



ALLEN & MAJOR
ASSOCIATES, INC.



SELF-STORAGE FACILITY
#15 CHESTER TURNPIKE
ALLENSTOWN, NEW HAMPSHIRE
STORMWATER MANAGEMENT PLAN

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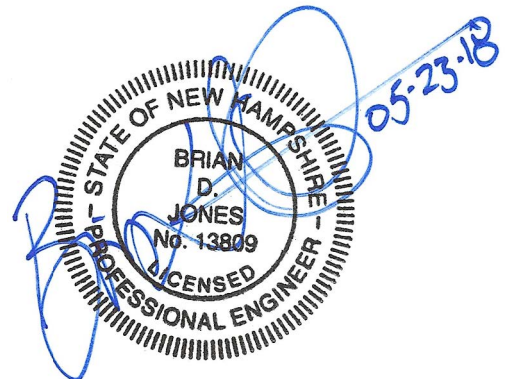
Revision 2: May 23, 2018

APPLICANT:

201 Highland, LLC
679 First NH Turnpike
Northwood, NH 03261

PREPARED BY:

Allen & Major Associates, Inc.
400 Harvey Road
Manchester, New Hampshire 03103



STORMWATER MANAGEMENT PLAN

SELF-STORAGE FACILITY
15 CHESTER TURNPIKE – ALLENSTOWN, NH

APPLICANT:

201 HIGHLAND, LLC
679 FIRST TURNPIKE
NORTHWOOD, NH 02169

OWNER:

A GROSSMAN SUNCOOK, LLC
ONE ADAMS PLACE
859 WILLARD STREET, SUITE 501
QUINCY, MA 02169

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
400 HARVEY ROAD
MANCHESTER, NEW HAMPSHIRE 03103

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SECTION 1.0

PROJECT OVERVIEW

1.0 OVERVIEW

1.1 INTRODUCTION

The purpose of this drainage report is to provide a detailed review of the stormwater runoff, both quality and quantity, as it pertains to the existing and proposed developed conditions. The report will show by means of narrative, calculations and exhibits that appropriate best management practices have been used to mitigate the impacts from the proposed development. The report will demonstrate that there is no increase in total peak rate of runoff from the site for all design storm events. The following table illustrates that an overall peak reduction of the site as a whole is achieved.

Design Storm	Peak Discharge		
	Pre-Development (cfs)	Post-Development (cfs)	Change (cfs)
SP1			
2-year	0.0	0.0	-0.0
10-year	0.0	0.0	-0.0
25-year	0.0	0.0	-0.0
50-year	0.2	0.0	-0.2
SP2			
2-year	0.0	0.0	-0.0
10-year	0.1	0.0	-0.1
25-year	0.4	0.0	-0.4
50-year	0.8	0.0	-0.8

Design Storm	Peak Volume		
	Pre-Development (cf)	Post-Development (cf)	Change (cf)
SP1			
2-year	0	0	0
10-year	154	0	-154
25-year	964	0	-964
50-year	2,251	0	-2,251
SP2			
2-year	160	0	-160
10-year	1,121	3	-1,118
25-year	2,324	43	-2,281
50-year	3,710	119	-3,591

1.2 SITE LOCATION AND DESCRIPTION

The proposed parcel that is the focus of this study is identified on the Town of Allenstown Tax Map 109 as Lot 28. The total land area for the development is 2.57 acres or 112,093± square feet. The proposed site development would convert a currently vacant property into a Self-Storage Facility.

The existing terrain scheduled for disturbance is flat to moderately sloping undeveloped woodland and brush. There is a portion of the lot that is existing gravel cover in the southern corner of the parcel. Currently, stormwater exits the site at two locations. The first, being a low point along the Chester Turnpike frontage and the second being a low point along the northeastern property line.

The disturbance area is approximately 95,000+/- square feet for the improvements to the site and associated drainage systems. This disturbance includes operations associated with the construction of the site. According to The Soil Survey of Merrimack and Belknap Counties, New Hampshire, the predominate soils of the site are identified by the US Department of Agricultural (USDA) Natural Resources Conservation Service (NRCS) as 313A Deerfield fine sandy loam and 699B Urban Land. For the purposes of the drainage analysis the Hydrological Soil Group was determined to be an “A” rating based upon the Web Soil Survey data.

The methodology is NRCS; TR-20, Type III rainfalls (2, 10, 25 & 50-year events). The Town of Allenstown Permanent (Post-Construction) Stormwater Management Ordinance requires infiltration practices to be designed to convey a minimum of a 10-year storm event without overtopping. The infiltration BMPs proposed have been designed to convey a 50-year storm event without overtopping. With the installation of these infiltration BMPs the required post-development peak flow rates and total runoff volumes have been met. All pertinent calculations represented in the following pages were developed utilizing HydroCAD Stormwater modeling software.

A stormwater analysis has been performed for two project site situations. The first analysis consists of the existing site conditions and the second consists of the proposed site conditions. There are two study points developed along the limits of the project boundaries where storm water runoff leaves the site. The study points and contributing watersheds are further outlined in the accompanying text and calculations.

1.3 EXISTING SITE CONDITIONS

The existing terrain scheduled for disturbance is flat to moderately sloping undeveloped woodland and brush. There are no buildings, parking, or landscaped areas located on site. Storm water runoff exits the site at two points along the property. In order to exhibit no increase in runoff to these points, stormwater runoff flows were analyzed at two specific “Study Points.” The included Existing Watershed Plan (EWP) outlines the boundaries and contributing watershed for the Study Points.

1. Study Point 1: This study point is an existing low point along the Chester Turnpike frontage. This is the collection point for Existing Watershed SP1. SP1 collects surface runoff from the eastern portion of the site and is primarily woodland and brush.
2. Study Point 2: This study point models the remainder of the runoff exiting the site. The location of this study point is along the south western property line. SP2 collects surface runoff from woodland and brush ground cover however, there is an area of compacted gravel which drains to SP2.

1.4 PROPOSED SITE CONDITIONS

The proposed site development would construct a Self-Storage Facility with approximately 34,290+/- square feet of storage space. Although, there is an increase in impervious cover for the site, the peak rate of runoff from the site will be mitigated through the installation of Stormcrete pervious concrete panels and Bioretention areas at either end of the development. These infiltration BMPs are nontraditional and nonstructural. These infiltration practices have been selected based upon the Town of Allenstown Permanent Stormwater Requirements, (*Section V.,B.,2., The use of nontraditional and/or nonstructural stormwater management measures shall be implemented to the maximum extent practical.*)

The disturbance area is approximately 95,000+/- square feet for the improvements to the site and associated drainage systems. This disturbance includes operations associated with the construction of the site. The reduction in runoff rate and volume is due to the installation of infiltration practices.

Site Data for Stormwater Modeling

The proposed site is comprised of approximately 84,483 square feet of impervious including pavement and roofs. Rainfall data used for modeling the stormwater runoff was derived from the “Northeast Regional Climate Center” Extreme Precipitation Tables. The storm events were broken down for the 2, 10, 25 & 50-year storms.

Hydraulic Study

A hydrologic study of the site was conducted in order to determine the impact of the proposed development on the existing storm water runoff. The study determined the rates of runoff at the two study points discussed in the existing condition analysis. The included Proposed Watershed Plan (PWP) outlines the boundaries and contributing watershed for the Study Points.

1. Study Point 1: This study point is an existing low point along the Chester Turnpike frontage. With the installation of infiltration practices the contributing area to this study point is much less than the existing model. The only contributing area is subcatchment P-8. This subcatchment area is designed to be collected within the Bioretention area in the front of the development. Both Bioretention areas have been designed to convey and infiltrate up to a 50-year storm. Therefore, there will be no discharge to SP1. All of the Stormcrete systems proposed have been designed to convey and infiltrate up to a 50-year storm. Therefore, these subcatchments will not contribute to P-8.
2. Study Point 2: This study point models the remainder of the runoff exiting the site. The location of this study point is along the south western property line. The Stormcrete systems and Bioretention areas proposed have been designed to convey and infiltrate up to a 50-year storm. Therefore, the contributing area (P-10) to SP2 has been greatly reduced. The contributing subcatchment P-10 has a groundcover of woodland.

SECTION 2.0

DISCUSSION

2.0 DISCUSSION

2.1 METHODOLOGY

The peak discharge rates were determined using techniques and data found in the following:

1. HydroCAD® Storm water Modeling System by HydroCAD Software Solutions LLC, version 10.00-18. The HydroCAD program was used to generate the runoff hydrographs for the watershed areas, to determine discharge/stage/storage characteristics for the infiltration ponds, and to perform drainage routing and to combine the results of the runoff hydrographs.
2. Soil Survey of Merrimack and Belknap Counties, New Hampshire by the United States Department of Agriculture, Natural Resources Conservation Services (NRCS). Soil types and boundaries were obtained from this reference.

2.2 PEAK DISCHARGE RATES

The stormwater runoff analysis of the existing and proposed conditions includes an estimation of the peak discharge rate from various rainfall events. Peak discharge rates were developed using NRCS TR-20, Type III rainfalls. Further, the analysis has been prepared in accordance with the NH Stormwater Management Manual and standard engineering practices. The peak discharge rate has been estimated for each watershed during the 2, 10, 25 and 50-year storm events consistent with the Town of Allenstown Permanent Stormwater Management Requirements.

The stormwater runoff model shows that the proposed site design results in no increase to the total rate of runoff during all storm events. This is accomplished through the installation and use of Stormcrete infiltration systems and Bioretention infiltration areas proposed at either end of the proposed development. The following table provides a summary of the estimated peak discharge rates for each study point during each of the design storm events. The HydroCAD worksheets are included in the Existing and Proposed Drainage Calculations section of this report. All Study points have shown a decrease in flow in Post Development verses Pre-Development.

Design Storm	Peak Discharge		
	Pre-Development (cfs)	Post-Development (cfs)	Change (cfs)
SP1			
2-year	0.0	0.0	-0.0
10-year	0.0	0.0	-0.0
25-year	0.0	0.0	-0.0
50-year	0.2	0.0	-0.2
SP2			
2-year	0.0	0.0	-0.0
10-year	0.1	0.0	-0.1
25-year	0.4	0.0	-0.4
50-year	0.8	0.0	-0.8

2.3 NONSTRUCTURAL DRAINAGE SYSTEM

A nonstructural and nontraditional drainage system is proposed in accordance with the Town of Allenstown's Permanent (Post-Construction) Stormwater Management Ordinance (Article XXV). A nonstructural design has been achieved by the use of Bioretention infiltration areas and Stormcrete precast modular porous concrete panels.

2.4 PERFORMANCE STANDARDS

Stormwater performance standards have been implemented as part of the overall stormwater management plan for the proposed development. The goal of these standards is to improve water quality and protect the waters of New Hampshire from adverse impacts due to development. The performance standards are met by implementing appropriate Best Management Practices (BMPs). BMPs were designed in accordance with the NH Stormwater Management Manual and Env.Wq. 1500. See Appendix Section 5 for water quality, recharge to groundwater, and 72-hour drawdown calculations.

BMPs implemented in the design include:

- Stormcrete™ Precast Modular Porous Concrete
- Bioretention System
- Specific maintenance schedule

2.5 OPERATION AND MAINTENANCE PLAN

General Information

Allen & Major Associates, Inc. has prepared the following Operation and Maintenance Plan for the Self-Storage project located at 15 Chester Turnpike, Allenstown, NH. The plan is broken down into the following major sections. The first section gives general information about ownership and responsibility (General Information). The next section describes the erosion and sediment control measures used during construction (Construction Period). The third section describes the long-term pollution prevention measures (Long Term Pollution Prevention Plan). The fourth section describes the proposed pervious concrete and bioretention areas (Facilities Description). The last section describes the maintenance requirements for the pervious concrete and Bioretention area (Maintenance Plan).

Contact Information

Stormwater Management System Owner: 201 Highland, LLC
679 First NH Turnpike
Northwood, NH 03261

Notification Procedures for Change of Responsibility for O&M

The Stormwater Management System (SMS) for this project is owned by 201 Highland, LLC. The owner shall be legally responsible for the long-term operation and maintenance of this SMS as outlined in this Operation and Maintenance (O&M) Plan. Should ownership of the SMS change, the owner will continue to be responsible until the succeeding owner shall notify the Town that the succeeding owner has assumed such responsibility. Upon subsequent transfers, the responsibility shall continue to be that of transferring owner until the transferee owner notifies the Town of Allenstown of its assumption of responsibility.

In the event the SMS will serve multiple lots/owners, such as the subdivision of the existing parcel, the owner(s) shall establish an association or other legally enforceable arrangements under which the association or a single party shall have legal responsibility for the operation and maintenance of the entire SMS.

Construction Period

1. Contact and meet with the Town of Allenstown Road Agent at least two (2) weeks prior to start of construction.
2. Install the tubular sediment barriers and stabilized construction access as shown on the enclosed Erosion and Sediment Control Plan.
3. Site access shall be achieved only from the designated stabilized construction entrance.
4. All erosion control measures shall be inspected weekly and after all rainfall events, and shall be maintained, repaired or replaced as required or at the direction of the owner's engineer, or the Town's Engineer.
5. Inspections shall be self-inspections with documentation maintained on site and available upon request.
6. Sediment accumulation up-gradient of the hay bales and silt fence greater than 6" in depth shall be removed and disposed of in accordance with all applicable regulations.
7. If it appears that sediment is exiting the site, silt sacks shall be installed in all catch basins adjacent to the site. Sediment accumulation on all adjacent catch basin inlets shall be removed and the silt sack replaced if torn or damaged.

-
8. The contractor shall comply with the General and Erosion Notes as shown on the Site Development Plans.

Post-Development Activities

1. Upon completion of all terrain alteration activities that direct stormwater to a particular practice, the responsible party (ies) shall initiate the O&M activities.
2. If silt sacks have been installed in catch basins adjacent to or within the site, these shall be removed prior to site occupancy. Sediment shall be disposed of in accordance with State and local requirements.
3. Paved Areas – Paved areas should be swept as part of the routine site maintenance. Pavement sweeping is an excellent source control for sedimentation to the existing drainage system and is typically performed in the spring of each year following the snow melt.
4. Salt and sand for de-icing on the paved areas during the winter months shall be limited to the minimum amount practicable.
5. All sediments removed from site drainage facilities shall be disposed of properly, and in accordance with applicable local and state regulations.
6. All vegetated areas on the site shall be stabilized and maintained to control erosion. Any disturbed areas shall be re-seeded as soon as practicable.
7. Work within any drainage structures shall performed in accordance with the latest OSHA regulations, and only by individuals with appropriate OSHA certification.
8. Maintenance Responsibilities - All post-construction maintenance activities shall be documented and kept on file and made available to the proper Town and State authorities upon request. The responsible party will be responsible for preparing a yearly log and report.
9. If ownership of the property is transferred, the new owner(s) shall become the responsible party (ies).
10. The responsible party shall perform annual site inspections which must document a review of stormwater flow paths, condition of any sediment or contaminant control devices, water quality notations, corrective actions and any time frames if unacceptable water quality runoff is noted, and the name and position of the inspector. All records of the inspections must be made available to the Town upon request.
11. As soon as any person responsible for a facility, site, activity, or operation has information of any known or suspected release of pollutants or non-stormwater discharges which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Allenstown’s municipal storm system, state waters, or waters of the United States, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release as to minimize the effects of the discharge. (If said individual is not competent to assess, contain, or clean-up, that person shall immediately notify another competent individual or firm.) If the substance poses an immediate health or safety concern, the Town of Allenstown Emergency Services must immediately be notified. If the substance does not pose an immediate concern, the Town of Allenstown Board of Health should be notified. This notification should be made as soon as possible, however, no later than twenty-four (24) hours post event. This notification does not preclude and must be made in addition to any Federal or State required notifications. The site operator/owner must be aware that discharges such as treated swimming pool water are not allowed discharges unless appropriate measures have been taken to reduce the treatment chemical concentrations in the water.

Long Term Pollution Prevention Plan

The Town of Allenstown requires that a Long-Term Pollution Prevention Plan (LTPPP) be prepared and incorporated as part of the Operation and Maintenance of the Stormwater Management System. The purpose of the LTPPP is to identify potential sources of pollution that may affect the quality of stormwater discharges, and to describe the implementation of practices to reduce the pollutants in stormwater discharges. The following items describe the source control and proper procedures for the LTPPP.

Housekeeping

The proposed site development has been designed to maintain a high level of water quality treatment for all stormwater discharge and groundwater. An Operation and Maintenance (O&M) plan has been prepared and is included in this section of the report. The Owner (or its designee) is responsible for adherence to the O&M plan in a strict and complete manner.

Storing of Materials and Waste Products

There are no proposed exterior (un-covered) storage areas. No waste products are to be stored on-site.

Vehicle Washing

Outdoor vehicle washing has the potential to result in high loads of nutrients, metals, and hydrocarbons during dry weather conditions, as the detergent-rich water used to wash the grime off the vehicle enters the stormwater drainage system. The proposed project does not include any designated vehicle washing areas, nor is it expected that any vehicle washing will take place on-site. Resident car washing or charity car wash fundraisers are not anticipated at this site and would not be allowed.

Maintenance of Lawns, Gardens and other Landscaped Areas

It should be recognized that this is a general guideline towards achieving high quality and well groomed landscaped areas. The grounds staff / landscape contractor must recognize the shortcomings of a general maintenance plan such as this and modify and/or augment it based on weekly, monthly, and yearly observations. In order to assure the highest quality conditions, the staff must also recognize and appreciate the need to be aware of the constantly changing conditions of the landscaping and be able to respond to them on a proactive basis. No trash or landscape debris (including lawn clippings) shall be stored or dumped within the landscaped or naturalized areas.

Fertilizer

Maintenance practices should be aimed at reducing environmental, mechanical and pest stresses to promote healthy and vigorous growth. When necessary, pest outbreaks should be treated with the most sensitive control measures available. Synthetic chemical controls should be used only as a last resort to organic and biological control methods. Fertilizer, synthetic chemical controls and pest management applications (when necessary) shall be performed only by licensed applicators in accordance with the manufacturer's label instructions when environmental conditions are conducive to controlled product application.

Only slow-release organic fertilizers should be used in the landscaped areas to limit the amount of nutrients that could enter downstream resource areas. Fertilization of developed areas on site will be performed within manufacturers labeling instructions and shall not exceed an NPK ratio of 1:1:1 (i.e. Triple 10 fertilizer mix), considered a low nitrogen mixture. Additionally, the fertilizer will include a slow release element.

Suggested Aeration Program

In-season aeration of lawn areas is good cultural practice and is recommended whenever feasible. It should be accomplished with a solid thin tine aeration method to reduce disruption to the use of the area. The depth

of solid tine aeration is similar to core type but should be performed when the soil is somewhat drier for a greater overall effect.

Depending on the intensity of use, it can be expected that all landscaped lawn areas will need aeration to reduce compaction at least once per year. The first operation should occur in late May following the spring season. Methods of reducing compaction will vary based on the nature of the compaction. Compaction on newly established landscaped areas is generally limited to the top 2-3" and can be alleviated using hollow core or thin tine aeration methods.

Landscape Maintenance Program Practices:

Lawn	<ul style="list-style-type: none"> ▪ Mow a minimum of once a week in spring, to a height of 2" to 2 1/2" high. Mowing should be frequent enough so that no more than 1/3 of grass blade is removed at each mowing. The top growth supports the roots; the shorter the grass is cut, the less the roots will grow. Short cutting also dries out the soil and encourages weeds to germinate. ▪ Mow approximately once every two weeks from July 1st to August 15th depending on lawn growth. ▪ Mow on a ten-day cycle in fall, when growth is stimulated by cooler nights and increased moisture. ▪ Do not remove grass clippings after mowing. ▪ Keep mower blades sharp to prevent ragged cuts on grass leaves, which cause a brownish appearance and increase the chance for disease to enter a leaf.
Shrubs	<ul style="list-style-type: none"> ▪ Mulch not more than 3" depth with shredded pine or fir bark. ▪ Hand prune annually, immediately after blooming, to remove 1/3 of the above-ground biomass (older stems). Stem removals to occur within 6" of the ground to open up shrub and maintain two-year wood (the blooming wood). ▪ Fertilize with 1/2 lb. slow-release fertilizer (see above section on Fertilizer) every second year. ▪ Hand prune evergreen shrubs only as needed to remove dead and damaged wood and to maintain the naturalistic form of the shrub. Never mechanically shear evergreen shrubs.
Trees	<ul style="list-style-type: none"> ▪ Provide aftercare for new tree plantings for the first three years. ▪ Do not fertilize trees, it artificially stimulates them (unless tree health warrants). ▪ Water once a week for the first year; twice a month the second, once a month the third year. ▪ Prune trees on a four-year cycle.

