

# ***Stormwater Report***

---

# **STORMWATER REPORT**

**FOR**

**55 Tilton Avenue  
Ashland, MA**

***January 23, 2026***

---

**PREPARED BY:  
Connorstone Engineering, Inc.  
10 Southwest Cutoff, Suite 7  
Northborough, MA 01532  
Phone: (508) 393-9727 Fax: (508) 393-5242**

## **TABLE OF CONTENTS**

---

### **1. STORMWATER REPORT**

- Project Narrative
- Checklist for Stormwater Report
- Summary of MassDEP's Stormwater Standards

### **2. WATER QUALITY STRUCTURE SIZING**

### **3. HYDROLOGIC MODEL OUTPUT (HYDROCAD CALCULATIONS)**

### **4. STORMWATER OPERATIONS AND MAINTENANCE PLAN AND LONG TERM POLLUTION PREVENTION PROGRAM**

### **5. NRCS SOIL MAPPING**

## ***STORMWATER NARRATIVE***

---

**55 Tilton Avenue  
Ashland, MA**

### **Existing Site Conditions**

The site includes 0.5-acre parcel of land located at 55 Tilton Avenue, and is currently developed as a single-family home. The site is abutted to the rear by the Rail Road and a commercial use property, to the east by Town owned land, and to the north by a residential use. The site also includes a 36-inch drainage line located across the rear portion of the site. This drain appears to convey runoff from the abutting commercial use property and a culvert under the Rail Road. As outlined in the project application documents, the site is located within the Nyanza Chemical plume and is subject to an Activities Use Limitation "AUL." The presence of potential contamination would preclude the possibility of groundwater infiltration or artificial recharge on-site.

### **Proposed Project**

The propose development includes the construction of a mixed use building including office/commercial and residential with on-site parking and driveway interconnection with the abutting commercial property. The overall increase to impervious surfaces within the project limits would be 14,935 Square feet (3,165 square feet existing vs. 18,100 square feet proposed).

The proposed stormwater management system has been included to provide:

- Surface collection of all paved and impervious surfaces through deep sump catch basins and stormwater pretreatment prior to connection to the replaced drainage trunk line.
- Stormwater pretreatment of all paved surfaces would be provided through the use of a hydrodynamic separators (Stormceptor, or equal), that have been sized to removal at least 80% of the total suspended solids.

As outlined in the Site Plan Application documents, the applicant has requested a waiver from certain aspects of the Stormwater Bylaw, which would be precluded due to the AUL and associated restrictions. An explanation of each standard is provided in this report.

# LOCUS LOCUS MAPPING





# 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, except as noted in the Site Plan Application Documents and waivers requested. 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



*[Handwritten Signature]* 2/26/2025  
Signature and Date

## Checklist

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

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



# Checklist for Stormwater Report

---

## Checklist (continued)

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

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

### Standard 1: No New Untreated Discharges

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



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 2: Peak Rate Attenuation - WAIVER REQUESTED

- 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 - WAIVER REQUESTED

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- 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.



# Checklist for Stormwater Report

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

## Checklist (continued)

### Standard 3: Recharge (continued)

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

### Standard 4: Water Quality

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

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



# Checklist for Stormwater Report

## Checklist (continued)

### Standard 4: Water Quality (continued)

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

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

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

N/A -

### 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. *-SEE WANTED REQUESTS*
- 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. *ON THE SITE PLAN*



# 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; - SITE PLANS
  - 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.

## MA D.E.P. STORMWATER STANDARDS

### **Standard 1: No New Untreated Discharges**

There are no new untreated discharges to any areas subject to the Wetlands Protection Act or the 100 foot buffer zone. All site discharges would be pretreated to remove a minim 80% of the total suspended solids prior to connection to the drainage system.

### **Standard 2: Peak Rate Attenuation**

As outlined in the Site Plan Application documents the Nyanza AUL places limitations on the site, and the LSP report has recommended stormwater runoff directed to the existing stormwater facilities. The peak flow rates for each design storm along with hydrographs have been provided in the model output. The stormwater runoff has been analyzed using HydroCAD, and rainfall depths for the design storms were taken from the most recent NOAA Atlas 14 for Ashland, MA.

The analysis and results below represent the total runoff generated from the project area under the existing and proposed conditions. A summary of each storm event is listed below.

| <b>Storm Event</b>        | <b>Peak Rate of Runoff<br/>Existing<br/>(Proposed)</b> | <b>Volume of Runoff<br/>Existing<br/>(Proposed)</b> |
|---------------------------|--|---|
| 1-inch storm<br>(1 inch)  | 0.00 cfs<br>(0.05 cfs)                                 | 0.000 acre-ft<br>(0.005 acre-ft)                    |
| 2-year<br>(3.36 inches)   | 0.00 cfs<br>(1.30 cfs)                                 | 0.003 acre-ft<br>(0.078 acre-ft)                    |
| 10-year<br>(5.25 inches)  | 0.14 cfs<br>(2.56 cfs)                                 | 0.025 acre-ft<br>(0.155 acre-ft)                    |
| 25-year<br>(6.42 inches)  | 0.35 cfs<br>(3.37 cfs)                                 | 0.046 acre-ft<br>(0.206 acre-ft)                    |
| 100-year<br>(8.24 inches) | 0.86 cfs<br>(4.62 cfs)                                 | 0.088 acre-ft<br>(0.287 acre-ft)                    |

### **Standard 3: Stormwater Recharge**

The site lies within an Activities and Use Limitation (AUL) under MassDEP related to the Nyanza groundwater plume. The letter from the LSP has been included with the Site Plan Application, and the presence of potential contamination would appear to preclude the possibility of groundwater infiltration or artificial recharge on-site.

**Standard 4: Water Quality**

The proposed project has been designed to provide an improvement to water quality through the installation of new deep sump catch basins and water quality structures (Stormceptors) sized to remove a greater than 80% of the annual total suspended solids. A recommended long-term pollution prevention plan is also provided as part of the attached Operation and Maintenance Plan.

