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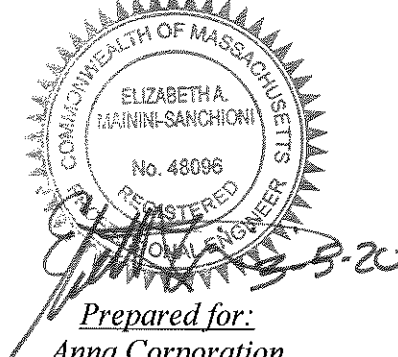
Stormwater Report

for

“Mendon Self Storage”

*41 Milford Street
Mendon, MA*

March 3, 2020



Prepared for:
Anna Corporation
PO Box 553
Milford, MA 01757

Prepared by:
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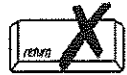
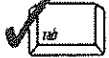
G&H Project No.: G-7532



Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

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

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

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

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

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

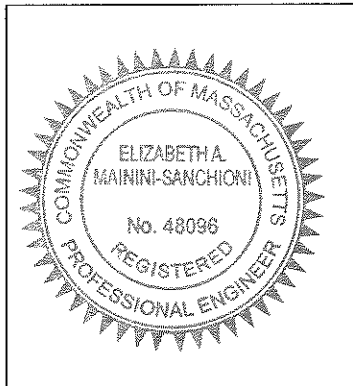
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

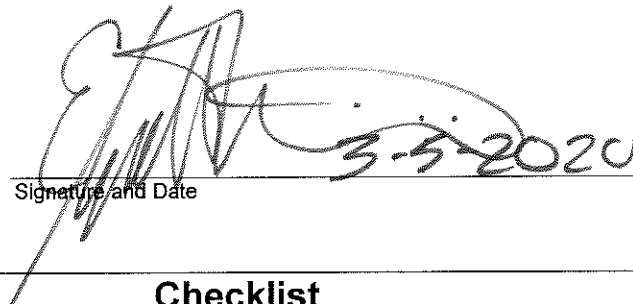
Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date


3-5-2020

Checklist

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

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted *prior* to the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does *not* cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has *not* been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

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

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
- Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

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

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has *not* been included in the Stormwater Report but will be submitted *before* land disturbance begins.
- The project is *not* covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is *not* the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted *prior to* the discharge of any stormwater to post-construction BMPs.

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SITE LOCATION & DESCRIPTION

This report was prepared on behalf of the property owner Anna Corporation. The project site is located on the easterly side of Milford Street (Route 16) in the town of Mendon. The property is approximately 2.08 acres with 1.08 acres directly adjacent to Milford Street containing four (4) metal self-storage buildings with associated infrastructure. the remaining 1.0 acre parcel of wooded land is located in the residential zoning district. The property owner received a variance from the Mendon Zoning Board of Appeals that will allow the remaining property to be developed commercially.

PROJECT DESCRIPTION

The owner is proposing to construct an additional self-storage building on the remaining land. The proposed building will be 300' long and 40' wide.

DESCRIPTION OF EXISTING DRAINAGE

The runoff from the proposed 1.0 acre area currently flows overland to the wetlands area to the south.

DESCRIPTION OF PROPOSED DRAINAGE FACILITIES

The runoff generated from the proposed development will be collected in a catch basin to drain manhole system, using HDPE pipe. A proposed 73-unit StormTech Chamber detention system will be constructed to attenuate the peak flows for the 2, 10, and 100-year storm events. Static recharge for the site will be provided in the area below the structure outlet invert. T.S.S. removal will occur within the hydrodynamic separator prior to discharged to the infiltration basin.

This report documents design compliance with the applicable sections of the Massachusetts Stormwater Management Standards 1-10.

Stormwater Design Parameter:

The stormwater management system was designed to control the post-development rate of peak rainfall runoff from the site by keeping it below the post-development peak rate of rainfall runoff as stated as the objective in the Massachusetts Stormwater Handbook. These calculations were performed using the HydroCAD hydraulic program, developed by applied Microcomputer System. The HydroCAD software is based upon the Soil Conservation Service, “Technical Release 55 – Urban Hydrology for Small Watersheds” and is generally accepted industry methodology.

The analysis was performed for the 2-year, 10-year, 25-year, and 100-year 24-hour storm events.

The following data was required for input:

- **Watershed Area:** Areas of each watershed were calculated and expressed in square feet for these calculations.
- **SCS Curve Number (Cn):** Based on the cover type and hydrologic soil group, a weighted curve number (CN) was determined for each of the existing watersheds utilizing Table 2-2a- *Runoff Curve Numbers For Urban Areas* and *Worksheet 2, Runoff Curve Number and Runoff* from the Soil Conservation Service Technical Release 55 – Urban Hydrology for Small Watersheds.
- **Time of Concentration, Tc (Minutes):** The time of concentration for each watershed was determined by finding the time necessary for runoff to travel from the hydraulically most distant point in the watershed to the point of concentration. For the proposed conditions the minimum time of 6 minutes was used for runoff to reach the most distant catch basin.
- **SCS 24-Hour Storm Type:** For the greater New England region, a Type III storm rainfall distribution is recommended for drainage calculations and was used for this project.
- **Rainfall Precipitation:** Rainfall precipitations used the HydroCad TP-40-Rain for Worcester County for the 2, 10, and 100-year storm events and are as follows:

2-year storm event:	3.2 inches
10-year storm event:	4.7 inches
100-year storm event:	6.8 inches

An on-site conventional storm drainage collection system is designed based on the “Rational Method” using Manning’s equation to carry a minimum 25-year storm event without surcharge (See Pipe Sizing Attachments). The proposed drainage pipes will be High Density Polyethylene Pipe.

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

All Paved area runoff will sheet flow across the pavement areas, accumulate into hooded catch basins, connect with drain pipe to a hydrodynamic separator, which discharges to the StormTech detention structure. The outlet pipe will discharge to an armored riprap slope to prevent erosion. No new untreated stormwater discharges are proposed.

Standard 2: Stormwater management systems shall be designed so that the post-development peak discharge rates do not exceed pre-development peak discharge rates.

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To meet Standard 2, the post-development peak discharge rate must be equal to or less than pre-development rates to prevent storm damage and downstream and offsite flooding from the 2-year thru and 100-year 24-hour storm events.

Peak discharge rates were calculated and evaluated at the same locations – at the wetland system, on the easterly side of the development.

In summary of the attached drainage analysis (HydroCAD), the peak discharge rates leaving the point of evaluation in cubic feet per second (cfs) are as follows;

Storm Events	Run off		
	Pre (cfs)	Post (cfs)	Change (cfs)
2-year	0.27	0.24	-0.03
10-year	1.01	0.93	-0.08
100-year	2.41	1.95	-0.46

Standard 3: Loss of annual recharge to ground water shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post- development site shall approximate the annual recharge from pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Hydrologic Group	Volume to Recharge x Total Impervious Area
A	0.60 inches of runoff
B	0.35 inches of runoff
C	0.25 inches of runoff
D	0.10 inches of runoff

The required volume of recharge for post-development conditions is calculated as follows;

Proposed Increase to Impervious Area: 0.63 acres (27,443 sf)

Required Recharge Volume

$$0.35'' \times 1/12'' \times 27,443 \text{ sf} = \underline{\underline{800}} \text{ cf} \quad (\text{B soils})$$

StormTech

Total storage volume provided below overflow outlet invert @ 281.50 = >3,000 cf

Soils

Soils underlying the site are defined as map unit 422B Canton fine sandy loam. We have estimated the soil as hydrologic group “B” for the majority of the site based on Web Soil Survey USDA/NRCS Soil Map. The recharge under the StormTech Chambers infiltration design is based on a calculation of the B soil type and a Rawls Rate of 1.02.

Calculations show that during a 100-year storm event, the StormTech System will completely dewater within approximately 30.0 hours (See Drawdown calculations in the appendix) which is in compliance with the maximum dewatering time of 72 hours.

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

- a) *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;*
- b) *Structural stormwater best management practices are sized to capture the required water quality volume as determined in accordance with the Massachusetts Stormwater Handbook; and*
- c) *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

The Water Quality Volume requiring 80% TSS removal, is calculated as follows:

The required water quality volume is based on 0.5”. The water quality volume equals 1.0 inches of runoff times the increased impervious area of the post-development site.

Proposed Impervious Area
Total Site Impervious Area = 27,443 sf
Impervious area to be treated = 27,443 sf

Total volume to be treated:
 $0.5'' \times 1\frac{1}{12}'' \times 27,443 \text{ sf} = \underline{\underline{1,143 \text{ cf Water Quality Volume Required}}}$

Provided Water Quality Volume:

All stormwater flows through the catch basins, hydrodynamic separators and infiltration structure.

See TSS Removal Calculations in Attachment Section.

Standard 4: requires the development and implementation of suitable practices for source control and pollution prevention. These measures must be identified in a long-term pollution prevention plan.

The long-term pollution prevention plan is incorporated into the Operation and Maintenance Plan required by Standard 9.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to

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eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The proposed project is not a use with higher potential pollutant loads.

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The subject property does not discharge stormwater within the Zone II of a public water supply.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable:

This Site is not a redevelopment project.

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

During land disturbance and construction activities, project proponents must implement controls that prevent erosion, control sediment movement, and stabilize exposed soils to prevent pollutants from moving offsite or entering wetlands or waters. Land disturbance activities include demolition, construction, clearing, excavation, grading, filling, and reconstruction.

Construction Period Pollution Prevention Plan and Erosion and Sedimentation Control.
EPA NPDES – Storm Water Pollution Prevention Plan (SWPPP)

A. Names of Persons or Entities Responsible for Plan Compliance

Roy Vaz
Anna Corporation
P.O. Box 553
Milford, MA 01757
Tel : 508-509-1129

B. Construction Period Pollution Prevention Measures

1. Inventory materials to be present on-site during construction.
2. Train employees and subcontractors in prevention and clean up procedures.
3. All materials stored on site will be stored in their appropriate containers and if possible, under a roof or covered.
4. Follow manufacturer's recommendation for disposal of used containers.
5. Store only enough products on site to do the job.
6. On site equipment, fueling and maintenance measures:
 - a. Inspect on-site vehicles and equipment daily for leaks.
 - b. Conduct all vehicle and equipment maintenance and refueling in front of building, away from storm drains and Wetlands.

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- c. Perform major repairs and maintenance off site.
 - d. Use drip pans, drip cloths or absorbent pads when replacing spent fuels.
 - e. Collect spent fuels and remove from site, per Local and State regulations.
 - f. Maintain a clean construction entrance; install a crushed stone apron where truck traffic is frequent to reduce soil compaction constant sweeping is required and limit tracking of sediment into streets, sweeping street when silt is observed on street.
7. A temporary concrete washout station and equipment wash station shall be located on the site. Concrete washout station and equipment wash station shall not be within the 100' wetland buffer. Areas shall be surrounded with a silt fence to contain materials and provide ease of cleanup.
 8. Stock pile materials, and maintain Erosion Control around the materials where it can easily be accessed. Maintain easy access to clean up materials to include brooms, mops, rags gloves, goggles, sand, sawdust, plastic and metal trash containers.
 9. Clean up spills.
 - a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry cleanup methods (sawdust, cat litter and/or rags and absorbent pads).
 - b. Sweep up dry materials immediately. Never wash them away or bury them.
 - c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil in a certified container and notify a certified hauler for removal.
 - d. Report significant spills to the Fire Department.
 10. It is the responsibility of the site superintendent or employees designated by the Applicant to inspect erosion control and repair as needed, also to inspect all on site vehicles for leaks and check all containers on site that may contain hazardous materials daily.
- C. Site Development Plans
1. See Site Plan set "Mendon Self Storage" dated February 20, 2020, prepared by Guerriere & Halnon, Inc.
- D. Construction Erosion and Sedimentation Control Plan;
1. See Site Plan set "Mendon Self Storage" dated February 20, 2020, prepared by Guerriere & Halnon, Inc.
- E. Plans
1. Construction Sequencing Plan
 - a. Record Order of Conditions - The site superintendent shall be aware of all the Conditions contained within the Order including inspection schedules.
 - b. Install DEP File # Sign.
 - c. Prior to any work on the site including tree/brush clearing, the approved limit of clearing as well as the location of the proposed erosion control devices (such as silt fence/straw bales, etc.) must be staked on the ground under the direction of a Massachusetts registered Professional Land Surveyor.
 - d. Install erosion control barrier at locations depicted on the plans.
 - e. Erosion control to be inspected by either the design engineer (or agent) or an erosion control monitor appointed by the Town of Mendon, MA.
 - f. Erosion control devices shall be stored on the site to be used in case of an emergency (large storm).
 - g. Perform tree/brush removal.