Management of Deicing Chemicals and Snow

Snow shall only be stockpiled on site within the snow storage areas depicted on the layout plan. If the stockpiles of snow do not fit within the designated areas, then snow will be disposed off-site. It will be the responsibility of the snow removal contractor to properly dispose of transported snow according to the Town of Allenstown and NHDES. It will be the responsibility of the snow removal contractor to follow these guidelines and all applicable laws and regulations.

The owner (or its designee) will be responsible for the clearing of the building entrances. The Owner may be required to use a de-icing agent such as potassium chloride to maintain a safe walking surface; however, these

are to be used at the minimum amount practicable. The de-icing agent for the walkways and building entrances will be kept within the storage rooms located within the buildings. De-icing agents will not be stored outside.

MAINTENANCE PLAN

Documentation

Maintenance documents shall include a completed maintenance checklist (attached) that will include any applicable notes or other documents as described in this section.

The Owner or its designee shall keep records of the maintenance of the Stormwater BMPs on a yearly basis. Maintenance documents shall include a completed maintenance checklist.

Nonstructural infiltration BMPs:

Stormcrete™ Precast Modular Porous Concrete: Inspection should be performed several times in the first few months and then 2-4 times per year depending upon the intensity of the use. Surfaces should be inspected for any deficiencies and accumulated sediment. Perimeter should be inspected for erosion and possible run-on situations. Inspection logs should be kept. Surfaces should be vacuumed 2 times per year. More may be necessary based on site conditions. See the included Stormcrete™ Operations & Maintenance Requirements.

Bioretention Areas: These systems should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24-hour period. Trash and debris should be removed at each inspection. At least once annually, system should be inspected for drawdown time. If Bioretention system does not drain within a 72-hours of a rainfall event, then a qualified professional should assess the conditions of the facility to determine measures required to restore filtration function or infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the filter media. Should be inspected at least annually, and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.

Other BMPs and Accessories:

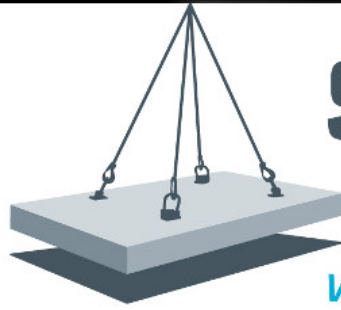
Roadways and Parking Surfaces:

Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader.

ADDITIONAL DOCUMENTATION

Stormcrete™ Operation & Maintenance Description
Operations & Maintenance Plan Schedule
Operation & Maintenance Plan Log

1-877-271-9055



STORM CRETE™

When it Rains...it's Porous™

Operation & Maintenance

Operation & Maintenance (O & M) of the StormCrete™ System has several key advantages over other porous/permeable surfaces on the market. Precast: StormCrete has consistent permeability because it is precast in a controlled environment. Porous: The entire surface area of the unit is porous as opposed to only the joints of “permeable paver” products (the joints provide a factor of savings. Replaceable: StormCrete units (one or several) can be easily removed and replaced in the event of plugging, damage or spill. Even with these advantages, all porous surfaces require ongoing maintenance to preserve permeability and service life. Typically, a minimum amount of planning and regular maintenance is more effective than rehabilitation.



Regular Inspection

Regular inspection of the StormCrete System is critical to developing a site specific maintenance program. Inspection should be performed several times in the first few months and then 2-4 times per year depending upon the intensity of use. Surfaces should be inspected for any deficiencies and accumulated sediment. Perimeter should be inspected for erosion and possible run-on situations. Inspection logs should be kept.

Routine Maintenance

As mentioned above, even with the advantages of the StormCrete System, all porous surfaces require some maintenance to preserve permeability and service life. A minimum amount of planning and regular maintenance is more effective than surface rehabilitation or replacement.

Surfaces should be vacuumed at least 2 times per year. More may be necessary based on site conditions. Well maintained Regenerative Air Vacuum sweeping equipment is recommended. Operator experience and training on both equipment and porous surfaces is essential.



Rehabilitation, Repairs, and Replacement

Small areas of clogging can be rehabilitated using focused vacuum and water pressure. If in-situ rehabilitation is not successful the StormCrete unit can be removed for additional rehab techniques (soaking, air or water pressure applied from the underside of unit, light vibration / percussion, etc). In the event of wide-spread clogging, damage, or spill the unit can be removed and replaced in almost any weather, any time of the year.

Winter Maintenance / Snow Removal

Winter operations of porous surfaces differ slightly from traditional impervious pavement. Plow edges should be well maintained and equipped with shoes. Where possible, plow passes should be made at a 45-degree angle to the slab joints. Sand should not be applied to StormCrete surfaces. The minimum amount of deicer should be used due to the stormwater function of the StormCrete System. Due to the low water to cement ratio in porous concrete, StormCrete tends to be resistant to deicing chemicals. Again, contractor training is critical to the longevity of the StormCrete System.

In cold weather climates, porous surfaces are particularly sensitive to sediment buildup. As an integral part of the SMS, the longevity and effectiveness of this significant capital investment is directly related to its care and maintenance.

We manage porous pavement as we do the entire stormwater system. We document condition and performance and restore surfaces as needed. Please [e-mail us](#) to meet your site specific O & M needs.



OPERATION & MAINTENANCE PLAN SCHEDULE

Party Responsible for O & M Plan: 201 Highland, LLC
 Project: Self-Storage Facility

Address: 15 Chester Turnpike - Allenstown, NH

Date:
 Address:
 Main Phone Number:
 O&M Main Point of Contact:

Structure or Task	Maintenance Activity	Schedule/Notes	Inspection Performed		Inspection Results
			Date:	By:	
Street Sweeping	Sweep, power broom or vacuum paved areas.	Sweep paved areas as needed, but not less than four times annually.			
Stormcrete™	See the included Stormcrete™ Operations & Maintenance Requirements	Inspect 2-4 times per year depending upon the intensity of the use			
Bioretention	Should be inspected at least annually, and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.	These systems should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24-hour period. Trash and debris should be removed at each inspection. At least once annually, system should be inspected for drawdown time. If Bioretention system does not drain within a 72-hours of a rainfall event, then a qualified professional should assess the conditions of the facility to determine measures required to restore filtration function or infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the filter media.			
Snow Storage	Debris shall be cleared from the site and properly disposed of at the end of the snow season but shall be cleared no later than May 15.	Avoid dumping snow removal over catch basins, in detention ponds, sediment forebays, rivers, wetlands, and flood plain. (See Site Plan for appropriate locations)			

- Notes: 1. This O&M Plan Schedule must be maintained by the owner and remain in onsite office at all times.
 2. Owner must keep the past 7 years of maintenance and inspection records on site.

Operation and Maintenance Plan Log During Construction

Project: Self-Storage Facility
Address: 15 Chester Turnpike
 Allenstown, NH

Company Responsible for O&M During Construction: _____

Individual responsible for Inspections & Log: _____

Erosion Control Inspection Qualifications: _____

Address: _____

Phone (24 Hour Contact Number): _____

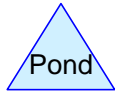
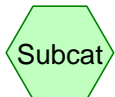
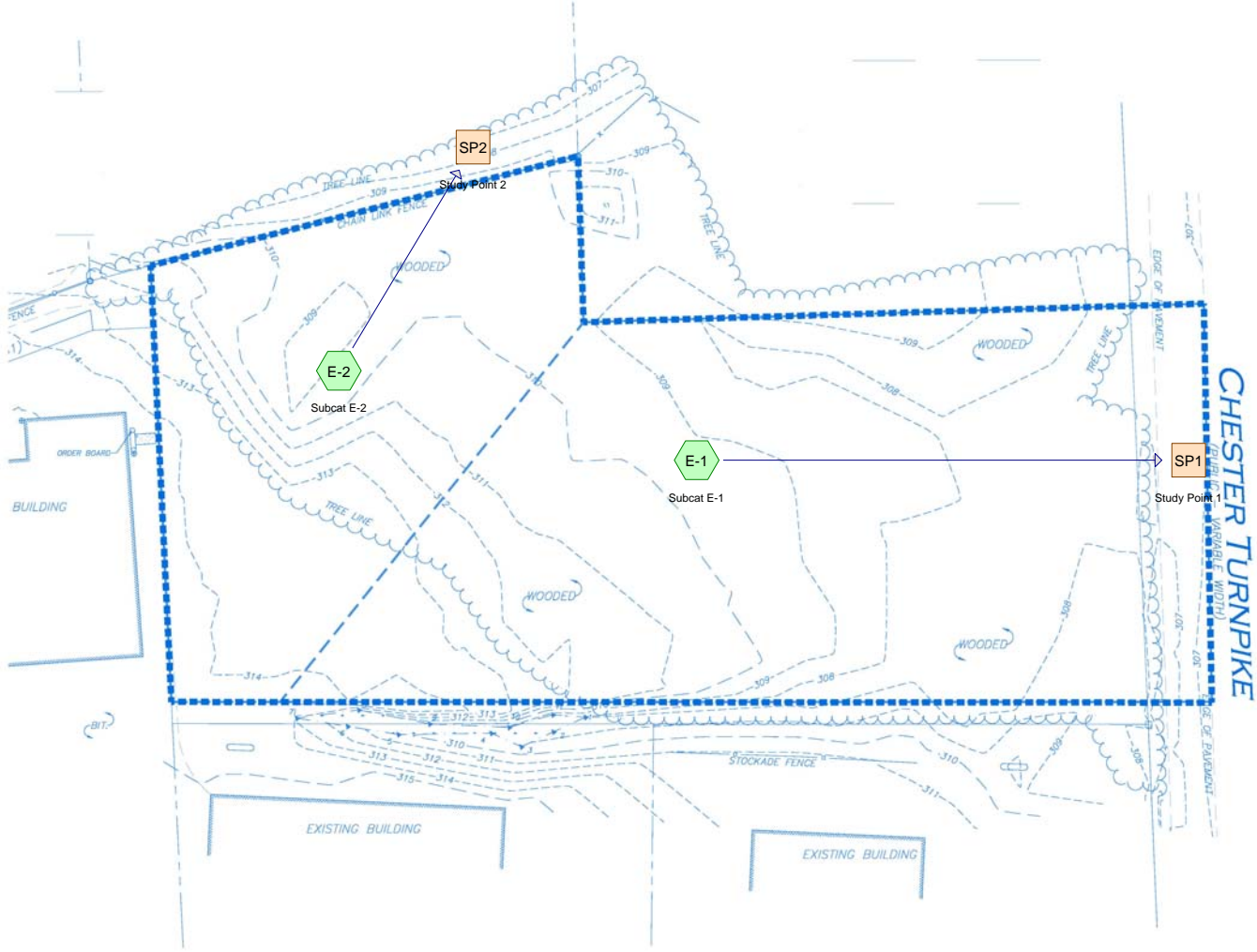
Erosion Control Measures	Weekly Inspection	Inspection Performed		Method	Notes/Remarks
	Schedule/or After Rainfall	Date	By:		
Temporary Sediment Basin				Inspect after every rainfall event during construction. Check for erosion. Maintain tubular sediment barrier along the downstream side of the basin. Upon completion of the site work, remove any sediment from the basin and dispose of in accordance with State and local requirements.	
Temporary Tree Protection				Review temporary tree protection fencing and trunk protection. Verify no machinery or construction materials are stored within the fenced area. Repair any damaged fencing. Document any damage to tree. Contact client's construction representative with any tree trunk or root damage.	
Tubular Sediment Barrier				Sediment accumulation up-gradient of the strawbales and silt fence sediment control greater than 6" in depth shall be removed and disposed of in accordance with all applicable regulations	
Construction Entrance				When silt is accumulating in the construction entrance, then the construction entrance shall be cleaned and stone replaced as necessary.	

Note: Operation and maintenance plan log shall be documented by contractor and kept within onsite construction office. Upon request, log and operation and maintenance files shall be made available to the City, State, and Federal authorities.

SECTION 3.0

PRE-DEVELOPMENT DRAINAGE CALCULATIONS

TYPE III, 2, 10, 25 & 50 YR STORM EVENT



Routing Diagram for 2047-04 Existing
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
12,234	96	Gravel surface, HSG A (E-1, E-2)
4,877	98	Paved parking, HSG A (E-1, E-2)
91,792	30	Woods, Good, HSG A (E-1, E-2)
108,903	40	TOTAL AREA

2047-04_Existing

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
108,903	HSG A	E-1, E-2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
108,903		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
12,234	0	0	0	0	12,234	Gravel surface	E-1, E-2
4,877	0	0	0	0	4,877	Paved parking	E-1, E-2
91,792	0	0	0	0	91,792	Woods, Good	E-1, E-2
108,903	0	0	0	0	108,903	TOTAL AREA	

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=72,608 sf 6.46% Impervious Runoff Depth=0.00"
Flow Length=470' Tc=14.6 min CN=36 Runoff=0.0 cfs 0 cf

Subcatchment E-2: Subcat E-2

Runoff Area=36,295 sf 0.51% Impervious Runoff Depth=0.05"
Flow Length=284' Tc=10.8 min CN=49 Runoff=0.0 cfs 160 cf

Reach SP1: Study Point 1

Inflow=0.0 cfs 0 cf
Outflow=0.0 cfs 0 cf

Reach SP2: Study Point 2

Inflow=0.0 cfs 160 cf
Outflow=0.0 cfs 160 cf

Total Runoff Area = 108,903 sf Runoff Volume = 160 cf Average Runoff Depth = 0.02"
95.52% Pervious = 104,026 sf 4.48% Impervious = 4,877 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
65,682	30	Woods, Good, HSG A
4,691	98	Paved parking, HSG A
2,235	96	Gravel surface, HSG A
72,608	36	Weighted Average
67,917		93.54% Pervious Area
4,691		6.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	70	0.0140	0.32		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
10.9	400	0.0150	0.61		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	470	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.0 cfs @ 15.11 hrs, Volume= 160 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
26,109	30	Woods, Good, HSG A
186	98	Paved parking, HSG A
10,000	96	Gravel surface, HSG A
36,295	49	Weighted Average
36,109		99.49% Pervious Area
186		0.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	84	0.0060	0.23		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
4.8	200	0.0190	0.69		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.8	284	Total			

Summary for Reach SP1: Study Point 1

Inflow Area = 72,608 sf, 6.46% Impervious, Inflow Depth = 0.00" for NRCS 2-year event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 36,295 sf, 0.51% Impervious, Inflow Depth = 0.05" for NRCS 2-year event
Inflow = 0.0 cfs @ 15.11 hrs, Volume= 160 cf
Outflow = 0.0 cfs @ 15.11 hrs, Volume= 160 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

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Type III 24-hr NRCS 10-year Rainfall=4.24"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=72,608 sf 6.46% Impervious Runoff Depth=0.03"
Flow Length=470' Tc=14.6 min CN=36 Runoff=0.0 cfs 154 cf

Subcatchment E-2: Subcat E-2

Runoff Area=36,295 sf 0.51% Impervious Runoff Depth=0.37"
Flow Length=284' Tc=10.8 min CN=49 Runoff=0.1 cfs 1,121 cf

Reach SP1: Study Point 1

Inflow=0.0 cfs 154 cf
Outflow=0.0 cfs 154 cf

Reach SP2: Study Point 2

Inflow=0.1 cfs 1,121 cf
Outflow=0.1 cfs 1,121 cf

Total Runoff Area = 108,903 sf Runoff Volume = 1,275 cf Average Runoff Depth = 0.14"
95.52% Pervious = 104,026 sf 4.48% Impervious = 4,877 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 0.0 cfs @ 20.91 hrs, Volume= 154 cf, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
65,682	30	Woods, Good, HSG A
4,691	98	Paved parking, HSG A
2,235	96	Gravel surface, HSG A
72,608	36	Weighted Average
67,917		93.54% Pervious Area
4,691		6.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	70	0.0140	0.32		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
10.9	400	0.0150	0.61		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	470	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.1 cfs @ 12.39 hrs, Volume= 1,121 cf, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
26,109	30	Woods, Good, HSG A
186	98	Paved parking, HSG A
10,000	96	Gravel surface, HSG A
36,295	49	Weighted Average
36,109		99.49% Pervious Area
186		0.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	84	0.0060	0.23		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
4.8	200	0.0190	0.69		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.8	284	Total			

Summary for Reach SP1: Study Point 1

Inflow Area = 72,608 sf, 6.46% Impervious, Inflow Depth = 0.03" for NRCS 10-year event
Inflow = 0.0 cfs @ 20.91 hrs, Volume= 154 cf
Outflow = 0.0 cfs @ 20.91 hrs, Volume= 154 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 36,295 sf, 0.51% Impervious, Inflow Depth = 0.37" for NRCS 10-year event
Inflow = 0.1 cfs @ 12.39 hrs, Volume= 1,121 cf
Outflow = 0.1 cfs @ 12.39 hrs, Volume= 1,121 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

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Type III 24-hr NRCS 25-year Rainfall=5.32"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=72,608 sf 6.46% Impervious Runoff Depth=0.16"
Flow Length=470' Tc=14.6 min CN=36 Runoff=0.0 cfs 964 cf

Subcatchment E-2: Subcat E-2

Runoff Area=36,295 sf 0.51% Impervious Runoff Depth=0.77"
Flow Length=284' Tc=10.8 min CN=49 Runoff=0.4 cfs 2,324 cf

Reach SP1: Study Point 1

Inflow=0.0 cfs 964 cf
Outflow=0.0 cfs 964 cf

Reach SP2: Study Point 2

Inflow=0.4 cfs 2,324 cf
Outflow=0.4 cfs 2,324 cf

Total Runoff Area = 108,903 sf Runoff Volume = 3,288 cf Average Runoff Depth = 0.36"
95.52% Pervious = 104,026 sf 4.48% Impervious = 4,877 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 0.0 cfs @ 13.90 hrs, Volume= 964 cf, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
65,682	30	Woods, Good, HSG A
4,691	98	Paved parking, HSG A
2,235	96	Gravel surface, HSG A
72,608	36	Weighted Average
67,917		93.54% Pervious Area
4,691		6.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	70	0.0140	0.32		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
10.9	400	0.0150	0.61		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	470	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.4 cfs @ 12.20 hrs, Volume= 2,324 cf, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
26,109	30	Woods, Good, HSG A
186	98	Paved parking, HSG A
10,000	96	Gravel surface, HSG A
36,295	49	Weighted Average
36,109		99.49% Pervious Area
186		0.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	84	0.0060	0.23		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
4.8	200	0.0190	0.69		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.8	284	Total			

Summary for Reach SP1: Study Point 1

Inflow Area = 72,608 sf, 6.46% Impervious, Inflow Depth = 0.16" for NRCS 25-year event
Inflow = 0.0 cfs @ 13.90 hrs, Volume= 964 cf
Outflow = 0.0 cfs @ 13.90 hrs, Volume= 964 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 36,295 sf, 0.51% Impervious, Inflow Depth = 0.77" for NRCS 25-year event
Inflow = 0.4 cfs @ 12.20 hrs, Volume= 2,324 cf
Outflow = 0.4 cfs @ 12.20 hrs, Volume= 2,324 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

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Type III 24-hr NRCS 50-year Rainfall=6.32"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E-1: Subcat E-1

Runoff Area=72,608 sf 6.46% Impervious Runoff Depth=0.37"
Flow Length=470' Tc=14.6 min CN=36 Runoff=0.2 cfs 2,251 cf