**Water Quality Structure 1**

| <b>1<br/>BMP</b>             | <b>2<br/>TSS<br/>Removal</b> | <b>3<br/>Starting TSS</b> | <b>4<br/>TSS Removal<br/>( 2 * 3 )</b> | <b>5<br/>Remaining TSS<br/>( 3 - 4 )</b> |
|------------------------------|------------------------------|---------------------------|--|--|
| Deep Sump<br>Catch Basin     | 25%                          | 100%                      | 25%                                    | 75%                                      |
| Stormceptor 450              | 84%                          | 75%                       | 63%                                    | 12%                                      |
| <b>Total TSS<br/>Removal</b> |                              |                           | <b>88%</b>                             |  |

STC-450: TSS removal = 84%

Water quality flow rate (WQF) = 0.35 cfs

Per MassDEP Guidance

$WQF = (qu) \times (\text{imp. area in square miles}) \times (1\text{-inch})$

where  $qu = 835$  (per guidance figure 4)

$A = 11,830 \text{ s.f.} = 0.00042 \text{ sq. mi.}$

**Standard 5: Land Uses with Higher Potential Pollutant Loads**

Not applicable – The site does not contain any land uses with higher pollutant loads. However, the project has been designed to meet the requirement of Standard 5 where groundwater recharge has not been proposed and the selected BMP's are suitable for the land use.

**Standard 6: Critical Areas**

Not applicable – The site is not located within any critical areas.

**Standard 7: Redevelopment**

Not applicable – The site does not qualify as a redevelopment project.

**Standard 8: Construction Period Controls**

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan have been provided on the site plans. The overall limit of work is less than 1-acre and would not be covered under the NPDES General Construction Permit.

**Standard 9: Operation and Maintenance Plan**

A recommended Operation and Maintenance Plan has been attached with this report.

**Standard 10: Illicit Discharge Statement**

Illicit discharges are prohibited. Existing building are to be removed and replaced with new utility connections and connections to the municipal sewer system within Tilton Avenue. All of the pre-existing plumbing and utility connections will be removed and/or otherwise decommissioned. Any new floor drains would be connected to oil/water separators and then connected to the municipal sewerage system per the Plumbing Code requirements.

Certification: To the best of my knowledge, the attached plans, computations and specifications meet the requirements of Standard 10 of the Massachusetts Stormwater Handbook regarding illicit discharges to the stormwater management system. Based upon available information, no known illicit discharges exist on the site, and future Illicit discharges are prohibited. The proposed sewerage utilities and/or floor drains shall be connected to the municipal sewerage system. All current documents and attachments were prepared under my direction and qualified personnel properly gathered and evaluated the information submitted.

Name: Vito Colonna

Organization: Connorstone Engineering

Signature: 

Date: 2/26/2025

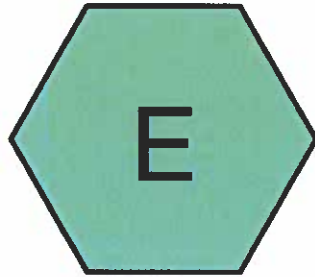
## **HYDROCAD CALCULATIONS**

---

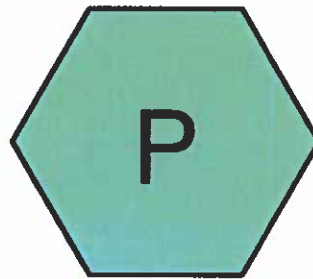
**PROPOSED CONDITION  
1-inch, 2 Year, 10 Year, 25 Year  
& 100 Year Storm  
Calculation Sheets**







Existing



Proposed



**Summary for Subcatchment E: Existing**

**Summary for Subcatchment P: Proposed**

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

Runoff = 0.05 cfs @ 12.06 hrs, Volume= 0.005 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-inch Rainfall=1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-inch Rainfall=1.00"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,430     | 98 | Roofs, HSG A                  |
| 1,735     | 98 | Paved parking, HSG A          |
| 18,385    | 39 | >75% Grass cover, Good, HSG A |
| 3,050     | 30 | Woods, Good, HSG A            |
| 24,600    | 45 | Weighted Average              |
| 21,435    |    | 87.13% Pervious Area          |
| 3,165     |    | 12.87% Impervious Area        |

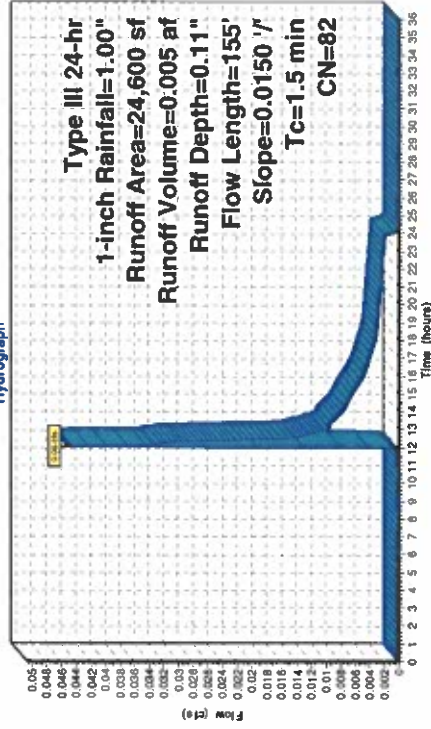
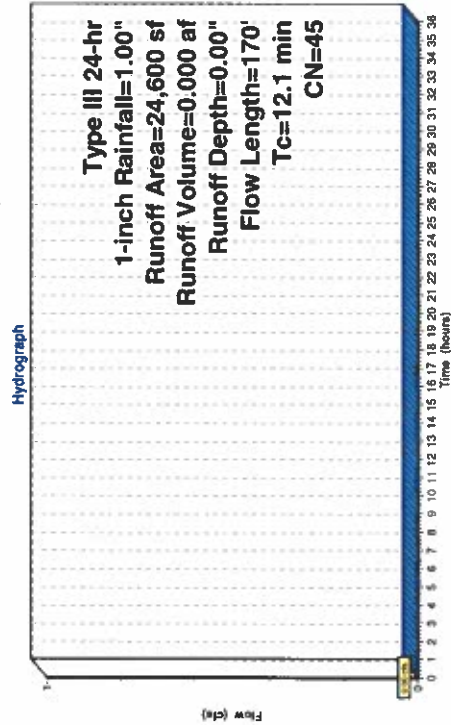
| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,270     | 98 | Roofs, HSG A                  |
| 11,830    | 98 | Paved parking, HSG A          |
| 6,500     | 39 | >75% Grass cover, Good, HSG A |
| 24,600    | 82 | Weighted Average              |
| 6,500     |    | 26.42% Pervious Area          |
| 18,100    |    | 73.58% Impervious Area        |

| Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|-------------------|----------------|--|
| 9.2      | 50            | 0.0150            | 0.09           | Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"                |
| 2.9      | 120           | 0.0100            | 0.70           | Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps |
| 12.1     | 170           | Total             |                |  |

| Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|-------------------|----------------|--|
| 0.8      | 50            | 0.0150            | 1.07           | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20" |
| 0.7      | 105           | 0.0150            | 2.49           | Shallow Concentrated Flow, Paved Kv= 20.3 fps  |
| 1.5      | 155           | Total             |                |  |

**Subcatchment E: Existing**

**Subcatchment P: Proposed**



Summary for Subcatchment E: Existing

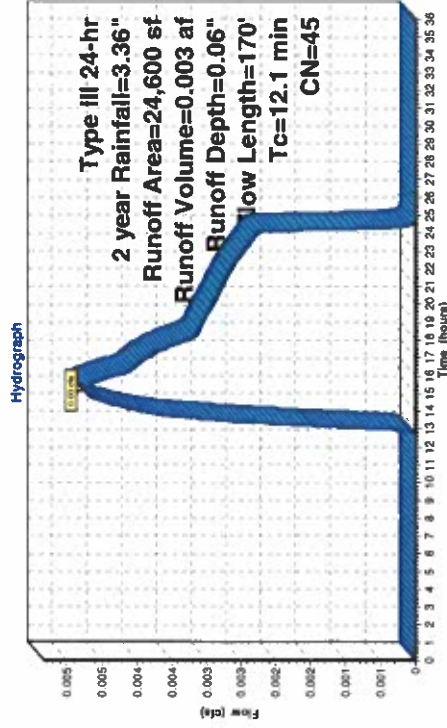
Runoff = 0.00 cfs @ 15.10 hrs, Volume= 0.003 af, Depth= 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2 year Rainfall=3.36"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,430     | 98 | Roofs, HSG A                  |
| 1,735     | 98 | Paved parking, HSG A          |
| 18,385    | 39 | >75% Grass cover, Good, HSG A |
| 3,050     | 30 | Woods, Good, HSG A            |
| 24,600    | 45 | Weighted Average              |
| 21,435    |    | 87.13% Pervious Area          |
| 3,165     |    | 12.87% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.2      | 50            | 0.0150        | 0.09              |                | Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"                 |
| 2.9      | 120           | 0.0100        | 0.70              |                | Shallow Concentrated Flow, Short Grass Pasture, Kv= 7.0 fps |
| 12.1     | 170           | Total         |                   |                |   |

Subcatchment E: Existing



Summary for Subcatchment P: Proposed

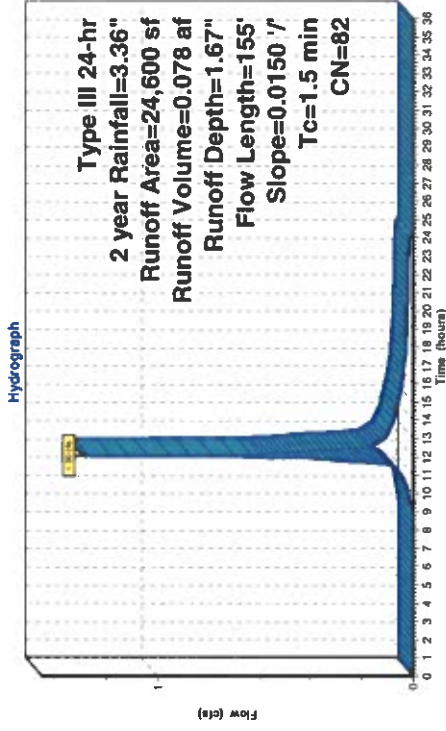
Runoff = 1.30 cfs @ 12.02 hrs, Volume= 0.078 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 2 year Rainfall=3.36"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,270     | 98 | Roofs, HSG A                  |
| 11,830    | 98 | Paved parking, HSG A          |
| 6,500     | 39 | >75% Grass cover, Good, HSG A |
| 24,600    | 82 | Weighted Average              |
| 6,500     |    | 26.42% Pervious Area          |
| 18,100    |    | 73.58% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|---------------|-------------------|----------------|--|
| 0.8      | 50            | 0.0150        | 1.07              |                | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20" |
| 0.7      | 105           | 0.0150        | 2.49              |                | Shallow Concentrated Flow, Paved, Kv= 20.3 fps |
| 1.5      | 155           | Total         |                   |                |  |

