)(366\ ft^2)}$$

$T_{drawdown}$ = *1.4 hours*

Leach Pit Cluster #1

$$T_{drawdown} = \frac{1{,}756\ ft^3}{(8.27\ in/hr\ x\ ft/12\ in)(864\ ft^2)}$$

$T_{drawdown}$ = *2.9 hours*

Drawdown within 72 Hours (continued)

Leach Pit Cluster #2

$$T_{drawdown} = \frac{2{,}606\ ft^3}{(8.27\ in/hr \times ft/12\ in)(1{,}152\ ft^2)}$$

$$T_{drawdown} = 3.3\ hours$$

Leach Pit Cluster #3

$$T_{drawdown} = \frac{2{,}645\ ft^3}{(8.27\ in/hr \times ft/12\ in)(864\ ft^2)}$$

$$T_{drawdown} = 4.4\ hours$$

6.3 WATER QUALITY VOLUME CALCULATIONS

Water Quality Volume

$V_{WQ} = (D_{WQ}/12 \text{ inches/foot}) \times (A_{imp} \times 43{,}560 \text{ ft}^2/\text{acre})$

V_{WQ} = Required Water Quality Volume (ft^3)
D_{WQ} = Water Quality Depth: one-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near another critical area, runoff from a LUHPPL, or exfiltration to soils with infiltration rate greater than 2.4 inches/hour, ½-inch for discharges near or to other areas.
A_{imp} = Impervious Area (acres)

FES-1

$$V_{WQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (54{,}146 \text{ ft}^2)$$

$$\boxed{V_{WQ} = 4{,}513 \text{ ft}^3}$$

FES-2

$$V_{WQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (69{,}564 \text{ ft}^2)$$

$$\boxed{V_{WQ} = 5{,}797 \text{ ft}^3}$$

FES-3

$$V_{WQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (27{,}884 \text{ ft}^2)$$

$$\boxed{V_{WQ} = 2{,}324 \text{ ft}^3}$$

FES-4

$$V_{WQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (50{,}827 \text{ ft}^2)$$

$$\boxed{V_{WQ} = 4{,}236 \text{ ft}^3}$$

Infiltration Basin #5

$$V_{WQ} = (1.0 \text{ inches}/12 \text{ inches/ft}) \times (2{,}043 \text{ ft}^2)$$

$$\boxed{V_{WQ} = 171 \text{ ft}^3}$$

APPENDICES

USGS Locus Map

SCALE: 1" = 1000'

0 500 1000 2000 FEET

PREPARED FOR:

MONOMOY PROPERTIES, LLC
79 COVE ROAD
SOUTH DENNIS, MA 02660

USGS LOCUS MAP

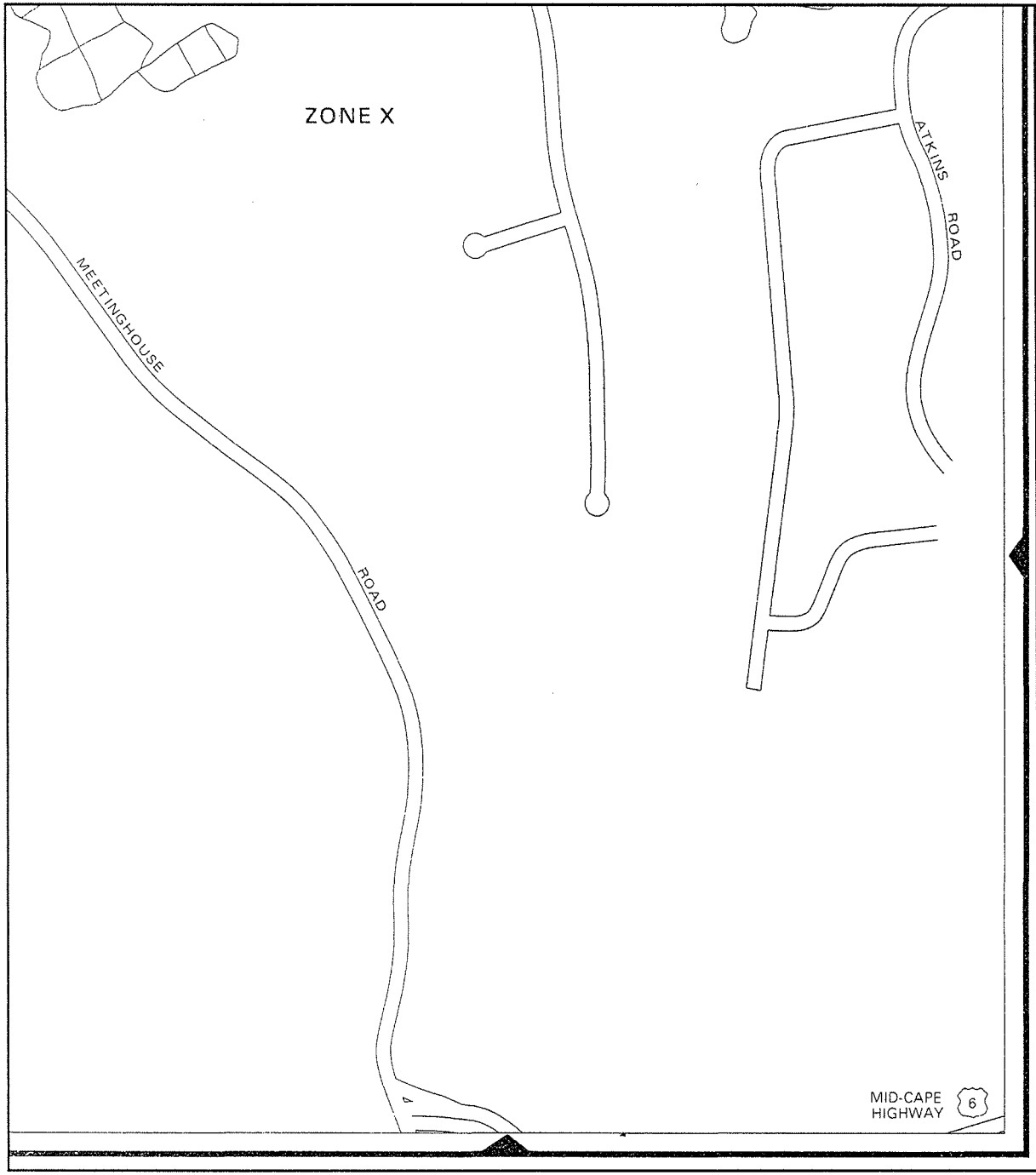
Source: MassGIS

ATKINS ROAD CLUSTER SUBDIVISION
EAST SANDWICH, MA

BSC GROUP
349 Route 28, Unit D
W. Yarmouth, Massachusetts
02673
508 778 8919

Job No.: 4-9675.00 Date: 9/20/13
Scale: AS NOTED Revised:
Dwg. No: Figure:

FEMA MAP



APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

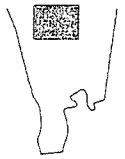
FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
SANDWICH,
MASSACHUSETTS
BARNSTABLE COUNTY

PANEL 2 OF 11
(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION



NOTE -

THIS MAP INCORPORATES APPROXIMATE BOUNDARIES OF COASTAL BARRIER RESOURCES SYSTEM UNITS AND/OR OTHERWISE PROTECTED AREAS ESTABLISHED UNDER THE COASTAL BARRIER IMPROVEMENT ACT OF 1990 (PL 101-591).