Subcatchment E-2: Subcat E-2

Runoff Area=36,295 sf 0.51% Impervious Runoff Depth=1.23"
Flow Length=284' Tc=10.8 min CN=49 Runoff=0.8 cfs 3,710 cf

Reach SP1: Study Point 1

Inflow=0.2 cfs 2,251 cf
Outflow=0.2 cfs 2,251 cf

Reach SP2: Study Point 2

Inflow=0.8 cfs 3,710 cf
Outflow=0.8 cfs 3,710 cf

Total Runoff Area = 108,903 sf Runoff Volume = 5,961 cf Average Runoff Depth = 0.66"
95.52% Pervious = 104,026 sf 4.48% Impervious = 4,877 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 0.2 cfs @ 12.52 hrs, Volume= 2,251 cf, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
65,682	30	Woods, Good, HSG A
4,691	98	Paved parking, HSG A
2,235	96	Gravel surface, HSG A
72,608	36	Weighted Average
67,917		93.54% Pervious Area
4,691		6.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	70	0.0140	0.32		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
10.9	400	0.0150	0.61		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
14.6	470	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.8 cfs @ 12.18 hrs, Volume= 3,710 cf, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
26,109	30	Woods, Good, HSG A
186	98	Paved parking, HSG A
10,000	96	Gravel surface, HSG A
36,295	49	Weighted Average
36,109		99.49% Pervious Area
186		0.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	84	0.0060	0.23		Sheet Flow, A-B Fallow n= 0.050 P2= 2.93"
4.8	200	0.0190	0.69		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.8	284	Total			

Summary for Reach SP1: Study Point 1

Inflow Area = 72,608 sf, 6.46% Impervious, Inflow Depth = 0.37" for NRCS 50-year event
Inflow = 0.2 cfs @ 12.52 hrs, Volume= 2,251 cf
Outflow = 0.2 cfs @ 12.52 hrs, Volume= 2,251 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

Inflow Area = 36,295 sf, 0.51% Impervious, Inflow Depth = 1.23" for NRCS 50-year event
Inflow = 0.8 cfs @ 12.18 hrs, Volume= 3,710 cf
Outflow = 0.8 cfs @ 12.18 hrs, Volume= 3,710 cf, Atten= 0%, Lag= 0.0 min

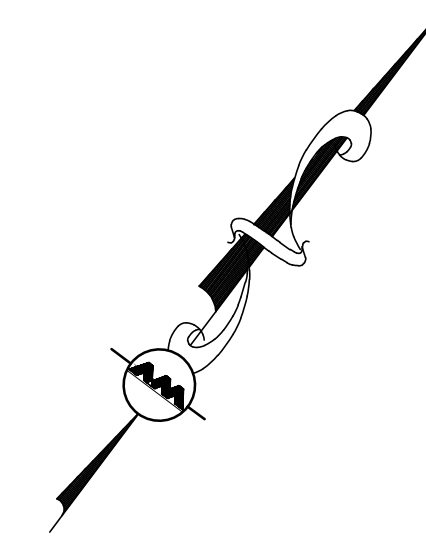
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

SUMMARY OF AREAS

DRAINAGE AREA	AREA (FEET)	CN
E1	36,295	48
E2	72,608	36
SITE TOTAL	102,276	40.0

LEGEND

- EXISTING WATERSHED: [Dashed line]
- SCS SOILS BOUNDARY: [Dotted line]
- Tc FLOW PATH: [Line with arrow]
- SUBCATCHMENT LABEL: [Hexagon with 'E-1']
- SUBCATCHMENT BOUNDARY: [Dashed line]
- FLOW DIRECTION: [Arrow]



STUDY POINT 2

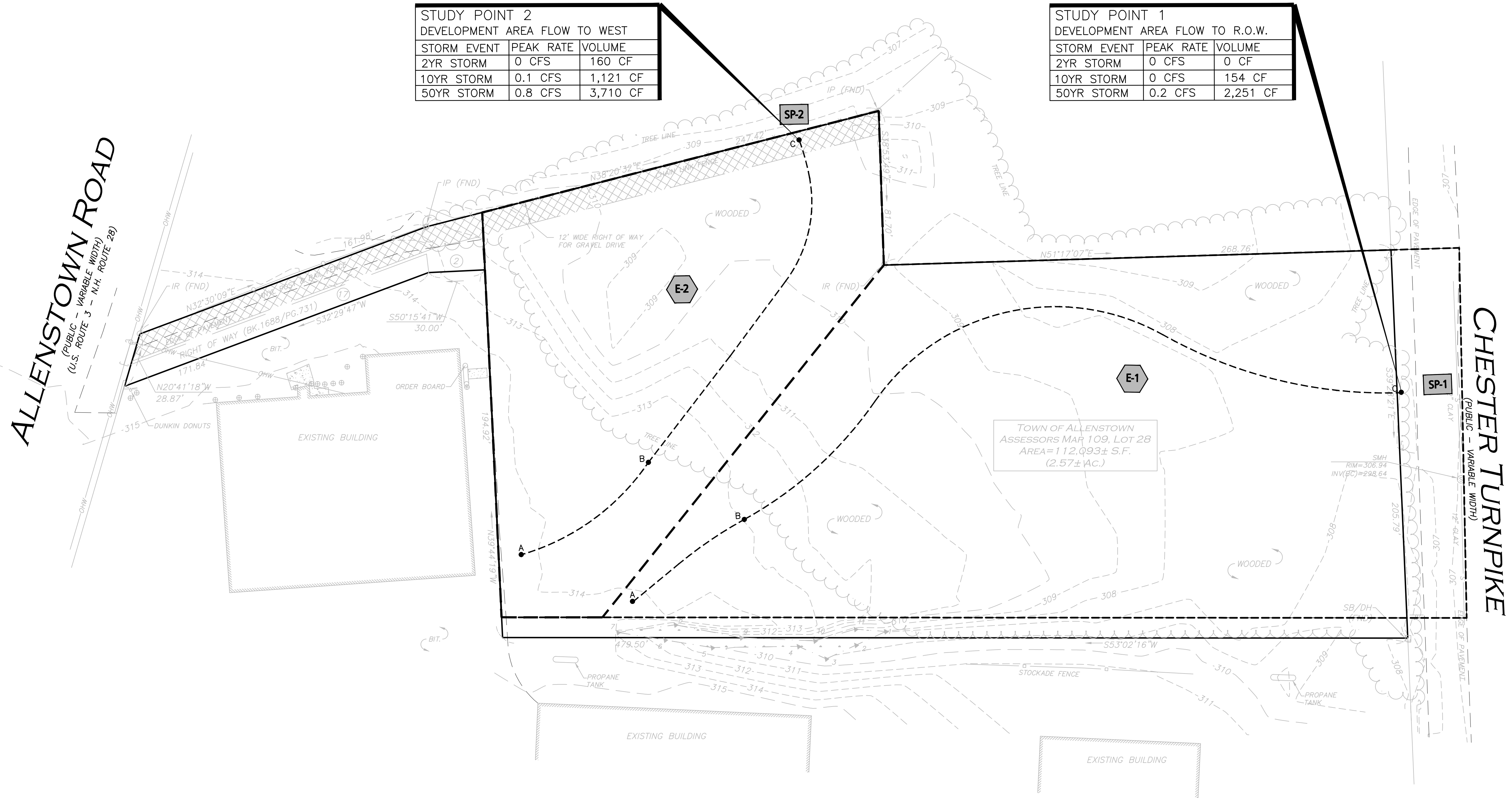
DEVELOPMENT AREA FLOW TO WEST

STORM EVENT	PEAK RATE	VOLUME
2YR STORM	0 CFS	160 CF
10YR STORM	0.1 CFS	1,121 CF
50YR STORM	0.8 CFS	3,710 CF

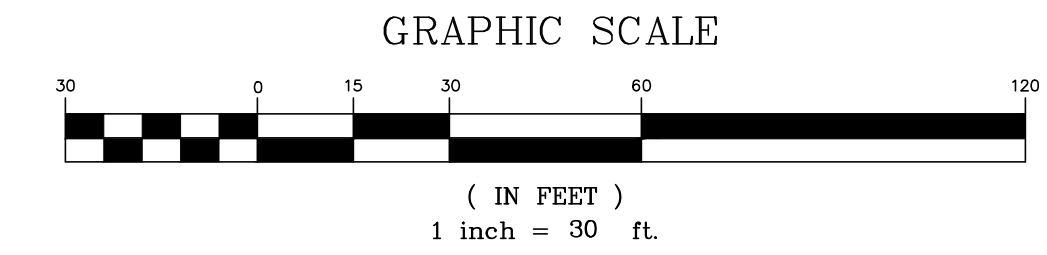
STUDY POINT 1

DEVELOPMENT AREA FLOW TO R.O.W.

STORM EVENT	PEAK RATE	VOLUME
2YR STORM	0 CFS	0 CF
10YR STORM	0 CFS	154 CF
50YR STORM	0.2 CFS	2,251 CF



TOWN OF ALLENSTOWN
ASSESSORS MAR 109, LOT 28
AREA=112,093± S.F.
(2.57± AC.)



REV	DATE	DESCRIPTION

APPLICANT:
201 HIGHLAND, LLC
679 FIRST NH TPK
NORTHWOOD, NH 03261

PROJECT:
SELF STORAGE FACILITY
15 CHESTER TURNPIKE
MAP 109, LOT 028
ALLENSTOWN, NH 03275

PROJECT NO.	2047-04A	DATE:	04-04-18
SCALE:	1"=30'	DWG. NAME:	C-2047-04
DRAFTED BY:	BDJ	CHECKED BY:	BDJ

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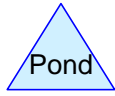
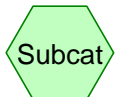
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DRAWING TITLE:	SHEET No.
EXISTING WATERSHED PLAN	EWP

SECTION 4.0

POST-DEVELOPMENT DRAINAGE CALCULATIONS

TYPE III, 2, 10, 25 & 50 YR STORM EVENT



Routing Diagram for 2047-04_Proposed
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
17,636	39	>75% Grass cover, Good, HSG A (P-1, P-10, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9)
1,470	96	Gravel surface, HSG A (P-7, P-8, P-9)
50,193	98	Paved parking, HSG A (P-1, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9)
34,290	98	Roofs, HSG A (P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9)
5,313	30	Woods, Good, HSG A (P-1, P-10, P-2, P-3, P-4, P-5, P-8)
108,903	85	TOTAL AREA

2047-04_Proposed

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
108,903	HSG A	P-1, P-10, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
108,903		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
17,636	0	0	0	0	17,636	>75% Grass cover, Good	P-1, P-10, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9
1,470	0	0	0	0	1,470	Gravel surface	P-7, P-8, P-9
50,193	0	0	0	0	50,193	Paved parking	P-1, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9
34,290	0	0	0	0	34,290	Roofs	P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9
5,313	0	0	0	0	5,313	Woods, Good	P-1, P-10, P-2, P-3, P-4, P-5, P-8
108,903	0	0	0	0	108,903	TOTAL AREA	

Notes Listing (all nodes)

Line#	Node Number	Notes
1	1P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
2	2P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
3	3P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
4	4P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
5	5P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
6	6P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
7	7P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
8	9P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour
9	10P	Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1	Runoff Area=3,912 sf 90.19% Impervious Runoff Depth=2.02" Tc=0.0 min CN=92 Runoff=0.3 cfs 658 cf
Subcatchment P-10: Subcat P-10	Runoff Area=5,260 sf 0.00% Impervious Runoff Depth=0.00" Tc=5.0 min CN=34 Runoff=0.0 cfs 0 cf
Subcatchment P-2: Subcat P-2	Runoff Area=12,283 sf 88.05% Impervious Runoff Depth=1.93" Tc=0.0 min CN=91 Runoff=0.8 cfs 1,977 cf
Subcatchment P-3: Subcat P-3	Runoff Area=12,158 sf 88.96% Impervious Runoff Depth=1.93" Tc=5.0 min CN=91 Runoff=0.6 cfs 1,957 cf
Subcatchment P-4: Subcat P-4	Runoff Area=10,161 sf 89.81% Impervious Runoff Depth=2.02" Tc=5.0 min CN=92 Runoff=0.6 cfs 1,710 cf
Subcatchment P-5: Subcat P-5	Runoff Area=10,218 sf 93.17% Impervious Runoff Depth=2.21" Tc=5.0 min CN=94 Runoff=0.6 cfs 1,878 cf
Subcatchment P-6: Subcat P-6	Runoff Area=13,371 sf 96.66% Impervious Runoff Depth=2.40" Tc=5.0 min CN=96 Runoff=0.8 cfs 2,679 cf
Subcatchment P-7: Subcat P-7	Runoff Area=13,607 sf 92.87% Impervious Runoff Depth=2.21" Tc=5.0 min CN=94 Runoff=0.8 cfs 2,501 cf
Subcatchment P-8: Subcat P-8	Runoff Area=16,013 sf 59.88% Impervious Runoff Depth=0.92" Tc=0.0 min CN=76 Runoff=0.5 cfs 1,222 cf
Subcatchment P-9: Subcat P-9	Runoff Area=11,920 sf 46.38% Impervious Runoff Depth=0.63" Tc=5.0 min CN=70 Runoff=0.2 cfs 628 cf
Reach SP1: Study Point 1	Inflow=0.0 cfs 0 cf Outflow=0.0 cfs 0 cf
Reach SP2: Study Point 2	Inflow=0.0 cfs 0 cf Outflow=0.0 cfs 0 cf
Pond 1P: Stormcrete#1	Peak Elev=307.05' Storage=11 cf Inflow=0.3 cfs 658 cf Discarded=0.2 cfs 660 cf Primary=0.0 cfs 0 cf Outflow=0.2 cfs 660 cf
Pond 2P: Stormcrete#2	Peak Elev=307.28' Storage=165 cf Inflow=0.8 cfs 1,977 cf Discarded=0.3 cfs 1,981 cf Primary=0.0 cfs 0 cf Outflow=0.3 cfs 1,981 cf
Pond 3P: Stormcrete#3	Peak Elev=307.58' Storage=153 cf Inflow=0.6 cfs 1,957 cf Discarded=0.3 cfs 1,960 cf Primary=0.0 cfs 0 cf Outflow=0.3 cfs 1,960 cf
Pond 4P: Stormcrete#4	Peak Elev=307.86' Storage=122 cf Inflow=0.6 cfs 1,710 cf Discarded=0.3 cfs 1,712 cf Primary=0.0 cfs 0 cf Outflow=0.3 cfs 1,712 cf
Pond 5P: Stormcrete#5	Peak Elev=308.27' Storage=147 cf Inflow=0.6 cfs 1,878 cf Discarded=0.3 cfs 1,879 cf Primary=0.0 cfs 0 cf Outflow=0.3 cfs 1,879 cf
Pond 6P: Stormcrete#6	Peak Elev=308.97' Storage=211 cf Inflow=0.8 cfs 2,679 cf Discarded=0.4 cfs 2,681 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 2,681 cf
Pond 7P: Stormcrete#7	Peak Elev=309.53' Storage=147 cf Inflow=0.8 cfs 2,501 cf Discarded=0.5 cfs 2,504 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 2,504 cf
Pond 9P: Bio-Retention	Peak Elev=305.59' Storage=67 cf Inflow=0.5 cfs 1,222 cf Discarded=0.3 cfs 1,223 cf Primary=0.0 cfs 0 cf Outflow=0.3 cfs 1,223 cf
Pond 10P: Bio-Retention	Peak Elev=310.54' Storage=11 cf Inflow=0.2 cfs 628 cf Discarded=0.2 cfs 628 cf Primary=0.0 cfs 0 cf Outflow=0.2 cfs 628 cf

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Total Runoff Area = 108,903 sf Runoff Volume = 15,211 cf Average Runoff Depth = 1.68"
22.42% Pervious = 24,420 sf 77.58% Impervious = 84,483 sf

Summary for Subcatchment P-1: Subcat P-1

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.3 cfs @ 12.00 hrs, Volume= 658 cf, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
246	30	Woods, Good, HSG A
138	39	>75% Grass cover, Good, HSG A
3,528	98	Paved parking, HSG A
3,912	92	Weighted Average
384		9.81% Pervious Area
3,528		90.19% Impervious Area

Summary for Subcatchment P-10: Subcat P-10

[45] Hint: Runoff=Zero

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
3,136	30	Woods, Good, HSG A
2,124	39	>75% Grass cover, Good, HSG A
5,260	34	Weighted Average
5,260		100.00% Pervious Area

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

Summary for Subcatchment P-2: Subcat P-2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.8 cfs @ 12.00 hrs, Volume= 1,977 cf, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
580	30	Woods, Good, HSG A
530	39	>75% Grass cover, Good, HSG A
5,816	98	Paved parking, HSG A
358	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
12,283	91	Weighted Average
1,467		11.95% Pervious Area
10,816		88.05% Impervious Area

Summary for Subcatchment P-3: Subcat P-3

Runoff = 0.6 cfs @ 12.07 hrs, Volume= 1,957 cf, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 2-year Rainfall=2.85"

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Area (sf)	CN	Description
469	30	Woods, Good, HSG A
343	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
5,816	98	Paved parking, HSG A
530	39	>75% Grass cover, Good, HSG A
12,158	91	Weighted Average
1,342		11.04% Pervious Area
10,816		88.96% Impervious Area

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

Summary for Subcatchment P-4: Subcat P-4

Runoff = 0.6 cfs @ 12.07 hrs, Volume= 1,710 cf, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
309	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,376	98	Paved parking, HSG A
279	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,161	92	Weighted Average
1,035		10.19% Pervious Area
9,126		89.81% Impervious Area

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

Summary for Subcatchment P-5: Subcat P-5

Runoff = 0.6 cfs @ 12.07 hrs, Volume= 1,878 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
109	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,770	98	Paved parking, HSG A
142	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,218	94	Weighted Average
698		6.83% Pervious Area
9,520		93.17% Impervious Area

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

Summary for Subcatchment P-6: Subcat P-6

Runoff = 0.8 cfs @ 12.07 hrs, Volume= 2,679 cf, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Area (sf)	CN	Description
447	39	>75% Grass cover, Good, HSG A
7,584	98	Paved parking, HSG A
5,340	98	Roofs, HSG A
13,371	96	Weighted Average
447		3.34% Pervious Area
12,924		96.66% Impervious Area

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

Summary for Subcatchment P-7: Subcat P-7

Runoff = 0.8 cfs @ 12.07 hrs, Volume= 2,501 cf, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
924	39	>75% Grass cover, Good, HSG A
7,687	98	Paved parking, HSG A
28	39	>75% Grass cover, Good, HSG A
4,950	98	Roofs, HSG A
17	96	Gravel surface, HSG A
13,607	94	Weighted Average
970		7.13% Pervious Area
12,637		92.87% Impervious Area

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

Summary for Subcatchment P-8: Subcat P-8

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.5 cfs @ 12.00 hrs, Volume= 1,222 cf, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

Area (sf)	CN	Description
4,741	39	>75% Grass cover, Good, HSG A
2,900	98	Roofs, HSG A
6,688	98	Paved parking, HSG A
627	96	Gravel surface, HSG A
593	39	>75% Grass cover, Good, HSG A
21	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
437	30	Woods, Good, HSG A
4	30	Woods, Good, HSG A
16,013	76	Weighted Average
6,425		40.12% Pervious Area
9,588		59.88% Impervious Area

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.2 cfs @ 12.09 hrs, Volume= 628 cf, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 2-year Rainfall=2.85"

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Area (sf)	CN	Description
3,600	98	Roofs, HSG A
1,929	98	Paved parking, HSG A
826	96	Gravel surface, HSG A
5,565	39	>75% Grass cover, Good, HSG A
11,920	70	Weighted Average
6,391		53.62% Pervious Area
5,529		46.38% Impervious Area

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

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 0.00" for NRCS 2-year event
 Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,260 sf, 0.00% Impervious, Inflow Depth = 0.00" for NRCS 2-year event
 Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Stormcrete #1

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=593)