- h. Strip off top and subsoil. Stockpile material to be reused away from any drainage inlet or protected wetland areas, remove excess material from the site. Install and maintain erosion control barrier around stockpile.
 - i. Rough grade site, maintaining temporary low areas/sediment traps for sediment accumulation and away from the wetlands and prevent sedimentation from migrating from the site.
 - j. Construct detention basin, outlets/outfalls and install pipes, manholes and catch basins. Stabilize side slopes with loam, seed and mulch.
 - k. Install underground utilities; protect all open drainage structures with erosion/siltation control devices, and rope off any areas susceptible to heavy vehicle damage.
 - l. Prepare compacted parking lot base.
 - m. Loam and seed (mulch as required) disturbed areas of site other than immediately adjacent to the parking lot.
 - n. Install binder course of bituminous asphalt.
 - o. Install curbing and final pavement wearing course.
 - p. Finish grade - loam and seed and landscaping.
 - q. Maintain all erosion control devices until site is stabilized, final inspections are performed, and a Certificate of Compliance is issued by the Conservation Commission.
 - r. The Contractor shall be responsible to schedule any required inspections of his/her work.
2. Construction Waste Management Plan
 - a. Dumpster for trash and bulk waste collection shall be provided separately for construction.
 - b. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
 - c. Segregate and provide containers for disposal options for waste.
 - d. Do not bury waste and debris on site.
 - e. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
- F. Operation and Maintenance of Erosion and Sedimentation Controls
The operation and maintenance of sedimentation control shall be the responsibility of the contractor. The inspection and maintenance of the storm water component shall be performed as noted below. The contractor shall, at all times have erosion control in place. The contractor, based on future weather reports shall prepare and inspect all erosion control devices; cleaning, repairing and upgrading is a priority so that the devices perform as per design. Inspect the site during rain events. **Don't stay away from the site.** At a minimum, there should be inspection to assure the devices are not clogged or plugged, or that devices have not been destroyed or damaged during the rain event. After a storm event inspection is required to clean and repair any damage components. Immediate repair is required.
- G. Inspection and Maintenance Schedules
 1. Inspection must be conducted at least once every 7 days and within 24 hours prior to and after the end of a storm event 0.5 inches or greater.
 2. Inspection frequency can be reduced to once a month if:
 - a. The site is temporarily stabilized.
 - b. Runoff is unlikely due to winter conditions, when site is covered with snow or ice.

Stormwater Report
Mendon Self Storage
Mendon, MA

3. Inspections must be conducted by qualified personnel, “qualified personnel” means a person knowledgeable in the principles and practice of erosion and sediment controls and who possess the skills to assess the conditions and take measures to maintain and ensure proper operation, also to conclude if the erosion control methods selected are effective.
4. For each inspection, the inspection report must include:
 - a. The inspection date.
 - b. Names, titles of personnel making the inspection.
 - c. Weather information for the period since the last inspection.
 - d. Weather information at the time of the inspection.
 - e. Locations of discharges of sediment from the site, if any.
 - f. Locations of BMP’s that need to be maintained.
 - g. Locations where additional BMP’s may be required.
 - h. Corrective action required or any changes to the SWPPP that may be necessary.
5. Qualified personnel shall inspect the following in-place work;

Inspection Schedule:

Erosion Control	Weekly
Catch Basins	Weekly
Temporary Sedimentation Traps/Basins	Weekly

Please Note: Special inspections shall also be made after a significant rainfall event.

Maintenance Schedule

Erosion Control Devices Failure	Immediately
Temporary Sedimentation Traps/Basins	As needed

Please Note: Special maintenance shall also be made after a significant rainfall event.

H. Inspection and Maintenance Log Form.

1. See Construction Phase Inspection and Maintenance Form attached

Standard 9: A Long –Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that storm water management systems function as designed.

The following shall serve as the (O&M) Plan required by Standard 9, as well as the Long-Term Pollution Prevention Plan required by Standard 4.

A. Names of Persons or Entities Responsible for Plan Compliance;

Roy Vaz
Anna Corporation
P.O. Box 553
Milford, MA 01757
Tel: 508-509-1129

B. Good housekeeping practices

1. Maintain site, landscaping and vegetation.
2. Sweep and pick up litter on pavements and grounds.
3. Deliveries shall be monitored by owners or representative to ensure that if any spillage occurs, it shall be contained and cleaned up immediately.
4. Maintain pavement and curbing in good repair.

C. Requirements for routine inspections and maintenance of stormwater BMPs

1. Plans: The storm water Operation and Maintenance Plan shall consist of all Plans, documents and all local state and federal approvals as required for the subject property.
2. Record Keeping:
 - a. Maintain a log of all operation and maintenance activities for at least three years following construction, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location);
3. Descriptions and Designs: The Best Management Practices (BMP) incorporated into the design include the following:
 - a. Deep sump catch basins with hoods installed to promote TSS Removal of solids and control floatable pollutants. This BMP has a design rate of 25% TSS Removal.
 - b. Hydrodynamic Separator - installed to promote TSS Removal of solids. This BMP has a design rate of 50% TSS Removal.
 - c. Infiltration Basin –has a design rate of 80% TSS Removal. Refer to TSS Removal Worksheet included in the Attachments.
 - d. Spill Containment Kit to contain and clean-up spills that could occur on site.
4. BMP Maintenance: After construction it is the responsibility of the owner to perform maintenance. The cleaning of the components of the stormwater management system shall generally be as follows:
 - a. Pavement: The owner shall keep the pavement swept with a mechanical sweeper or hand swept semi-annually at a minimum.
 - b. Catch Basins: Shall be cleaned by excavating, pumping or vacuuming. The sediment shall be disposed of off-site by the Owner. Inspect quarterly, remove silt when ¼ full.
 - c. Hydrodynamic Separator shall be cleaned by pumping. The sediment shall be disposed of off-site by the Owner. Inspect quarterly, remove silt when ¼ full.
 - d. StormTech Chambers: Inspect for proper function after every major storm event during the first 3 months of operation, inspect/remove debris twice per year afterward.
5. Access Provisions: All of the components of the storm water system will be accessible by the Owner

- D. Spill prevention and response plans
1. Train employees and subcontractors in prevention and clean up procedures.
 2. All materials stored on site will be stored in their appropriate containers under a roof or in the approved underground storage tanks.
 3. Follow manufacturer's recommendation for disposal of used containers.
 4. On site equipment, fueling and maintenance measures:
 - a. Inspect on-site vehicles and equipment daily for leaks.
 - b. Conduct all vehicle and equipment maintenance off Site and refueling in one location, away from storm drains and wetlands.
 5. Clean up spills.
 - a. Never hose down "dirty" pavement or impermeable surfaces where fluids have spilled. Use dry clean-up methods (sawdust, cat litter and/or rags and absorbent pads).
 - b. Sweep up dry materials immediately. Never wash them away or bury them.
 - c. Clean up spills on dirt areas by digging up and properly disposing of contaminated soil.
 - d. Report significant spills to the Fire Department, Conservation Commission and Board of Health.
- E. Provisions for maintenance of lawns, gardens, and other landscaped areas
Dispose of clippings outside of the 100-foot buffer zone to the adjacent wetland and away from storm drainage and use 0% phosphate fertilizer.
- F. Requirements for storage and use of herbicides, and pesticides
The application of herbicides or pesticides will be done by professional certified contractor.
- G. Provisions for solid waste management
1. Waste Management Plan
 - a. Recycle materials whenever possible (paper, plaster cardboard, metal cans). Separate containers for material are recommended.
 - b. Do not bury waste and debris on site.
 - c. Certified haulers will be hired to remove the dumpster container waste as needed. Recycling products will also be removed off site weekly.
- H. Snow disposal and plowing plans
Snow storage is adequate around the site for large storm events, see site plan
- I. Winter Road Salt and/or Sand Use and Storage restrictions
No sand, salt, or chemicals for de-icing will be stored outside.
- J. Pavement sweeping schedules
Sweeping, the act of cleaning pavement can be done by mechanical sweepers, vacuum sweeper or hand sweeper. The quantity of sand is a direct correlation with the treatment of ice and snow and the types of chemicals and spreaders that are being used on site to manage snow. If a liquid de-icer such as calcium chloride is used as a pretreatment to new events the amount of sand is minimized. Sweeping for this site should be done semi-annually at a minimum. Collecting the particulate before it enters the catch basins is cheaper and more environmentally friendly than in a catch basin mixing with oils and greases in the surface water runoff in catch basins.

Stormwater Report
Mendon Self Storage
Mendon, MA

- K. Provisions for prevention of illicit discharges to the stormwater management system
The discharge into the stormwater system is not being violated, see attachment for illicit discharges compliance.
- L. Training the staff or personnel involved with implementing Long-Term Pollution Prevention Plan
The owner shall develop policies and procedures for containing the illicit spilling of oils, soda, beer, paper and litter. These wastes provide a degrading of the water quality. The placement of signs and trash barrels with lids around the site would contribute to a clean water quality site condition.
- M. List of Emergency contacts for implementing Long-Term Pollution Prevention Plan:

Roy Vaz
Anna Corporation
P.O. Box 553
Milford, MA 01757
Tel: 508-509-1129

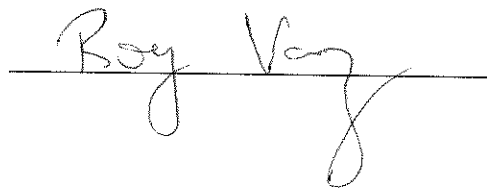
Standard 10: All illicit discharges to the stormwater management system are prohibited.

Standard 10 prohibits illicit discharges to stormwater management systems. The stormwater management system is the system for conveying, treating, and infiltrating stormwater on site, including stormwater best management practices and any pipes intended to transport stormwater to the ground water, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated ground water, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

Illicit Discharge Compliance Statement

It is the intent of the Owner, Anna Corporation., P.O. Box 553, Milford, MA 01757 to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. There will be no connection to the storm water system to inadvertently direct other types of liquids, chemicals or solids into the storm drainage system. The Owner will also promote a clean Green Environment by mitigating spills onto pavements; oils, soda, chemicals, pet waste, debris and litter.