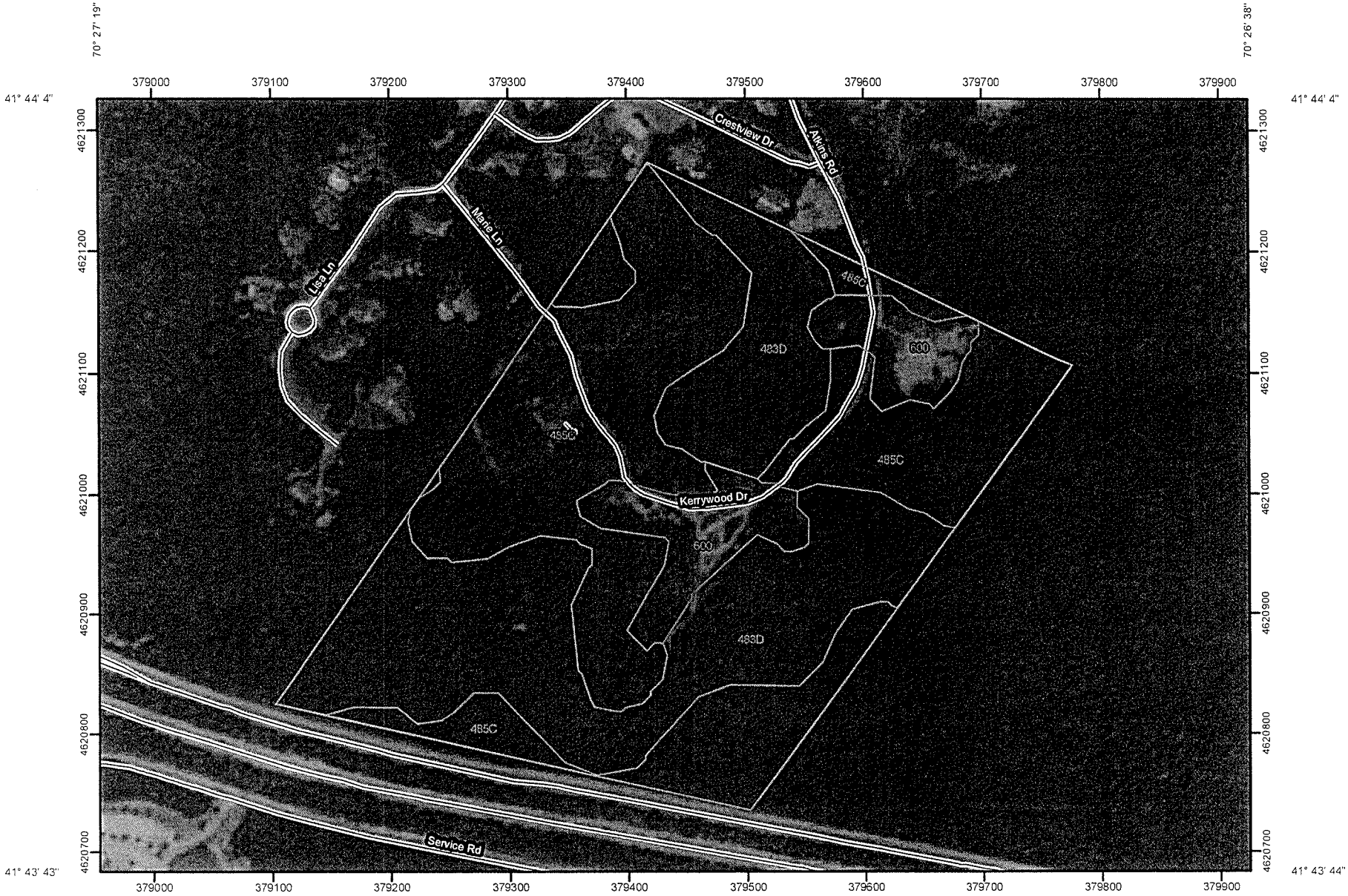
COMMUNITY-PANEL NUMBER
250012 0002 F

MAP REVISED:
JULY 2, 1992

Federal Emergency Management Agency

SOIL SURVEY MAP

Soil Map—Barnstable County, Massachusetts
(Atkins Road Cluster Subdivision)



Map Scale: 1:4,600 if printed on A size (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1,000 1,500

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

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

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:4,600 if printed on A size (8.5" × 11") sheet.