Inflow Area = 3,912 sf, 90.19% Impervious, Inflow Depth = 2.02" for NRCS 2-year event
 Inflow = 0.3 cfs @ 12.00 hrs, Volume= 658 cf
 Outflow = 0.2 cfs @ 12.05 hrs, Volume= 660 cf, Atten= 25%, Lag= 2.7 min
 Discarded = 0.2 cfs @ 12.05 hrs, Volume= 660 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 307.05' @ 12.05 hrs Surf.Area= 580 sf Storage= 11 cf
 Flood Elev= 309.50' Surf.Area= 580 sf Storage= 580 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.1 min (796.6 - 796.4)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	580 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 1,450 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.00	580	298.0	0	0	580
309.50	580	298.0	1,450	1,450	1,325

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 301.75'
#2	Primary	309.50'	145.0' long Overflow X 2.00 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=0.2 cfs @ 12.05 hrs HW=307.05' (Free Discharge)

↑1=Exfiltration (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.00' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 2P: Stormcrete #2

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=573)

Inflow Area = 12,283 sf, 88.05% Impervious, Inflow Depth = 1.93" for NRCS 2-year event
 Inflow = 0.8 cfs @ 12.00 hrs, Volume= 1,977 cf
 Outflow = 0.3 cfs @ 12.10 hrs, Volume= 1,981 cf, Atten= 57%, Lag= 6.0 min
 Discarded = 0.3 cfs @ 12.10 hrs, Volume= 1,981 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 307.28' @ 12.10 hrs Surf.Area= 916 sf Storage= 165 cf
 Flood Elev= 309.83' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.8 min (803.1 - 801.3)

Volume	Invert	Avail.Storage	Storage Description
#1	306.83'	1,099 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.83	916	466.0	0	0	916
309.83	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	306.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	309.83'	237.0' long Overflow X 2.00 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=0.3 cfs @ 12.10 hrs HW=307.28' (Free Discharge)

↑1=Exfiltration (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=306.83' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 3P: Stormcrete #3

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=575)

Inflow Area = 12,158 sf, 88.96% Impervious, Inflow Depth = 1.93" for NRCS 2-year event
 Inflow = 0.6 cfs @ 12.07 hrs, Volume= 1,957 cf
 Outflow = 0.3 cfs @ 12.20 hrs, Volume= 1,960 cf, Atten= 50%, Lag= 7.9 min
 Discarded = 0.3 cfs @ 12.20 hrs, Volume= 1,960 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 307.58' @ 12.20 hrs Surf.Area= 916 sf Storage= 153 cf
 Flood Elev= 310.16' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.7 min (807.7 - 805.9)

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Volume	Invert	Avail.Storage	Storage Description
#1	307.16'	1,099 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.16	916	466.0	0	0	916
310.16	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.16'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	310.16'	237.0' long Overflow X 2.00 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=0.3 cfs @ 12.20 hrs HW=307.58' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.16' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 4P: Stormcrete #4

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=577)

Inflow Area = 10,161 sf, 89.81% Impervious, Inflow Depth = 2.02" for NRCS 2-year event
 Inflow = 0.6 cfs @ 12.07 hrs, Volume= 1,710 cf
 Outflow = 0.3 cfs @ 12.19 hrs, Volume= 1,712 cf, Atten= 48%, Lag= 7.3 min
 Discarded = 0.3 cfs @ 12.19 hrs, Volume= 1,712 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 307.86' @ 12.19 hrs Surf.Area= 836 sf Storage= 122 cf
 Flood Elev= 310.50' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.5 min (802.5 - 801.1)

Volume	Invert	Avail.Storage	Storage Description
#1	307.50'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.50	836	426.0	0	0	836
310.50	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.80'
#2	Primary	310.50'	217.0' long Overflow X 2.00 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=0.3 cfs @ 12.19 hrs HW=307.86' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.50' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 5P: Stormcrete #5

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=575)

Inflow Area = 10,218 sf, 93.17% Impervious, Inflow Depth = 2.21" for NRCS 2-year event
 Inflow = 0.6 cfs @ 12.07 hrs, Volume= 1,878 cf
 Outflow = 0.3 cfs @ 12.20 hrs, Volume= 1,879 cf, Atten= 50%, Lag= 7.9 min
 Discarded = 0.3 cfs @ 12.20 hrs, Volume= 1,879 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 308.27' @ 12.20 hrs Surf.Area= 836 sf Storage= 147 cf
 Flood Elev= 310.83' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.8 min (791.9 - 790.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	307.83'	1,003 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
307.83	836	426.0	0	0	836	
310.83	836	426.0	2,508	2,508	2,114	

Device	Routing	Invert	Outlet Devices									
#1	Discarded	307.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 303.50'									
#2	Primary	310.83'	217.0' long Overflow X 2.00									
			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=0.3 cfs @ 12.20 hrs HW=308.27' (Free Discharge)
 ↳1=Exfiltration (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.83' (Free Discharge)
 ↳2=Overflow (Controls 0.0 cfs)

Summary for Pond 6P: Stormcrete #6

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=574)

Inflow Area = 13,371 sf, 96.66% Impervious, Inflow Depth = 2.40" for NRCS 2-year event
 Inflow = 0.8 cfs @ 12.07 hrs, Volume= 2,679 cf
 Outflow = 0.4 cfs @ 12.20 hrs, Volume= 2,681 cf, Atten= 51%, Lag= 8.0 min
 Discarded = 0.4 cfs @ 12.20 hrs, Volume= 2,681 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 308.97' @ 12.20 hrs Surf.Area= 1,134 sf Storage= 211 cf
 Flood Elev= 311.16' Surf.Area= 1,134 sf Storage= 1,207 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.9 min (778.3 - 776.5)

Volume	Invert	Avail.Storage	Storage Description			
#1	308.50'	1,207 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 3,016 cf Overall x 40.0% Voids			

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.50	1,134	575.0	0	0	1,134
311.16	1,134	575.0	3,016	3,016	2,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 304.20'
#2	Primary	311.16'	295.0' long Overflow
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50			
Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32			

Discarded OutFlow Max=0.4 cfs @ 12.20 hrs HW=308.97' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=308.50' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 7P: Stormcrete #7

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=581)

Inflow Area = 13,607 sf, 92.87% Impervious, Inflow Depth = 2.21" for NRCS 2-year event
 Inflow = 0.8 cfs @ 12.07 hrs, Volume= 2,501 cf
 Outflow = 0.5 cfs @ 12.17 hrs, Volume= 2,504 cf, Atten= 43%, Lag= 6.2 min
 Discarded = 0.5 cfs @ 12.17 hrs, Volume= 2,504 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.53' @ 12.17 hrs Surf.Area= 1,314 sf Storage= 147 cf
 Flood Elev= 311.50' Surf.Area= 1,314 sf Storage= 1,183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (791.1 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	309.25'	1,183 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,957 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.25	1,314	515.0	0	0	1,314
311.50	1,314	515.0	2,957	2,957	2,473

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.25'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 305.25'
#2	Primary	311.50'	262.5' long Overflow
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=0.5 cfs @ 12.17 hrs HW=309.53' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=309.25' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 9P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=579)

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Type III 24-hr NRCS 2-year Rainfall=2.85"

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Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 0.92" for NRCS 2-year event
 Inflow = 0.5 cfs @ 12.00 hrs, Volume= 1,222 cf
 Outflow = 0.3 cfs @ 12.09 hrs, Volume= 1,223 cf, Atten= 45%, Lag= 5.2 min
 Discarded = 0.3 cfs @ 12.09 hrs, Volume= 1,223 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 305.59' @ 12.09 hrs Surf.Area= 743 sf Storage= 67 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.9 min (858.0 - 857.1)

Volume	Invert	Avail.Storage	Storage Description
#1	305.50'	2,126 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)
305.50	668	214.0	0	0	668
306.00	1,109	226.0	440	440	1,102
307.00	2,339	287.0	1,686	2,126	3,606

Device	Routing	Invert	Outlet Devices
#1	Primary	307.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	305.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

Discarded OutFlow Max=0.3 cfs @ 12.09 hrs HW=305.59' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.50' TW=0.00' (Dynamic Tailwater)
 ↑**1=Overflow** (Controls 0.0 cfs)

Summary for Pond 10P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

Inflow Area = 11,920 sf, 46.38% Impervious, Inflow Depth = 0.63" for NRCS 2-year event
 Inflow = 0.2 cfs @ 12.09 hrs, Volume= 628 cf
 Outflow = 0.2 cfs @ 12.12 hrs, Volume= 628 cf, Atten= 9%, Lag= 2.1 min
 Discarded = 0.2 cfs @ 12.12 hrs, Volume= 628 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.54' @ 12.12 hrs Surf.Area= 329 sf Storage= 11 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.2 min (884.3 - 884.1)

Volume	Invert	Avail.Storage	Storage Description
#1	310.50'	7,154 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)
310.50	269	202.0	0	0	269
311.00	1,654	299.0	432	432	4,138
312.00	3,229	330.0	2,398	2,830	5,721
313.00	5,521	410.0	4,324	7,154	10,447

Device	Routing	Invert	Outlet Devices
#1	Primary	313.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	310.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

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Discarded OutFlow Max=0.2 cfs @ 12.12 hrs HW=310.54' (Free Discharge)

↑**2=Exfiltration** (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=310.50' (Free Discharge)

↑**1=Overflow** (Controls 0.0 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1	Runoff Area=3,912 sf 90.19% Impervious Runoff Depth=3.35" Tc=0.0 min CN=92 Runoff=0.4 cfs 1,092 cf
Subcatchment P-10: Subcat P-10	Runoff Area=5,260 sf 0.00% Impervious Runoff Depth=0.01" Tc=5.0 min CN=34 Runoff=0.0 cfs 3 cf
Subcatchment P-2: Subcat P-2	Runoff Area=12,283 sf 88.05% Impervious Runoff Depth=3.25" Tc=0.0 min CN=91 Runoff=1.3 cfs 3,324 cf
Subcatchment P-3: Subcat P-3	Runoff Area=12,158 sf 88.96% Impervious Runoff Depth=3.25" Tc=5.0 min CN=91 Runoff=1.1 cfs 3,290 cf
Subcatchment P-4: Subcat P-4	Runoff Area=10,161 sf 89.81% Impervious Runoff Depth=3.35" Tc=5.0 min CN=92 Runoff=0.9 cfs 2,836 cf
Subcatchment P-5: Subcat P-5	Runoff Area=10,218 sf 93.17% Impervious Runoff Depth=3.56" Tc=5.0 min CN=94 Runoff=1.0 cfs 3,031 cf
Subcatchment P-6: Subcat P-6	Runoff Area=13,371 sf 96.66% Impervious Runoff Depth=3.78" Tc=5.0 min CN=96 Runoff=1.3 cfs 4,209 cf
Subcatchment P-7: Subcat P-7	Runoff Area=13,607 sf 92.87% Impervious Runoff Depth=3.56" Tc=5.0 min CN=94 Runoff=1.3 cfs 4,036 cf
Subcatchment P-8: Subcat P-8	Runoff Area=16,013 sf 59.88% Impervious Runoff Depth=1.92" Tc=0.0 min CN=76 Runoff=1.0 cfs 2,568 cf
Subcatchment P-9: Subcat P-9	Runoff Area=11,920 sf 46.38% Impervious Runoff Depth=1.49" Tc=5.0 min CN=70 Runoff=0.5 cfs 1,482 cf
Reach SP1: Study Point 1	Inflow=0.0 cfs 0 cf Outflow=0.0 cfs 0 cf
Reach SP2: Study Point 2	Inflow=0.0 cfs 3 cf Outflow=0.0 cfs 3 cf
Pond 1P: Stormcrete#1	Peak Elev=307.30' Storage=71 cf Inflow=0.4 cfs 1,092 cf Discarded=0.2 cfs 1,092 cf Primary=0.0 cfs 0 cf Outflow=0.2 cfs 1,092 cf
Pond 2P: Stormcrete#2	Peak Elev=308.15' Storage=484 cf Inflow=1.3 cfs 3,324 cf Discarded=0.4 cfs 3,327 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 3,327 cf
Pond 3P: Stormcrete#3	Peak Elev=308.46' Storage=475 cf Inflow=1.1 cfs 3,290 cf Discarded=0.4 cfs 3,293 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 3,293 cf
Pond 4P: Stormcrete#4	Peak Elev=308.63' Storage=379 cf Inflow=0.9 cfs 2,836 cf Discarded=0.3 cfs 2,837 cf Primary=0.0 cfs 0 cf Outflow=0.3 cfs 2,837 cf
Pond 5P: Stormcrete#5	Peak Elev=309.07' Storage=413 cf Inflow=1.0 cfs 3,031 cf Discarded=0.4 cfs 3,034 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 3,034 cf
Pond 6P: Stormcrete#6	Peak Elev=309.73' Storage=557 cf Inflow=1.3 cfs 4,209 cf Discarded=0.5 cfs 4,214 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 4,214 cf
Pond 7P: Stormcrete#7	Peak Elev=310.11' Storage=452 cf Inflow=1.3 cfs 4,036 cf Discarded=0.5 cfs 4,040 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 4,040 cf
Pond 9P: Bio-Retention	Peak Elev=305.91' Storage=343 cf Inflow=1.0 cfs 2,568 cf Discarded=0.4 cfs 2,569 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 2,569 cf
Pond 10P: Bio-Retention	Peak Elev=310.65' Storage=59 cf Inflow=0.5 cfs 1,482 cf Discarded=0.4 cfs 1,482 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 1,482 cf

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Type III 24-hr NRCS 10-year Rainfall=4.24"

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Total Runoff Area = 108,903 sf Runoff Volume = 25,873 cf Average Runoff Depth = 2.85"
22.42% Pervious = 24,420 sf 77.58% Impervious = 84,483 sf

Summary for Subcatchment P-1: Subcat P-1

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.4 cfs @ 12.00 hrs, Volume= 1,092 cf, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
246	30	Woods, Good, HSG A
138	39	>75% Grass cover, Good, HSG A
3,528	98	Paved parking, HSG A
3,912	92	Weighted Average
384		9.81% Pervious Area
3,528		90.19% Impervious Area

Summary for Subcatchment P-10: Subcat P-10

Runoff = 0.0 cfs @ 23.25 hrs, Volume= 3 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
3,136	30	Woods, Good, HSG A
2,124	39	>75% Grass cover, Good, HSG A
5,260	34	Weighted Average
5,260		100.00% Pervious Area

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

Summary for Subcatchment P-2: Subcat P-2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.3 cfs @ 12.00 hrs, Volume= 3,324 cf, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
580	30	Woods, Good, HSG A
530	39	>75% Grass cover, Good, HSG A
5,816	98	Paved parking, HSG A
358	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
12,283	91	Weighted Average
1,467		11.95% Pervious Area
10,816		88.05% Impervious Area

Summary for Subcatchment P-3: Subcat P-3

Runoff = 1.1 cfs @ 12.07 hrs, Volume= 3,290 cf, Depth= 3.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

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Type III 24-hr NRCS 10-year Rainfall=4.24"

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Area (sf)	CN	Description
469	30	Woods, Good, HSG A
343	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
5,816	98	Paved parking, HSG A
530	39	>75% Grass cover, Good, HSG A
12,158	91	Weighted Average
1,342		11.04% Pervious Area
10,816		88.96% Impervious Area

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

Summary for Subcatchment P-4: Subcat P-4

Runoff = 0.9 cfs @ 12.07 hrs, Volume= 2,836 cf, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
309	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,376	98	Paved parking, HSG A
279	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,161	92	Weighted Average
1,035		10.19% Pervious Area
9,126		89.81% Impervious Area

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

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.0 cfs @ 12.07 hrs, Volume= 3,031 cf, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
109	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,770	98	Paved parking, HSG A
142	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,218	94	Weighted Average
698		6.83% Pervious Area
9,520		93.17% Impervious Area

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

Summary for Subcatchment P-6: Subcat P-6

Runoff = 1.3 cfs @ 12.07 hrs, Volume= 4,209 cf, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
447	39	>75% Grass cover, Good, HSG A
7,584	98	Paved parking, HSG A
5,340	98	Roofs, HSG A
13,371	96	Weighted Average
447		3.34% Pervious Area
12,924		96.66% Impervious Area

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

Summary for Subcatchment P-7: Subcat P-7

Runoff = 1.3 cfs @ 12.07 hrs, Volume= 4,036 cf, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
924	39	>75% Grass cover, Good, HSG A
7,687	98	Paved parking, HSG A
28	39	>75% Grass cover, Good, HSG A
4,950	98	Roofs, HSG A
17	96	Gravel surface, HSG A
13,607	94	Weighted Average
970		7.13% Pervious Area
12,637		92.87% Impervious Area

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

Summary for Subcatchment P-8: Subcat P-8

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.0 cfs @ 12.00 hrs, Volume= 2,568 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
4,741	39	>75% Grass cover, Good, HSG A
2,900	98	Roofs, HSG A
6,688	98	Paved parking, HSG A
627	96	Gravel surface, HSG A
593	39	>75% Grass cover, Good, HSG A
21	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
437	30	Woods, Good, HSG A
4	30	Woods, Good, HSG A
16,013	76	Weighted Average
6,425		40.12% Pervious Area
9,588		59.88% Impervious Area

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.5 cfs @ 12.08 hrs, Volume= 1,482 cf, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 10-year Rainfall=4.24"

Area (sf)	CN	Description
3,600	98	Roofs, HSG A
1,929	98	Paved parking, HSG A
826	96	Gravel surface, HSG A
5,565	39	>75% Grass cover, Good, HSG A
11,920	70	Weighted Average
6,391		53.62% Pervious Area
5,529		46.38% Impervious Area

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

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 0.00" for NRCS 10-year event
 Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,260 sf, 0.00% Impervious, Inflow Depth = 0.01" for NRCS 10-year event
 Inflow = 0.0 cfs @ 23.25 hrs, Volume= 3 cf
 Outflow = 0.0 cfs @ 23.25 hrs, Volume= 3 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Stormcrete #1

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=572)

Inflow Area = 3,912 sf, 90.19% Impervious, Inflow Depth = 3.35" for NRCS 10-year event
 Inflow = 0.4 cfs @ 12.00 hrs, Volume= 1,092 cf
 Outflow = 0.2 cfs @ 12.09 hrs, Volume= 1,092 cf, Atten= 51%, Lag= 5.2 min
 Discarded = 0.2 cfs @ 12.09 hrs, Volume= 1,092 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 307.30' @ 12.09 hrs Surf.Area= 580 sf Storage= 71 cf
 Flood Elev= 309.50' Surf.Area= 580 sf Storage= 580 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (783.5 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	580 cf	Stormcrete Storage (Irregular) Listed below (Recal) 1,450 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.00	580	298.0	0	0	580
309.50	580	298.0	1,450	1,450	1,325

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 301.75'
#2	Primary	309.50'	145.0' long Overflow X 2.00 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=0.2 cfs @ 12.09 hrs HW=307.30' (Free Discharge)

↑1=Exfiltration (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.00' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 2P: Stormcrete #2

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=550)

Inflow Area = 12,283 sf, 88.05% Impervious, Inflow Depth = 3.25" for NRCS 10-year event
 Inflow = 1.3 cfs @ 12.00 hrs, Volume= 3,324 cf
 Outflow = 0.4 cfs @ 12.24 hrs, Volume= 3,327 cf, Atten= 69%, Lag= 14.2 min
 Discarded = 0.4 cfs @ 12.24 hrs, Volume= 3,327 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 308.15' @ 12.24 hrs Surf.Area= 916 sf Storage= 484 cf
 Flood Elev= 309.83' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.9 min (792.7 - 786.8)

Volume	Invert	Avail.Storage	Storage Description
#1	306.83'	1,099 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.83	916	466.0	0	0	916
309.83	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	306.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	309.83'	237.0' long Overflow X 2.00 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=0.4 cfs @ 12.24 hrs HW=308.15' (Free Discharge)

↑1=Exfiltration (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=306.83' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 3P: Stormcrete #3

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=552)