Subcatchment P: Proposed



Summary for Subcatchment E: Existing

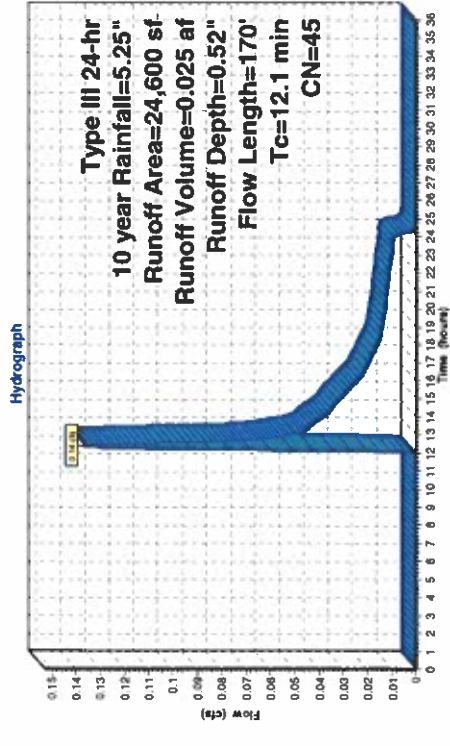
Runoff = 0.14 cfs @ 12.38 hrs, Volume= 0.025 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10 year Rainfall=5.25"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,430     | 98 | Roofs, HSG A                  |
| 1,735     | 98 | Paved parking, HSG A          |
| 18,385    | 39 | >75% Grass cover, Good, HSG A |
| 3,050     | 30 | Woods, Good, HSG A            |
| 24,600    | 45 | Weighted Average              |
| 21,435    |    | 87.13% Pervious Area          |
| 3,165     |    | 12.87% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.2      | 50            | 0.0150        | 0.09              |                | Sheet Flow,<br>Grass: Dense n= 0.240 P2= 3.20"                |
| 2.9      | 120           | 0.0100        | 0.70              |                | Shallow Concentrated Flow,<br>Short Grass Pasture Kv= 7.0 fps |
| 12.1     | 170           | Total         |                   |                |   |

Subcatchment E: Existing



Summary for Subcatchment P: Proposed

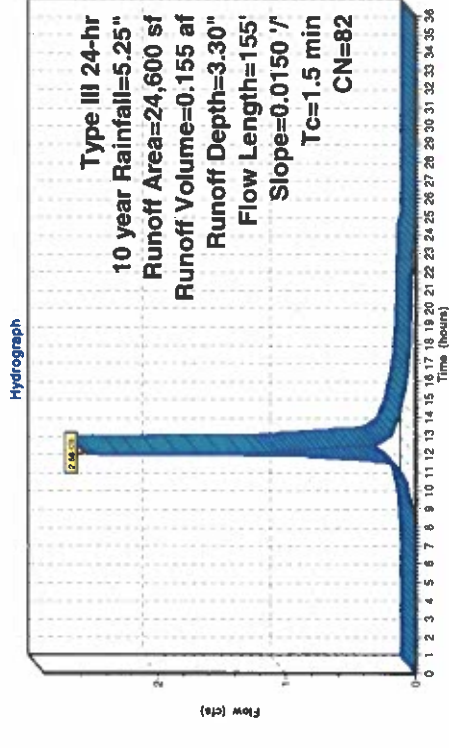
Runoff = 2.56 cfs @ 12.02 hrs, Volume= 0.155 af, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10 year Rainfall=5.25"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,270     | 98 | Roofs, HSG A                  |
| 11,830    | 98 | Paved parking, HSG A          |
| 6,500     | 39 | >75% Grass cover, Good, HSG A |
| 24,600    | 82 | Weighted Average              |
| 6,500     |    | 26.42% Pervious Area          |
| 18,100    |    | 73.58% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                       |
|----------|---------------|---------------|-------------------|----------------|---|
| 0.8      | 50            | 0.0150        | 1.07              |                | Sheet Flow,<br>Smooth surfaces n= 0.011 P2= 3.20" |
| 0.7      | 105           | 0.0150        | 2.49              |                | Shallow Concentrated Flow,<br>Paved Kv= 20.3 fps  |
| 1.5      | 155           | Total         |                   |                |   |

Subcatchment P: Proposed



**Summary for Subcatchment E: Existing**

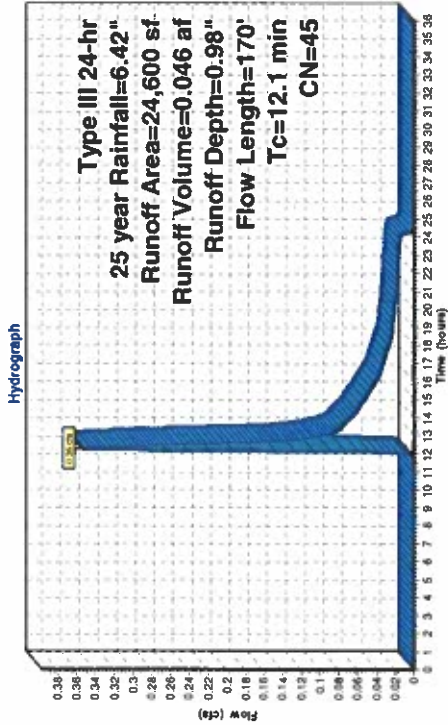
Runoff = 0.35 cfs @ 12.22 hrs, Volume= 0.046 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25 year Rainfall=6.42"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,430     | 98 | Roofs, HSG A                  |
| 1,735     | 98 | Paved parking, HSG A          |
| 18,385    | 39 | >75% Grass cover, Good, HSG A |
| 3,050     | 30 | Woods, Good, HSG A            |
| 24,600    | 45 | Weighted Average              |
| 21,435    |    | 87.13% Pervious Area          |
| 3,165     |    | 12.87% Impervious Area        |

| Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|-------------------|----------------|--|
| 9.2      | 50            | 0.0150            | 0.09           | Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"                |
| 2.9      | 120           | 0.0100            | 0.70           | Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps |
| 12.1     | 170           | Total             |                |  |