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

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

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 9, Jul 23, 2010

Date(s) aerial images were photographed: 7/25/2003

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

Map Unit Legend

Barnstable County, Massachusetts (MA001)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
483D	Plymouth-Barnstable complex, hilly, very bouldery	19.8	41.4%
485C	Barnstable-Plymouth complex, rolling	23.0	48.1%
600	Pits, sand and gravel	5.0	10.4%
Totals for Area of Interest		**47.7**	**100.0%**

SOIL TEST PIT LOGS

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Monomoy Properties LLC
Owner Name

Atkins Road — Assessors Map 34
Street Address — Map/Lot #

East Sandwich — Massachusetts — 02537
City — State — Zip Code

B. Site Information

1. (Check one) [X] New Construction [ ] Upgrade [ ] Repair

2. Published Soil Survey Available? [X] Yes [ ] No If yes: Web Soil Survey accessed 10/9/12 (Year Published) — (Publication Scale) — 483D, 485C, 600 (Soil Map Unit)
   1. Plymouth-Barnstable complex, hilly, very bouldery 2. Barnstable-Plymouth complex, rolling 3. Pits, sand and gravel
   Soil Name — Soil Limitations

3. Surficial Geological Report Available? [ ] Yes [ ] No If yes: (Year Published) — (Publication Scale) — (Map Unit)
   Geologic Material — Landform

4. Flood Rate Insurance Map
   Above the 500-year flood boundary? [X] Yes [ ] No Within the 100-year flood boundary? [ ] Yes [X] No
   Within the 500-year flood boundary? [ ] Yes [X] No Within a velocity zone? [ ] Yes [X] No

5. Wetland Area: National Wetland Inventory Map — (Map Unit) — (Name)
   Wetlands Conservancy Program Map — (Map Unit) — (Name)

6. Current Water Resource Conditions (USGS): (Month/Year) Range: [ ] Above Normal [ ] Normal [ ] Below Normal

7. Other references reviewed:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: TP-1 | 10/16/2012 (Date) | _____ (Time) | _____ (Weather)

1. Location

   Ground Elevation at Surface of Hole: 170+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

   Trees, brush (Vegetation) | Outwash plain (Landform) | Shoulder (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	____ feet	Drainage Way	____ feet	Possible Wet Area	____ feet
Property Line	____ feet	Drinking Water Well	____ feet	Other	____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

   Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 9	E	10YR 6/2				LS					
9 - 26	Bw	10YR 5/8				LS					
26 - 124	C	2.5Y 6/3				M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-2 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 189+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 10 to 15% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Summit (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	____ feet	Drainage Way	____ feet	Possible Wet Area	____ feet
Property Line	____ feet	Drinking Water Well	____ feet	Other	____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS					
5 - 19	Bw	10YR 5/8				LS					
19 - 21	Ab	10YR 2/2				SL					
21 - 25	E	10YR 6/2				LS					
25 - 40	Bwd	10YR 6/8				LS					
40 - 60	C1d	2.5Y 7/3				LS					
60 - 120	C2d	2.5Y 6/3				C. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-3 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

   Ground Elevation at Surface of Hole: 161+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

   Trees, brush (Vegetation) | Outwash plain (Landform) | Toe of slope (Position on Landscape (attach sheet))

3. Distances from:
   - Open Water Body _____ feet
   - Drainage Way _____ feet
   - Possible Wet Area _____ feet
   - Property Line _____ feet
   - Drinking Water Well _____ feet
   - Other _____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

   Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-3

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS			granular		
5 - 30	Bw	10YR 5/8				SL			blocky		
30 - 110	C	2.5Y 6/3				M. Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-4 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 163+/- Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | On slope (Position on Landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area _____ feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ Depth Weeping from Pit | _____ Depth Standing Water in Hole

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-4

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS			granular		
5 - 15	Bw	10YR 4/6				LS			blocky		
15 - 120	C1	2.5Y 6/3				M. Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-5 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 129+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 0 to 5% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Toe of slope (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	____ feet	Drainage Way	____ feet	Possible Wet Area	____ feet
Property Line	____ feet	Drinking Water Well	____ feet	Other	____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
City/Town of