Respectfully Acknowledged,

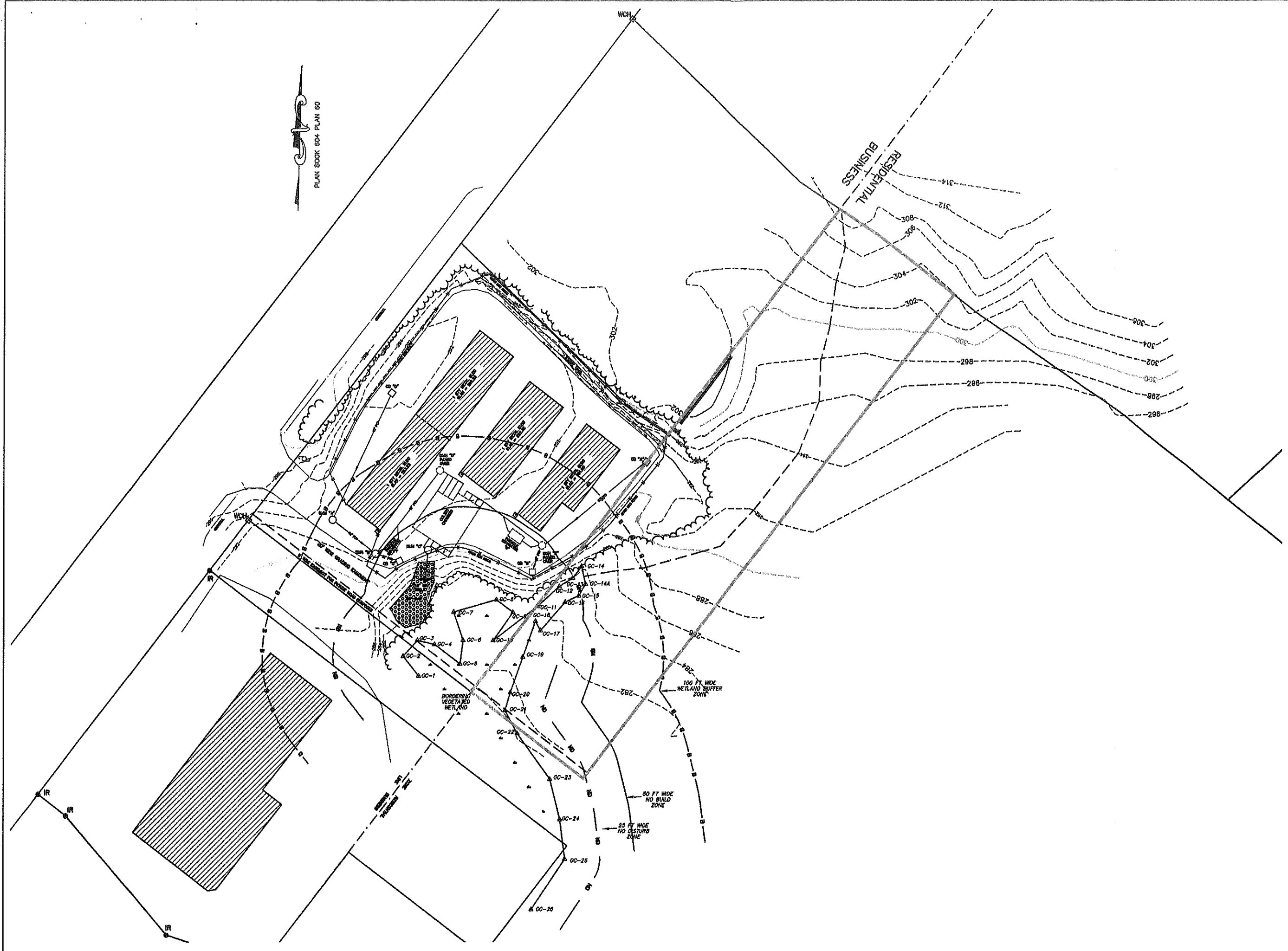
A handwritten signature in cursive script, appearing to read "Roy Vay", is written over a horizontal line.

Stormwater Report
Mendon Self Storage
Mendon, MA

WATERSHED PLAN
Pre and Post Development Conditions



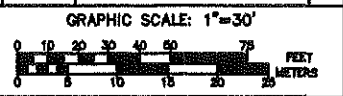
PLAN BOOK 604 PLAN 60



OWNER:
ANNA CORPORATION
PO BOX 553
MILFORD MA 01757

PRE-DEVELOPMENT DRAINAGE AREAS
MENDON SELF STORAGE
MENDON, MASS.
SCALE: 1"=30'
DATE: FEBRUARY 11, 2020

NO	DATE	INITIAL	SUBMITTAL	INIT



Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
333 WEST STREET PH. (508) 473-8630
MILFORD, MA 01757 FX. (508) 473-8243
www.gandhengineering.com



PLAN BOOK 604 PLAN 80

OWNER:
 ANNA CORPORATION
 PO BOX 553
 MILFORD MA 01757

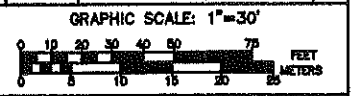
POST-DEVELOPMENT DRAINAGE AREAS

MENDON SELF STORAGE

MENDON, MASS.

SCALE: 1"=30'
 DATE: FEBRUARY 11, 2020

NO	DATE	INITIAL	SUBMITTAL	INIT



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Stormwater Report
Mendon Self Storage
Mendon, MA

DRAINAGE ANALYSIS

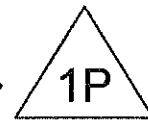
HydroCAD Calculations – Pre-Post Development Conditions 2, 10, 100-Year Storm Events



Pre Runoff to Wetlands



Post Runoff to Det.
Basin



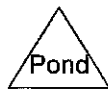
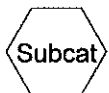
(new Pond)



Posr Runoff to Wetlands
Undetained



Total Post Runoff to
Wetlands



Routing Diagram for Mendon Self Storage

Prepared by {enter your company name here}, Printed 2/20/2020
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PRE-DEVELOPMENT

2-YEAR STORM

Mendon Self Storage

Type III 24-hr 2-year storm Rainfall=3.20"

Prepared by {enter your company name here}

Printed 2/20/2020

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Summary for Subcatchment 1S: Pre Runoff to Wetlands

Runoff = 0.27 cfs @ 12.22 hrs, Volume= 0.032 af, Depth> 0.39"

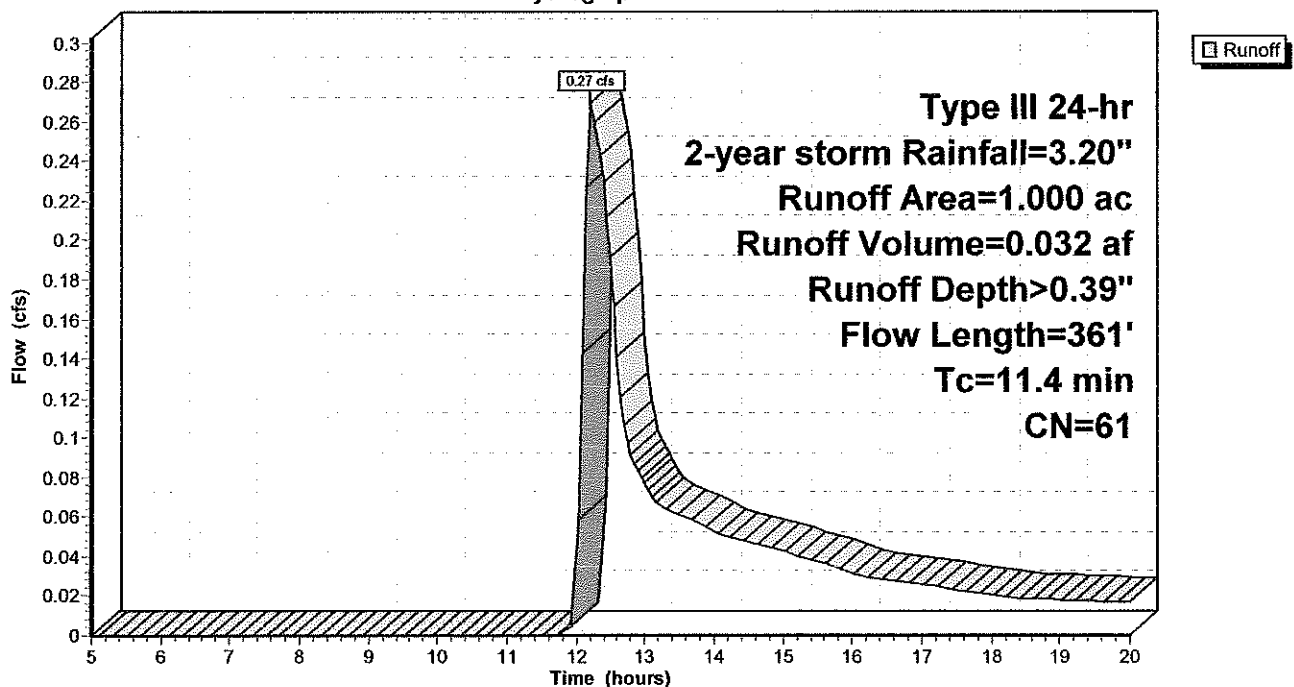
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year storm Rainfall=3.20"

Area (ac)	CN	Description
0.960	60	Woods, Fair, HSG B
0.040	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	126	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	85	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	361	Total			

Subcatchment 1S: Pre Runoff to Wetlands

Hydrograph



10-YR STORM

Mendon Self Storage

Type III 24-hr 10-year storm Rainfall=4.70"

Prepared by {enter your company name here}

Printed 2/20/2020

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Summary for Subcatchment 1S: Pre Runoff to Wetlands

Runoff = 1.01 cfs @ 12.18 hrs, Volume= 0.089 af, Depth> 1.07"

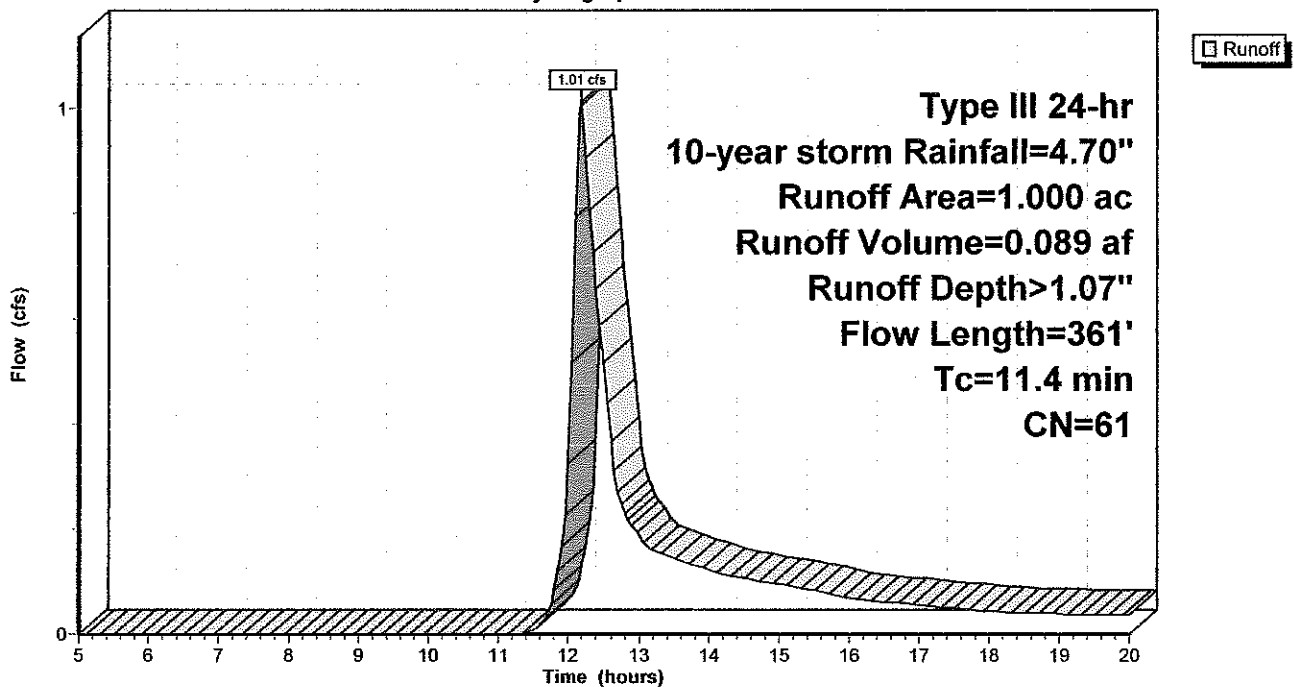
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-year storm Rainfall=4.70"

Area (ac)	CN	Description
0.960	60	Woods, Fair, HSG B
0.040	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	126	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	85	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	361	Total			