**Subcatchment E: Existing**



**Summary for Subcatchment P: Proposed**

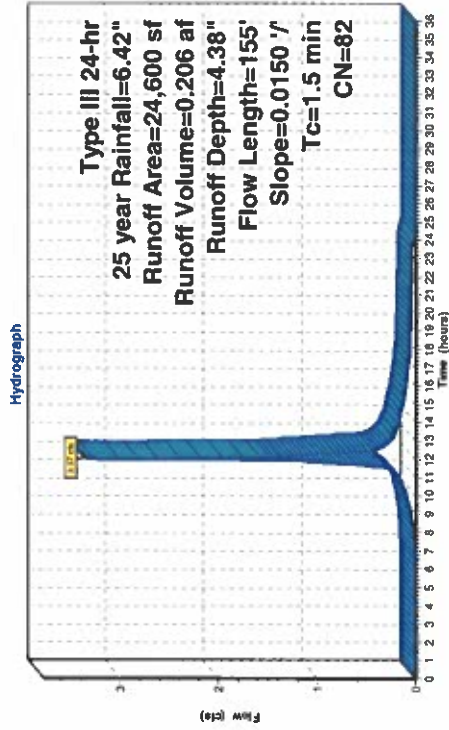
Runoff = 3.37 cfs @ 12.02 hrs, Volume= 0.206 af, Depth= 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25 year Rainfall=6.42"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,270     | 98 | Roofs, HSG A                  |
| 11,830    | 98 | Paved parking, HSG A          |
| 6,500     | 39 | >75% Grass cover, Good, HSG A |
| 24,600    | 82 | Weighted Average              |
| 6,500     |    | 26.42% Pervious Area          |
| 18,100    |    | 73.58% Impervious Area        |

| Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|-------------------|----------------|--|
| 0.8      | 50            | 0.0150            | 1.07           | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20" |
| 0.7      | 105           | 0.0150            | 2.49           | Shallow Concentrated Flow, Paved Kv= 20.3 fps  |
| 1.5      | 155           | Total             |                |  |

**Subcatchment P: Proposed**



Summary for Subcatchment E: Existing

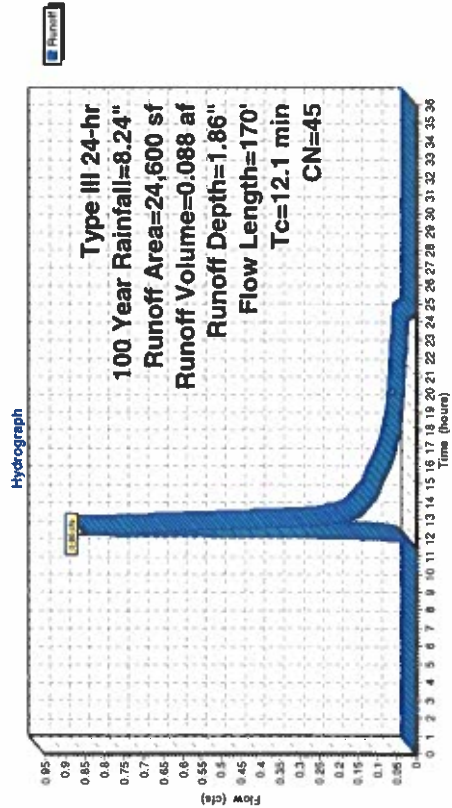
Runoff = 0.85 cfs @ 12.19 hrs, Volume= 0.088 af, Depth= 1.86"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100 Year Rainfall=8.24"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 1,430     | 98 | Roofs, HSG A                  |
| 1,735     | 98 | Paved parking, HSG A          |
| 18,385    | 39 | >75% Grass cover, Good, HSG A |
| 3,050     | 30 | Woods, Good, HSG A            |
| 24,600    | 45 | Weighted Average              |
| 21,435    |    | 87.13% Pervious Area          |
| 3,165     |    | 12.87% Impervious Area        |

| Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|-------------------|----------------|--|
| 9.2      | 50            | 0.0150            | 0.09           | Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"                |
| 2.9      | 120           | 0.0100            | 0.70           | Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps |
| 12.1     | 170           | Total             |                |  |

Subcatchment E: Existing



Summary for Subcatchment P: Proposed

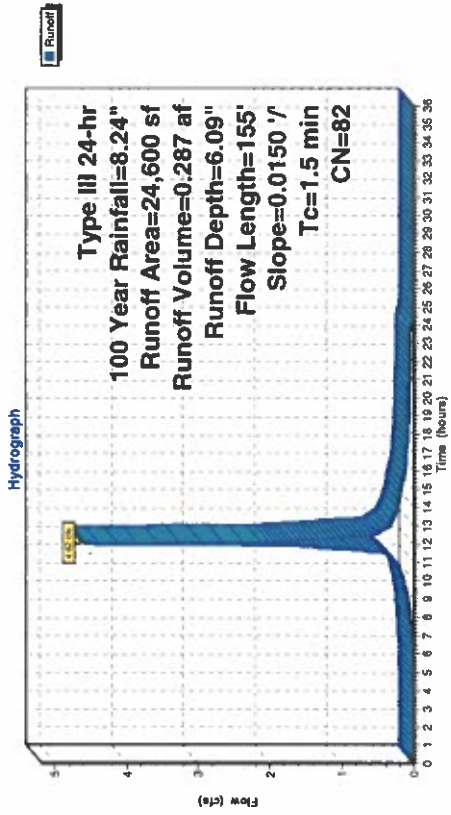
Runoff = 4.62 cfs @ 12.02 hrs, Volume= 0.287 af, Depth= 6.09"  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100 Year Rainfall=8.24"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,270     | 98 | Roofs, HSG A                  |
| 11,830    | 98 | Paved parking, HSG A          |
| 6,500     | 39 | >75% Grass cover, Good, HSG A |
| 24,600    | 82 | Weighted Average              |
| 6,500     |    | 26.42% Pervious Area          |
| 18,100    |    | 73.58% Impervious Area        |

| Tc (min) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                    |
|----------|---------------|-------------------|----------------|--|
| 0.8      | 50            | 0.0150            | 1.07           | Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20" |
| 0.7      | 105           | 0.0150            | 2.49           | Shallow Concentrated Flow, Paved Kv= 20.3 fps  |
| 1.5      | 155           | Total             |                |  |

Subcatchment P: Proposed



## **WATER QUALITY STRUCTURE SIZING DATA**

---



## Stormceptor Design Summary

### PCSWMM for Stormceptor

#### Project Information

|                |               |
|----------------|---------------|
| Date           | 2/27/2025     |
| Project Name   | 55 Tilton Ave |
| Project Number | -             |
| Location       | Ashland       |

#### Designer Information

|         |      |
|---------|------|
| Company | CASI |
| Contact | -    |

#### Notes

|     |
|-----|
| N/A |
|-----|

#### Drainage Area

|                    |     |
|--------------------|-----|
| Total Area (ac)    | 0.3 |
| Imperviousness (%) | 100 |

The Stormceptor System model STC 450i achieves the water quality objective removing 84% TSS for a NJDEP (clay, silt, sand) particle size distribution; providing continuous positive treatment for a stormwater quality flow rate of 0.35 cfs.