Inflow Area = 12,158 sf, 88.96% Impervious, Inflow Depth = 3.25" for NRCS 10-year event
 Inflow = 1.1 cfs @ 12.07 hrs, Volume= 3,290 cf
 Outflow = 0.4 cfs @ 12.32 hrs, Volume= 3,293 cf, Atten= 64%, Lag= 14.8 min
 Discarded = 0.4 cfs @ 12.32 hrs, Volume= 3,293 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 308.46' @ 12.32 hrs Surf.Area= 916 sf Storage= 475 cf
 Flood Elev= 310.16' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.9 min (797.3 - 791.5)

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Volume	Invert	Avail.Storage	Storage Description
#1	307.16'	1,099 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.16	916	466.0	0	0	916
310.16	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.16'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	310.16'	237.0' long Overflow X 2.00 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=0.4 cfs @ 12.32 hrs HW=308.46' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.16' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 4P: Stormcrete #4

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=556)

Inflow Area = 10,161 sf, 89.81% Impervious, Inflow Depth = 3.35" for NRCS 10-year event
 Inflow = 0.9 cfs @ 12.07 hrs, Volume= 2,836 cf
 Outflow = 0.3 cfs @ 12.30 hrs, Volume= 2,837 cf, Atten= 63%, Lag= 13.7 min
 Discarded = 0.3 cfs @ 12.30 hrs, Volume= 2,837 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 308.63' @ 12.30 hrs Surf.Area= 836 sf Storage= 379 cf
 Flood Elev= 310.50' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.0 min (792.1 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	307.50'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.50	836	426.0	0	0	836
310.50	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.80'
#2	Primary	310.50'	217.0' long Overflow X 2.00 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=0.3 cfs @ 12.30 hrs HW=308.63' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.50' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 5P: Stormcrete #5

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=554)

Inflow Area = 10,218 sf, 93.17% Impervious, Inflow Depth = 3.56" for NRCS 10-year event
 Inflow = 1.0 cfs @ 12.07 hrs, Volume= 3,031 cf
 Outflow = 0.4 cfs @ 12.30 hrs, Volume= 3,034 cf, Atten= 63%, Lag= 13.7 min
 Discarded = 0.4 cfs @ 12.30 hrs, Volume= 3,034 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.07' @ 12.30 hrs Surf.Area= 836 sf Storage= 413 cf
 Flood Elev= 310.83' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.3 min (782.7 - 777.4)

Volume	Invert	Avail.Storage	Storage Description
#1	307.83'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.83	836	426.0	0	0	836
310.83	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 303.50'
#2	Primary	310.83'	217.0' long Overflow X 2.00 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=0.4 cfs @ 12.30 hrs HW=309.07' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.83' (Free Discharge)
 ↳ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 6P: Stormcrete #6

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=555)

Inflow Area = 13,371 sf, 96.66% Impervious, Inflow Depth = 3.78" for NRCS 10-year event
 Inflow = 1.3 cfs @ 12.07 hrs, Volume= 4,209 cf
 Outflow = 0.5 cfs @ 12.29 hrs, Volume= 4,214 cf, Atten= 63%, Lag= 13.4 min
 Discarded = 0.5 cfs @ 12.29 hrs, Volume= 4,214 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.73' @ 12.29 hrs Surf.Area= 1,134 sf Storage= 557 cf
 Flood Elev= 311.16' Surf.Area= 1,134 sf Storage= 1,207 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.1 min (770.7 - 765.5)

Volume	Invert	Avail.Storage	Storage Description
#1	308.50'	1,207 cf	Stormcete Storage (Irregular) Listed below (Recalc) 3,016 cf Overall x 40.0% Voids

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.50	1,134	575.0	0	0	1,134
311.16	1,134	575.0	3,016	3,016	2,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 304.20'
#2	Primary	311.16'	295.0' long Overflow
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50			
Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32			

Discarded OutFlow Max=0.5 cfs @ 12.29 hrs HW=309.73' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=308.50' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 7P: Stormcrete #7

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=564)

Inflow Area = 13,607 sf, 92.87% Impervious, Inflow Depth = 3.56" for NRCS 10-year event
 Inflow = 1.3 cfs @ 12.07 hrs, Volume= 4,036 cf
 Outflow = 0.5 cfs @ 12.26 hrs, Volume= 4,040 cf, Atten= 59%, Lag= 11.2 min
 Discarded = 0.5 cfs @ 12.26 hrs, Volume= 4,040 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.11' @ 12.26 hrs Surf.Area= 1,314 sf Storage= 452 cf
 Flood Elev= 311.50' Surf.Area= 1,314 sf Storage= 1,183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.6 min (781.0 - 777.4)

Volume	Invert	Avail.Storage	Storage Description
#1	309.25'	1,183 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,957 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.25	1,314	515.0	0	0	1,314
311.50	1,314	515.0	2,957	2,957	2,473

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.25'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 305.25'
#2	Primary	311.50'	262.5' long Overflow
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=0.5 cfs @ 12.26 hrs HW=310.11' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=309.25' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 9P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=553)

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Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 1.92" for NRCS 10-year event
 Inflow = 1.0 cfs @ 12.00 hrs, Volume= 2,568 cf
 Outflow = 0.4 cfs @ 12.22 hrs, Volume= 2,569 cf, Atten= 64%, Lag= 13.2 min
 Discarded = 0.4 cfs @ 12.22 hrs, Volume= 2,569 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 305.91' @ 12.22 hrs Surf.Area= 1,021 sf Storage= 343 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 5.0 min (839.7 - 834.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	305.50'	2,126 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)
305.50	668	214.0	0	0	668
306.00	1,109	226.0	440	440	1,102
307.00	2,339	287.0	1,686	2,126	3,606

Device	Routing	Invert	Outlet Devices
#1	Primary	307.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	305.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

Discarded OutFlow Max=0.4 cfs @ 12.22 hrs HW=305.91' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.50' TW=0.00' (Dynamic Tailwater)
 ↑**1=Overflow** (Controls 0.0 cfs)

Summary for Pond 10P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=573)

Inflow Area = 11,920 sf, 46.38% Impervious, Inflow Depth = 1.49" for NRCS 10-year event
 Inflow = 0.5 cfs @ 12.08 hrs, Volume= 1,482 cf
 Outflow = 0.4 cfs @ 12.13 hrs, Volume= 1,482 cf, Atten= 14%, Lag= 2.8 min
 Discarded = 0.4 cfs @ 12.13 hrs, Volume= 1,482 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.65' @ 12.13 hrs Surf.Area= 552 sf Storage= 59 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.7 min (856.8 - 856.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	310.50'	7,154 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)
310.50	269	202.0	0	0	269
311.00	1,654	299.0	432	432	4,138
312.00	3,229	330.0	2,398	2,830	5,721
313.00	5,521	410.0	4,324	7,154	10,447

Device	Routing	Invert	Outlet Devices
#1	Primary	313.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	310.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

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Discarded OutFlow Max=0.4 cfs @ 12.13 hrs HW=310.65' (Free Discharge)

↑**2=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=310.50' (Free Discharge)

↑**1=Overflow** (Controls 0.0 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1	Runoff Area=3,912 sf 90.19% Impervious Runoff Depth=4.40" Tc=0.0 min CN=92 Runoff=0.5 cfs 1,435 cf
Subcatchment P-10: Subcat P-10	Runoff Area=5,260 sf 0.00% Impervious Runoff Depth=0.10" Tc=5.0 min CN=34 Runoff=0.0 cfs 43 cf
Subcatchment P-2: Subcat P-2	Runoff Area=12,283 sf 88.05% Impervious Runoff Depth=4.29" Tc=0.0 min CN=91 Runoff=1.7 cfs 4,395 cf
Subcatchment P-3: Subcat P-3	Runoff Area=12,158 sf 88.96% Impervious Runoff Depth=4.29" Tc=5.0 min CN=91 Runoff=1.4 cfs 4,350 cf
Subcatchment P-4: Subcat P-4	Runoff Area=10,161 sf 89.81% Impervious Runoff Depth=4.40" Tc=5.0 min CN=92 Runoff=1.2 cfs 3,728 cf
Subcatchment P-5: Subcat P-5	Runoff Area=10,218 sf 93.17% Impervious Runoff Depth=4.62" Tc=5.0 min CN=94 Runoff=1.2 cfs 3,937 cf
Subcatchment P-6: Subcat P-6	Runoff Area=13,371 sf 96.66% Impervious Runoff Depth=4.85" Tc=5.0 min CN=96 Runoff=1.6 cfs 5,405 cf
Subcatchment P-7: Subcat P-7	Runoff Area=13,607 sf 92.87% Impervious Runoff Depth=4.62" Tc=5.0 min CN=94 Runoff=1.6 cfs 5,243 cf
Subcatchment P-8: Subcat P-8	Runoff Area=16,013 sf 59.88% Impervious Runoff Depth=2.80" Tc=0.0 min CN=76 Runoff=1.5 cfs 3,738 cf
Subcatchment P-9: Subcat P-9	Runoff Area=11,920 sf 46.38% Impervious Runoff Depth=2.28" Tc=5.0 min CN=70 Runoff=0.7 cfs 2,261 cf
Reach SP1: Study Point 1	Inflow=0.0 cfs 0 cf Outflow=0.0 cfs 0 cf
Reach SP2: Study Point 2	Inflow=0.0 cfs 43 cf Outflow=0.0 cfs 43 cf
Pond 1P: Stormcrete#1	Peak Elev=307.56' Storage=129 cf Inflow=0.5 cfs 1,435 cf Discarded=0.2 cfs 1,437 cf Primary=0.0 cfs 0 cf Outflow=0.2 cfs 1,437 cf
Pond 2P: Stormcrete#2	Peak Elev=308.99' Storage=791 cf Inflow=1.7 cfs 4,395 cf Discarded=0.4 cfs 4,396 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 4,396 cf
Pond 3P: Stormcrete#3	Peak Elev=309.29' Storage=782 cf Inflow=1.4 cfs 4,350 cf Discarded=0.4 cfs 4,352 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 4,352 cf
Pond 4P: Stormcrete#4	Peak Elev=309.38' Storage=628 cf Inflow=1.2 cfs 3,728 cf Discarded=0.4 cfs 3,731 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 3,731 cf
Pond 5P: Stormcrete#5	Peak Elev=309.80' Storage=660 cf Inflow=1.2 cfs 3,937 cf Discarded=0.4 cfs 3,940 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 3,940 cf
Pond 6P: Stormcrete#6	Peak Elev=310.43' Storage=875 cf Inflow=1.6 cfs 5,405 cf Discarded=0.5 cfs 5,405 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 5,405 cf
Pond 7P: Stormcrete#7	Peak Elev=310.68' Storage=754 cf Inflow=1.6 cfs 5,243 cf Discarded=0.6 cfs 5,244 cf Primary=0.0 cfs 0 cf Outflow=0.6 cfs 5,244 cf
Pond 9P: Bio-Retention	Peak Elev=306.15' Storage=615 cf Inflow=1.5 cfs 3,738 cf Discarded=0.5 cfs 3,740 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 3,740 cf
Pond 10P: Bio-Retention	Peak Elev=310.73' Storage=114 cf Inflow=0.7 cfs 2,261 cf Discarded=0.6 cfs 2,261 cf Primary=0.0 cfs 0 cf Outflow=0.6 cfs 2,261 cf

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Type III 24-hr NRCS 25-year Rainfall=5.32"

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Total Runoff Area = 108,903 sf Runoff Volume = 34,535 cf Average Runoff Depth = 3.81"
22.42% Pervious = 24,420 sf 77.58% Impervious = 84,483 sf

Summary for Subcatchment P-1: Subcat P-1

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.5 cfs @ 12.00 hrs, Volume= 1,435 cf, Depth= 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
246	30	Woods, Good, HSG A
138	39	>75% Grass cover, Good, HSG A
3,528	98	Paved parking, HSG A
3,912	92	Weighted Average
384		9.81% Pervious Area
3,528		90.19% Impervious Area

Summary for Subcatchment P-10: Subcat P-10

Runoff = 0.0 cfs @ 15.02 hrs, Volume= 43 cf, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
3,136	30	Woods, Good, HSG A
2,124	39	>75% Grass cover, Good, HSG A
5,260	34	Weighted Average
5,260		100.00% Pervious Area

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

Summary for Subcatchment P-2: Subcat P-2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.7 cfs @ 12.00 hrs, Volume= 4,395 cf, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
580	30	Woods, Good, HSG A
530	39	>75% Grass cover, Good, HSG A
5,816	98	Paved parking, HSG A
358	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
12,283	91	Weighted Average
1,467		11.95% Pervious Area
10,816		88.05% Impervious Area

Summary for Subcatchment P-3: Subcat P-3

Runoff = 1.4 cfs @ 12.07 hrs, Volume= 4,350 cf, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

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Type III 24-hr NRCS 25-year Rainfall=5.32"

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Area (sf)	CN	Description
469	30	Woods, Good, HSG A
343	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
5,816	98	Paved parking, HSG A
530	39	>75% Grass cover, Good, HSG A
12,158	91	Weighted Average
1,342		11.04% Pervious Area
10,816		88.96% Impervious Area

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

Summary for Subcatchment P-4: Subcat P-4

Runoff = 1.2 cfs @ 12.07 hrs, Volume= 3,728 cf, Depth= 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
309	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,376	98	Paved parking, HSG A
279	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,161	92	Weighted Average
1,035		10.19% Pervious Area
9,126		89.81% Impervious Area

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

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.2 cfs @ 12.07 hrs, Volume= 3,937 cf, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
109	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,770	98	Paved parking, HSG A
142	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,218	94	Weighted Average
698		6.83% Pervious Area
9,520		93.17% Impervious Area

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

Summary for Subcatchment P-6: Subcat P-6

Runoff = 1.6 cfs @ 12.07 hrs, Volume= 5,405 cf, Depth= 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

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Type III 24-hr NRCS 25-year Rainfall=5.32"

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Area (sf)	CN	Description
447	39	>75% Grass cover, Good, HSG A
7,584	98	Paved parking, HSG A
5,340	98	Roofs, HSG A
13,371	96	Weighted Average
447		3.34% Pervious Area
12,924		96.66% Impervious Area

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

Summary for Subcatchment P-7: Subcat P-7

Runoff = 1.6 cfs @ 12.07 hrs, Volume= 5,243 cf, Depth= 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
924	39	>75% Grass cover, Good, HSG A
7,687	98	Paved parking, HSG A
28	39	>75% Grass cover, Good, HSG A
4,950	98	Roofs, HSG A
17	96	Gravel surface, HSG A
13,607	94	Weighted Average
970		7.13% Pervious Area
12,637		92.87% Impervious Area

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

Summary for Subcatchment P-8: Subcat P-8

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.5 cfs @ 12.00 hrs, Volume= 3,738 cf, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
4,741	39	>75% Grass cover, Good, HSG A
2,900	98	Roofs, HSG A
6,688	98	Paved parking, HSG A
627	96	Gravel surface, HSG A
593	39	>75% Grass cover, Good, HSG A
21	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
437	30	Woods, Good, HSG A
4	30	Woods, Good, HSG A
16,013	76	Weighted Average
6,425		40.12% Pervious Area
9,588		59.88% Impervious Area

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.7 cfs @ 12.08 hrs, Volume= 2,261 cf, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 25-year Rainfall=5.32"

Area (sf)	CN	Description
3,600	98	Roofs, HSG A
1,929	98	Paved parking, HSG A
826	96	Gravel surface, HSG A
5,565	39	>75% Grass cover, Good, HSG A
11,920	70	Weighted Average
6,391		53.62% Pervious Area
5,529		46.38% Impervious Area

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

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 0.00" for NRCS 25-year event
 Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,260 sf, 0.00% Impervious, Inflow Depth = 0.10" for NRCS 25-year event
 Inflow = 0.0 cfs @ 15.02 hrs, Volume= 43 cf
 Outflow = 0.0 cfs @ 15.02 hrs, Volume= 43 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Stormcrete #1

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=570)

Inflow Area = 3,912 sf, 90.19% Impervious, Inflow Depth = 4.40" for NRCS 25-year event
 Inflow = 0.5 cfs @ 12.00 hrs, Volume= 1,435 cf
 Outflow = 0.2 cfs @ 12.11 hrs, Volume= 1,437 cf, Atten= 61%, Lag= 6.8 min
 Discarded = 0.2 cfs @ 12.11 hrs, Volume= 1,437 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 307.56' @ 12.11 hrs Surf.Area= 580 sf Storage= 129 cf
 Flood Elev= 309.50' Surf.Area= 580 sf Storage= 580 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.3 min (777.5 - 775.2)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	580 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 1,450 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.00	580	298.0	0	0	580
309.50	580	298.0	1,450	1,450	1,325

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 301.75'
#2	Primary	309.50'	145.0' long Overflow X 2.00 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=0.2 cfs @ 12.11 hrs HW=307.56' (Free Discharge)

↑1=Exfiltration (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.00' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 2P: Stormcrete #2

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=533)

Inflow Area = 12,283 sf, 88.05% Impervious, Inflow Depth = 4.29" for NRCS 25-year event
 Inflow = 1.7 cfs @ 12.00 hrs, Volume= 4,395 cf
 Outflow = 0.4 cfs @ 12.28 hrs, Volume= 4,396 cf, Atten= 73%, Lag= 16.9 min
 Discarded = 0.4 cfs @ 12.28 hrs, Volume= 4,396 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 308.99' @ 12.28 hrs Surf.Area= 916 sf Storage= 791 cf
 Flood Elev= 309.83' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 9.3 min (788.6 - 779.3)

Volume	Invert	Avail.Storage	Storage Description
#1	306.83'	1,099 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.83	916	466.0	0	0	916
309.83	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	306.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	309.83'	237.0' long Overflow X 2.00 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=0.4 cfs @ 12.28 hrs HW=308.99' (Free Discharge)

↑1=Exfiltration (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=306.83' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 3P: Stormcrete #3

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=535)

Inflow Area = 12,158 sf, 88.96% Impervious, Inflow Depth = 4.29" for NRCS 25-year event
 Inflow = 1.4 cfs @ 12.07 hrs, Volume= 4,350 cf
 Outflow = 0.4 cfs @ 12.36 hrs, Volume= 4,352 cf, Atten= 69%, Lag= 17.6 min
 Discarded = 0.4 cfs @ 12.36 hrs, Volume= 4,352 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.29' @ 12.36 hrs Surf.Area= 916 sf Storage= 782 cf
 Flood Elev= 310.16' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 9.4 min (793.3 - 783.9)

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Volume	Invert	Avail.Storage	Storage Description
#1	307.16'	1,099 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.16	916	466.0	0	0	916
310.16	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.16'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	310.16'	237.0' long Overflow X 2.00 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=0.4 cfs @ 12.36 hrs HW=309.29' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.16' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 4P: Stormcrete #4

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=540)

Inflow Area = 10,161 sf, 89.81% Impervious, Inflow Depth = 4.40" for NRCS 25-year event
 Inflow = 1.2 cfs @ 12.07 hrs, Volume= 3,728 cf
 Outflow = 0.4 cfs @ 12.35 hrs, Volume= 3,731 cf, Atten= 68%, Lag= 16.7 min
 Discarded = 0.4 cfs @ 12.35 hrs, Volume= 3,731 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.38' @ 12.35 hrs Surf.Area= 836 sf Storage= 628 cf
 Flood Elev= 310.50' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 8.2 min (788.1 - 779.9)

Volume	Invert	Avail.Storage	Storage Description
#1	307.50'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.50	836	426.0	0	0	836
310.50	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.80'
#2	Primary	310.50'	217.0' long Overflow X 2.00 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=0.4 cfs @ 12.35 hrs HW=309.38' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.50' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 5P: Stormcrete #5

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=539)

Inflow Area = 10,218 sf, 93.17% Impervious, Inflow Depth = 4.62" for NRCS 25-year event
 Inflow = 1.2 cfs @ 12.07 hrs, Volume= 3,937 cf
 Outflow = 0.4 cfs @ 12.34 hrs, Volume= 3,940 cf, Atten= 67%, Lag= 16.4 min
 Discarded = 0.4 cfs @ 12.34 hrs, Volume= 3,940 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.80' @ 12.34 hrs Surf.Area= 836 sf Storage= 660 cf
 Flood Elev= 310.83' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 8.3 min (779.1 - 770.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	307.83'	1,003 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
307.83	836	426.0	0	0	836	
310.83	836	426.0	2,508	2,508	2,114	

