DRAINAGE REPORT

For

PP EVERETT STREET, LLC

PROPOSED

MIXED-USE RESIDENTIAL DEVELOPMENT

22 Everett Street
Westwood, MA 02090

Prepared by:

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I. EXECUTIVE SUMMARY

This report examines the changes in drainage that can be expected as the result of the development of a proposed mixed-use residential development located at 22 Everett Street in the Town of Westwood. The overall property, which contains approximately 6.8 acres of land, currently consists of an existing building, shed, paved, gravel and compacted dirt parking areas, material storage areas, Purgatory Brook, and undeveloped wooded areas.

The proposed project includes the construction of two new buildings, “Building A” and “Building B”. Building A has a 39,700-sf footprint consisting of 12,000 sf of retail area, 96 residential units and an at grade parking garage. Building B has a 22,460-sf footprint consisting of 62 residential units and an at grade parking garage. The project also proposes to include new amenity areas, a dog park, playground area, pickle ball courts, new landscaping, storm water management components and associated utilities. This report addresses a comparative analysis of the pre- and post-development site runoff conditions. Additionally, this report provides calculations documenting the design of the proposed stormwater conveyance/management system as illustrated within the accompanying Site Development Plans prepared by Bohler. The project will also provide erosion and sedimentation controls during the demolition and construction periods, as well as long term stabilization of the site.

For the purposes of this analysis the pre- and post-development drainage conditions were analyzed at two (2) “design points” where stormwater runoff currently drains to under existing conditions. These design points are described in further detail in **Section II** below. A summary of the existing and proposed conditions peak runoff rates and volumes for the 2-, 10-, 25-, and 100-year storms can be found in **Table 1.1** below. In addition, the project has been designed to meet or exceed the Stormwater Management Standards as detailed herein.

Table 1.1: Design Point Peak Runoff Rate Summary

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP1	11.60	3.43	**-8.17**	24.46	8.82	**-15.64**	33.06	11.55	**-21.51**	46.72	15.87	**-30.85**
DP2	1.35	0.02	**-1.33**	2.12	0.25	**-1.87**	2.59	0.40	**-2.19**	3.33	0.66	**-2.67**

**Flows are represented in cubic feet per second (cfs)*

II. EXISTING SITE CONDITIONS

Existing Site Description

The Site consists of approximately 6.8 acres of land located along the northerly side of Everett Street in Westwood, Massachusetts. The Site abuts industrial use properties to the north and east and the rail line to the west. The site consists of an existing building in the center of the lot, shed, paved, gravel and compacted dirt parking areas, material storage areas, and existing utility connection. Purgatory Brook runs through the Site and separates the Site into three (3) areas. The northwest corner of the Site contains a gas regulator structure for use by Enbridge Gas, formerly known as Algonquin Gas Company. The Site contains several easements for utility access including a gas, sewer, drainage, and electric easement, as well as right of way access along the MBTA commuter rail line which abuts the western side of the property. The limit of analysis for drainage totals approximately 8.2 acres which includes off-site runoff from both the eastern and western portions of the Site.

On-Site Soil Information

The soils on the Site are mapped as Urban Land. Based upon on-site soil testing performed on January 19, 2023 by a licensed soil evaluator in the State of Massachusetts, the soils on Site at the depths of the proposed infiltration depth were observed to be loamy sand which is generally consistent with the HSG “A”. As such, the drainage analysis has utilized an infiltration rate of 2.41 in/hr which corresponds to the Rawl’s rate for loamy sand, HSG “A”.

During the soil testing performed on Site as described above, groundwater was observed on the Site between 4.0 and 5.3 feet below the surface elevation. In 2 of the 13 test pits, weeping from the side of the pit was observed 4.3 - 5.3 feet below the ground surface. Standing water in the pit was not observed. Based on the observed groundwater elevations, the Site is constrained relative to the proposed infiltration and results in shallow subsurface stormwater management features. Refer to **Appendix C** for Test Pit Logs and additional information.

Existing Collection and Conveyance

The site generally slopes from high points along the property lines in towards Purgatory Brook or existing catch basins on-site. A portion of the southern section of the Site drains out to the Everett Street municipal drainage system. The northwest portion of the Site drains to the southeast to Purgatory Brook. The center portion of the Site drains to the northeast to Purgatory Brook. The

northeast portion of the Site drains to the southwest to Purgatory Brook. The southwest portion of the site drains to existing catch basins within the parking lot and is conveyed via underground pipes to Purgatory Brook. The remainder of the Site sheet flows into the Everett Street municipal drainage system. There does not appear to be any best management practices on site.

Slopes on the site range from 0%-12% with on-site elevations ranging from el. 82 in the southwest portion abutting the MBTA to el. 65 within Purgatory Brook.

Existing Watersheds and Design Point Information

For the purposes of this analysis, the pre- and post-development drainage conditions were analyzed at two (2) “design points” as described below where stormwater runoff currently drains to under existing conditions. The existing site was subdivided into two (2) separate sub catchments, as described below, to analyze existing and proposed flow rates at each design point. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Design Point #1 (DP1) is Purgatory Brook. Under existing conditions, this design point receives stormwater flows from approximately 7.80 acres of land, designated as watersheds “EX-1”, “EX-3”, “EX-4”, “EX-5”, “EX-6” and “EX-7”.

Design Point #2 (DP2) is the existing roadway Everett Street. Under existing conditions, this design point receives stormwater flows from approximately 0.41 acres of land, designated as watershed “EX-2”.

Subcatchment EX-1 in total is 0.88 acres of paved parking area, vegetation and portions of the MBTA rail area. The area flows into existing catch basin and is conveyed via underground pipes and outflows to Purgatory Brook.

Subcatchment EX-2 in total is 0.41 acres of paved parking area. The area sheet flows to Everett Street into the existing municipal drainage systems.

Subcatchment EX-3 in total is 1.53 acres of paved parking area, vegetation, portions of the MBTA rail and compacted gravel areas. The area slopes to the northeast towards low points in Purgatory Brook.

Subcatchment EX-4 in total is 1.84 acres of paved parking area, an Enbridge gas regulator station, previously disturbed compacted dirt areas, vegetation, and portions of the MBTA rail. The area slopes to the southeast towards low points in Purgatory Brook.

Subcatchment EX-5 in total is 2.49 acres of paved parking area, existing shed, previously disturbed compacted dirt areas material storage areas, vegetation, and portions of vegetation in the abutting property. The area slopes to the southwest towards low points in Purgatory Brook.

Subcatchment EX-6 in total is 0.44 and consists of the surface water within Purgatory Brook.

Subcatchment EX-7 in total is 0.60 acres of building footprint area. The area is routed to Purgatory Brook through the existing pipe systems.

Refer to **Table 1.1, and 6.1** for the existing conditions peak rates of runoff. Refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the existing drainage areas.

III. PROPOSED SITE CONDITIONS

Proposed Development Description

The proposed project includes the construction of a two new buildings, “Building A” and “Building B”. Building A has a 39,700-sf footprint consisting of 12,000 sf of retail area, 96 residential units and an at grade parking garage. Building B has a 22,460-sf footprint consisting of 62 residential units and an at grade parking garage. The project is also proposed to include two separate surface parking areas for Building A and Building B, the construction of amenity areas, dog park, playground area, pickle ball courts and new landscaping, storm water management components and associated utilities. The Project will debris general clean up, removal of invasive species, and riverfront remediation. The majority of the Site, including the proposed parking areas, has been designed to drain to deep-sump, hooded catch basins or water quality inlets. The catch basins or water quality inlets will capture and convey stormwater runoff, via an underground pipe system, to one of three (3) proposed infiltration basins. Pretreatment of stormwater runoff will be provided by a combination of water quality inlets and water quality units prior to discharging into the proposed infiltration basins. The basins are designed to overflow through pipe systems with outlet control structures to Purgatory Brook. Rooftop runoff has been designed to flow through the subsurface infiltration systems as well.

Portions of the site that are not draining to the subsurface infiltration systems are designed to drain to deep sump catch basins and conveyed via underground pipes to one of two proposed level spreaders. The level spreaders will discharge directly to Purgatory Brook.

There is a small section of driveway on the Site that is too low to be captured with the proposed stormwater improvements and it will flow directly to Everett Street to be conveyed through the municipal drainage system as it currently functions in the existing conditions.

Proposed Development Collection and Conveyance

Water quality inlets, and catch basins directed to water quality units are proposed to collect and route runoff from the majority of impervious areas on-site. Roof drains are proposed to collect runoff from the proposed building and are routed to the proposed infiltration system. Pipes have been designed for the 25-year storm using Storm Sewers the Rational Method. Pipe sizing calculations are included in **Appendix F**.

The best management practices (BMPs) incorporated into the proposed stormwater management system have been designed to meets, or exceeds, the standards set forth in the Massachusetts Department of Environmental Protection Stormwater Handbook standards. Refer to **Section V** for additional information.

Proposed Watersheds and Design Point Information

The project has been designed to maintain existing drainage watersheds to the greatest extent possible, with the same design points described in **Section II** above. The site was subdivided into twelve (12) separate sub catchments for the proposed conditions as described below. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Under proposed conditions DP#1 receives stormwater flows from approximately 8.02 acres of land, designated as watershed “PR-2A”, “PR-2B”, “PR-3”, “PR-4”, “PR-5”, “PR-6”, “PR-7”, “PR-8”, “PR-9”, “PR-10”, and “PR-11”.

Under proposed conditions DP#2 receives stormwater flows from approximately 0.16 acres of land, designated as watershed “P-1”.

Subcatchment PR-1 in total is 0.16 acres of paved parking area, and landscape area that has been graded to sheet flow into the existing municipal drainage system in Everett Street.

Subcatchment PR-2a in total is 1.44 acres of paved parking area, landscaping in relation to Building A and existing wooded areas and portions of the MBTA rail area. The area has been designed to slope to one of four catch basins which is routed to one of two water quality units before discharging to the proposed Subsurface Infiltration System 1. The outlet control from this system connect to the existing on-site underground drainage pipe system which outfalls to Purgatory Brook

Subcatchment PR-2b in total is 0.17 acres of paved parking in relation to Building A. The area slopes to the water quality inlet in the eastern corner of the parking lot which drains to the proposed Subsurface Infiltration System 3. The outlet control from this system connect to the existing on-site underground drainage pipe system which outfalls to Purgatory Brook.

Subcatchment PR-3 in total is 0.72 acres landscaped areas and pathways leading to the inner portion of the “U” shape of Building A. This area has been designed to overland to flow to Purgatory Brook.

Subcatchment PR-4 in total is 0.91 acres and consists of the roof area of Building A. The architect has designed the building to drain to roof drains which are routed into Subsurface Infiltration System 1. All roof runoff ultimately outlets to the existing on-site underground drainage pipe system which outfalls to Purgatory Brook.

Subcatchment PR-5 is in total 1.84 acres of existing wooded area, gas regulator, portions of the MBTA and a proposed amenity area to include a playground and pickle ball courts. The area has been graded to drain to the east via overland flow into Purgatory Brook as the area currently functions under existing conditions.

Subcatchment PR-6 is in total 0.74 acres of the proposed parking area, paved access drive and landscaping for Building B. The area has been graded to drain to one of two water quality inlets or one of three catch basins which are routed to a water quality unit and runoff is then routed to the proposed Subsurface Infiltration System 2. Overflow from the subsurface infiltration system is routed to a proposed level spreader before overflowing into Purgatory Brook.

Subcatchment PR-7 is in total 0.27 acres of the paved access drive to Building B. The area has been graded to drain a catch basin which is routed to a level spreader before overflowing to Purgatory Brook.

Subcatchment PR-8 is in total 0.52 acres consists of the roof area of Building B. The architect has designed the building to drain to roof drains which are routed to the proposed Subsurface Infiltration System 3 before overflowing to Purgatory Brook.

Subcatchment PR-9 is in total 0.35 aces of the proposed dog park, landscaped, paved pathways and wooded areas. The area has been graded to drain to the proposed rip rap level spreader area before overflowing to Purgatory Brook.

Subcatchment PR-10 is in total 0.62 acres of wooded area, landscaped and paved amenity space. The area has been graded to flow to a catch basin located that is routed to a rip rap area where the pipe daylights to Purgatory Brook.

Subcatchment PR-11 is in total is 0.44 and consists of the surface water within Purgatory Brook.

Refer to **Table 1.1 and 6.1** for the calculated proposed conditions peak rates of runoff. For additional hydrologic information, refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the proposed drainage areas.

IV. METHODOLOGY

Peak Flow Calculations

Methodology utilized to design the proposed stormwater management system includes compliance with the guidelines set forth in the latest edition of the Massachusetts DEP Stormwater Handbook. The pre- and post-development runoff rates being discharged from the site were computed using the HydroCAD computer program. The drainage area and outlet information were entered into the program, which routes storm flows based on NRCS TR-20 and TR-55 methods. The other components of the model were determined following standard NRCS procedures for Curve Numbers (CNs) and times of concentrations documented in the appendices of this report. The rainfall data utilized and listed below in table 4.1 below for stormwater calculations is based on NOAA. Refer to **Appendix F** for more information.

Table 4.1: NOAA Rainfall Intensities

Frequency	2 year	10 year	25 year	100 year
Rainfall* (inches)	3.42	5.32	6.51	8.35

Values derived from NOAA ATLAS on 01/17/2023

The proposed stormwater management as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25- and 100-year design storm events. Additionally, the proposed project meets, or exceeds, the MADEP Stormwater Management standards. Compliance with these standards is described further below.

V. STORMWATER MANAGEMENT STANDARDS

Standard #1: No New Untreated Discharges

The project has been designed so that the majority of the proposed impervious areas including the building roof and paved parking/driveway areas shall be collected and passed through the proposed drainage system for treatment prior to discharge.

Standard #2: Peak Rate Attenuation

As outlined in **Table 1.1** and **Table 6.1**, the development of the site and the proposed stormwater management system, have been designed so that post-development peak rates of runoff are below pre-development conditions for the 2-, 10-, 25- and 100-year storm events at all design points.

Standard #3: Recharge

The stormwater runoff from the project will be collected and diverted to one of several proposed infiltration systems. The project as proposed will involve the creation of 0.18 aces of new impervious area and is required to infiltrate 534 cubic feet of stormwater as defined in Stormwater Standard 3. The proposed infiltration system will provide 14,818 cubic feet of volume below the lowest outlet for groundwater recharge. Refer to **Appendix F** of this report for calculations documenting required and provided recharge volumes.

The DEP Stormwater Standards require that the infiltration BMP drains completely within 72 hours of the end of the storm event. Calculations showing that the proposed Subsurface Infiltration System 1 will drain in 7.9 hours, Subsurface Infiltration System 2 will drain in 7.9 hours and Subsurface Infiltration System 3 will drain in 8.4 hours which is included in **Appendix F** of this report.

A groundwater mounding analysis has been provided in **Appendix F** of this report. The analysis shows that the groundwater mound will have no effect on the proposed system.

Standard #4: Water Quality

Water quality treatment is provided via a combination of water quality units, water quality inlets, and the infiltration systems. TSS removal calculations are included in **Appendix F** of this report. The project as proposed will involve the creation 0.18 acres of new impervious area and is required to treat 1.0 inch of runoff from the proposed impervious surfaces, which is equal to 14,707

cubic feet of water quality volume as defined in Stormwater Standard 4. The proposed infiltration basins provide a total of 14,818 cubic feet of water quality volume below the lowest outlet for water quality treatment. Refer to **Appendix F** of this report for calculations documenting required and provided water quality volumes.

Standard #5: Land Use with Higher Potential Pollutant Loads

Not Applicable for this project.

Standard #6: Critical Areas

An IWPA Zone has been established on-site in relation to off-site wells and includes a majority of the development. The proposed stormwater management system has been designed to provide at least eighty percent (80%) removal of Total Suspended Solids (TSS) through the use of several Best Management Practices (BMPs), including water quality inlets, water quality units and subsurface infiltration systems. The water quality inlets and water quality units will provide a minimum of 44% TSS removal prior to all infiltration basins. The stormwater systems are designed to meet a water quality volume equal to 1 inch of all impervious area. Refer to **Appendix F** for TSS removal calculations.

Standard #7: Redevelopment

Not Applicable for this project.

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

The proposed project will provide construction period erosion and sedimentation controls as indicated within the site plan set provided for this project. This includes a proposed construction exit, protection for stormwater inlets, protection around temporary material stock piles and various other techniques as outlined on the erosion and sediment control sheets. Additionally, the project is required to file a Notice of Intent with the US EPA and implement a Stormwater Pollution Prevention Plan (SWPPP) during the construction period. The SWPPP will be prepared prior to the start of construction and will be implemented by the site contractor under the guidance and responsibility of the project's proponent. Refer to **Appendix H**.

Standard #9: Operation and Maintenance Plan (O&M Plan)

An Operation and Maintenance (O&M) Plan for this site has been prepared and is included in **Appendix G** of this report. The O&M Plan outlines procedures and time tables for the long term

operation and maintenance of the proposed site stormwater management system, including initial inspections upon completion of construction, and periodic monitoring of the system components, in accordance with established practices and the manufacturer's recommendations. The O&M Plan includes a list of responsible parties and an estimated budget for inspections and maintenance.

Standard #10: Prohibition of Illicit Discharges

The proposed stormwater system will only convey allowable non-stormwater discharges (firefighting waters, irrigation, air conditioning condensates, etc.) and will not contain any illicit discharges from prohibited sources. An Illicit Discharge Statement is included in **Appendix G** of this report.

VI. SUMMARY

In summary, the proposed stormwater management system illustrated on the drawings prepared by Bohler results in a reduction in peak rates of runoff and volume from the subject site when compared to pre-development conditions for the 2-, 10-, 25- and 100-year storm frequencies. In addition, the proposed best management practices will result in an effective removal of total suspended solids from the post-development runoff. The pre-development versus post-development stormwater discharge comparisons are contained in **Table 6.1** below:

Table 6.1: Design Point Peak Runoff Rate Summary

Point of Analysis	2-Year Storm			10-Year Storm			25-Year Storm			100-Year Storm		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP1	11.60	3.43	**-8.17**	24.46	8.82	**-15.64**	33.06	11.55	**-21.51**	46.72	15.87	**-30.85**
DP2	1.35	0.02	**-1.33**	2.12	0.25	**-1.87**	2.59	0.40	**-2.19**	3.33	0.66	**-2.67**

**Flows are represented in cubic feet per second (cfs)*

As outlined in the tables above, the proposed stormwater management system as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25- and 100-year storm events. Additionally, the project meets or exceeds the MADEP Stormwater Management Standards as described further herein.

The proposed project will reduce the amount of flow going to the municipal drainage system in Everett Street, improve water quality and increase infiltration on-site. The introduction of BMPs to the Site will be a large improvement from the existing conditions.

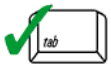
APPENDIX A: MASSACHUSETTS STORMWATER MANAGEMENT CHECKLIST

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

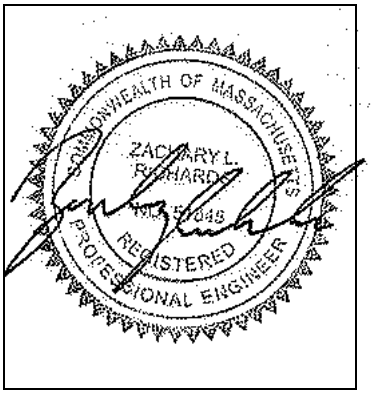
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date

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): Water Quality Structures, subsurface infiltration

Standard 1: No New Untreated Discharges

☐ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

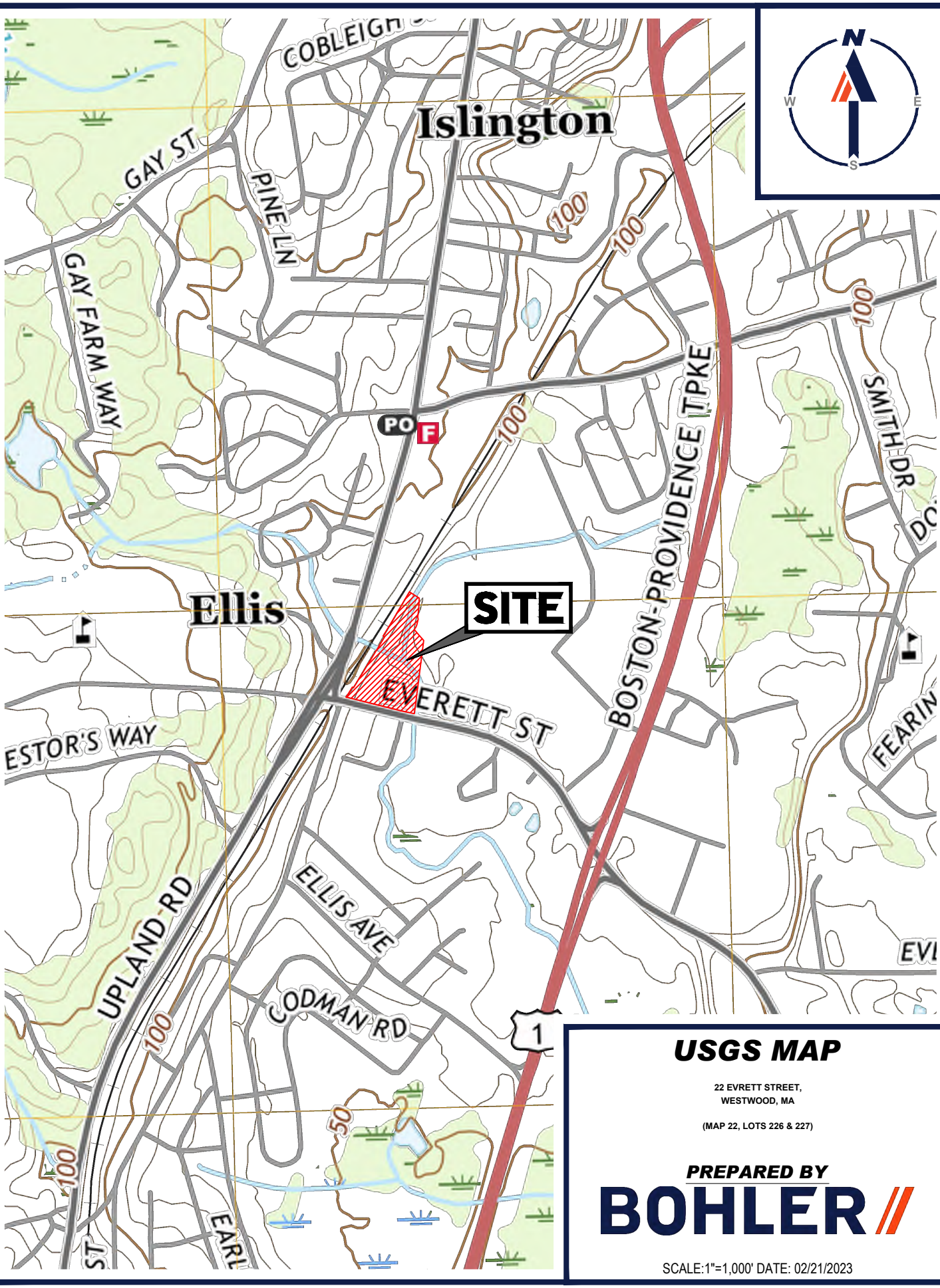
☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

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

APPENDIX B: PROJECT LOCATION MAPS

- *USGS MAP*
- *FEMA FIRMETTE*



USGS MAP

22 EVRETT STREET,
WESTWOOD, MA

(MAP 22, LOTS 226 & 227)