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C. On-Site Review (continued)

Deep Observation Hole Number: TP-5

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 18	Bw	10YR 6/8				LS			granular		
18 - 120	C	2.5Y 6/3				M/C Sand	15%		single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-6 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 128.5+/- Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 0 to 5% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Valley (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	_____ feet	Drainage Way	_____ feet	Possible Wet Area	_____ feet
Property Line	_____ feet	Drinking Water Well	_____ feet	Other	_____ feet

4. Parent Material: Glacial outwash Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-6

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 5	A	10YR 3/2				LS			granular		
5 - 13	Bw	10YR 4/4				LS			single grain		
13 - 100	C	2.5Y 6/3				M. Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-7 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 149+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 0 to 5% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Shoulder (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	_____ feet	Drainage Way	_____ feet	Possible Wet Area	_____ feet
Property Line	_____ feet	Drinking Water Well	_____ feet	Other	_____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ Depth Weeping from Pit | _____ Depth Standing Water in Hole

Estimated Depth to High Groundwater: _____ inches | _____ elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-7

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 112	C	2.5Y 6/3				M. Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-8 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 125+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Valley (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	____ feet	Drainage Way	____ feet	Possible Wet Area	____ feet
Property Line	____ feet	Drinking Water Well	____ feet	Other	____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
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C. On-Site Review (continued)

Deep Observation Hole Number: TP-8

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 14	Bw	10YR 6/8				LS			granular		
14 - 120	C	2.5Y 7/3				M/F Sand			single grain		

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-9 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 142.5+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | On slope (Position on Landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area _____ feet

Property Line _____ feet | Drinking Water Well _____ feet | Other _____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ Depth Weeping from Pit | _____ Depth Standing Water in Hole

Estimated Depth to High Groundwater: _____ inches | _____ elevation

Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-9

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 7	FILL										
7 - 9	Ab	10YR 2/2				SL					
9 - 12	E	10YR 6/2				LS					
12 - 31	Bw	10YR 5/8				LS					
31 - 72	C1	5Y 5/3				SL					
72 - 162	C2	5Y 6/4				Fine SL					

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-10 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 155.5+/- Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 0 to 5% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Shoulder (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	_____ feet	Drainage Way	_____ feet	Possible Wet Area	_____ feet
Property Line	_____ feet	Drinking Water Well	_____ feet	Other	_____ feet

4. Parent Material: Glacial outwash Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-10

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 4	A	10YR 3/2				LS					
4 - 9	E	10YR 6/2				LS					
9 - 28	Bw	10YR 5/8				LS					
28 - 120	C	2.5Y 6/3				M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-11 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

   Ground Elevation at Surface of Hole: 151+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 10 to 15% (Slope (%))

   Trees, brush (Vegetation) | Outwash plain (Landform) | Valley (Position on Landscape (attach sheet))

3. Distances from:
   - Open Water Body _____ feet
   - Drainage Way _____ feet
   - Possible Wet Area _____ feet
   - Property Line _____ feet
   - Drinking Water Well _____ feet
   - Other _____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ Depth Weeping from Pit | _____ Depth Standing Water in Hole

   Estimated Depth to High Groundwater: _____ inches | _____ elevation

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C. On-Site Review (continued)

Deep Observation Hole Number: TP-11

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 8	E	10YR 6/2				LS					
8 - 28	Bw	10YR 5/8				LS					
28 - 72	C1	2.5Y 6/4				LS					
72 - 128	C2	2.5Y 6/3				C. Sand	15%	15%			

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-12 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 139+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Shoulder (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	____ feet	Drainage Way	____ feet	Possible Wet Area	____ feet
Property Line	____ feet	Drinking Water Well	____ feet	Other	____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: _____ inches _____ elevation

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City/Town of
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-12

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 8	E	10YR 6/2				LS					
8 - 20	Bw	10YR 5/8				SL					
20 - 44	C1	10YR 6/8				LS					
44 - 120	C2	2.5Y 6/3				M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-13 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 133+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