Device	Routing	Invert	Outlet Devices									
#1	Discarded	307.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 303.50'									
#2	Primary	310.83'	217.0' long Overflow X 2.00									
			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=0.4 cfs @ 12.34 hrs HW=309.80' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.83' (Free Discharge)
 ↳ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 6P: Stormcrete #6

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=541)

Inflow Area = 13,371 sf, 96.66% Impervious, Inflow Depth = 4.85" for NRCS 25-year event
 Inflow = 1.6 cfs @ 12.07 hrs, Volume= 5,405 cf
 Outflow = 0.5 cfs @ 12.34 hrs, Volume= 5,405 cf, Atten= 67%, Lag= 16.0 min
 Discarded = 0.5 cfs @ 12.34 hrs, Volume= 5,405 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.43' @ 12.34 hrs Surf.Area= 1,134 sf Storage= 875 cf
 Flood Elev= 311.16' Surf.Area= 1,134 sf Storage= 1,207 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 7.8 min (767.8 - 760.0)

Volume	Invert	Avail.Storage	Storage Description			
#1	308.50'	1,207 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 3,016 cf Overall x 40.0% Voids			

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.50	1,134	575.0	0	0	1,134
311.16	1,134	575.0	3,016	3,016	2,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 304.20'
#2	Primary	311.16'	295.0' long Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.5 cfs @ 12.34 hrs HW=310.43' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=308.50' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 7P: Stormcrete #7

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=550)

Inflow Area = 13,607 sf, 92.87% Impervious, Inflow Depth = 4.62" for NRCS 25-year event
 Inflow = 1.6 cfs @ 12.07 hrs, Volume= 5,243 cf
 Outflow = 0.6 cfs @ 12.31 hrs, Volume= 5,244 cf, Atten= 64%, Lag= 14.2 min
 Discarded = 0.6 cfs @ 12.31 hrs, Volume= 5,244 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.68' @ 12.31 hrs Surf.Area= 1,314 sf Storage= 754 cf
 Flood Elev= 311.50' Surf.Area= 1,314 sf Storage= 1,183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 6.0 min (776.8 - 770.8)

Volume	Invert	Avail.Storage	Storage Description
#1	309.25'	1,183 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,957 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.25	1,314	515.0	0	0	1,314
311.50	1,314	515.0	2,957	2,957	2,473

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.25'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 305.25'
#2	Primary	311.50'	262.5' long Overflow 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=0.6 cfs @ 12.31 hrs HW=310.68' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=309.25' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 9P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=536)

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Type III 24-hr NRCS 25-year Rainfall=5.32"

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Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 2.80" for NRCS 25-year event
 Inflow = 1.5 cfs @ 12.00 hrs, Volume= 3,738 cf
 Outflow = 0.5 cfs @ 12.21 hrs, Volume= 3,740 cf, Atten= 65%, Lag= 12.8 min
 Discarded = 0.5 cfs @ 12.21 hrs, Volume= 3,740 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 306.15' @ 12.21 hrs Surf.Area= 1,263 sf Storage= 615 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 7.6 min (831.5 - 823.9)

Volume	Invert	Avail.Storage	Storage Description
#1	305.50'	2,126 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)
305.50	668	214.0	0	0	668
306.00	1,109	226.0	440	440	1,102
307.00	2,339	287.0	1,686	2,126	3,606

Device	Routing	Invert	Outlet Devices
#1	Primary	307.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	305.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

Discarded OutFlow Max=0.5 cfs @ 12.21 hrs HW=306.15' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.50' TW=0.00' (Dynamic Tailwater)
 ↑**1=Overflow** (Controls 0.0 cfs)

Summary for Pond 10P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

Inflow Area = 11,920 sf, 46.38% Impervious, Inflow Depth = 2.28" for NRCS 25-year event
 Inflow = 0.7 cfs @ 12.08 hrs, Volume= 2,261 cf
 Outflow = 0.6 cfs @ 12.13 hrs, Volume= 2,261 cf, Atten= 17%, Lag= 3.1 min
 Discarded = 0.6 cfs @ 12.13 hrs, Volume= 2,261 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.73' @ 12.13 hrs Surf.Area= 760 sf Storage= 114 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (844.4 - 843.4)

Volume	Invert	Avail.Storage	Storage Description
#1	310.50'	7,154 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)
310.50	269	202.0	0	0	269
311.00	1,654	299.0	432	432	4,138
312.00	3,229	330.0	2,398	2,830	5,721
313.00	5,521	410.0	4,324	7,154	10,447

Device	Routing	Invert	Outlet Devices
#1	Primary	313.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	310.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

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Type III 24-hr NRCS 25-year Rainfall=5.32"

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Discarded OutFlow Max=0.6 cfs @ 12.13 hrs HW=310.73' (Free Discharge)

↑**2=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=310.50' (Free Discharge)

↑**1=Overflow** (Controls 0.0 cfs)

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment P-1: Subcat P-1	Runoff Area=3,912 sf 90.19% Impervious Runoff Depth=5.38" Tc=0.0 min CN=92 Runoff=0.6 cfs 1,755 cf
Subcatchment P-10: Subcat P-10	Runoff Area=5,260 sf 0.00% Impervious Runoff Depth=0.27" Tc=5.0 min CN=34 Runoff=0.0 cfs 119 cf
Subcatchment P-2: Subcat P-2	Runoff Area=12,283 sf 88.05% Impervious Runoff Depth=5.27" Tc=0.0 min CN=91 Runoff=2.0 cfs 5,395 cf
Subcatchment P-3: Subcat P-3	Runoff Area=12,158 sf 88.96% Impervious Runoff Depth=5.27" Tc=5.0 min CN=91 Runoff=1.7 cfs 5,340 cf
Subcatchment P-4: Subcat P-4	Runoff Area=10,161 sf 89.81% Impervious Runoff Depth=5.38" Tc=5.0 min CN=92 Runoff=1.4 cfs 4,559 cf
Subcatchment P-5: Subcat P-5	Runoff Area=10,218 sf 93.17% Impervious Runoff Depth=5.61" Tc=5.0 min CN=94 Runoff=1.5 cfs 4,780 cf
Subcatchment P-6: Subcat P-6	Runoff Area=13,371 sf 96.66% Impervious Runoff Depth=5.85" Tc=5.0 min CN=96 Runoff=1.9 cfs 6,514 cf
Subcatchment P-7: Subcat P-7	Runoff Area=13,607 sf 92.87% Impervious Runoff Depth=5.61" Tc=5.0 min CN=94 Runoff=2.0 cfs 6,365 cf
Subcatchment P-8: Subcat P-8	Runoff Area=16,013 sf 59.88% Impervious Runoff Depth=3.66" Tc=0.0 min CN=76 Runoff=1.9 cfs 4,881 cf
Subcatchment P-9: Subcat P-9	Runoff Area=11,920 sf 46.38% Impervious Runoff Depth=3.06" Tc=5.0 min CN=70 Runoff=1.0 cfs 3,041 cf
Reach SP1: Study Point 1	Inflow=0.0 cfs 0 cf Outflow=0.0 cfs 0 cf
Reach SP2: Study Point 2	Inflow=0.0 cfs 119 cf Outflow=0.0 cfs 119 cf
Pond 1P: Stormcrete#1	Peak Elev=307.86' Storage=199 cf Inflow=0.6 cfs 1,755 cf Discarded=0.2 cfs 1,757 cf Primary=0.0 cfs 0 cf Outflow=0.2 cfs 1,757 cf
Pond 2P: Stormcrete#2	Peak Elev=309.80' Storage=1,089 cf Inflow=2.0 cfs 5,395 cf Discarded=0.5 cfs 5,398 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 5,398 cf
Pond 3P: Stormcrete#3	Peak Elev=310.11' Storage=1,080 cf Inflow=1.7 cfs 5,340 cf Discarded=0.5 cfs 5,341 cf Primary=0.0 cfs 0 cf Outflow=0.5 cfs 5,341 cf
Pond 4P: Stormcrete#4	Peak Elev=310.11' Storage=872 cf Inflow=1.4 cfs 4,559 cf Discarded=0.4 cfs 4,561 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 4,561 cf
Pond 5P: Stormcrete#5	Peak Elev=310.52' Storage=900 cf Inflow=1.5 cfs 4,780 cf Discarded=0.4 cfs 4,782 cf Primary=0.0 cfs 0 cf Outflow=0.4 cfs 4,782 cf
Pond 6P: Stormcrete#6	Peak Elev=311.11' Storage=1,185 cf Inflow=1.9 cfs 6,514 cf Discarded=0.6 cfs 6,514 cf Primary=0.0 cfs 0 cf Outflow=0.6 cfs 6,514 cf
Pond 7P: Stormcrete#7	Peak Elev=311.26' Storage=1,056 cf Inflow=2.0 cfs 6,365 cf Discarded=0.6 cfs 6,366 cf Primary=0.0 cfs 0 cf Outflow=0.6 cfs 6,366 cf
Pond 9P: Bio-Retention	Peak Elev=306.33' Storage=870 cf Inflow=1.9 cfs 4,881 cf Discarded=0.7 cfs 4,882 cf Primary=0.0 cfs 0 cf Outflow=0.7 cfs 4,882 cf
Pond 10P: Bio-Retention	Peak Elev=310.80' Storage=177 cf Inflow=1.0 cfs 3,041 cf Discarded=0.8 cfs 3,041 cf Primary=0.0 cfs 0 cf Outflow=0.8 cfs 3,041 cf

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Type III 24-hr NRCS 50-year Rainfall=6.32"

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Total Runoff Area = 108,903 sf Runoff Volume = 42,750 cf Average Runoff Depth = 4.71"
22.42% Pervious = 24,420 sf 77.58% Impervious = 84,483 sf

Summary for Subcatchment P-1: Subcat P-1

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.6 cfs @ 12.00 hrs, Volume= 1,755 cf, Depth= 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
246	30	Woods, Good, HSG A
138	39	>75% Grass cover, Good, HSG A
3,528	98	Paved parking, HSG A
3,912	92	Weighted Average
384		9.81% Pervious Area
3,528		90.19% Impervious Area

Summary for Subcatchment P-10: Subcat P-10

Runoff = 0.0 cfs @ 12.44 hrs, Volume= 119 cf, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
3,136	30	Woods, Good, HSG A
2,124	39	>75% Grass cover, Good, HSG A
5,260	34	Weighted Average
5,260		100.00% Pervious Area

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

Summary for Subcatchment P-2: Subcat P-2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.0 cfs @ 12.00 hrs, Volume= 5,395 cf, Depth= 5.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
580	30	Woods, Good, HSG A
530	39	>75% Grass cover, Good, HSG A
5,816	98	Paved parking, HSG A
358	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
12,283	91	Weighted Average
1,467		11.95% Pervious Area
10,816		88.05% Impervious Area

Summary for Subcatchment P-3: Subcat P-3

Runoff = 1.7 cfs @ 12.07 hrs, Volume= 5,340 cf, Depth= 5.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

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Type III 24-hr NRCS 50-year Rainfall=6.32"

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Area (sf)	CN	Description
469	30	Woods, Good, HSG A
343	39	>75% Grass cover, Good, HSG A
5,000	98	Roofs, HSG A
5,816	98	Paved parking, HSG A
530	39	>75% Grass cover, Good, HSG A
12,158	91	Weighted Average
1,342		11.04% Pervious Area
10,816		88.96% Impervious Area

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

Summary for Subcatchment P-4: Subcat P-4

Runoff = 1.4 cfs @ 12.07 hrs, Volume= 4,559 cf, Depth= 5.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
309	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,376	98	Paved parking, HSG A
279	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,161	92	Weighted Average
1,035		10.19% Pervious Area
9,126		89.81% Impervious Area

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

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.5 cfs @ 12.07 hrs, Volume= 4,780 cf, Depth= 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
109	30	Woods, Good, HSG A
447	39	>75% Grass cover, Good, HSG A
5,770	98	Paved parking, HSG A
142	39	>75% Grass cover, Good, HSG A
3,750	98	Roofs, HSG A
10,218	94	Weighted Average
698		6.83% Pervious Area
9,520		93.17% Impervious Area

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

Summary for Subcatchment P-6: Subcat P-6

Runoff = 1.9 cfs @ 12.07 hrs, Volume= 6,514 cf, Depth= 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr NRCS 50-year Rainfall=6.32"

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Type III 24-hr NRCS 50-year Rainfall=6.32"

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Area (sf)	CN	Description
447	39	>75% Grass cover, Good, HSG A
7,584	98	Paved parking, HSG A
5,340	98	Roofs, HSG A
13,371	96	Weighted Average
447		3.34% Pervious Area
12,924		96.66% Impervious Area

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

Summary for Subcatchment P-7: Subcat P-7

Runoff = 2.0 cfs @ 12.07 hrs, Volume= 6,365 cf, Depth= 5.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
924	39	>75% Grass cover, Good, HSG A
7,687	98	Paved parking, HSG A
28	39	>75% Grass cover, Good, HSG A
4,950	98	Roofs, HSG A
17	96	Gravel surface, HSG A
13,607	94	Weighted Average
970		7.13% Pervious Area
12,637		92.87% Impervious Area

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

Summary for Subcatchment P-8: Subcat P-8

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.9 cfs @ 12.00 hrs, Volume= 4,881 cf, Depth= 3.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
4,741	39	>75% Grass cover, Good, HSG A
2,900	98	Roofs, HSG A
6,688	98	Paved parking, HSG A
627	96	Gravel surface, HSG A
593	39	>75% Grass cover, Good, HSG A
21	30	Woods, Good, HSG A
2	30	Woods, Good, HSG A
437	30	Woods, Good, HSG A
4	30	Woods, Good, HSG A
16,013	76	Weighted Average
6,425		40.12% Pervious Area
9,588		59.88% Impervious Area

Summary for Subcatchment P-9: Subcat P-9

Runoff = 1.0 cfs @ 12.08 hrs, Volume= 3,041 cf, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
 Type III 24-hr NRCS 50-year Rainfall=6.32"

Area (sf)	CN	Description
3,600	98	Roofs, HSG A
1,929	98	Paved parking, HSG A
826	96	Gravel surface, HSG A
5,565	39	>75% Grass cover, Good, HSG A
11,920	70	Weighted Average
6,391		53.62% Pervious Area
5,529		46.38% Impervious Area

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

Summary for Reach SP1: Study Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 0.00" for NRCS 50-year event
 Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Reach SP2: Study Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5,260 sf, 0.00% Impervious, Inflow Depth = 0.27" for NRCS 50-year event
 Inflow = 0.0 cfs @ 12.44 hrs, Volume= 119 cf
 Outflow = 0.0 cfs @ 12.44 hrs, Volume= 119 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Summary for Pond 1P: Stormcrete #1

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=562)

Inflow Area = 3,912 sf, 90.19% Impervious, Inflow Depth = 5.38" for NRCS 50-year event
 Inflow = 0.6 cfs @ 12.00 hrs, Volume= 1,755 cf
 Outflow = 0.2 cfs @ 12.18 hrs, Volume= 1,757 cf, Atten= 66%, Lag= 10.8 min
 Discarded = 0.2 cfs @ 12.18 hrs, Volume= 1,757 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 307.86' @ 12.18 hrs Surf.Area= 580 sf Storage= 199 cf

Flood Elev= 309.50' Surf.Area= 580 sf Storage= 580 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 3.7 min (773.8 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	580 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 1,450 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.00	580	298.0	0	0	580
309.50	580	298.0	1,450	1,450	1,325

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 301.75'
#2	Primary	309.50'	145.0' long Overflow X 2.00 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=0.2 cfs @ 12.18 hrs HW=307.86' (Free Discharge)

↑1=Exfiltration (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.00' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 2P: Stormcrete #2

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=518)

Inflow Area = 12,283 sf, 88.05% Impervious, Inflow Depth = 5.27" for NRCS 50-year event
 Inflow = 2.0 cfs @ 12.00 hrs, Volume= 5,395 cf
 Outflow = 0.5 cfs @ 12.31 hrs, Volume= 5,398 cf, Atten= 75%, Lag= 18.3 min
 Discarded = 0.5 cfs @ 12.31 hrs, Volume= 5,398 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.80' @ 12.31 hrs Surf.Area= 916 sf Storage= 1,089 cf
 Flood Elev= 309.83' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 12.2 min (786.1 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1	306.83'	1,099 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.83	916	466.0	0	0	916
309.83	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	306.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	309.83'	237.0' long Overflow X 2.00 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=0.5 cfs @ 12.31 hrs HW=309.80' (Free Discharge)

↑1=Exfiltration (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=306.83' (Free Discharge)

↑2=Overflow (Controls 0.0 cfs)

Summary for Pond 3P: Stormcrete #3

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=519)

Inflow Area = 12,158 sf, 88.96% Impervious, Inflow Depth = 5.27" for NRCS 50-year event
 Inflow = 1.7 cfs @ 12.07 hrs, Volume= 5,340 cf
 Outflow = 0.5 cfs @ 12.39 hrs, Volume= 5,341 cf, Atten= 71%, Lag= 19.1 min
 Discarded = 0.5 cfs @ 12.39 hrs, Volume= 5,341 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.11' @ 12.39 hrs Surf.Area= 916 sf Storage= 1,080 cf
 Flood Elev= 310.16' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 12.4 min (790.9 - 778.5)

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Volume	Invert	Avail.Storage	Storage Description
#1	307.16'	1,099 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.16	916	466.0	0	0	916
310.16	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.16'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	310.16'	237.0' long Overflow X 2.00 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=0.5 cfs @ 12.39 hrs HW=310.11' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.16' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 4P: Stormcrete #4

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=526)

Inflow Area = 10,161 sf, 89.81% Impervious, Inflow Depth = 5.38" for NRCS 50-year event
 Inflow = 1.4 cfs @ 12.07 hrs, Volume= 4,559 cf
 Outflow = 0.4 cfs @ 12.38 hrs, Volume= 4,561 cf, Atten= 70%, Lag= 18.4 min
 Discarded = 0.4 cfs @ 12.38 hrs, Volume= 4,561 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.11' @ 12.38 hrs Surf.Area= 836 sf Storage= 872 cf
 Flood Elev= 310.50' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 11.0 min (785.7 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	307.50'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.50	836	426.0	0	0	836
310.50	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.80'
#2	Primary	310.50'	217.0' long Overflow X 2.00 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=0.4 cfs @ 12.38 hrs HW=310.11' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.50' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 5P: Stormcrete #5

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=526)

Inflow Area = 10,218 sf, 93.17% Impervious, Inflow Depth = 5.61" for NRCS 50-year event
 Inflow = 1.5 cfs @ 12.07 hrs, Volume= 4,780 cf
 Outflow = 0.4 cfs @ 12.37 hrs, Volume= 4,782 cf, Atten= 70%, Lag= 17.9 min
 Discarded = 0.4 cfs @ 12.37 hrs, Volume= 4,782 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.52' @ 12.37 hrs Surf.Area= 836 sf Storage= 900 cf
 Flood Elev= 310.83' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 10.8 min (777.0 - 766.2)

Volume	Invert	Avail.Storage	Storage Description			
#1	307.83'	1,003 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
307.83	836	426.0	0	0	836	
310.83	836	426.0	2,508	2,508	2,114	

Device	Routing	Invert	Outlet Devices									
#1	Discarded	307.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 303.50'									
#2	Primary	310.83'	217.0' long Overflow X 2.00									
			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=0.4 cfs @ 12.37 hrs HW=310.52' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.83' (Free Discharge)
 ↳ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 6P: Stormcrete #6

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=528)