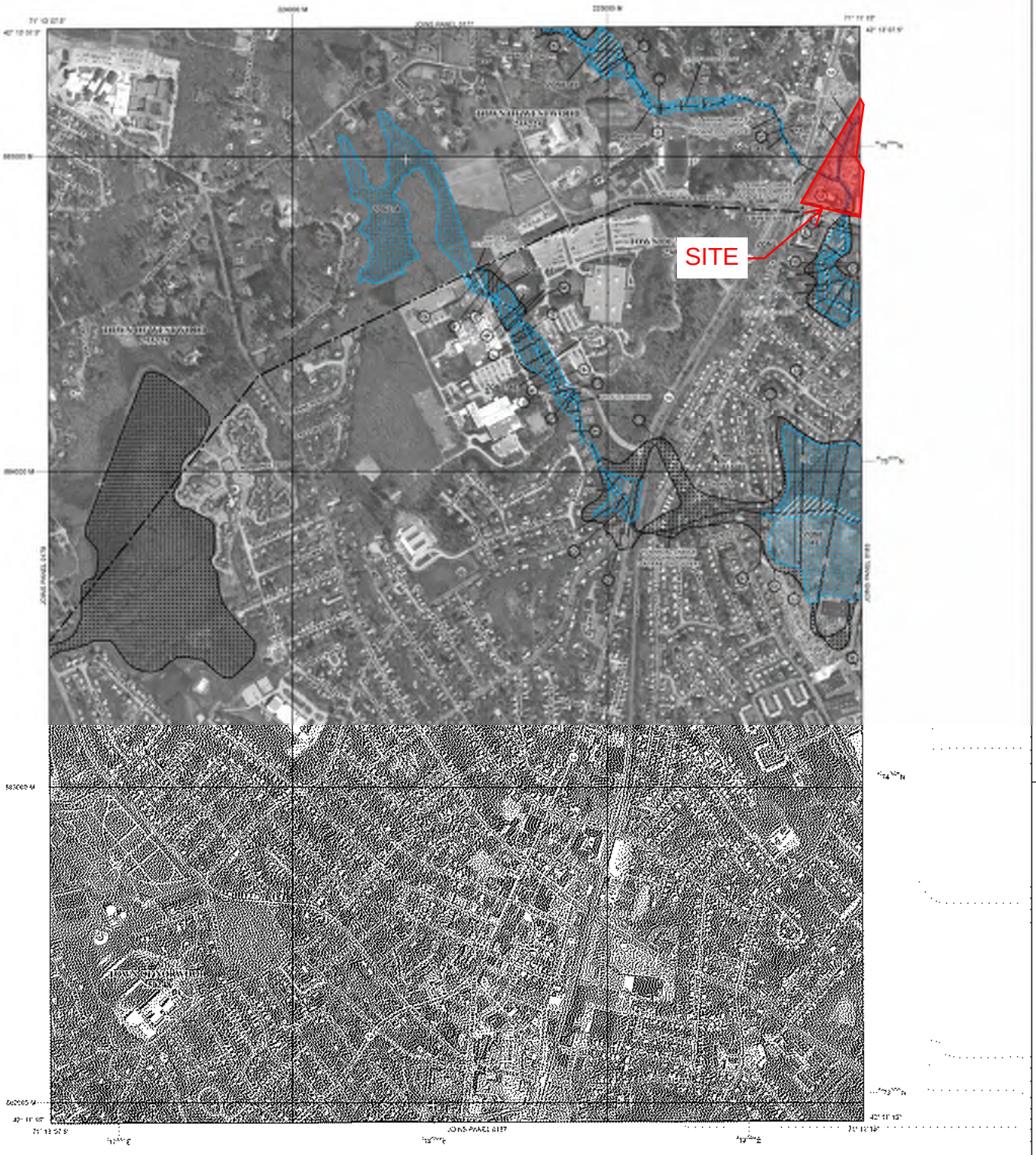
PREPARED BY

BOHLER

SCALE:1"=1,000' DATE: 02/21/2023

P:\21\M211078\CAD\Drawings\Exhibits\Aerial Exhibit\M211078-AERL-0a.dwg

NOTES TO USERS



LEGEND

MAP SCALE 1" = 500'

PANEL 0129E

FIRM

FLOOD INSURANCE RATE M

NORFOLK COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

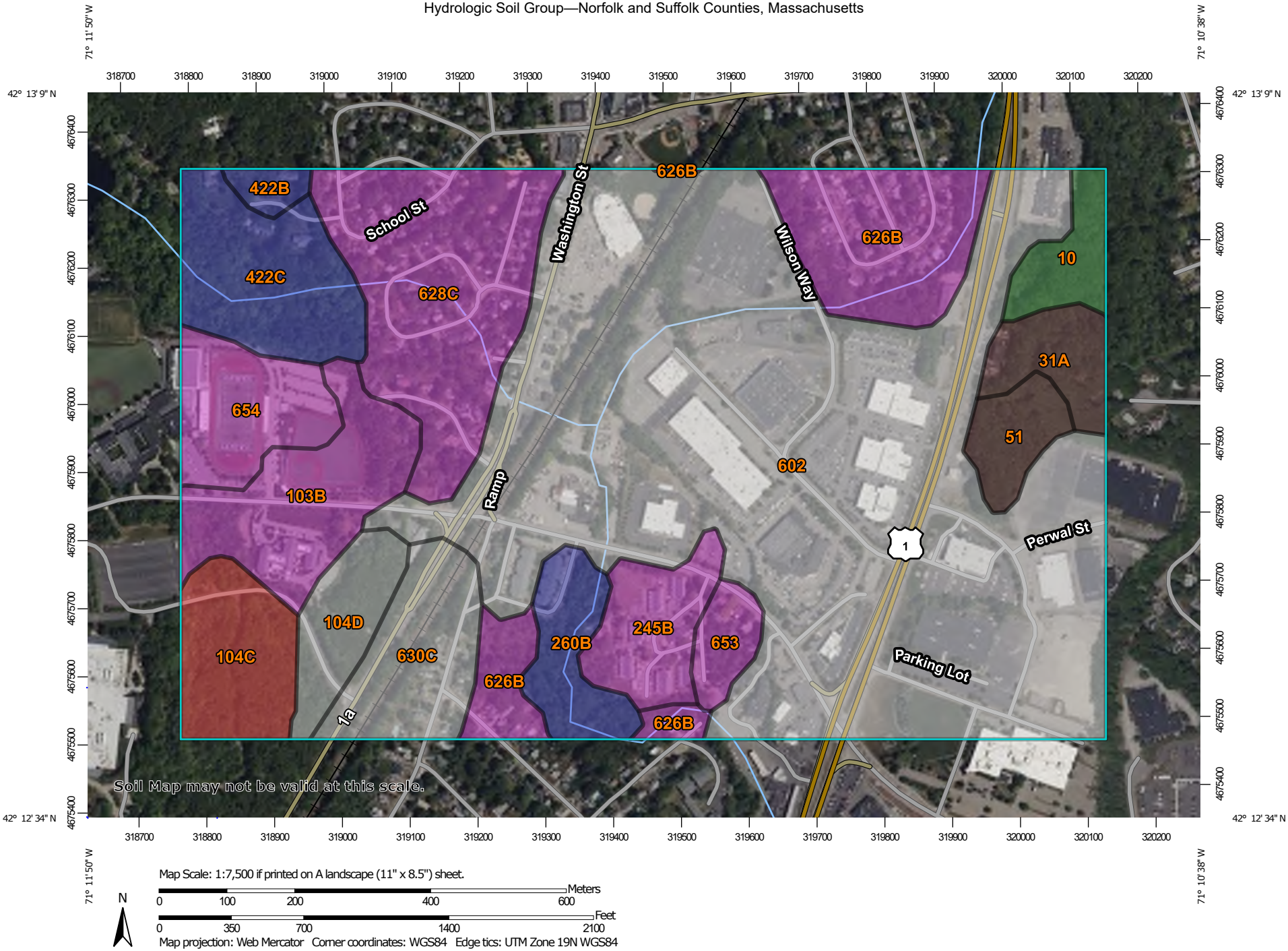
PANEL 129 OF 430

EFFECTIVE JULY 17

Federal Emergency Management

APPENDIX C: SOIL AND WETLAND INFORMATION

- *NCRS CUSTOM SOIL RESOURCE REPORT*
- *SOIL LOGS AND TEST PIT MAP*


71° 11' 50" W
71° 10' 38" W
42° 13' 9" N
42° 12' 34" N
318700
318800
318900
319000
319100
319200
319300
319400
319500
319600
319700
319800
319900
320000
320100
320200
4676400
4676300
4676200
4676100
4676000
4675900
4675800
4675700
4675600
4675500
4675400
422B
422C
School St
628C
Washington St
626B
Wilson Way
626B
10
31A
51
654
602
103B
Ramp
1
Perwal St
104D
104C
630C
260B
245B
653
626B
626B
Parking Lot
1a
Soil Map may not be valid at this scale.
Map Scale: 1:7,500 if printed on A landscape (11" x 8.5") sheet.
N
0 100 200 400 600 Meters
0 350 700 1400 2100 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 18, Sep 9, 2022

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
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	A/D	4.8	1.7%
31A	Walpole sandy loam, 0 to 3 percent slopes	B/D	5.6	2.0%
51	Swansea muck, 0 to 1 percent slopes	B/D	4.7	1.7%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	14.9	5.2%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	10.1	3.6%
104D	Hollis-Rock outcrop-Charlton complex, 15 to 35 percent slopes		6.9	2.4%
245B	Hinckley loamy sand, 3 to 8 percent slopes	A	8.2	2.9%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	7.1	2.5%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	1.7	0.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	14.0	5.0%
602	Urban land, 0 to 15 percent slopes		134.8	47.5%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	20.1	7.1%
628C	Canton-Urban land complex, 3 to 15 percent slopes	A	26.3	9.3%
630C	Charlton-Hollis-Urban land complex, 3 to 15 percent slopes		11.3	4.0%
653	Udorthents, sandy	A	3.4	1.2%
654	Udorthents, loamy	A	9.8	3.4%
Totals for Area of Interest			**283.7**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-1
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>35 ft.	Possible Wet Area:	>35 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
48"	FILL	-	-	-
84"	C	Loamy Sand	10 YR 5/3	15% C&S, 25% gravel, massive, friable
	-	-		
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	58"	
	Weeping From Pit Face:	52"	
	Estimated Seasonal High Groundwater:		52"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:			52"		
		Depth to soil mottles, description:					
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-2
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s °	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>35 ft.	Possible Wet Area:	>35 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
54"	FILL	-	-	-
84"	C	Loamy Sand	2.5Y 3/2	15% C&S, 20% gravel, massive, friable
	-	-		
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	72"	
	Weeping From Pit Face:	64"	
	Estimated Seasonal High Groundwater:		64"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:			64"		
		Depth to soil mottles, description:					
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					
Notes:							

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-3
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>35 ft.	Possible Wet Area:	>35 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
20"	FILL	-	-	-
54"	C1	Sand	10 YR 5/6	10% C&S, 15% gravel, single-grain, loose
120"	C2	Loamy Sand	2.5Y 4/3	5% C&S, 5% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	-	
	Weeping From Pit Face:	-	
	Estimated Seasonal High Groundwater:		42"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:		No GW Obs.			
		Depth to weeping from side of obs. hole:		No GW Obs.			
		Depth to soil mottles, description:		42"			
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-4
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s °	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>50 ft.	Possible Wet Area:	>50 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
16"	FILL	-	-	-
60"	C1	Sand	10 YR 5/6	10% C&S, 15% gravel, single-grain, loose
120"	C2	Loamy Sand	2.5Y 4/3	2% C&S, 5% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	-	
	Weeping From Pit Face:	-	
	Estimated Seasonal High Groundwater:		52"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:		No GW Obs.			
		Depth to weeping from side of obs. hole:		No GW Obs.			
		Depth to soil mottles, description:		52"			
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					
Notes:							

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-5
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>100 ft.	Possible Wet Area:	>100 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
24"	FILL	-	-	-
48"	C1	Sand	10 YR 5/6	15% C&S, 25% gravel, single-grain, loose
120"	C2	Loamy Sand	2.5Y 4/3	2% C&S, 5% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	-	
	Weeping From Pit Face:	-	
	Estimated Seasonal High Groundwater:		52"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:		No GW Obs.			
		Depth to weeping from side of obs. hole:		No GW Obs.			
		Depth to soil mottles, description:		52"			
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-6
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s °	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>35 ft.	Possible Wet Area:	>35 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
32"	FILL	-	-	-
116"	C1	Loamy Sand	10 YR 5/4	0% C&S, 2% gravel, massive, friable
132"	C2	Sandy Loam	5Y 5/1	0% C&S, 0% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	126"	
	Weeping From Pit Face:	84"	
	Estimated Seasonal High Groundwater:		60"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			60"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					
Notes:							

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-7
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>35 ft.	Possible Wet Area:	>35 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
48"	FILL	-	-	-
100"	C1	Loamy Sand	10 YR 5/4	0% C&S, 2% gravel, massive, friable
120"	C2	Sandy Loam	5Y 5/1	0% C&S, 0% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	116"	
	Weeping From Pit Face:	108"	
	Estimated Seasonal High Groundwater:		52"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			52"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-8
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s °	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>35 ft.	Possible Wet Area:	>35 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
52"	FILL	-	-	-
80"	C1	Sand	10 YR 5/4	10% C&S, 15% gravel, single-grain, loose
132"	C2	Sandy Loam	10YR 5/2	0% C&S, 0% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	128"	
	Weeping From Pit Face:	62"	
	Estimated Seasonal High Groundwater:		48"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			48"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					
Notes:							

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-9
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>100 ft.	Possible Wet Area:	>100 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
52"	FILL	-	-	-
84"	C1	Sand	10 YR 5/4	5% C&S, 5% gravel, single-grain, loose
120"	C2	Sandy Loam	10YR 5/2	0% C&S, 0% gravel, massive, friable
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	116"	
	Weeping From Pit Face:	60"	
	Estimated Seasonal High Groundwater:		48"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			48"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-10
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s °	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>200 ft.	Possible Wet Area:	>200 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
52"	FILL	-	-	-
132"	C	Sand	10 YR 4/4	2% C&S, 5% gravel, single-grain, loose
	-	-		
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	108"	
	Weeping From Pit Face:	64"	
	Estimated Seasonal High Groundwater:		60"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			60"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					
Notes:							

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-11
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>200 ft.	Possible Wet Area:	>200 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
48"	FILL	-	-	-
120"	C	Loamy Sand	10 YR 5/4	5% C&S, 5% gravel, massive, friable
	-	-		
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	116"	
	Weeping From Pit Face:	68"	
	Estimated Seasonal High Groundwater:		52"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			52"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-12
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s °	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:	Moraines, outwash plains	
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>200 ft.	Possible Wet Area:	>200 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
80"	FILL	-	-	-
120"	C	Loamy Sand	10 YR 5/4	5% C&S, 5% gravel, massive, friable
	-	-		
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:	116"	
	Weeping From Pit Face:	72"	
	Estimated Seasonal High Groundwater:		60"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:					
		Depth to weeping from side of obs. hole:					
		Depth to soil mottles, description:			60"		
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	

Site Location or lot #	22 Everett Street, Westwood, MA				DEEP HOLE # TP-13
Applicant/owner:	Giorgio Petruzziello - Supreme Companies				
DATE:	1/19/2023	WEATHER:	Cloudy	TEMP: 40s º	
LOCATION: (Refer to sketch attached)					
PERFORMED BY:	Molly Obendorf (SE# 14018)				
WITNESSED BY:	N/A (for drainage only)				
Land Use:	Commercial/Parking lot		Landform:		
Vegetation:	Pavement & Gravel		Slope:	~2%	
Stone Walls:	☐ Y ☒ N		Surface Stones:	☐ Y ☒ N	

Distance From:			
Open Water Bodies:	>50 ft.	Possible Wet Area:	>50 ft.
Drinking Water Well:	- ft.	Drainageway:	ft.
Property Line:	>10 ft.	Other:	(drainage only)

DEEP OBSERVATION HOLE LOG

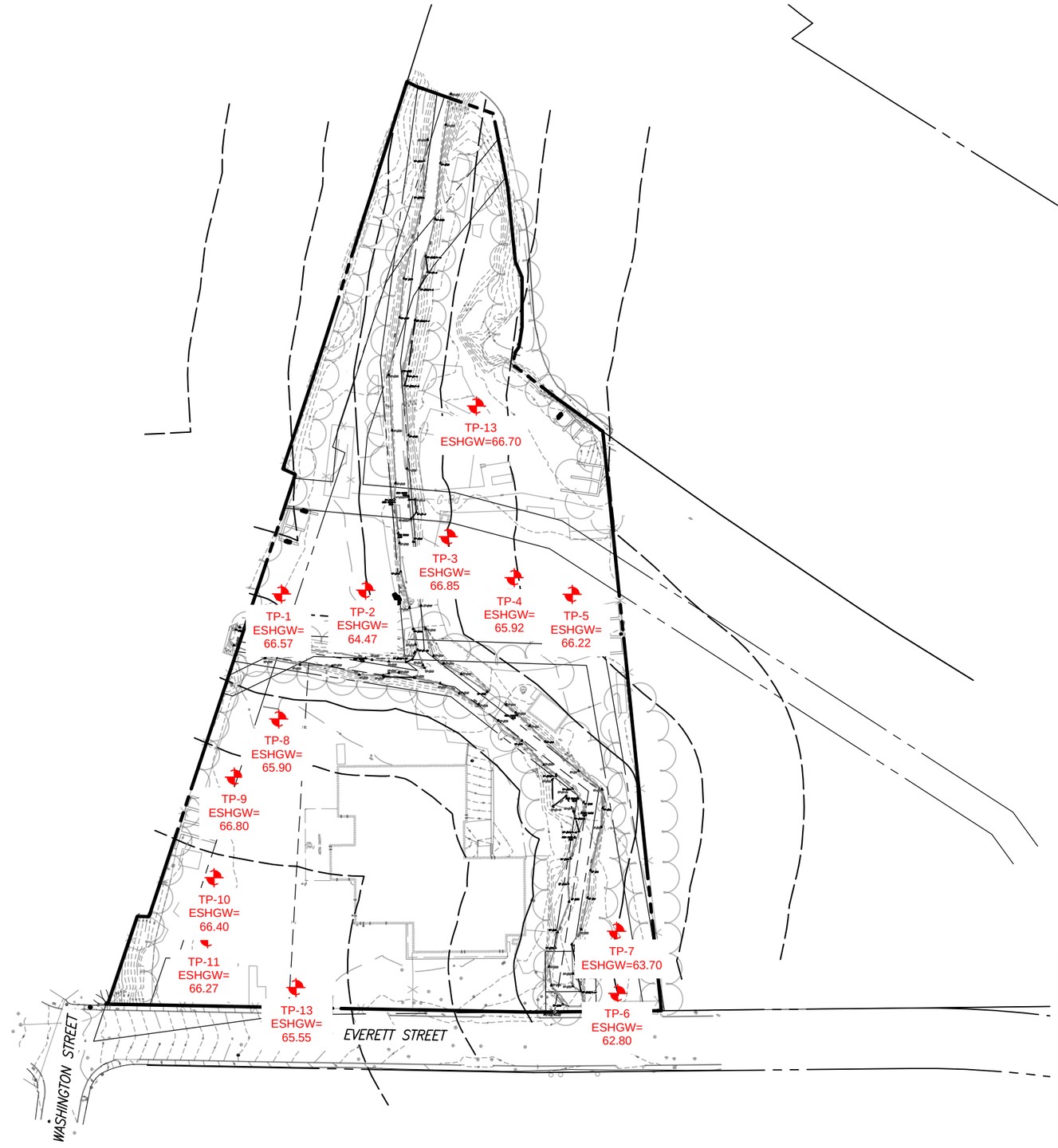
Depth	Soil Horizon	Soil Texture	Soil Color	Other: Structures; Stones; Boulders; Consistency; % gravel
12"	FILL	-	-	-
120"	C	Loamy Sand	10 YR 5/2	0% C&S, 0% gravel, massive, friable
	-	-		
	-	-		

Parent Material (geologic):	Glacial Outwash	Depth to Bedrock:	-
Depth to Groundwater:	Standing Water in Hole:		
	Weeping From Pit Face:		
	Estimated Seasonal High Groundwater:		48"

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method used:		Depth observed standing in obs. hole:		No GW Obs.			
		Depth to weeping from side of obs. hole:		No GW Obs.			
		Depth to soil mottles, description:		48"			
		Groundwater adjustment:					
Index Well #:		Reading Date:		Index Well Level:		Adj. Factor:	
Adj. ground water level:		-					

Notes:	



ESHGW=ESTIMATED SEASONAL HIGH GROUNDWATER

TEST PIT MAP

22 EVERETT ST
WESTWOOD, MA

PREPARED BY

BOHLER

SCALE:1"=120' DATE: 03/07/2023

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APPENDIX D: EXISTING CONDITIONS HYDROLOGIC ANALYSIS

- *EXISTING CONDITIONS DRAINAGE MAP*
- *EXISTING CONDITIONS HYDROCAD COMPUTATIONS*

LEGEND

- DP# — DESIGN POINT
- EX-# — EXISTING SUBCATCHMENT
- XX# — BASIN OR MODELED DRAINAGE STRUCTURE
- OVERALL ANALYSIS BOUNDARY
- SUBCATCHMENT BOUNDARY
- NRCS SOIL BOUNDARY
- TIME OF CONCENTRATION
- CONCRETE OR PAVEMENT
- ROOF
- SURFACE WATER (IMPERVIOUS)
- GRAVEL AREAS
- WOODS OR UNDEVELOPED AREA
- COMPACTED DIRT/ GRASS COVER <50%

EXISTING CONDITIONS DRAINAGE AREA MAP

22 EVERETT ST
WESTWOOD, MA 02090

PREPARED BY

BOHLER

SCALE:1"=120' DATE: 1/24/2023

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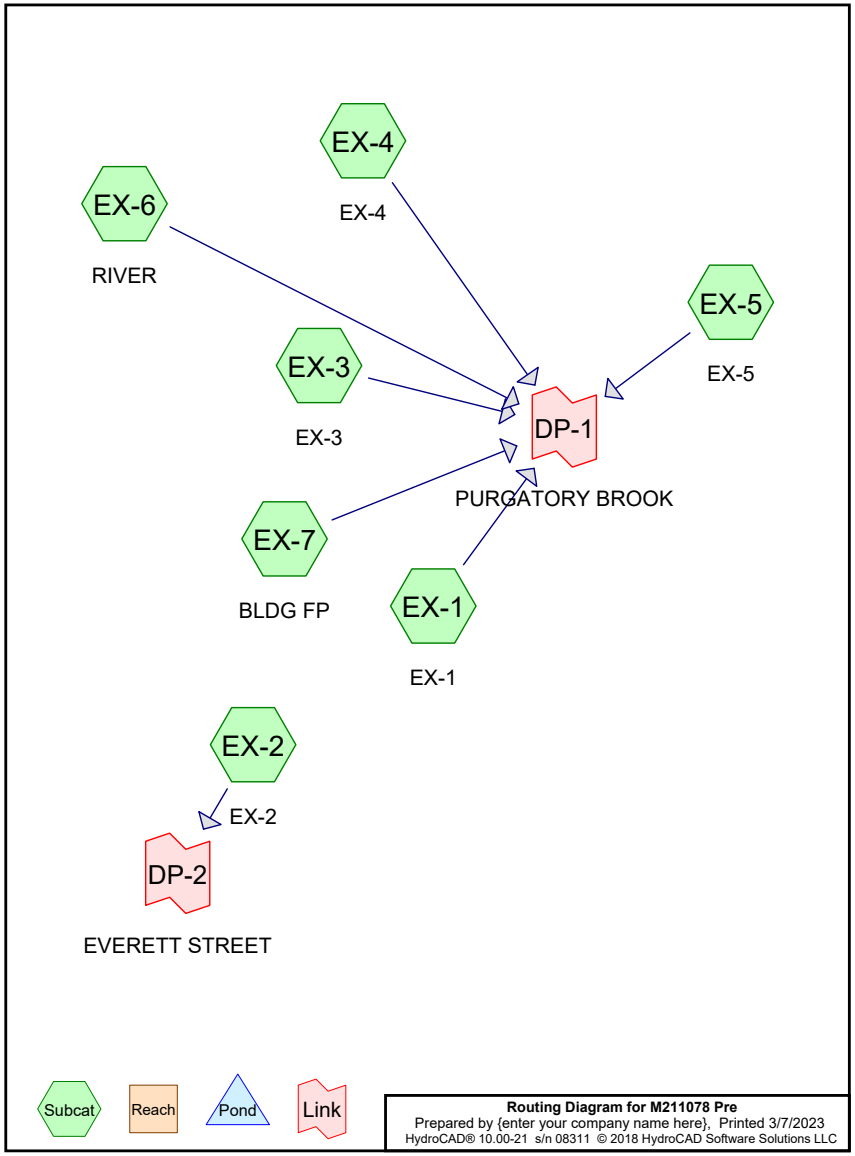


Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.020	68	<50% Grass cover, Poor, HSG A (EX-1)
0.065	68	<50% Grass cover, Poor, HSG A, compacted dirt along east side of BLDG (EX-3)
0.607	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation (EX-4, EX-5)
0.084	96	Gravel surface, HSG A, Gravel Along MBTA tracks (EX-1)
0.292	96	Gravel surface, HSG A, Gravel along MBTA and River (EX-3)
0.366	96	Gravel surface, HSG A, MBTA tracks and gas regulator area (EX-4)
0.891	96	Gravel surface, HSG A, stockpiles and eastern gravel drive (EX-5)
0.753	98	Paved parking, HSG A, Back parking area/loading dock (EX-3)
0.409	98	Paved parking, HSG A, Front Parking Lot (EX-2)
0.558	98	Paved parking, HSG A, Front parking lot area (EX-1)
0.379	98	Paved parking, HSG A, crossing area (EX-4)
0.708	98	Paved parking, HSG A, crossing/shed area (EX-5)
0.603	98	Roofs, HSG A, Existing BLDG (EX-7)
0.020	98	Roofs, HSG A, shed (EX-5)
0.443	98	Water Surface, HSG A, River (EX-6)
1.361	32	Woods/grass comb., Good, HSG A (EX-4, EX-5)
0.424	32	Woods/grass comb., Good, HSG A, Tree Line (EX-3)
0.221	32	Woods/grass comb., Good, HSG A, Tree line along MBTA (EX-1)
8.204	**79**	**TOTAL AREA**

Summary for Subcatchment EX-1: EX-1

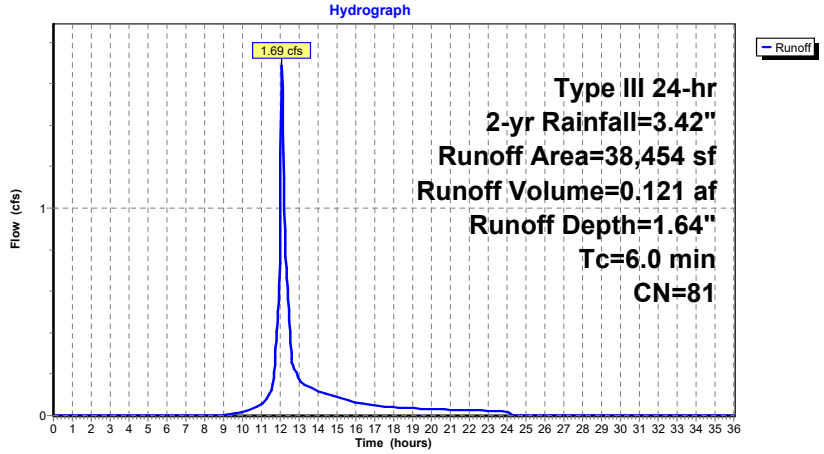
Runoff = 1.69 cfs @ 12.09 hrs, Volume= 0.121 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	9,646	32	Woods/grass comb., Good, HSG A, Tree line along MBTA
*	24,304	98	Paved parking, HSG A, Front parking lot area
*	3,640	96	Gravel surface, HSG A, Gravel Along MBTA tracks
	864	68	<50% Grass cover, Poor, HSG A
	38,454	81	Weighted Average
	14,150		36.80% Pervious Area
	24,304		63.20% Impervious Area

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

Subcatchment EX-1: EX-1



Summary for Subcatchment EX-2: EX-2

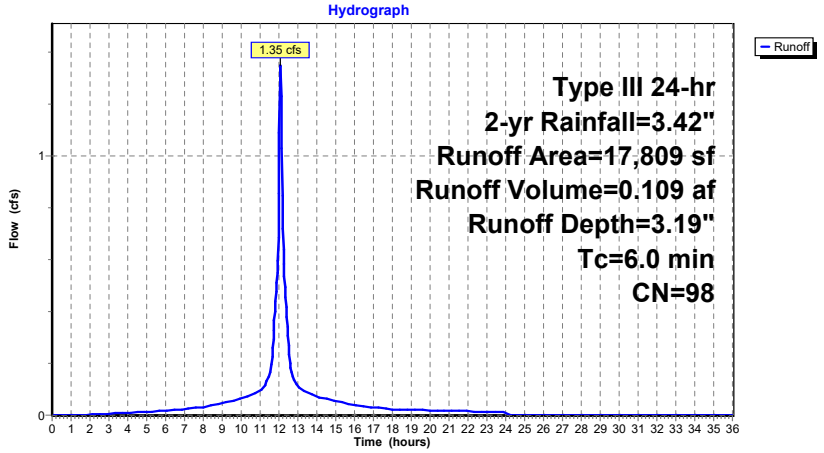
Runoff = 1.35 cfs @ 12.08 hrs, Volume= 0.109 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	17,809	98	Paved parking, HSG A, Front Parking Lot
	17,809		100.00% Impervious Area

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

Subcatchment EX-2: EX-2



Summary for Subcatchment EX-3: EX-3

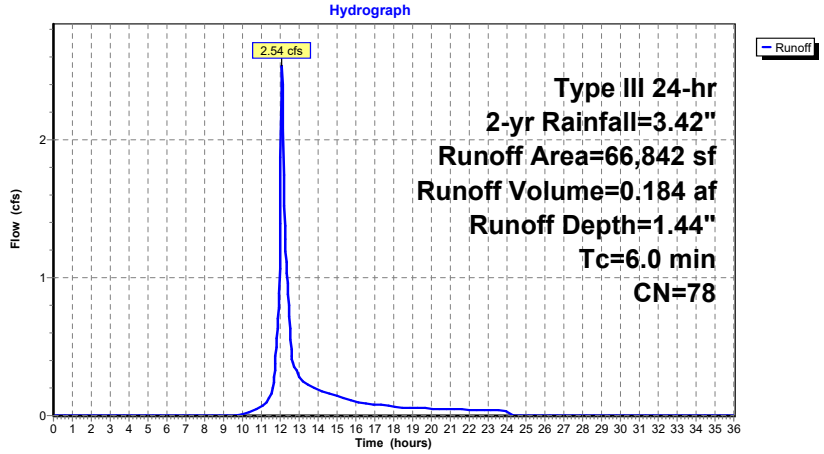
Runoff = 2.54 cfs @ 12.09 hrs, Volume= 0.184 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	12,739	96	Gravel surface, HSG A, Gravel along MBTA and River
*	18,465	32	Woods/grass comb., Good, HSG A, Tree Line
*	32,817	98	Paved parking, HSG A, Back parking area/loading dock
*	2,821	68	<50% Grass cover, Poor, HSG A, compacted dirt along east side of BLDG
	66,842	78	Weighted Average
	34,025		50.90% Pervious Area
	32,817		49.10% Impervious Area

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

Subcatchment EX-3: EX-3



Summary for Subcatchment EX-4: EX-4

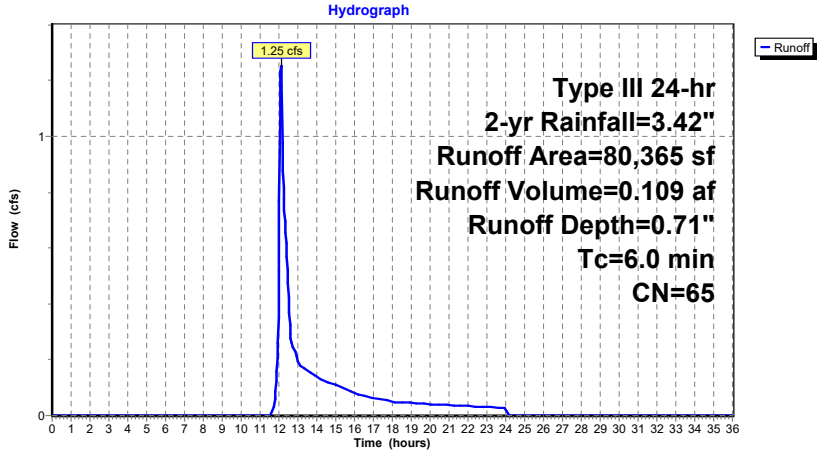
Runoff = 1.25 cfs @ 12.11 hrs, Volume= 0.109 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
	33,480	32	Woods/grass comb., Good, HSG A
*	15,959	96	Gravel surface, HSG A, MBTA tracks and gas regulator area
*	16,506	98	Paved parking, HSG A, crossing area
*	14,420	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	80,365	65	Weighted Average
	63,859		79.46% Pervious Area
	16,506		20.54% Impervious Area

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

Subcatchment EX-4: EX-4



Summary for Subcatchment EX-5: EX-5

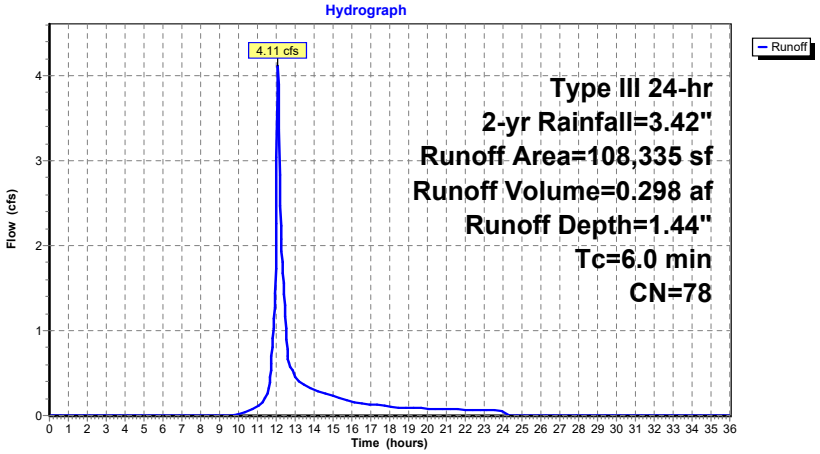
Runoff = 4.11 cfs @ 12.09 hrs, Volume= 0.298 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	38,812	96	Gravel surface, HSG A, stockpiles and eastern gravel drive
	25,787	32	Woods/grass comb., Good, HSG A
*	30,834	98	Paved parking, HSG A, crossing/shed area
*	885	98	Roofs, HSG A, shed
*	12,017	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	108,335	78	Weighted Average
	76,616		70.72% Pervious Area
	31,719		29.28% Impervious Area

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

Subcatchment EX-5: EX-5



Summary for Subcatchment EX-6: RIVER

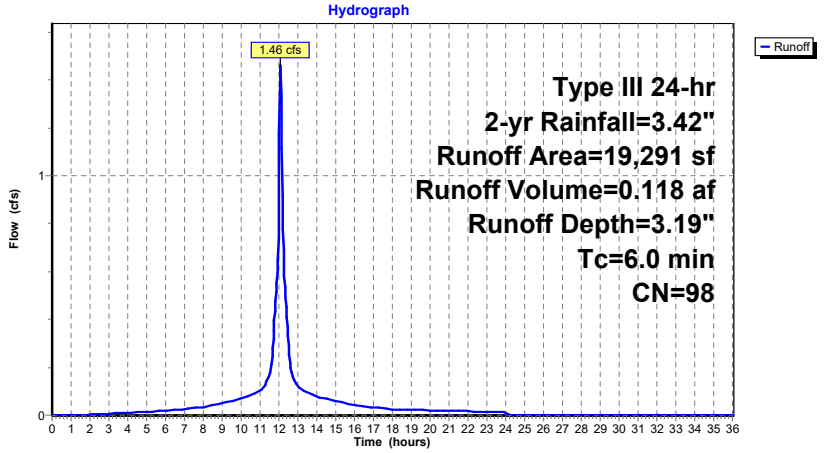
Runoff = 1.46 cfs @ 12.08 hrs, Volume= 0.118 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment EX-6: RIVER



Summary for Subcatchment EX-7: BLDG FP

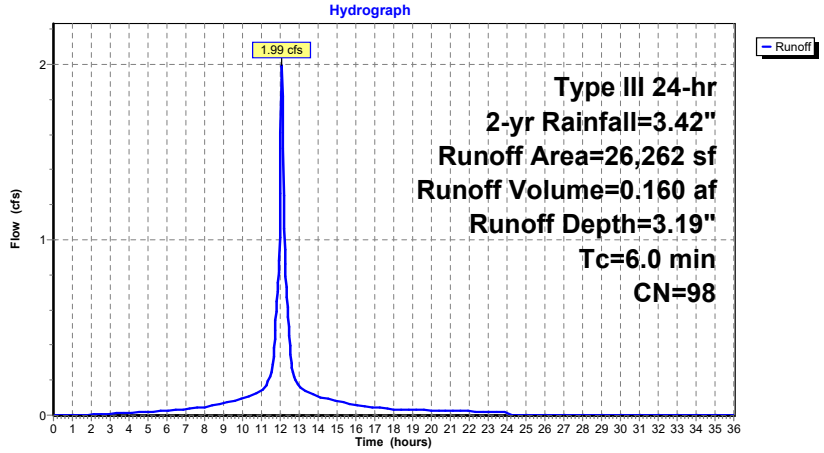
Runoff = 1.99 cfs @ 12.08 hrs, Volume= 0.160 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	26,262	98	Roofs, HSG A, Existing BLDG
	26,262		100.00% Impervious Area

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

Subcatchment EX-7: BLDG FP

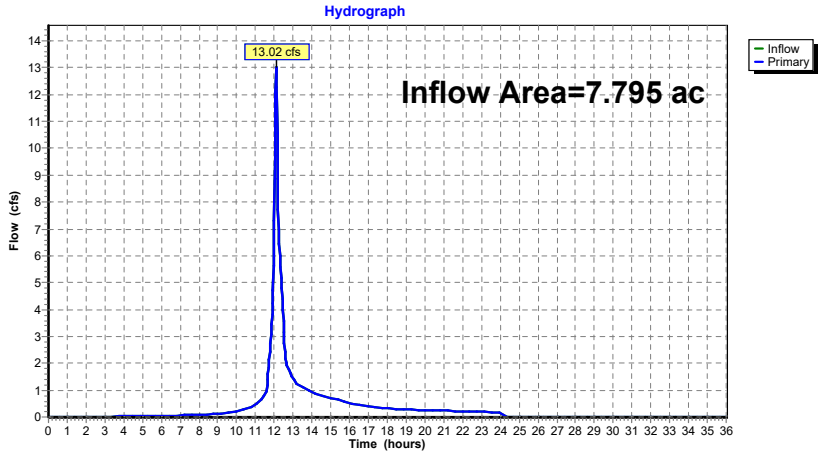


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 7.795 ac, 44.44% Impervious, Inflow Depth = 1.52" for 2-yr event
Inflow = 13.02 cfs @ 12.09 hrs, Volume= 0.989 af
Primary = 13.02 cfs @ 12.09 hrs, Volume= 0.989 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: PURGATORY BROOK

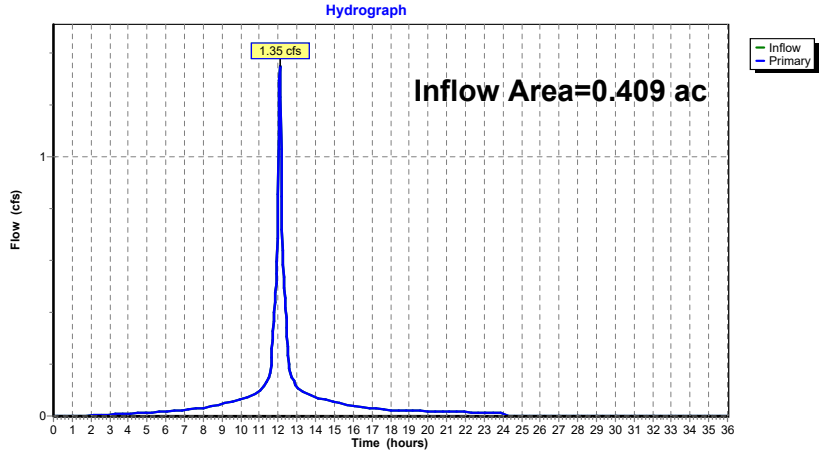


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth = 3.19" for 2-yr event
Inflow = 1.35 cfs @ 12.08 hrs, Volume= 0.109 af
Primary = 1.35 cfs @ 12.08 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: EVERETT STREET



Summary for Subcatchment EX-1: EX-1

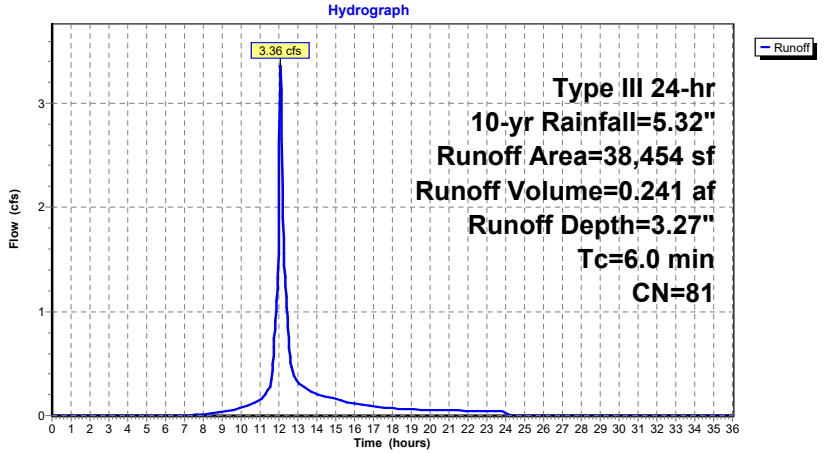
Runoff = 3.36 cfs @ 12.09 hrs, Volume= 0.241 af, Depth= 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	9,646	32	Woods/grass comb., Good, HSG A, Tree line along MBTA
*	24,304	98	Paved parking, HSG A, Front parking lot area
*	3,640	96	Gravel surface, HSG A, Gravel Along MBTA tracks
	864	68	<50% Grass cover, Poor, HSG A
	38,454	81	Weighted Average
	14,150		36.80% Pervious Area
	24,304		63.20% Impervious Area

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

Subcatchment EX-1: EX-1



Summary for Subcatchment EX-2: EX-2

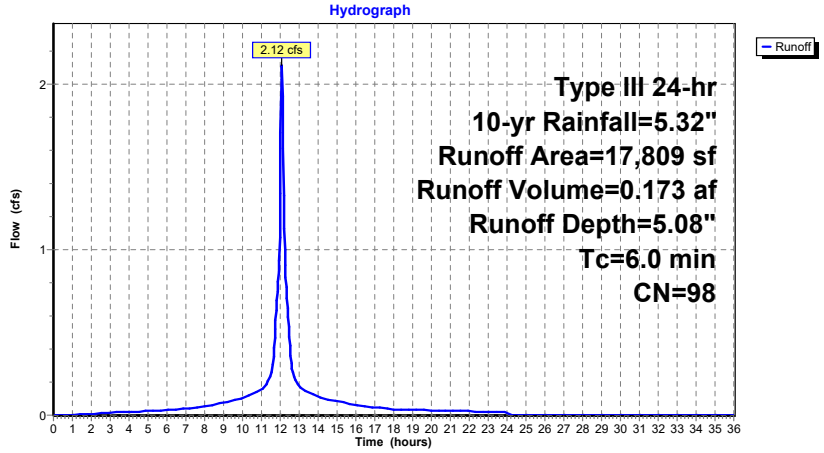
Runoff = 2.12 cfs @ 12.08 hrs, Volume= 0.173 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	17,809	98	Paved parking, HSG A, Front Parking Lot
	17,809		100.00% Impervious Area

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

Subcatchment EX-2: EX-2



Summary for Subcatchment EX-3: EX-3

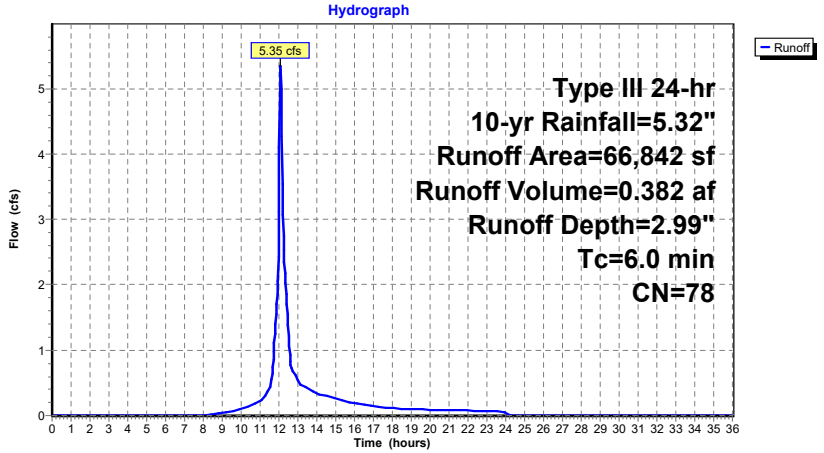
Runoff = 5.35 cfs @ 12.09 hrs, Volume= 0.382 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	12,739	96	Gravel surface, HSG A, Gravel along MBTA and River
*	18,465	32	Woods/grass comb., Good, HSG A, Tree Line
*	32,817	98	Paved parking, HSG A, Back parking area/loading dock
*	2,821	68	<50% Grass cover, Poor, HSG A, compacted dirt along east side of BLDG
	66,842	78	Weighted Average
	34,025		50.90% Pervious Area
	32,817		49.10% Impervious Area

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

Subcatchment EX-3: EX-3



Summary for Subcatchment EX-4: EX-4

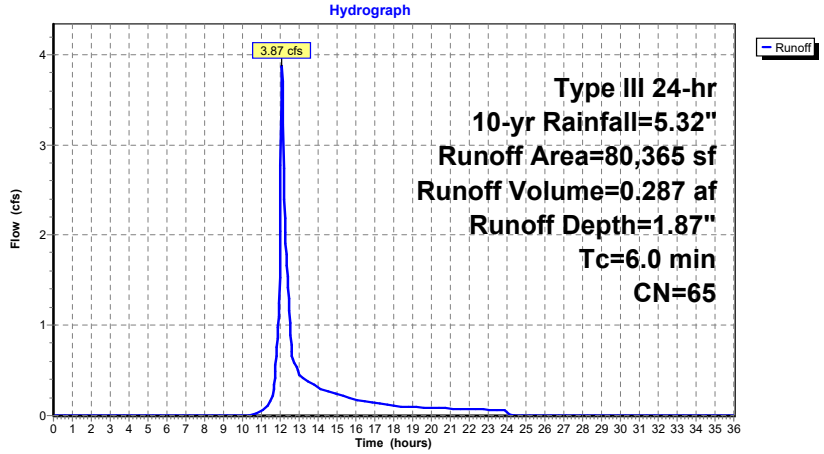
Runoff = 3.87 cfs @ 12.10 hrs, Volume= 0.287 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
	33,480	32	Woods/grass comb., Good, HSG A
*	15,959	96	Gravel surface, HSG A, MBTA tracks and gas regulator area
*	16,506	98	Paved parking, HSG A, crossing area
*	14,420	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	80,365	65	Weighted Average
	63,859		79.46% Pervious Area
	16,506		20.54% Impervious Area

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

Subcatchment EX-4: EX-4



Summary for Subcatchment EX-5: EX-5

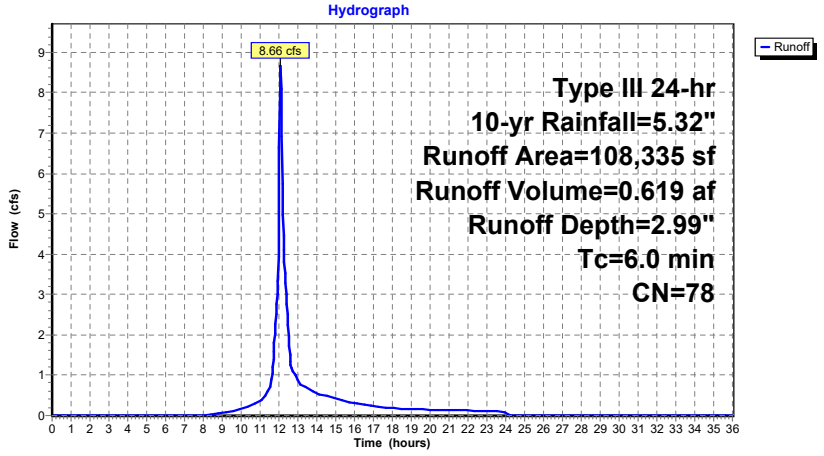
Runoff = 8.66 cfs @ 12.09 hrs, Volume= 0.619 af, Depth= 2.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	38,812	96	Gravel surface, HSG A, stockpiles and eastern gravel drive
	25,787	32	Woods/grass comb., Good, HSG A
*	30,834	98	Paved parking, HSG A, crossing/shed area
*	885	98	Roofs, HSG A, shed
*	12,017	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	108,335	78	Weighted Average
	76,616		70.72% Pervious Area
	31,719		29.28% Impervious Area