Subcatchment 1S: Pre Runoff to Wetlands

Hydrograph



**100-YEAR
STORM**

Summary for Subcatchment 1S: Pre Runoff to Wetlands

Runoff = 2.41 cfs @ 12.17 hrs, Volume= 0.195 af, Depth> 2.34"

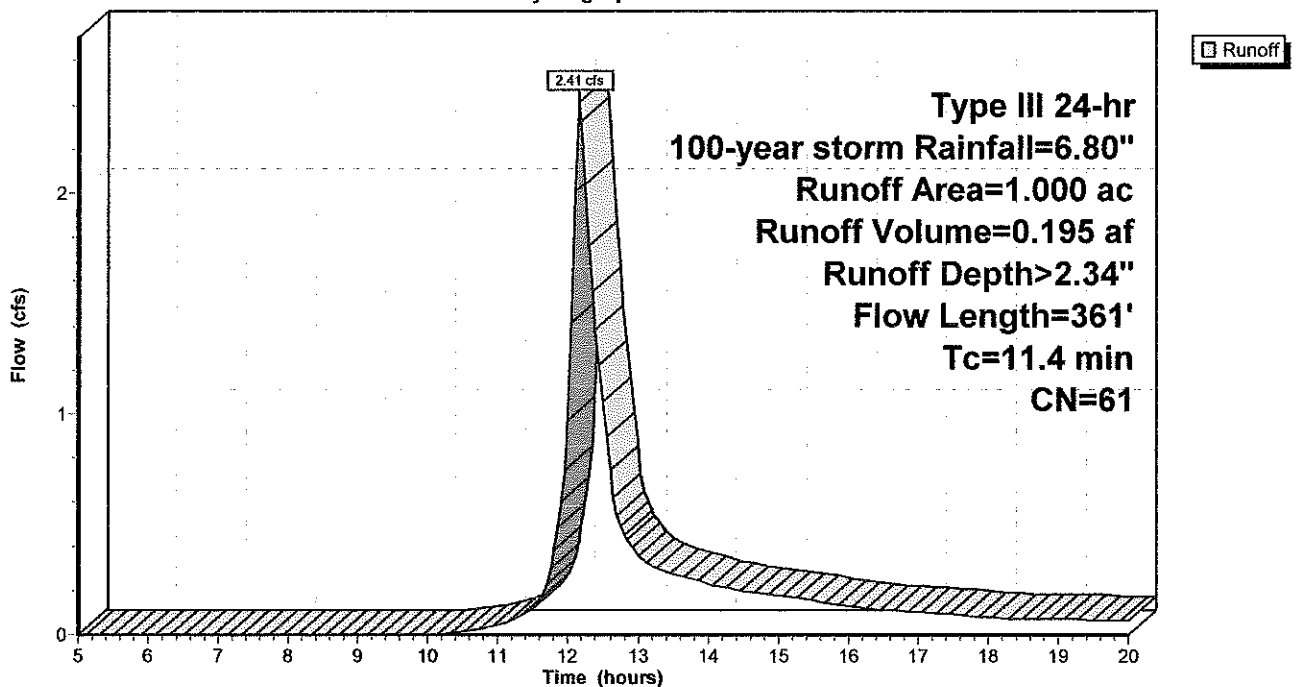
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-year storm Rainfall=6.80"

Area (ac)	CN	Description
0.960	60	Woods, Fair, HSG B
0.040	79	Woods, Fair, HSG D
1.000	61	Weighted Average
1.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	126	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	100	0.0400	1.00		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.1	85	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.4	361	Total			

Subcatchment 1S: Pre Runoff to Wetlands

Hydrograph



POST-DEVELOPMENT

2-YEAR STORM

Mendon Self Storage

Type III 24-hr 2-year storm Rainfall=3.20"

Prepared by {enter your company name here}

Printed 2/20/2020

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Summary for Subcatchment 2S: Post Runoff to Det. Basin

Runoff = 1.91 cfs @ 12.09 hrs, Volume= 0.146 af, Depth> 2.77"

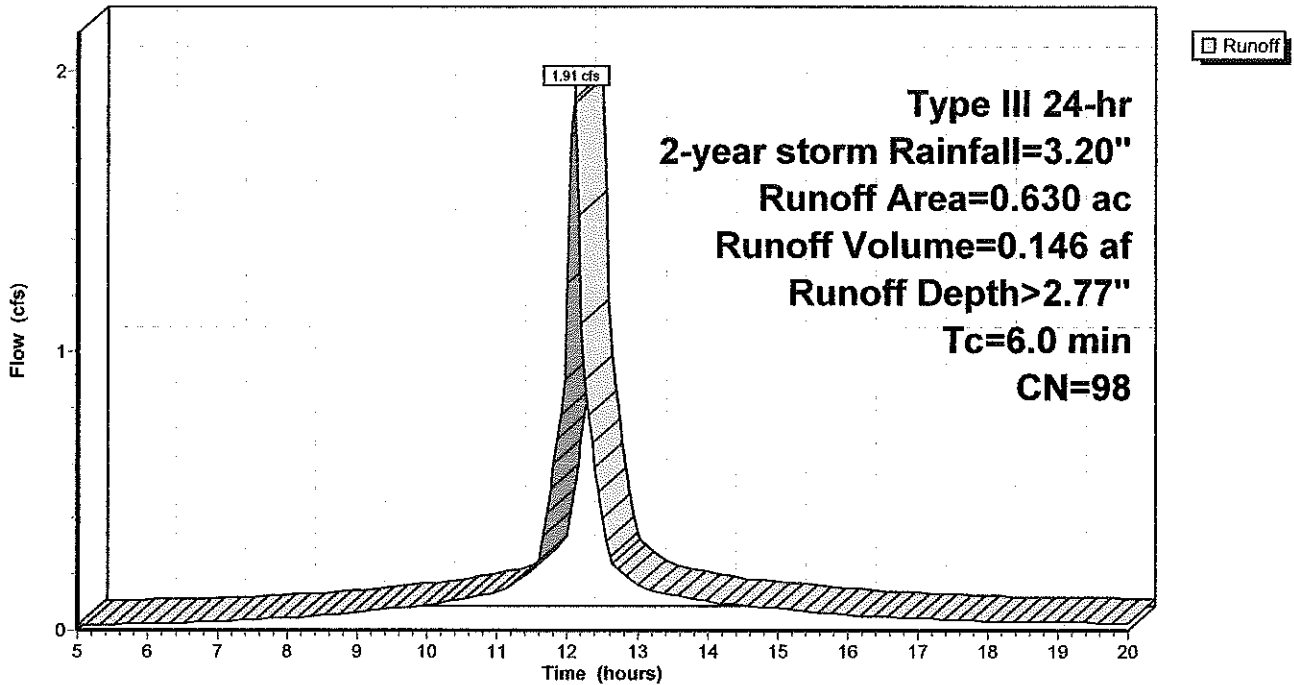
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year storm Rainfall=3.20"

Area (ac)	CN	Description
0.280	98	Roofs, HSG B
0.350	98	Paved parking, HSG B
0.630	98	Weighted Average
0.630		100.00% Impervious Area

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

Subcatchment 2S: Post Runoff to Det. Basin

Hydrograph



Mendon Self Storage

Type III 24-hr 2-year storm Rainfall=3.20"

Prepared by {enter your company name here}

Printed 3/4/2020

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Summary for Pond 1P: (new Pond)

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.630 ac, 100.00% Impervious, Inflow Depth > 2.91" for 2-year storm event
 Inflow = 1.91 cfs @ 12.09 hrs, Volume= 0.153 af
 Outflow = 0.26 cfs @ 12.61 hrs, Volume= 0.153 af, Atten= 86%, Lag= 31.4 min
 Discarded = 0.07 cfs @ 10.20 hrs, Volume= 0.127 af
 Primary = 0.19 cfs @ 12.61 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 281.77' @ 12.61 hrs Surf.Area= 2,913 sf Storage= 2,926 cf

Plug-Flow detention time= 271.4 min calculated for 0.153 af (100% of inflow)
 Center-of-Mass det. time= 271.8 min (1,038.0 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	280.00'	3,902 cf	Custom Stage Data (Prismatic) Listed below 13,109 cf Overall - 3,354 cf Embedded = 9,755 cf x 40.0% Voids
#2	281.00'	3,354 cf	ADS StormTech SC-740 x 73 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		7,256 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.00	2,913	0	0
281.00	2,913	2,913	2,913
282.00	2,913	2,913	5,826
283.00	2,913	2,913	8,739
283.50	2,913	1,457	10,196
284.50	2,913	2,913	13,109

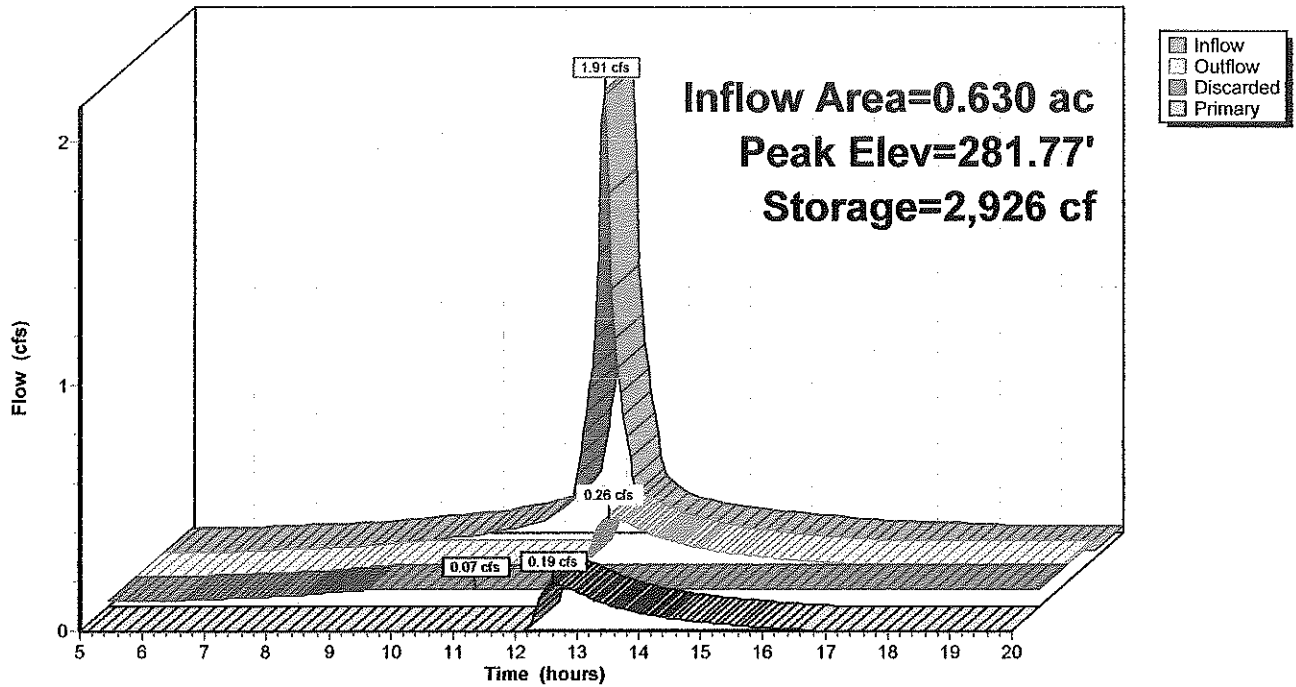
Device	Routing	Invert	Outlet Devices
#1	Primary	281.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	280.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.07 cfs @ 10.20 hrs HW=280.05' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.19 cfs @ 12.61 hrs HW=281.77' TW=0.00' (Dynamic Tailwater)
 ↑1=Orifice/Grate (Orifice Controls 0.19 cfs @ 1.78 fps)

Pond 1P: (new Pond)