Inflow Area = 13,371 sf, 96.66% Impervious, Inflow Depth = 5.85" for NRCS 50-year event
 Inflow = 1.9 cfs @ 12.07 hrs, Volume= 6,514 cf
 Outflow = 0.6 cfs @ 12.36 hrs, Volume= 6,514 cf, Atten= 69%, Lag= 17.6 min
 Discarded = 0.6 cfs @ 12.36 hrs, Volume= 6,514 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 311.11' @ 12.36 hrs Surf.Area= 1,134 sf Storage= 1,185 cf
 Flood Elev= 311.16' Surf.Area= 1,134 sf Storage= 1,207 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 10.2 min (766.4 - 756.2)

Volume	Invert	Avail.Storage	Storage Description			
#1	308.50'	1,207 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 3,016 cf Overall x 40.0% Voids			

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.50	1,134	575.0	0	0	1,134
311.16	1,134	575.0	3,016	3,016	2,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 304.20'
#2	Primary	311.16'	295.0' long Overflow
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50			
Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32			

Discarded OutFlow Max=0.6 cfs @ 12.36 hrs HW=311.11' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=308.50' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 7P: Stormcrete #7

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=539)

Inflow Area = 13,607 sf, 92.87% Impervious, Inflow Depth = 5.61" for NRCS 50-year event
 Inflow = 2.0 cfs @ 12.07 hrs, Volume= 6,365 cf
 Outflow = 0.6 cfs @ 12.34 hrs, Volume= 6,366 cf, Atten= 67%, Lag= 16.0 min
 Discarded = 0.6 cfs @ 12.34 hrs, Volume= 6,366 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 311.26' @ 12.34 hrs Surf.Area= 1,314 sf Storage= 1,056 cf
 Flood Elev= 311.50' Surf.Area= 1,314 sf Storage= 1,183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 8.1 min (774.3 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	309.25'	1,183 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,957 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.25	1,314	515.0	0	0	1,314
311.50	1,314	515.0	2,957	2,957	2,473

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.25'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 305.25'
#2	Primary	311.50'	262.5' long Overflow
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=0.6 cfs @ 12.34 hrs HW=311.26' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=309.25' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 9P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=524)

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Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 3.66" for NRCS 50-year event
 Inflow = 1.9 cfs @ 12.00 hrs, Volume= 4,881 cf
 Outflow = 0.7 cfs @ 12.20 hrs, Volume= 4,882 cf, Atten= 64%, Lag= 11.9 min
 Discarded = 0.7 cfs @ 12.20 hrs, Volume= 4,882 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 306.33' @ 12.20 hrs Surf.Area= 1,470 sf Storage= 870 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 9.1 min (825.3 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1	305.50'	2,126 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)
305.50	668	214.0	0	0	668
306.00	1,109	226.0	440	440	1,102
307.00	2,339	287.0	1,686	2,126	3,606

Device	Routing	Invert	Outlet Devices
#1	Primary	307.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	305.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

Discarded OutFlow Max=0.7 cfs @ 12.20 hrs HW=306.33' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.7 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.50' TW=0.00' (Dynamic Tailwater)
 ↑**1=Overflow** (Controls 0.0 cfs)

Summary for Pond 10P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

Inflow Area = 11,920 sf, 46.38% Impervious, Inflow Depth = 3.06" for NRCS 50-year event
 Inflow = 1.0 cfs @ 12.08 hrs, Volume= 3,041 cf
 Outflow = 0.8 cfs @ 12.13 hrs, Volume= 3,041 cf, Atten= 20%, Lag= 3.4 min
 Discarded = 0.8 cfs @ 12.13 hrs, Volume= 3,041 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.80' @ 12.13 hrs Surf.Area= 968 sf Storage= 177 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.3 min (836.0 - 834.8)

Volume	Invert	Avail.Storage	Storage Description
#1	310.50'	7,154 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)
310.50	269	202.0	0	0	269
311.00	1,654	299.0	432	432	4,138
312.00	3,229	330.0	2,398	2,830	5,721
313.00	5,521	410.0	4,324	7,154	10,447

Device	Routing	Invert	Outlet Devices
#1	Primary	313.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	310.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

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Discarded OutFlow Max=0.8 cfs @ 12.13 hrs HW=310.80' (Free Discharge)

↳ **2=Exfiltration** (Controls 0.8 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=310.50' (Free Discharge)

↳ **1=Overflow** (Controls 0.0 cfs)

SUMMARY OF AREAS

DRAINAGE AREA	AREA (FEET)	CN
P1	3,912	92
P2	12,283	91
P3	12,158	91
P4	10,161	92
P5	10,218	94
P6	13,371	96
P7	13,607	94
P8	16,013	76
P9	11,920	70
P10	5,260	34
SITE TOTAL	108,903	85.14

LEGEND

EXISTING WATERSHED

PROPOSED WATERSHED

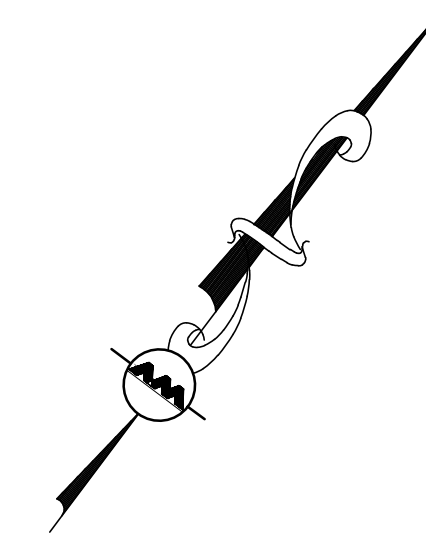
SCS SOILS BOUNDARY

Tc FLOW PATH AB

SUBCATCHMENT LABEL P-1

SUBCATCHMENT BOUNDARY

FLOW DIRECTION



STUDY POINT 2
DEVELOPMENT AREA FLOW TO WEST

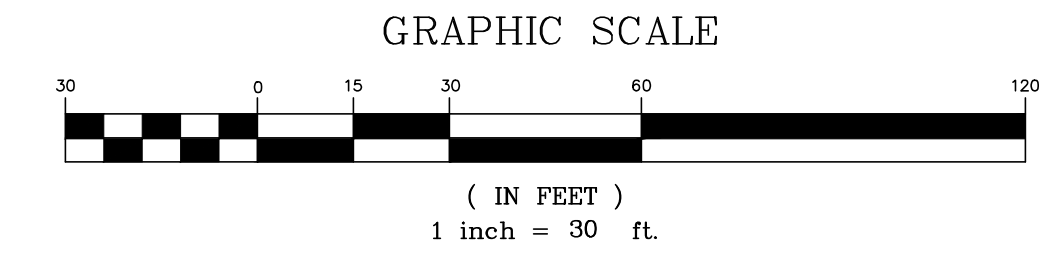
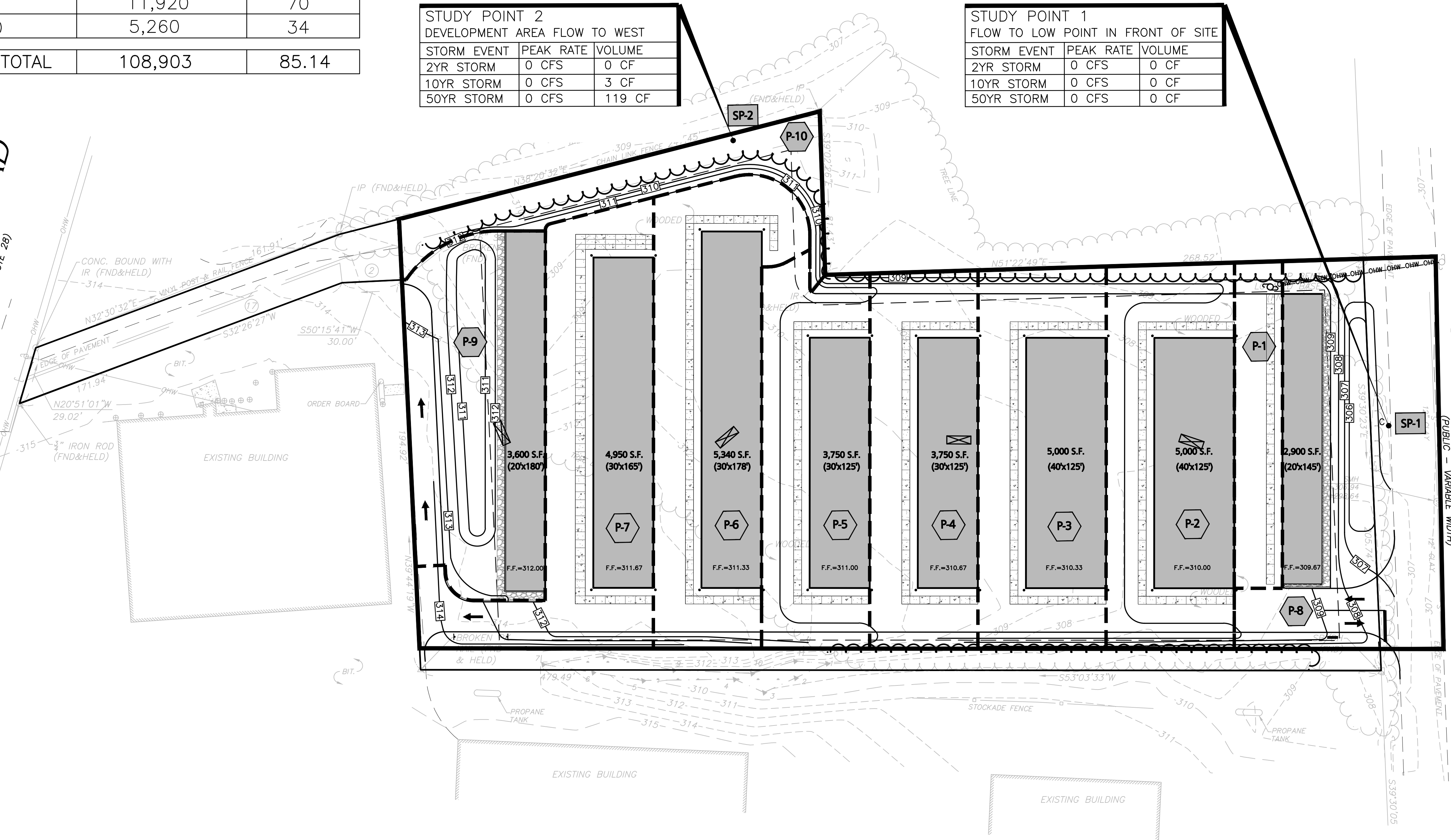
STORM EVENT	PEAK RATE	VOLUME
2YR STORM	0 CFS	0 CF
10YR STORM	0 CFS	3 CF
50YR STORM	0 CFS	119 CF

STUDY POINT 1
FLOW TO LOW POINT IN FRONT OF SITE

STORM EVENT	PEAK RATE	VOLUME
2YR STORM	0 CFS	0 CF
10YR STORM	0 CFS	0 CF
50YR STORM	0 CFS	0 CF

ALLENSTOWN ROAD
(PUBLIC - VARIABLE WIDTH)
(U.S. ROUTE 3 - N.H. ROUTE 28)

CHESTER TURNPIKE
(PUBLIC - VARIABLE WIDTH)



REV	DATE	DESCRIPTION

APPLICANT:
201 HIGHLAND, LLC
679 FIRST NH TPK
NORTHWOOD, NH 03261

PROJECT:
SELF STORAGE FACILITY
15 CHESTER TURNPIKE
MAP 109, LOT 028
ALLENSTOWN, NH 03275

PROJECT NO. 2047-04A	DATE: 04-04-18
SCALE: 1"=30'	DWG. NAME: C-2047-04
DRAFTED BY: BDJ	CHECKED BY: BDJ

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DRAWING TITLE: PROPOSED WATERSHED PLAN	SHEET No. PWP
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SECTION 5.0

APPENDIX

RAINFALL DATA

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.441 degrees West
Latitude	43.124 degrees North
Elevation	0 feet
Date/Time	Wed, 28 Mar 2018 13:45:56 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.39	0.49	0.64	0.80	1.01	1yr	0.69	0.98	1.17	1.48	1.87	2.38	2.61	1yr	2.11	2.51	2.91	3.60	4.16	1yr
2yr	0.32	0.49	0.61	0.80	1.00	1.26	2yr	0.87	1.16	1.46	1.82	2.28	2.85	3.18	2yr	2.52	3.06	3.54	4.23	4.83	2yr
5yr	0.37	0.58	0.73	0.98	1.25	1.59	5yr	1.08	1.45	1.84	2.31	2.87	3.57	4.05	5yr	3.16	3.89	4.49	5.28	5.97	5yr
10yr	0.42	0.66	0.84	1.14	1.48	1.90	10yr	1.28	1.71	2.21	2.76	3.43	4.24	4.86	10yr	3.75	4.67	5.38	6.25	7.01	10yr
25yr	0.50	0.79	1.01	1.39	1.85	2.39	25yr	1.60	2.15	2.78	3.49	4.33	5.32	6.18	25yr	4.71	5.95	6.83	7.81	8.67	25yr
50yr	0.57	0.91	1.17	1.63	2.19	2.85	50yr	1.89	2.54	3.33	4.18	5.16	6.32	7.43	50yr	5.60	7.14	8.18	9.25	10.20	50yr
100yr	0.64	1.04	1.34	1.90	2.60	3.40	100yr	2.24	3.02	3.98	4.99	6.16	7.52	8.93	100yr	6.66	8.59	9.81	10.96	11.99	100yr
200yr	0.74	1.21	1.56	2.23	3.08	4.05	200yr	2.66	3.58	4.75	5.96	7.35	8.95	10.74	200yr	7.92	10.33	11.77	12.99	14.11	200yr
500yr	0.89	1.46	1.90	2.76	3.86	5.11	500yr	3.33	4.50	6.01	7.54	9.28	11.26	13.72	500yr	9.97	13.19	14.97	16.28	17.51	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.21	0.32	0.39	0.53	0.65	0.88	1yr	0.56	0.86	1.06	1.36	1.60	2.09	2.46	1yr	1.85	2.37	2.68	3.30	3.80	1yr
2yr	0.31	0.47	0.58	0.79	0.97	1.15	2yr	0.84	1.13	1.31	1.73	2.20	2.77	3.08	2yr	2.45	2.96	3.44	4.10	4.69	2yr
5yr	0.35	0.54	0.67	0.91	1.16	1.38	5yr	1.00	1.35	1.54	2.01	2.57	3.32	3.72	5yr	2.94	3.58	4.15	4.93	5.57	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.56	10yr	1.14	1.53	1.75	2.26	2.88	3.80	4.30	10yr	3.36	4.14	4.78	5.65	6.35	10yr
25yr	0.44	0.68	0.84	1.20	1.58	1.82	25yr	1.36	1.78	2.07	2.63	3.35	4.53	5.19	25yr	4.01	4.99	5.73	6.76	7.58	25yr
50yr	0.49	0.75	0.93	1.33	1.80	2.05	50yr	1.55	2.01	2.35	2.95	3.77	5.17	5.99	50yr	4.58	5.76	6.55	7.74	8.64	50yr
100yr	0.55	0.83	1.04	1.50	2.06	2.32	100yr	1.78	2.27	2.67	3.32	4.24	5.90	6.90	100yr	5.23	6.63	7.50	8.87	9.84	100yr
200yr	0.61	0.92	1.17	1.69	2.36	2.60	200yr	2.03	2.55	3.03	3.73	4.77	6.74	8.07	200yr	5.96	7.76	8.57	10.16	11.18	200yr
500yr	0.71	1.06	1.36	1.98	2.82	3.04	500yr	2.43	2.97	3.59	4.36	5.60	8.00	9.73	500yr	7.08	9.36	10.15	12.18	13.27	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.73	0.90	1.08	1yr	0.78	1.05	1.20	1.59	2.01	2.54	2.79	1yr	2.25	2.68	3.20	3.90	4.45	1yr
2yr	0.33	0.51	0.62	0.84	1.04	1.24	2yr	0.90	1.21	1.40	1.84	2.34	2.95	3.30	2yr	2.61	3.17	3.68	4.37	4.99	2yr
5yr	0.41	0.63	0.78	1.07	1.36	1.58	5yr	1.17	1.54	1.79	2.31	2.94	3.84	4.40	5yr	3.40	4.23	4.84	5.64	6.39	5yr
10yr	0.49	0.75	0.93	1.29	1.67	1.92	10yr	1.44	1.87	2.17	2.75	3.51	4.70	5.47	10yr	4.16	5.26	6.00	6.86	7.75	10yr
25yr	0.62	0.94	1.17	1.68	2.21	2.49	25yr	1.90	2.43	2.79	3.46	4.41	6.16	7.33	25yr	5.45	7.05	7.96	8.90	9.92	25yr
50yr	0.74	1.12	1.40	2.01	2.71	3.03	50yr	2.34	2.97	3.37	4.15	5.25	7.57	9.15	50yr	6.70	8.80	9.88	10.85	12.01	50yr
100yr	0.89	1.35	1.69	2.44	3.35	3.70	100yr	2.89	3.61	4.08	4.95	6.27	9.31	11.44	100yr	8.24	11.00	12.27	13.24	14.57	100yr
200yr	1.07	1.61	2.04	2.95	4.12	4.51	200yr	3.56	4.41	4.93	5.92	7.49	11.46	14.10	200yr	10.14	13.56	15.28	16.16	17.67	200yr
500yr	1.37	2.04	2.63	3.82	5.44	5.90	500yr	4.69	5.76	6.36	7.50	9.48	15.09	18.94	500yr	13.35	18.21	20.42	21.06	22.85	500yr



MANNING'S NUMBER TABLES

Manning's Number Tables

VALUES OF THE ROUGHNESS COEFFICIENT n (continued)

Type of channel and description	Minimum	Normal	Maximum
A. CLOSED CONDUITS FLOWING PARTLY FULL			
A-1. Metal			
a. Brass, smooth	0.009	0.010	0.013
b. Steel	0.010	0.012	0.014
1. Lockbar and welded	0.013	0.016	0.017
2. Riveted and spiral	0.010	0.013	0.014
c. Cast iron	0.011	0.014	0.016
1. Coated	0.012	0.014	0.015
2. Uncoated	0.013	0.016	0.017
d. Wrought iron	0.017	0.019	0.021
1. Black	0.021	0.024	0.030
2. Galvanized	0.008	0.009	0.010
e. Corrugated metal	0.009	0.010	0.013
1. Subdrain	0.010	0.011	0.013
2. Storm drain	0.011	0.013	0.015
A-2. Nonmetal	0.010	0.011	0.013
a. Lucite	0.011	0.013	0.015
b. Glass	0.012	0.014	0.016
c. Cement	0.013	0.015	0.017
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.011	0.013	0.015
d. Concrete	0.010	0.011	0.013
1. Culvert, straight and free of debris	0.011	0.013	0.014
2. Culvert with bends, connections, and some debris	0.011	0.013	0.014
3. Finished	0.011	0.012	0.014
4. Sewer with manholes, inlet, etc., straight	0.013	0.015	0.017
5. Unfinished, steel form	0.012	0.013	0.014
6. Unfinished, smooth wood form	0.012	0.014	0.016
7. Unfinished, rough wood form	0.015	0.017	0.020
e. Wood	0.010	0.012	0.014
1. Stave	0.015	0.017	0.020
2. Laminated, treated	0.011	0.013	0.015
f. Clay	0.011	0.013	0.015
1. Common drainage tile	0.011	0.014	0.017
2. Vitrified sewer	0.013	0.015	0.017
3. Vitrified sewer with manholes, inlet, etc.	0.014	0.016	0.018
4. Vitrified subdrain with open joint	0.011	0.013	0.015
g. Brickwork	0.011	0.013	0.015
1. Glazed	0.012	0.015	0.017
2. Lined with cement mortar	0.012	0.015	0.017
h. Sanitary sewers coated with sewage slimes, with bends and connections	0.012	0.013	0.016
i. Paved invert, sewer, smooth bottom	0.016	0.019	0.020
j. Rubble masonry, cemented	0.018	0.025	0.030
B. LINED OR BUILT-UP CHANNELS			
B-1. Metal			
a. Smooth steel surface	0.011	0.012	0.014
1. Unpainted	0.012	0.013	0.017
2. Painted	0.021	0.025	0.030
b. Corrugated	0.010	0.011	0.013
B-2. Nonmetal	0.010	0.011	0.013
a. Cement	0.010	0.011	0.013
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.010	0.011	0.013
b. Wood	0.010	0.012	0.014
1. Planed, untreated	0.011	0.012	0.015
2. Planed, creosoted	0.011	0.013	0.015
3. Unplaned	0.012	0.015	0.018
4. Plank with battens	0.010	0.014	0.017
5. Lined with roofing paper	0.011	0.013	0.016
c. Concrete	0.011	0.015	0.020
1. Trowel finish	0.015	0.017	0.020
2. Float finish	0.014	0.017	0.020
3. Finished, with gravel on bottom	0.016	0.019	0.023
4. Unfinished	0.018	0.022	0.025
5. Gunite, good section	0.017	0.020	0.022
6. Gunite, wavy section	0.022	0.027	0.030
7. On good excavated rock	0.022	0.027	0.030
8. On irregular excavated rock	0.017	0.020	0.025
d. Concrete bottom float finished with sides of	0.015	0.017	0.020
1. Dressed stone in mortar	0.017	0.020	0.024
2. Random stone in mortar	0.016	0.020	0.024
3. Cement rubble masonry, plastered	0.020	0.025	0.030
4. Cement rubble masonry	0.020	0.030	0.035
5. Dry rubble or riprap	0.017	0.020	0.025
e. Gravel bottom with sides of	0.020	0.023	0.036
1. Formed concrete	0.011	0.013	0.015
2. Random stone in mortar	0.012	0.015	0.018
3. Dry rubble or riprap	0.017	0.025	0.030
f. Brick	0.011	0.013	0.015
1. Glazed	0.012	0.015	0.018
2. In cement mortar	0.017	0.025	0.030
g. Masonry	0.023	0.032	0.035
1. Cemented rubble	0.013	0.015	0.017
2. Dry rubble	0.013	0.013	0.013
h. Dressed ashlar	0.013	0.013	0.013
i. Asphalt	0.013	0.013	0.013
1. Smooth	0.013	0.013	0.013
2. Rough	0.016	0.016	0.016
j. Vegetal lining	0.030	0.500