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

Subcatchment EX-5: EX-5



Summary for Subcatchment EX-6: RIVER

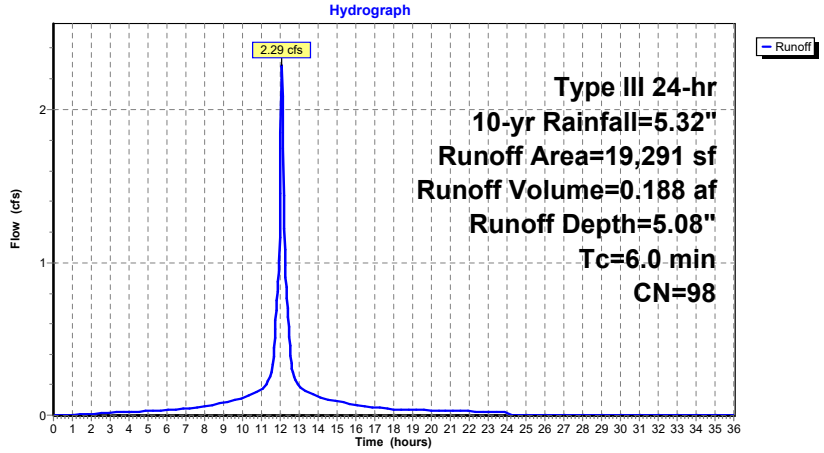
Runoff = 2.29 cfs @ 12.08 hrs, Volume= 0.188 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment EX-6: RIVER



Summary for Subcatchment EX-7: BLDG FP

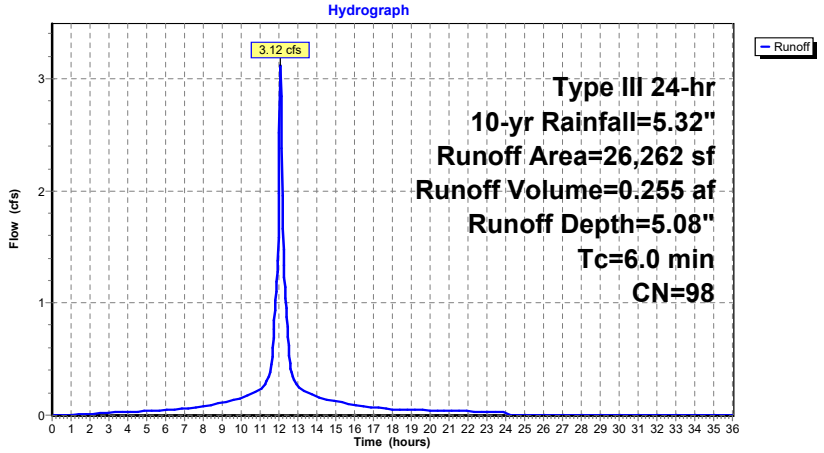
Runoff = 3.12 cfs @ 12.08 hrs, Volume= 0.255 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	26,262	98	Roofs, HSG A, Existing BLDG
	26,262		100.00% Impervious Area

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

Subcatchment EX-7: BLDG FP

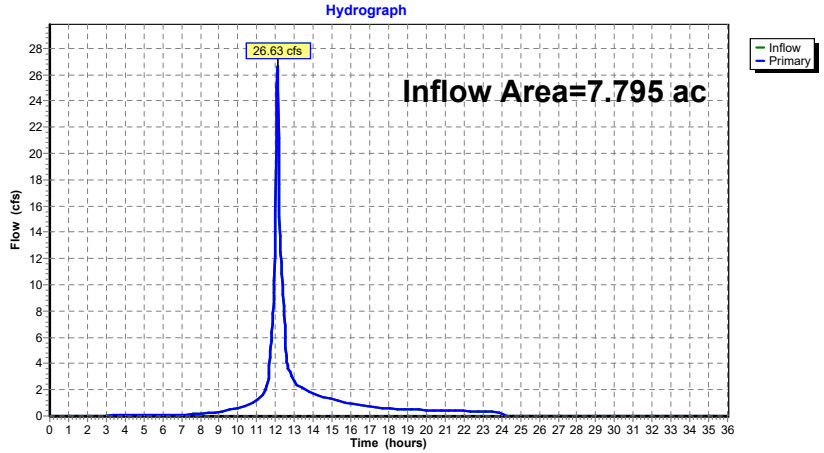


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 7.795 ac, 44.44% Impervious, Inflow Depth = 3.03" for 10-yr event
Inflow = 26.63 cfs @ 12.09 hrs, Volume= 1.971 af
Primary = 26.63 cfs @ 12.09 hrs, Volume= 1.971 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: PURGATORY BROOK

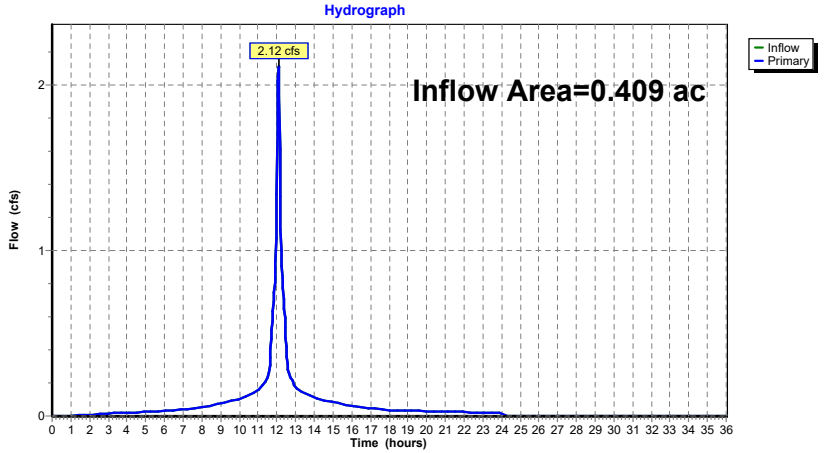


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth = 5.08" for 10-yr event
Inflow = 2.12 cfs @ 12.08 hrs, Volume= 0.173 af
Primary = 2.12 cfs @ 12.08 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: EVERETT STREET



Summary for Subcatchment EX-1: EX-1

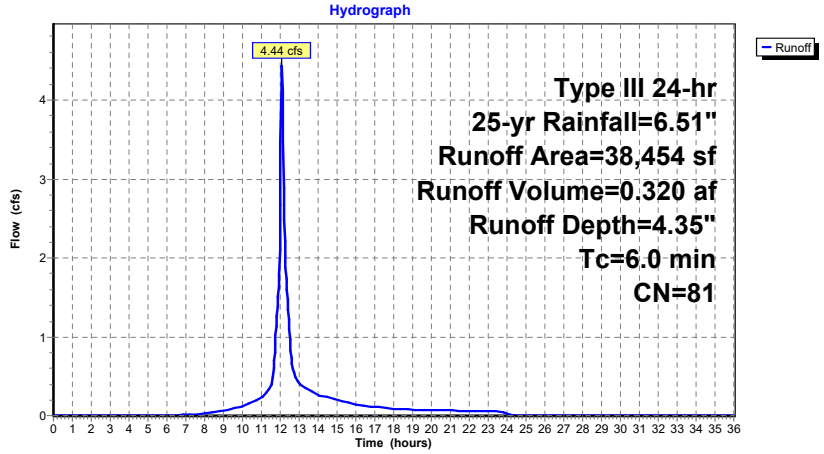
Runoff = 4.44 cfs @ 12.09 hrs, Volume= 0.320 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	9,646	32	Woods/grass comb., Good, HSG A, Tree line along MBTA
*	24,304	98	Paved parking, HSG A, Front parking lot area
*	3,640	96	Gravel surface, HSG A, Gravel Along MBTA tracks
	864	68	<50% Grass cover, Poor, HSG A
	38,454	81	Weighted Average
	14,150		36.80% Pervious Area
	24,304		63.20% Impervious Area

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

Subcatchment EX-1: EX-1



Summary for Subcatchment EX-2: EX-2

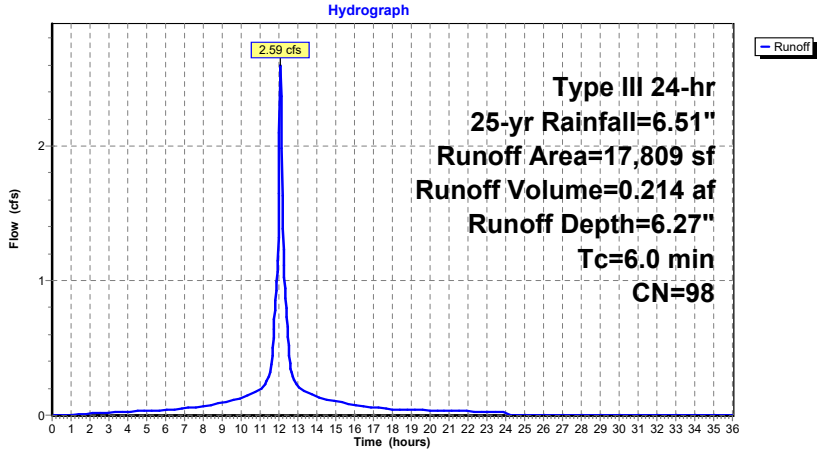
Runoff = 2.59 cfs @ 12.08 hrs, Volume= 0.214 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	17,809	98	Paved parking, HSG A, Front Parking Lot
	17,809		100.00% Impervious Area

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

Subcatchment EX-2: EX-2



Summary for Subcatchment EX-3: EX-3

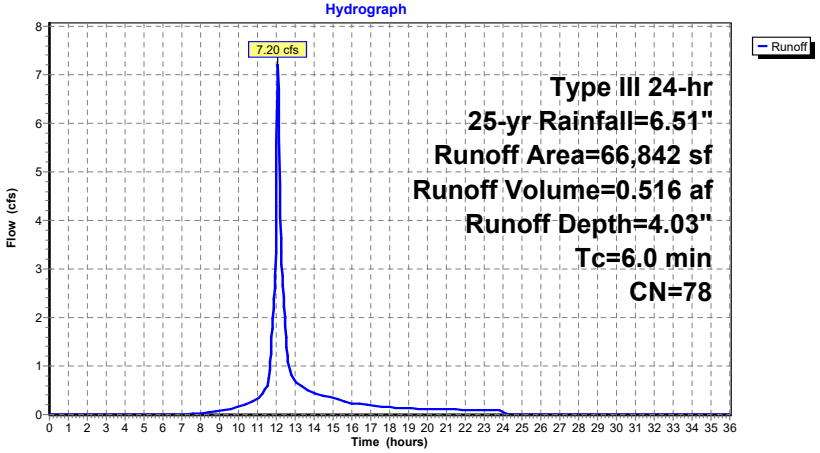
Runoff = 7.20 cfs @ 12.09 hrs, Volume= 0.516 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	12,739	96	Gravel surface, HSG A, Gravel along MBTA and River
*	18,465	32	Woods/grass comb., Good, HSG A, Tree Line
*	32,817	98	Paved parking, HSG A, Back parking area/loading dock
*	2,821	68	<50% Grass cover, Poor, HSG A, compacted dirt along east side of BLDG
	66,842	78	Weighted Average
	34,025		50.90% Pervious Area
	32,817		49.10% Impervious Area

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

Subcatchment EX-3: EX-3



Summary for Subcatchment EX-4: EX-4

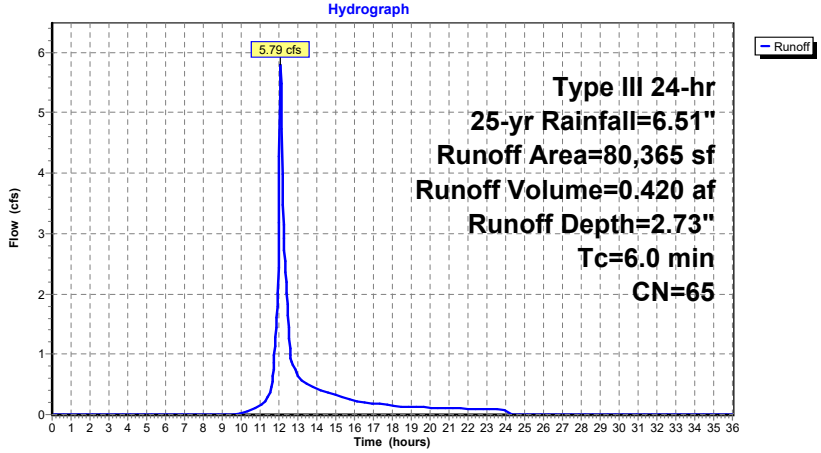
Runoff = 5.79 cfs @ 12.09 hrs, Volume= 0.420 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
	33,480	32	Woods/grass comb., Good, HSG A
*	15,959	96	Gravel surface, HSG A, MBTA tracks and gas regulator area
*	16,506	98	Paved parking, HSG A, crossing area
*	14,420	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	80,365	65	Weighted Average
	63,859		79.46% Pervious Area
	16,506		20.54% Impervious Area

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

Subcatchment EX-4: EX-4



Summary for Subcatchment EX-5: EX-5

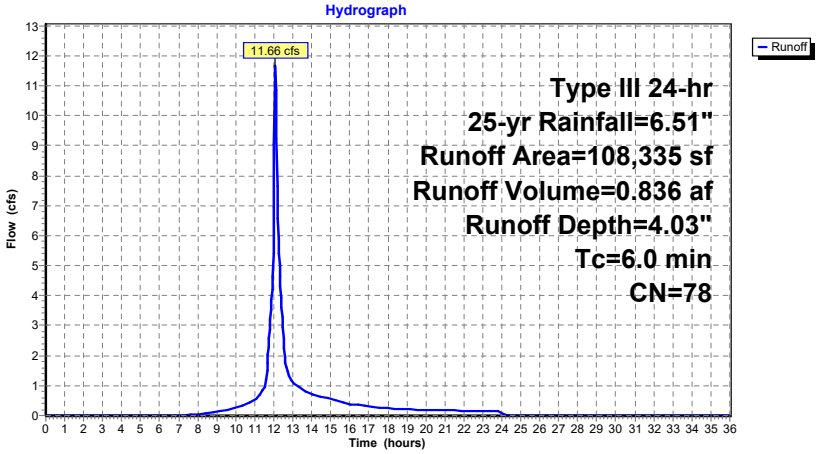
Runoff = 11.66 cfs @ 12.09 hrs, Volume= 0.836 af, Depth= 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	38,812	96	Gravel surface, HSG A, stockpiles and eastern gravel drive
	25,787	32	Woods/grass comb., Good, HSG A
*	30,834	98	Paved parking, HSG A, crossing/shed area
*	885	98	Roofs, HSG A, shed
*	12,017	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	108,335	78	Weighted Average
	76,616		70.72% Pervious Area
	31,719		29.28% Impervious Area

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

Subcatchment EX-5: EX-5



Summary for Subcatchment EX-6: RIVER

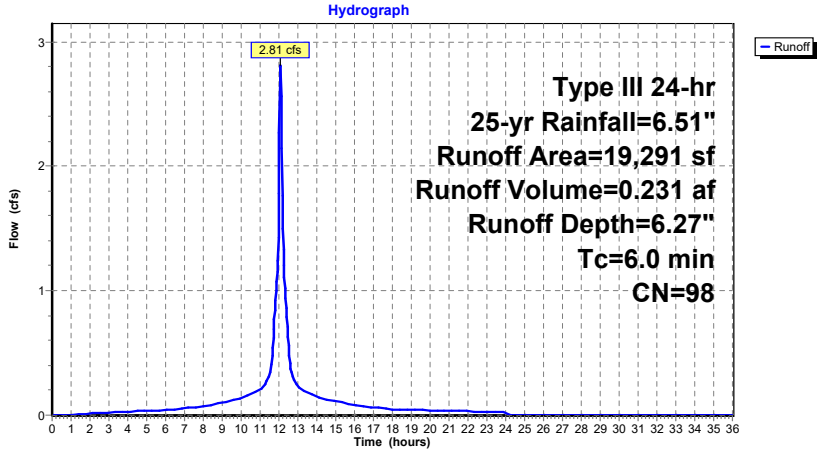
Runoff = 2.81 cfs @ 12.08 hrs, Volume= 0.231 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment EX-6: RIVER



Summary for Subcatchment EX-7: BLDG FP

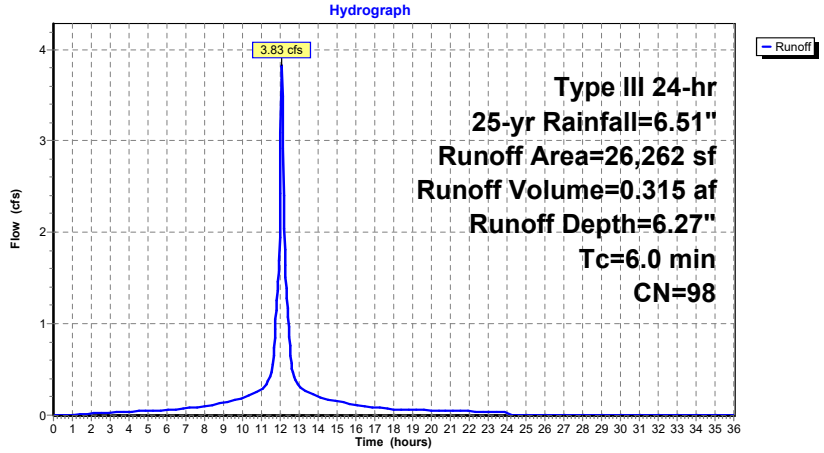
Runoff = 3.83 cfs @ 12.08 hrs, Volume= 0.315 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	26,262	98	Roofs, HSG A, Existing BLDG
	26,262		100.00% Impervious Area

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

Subcatchment EX-7: BLDG FP

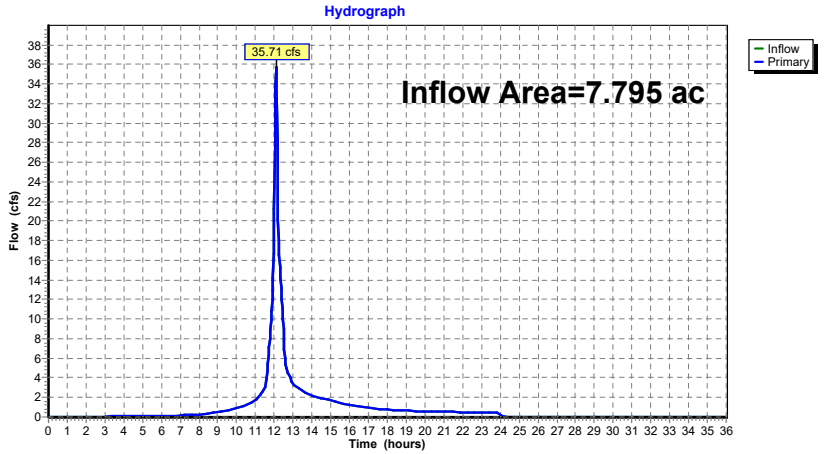


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 7.795 ac, 44.44% Impervious, Inflow Depth = 4.06" for 25-yr event
Inflow = 35.71 cfs @ 12.09 hrs, Volume= 2.638 af
Primary = 35.71 cfs @ 12.09 hrs, Volume= 2.638 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: PURGATORY BROOK

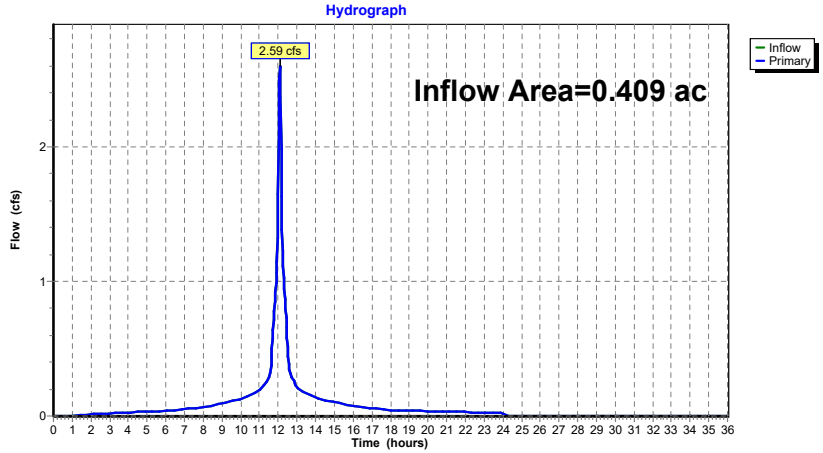


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth = 6.27" for 25-yr event
Inflow = 2.59 cfs @ 12.08 hrs, Volume= 0.214 af
Primary = 2.59 cfs @ 12.08 hrs, Volume= 0.214 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: EVERETT STREET



Summary for Subcatchment EX-1: EX-1

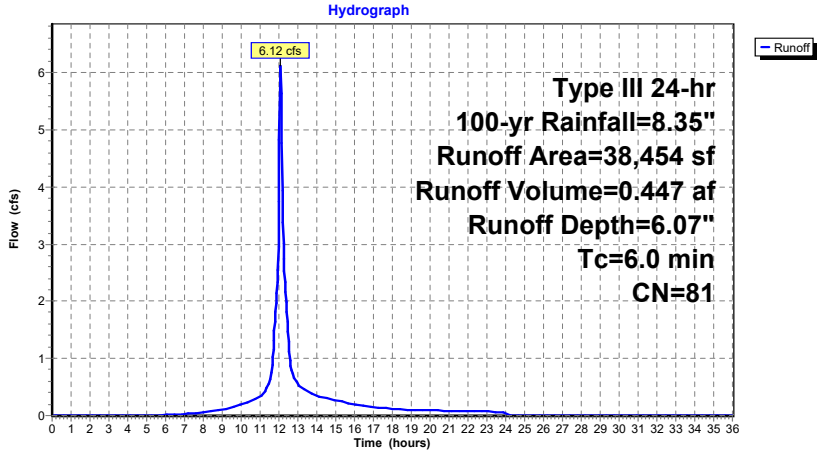
Runoff = 6.12 cfs @ 12.09 hrs, Volume= 0.447 af, Depth= 6.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	9,646	32	Woods/grass comb., Good, HSG A, Tree line along MBTA
*	24,304	98	Paved parking, HSG A, Front parking lot area
*	3,640	96	Gravel surface, HSG A, Gravel Along MBTA tracks
	864	68	<50% Grass cover, Poor, HSG A
	38,454	81	Weighted Average
	14,150		36.80% Pervious Area
	24,304		63.20% Impervious Area

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

Subcatchment EX-1: EX-1



Summary for Subcatchment EX-2: EX-2

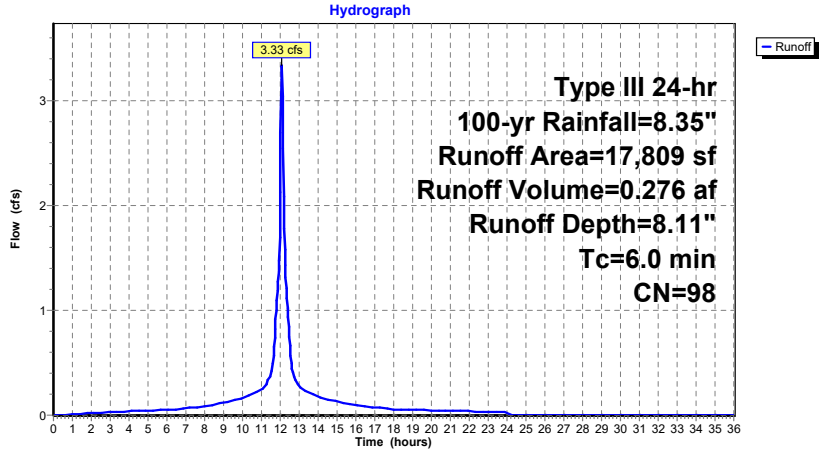
Runoff = 3.33 cfs @ 12.08 hrs, Volume= 0.276 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	17,809	98	Paved parking, HSG A, Front Parking Lot
	17,809		100.00% Impervious Area