Trees, brush (Vegetation) | Outwash plain (Landform) | Valley (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	____ feet	Drainage Way	____ feet	Possible Wet Area	____ feet
Property Line	____ feet	Drinking Water Well	____ feet	Other	____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) _____ (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
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C. On-Site Review (continued)

Deep Observation Hole Number: TP-13

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 2	A	10YR 3/2				LS					
2 - 6	E	10YR 6/2				LS					
6 - 26	Bw	10YR 6/8				LS					
26 - 156	C	2.5Y 5/4				LS					

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
City/Town of

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C. On-Site Review (continued)

Deep Observation Hole Number: TP-14 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

   Ground Elevation at Surface of Hole: 145+/- | Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 5 to 10% (Slope (%))

   Trees, brush (Vegetation) | Outwash plain (Landform) | On slope (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	_____ feet	Drainage Way	_____ feet	Possible Wet Area	_____ feet
Property Line	_____ feet	Drinking Water Well	_____ feet	Other	_____ feet

4. Parent Material: Glacial outwash | Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: _____ (Depth Weeping from Pit) | _____ (Depth Standing Water in Hole)

   Estimated Depth to High Groundwater: _____ inches | _____ elevation

Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-14

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 3	A	10YR 3/2				LS					
3 - 9	E	10YR 6/2				LS					
9 - 25	Bw	10YR 5/8				LS					
25 - 120	C	2.5Y 6/3				M. Sand	15%	15%			

Additional Notes:

No groundwater or redoximorphic features observed.

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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-15 | 10/16/12 (Date) | _____ (Time) | _____ (Weather)

1. Location

Ground Elevation at Surface of Hole: 115+/- Location (identify on plan): _____

2. Land Use: Woodland (e.g., woodland, agricultural field, vacant lot, etc.) | None (Surface Stones) | 0 to 5% (Slope (%))
Trees, brush (Vegetation) | Outwash plain (Landform) | Toe of slope (Position on Landscape (attach sheet))

3. Distances from: Open Water Body _____ feet | Drainage Way _____ feet | Possible Wet Area _____ feet
Property Line _____ feet | Drinking Water Well _____ feet | Other _____ feet

4. Parent Material: Glacial outwash Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: _____ Depth Weeping from Pit _____ Depth Standing Water in Hole

Estimated Depth to High Groundwater: _____ inches _____ elevation

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: TP-15

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color- Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0 - 120	C	2.5Y 6/3				M. Sand					

Additional Notes:

No groundwater or redoximorphic features observed.

Commonwealth of Massachusetts
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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	A.	B.
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☐ Depth to soil redoximorphic features (mottles)	A. _____ inches	B. _____ inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

      ☒ Yes ☐ No

   b. If yes, at what depth was it observed? Upper boundary: _____ inches Lower boundary: _____ inches

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Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	February 5, 2014 Date
Brian G. Yergatian, P.E. / #SE 3009 Typed or Printed Name of Soil Evaluator / License #	October 24, 2005 Date of Soil Evaluator Exam
Samuel J. Jensen, P.E. Name of Board of Health Witness	Engineering Department Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Field Diagrams

Use this sheet for field diagrams:

For test pit locations, see attached plan.

ISSUED FOR PERMITTING
NOT FOR CONSTRUCTION

BRIAN G. YERGATIAN DATE
PROFESSIONAL ENGINEER

ATKINS ROAD CLUSTER SUBDIVISION

ATKINS ROAD

IN

EAST SANDWICH
MASSACHUSETTS
(BARNSTABLE COUNTY)

TEST PIT LOCATION PLAN

OCTOBER 16, 2012

REVISIONS:

NO.	DATE	DESC.

PREPARED FOR:
MONOMOY PROPERTIES, LLC
79 COVE ROAD
SOUTH DENNIS, MA 02660

BSC GROUP
349 Route 28, Unit D
W. Yarmouth, Massachusetts
02673
508 778 8919

SCALE: 1" = 100'
0 50 100 200 feet

FILE: 4967500-WS.dwg
DWG. NO:
JOB. NO: 4-9675.00
SHEET 1 OF 1