Manning's Number Tables (continued)

VALUES OF THE ROUGHNESS COEFFICIENT n (continued)

Type of channel and description	Minimum	Normal	Maximum
b. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages	0.030	0.040	0.050
1. Bottom: gravels, cobbles, and few boulders	0.040	0.050	0.070
2. Bottom: cobbles with large boulders			
D-2. Flood plains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
D-3. Major streams (top width at flood stage >100 ft). The n value is less than that for minor streams of similar description, because banks offer less effective resistance.			
a. Regular section with no boulders or brush	0.025	0.060
b. Irregular and rough section	0.035	0.100

VALUES OF THE ROUGHNESS COEFFICIENT n (continued)

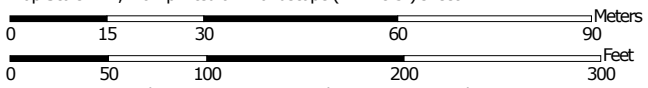
Type of channel and description	Minimum	Normal	Maximum
C. EXCAVATED OR DREDGED			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
D. NATURAL STREAMS			
D-1. Minor streams (top width at flood stage <100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

USDA SOIL MAPPING

Hydrologic Soil Group—Merrimack and Belknap Counties, New Hampshire
(USDA soil report)




Map Scale: 1:1,170 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines

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

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Merrimack and Belknap Counties, New Hampshire

Survey Area Data: Version 20, Sep 22, 2015

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

Date(s) aerial images were photographed: Apr 8, 2011—Apr 9, 2011

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Merrimack and Belknap Counties, New Hampshire (NH609)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
26A	Windsor loamy sand, 0 to 3 percent slopes	A	0.0	0.0%
313A	Deerfield fine sandy loam, 0 to 5 percent slopes	A/D	1.6	53.2%
699B	Urban land, 0 to 8 percent slopes		1.4	46.8%
Totals for Area of Interest			3.0	100.0%

Description

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

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

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

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

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

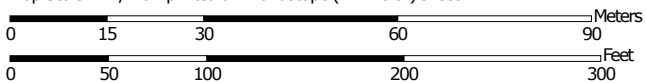
Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over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

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

Saturated Hydraulic Conductivity (Ksat)—Merrimack and Belknap Counties, New Hampshire
(USDA soil report - Ksat)



Map Scale: 1:1,170 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84






MAP LEGEND

Area of Interest (AOI)




 Area of Interest (AOI)

Soils




Soil Rating Polygons

-  ≤ 99.8187
-  > 99.8187 and ≤ 100.0000
-  Not rated or not available


Soil Rating Lines

-  ≤ 99.8187
-  > 99.8187 and ≤ 100.0000
-  Not rated or not available






Soil Rating Points

-  ≤ 99.8187
-  > 99.8187 and ≤ 100.0000
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Merrimack and Belknap Counties, New Hampshire
Survey Area Data: Version 20, Sep 22, 2015

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

Date(s) aerial images were photographed: Apr 8, 2011—Apr 9, 2011

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.

Saturated Hydraulic Conductivity (Ksat)

Saturated Hydraulic Conductivity (Ksat)— Summary by Map Unit — Merrimack and Belknap Counties, New Hampshire (NH609)				
Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
26A	Windsor loamy sand, 0 to 3 percent slopes	100.0000	0.0	0.0%
313A	Deerfield fine sandy loam, 0 to 5 percent slopes	99.8187	1.6	53.2%
699B	Urban land, 0 to 8 percent slopes		1.4	46.8%
Totals for Area of Interest			3.0	100.0%

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 12

Bottom Depth: 36

Units of Measure: Inches

GROUNDWATER RECHARGE CALCULATION

Groundwater Recharge Volume (GRV) Calculation

1.83	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.40	inches	Rd = weighted groundwater recharge depth	
0.7312	ac-in	GRV = AI * Rd	
2,654	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

2,654 CF Groundwater Recharge Required. < 16,454 CF Total Recharge Area Provided

7,174 CF Provided with Stormcrete Systems

9,280 CF Provided with Bioretention Areas

16,454 CF Total Recharge Area Provided (See attached HydroCAD calculation pages)

Summary for Pond 1P: Stormcrete #1

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=562)

Inflow Area = 3,912 sf, 90.19% Impervious, Inflow Depth = 5.38" for NRCS 50-year event
 Inflow = 0.6 cfs @ 12.00 hrs, Volume= 1,755 cf
 Outflow = 0.2 cfs @ 12.18 hrs, Volume= 1,757 cf, Atten= 66%, Lag= 10.8 min
 Discarded = 0.2 cfs @ 12.18 hrs, Volume= 1,757 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 307.86' @ 12.18 hrs Surf.Area= 580 sf Storage= 199 cf
 Flood Elev= 309.50' Surf.Area= 580 sf Storage= 580 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.7 min (773.8 - 770.1)

Volume	Invert	Avail.Storage	Storage Description
#1	307.00'	580 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 1,450 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.00	580	298.0	0	0	580
309.50	580	298.0	1,450	1,450	1,325

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.00'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 301.75'
#2	Primary	309.50'	145.0' long Overflow X 2.00 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=0.2 cfs @ 12.18 hrs HW=307.86' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.00' (Free Discharge)
 ↳ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 2P: Stormcrete #2

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=518)

Inflow Area = 12,283 sf, 88.05% Impervious, Inflow Depth = 5.27" for NRCS 50-year event
 Inflow = 2.0 cfs @ 12.00 hrs, Volume= 5,395 cf
 Outflow = 0.5 cfs @ 12.31 hrs, Volume= 5,398 cf, Atten= 75%, Lag= 18.3 min
 Discarded = 0.5 cfs @ 12.31 hrs, Volume= 5,398 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 309.80' @ 12.31 hrs Surf.Area= 916 sf Storage= 1,089 cf
 Flood Elev= 309.83' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 12.2 min (786.1 - 773.9)

Volume	Invert	Avail.Storage	Storage Description
#1	306.83'	1,099 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

2047-04_Proposed

Prepared by Allen & Major
 HydroCAD® 10.00-18 s/n 02881 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr NRCS 50-year Rainfall=6.32"

Printed 5/23/2018

Page 2

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
306.83	916	466.0	0	0	916
309.83	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	306.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	309.83'	237.0' long Overflow X 2.00
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=0.5 cfs @ 12.31 hrs HW=309.80' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=306.83' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 3P: Stormcrete #3

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=519)

Inflow Area = 12,158 sf, 88.96% Impervious, Inflow Depth = 5.27" for NRCS 50-year event
 Inflow = 1.7 cfs @ 12.07 hrs, Volume= 5,340 cf
 Outflow = 0.5 cfs @ 12.39 hrs, Volume= 5,341 cf, Atten= 71%, Lag= 19.1 min
 Discarded = 0.5 cfs @ 12.39 hrs, Volume= 5,341 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.11' @ 12.39 hrs Surf.Area= 916 sf Storage= 1,080 cf
 Flood Elev= 310.16' Surf.Area= 916 sf Storage= 1,099 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 12.4 min (790.9 - 778.5)

Volume	Invert	Avail.Storage	Storage Description
#1	307.16'	1,099 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 2,748 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.16	916	466.0	0	0	916
310.16	916	466.0	2,748	2,748	2,314

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.16'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.40'
#2	Primary	310.16'	237.0' long Overflow X 2.00
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=0.5 cfs @ 12.39 hrs HW=310.11' (Free Discharge)
 ↑ **1=Exfiltration** (Controls 0.5 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.16' (Free Discharge)
 ↑ **2=Overflow** (Controls 0.0 cfs)

Summary for Pond 4P: Stormcrete #4

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=526)

2047-04_Proposed

Prepared by Allen & Major
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Type III 24-hr NRCS 50-year Rainfall=6.32"

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Inflow Area = 10,161 sf, 89.81% Impervious, Inflow Depth = 5.38" for NRCS 50-year event
 Inflow = 1.4 cfs @ 12.07 hrs, Volume= 4,559 cf
 Outflow = 0.4 cfs @ 12.38 hrs, Volume= 4,561 cf, Atten= 70%, Lag= 18.4 min
 Discarded = 0.4 cfs @ 12.38 hrs, Volume= 4,561 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.11' @ 12.38 hrs Surf.Area= 836 sf Storage= 872 cf
 Flood Elev= 310.50' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 11.0 min (785.7 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	307.50'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.50	836	426.0	0	0	836
310.50	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 302.80'
#2	Primary	310.50'	217.0' long Overflow X 2.00 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=0.4 cfs @ 12.38 hrs HW=310.11' (Free Discharge)
 ↳1=Exfiltration (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.50' (Free Discharge)
 ↳2=Overflow (Controls 0.0 cfs)

Summary for Pond 5P: Stormcrete #5

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=526)

Inflow Area = 10,218 sf, 93.17% Impervious, Inflow Depth = 5.61" for NRCS 50-year event
 Inflow = 1.5 cfs @ 12.07 hrs, Volume= 4,780 cf
 Outflow = 0.4 cfs @ 12.37 hrs, Volume= 4,782 cf, Atten= 70%, Lag= 17.9 min
 Discarded = 0.4 cfs @ 12.37 hrs, Volume= 4,782 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.52' @ 12.37 hrs Surf.Area= 836 sf Storage= 900 cf
 Flood Elev= 310.83' Surf.Area= 836 sf Storage= 1,003 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 10.8 min (777.0 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	307.83'	1,003 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,508 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
307.83	836	426.0	0	0	836
310.83	836	426.0	2,508	2,508	2,114

Device	Routing	Invert	Outlet Devices
#1	Discarded	307.83'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 303.50'
#2	Primary	310.83'	217.0' long Overflow X 2.00 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=0.4 cfs @ 12.37 hrs HW=310.52' (Free Discharge)

↑**1=Exfiltration** (Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=307.83' (Free Discharge)

↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 6P: Stormcrete #6

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=528)

Inflow Area = 13,371 sf, 96.66% Impervious, Inflow Depth = 5.85" for NRCS 50-year event
 Inflow = 1.9 cfs @ 12.07 hrs, Volume= 6,514 cf
 Outflow = 0.6 cfs @ 12.36 hrs, Volume= 6,514 cf, Atten= 69%, Lag= 17.6 min
 Discarded = 0.6 cfs @ 12.36 hrs, Volume= 6,514 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 311.11' @ 12.36 hrs Surf.Area= 1,134 sf Storage= 1,185 cf
 Flood Elev= 311.16' Surf.Area= 1,134 sf Storage= 1,207 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 10.2 min (766.4 - 756.2)

Volume	Invert	Avail.Storage	Storage Description
#1	308.50'	1,207 cf	Stormcrete Storage (Irregular) Listed below (Recalc) 3,016 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
308.50	1,134	575.0	0	0	1,134
311.16	1,134	575.0	3,016	3,016	2,664

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.50'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 304.20'
#2	Primary	311.16'	295.0' long Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.6 cfs @ 12.36 hrs HW=311.11' (Free Discharge)

↑**1=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=308.50' (Free Discharge)

↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 7P: Stormcrete #7

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=539)

Inflow Area = 13,607 sf, 92.87% Impervious, Inflow Depth = 5.61" for NRCS 50-year event
 Inflow = 2.0 cfs @ 12.07 hrs, Volume= 6,365 cf
 Outflow = 0.6 cfs @ 12.34 hrs, Volume= 6,366 cf, Atten= 67%, Lag= 16.0 min
 Discarded = 0.6 cfs @ 12.34 hrs, Volume= 6,366 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 311.26' @ 12.34 hrs Surf.Area= 1,314 sf Storage= 1,056 cf
 Flood Elev= 311.50' Surf.Area= 1,314 sf Storage= 1,183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 8.1 min (774.3 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	309.25'	1,183 cf	Stormcete Storage (Irregular) Listed below (Recalc) 2,957 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
309.25	1,314	515.0	0	0	1,314
311.50	1,314	515.0	2,957	2,957	2,473

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.25'	14.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 305.25'
#2	Primary	311.50'	262.5' long Overflow 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=0.6 cfs @ 12.34 hrs HW=311.26' (Free Discharge)
 ↑**1=Exfiltration** (Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=309.25' (Free Discharge)
 ↑**2=Overflow** (Controls 0.0 cfs)

Summary for Pond 9P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=524)

Inflow Area = 16,013 sf, 59.88% Impervious, Inflow Depth = 3.66" for NRCS 50-year event
 Inflow = 1.9 cfs @ 12.00 hrs, Volume= 4,881 cf
 Outflow = 0.7 cfs @ 12.20 hrs, Volume= 4,882 cf, Atten= 64%, Lag= 11.9 min
 Discarded = 0.7 cfs @ 12.20 hrs, Volume= 4,882 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 306.33' @ 12.20 hrs Surf.Area= 1,470 sf Storage= 870 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 9.1 min (825.3 - 816.2)

Volume	Invert	Avail.Storage	Storage Description
#1	305.50'	2,126 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)
305.50	668	214.0	0	0	668
306.00	1,109	226.0	440	440	1,102
307.00	2,339	287.0	1,686	2,126	3,606

Device	Routing	Invert	Outlet Devices
#1	Primary	307.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	305.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

Discarded OutFlow Max=0.7 cfs @ 12.20 hrs HW=306.33' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.7 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.50' TW=0.00' (Dynamic Tailwater)
 ↑**1=Overflow** (Controls 0.0 cfs)

Summary for Pond 10P: Bio-Retention

Infiltration Rate = 99.81 Micrometers/Second = 14.13 Inch/Hour

Inflow Area = 11,920 sf, 46.38% Impervious, Inflow Depth = 3.06" for NRCS 50-year event
 Inflow = 1.0 cfs @ 12.08 hrs, Volume= 3,041 cf
 Outflow = 0.8 cfs @ 12.13 hrs, Volume= 3,041 cf, Atten= 20%, Lag= 3.4 min
 Discarded = 0.8 cfs @ 12.13 hrs, Volume= 3,041 cf
 Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 310.80' @ 12.13 hrs Surf.Area= 968 sf Storage= 177 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.3 min (836.0 - 834.8)

Volume	Invert	Avail.Storage	Storage Description
#1	310.50'	7,154 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)
310.50	269	202.0	0	0	269
311.00	1,654	299.0	432	432	4,138
312.00	3,229	330.0	2,398	2,830	5,721
313.00	5,521	410.0	4,324	7,154	10,447

Device	Routing	Invert	Outlet Devices
#1	Primary	313.00'	40.0' long x 20.0' breadth Overflow 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
#2	Discarded	310.50'	14.130 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 301.50'

Discarded OutFlow Max=0.8 cfs @ 12.13 hrs HW=310.80' (Free Discharge)
 ↑ **2=Exfiltration** (Controls 0.8 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=310.50' (Free Discharge)
 ↑ **1=Overflow** (Controls 0.0 cfs)

TSS REMOVAL CALCULATION



Project No.	<u>2047-04</u>	Sheet	<u>1 of 1</u>
Project Description	<u>Self-Storage Facility</u>		
	<u>15 Chester Turnpike, Allentown, NH</u>		
Calculated By	<u>ARM</u>	Date	<u>May 2018</u>
Checked By	<u>BDJ</u>	Date	<u></u>

TSS REMOVAL CALCULATIONS

The calculations provide the TSS removal rate for the Treatment Train #2 (rear underground system)

<u>Stormwater Management BMP</u>	<u>TSS Removal rate</u>
Street Sweeping	5 %
Infiltration Practice (Bioretention/pervious concrete)	90 %
Average Annual Load	= 1.0
Street Sweeping	= <u>5.0</u> % Removal Rate
	95.0 % TSS Load Remains
TSS Load Remaining	= 95.0 %
Infiltration Practice	= <u>90.0</u> % Removal Rate
	9.5 % TSS Load Remains

Percentage of TSS Remaining	-	Initial TSS Load	=	Final TSS Removal Rate
9.50	-	100.0	=	90.5 %

72 HOUR DRAWDOWN CALCULATION



Project No.	2047-04	Sheet	1 of 1
Project Description	Self-Storage Facility		
	Allenstown, NH		
Calculated By	ARM	Date	05/23/18
Checked By	BDJ	Date	

Drawdown within 72 hours Analysis for Static Method

Stormcrete Infiltration System

6P - Stormcrete #6 was chosen to calculate as it has the largest contributing runoff volume.

Infiltration Rate: 14.13 inches/hour (*From NRCS web soil survey KSAT*)

Design Infiltration Rate: 7.07 inches/hour (*Assume 50% reduction for safety*)

Volume Provide for Infiltration: 1,207 cf

Basin bottom area: 1,134 sf

Time_{drawdown} = (Required Recharge Volume in cubic feet as determined by the Static Method)(1/Design Infiltration Rate in inches per hour)(conversion for inches to feet)(1/bottom area in feet)

$$\begin{aligned} \text{Time}_{\text{drawdown}} &= (1,207 \text{ cf}) (1 / 7.07 \text{ in/hr}) (1\text{ft}/12 \text{ in.}) (1 / 1,134 \text{ sf}) \\ &= \mathbf{1.81 \text{ hours}} \end{aligned}$$

Bioretention Infiltration Area

9P - Bioretention Pond was chosen to calculate as it has the larger contributing runoff volume.

Infiltration Rate: 14.13 inches/hour (*From NRCS web soil survey KSAT*)

Design Infiltration Rate: 7.07 inches/hour (*Assume 50% reduction for safety*)

Volume Provide for Infiltration: 2,126 cf

Basin bottom area: 668 sf

Time_{drawdown} = (Required Recharge Volume in cubic feet as determined by the Static Method)(1/Design Infiltration Rate in inches per hour)(conversion for inches to feet)(1/bottom area in feet)

$$\begin{aligned} \text{Time}_{\text{drawdown}} &= (2,126 \text{ cf}) (1 / 7.07 \text{ in/hr}) (1\text{ft}/12 \text{ in.}) (1 / 668 \text{ sf}) \\ &= \mathbf{5.41 \text{ hours}} \end{aligned}$$