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

Subcatchment EX-2: EX-2



Summary for Subcatchment EX-3: EX-3

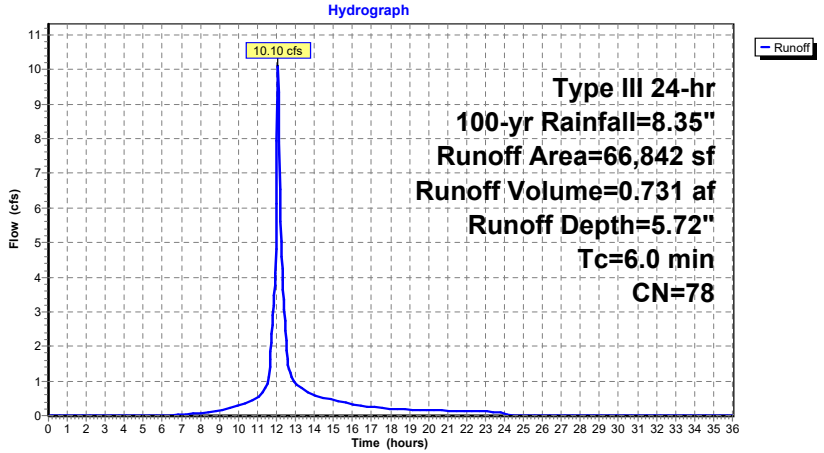
Runoff = 10.10 cfs @ 12.09 hrs, Volume= 0.731 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	12,739	96	Gravel surface, HSG A, Gravel along MBTA and River
*	18,465	32	Woods/grass comb., Good, HSG A, Tree Line
*	32,817	98	Paved parking, HSG A, Back parking area/loading dock
*	2,821	68	<50% Grass cover, Poor, HSG A, compacted dirt along east side of BLDG
	66,842	78	Weighted Average
	34,025		50.90% Pervious Area
	32,817		49.10% Impervious Area

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

Subcatchment EX-3: EX-3



Summary for Subcatchment EX-4: EX-4

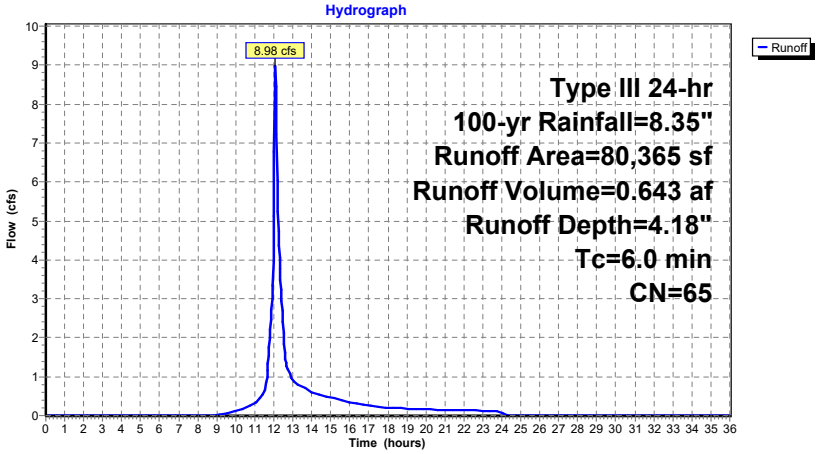
Runoff = 8.98 cfs @ 12.09 hrs, Volume= 0.643 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
	33,480	32	Woods/grass comb., Good, HSG A
*	15,959	96	Gravel surface, HSG A, MBTA tracks and gas regulator area
*	16,506	98	Paved parking, HSG A, crossing area
*	14,420	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	80,365	65	Weighted Average
	63,859		79.46% Pervious Area
	16,506		20.54% Impervious Area

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

Subcatchment EX-4: EX-4



Summary for Subcatchment EX-5: EX-5

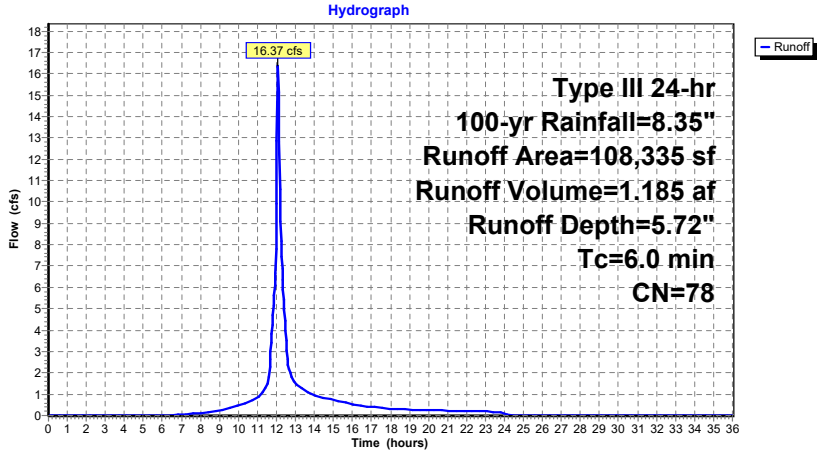
Runoff = 16.37 cfs @ 12.09 hrs, Volume= 1.185 af, Depth= 5.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	38,812	96	Gravel surface, HSG A, stockpiles and eastern gravel drive
	25,787	32	Woods/grass comb., Good, HSG A
*	30,834	98	Paved parking, HSG A, crossing/shed area
*	885	98	Roofs, HSG A, shed
*	12,017	68	<50% Grass cover, Poor, HSG A, remaining area of previous degradation
	108,335	78	Weighted Average
	76,616		70.72% Pervious Area
	31,719		29.28% Impervious Area

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

Subcatchment EX-5: EX-5



Summary for Subcatchment EX-6: RIVER

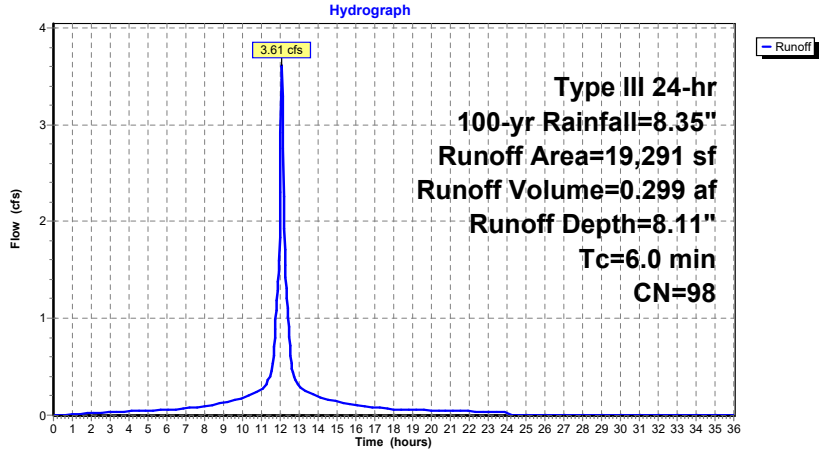
Runoff = 3.61 cfs @ 12.08 hrs, Volume= 0.299 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment EX-6: RIVER



Summary for Subcatchment EX-7: BLDG FP

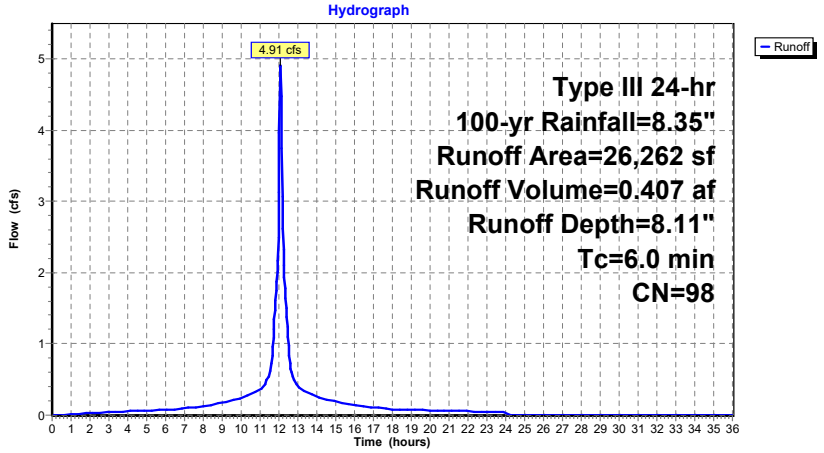
Runoff = 4.91 cfs @ 12.08 hrs, Volume= 0.407 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	26,262	98	Roofs, HSG A, Existing BLDG
	26,262		100.00% Impervious Area

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

Subcatchment EX-7: BLDG FP

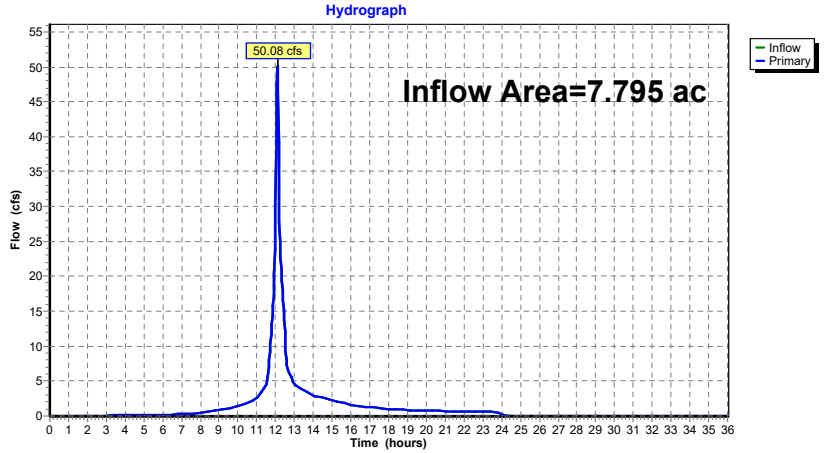


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 7.795 ac, 44.44% Impervious, Inflow Depth = 5.71" for 100-yr event
Inflow = 50.08 cfs @ 12.09 hrs, Volume= 3.711 af
Primary = 50.08 cfs @ 12.09 hrs, Volume= 3.711 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-1: PURGATORY BROOK

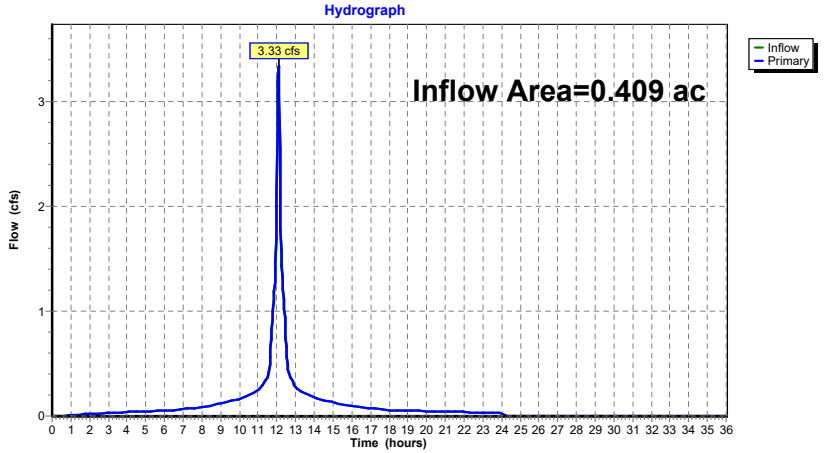


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.409 ac,100.00% Impervious, Inflow Depth = 8.11" for 100-yr event
Inflow = 3.33 cfs @ 12.08 hrs, Volume= 0.276 af
Primary = 3.33 cfs @ 12.08 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min

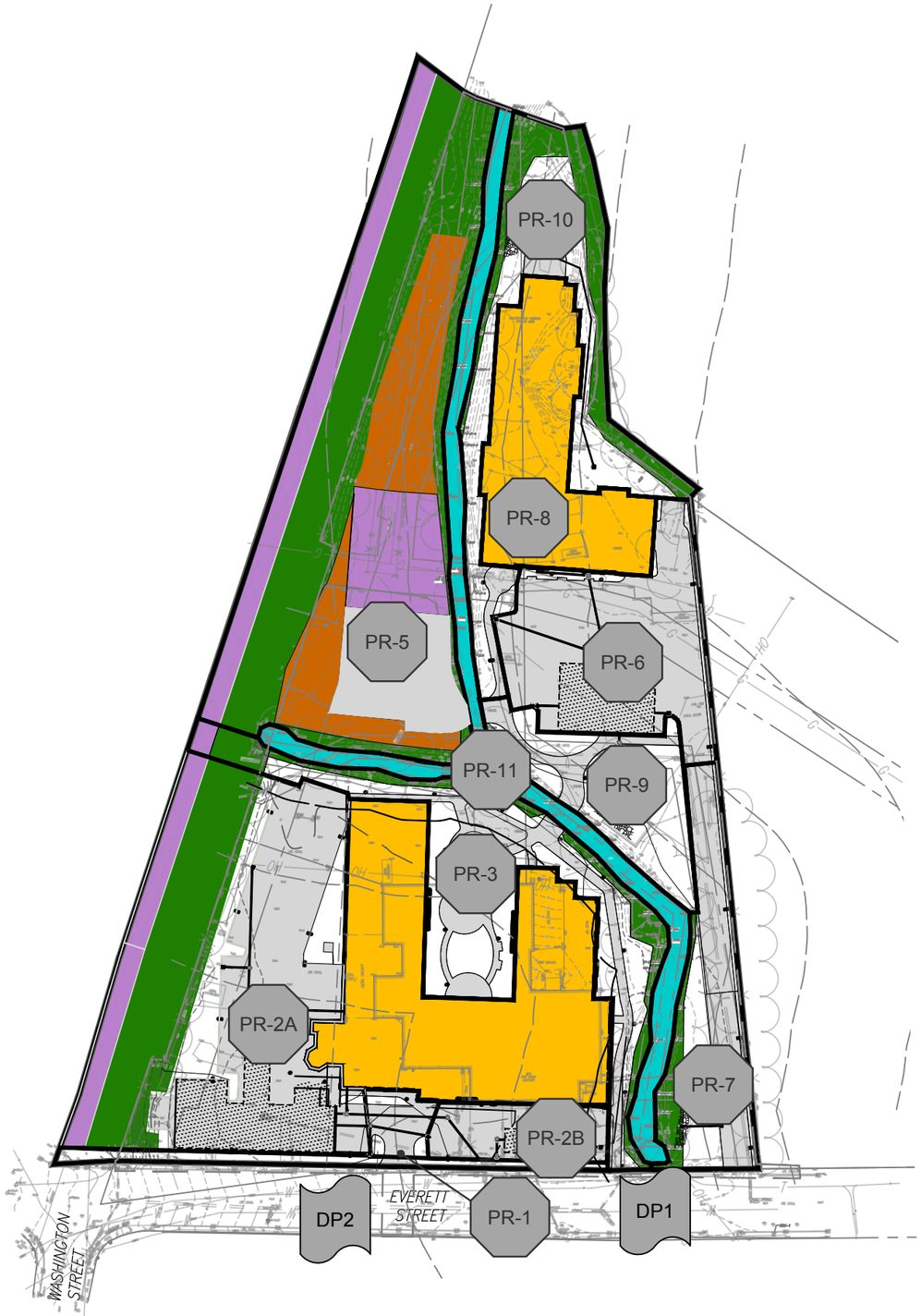
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.03 hrs

Link DP-2: EVERETT STREET



APPENDIX E: PROPOSED CONDITIONS HYDROLOGIC ANALYSIS

- *PROPOSED CONDITIONS DRAINAGE MAP*
- *PROPOSED CONDITIONS HYDROCAD CALCULATIONS*



LEGEND

DP# — DESIGN POINT

PR-# — PROPOSED SUBCATCHMENT

XX# — BASIN OR MODELED DRAINAGE STRUCTURE

OVERALL ANALYSIS BOUNDARY

SUBCATCHMENT BOUNDARY

NRCS SOIL BOUNDARY

TIME OF CONCENTRATION

CONCRETE OR PAVEMENT

ROOF

SURFACE WATER (IMPERVIOUS)

GRAVEL AREAS

LANDSCAPED/GRASSED AREAS

WOODS OR UNDEVELOPED AREA

COMPACTED DIRT/ GRASS COVER <50%

PROPOSED CONDITIONS DRAINAGE AREA MAP

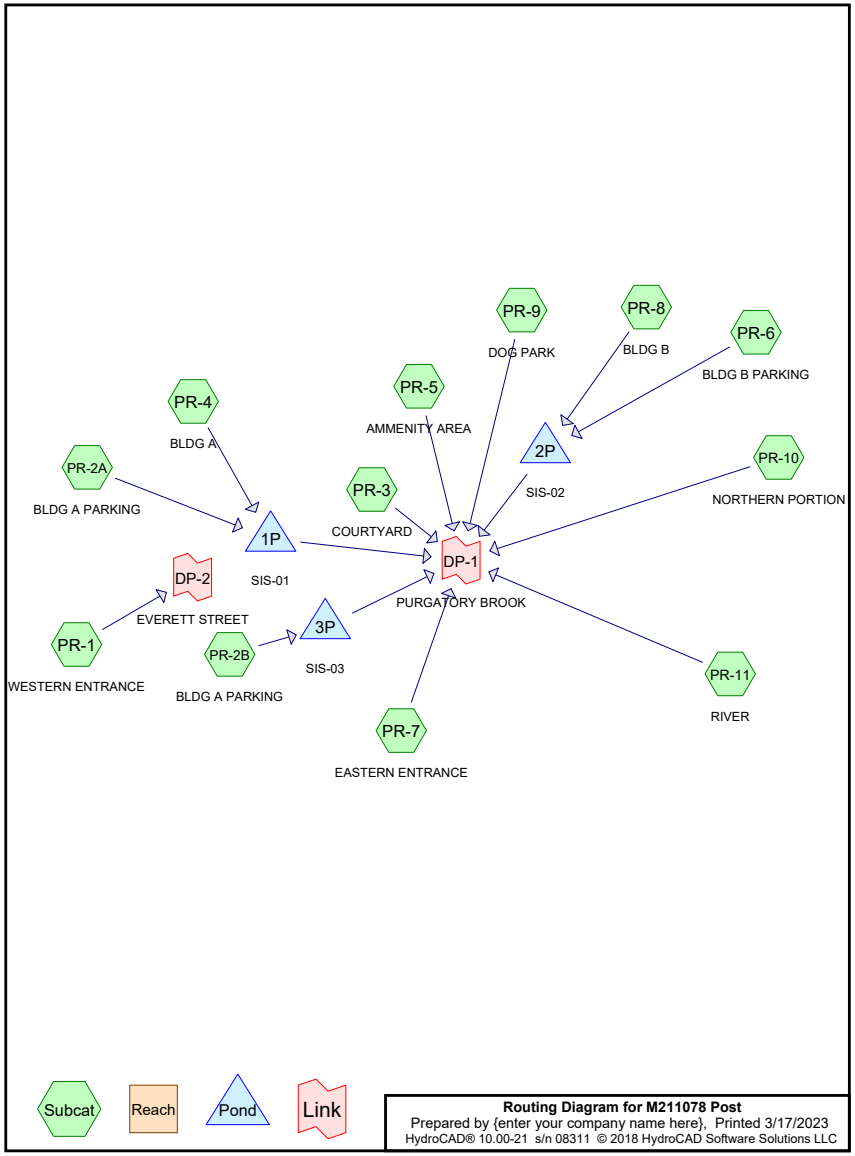
22 EVERETT ST
WESTWOOD, MA 02090

PREPARED BY

BOHLER

SCALE:1"=120' DATE: 1/24/2023

P:\21\M211078\CAD\Drawings\Plan Sets\Drainage Maps\M211078-PDAM-0a.dwg



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.404	68	<50% Grass cover, Poor, HSG A (PR-5)
1.515	39	>75% Grass cover, Good, HSG A (PR-1, PR-10, PR-2A, PR-3, PR-6, PR-7, PR-9)
0.471	96	Gravel surface, HSG A (PR-3, PR-5)
0.153	96	Gravel surface, HSG A - Rail (PR-2A)
1.236	98	Paved parking, HSG A (PR-1, PR-10, PR-3, PR-5, PR-6, PR-7)
0.697	98	Paved parking, HSG A - parking (PR-2A)
0.023	98	Paved parking, HSG A - rear building (PR-10)
0.169	98	Paved parking, HSG A-2B (PR-2B)
1.422	98	Roofs, HSG A (PR-4, PR-8)
0.063	98	Unconnected pavement, HSG A (PR-9)
0.443	98	Water Surface, HSG A, River (PR-11)
1.604	32	Woods/grass comb., Good, HSG A (PR-10, PR-2A, PR-3, PR-5, PR-7)
8.199	**73**	**TOTAL AREA**

Summary for Subcatchment PR-1: WESTERN ENTRANCE

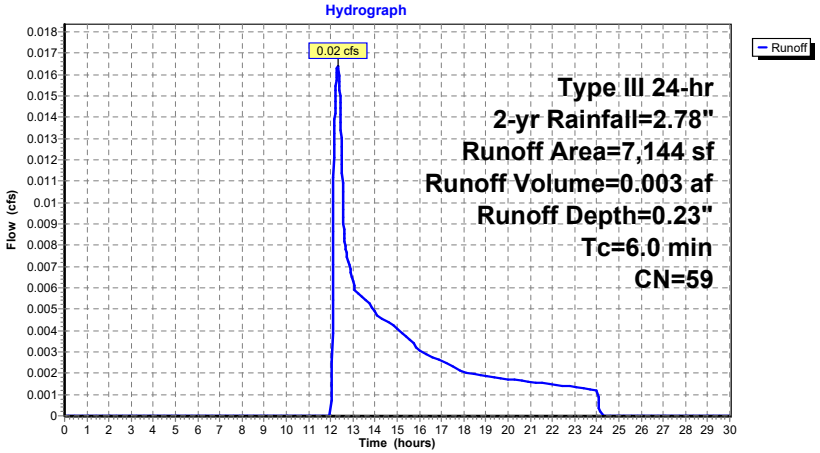
Runoff = 0.02 cfs @ 12.32 hrs, Volume= 0.003 af, Depth= 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
4,719	39	>75% Grass cover, Good, HSG A
2,425	98	Paved parking, HSG A
7,144	59	Weighted Average
4,719		66.06% Pervious Area
2,425		33.94% Impervious Area

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

Subcatchment PR-1: WESTERN ENTRANCE



Summary for Subcatchment PR-10: NORTHERN PORTION

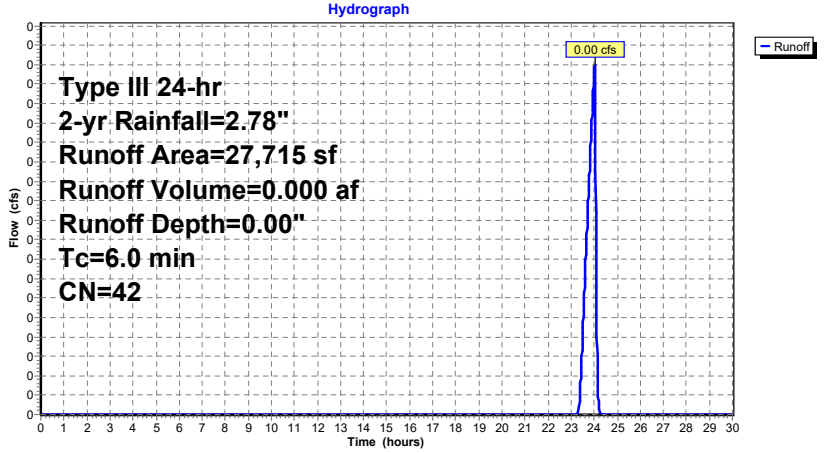
Runoff = 0.00 cfs @ 24.02 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

	Area (sf)	CN	Description
	9,680	32	Woods/grass comb., Good, HSG A
	1,360	98	Paved parking, HSG A
*	995	98	Paved parking, HSG A - rear building
	15,680	39	>75% Grass cover, Good, HSG A
	27,715	42	Weighted Average
	25,360		91.50% Pervious Area
	2,355		8.50% Impervious Area