#### Rainfall

|                  |                  |
|------------------|------------------|
| Name             | WORCESTER WSO AP |
| State            | MA               |
| ID               | 9923             |
| Years of Records | 1948 to 2005     |
| Latitude         | 42°16'2"N        |
| Longitude        | 71°52'34"W       |

#### Water Quality Objective

|                    |      |
|--------------------|------|
| TSS Removal (%)    | 80   |
| WQ Flow Rate (cfs) | 0.35 |

#### Upstream Storage

| Storage (ac-ft) | Discharge (cfs) |
|-----------------|-----------------|
| 0               | 0               |

#### Stormceptor Sizing Summary

| Stormceptor Model | TSS Removal |
|-------------------|-------------|
|                   | %           |
| STC 450i          | 84          |
| STC 900           | 90          |
| STC 1200          | 90          |
| STC 1800          | 90          |
| STC 2400          | 92          |
| STC 3600          | 93          |
| STC 4800          | 95          |
| STC 6000          | 95          |
| STC 7200          | 96          |
| STC 11000         | 97          |
| STC 13000         | 97          |
| STC 16000         | 98          |

← MODEL  
SELECTED



### Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

| NJDEP (clay, silt, sand) |                   |                  |                           |  |                     |                   |                  |                           |
|--------------------------|-------------------|------------------|---------------------------|--|---------------------|-------------------|------------------|---------------------------|
| Particle Size<br>µm      | Distribution<br>% | Specific Gravity | Settling Velocity<br>ft/s |  | Particle Size<br>µm | Distribution<br>% | Specific Gravity | Settling Velocity<br>ft/s |
| 1                        | 5                 | 2.65             | 0.0012                    |  |                     |                   |                  |                           |
| 4                        | 15                | 2.65             | 0.0012                    |  |                     |                   |                  |                           |
| 29                       | 25                | 2.65             | 0.0025                    |  |                     |                   |                  |                           |
| 75                       | 15                | 2.65             | 0.0133                    |  |                     |                   |                  |                           |
| 175                      | 30                | 2.65             | 0.0619                    |  |                     |                   |                  |                           |
| 375                      | 5                 | 2.65             | 0.1953                    |  |                     |                   |                  |                           |
| 750                      | 5                 | 2.65             | 0.4266                    |  |                     |                   |                  |                           |

### Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

| Inlet and Outlet Pipe Invert Elevations Differences |          |                     |                        |
|---|----------|---------------------|------------------------|
| Inlet Pipe Configuration                            | STC 450i | STC 900 to STC 7200 | STC 11000 to STC 16000 |
| Single inlet pipe                                   | 3 in.    | 1 in.               | 3 in.                  |
| Multiple inlet pipes                                | 3 in.    | 3 in.               | Only one inlet pipe.   |

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 [www.rinkerstormceptor.com](http://www.rinkerstormceptor.com)

## **STORMWATER OPERATION & MAINTENANCE PLAN**

---

# **Stormwater Operations and Management Plan and Long-term Pollution Prevention Program**

55 Tilton Avenue  
Ashland, MA

**Stormwater Management System Owner:  
AND Responsible Party** \_\_\_\_\_

This Operation and Maintenance Plan has been prepared in accordance with the MA Department of Environmental Protection stormwater standards and recommendations outlined in the stormwater handbook. This plan outlines the minimum efforts necessary to ensure that the stormwater collection and treatment system and sedimentation and erosion control system for this site operates in accordance with Massachusetts Department of Environmental Protection (DEP) stormwater management policy. Efforts in addition to the minimum listed herein may be required to ensure adequate stormwater management.

This plan includes general site restrictions, routing/non-routine operation and maintenance; reporting and record keeping; and an estimated budget.

## **General Conditions**

---

1. The following site conditions are imposed as part of this Plan.
  - Illicit discharges into stormwater management system are perpetually prohibited.
  - The use of fertilizers should be limited to slow-release, low-nitrogen fertilizers.
2. The Town Engineer shall be notified before maintenance work is performed and shall be afforded the opportunity to inspect the work. Copies of any contracts, inspection reports, and invoices for the work performed shall be retained and made available if requested by the Town Engineer.
3. All material removed from the drainage system (i.e. catch basin cleanings) shall be legally disposed of off-site.

## **Operation and Maintenance:**

---

Stormwater management facilities should be inspected a minimum of four times per year and following at least one major storm per year. Upon completion of inspection, the inspector should specify any necessary corrective actions to be taken by ownership of the facility. The items to be inspected and maintained are described in the following sections.

Based on the observed conditions, the Responsible Party shall immediately schedule the appropriate maintenance. Some minor maintenance, such as the removal of blockages, debris and saplings in the basins may be conducted at the time of the inspection. More difficult maintenance activities, requiring special equipment, will have to be scheduled, such as the removal of excessive sediment or the repair of eroded areas. All sediment must be removed at least once per year.

### Catch Basins, and Stormceptors.

The actual removal of sediments and associated pollutants and trash occurs only when sumps are cleaned out; therefore, regular maintenance is required. The more frequent the cleaning, the less likely sediments will be resuspended and subsequently discharged. Frequent cleaning also results in more volume available for future storms and enhances the overall performance.

At a minimum, catch basins and Stormceptors should be inspected four times annually, and cleaned whenever sediment accumulation exceeds 12 inches in catch basins and 8 inches in Stormceptors. Disposal of the accumulated sediment and hydrocarbons must be in accordance with applicable local, state, and federal guidelines and regulations. At each inspection, inspect gas trap hoods and repair as necessary. Inspect outlet pipe and remove debris. Vacuum trucks shall be utilized for all cleanings.