Hydrograph



Summary for Subcatchment 3S: Posr Runoff to Wetlands Undetained

Runoff = 0.11 cfs @ 12.16 hrs, Volume= 0.012 af, Depth> 0.39"

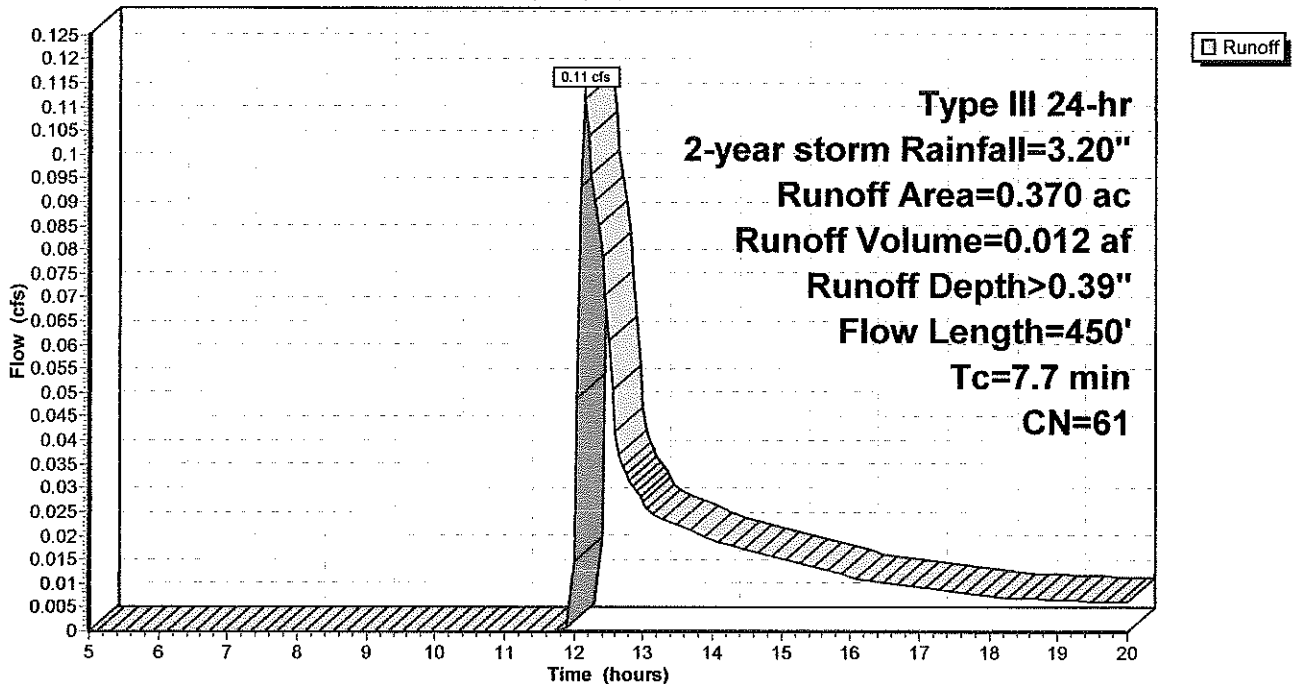
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-year storm Rainfall=3.20"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.1000	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
4.6	380	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3300	4.02		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.7	450	Total			

Subcatchment 3S: Posr Runoff to Wetlands Undetained

Hydrograph

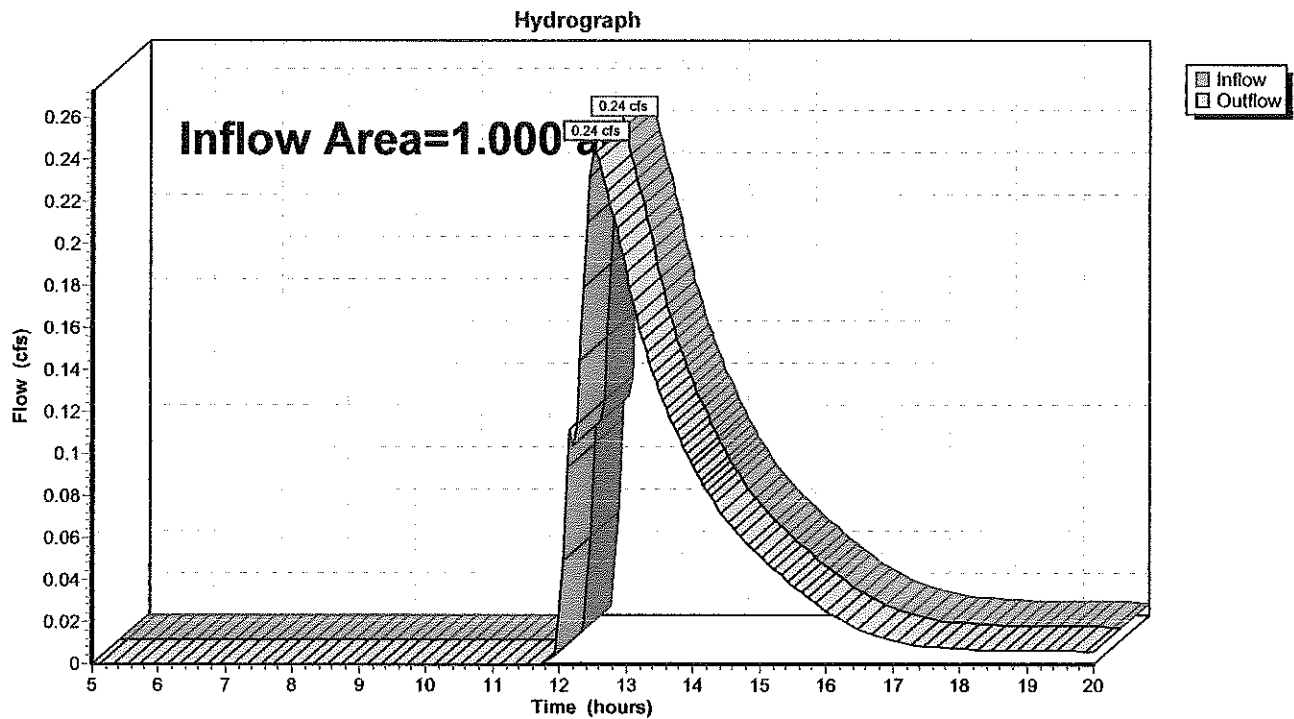


Summary for Reach 1R: Total Post Runoff to Wetlands

Inflow Area = 1.000 ac, 63.00% Impervious, Inflow Depth > 0.45" for 2-year storm event
Inflow = 0.24 cfs @ 12.53 hrs, Volume= 0.038 af
Outflow = 0.24 cfs @ 12.53 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Post Runoff to Wetlands



10-YR STORM

Mendon Self Storage

Type III 24-hr 10-year storm Rainfall=4.70"

Prepared by {enter your company name here}

Printed 2/20/2020

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Summary for Subcatchment 2S: Post Runoff to Det. Basin

Runoff = 2.83 cfs @ 12.09 hrs, Volume= 0.218 af, Depth> 4.15"

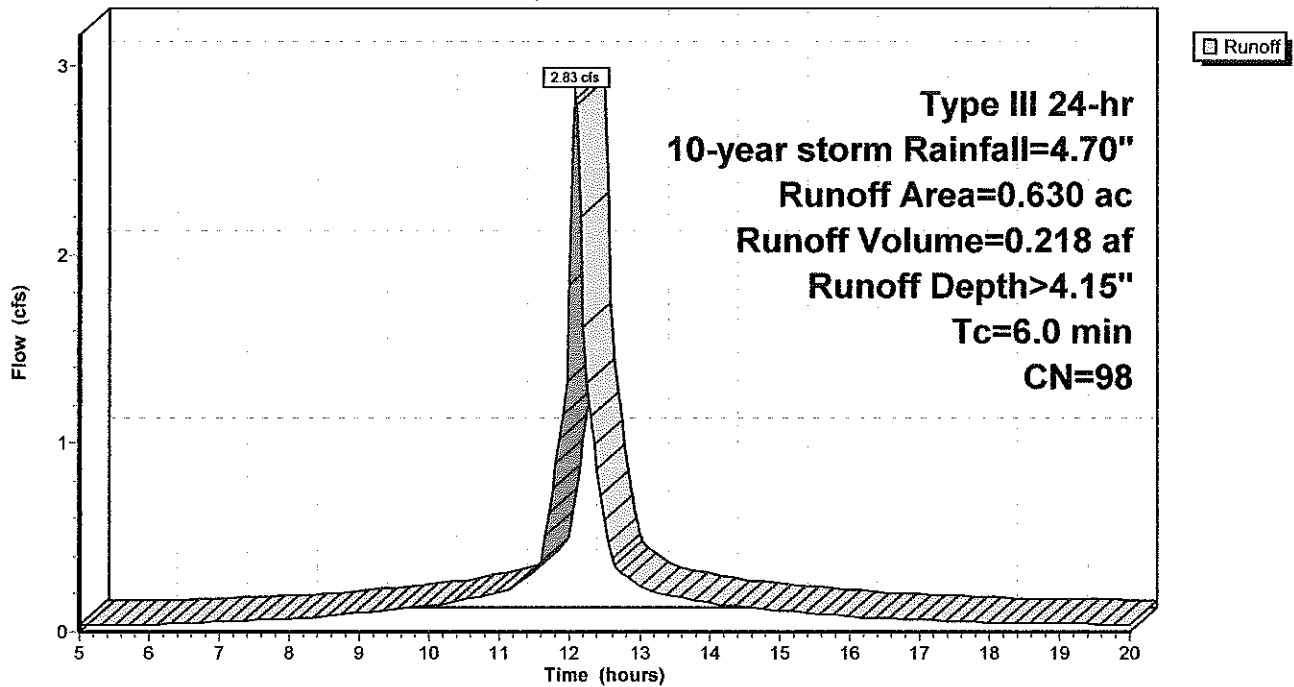
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-year storm Rainfall=4.70"

Area (ac)	CN	Description
0.280	98	Roofs, HSG B
0.350	98	Paved parking, HSG B
0.630	98	Weighted Average
0.630		100.00% Impervious Area

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

Subcatchment 2S: Post Runoff to Det. Basin

Hydrograph



Mendon Self Storage

Type III 24-hr 10-year storm Rainfall=4.70"

Prepared by {enter your company name here}

Printed 3/4/2020

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Summary for Pond 1P: (new Pond)

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.630 ac, 100.00% Impervious, Inflow Depth > 4.35" for 10-year storm event
 Inflow = 2.83 cfs @ 12.09 hrs, Volume= 0.228 af
 Outflow = 0.77 cfs @ 12.44 hrs, Volume= 0.228 af, Atten= 73%, Lag= 21.0 min
 Discarded = 0.07 cfs @ 8.95 hrs, Volume= 0.142 af
 Primary = 0.70 cfs @ 12.44 hrs, Volume= 0.086 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 282.29' @ 12.44 hrs Surf.Area= 2,913 sf Storage= 4,037 cf

Plug-Flow detention time= 223.8 min calculated for 0.228 af (100% of inflow)
 Center-of-Mass det. time= 224.0 min (986.9 - 762.9)

Volume	Invert	Avail.Storage	Storage Description
#1	280.00'	3,902 cf	Custom Stage Data (Prismatic) Listed below 13,109 cf Overall - 3,354 cf Embedded = 9,755 cf x 40.0% Voids
#2	281.00'	3,354 cf	ADS_StormTech SC-740 x 73 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		7,256 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.00	2,913	0	0
281.00	2,913	2,913	2,913
282.00	2,913	2,913	5,826
283.00	2,913	2,913	8,739
283.50	2,913	1,457	10,196
284.50	2,913	2,913	13,109