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

Subcatchment PR-10: NORTHERN PORTION



Summary for Subcatchment PR-11: RIVER

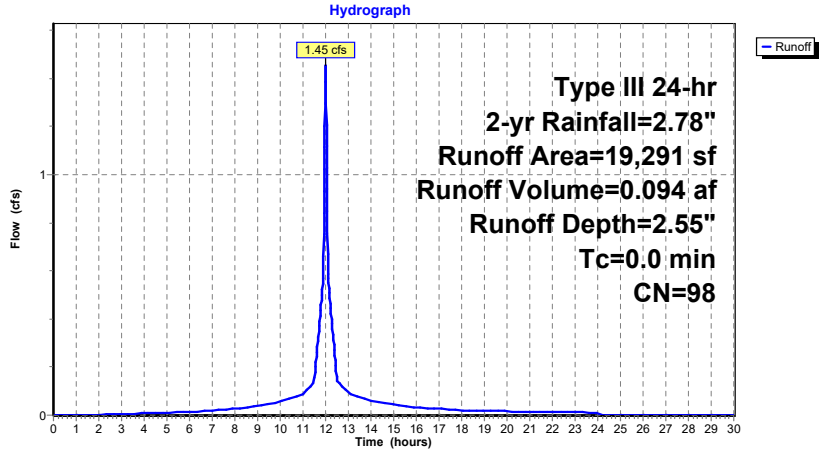
Runoff = 1.45 cfs @ 12.00 hrs, Volume= 0.094 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment PR-11: RIVER



Summary for Subcatchment PR-2A: BLDG A PARKING

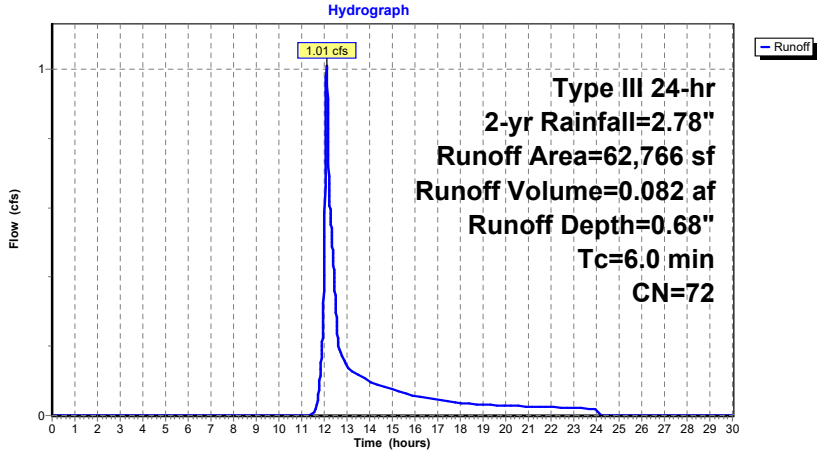
Runoff = 1.01 cfs @ 12.10 hrs, Volume= 0.082 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

	Area (sf)	CN	Description
*	6,650	96	Gravel surface, HSG A - Rail
*	30,345	98	Paved parking, HSG A - parking
	2,350	39	>75% Grass cover, Good, HSG A
	5,784	39	>75% Grass cover, Good, HSG A
	17,637	32	Woods/grass comb., Good, HSG A
	62,766	72	Weighted Average
	32,421		51.65% Pervious Area
	30,345		48.35% Impervious Area

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

Subcatchment PR-2A: BLDG A PARKING



Summary for Subcatchment PR-2B: BLDG A PARKING

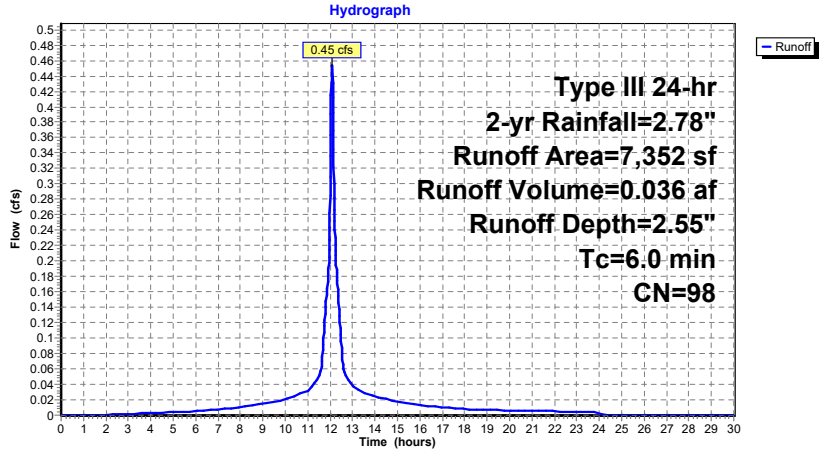
Runoff = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

	Area (sf)	CN	Description
*	7,352	98	Paved parking, HSG A-2B
	7,352		100.00% Impervious Area

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

Subcatchment PR-2B: BLDG A PARKING



Summary for Subcatchment PR-3: COURTYARD

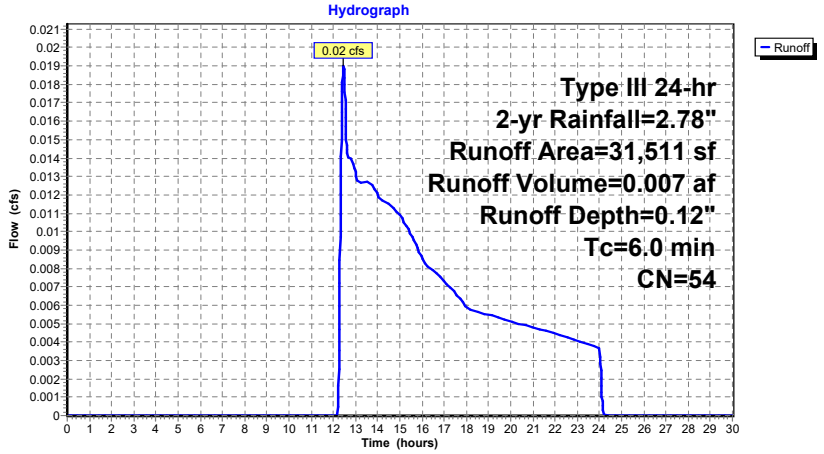
Runoff = 0.02 cfs @ 12.46 hrs, Volume= 0.007 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
6,167	32	Woods/grass comb., Good, HSG A
8,303	98	Paved parking, HSG A
591	96	Gravel surface, HSG A
16,450	39	>75% Grass cover, Good, HSG A
31,511	54	Weighted Average
23,208		73.65% Pervious Area
8,303		26.35% Impervious Area

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

Subcatchment PR-3: COURTYARD



Summary for Subcatchment PR-4: BLDG A

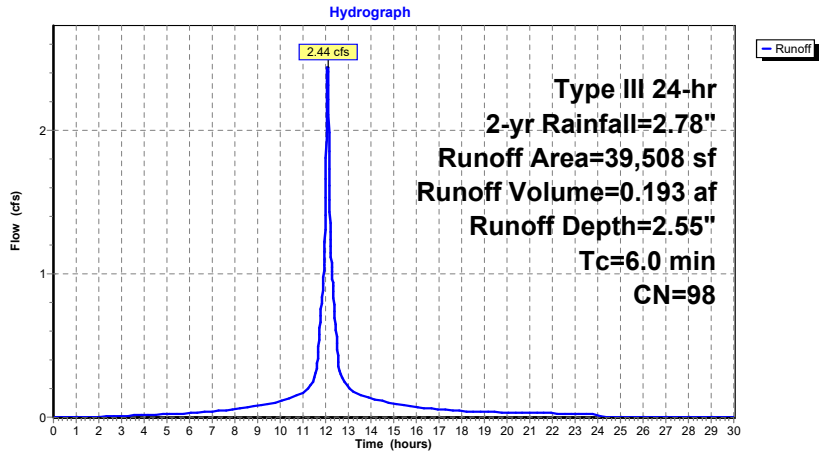
Runoff = 2.44 cfs @ 12.08 hrs, Volume= 0.193 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
39,508	98	Roofs, HSG A
39,508		100.00% Impervious Area

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

Subcatchment PR-4: BLDG A



Summary for Subcatchment PR-5: AMMENITY AREA

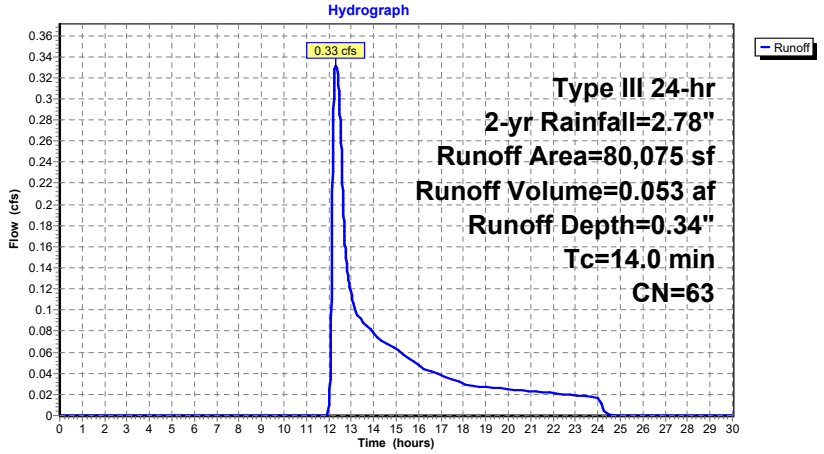
Runoff = 0.33 cfs @ 12.31 hrs, Volume= 0.053 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
19,934	96	Gravel surface, HSG A
8,965	98	Paved parking, HSG A
33,565	32	Woods/grass comb., Good, HSG A
17,611	68	<50% Grass cover, Poor, HSG A
80,075	63	Weighted Average
71,110		88.80% Pervious Area
8,965		11.20% Impervious Area

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

Subcatchment PR-5: AMMENITY AREA



Summary for Subcatchment PR-6: BLDG B PARKING

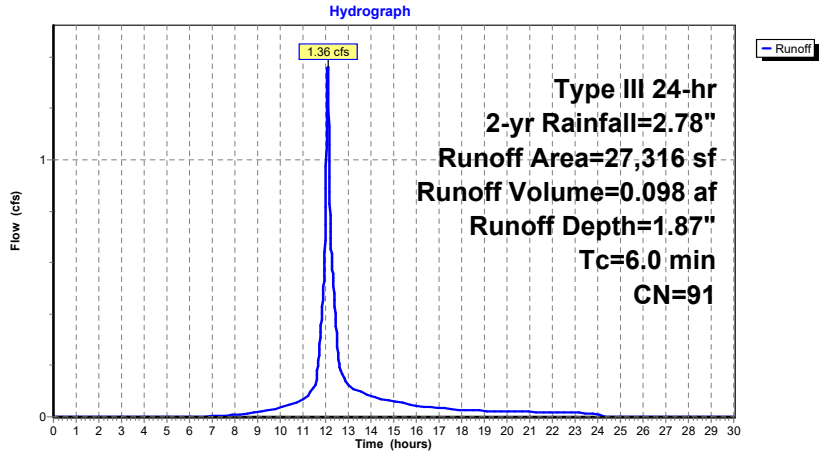
Runoff = 1.36 cfs @ 12.09 hrs, Volume= 0.098 af, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
3,228	39	>75% Grass cover, Good, HSG A
24,088	98	Paved parking, HSG A
27,316	91	Weighted Average
3,228		11.82% Pervious Area
24,088		88.18% Impervious Area

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

Subcatchment PR-6: BLDG B PARKING



Summary for Subcatchment PR-7: EASTERN ENTRANCE

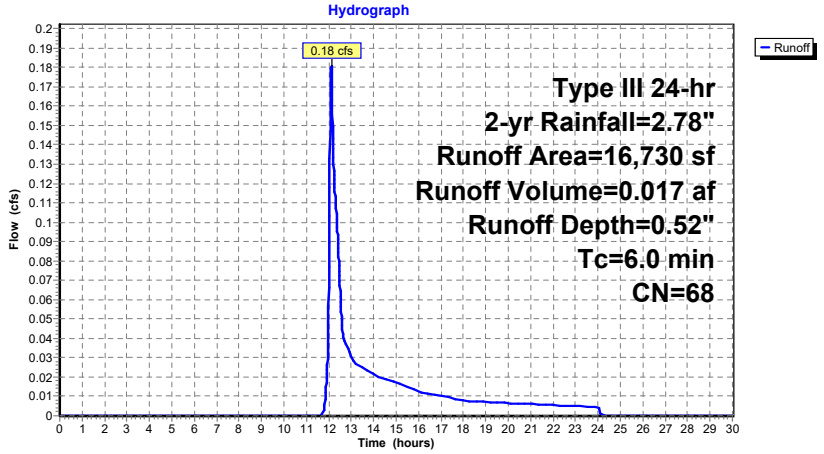
Runoff = 0.18 cfs @ 12.11 hrs, Volume= 0.017 af, Depth= 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
8,678	98	Paved parking, HSG A
5,225	39	>75% Grass cover, Good, HSG A
2,827	32	Woods/grass comb., Good, HSG A
16,730	68	Weighted Average
8,052		48.13% Pervious Area
8,678		51.87% Impervious Area

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

Subcatchment PR-7: EASTERN ENTRANCE



Summary for Subcatchment PR-8: BLDG B

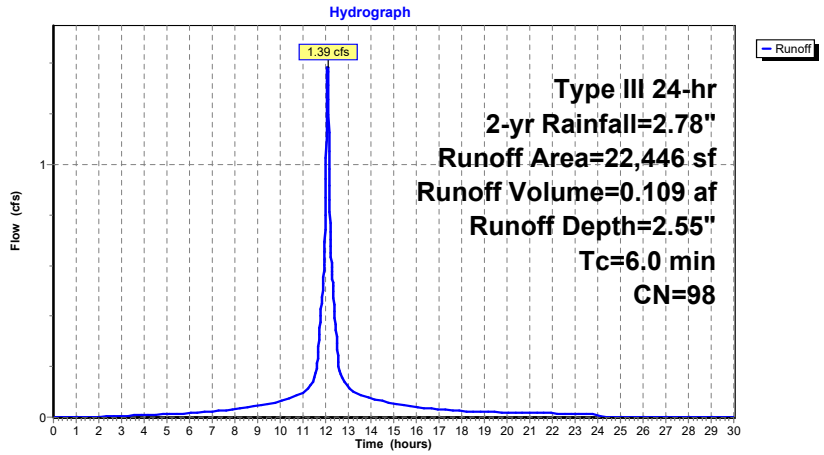
Runoff = 1.39 cfs @ 12.08 hrs, Volume= 0.109 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Description
22,446	98	Roofs, HSG A
22,446		100.00% Impervious Area

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

Subcatchment PR-8: BLDG B



Summary for Subcatchment PR-9: DOG PARK

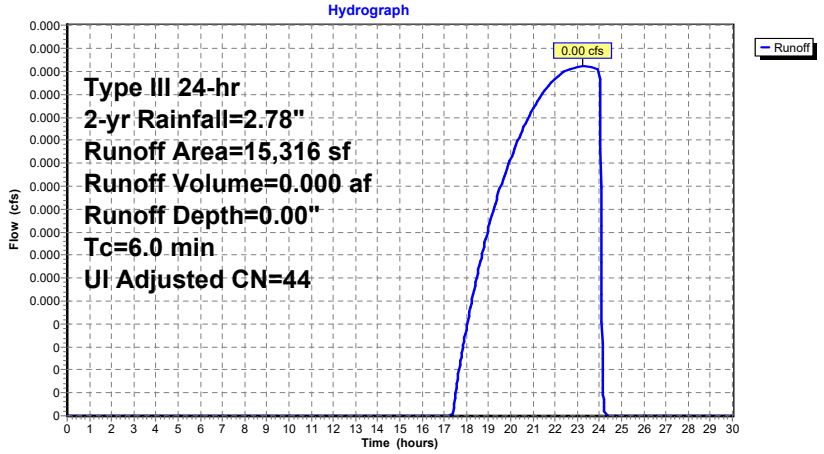
Runoff = 0.00 cfs @ 23.26 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=2.78"

Area (sf)	CN	Adj	Description
12,553	39		>75% Grass cover, Good, HSG A
2,763	98		Unconnected pavement, HSG A
15,316	50	44	Weighted Average, UI Adjusted
12,553			81.96% Pervious Area
2,763			18.04% Impervious Area
2,763			100.00% Unconnected

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

Subcatchment PR-9: DOG PARK



Summary for Pond 1P: SIS-01

Inflow Area = 2.348 ac, 68.30% Impervious, Inflow Depth = 1.40" for 2-yr event
Inflow = 3.43 cfs @ 12.09 hrs, Volume= 0.274 af
Outflow = 0.43 cfs @ 11.71 hrs, Volume= 0.274 af, Atten= 87%, Lag= 0.0 min
Discarded = 0.43 cfs @ 11.71 hrs, Volume= 0.274 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.82' @ 12.78 hrs Surf.Area= 7,736 sf Storage= 3,624 cf

Plug-Flow detention time= 59.1 min calculated for 0.274 af (100% of inflow)
Center-of-Mass det. time= 59.1 min (854.1 - 795.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.00'	6,862 cf	**39.50'W x 195.86'L x 3.50'H Field A** 27,077 cf Overall - 9,923 cf Embedded = 17,154 cf x 40.0% Voids
#2A	68.50'	9,923 cf	**ADS_StormTech SC-740 +Cap** x 216 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 8 Rows of 27 Chambers
#3	68.00'	50 cf	**4.00'D x 4.00'H CBN-1**-Impervious
		16,835 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.12'	**12.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.12' / 67.00' S= 0.0255 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	68.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.43 cfs @ 11.71 hrs HW=68.04' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=68.00' (Free Discharge)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 1P: SIS-01 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

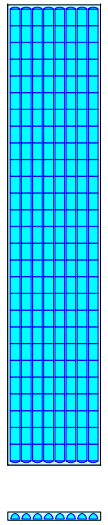
27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
8 Rows x 51.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 39.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

216 Chambers x 45.9 cf = 9,923.0 cf Chamber Storage

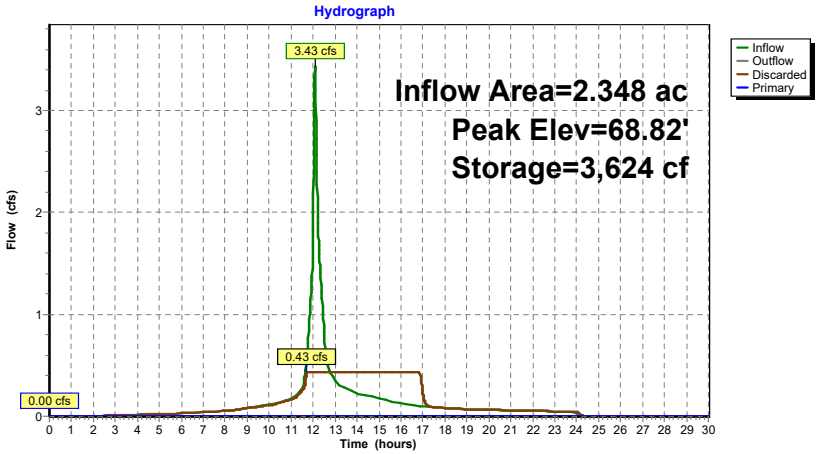
27,077.2 cf Field - 9,923.0 cf Chambers = 17,154.1 cf Stone x 40.0% Voids = 6,861.7 cf Stone Storage

Chamber Storage + Stone Storage = 16,784.7 cf = 0.385 af
Overall Storage Efficiency = 62.0%
Overall System Size = 195.86' x 39.50' x 3.50'

216 Chambers
1,002.9 cy Field
635.3 cy Stone



Pond 1P: SIS-01



Summary for Pond 2P: SIS-02

Inflow Area = 1.142 ac, 93.51% Impervious, Inflow Depth = 2.17" for 2-yr event
Inflow = 2.74 cfs @ 12.09 hrs, Volume= 0.207 af
Outflow = 0.27 cfs @ 11.46 hrs, Volume= 0.193 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.27 cfs @ 11.46 hrs, Volume= 0.193 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.25' @ 12.91 hrs Surf.Area= 4,793 sf Storage= 3,193 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 46.2 min (828.4 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.20'	4,285 cf	**58.50'W x 81.94'L x 3.50'H Field A** 16,777 cf Overall - 6,064 cf Embedded = 10,712 cf x 40.0% Voids
#2A	68.70'	6,064 cf	**ADS_StormTech SC-740 +Cap** x 132 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 12 Rows of 11 Chambers
#3	64.00'	50 cf	**4.00'D x 4.00'H CBN-08**-Impervious
		10,399 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**20.0' long x 5.0' breadth Level Spreader** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Device 1	70.50'	**24.0" Round Culvert** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.50' / 65.00' S= 0.0705 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#3	Discarded	68.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.27 cfs @ 11.46 hrs HW=68.20' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=64.00' (Free Discharge)
└**1=Level Spreader** (Controls 0.00 cfs)
└**2=Culvert** (Controls 0.00 cfs)

Pond 2P: SIS-02 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

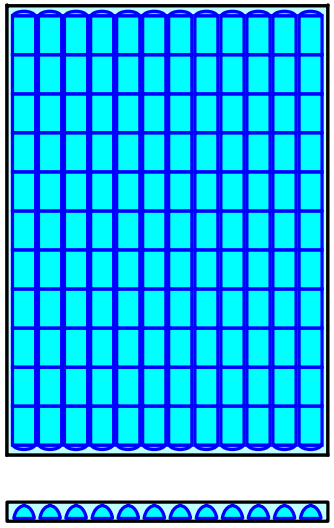
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

132 Chambers x 45.9 cf = 6,064.1 cf Chamber Storage

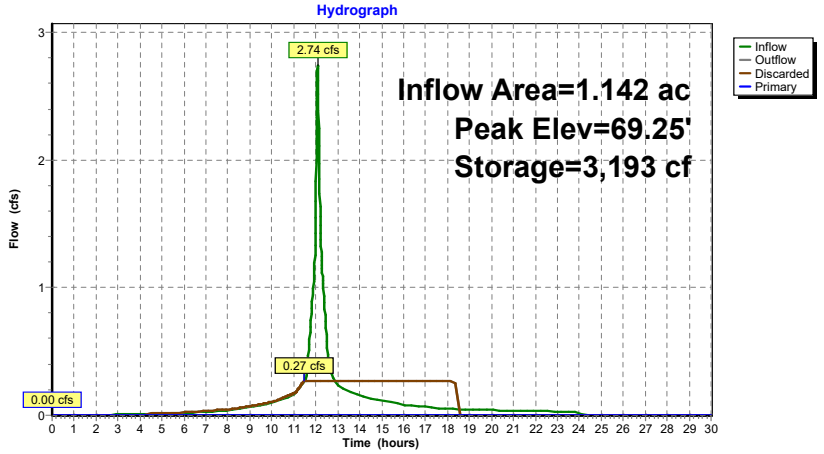
16,776.5 cf Field - 6,064.1 cf Chambers = 10,712.4 cf Stone x 40.0% Voids = 4,285.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,349.1 cf = 0.238 af
Overall Storage Efficiency = 61.7%
Overall System Size = 81.94' x 58.50' x 3.50'

132 Chambers
621.4 cy Field
396.8 cy Stone



Pond 2P: SIS-02



Summary for Pond 3P: SIS-03

Inflow Area = 0.169 ac,100.00% Impervious, Inflow Depth = 2.55" for 2-yr event
Inflow = 0.45 cfs @ 12.08 hrs, Volume= 0.036 af
Outflow = 0.04 cfs @ 11.39 hrs, Volume= 0.036 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.39 hrs, Volume= 0.036 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 67.25' @ 12.85 hrs Surf.Area= 804 sf Storage= 524 cf

Plug-Flow detention time= 79.6 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 78.8 min (838.3 - 759.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	66.20'	758 cf	**20.50'W x 39.22'L x 3.50'H Field A** 2,814 cf Overall - 919 cf Embedded = 1,895 cf x 40.0% Voids
#2A	66.70'	919 cf	**ADS_StormTech SC-740 +Cap** x 20 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 4 Rows of 5 Chambers
#3	66.00'	50 cf	**4.00'D x 4.00'H WQI-01**-Impervious
		1,727 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.40' / 69.10' S= 0.0231 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	66.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.39 hrs HW=66.20' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' (Free Discharge)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 3P: SIS-03 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