### Street Sweeping

Street sweeping of the roadway should be performed at least twice per year, preferably in the spring after the snow has melted and in the fall, prior to snowfall. Disposal of the sweepings must be in accordance with applicable local, state, and federal guidelines and regulations.

### Debris Accumulation

The inspector shall check basins and channels for both sediment and debris accumulations. Debris and sediment shall be removed at the time of the inspection, if feasible. Sediment shall not be allowed to accumulate and restrict flows. Most debris can be removed by hand or with hand tools (e.g. shovel). Some larger objects, such as fallen tree limbs, may have to be cut up before removal by hand is possible.

### Vegetation

The initial vegetation inspection shall occur four (4) weeks after final stabilization of the site; vegetation shall be dense (and aesthetically acceptable on all portions of the project, including the side slopes, buffer strips and the embankments). The inspector shall determine and document: (1) whether fertilizing is required (2) the areas where grass shall be mowed, and (3) the areas which shall be protected against erosion. In addition, recently seeded areas shall be inspected for failures.

Eroded areas shall be filled and compacted, if necessary, and reseeded as soon as possible. If an area erodes twice, then a geotextile fabric is to be installed to stabilize the area to allow vegetation to be established. These maintenance activities shall take place during the planting season. Areas affected by lack of rainfall shall be watered. If a recently established vegetated area is determined to be inadequate for erosion control it shall be refertilized with microbial release, not sulfur encapsulated, fertilizer, (using half of the rate originally applied). If the stand is more than 60% damaged, it shall be reestablished, following the original preparation and seeding instructions. Areas of repeated erosion/scour problems shall be lined with riprap only after twice attempting to stabilize the area with geotextile fabric.

### Pipe Outlets

Pipe outlets shall be checked for: (1) signs of seepage, (2) signs of scour, (3) cracks, breaks, or deterioration of materials, and (4) rip rap condition / undermining. The outlet channel itself shall be free from obstruction (e.g., fallen trees). Vegetation and riprap shall be in good condition (e.g., grass shall be dense and healthy looking; riprap shall be free from undermining and/or deterioration). If scour is evident, the damaged area shall be filled, compacted and reseeded, stabilized with a geotextile fabric, or lined with riprap in that order. If rip rapped areas have been damaged, the riprap shall be replaced or supplemented. The use of concentrated flow dissipation devices, such as level spreaders, may help to eliminate inlet scour problems.

### Snow Removal

Snow shall not be plowed toward the wetland areas. All catch basins shall be uncovered and functional immediately after snow plowing.

### Public Safety Features

The driveway shall be kept free of snow and debris for emergency vehicle access. Storage shall not be allowed in these areas.

| Activity   | Frequency   |
|--|---|
| Perform Inspection of all System Components and Prepare Report | Four times per year   |
| Clean Catch Basins & Stormceptor                               | Minimum once per year or when sediment reaches 12-inches in catch basins or 8-inches in Stormceptor |
| Street Sweeping  | Minimum twice per year (spring and fall)  |
| Clean Gutters  | Minimum twice per year or whenever debris is noted  |

### Reporting and Record Keeping

The responsible party will be responsible for maintaining accurate Maintenance Logs for all maintenance and inspections. The maintenance logs shall be kept on site for a minimum of three (3) years and be available for inspection by the Town municipal departments or other auditing authority, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location). This will be a perpetual requirement of the Owners or their Designated Party.

The Site Maintenance Log will be completed as described above, and at a minimum will include the following items:

- Date activity performed;
- Last rain event;
- BMP's inspected and condition;
- Specific maintenance task;
- Staff or contractor performing activity;
- Verification of maintenance activity;
- For disposal include type of material and the disposal location; and
- Recommended additional maintenance tasks.

### Estimated Budget

The estimated annual budget to perform the routine scheduled maintenance is approximately \$5,000.00. This estimate does not include the repair of structures, pipes, embankments; cleaning drain lines; snow plowing; or other non-routine tasks.

## **Emergency Response Plan / Spill Control Practices**

---

On-site storage of hazardous materials shall not be allowed.

In the event of an accident in the roadway or on individual lots, where a significant amount of gasoline or other petroleum product is released, the following procedure should be followed:

1. Immediately contact the following agencies:

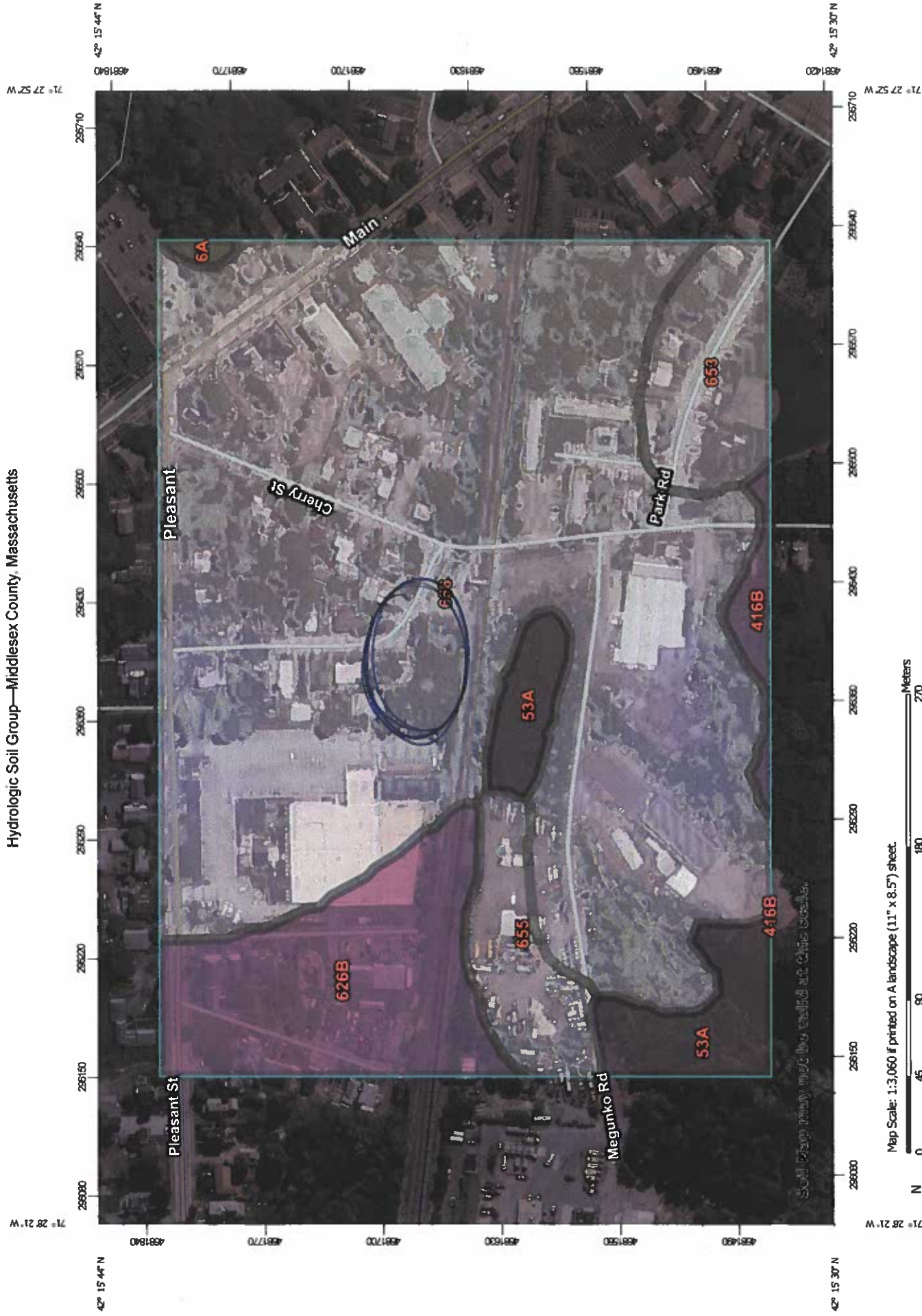
|                            |                |
|----------------------------|----------------|
| Ashland Fire Department    | (508) 881-2323 |
| MassDEP Emergency response | (888) 304-1133 |

2. Provide support to agencies listed above, which may include contacting an outside contractor to provide clean-up or contacting a Licensed Site Professional (LSP) to lead the clean-up.

If the volume of spill has reached the catch basins, the structures should be cleaned by a licensed liquid waste hauler. The outlet to the drainage system should be inspected. If there is evidence of discharge from the drainage system, additional corrective actions must be taken extending to the receiving water or beyond.



Hydrologic Soil Group—Middlesex County, Massachusetts



Map Scale: 1:3,060 if printed on A landscape (11" x 8.5") sheet.



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

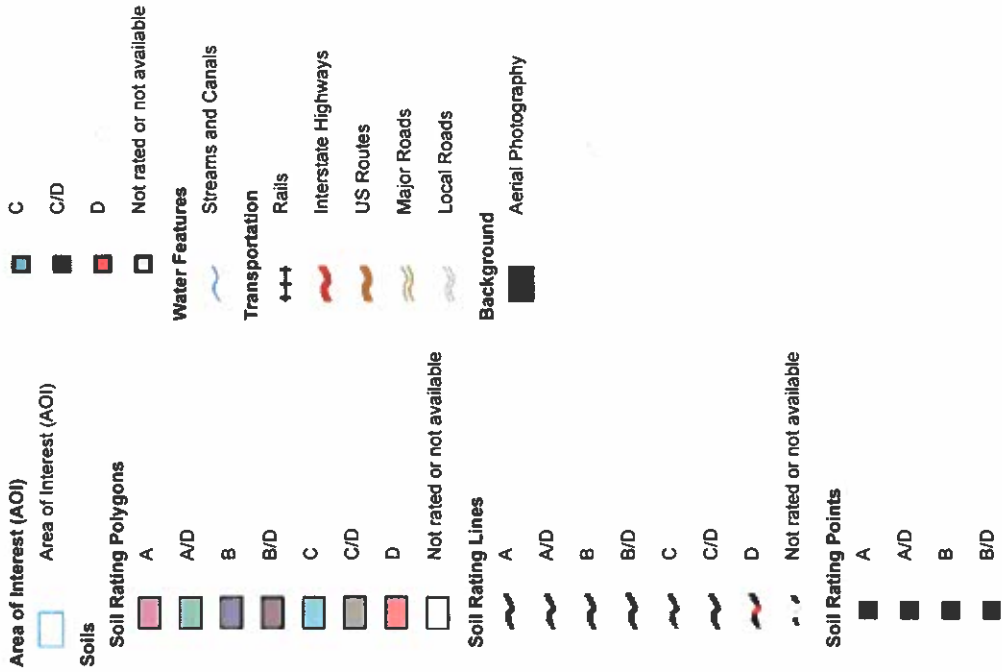
Soil Data may not be valid at this scale.



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

## MAP LEGEND



## 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:  
 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: Middlesex County, Massachusetts  
 Survey Area Data: Version 24, Aug 27, 2024

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

## Hydrologic Soil Group

| Map unit symbol                    | Map unit name   | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|---|--------|--------------|----------------|
| 6A                                 | Scarboro mucky fine sandy loam, 0 to 3 percent slopes     | A/D    | 0.1          | 0.3%           |
| 53A                                | Freetown muck, ponded, 0 to 1 percent slopes              | B/D    | 2.4          | 5.3%           |
| 416B                               | Narragansett silt loam, 3 to 8 percent slopes, very stony | A      | 0.6          | 1.3%           |
| 626B                               | Merrimac-Urban land complex, 0 to 8 percent slopes        | A      | 5.1          | 11.6%          |
| 653                                | Udorthents, sandy   |        | 2.4          | 5.5%           |
| 655                                | Udorthents, wet substratum                                |        | 1.9          | 4.2%           |
| 656                                | Udorthents-Urban land complex                             |        | 31.7         | 71.7%          |
| <b>Totals for Area of Interest</b> |   |        | <b>44.2</b>  | <b>100.0%</b>  |