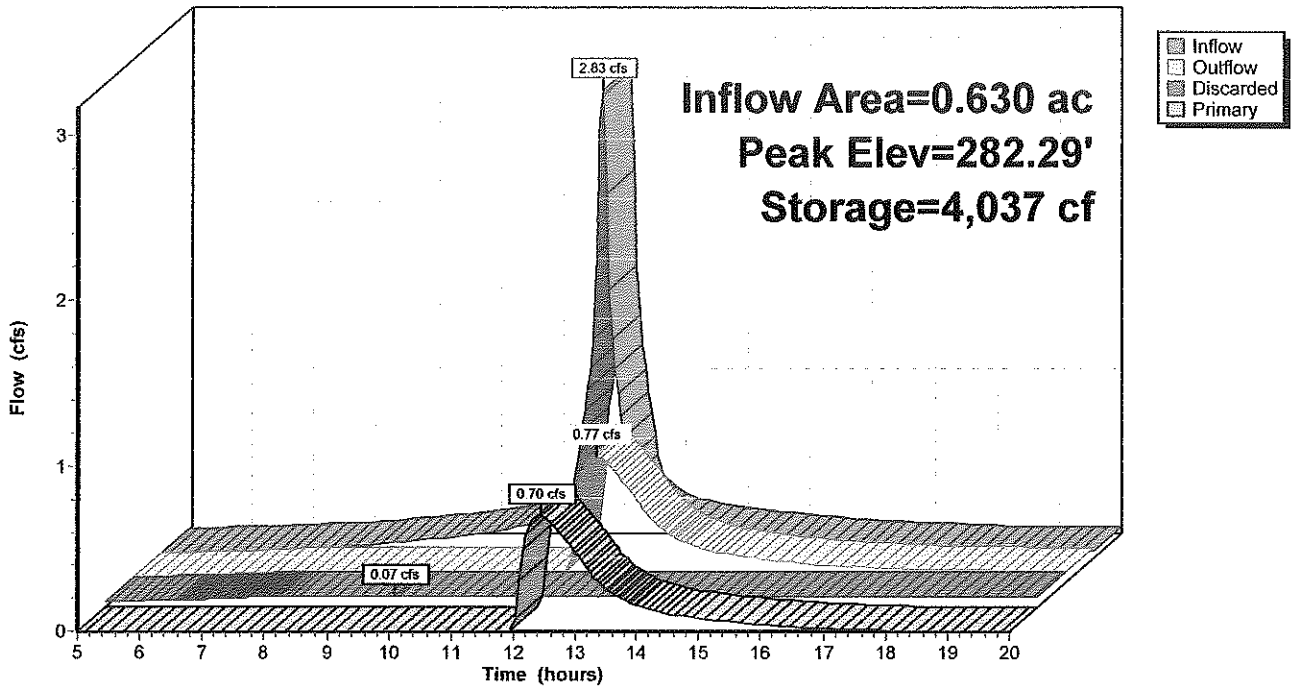
Device	Routing	Invert	Outlet Devices
#1	Primary	281.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	280.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.07 cfs @ 8.95 hrs HW=280.05' (Free Discharge)
 ↑ **2=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.70 cfs @ 12.44 hrs HW=282.29' TW=0.00' (Dynamic Tailwater)
 ↑ **1=Orifice/Grate** (Orifice Controls 0.70 cfs @ 3.54 fps)

Pond 1P: (new Pond)

Hydrograph



Mendon Self Storage

Type III 24-hr 10-year storm Rainfall=4.70"

Prepared by {enter your company name here}

Printed 2/20/2020

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Summary for Subcatchment 3S: Posr Runoff to Wetlands Undetained

Runoff = 0.42 cfs @ 12.13 hrs, Volume= 0.033 af, Depth> 1.07"

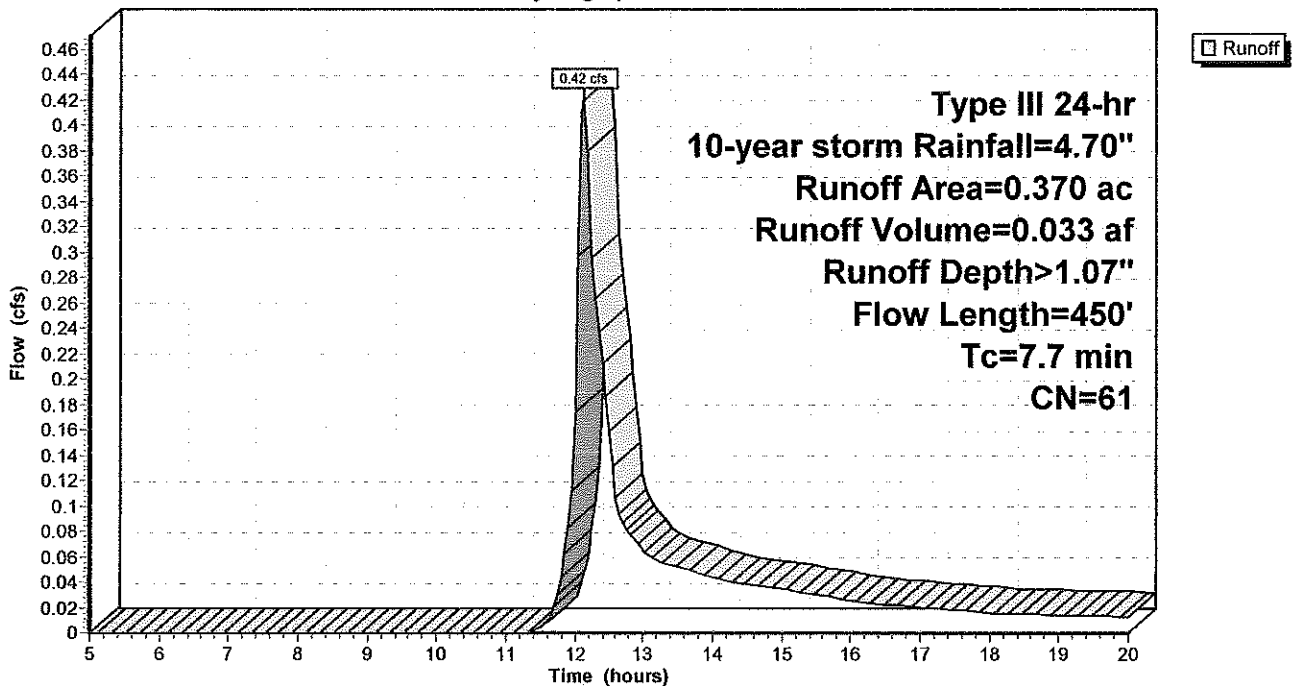
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-year storm Rainfall=4.70"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.1000	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
4.6	380	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3300	4.02		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.7	450	Total			

Subcatchment 3S: Posr Runoff to Wetlands Undetained

Hydrograph

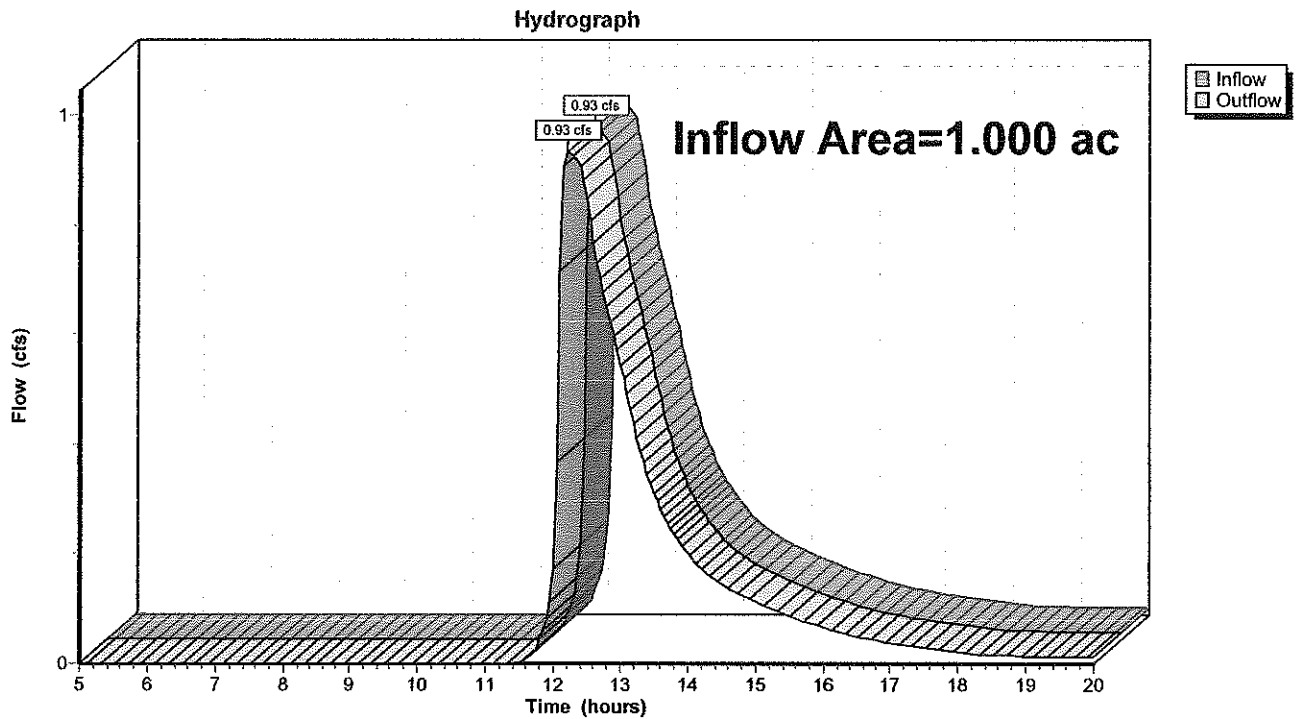


Summary for Reach 1R: Total Post Runoff to Wetlands

Inflow Area = 1.000 ac, 63.00% Impervious, Inflow Depth > 1.44" for 10-year storm event
Inflow = 0.93 cfs @ 12.20 hrs, Volume= 0.120 af
Outflow = 0.93 cfs @ 12.20 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Post Runoff to Wetlands



**100-YEAR
STORM**

Mendon Self Storage

Prepared by {enter your company name here}

HydroCAD® 10.00-16 s/n 01433 © 2015 HydroCAD Software Solutions LLC

Type III 24-hr 100-year storm Rainfall=6.80"

Printed 2/20/2020

Summary for Subcatchment 2S: Post Runoff to Det. Basin

Runoff = 4.10 cfs @ 12.09 hrs, Volume= 0.318 af, Depth> 6.06"

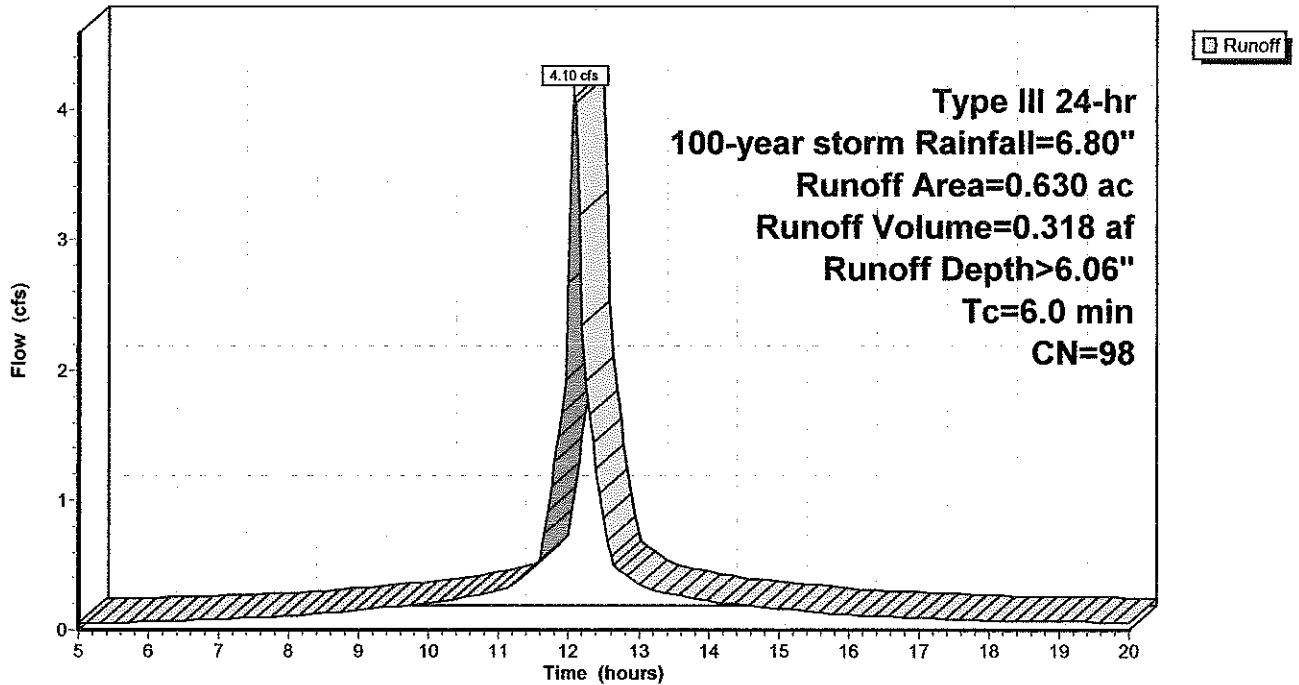
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-year storm Rainfall=6.80"