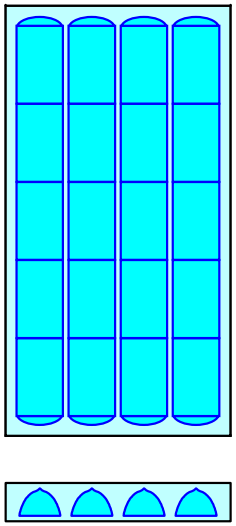
5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

20 Chambers x 45.9 cf = 918.8 cf Chamber Storage

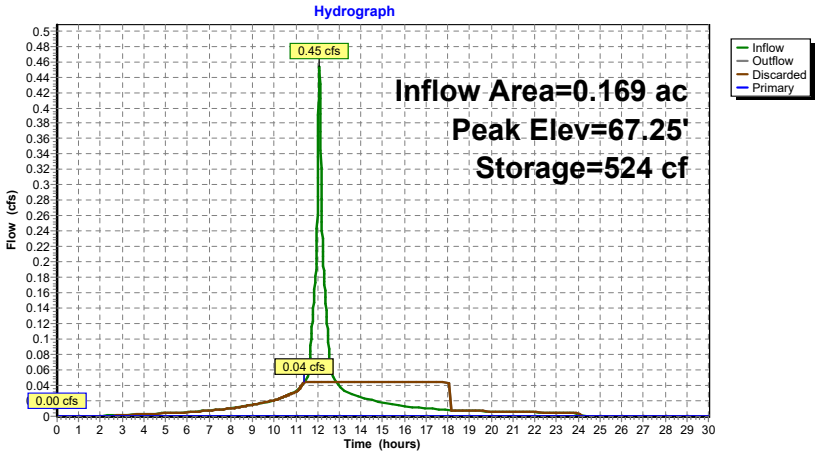
2,813.8 cf Field - 918.8 cf Chambers = 1,895.0 cf Stone x 40.0% Voids = 758.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,676.8 cf = 0.038 af
Overall Storage Efficiency = 59.6%
Overall System Size = 39.22' x 20.50' x 3.50'

20 Chambers
104.2 cy Field
70.2 cy Stone



Pond 3P: SIS-03

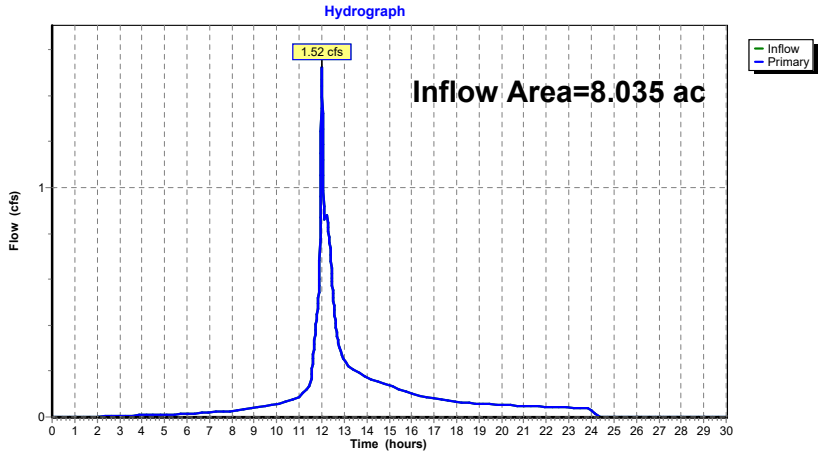


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 8.035 ac, 49.74% Impervious, Inflow Depth = 0.26" for 2-yr event
Inflow = 1.52 cfs @ 12.00 hrs, Volume= 0.171 af
Primary = 1.52 cfs @ 12.00 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: PURGATORY BROOK

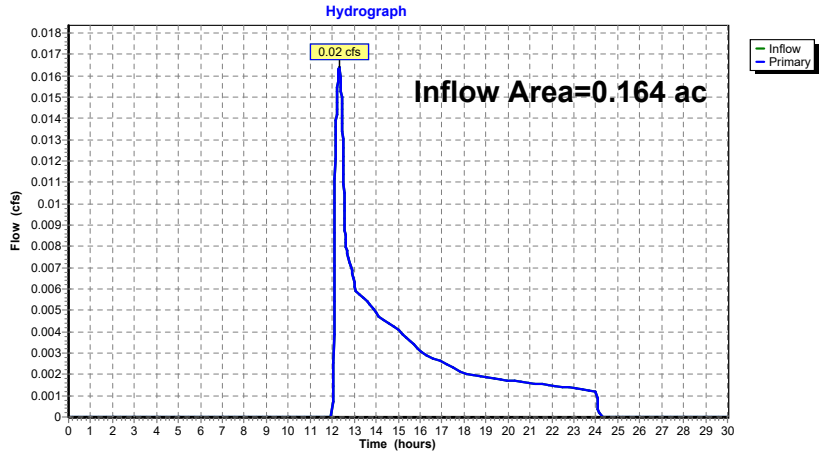


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.164 ac, 33.94% Impervious, Inflow Depth = 0.23" for 2-yr event
Inflow = 0.02 cfs @ 12.32 hrs, Volume= 0.003 af
Primary = 0.02 cfs @ 12.32 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-2: EVERETT STREET



Summary for Subcatchment PR-1: WESTERN ENTRANCE

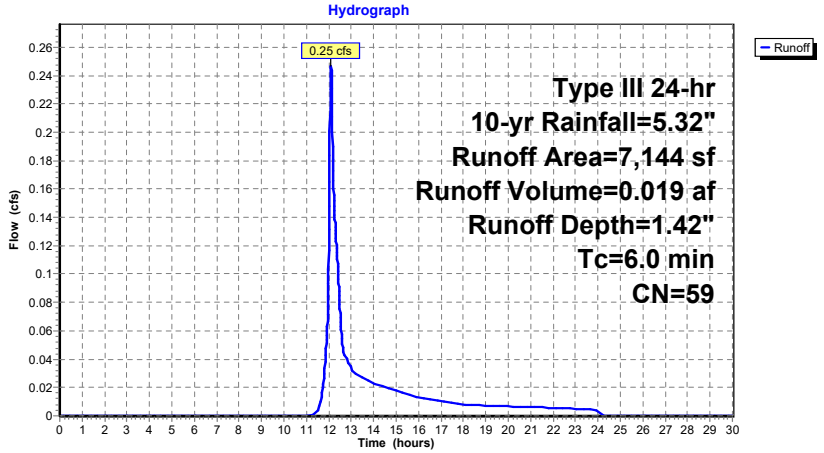
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
4,719	39	>75% Grass cover, Good, HSG A
2,425	98	Paved parking, HSG A
7,144	59	Weighted Average
4,719		66.06% Pervious Area
2,425		33.94% Impervious Area

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

Subcatchment PR-1: WESTERN ENTRANCE



Summary for Subcatchment PR-10: NORTHERN PORTION

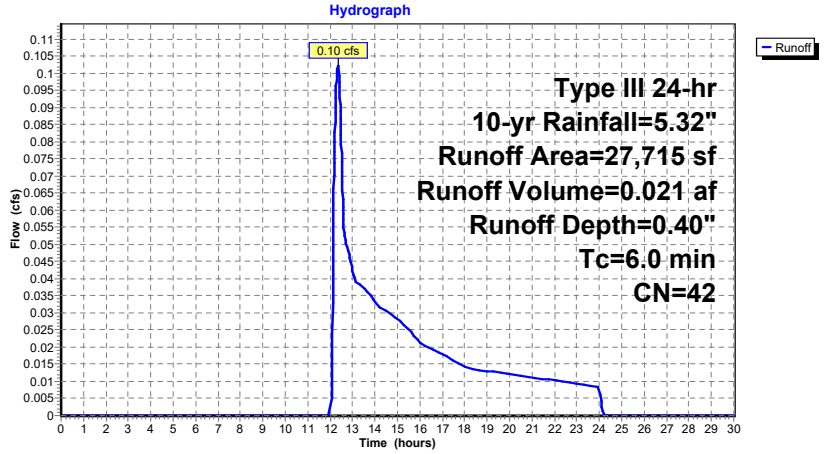
Runoff = 0.10 cfs @ 12.34 hrs, Volume= 0.021 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
	9,680	32	Woods/grass comb., Good, HSG A
	1,360	98	Paved parking, HSG A
*	995	98	Paved parking, HSG A - rear building
	15,680	39	>75% Grass cover, Good, HSG A
	27,715	42	Weighted Average
	25,360		91.50% Pervious Area
	2,355		8.50% Impervious Area

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

Subcatchment PR-10: NORTHERN PORTION



Summary for Subcatchment PR-11: RIVER

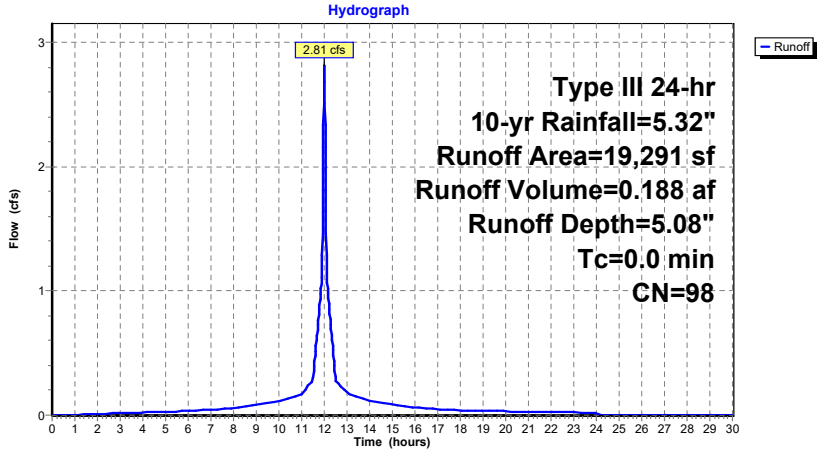
Runoff = 2.81 cfs @ 12.00 hrs, Volume= 0.188 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment PR-11: RIVER



Summary for Subcatchment PR-2A: BLDG A PARKING

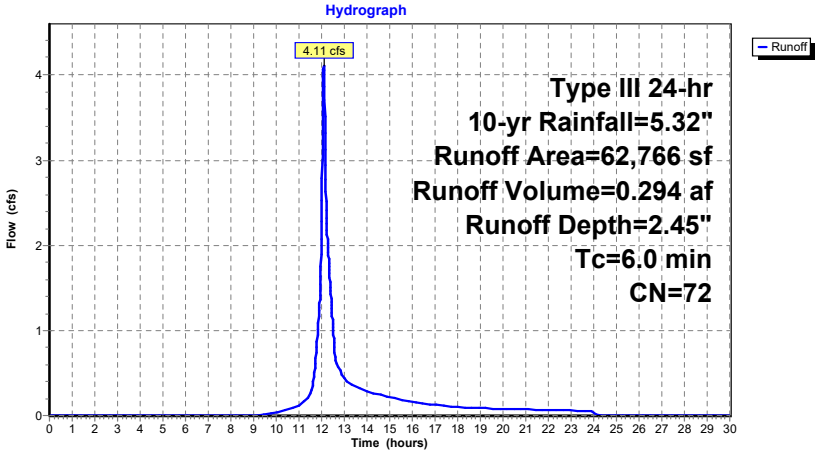
Runoff = 4.11 cfs @ 12.09 hrs, Volume= 0.294 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	6,650	96	Gravel surface, HSG A - Rail
*	30,345	98	Paved parking, HSG A - parking
	2,350	39	>75% Grass cover, Good, HSG A
	5,784	39	>75% Grass cover, Good, HSG A
	17,637	32	Woods/grass comb., Good, HSG A
	62,766	72	Weighted Average
	32,421		51.65% Pervious Area
	30,345		48.35% Impervious Area

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

Subcatchment PR-2A: BLDG A PARKING



Summary for Subcatchment PR-2B: BLDG A PARKING

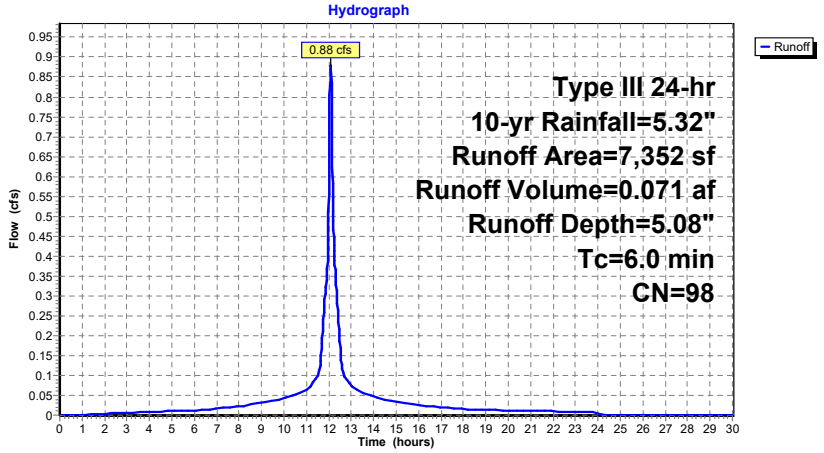
Runoff = 0.88 cfs @ 12.08 hrs, Volume= 0.071 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

	Area (sf)	CN	Description
*	7,352	98	Paved parking, HSG A-2B
	7,352		100.00% Impervious Area

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

Subcatchment PR-2B: BLDG A PARKING



Summary for Subcatchment PR-3: COURTYARD

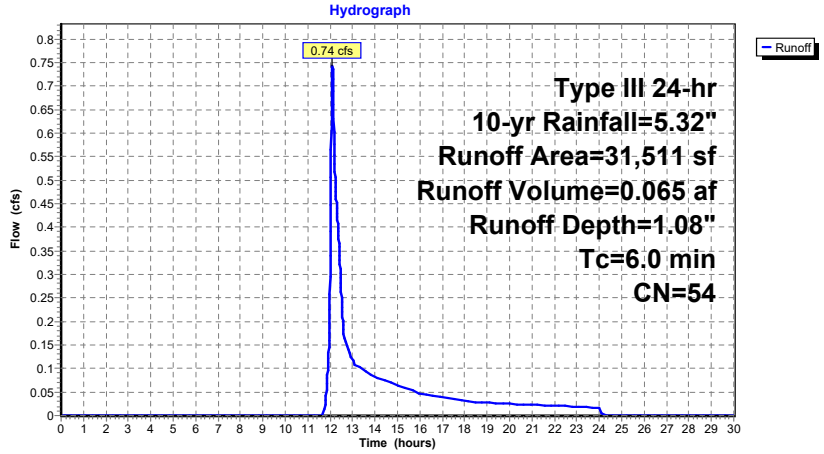
Runoff = 0.74 cfs @ 12.11 hrs, Volume= 0.065 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
6,167	32	Woods/grass comb., Good, HSG A
8,303	98	Paved parking, HSG A
591	96	Gravel surface, HSG A
16,450	39	>75% Grass cover, Good, HSG A
31,511	54	Weighted Average
23,208		73.65% Pervious Area
8,303		26.35% Impervious Area

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

Subcatchment PR-3: COURTYARD



Summary for Subcatchment PR-4: BLDG A

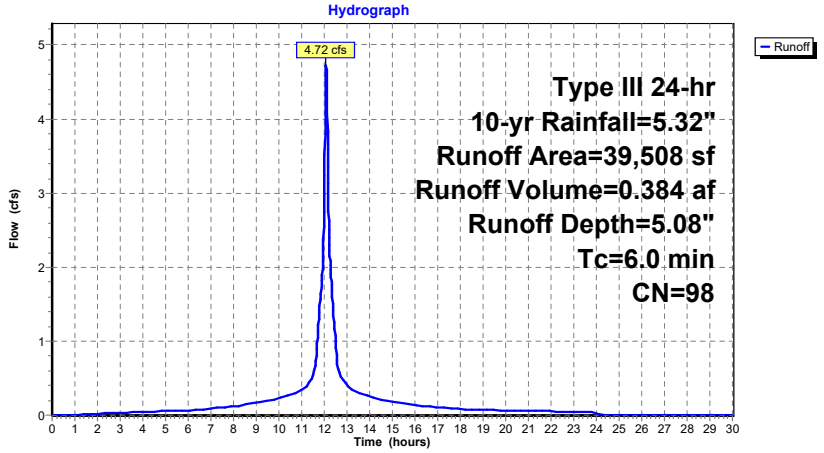
Runoff = 4.72 cfs @ 12.08 hrs, Volume= 0.384 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
39,508	98	Roofs, HSG A
39,508		100.00% Impervious Area

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

Subcatchment PR-4: BLDG A



Summary for Subcatchment PR-5: AMMENITY AREA

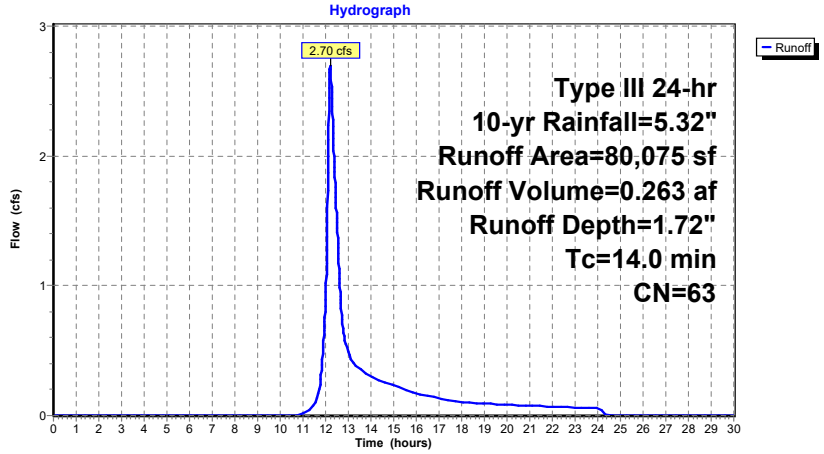
Runoff = 2.70 cfs @ 12.21 hrs, Volume= 0.263 af, Depth= 1.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
19,934	96	Gravel surface, HSG A
8,965	98	Paved parking, HSG A
33,565	32	Woods/grass comb., Good, HSG A
17,611	68	<50% Grass cover, Poor, HSG A
80,075	63	Weighted Average
71,110		88.80% Pervious Area
8,965		11.20% Impervious Area

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

Subcatchment PR-5: AMMENITY AREA



Summary for Subcatchment PR-6: BLDG B PARKING

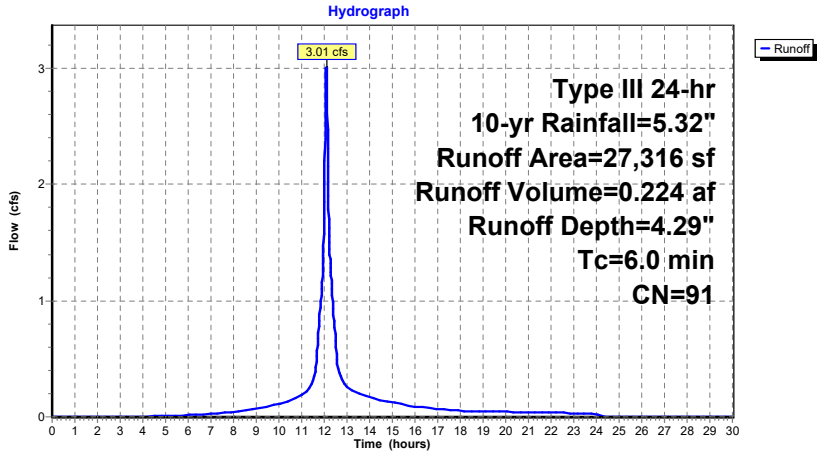
Runoff = 3.01 cfs @ 12.08 hrs, Volume= 0.224 af, Depth= 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
3,228	39	>75% Grass cover, Good, HSG A
24,088	98	Paved parking, HSG A
27,316	91	Weighted Average
3,228		11.82% Pervious Area
24,088		88.18% Impervious Area

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

Subcatchment PR-6: BLDG B PARKING



Summary for Subcatchment PR-7: EASTERN ENTRANCE

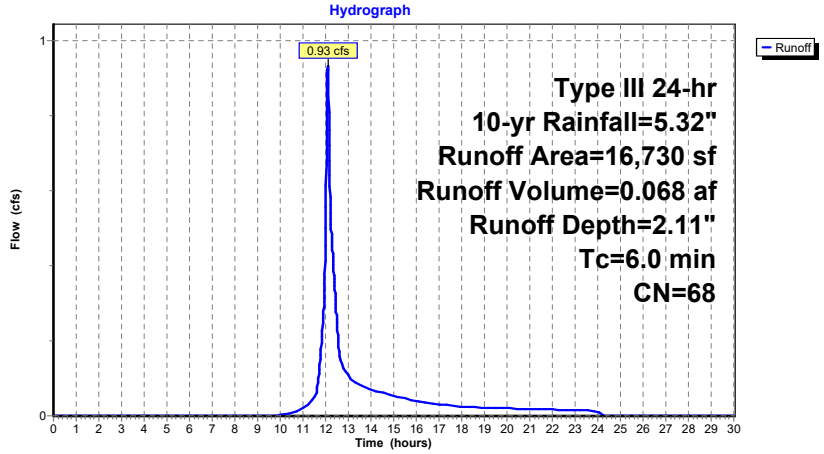
Runoff = 0.93 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
8,678	98	Paved parking, HSG A
5,225	39	>75% Grass cover, Good, HSG A
2,827	32	Woods/grass comb., Good, HSG A
16,730	68	Weighted Average
8,052		48.13% Pervious Area
8,678		51.87% Impervious Area

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

Subcatchment PR-7: EASTERN ENTRANCE



Summary for Subcatchment PR-8: BLDG B

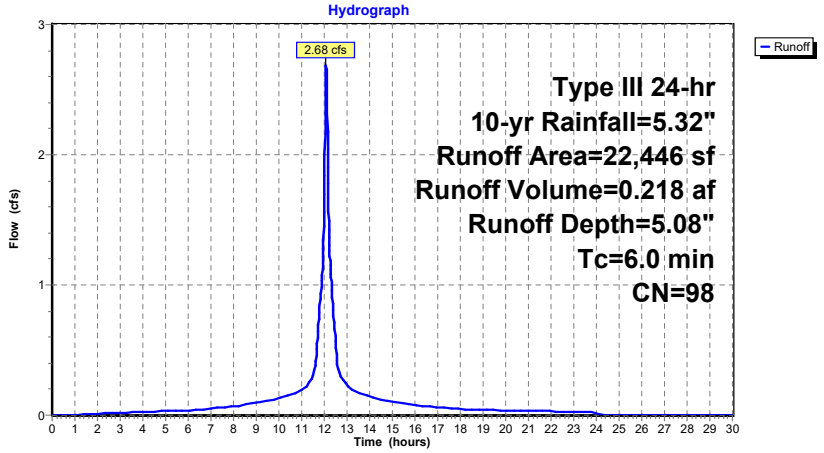
Runoff = 2.68 cfs @ 12.08 hrs, Volume= 0.218 af, Depth= 5.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Description
22,446	98	Roofs, HSG A
22,446		100.00% Impervious Area

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

Subcatchment PR-8: BLDG B



Summary for Subcatchment PR-9: DOG PARK

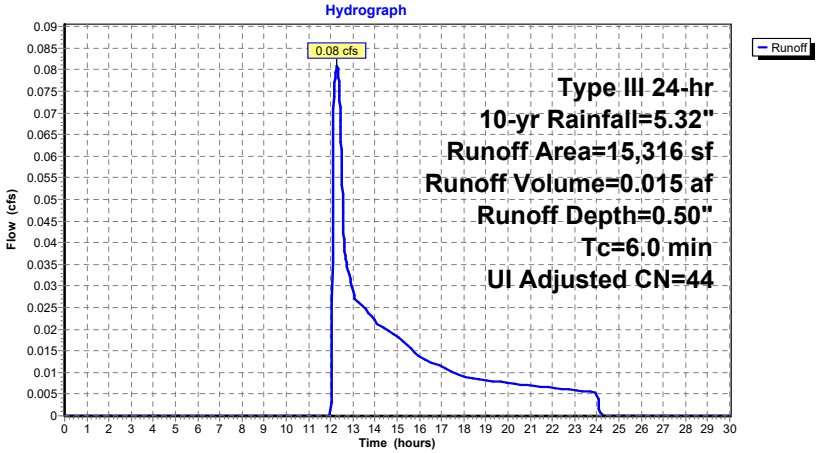
Runoff = 0.08 cfs @ 12.29 hrs, Volume= 0.015 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.32"