Area (ac)	CN	Description
0.280	98	Roofs, HSG B
0.350	98	Paved parking, HSG B
0.630	98	Weighted Average
0.630		100.00% Impervious Area

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

Subcatchment 2S: Post Runoff to Det. Basin

Hydrograph



Summary for Pond 1P: (new Pond)

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.630 ac, 100.00% Impervious, Inflow Depth > 6.35" for 100-year storm event
 Inflow = 4.10 cfs @ 12.09 hrs, Volume= 0.334 af
 Outflow = 1.24 cfs @ 12.40 hrs, Volume= 0.334 af, Atten= 70%, Lag= 19.0 min
 Discarded = 0.07 cfs @ 7.55 hrs, Volume= 0.155 af
 Primary = 1.17 cfs @ 12.40 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 283.28' @ 12.40 hrs Surf.Area= 2,913 sf Storage= 5,810 cf

Plug-Flow detention time= 192.1 min calculated for 0.333 af (100% of inflow)
 Center-of-Mass det. time= 192.4 min (953.3 - 760.9)

Volume	Invert	Avail.Storage	Storage Description
#1	280.00'	3,902 cf	Custom Stage Data (Prismatic) Listed below 13,109 cf Overall - 3,354 cf Embedded = 9,755 cf x 40.0% Voids
#2	281.00'	3,354 cf	ADS_StormTech SC-740 x 73 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
		7,256 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
280.00	2,913	0	0
281.00	2,913	2,913	2,913
282.00	2,913	2,913	5,826
283.00	2,913	2,913	8,739
283.50	2,913	1,457	10,196
284.50	2,913	2,913	13,109

Device	Routing	Invert	Outlet Devices
#1	Primary	281.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Discarded	280.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.07 cfs @ 7.55 hrs HW=280.05' (Free Discharge)
 ↑2=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=1.17 cfs @ 12.40 hrs HW=283.27' TW=0.00' (Dynamic Tailwater)
 ↑1=Orifice/Grate (Orifice Controls 1.17 cfs @ 5.95 fps)

Mendon Self Storage

Prepared by {enter your company name here}

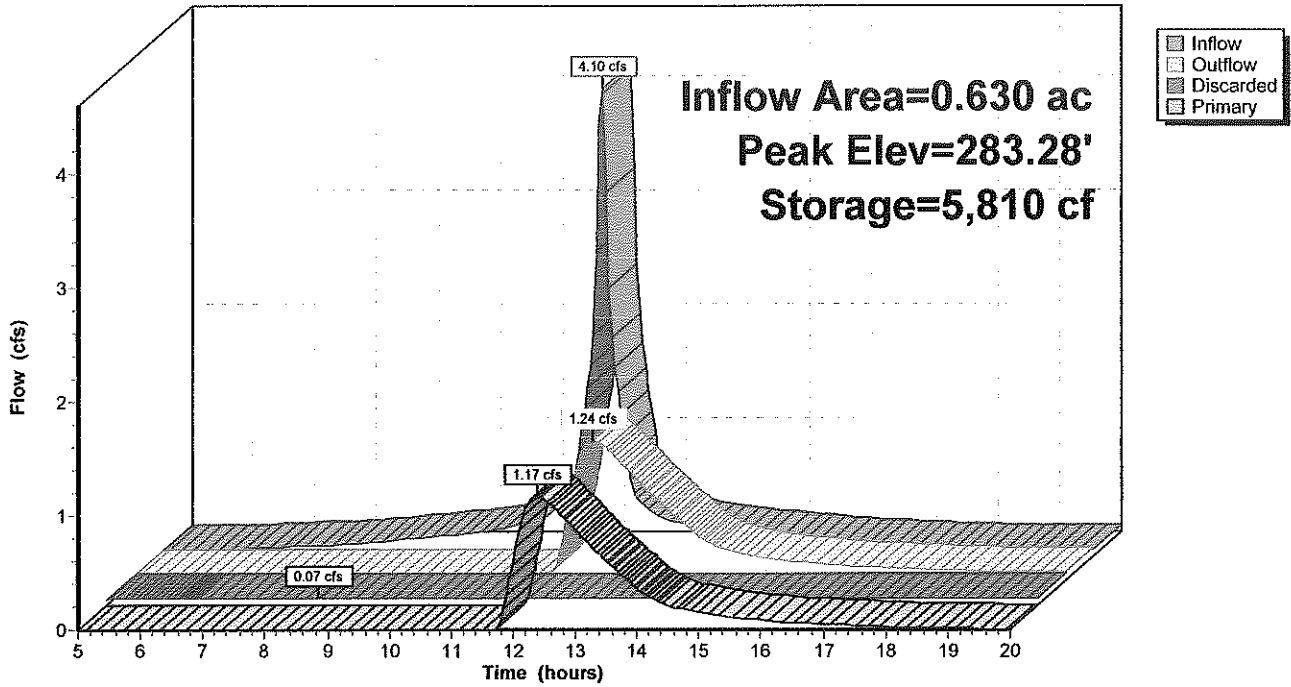
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Type III 24-hr 100-year storm Rainfall=6.80"

Printed 2/20/2020

Pond 1P: (new Pond)

Hydrograph



Mendon Self Storage

Prepared by {enter your company name here}

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Type III 24-hr 100-year storm Rainfall=6.80"

Printed 2/20/2020

Summary for Subcatchment 3S: Posr Runoff to Wetlands Undetained

Runoff = 1.00 cfs @ 12.12 hrs, Volume= 0.072 af, Depth> 2.35"

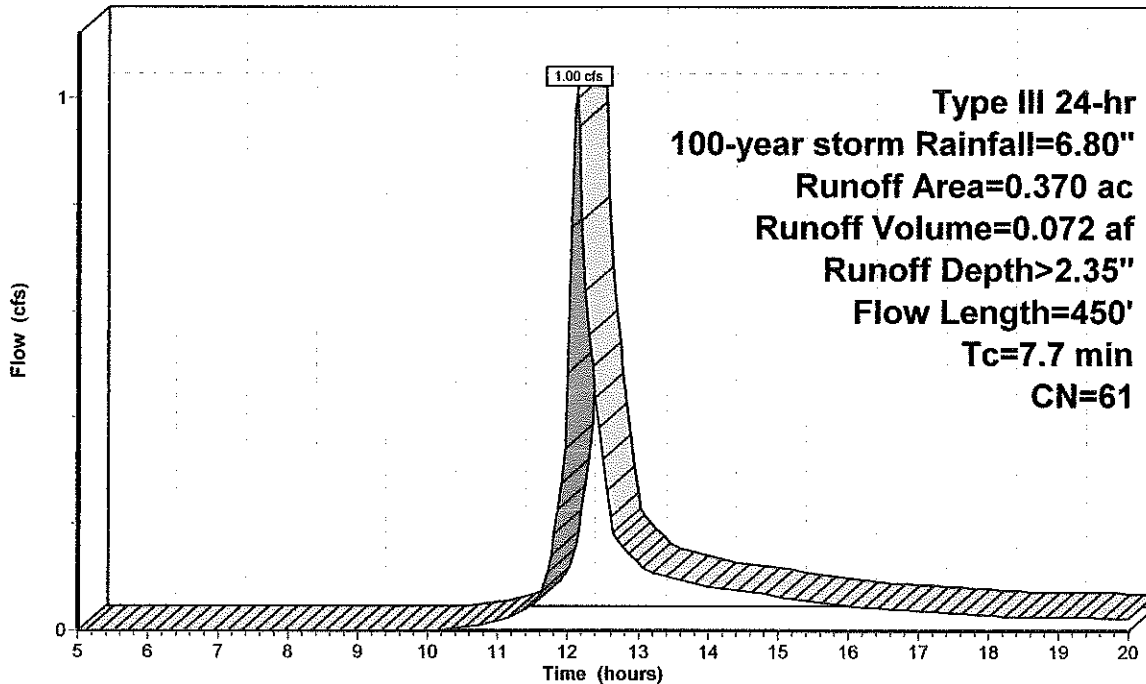
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-year storm Rainfall=6.80"

Area (ac)	CN	Description
0.370	61	>75% Grass cover, Good, HSG B
0.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	50	0.1000	0.28		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
4.6	380	0.0380	1.36		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	20	0.3300	4.02		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.7	450	Total			

Subcatchment 3S: Posr Runoff to Wetlands Undetained

Hydrograph



Runoff

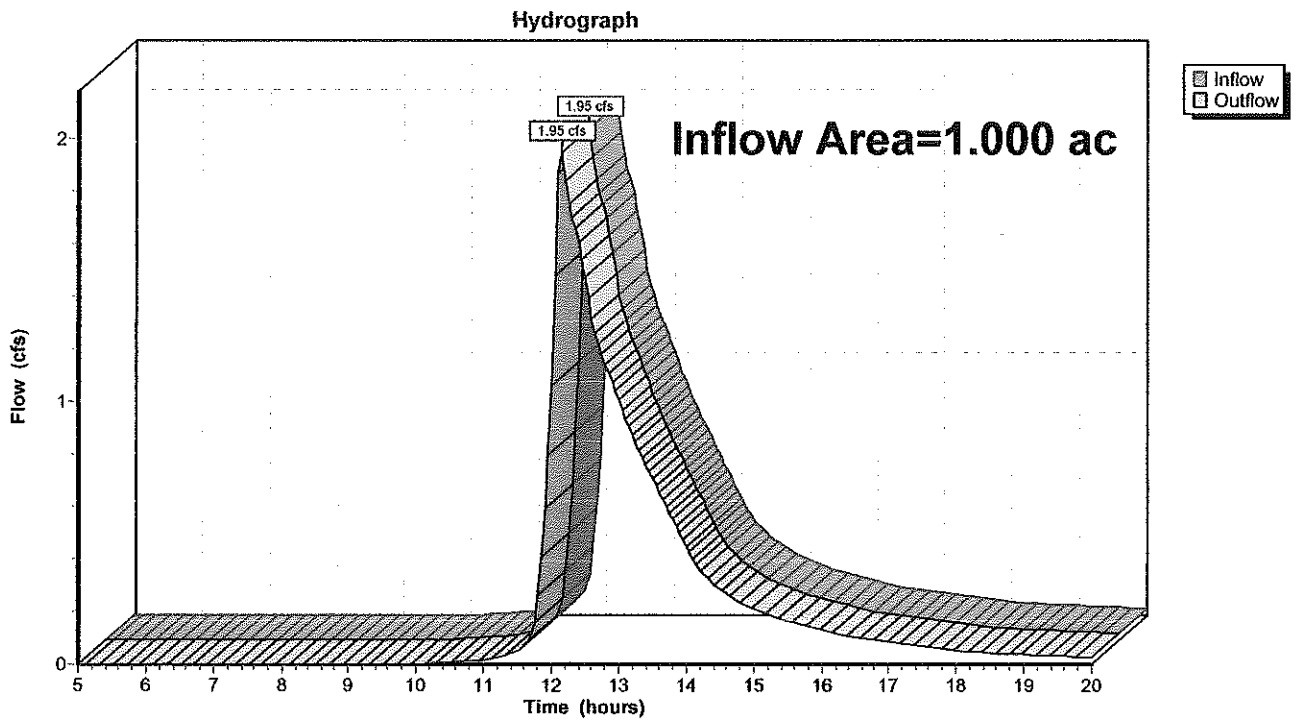
Type III 24-hr
 100-year storm Rainfall=6.80"
 Runoff Area=0.370 ac
 Runoff Volume=0.072 af
 Runoff Depth>2.35"
 Flow Length=450'
 Tc=7.7 min
 CN=61

Summary for Reach 1R: Total Post Runoff to Wetlands

Inflow Area = 1.000 ac, 63.00% Impervious, Inflow Depth > 3.01" for 100-year storm event
Inflow = 1.95 cfs @ 12.15 hrs, Volume= 0.251 af
Outflow = 1.95 cfs @ 12.15 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Post Runoff to Wetlands



Stormwater Report
Mendon Self Storage
Mendon, MA

DRAINAGE ANALYSIS

Storm Drain Calculations – Rational Method and Catchment Area Calculation

MENDON SELF STORAGE

Weighted "c" Values

DA-1 A=0.63 ac. Imp.=0.63 ac. C = .9

PIPE SIZING 25 YEAR STORM

$Q=CIA$ C=.9 I=6.2 A=0.63 AC.

$Q=(.9)(6.2)(0.63) = 3.40$ CFS

5 FT OF 12" DIA. HDPE PIPE WITH A 5% SLOPE

FULL CAPACITY=10.36 CFS

FULL VELOCITY=13.19 FPS

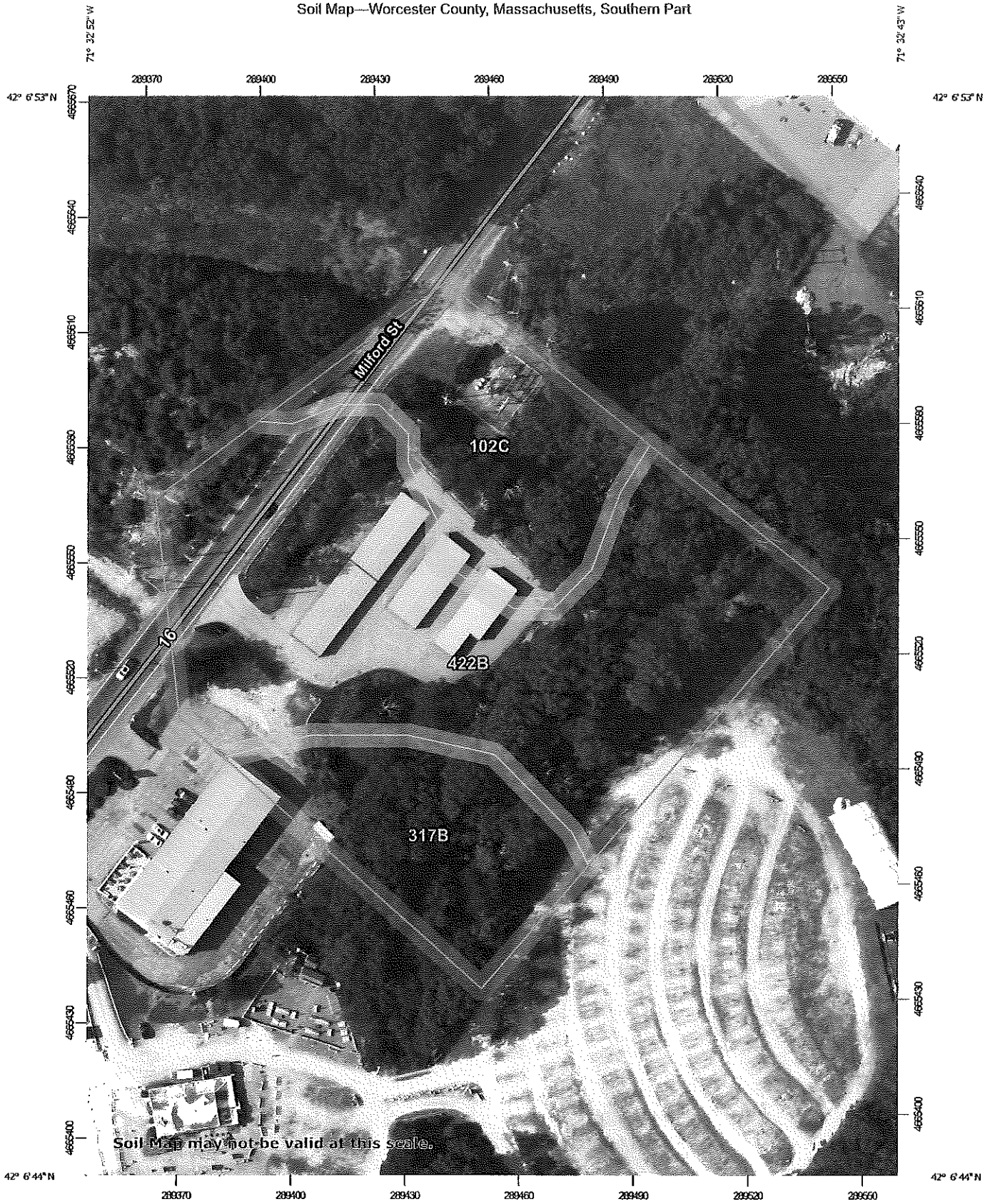
PEAK VELOCITY=11.81 FPS

d/d=.39

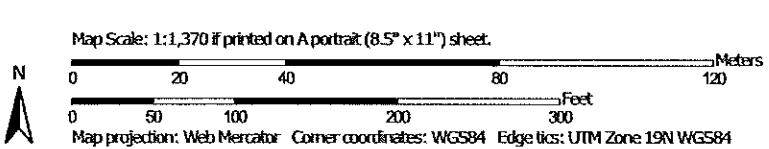
Stormwater Report
Mendon Self Storage
Mendon, MA

USDA WEB SOIL SURVEY

Soil Map—Worcester County, Massachusetts, Southern Part



Soil Map may not be valid at this scale.





































Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	1.0	21.3%
317B	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	0.8	18.0%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	2.7	60.7%
Totals for Area of Interest		4.5	100.0%

Soil Map—Worcester County, Massachusetts, Southern Part

MAP LEGEND

- | | |
|--|---|
|  Area of Interest (AOI) |  Spoil Area |
|  Soils |  Stony Spot |
|  Soil Map Unit Polygons |  Very Stony Spot |
|  Soil Map Unit Lines |  Wet Spot |
|  Soil Map Unit Points |  Other |
| Special Point Features |  Special Line Features |
|  Blowout | Water Features |
|  Borrow Pit | Streams and Canals |
|  Clay Spot | Transportation |
|  Closed Depression |  Rails |
|  Gravel Pit |  Interstate Highways |
|  Gravelly Spot |  US Routes |
|  Landfill | Major Roads |
|  Lava Flow | Local Roads |
|  Marsh or swamp | Background |
|  Mine or Quarry |  Aerial Photography |
|  Miscellaneous Water | |
|  Perennial Water | |
|  Rock Outcrop | |
|  Saline Spot | |
|  Sandy Spot | |
|  Severely Eroded Spot | |
|  Sinkhole | |
|  Slide or Slip | |
|  Sodic Spot | |

MAP INFORMATION

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

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

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

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

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

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

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

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

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

Date(s) aerial images were photographed: Jul 28, 2019—Aug 15, 2019

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

Stormwater Report
Mendon Self Storage
Mendon, MA

DRAWDOWN CALCULATIONS (100-YR)

Mendon Self Storage

Type III 24-hr 100-year storm Rainfall=6.80"

Prepared by {enter your company name here}

Printed 2/20/2020

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Hydrograph for Pond 1P: (new Pond)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.05	0	280.00	0.05	0.05	0.00
7.50	0.09	50	280.04	0.07	0.07	0.00
10.00	0.20	707	280.61	0.07	0.07	0.00
12.50	0.86	5,747	283.23	1.22	0.07	1.15
15.00	0.17	2,837	281.73	0.22	0.07	0.15
17.50	0.08	2,559	281.61	0.10	0.07	0.03
20.00	0.06	2,393	281.53	0.07	0.07	0.00
22.50	0.04	2,223	281.46	0.07	0.07	0.00
25.00	0.00	1,836	281.29	0.07	0.07	0.00
27.50	0.00	1,217	281.02	0.07	0.07	0.00
30.00	0.00	598	280.51	0.07	0.07	0.00
32.50	0.00	0	280.00	0.00	0.00	0.00
35.00	0.00	0	280.00	0.00	0.00	0.00
37.50	0.00	0	280.00	0.00	0.00	0.00
40.00	0.00	0	280.00	0.00	0.00	0.00
42.50	0.00	0	280.00	0.00	0.00	0.00
45.00	0.00	0	280.00	0.00	0.00	0.00
47.50	0.00	0	280.00	0.00	0.00	0.00
50.00	0.00	0	280.00	0.00	0.00	0.00
52.50	0.00	0	280.00	0.00	0.00	0.00
55.00	0.00	0	280.00	0.00	0.00	0.00
57.50	0.00	0	280.00	0.00	0.00	0.00
60.00	0.00	0	280.00	0.00	0.00	0.00
62.50	0.00	0	280.00	0.00	0.00	0.00
65.00	0.00	0	280.00	0.00	0.00	0.00
67.50	0.00	0	280.00	0.00	0.00	0.00
70.00	0.00	0	280.00	0.00	0.00	0.00

Stormwater Report
Mendon Self Storage
Mendon, MA

TSS REMOVAL CALCULATIONS

INSTRUCTIONS:

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location:

A BMP ¹	B TSS Removal Rate ¹	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Barracuda Water Quality Manhole	0.50	0.75	0.38	0.38
Subsurface Infiltration Basin	0.80	0.38	0.30	0.08
		0.00	0.00	0.00

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

Total TSS Removal =

Project:
 Prepared By:
 Date:

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

TSS Removal Calculation Worksheet

Stormwater Report
Mendon Self Storage
Mendon, MA

SUPPLEMENT ATTACHMENTS

**MENDON SELF STORAGE
MENDON, MA
CONSTRUCTION PHASE INSPECTION AND MAINTENANCE LOG**

Date _____ Prev. Insp. Date: _____

Inspector: _____ Title: _____

Weather: _____

Weather Since Last Inspection _____

Erosion Control - Inspect Weekly

Comments:
Corrective measures taken and date

On Site Pavement Sweeping - Inspect Weekly

Comments:
Corrective measures taken and date

Catch Basins - Inspect Weekly

Comments:
Corrective measures taken and date

Stormceptor - Inspect Weekly

Comments:
Corrective measures taken and date

Temporary Sediment Traps/Basins - Inspect Weekly

Comments:
Corrective measures taken and date

**MENDON SELF STORAGE
MENDON, MA
CONSTRUCTION PHASE INSPECTION AND MAINTENANCE LOG**

Notify Conservation Commission RE Issues Effecting Resource Areas

Comments:
Corrective measures taken and date

Silt on Public Streets - Inspect Weekly

Comments:
Corrective measures taken and date

Stock Pile Materials - Ring with Haybales - Inspect Weekly

Comments:
Corrective measures taken and date

Any Fuel or Chemical Spill - Inspect Daily

Comments:
Corrective measures taken and date