Area (sf)	CN	Adj	Description
12,553	39		>75% Grass cover, Good, HSG A
2,763	98		Unconnected pavement, HSG A
15,316	50	44	Weighted Average, UI Adjusted
12,553			81.96% Pervious Area
2,763			18.04% Impervious Area
2,763			100.00% Unconnected

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

Subcatchment PR-9: DOG PARK



Summary for Pond 1P: SIS-01

Inflow Area = 2.348 ac, 68.30% Impervious, Inflow Depth = 3.47" for 10-yr event
Inflow = 8.82 cfs @ 12.09 hrs, Volume= 0.678 af
Outflow = 2.17 cfs @ 12.48 hrs, Volume= 0.678 af, Atten= 75%, Lag= 23.6 min
Discarded = 0.43 cfs @ 10.97 hrs, Volume= 0.507 af
Primary = 1.74 cfs @ 12.48 hrs, Volume= 0.171 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.84' @ 12.48 hrs Surf.Area= 7,736 sf Storage= 9,871 cf

Plug-Flow detention time= 106.3 min calculated for 0.678 af (100% of inflow)
Center-of-Mass det. time= 106.3 min (893.3 - 787.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.00'	6,862 cf	**39.50'W x 195.86'L x 3.50'H Field A** 27,077 cf Overall - 9,923 cf Embedded = 17,154 cf x 40.0% Voids
#2A	68.50'	9,923 cf	**ADS_StormTech SC-740 +Cap** x 216 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 8 Rows of 27 Chambers
#3	68.00'	50 cf	**4.00'D x 4.00'H CBN-1**-Impervious
		16,835 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.12'	**12.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.12' / 67.00' S= 0.0255 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	68.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.43 cfs @ 10.97 hrs HW=68.04' (Free Discharge)
↑└**2=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=1.74 cfs @ 12.48 hrs HW=69.84' (Free Discharge)
↑└**1=Culvert** (Inlet Controls 1.74 cfs @ 2.89 fps)

Pond 1P: SIS-01 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

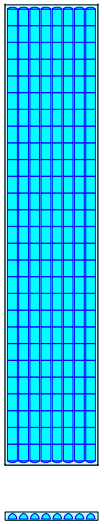
27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
8 Rows x 51.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 39.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

216 Chambers x 45.9 cf = 9,923.0 cf Chamber Storage

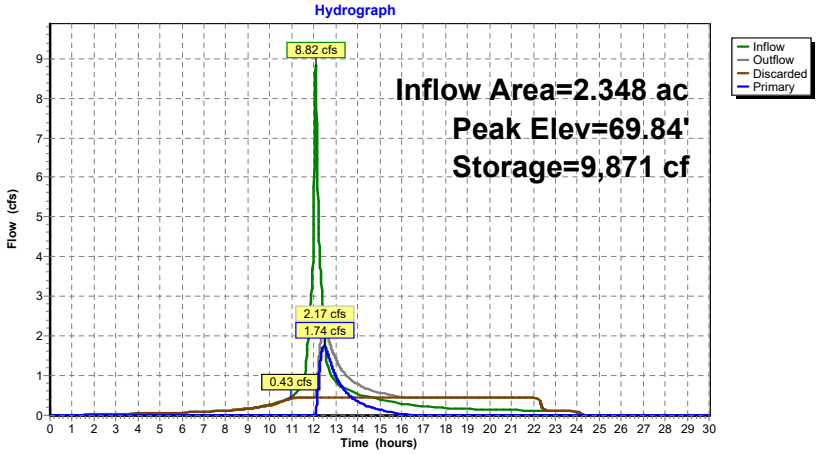
27,077.2 cf Field - 9,923.0 cf Chambers = 17,154.1 cf Stone x 40.0% Voids = 6,861.7 cf Stone Storage

Chamber Storage + Stone Storage = 16,784.7 cf = 0.385 af
Overall Storage Efficiency = 62.0%
Overall System Size = 195.86' x 39.50' x 3.50'

216 Chambers
1,002.9 cy Field
635.3 cy Stone



Pond 1P: SIS-01



Summary for Pond 2P: SIS-02

Inflow Area = 1.142 ac, 93.51% Impervious, Inflow Depth = 4.65" for 10-yr event
Inflow = 5.69 cfs @ 12.08 hrs, Volume= 0.443 af
Outflow = 0.53 cfs @ 12.92 hrs, Volume= 0.445 af, Atten= 91%, Lag= 49.9 min
Discarded = 0.27 cfs @ 10.21 hrs, Volume= 0.416 af
Primary = 0.27 cfs @ 12.92 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 70.71' @ 12.92 hrs Surf.Area= 4,793 sf Storage= 8,273 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 231.7 min (997.8 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.20'	4,285 cf	**58.50'W x 81.94'L x 3.50'H Field A** 16,777 cf Overall - 6,064 cf Embedded = 10,712 cf x 40.0% Voids
#2A	68.70'	6,064 cf	**ADS_StormTech SC-740 +Cap** x 132 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 12 Rows of 11 Chambers
#3	64.00'	50 cf	**4.00'D x 4.00'H CBN-08**-Impervious
		10,399 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**20.0' long x 5.0' breadth Level Spreader** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Device 1	70.50'	**24.0" Round Culvert** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.50' / 65.00' S= 0.0705 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#3	Discarded	68.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.27 cfs @ 10.21 hrs HW=68.20' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.27 cfs @ 12.92 hrs HW=70.71' (Free Discharge)
└**1=Level Spreader** (Passes 0.27 cfs of 174.25 cfs potential flow)
└**2=Culvert** (Inlet Controls 0.27 cfs @ 1.55 fps)

Pond 2P: SIS-02 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

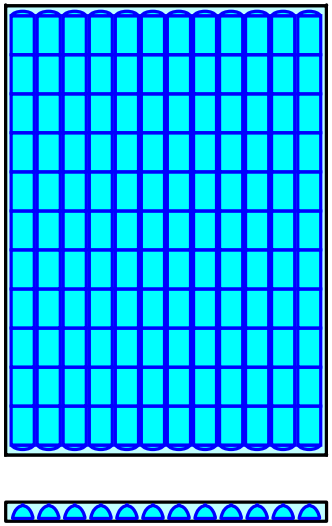
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

132 Chambers x 45.9 cf = 6,064.1 cf Chamber Storage

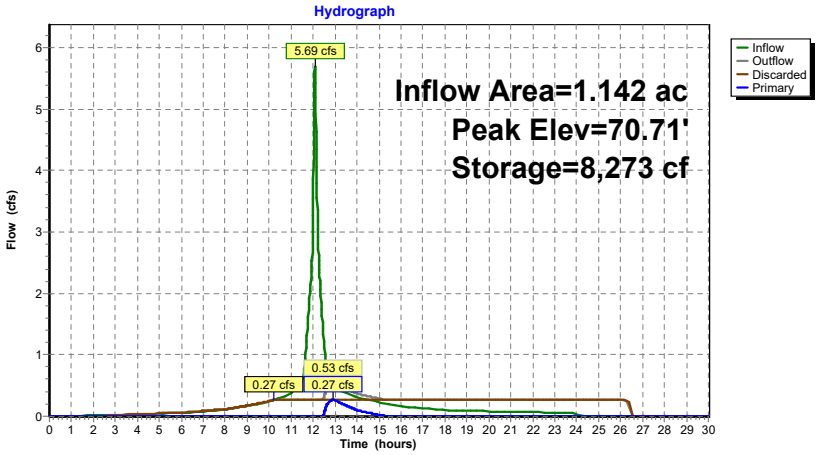
16,776.5 cf Field - 6,064.1 cf Chambers = 10,712.4 cf Stone x 40.0% Voids = 4,285.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,349.1 cf = 0.238 af
Overall Storage Efficiency = 61.7%
Overall System Size = 81.94' x 58.50' x 3.50'

132 Chambers
621.4 cy Field
396.8 cy Stone



Pond 2P: SIS-02



Summary for Pond 3P: SIS-03

Inflow Area = 0.169 ac,100.00% Impervious, Inflow Depth = 5.08" for 10-yr event
Inflow = 0.88 cfs @ 12.08 hrs, Volume= 0.071 af
Outflow = 0.04 cfs @ 10.18 hrs, Volume= 0.071 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.04 cfs @ 10.18 hrs, Volume= 0.071 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 68.73' @ 14.07 hrs Surf.Area= 804 sf Storage= 1,368 cf

Plug-Flow detention time= 245.6 min calculated for 0.071 af (100% of inflow)
Center-of-Mass det. time= 245.2 min (992.2 - 747.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	66.20'	758 cf	**20.50'W x 39.22'L x 3.50'H Field A** 2,814 cf Overall - 919 cf Embedded = 1,895 cf x 40.0% Voids
#2A	66.70'	919 cf	**ADS_StormTech SC-740 +Cap** x 20 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 4 Rows of 5 Chambers
#3	66.00'	50 cf	**4.00'D x 4.00'H WQI-01**-Impervious
		1,727 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.40' / 69.10' S= 0.0231 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	66.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 10.18 hrs HW=66.20' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=66.00' (Free Discharge)
↑**1=Culvert** (Controls 0.00 cfs)

Pond 3P: SIS-03 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

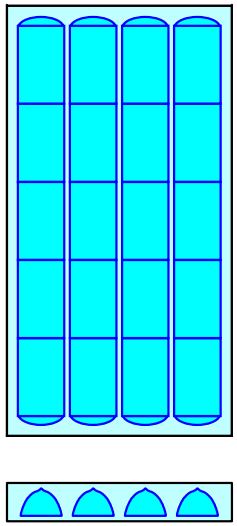
5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

20 Chambers x 45.9 cf = 918.8 cf Chamber Storage

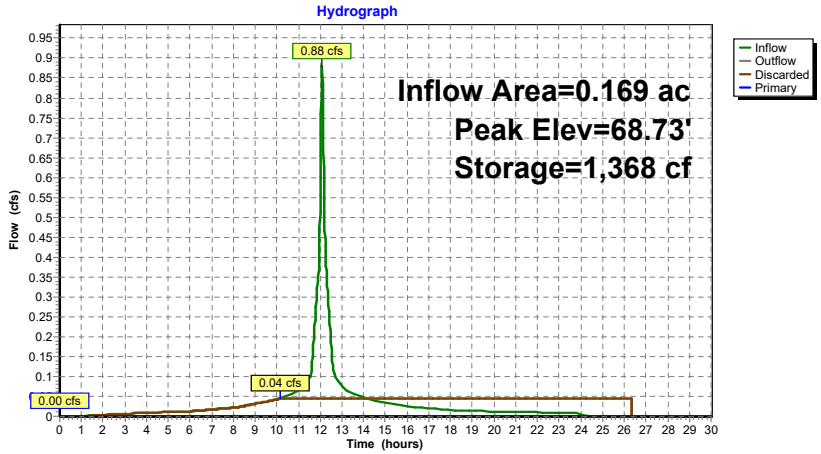
2,813.8 cf Field - 918.8 cf Chambers = 1,895.0 cf Stone x 40.0% Voids = 758.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,676.8 cf = 0.038 af
Overall Storage Efficiency = 59.6%
Overall System Size = 39.22' x 20.50' x 3.50'

20 Chambers
104.2 cy Field
70.2 cy Stone



Pond 3P: SIS-03

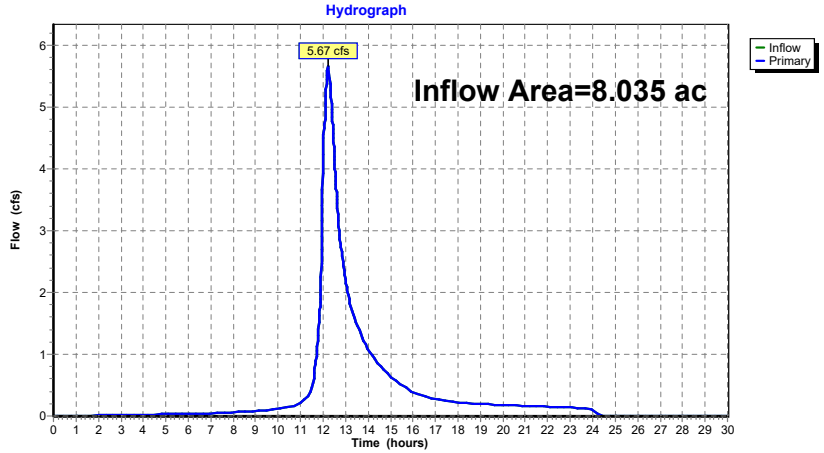


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 8.035 ac, 49.74% Impervious, Inflow Depth = 1.22" for 10-yr event
Inflow = 5.67 cfs @ 12.22 hrs, Volume= 0.819 af
Primary = 5.67 cfs @ 12.22 hrs, Volume= 0.819 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: PURGATORY BROOK

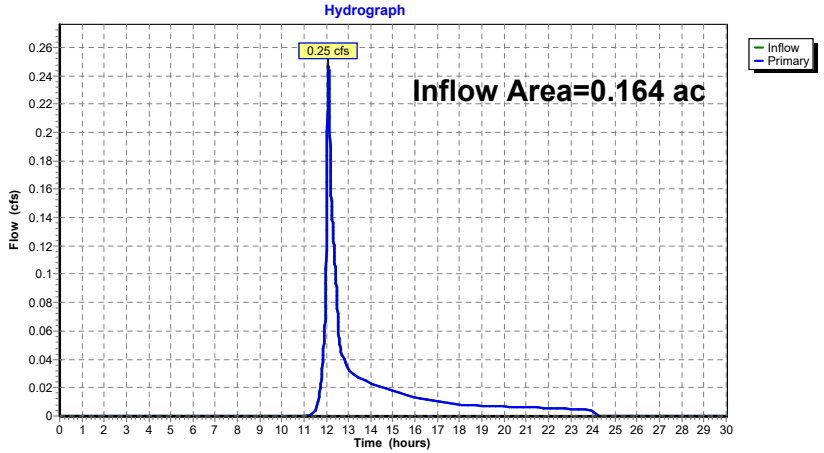


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.164 ac, 33.94% Impervious, Inflow Depth = 1.42" for 10-yr event
Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af
Primary = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-2: EVERETT STREET



Summary for Subcatchment PR-1: WESTERN ENTRANCE

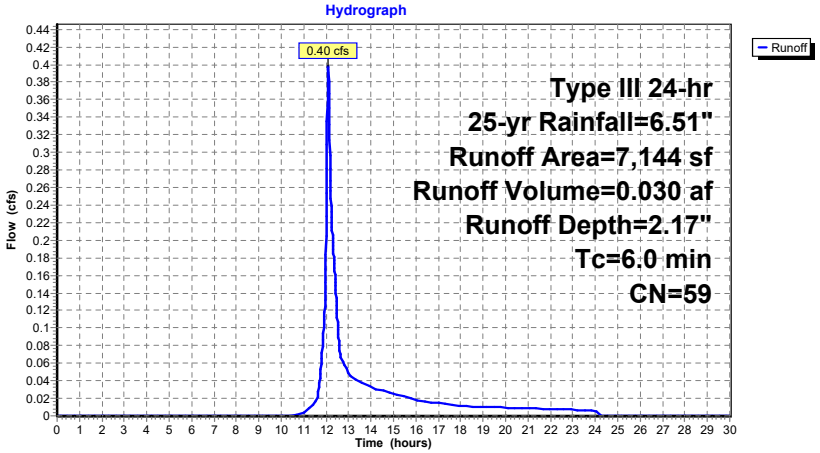
Runoff = 0.40 cfs @ 12.10 hrs, Volume= 0.030 af, Depth= 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
4,719	39	>75% Grass cover, Good, HSG A
2,425	98	Paved parking, HSG A
7,144	59	Weighted Average
4,719		66.06% Pervious Area
2,425		33.94% Impervious Area

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

Subcatchment PR-1: WESTERN ENTRANCE



Summary for Subcatchment PR-10: NORTHERN PORTION

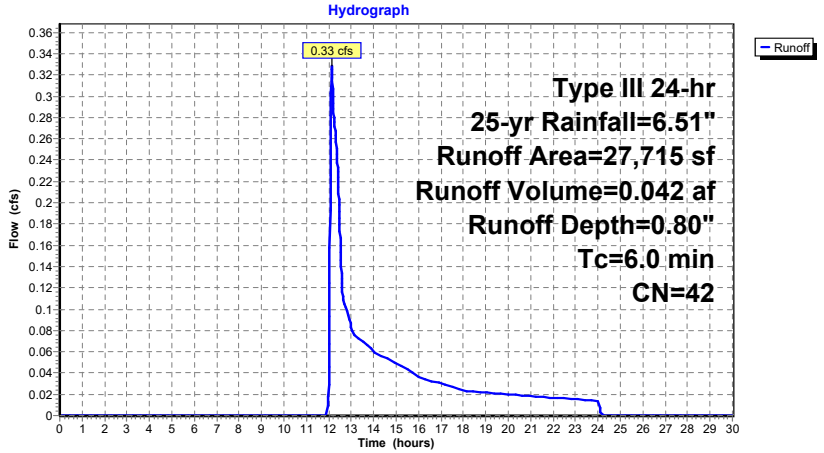
Runoff = 0.33 cfs @ 12.13 hrs, Volume= 0.042 af, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
	9,680	32	Woods/grass comb., Good, HSG A
	1,360	98	Paved parking, HSG A
*	995	98	Paved parking, HSG A - rear building
	15,680	39	>75% Grass cover, Good, HSG A
	27,715	42	Weighted Average
	25,360		91.50% Pervious Area
	2,355		8.50% Impervious Area

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

Subcatchment PR-10: NORTHERN PORTION



Summary for Subcatchment PR-11: RIVER

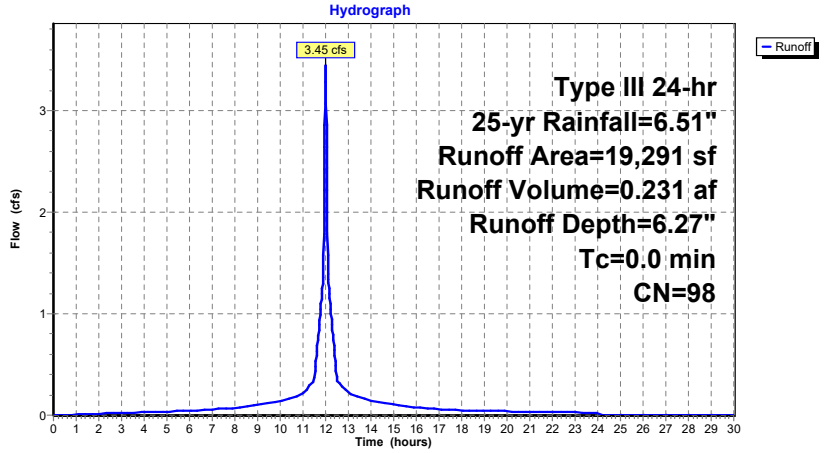
Runoff = 3.45 cfs @ 12.00 hrs, Volume= 0.231 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment PR-11: RIVER



Summary for Subcatchment PR-2A: BLDG A PARKING

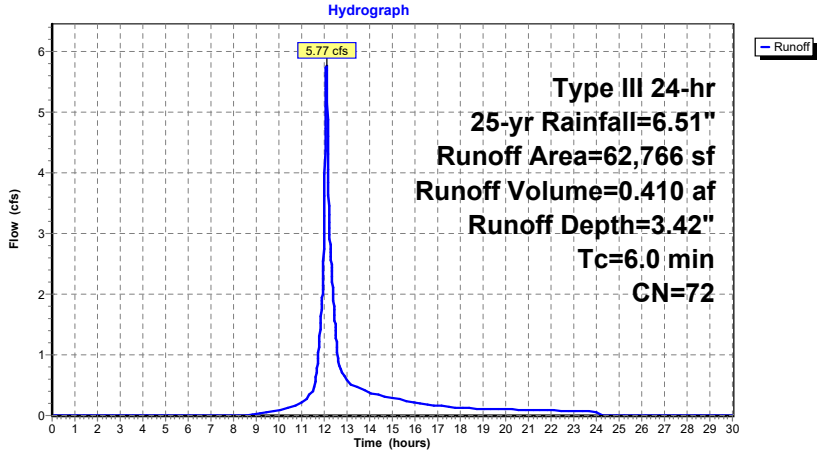
Runoff = 5.77 cfs @ 12.09 hrs, Volume= 0.410 af, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	6,650	96	Gravel surface, HSG A - Rail
*	30,345	98	Paved parking, HSG A - parking
	2,350	39	>75% Grass cover, Good, HSG A
	5,784	39	>75% Grass cover, Good, HSG A
	17,637	32	Woods/grass comb., Good, HSG A
	62,766	72	Weighted Average
	32,421		51.65% Pervious Area
	30,345		48.35% Impervious Area

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

Subcatchment PR-2A: BLDG A PARKING



Summary for Subcatchment PR-2B: BLDG A PARKING

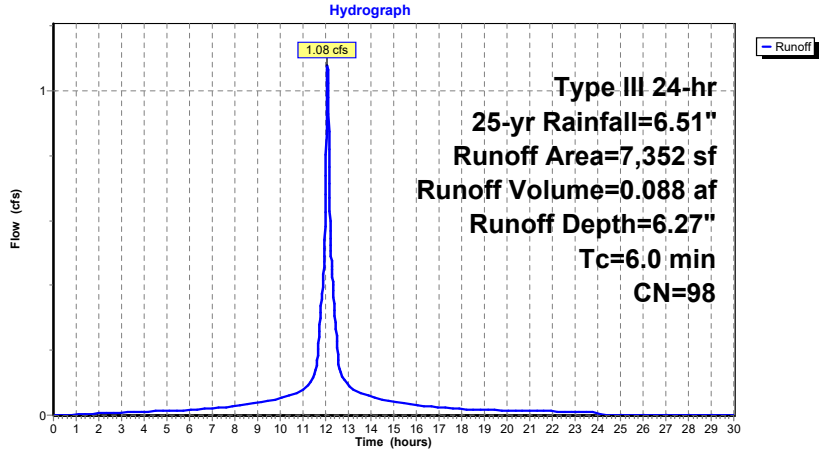
Runoff = 1.08 cfs @ 12.08 hrs, Volume= 0.088 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

	Area (sf)	CN	Description
*	7,352	98	Paved parking, HSG A-2B
	7,352		100.00% Impervious Area

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

Subcatchment PR-2B: BLDG A PARKING



Summary for Subcatchment PR-3: COURTYARD

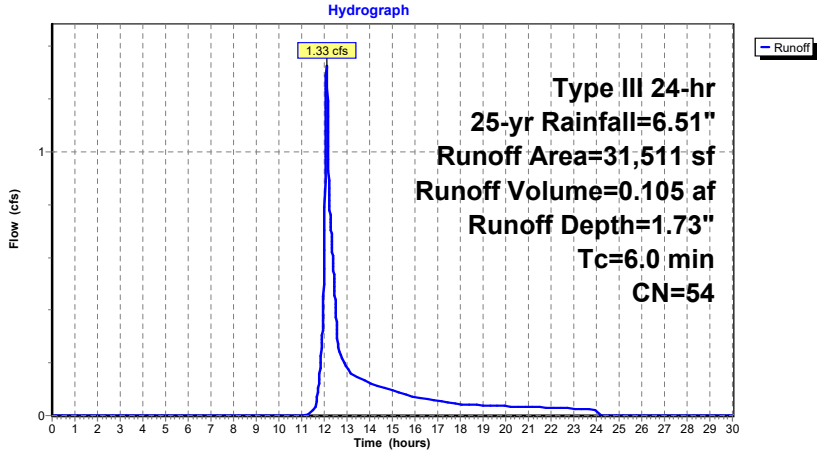
Runoff = 1.33 cfs @ 12.10 hrs, Volume= 0.105 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
6,167	32	Woods/grass comb., Good, HSG A
8,303	98	Paved parking, HSG A
591	96	Gravel surface, HSG A
16,450	39	>75% Grass cover, Good, HSG A
31,511	54	Weighted Average
23,208		73.65% Pervious Area
8,303		26.35% Impervious Area

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

Subcatchment PR-3: COURTYARD



Summary for Subcatchment PR-4: BLDG A

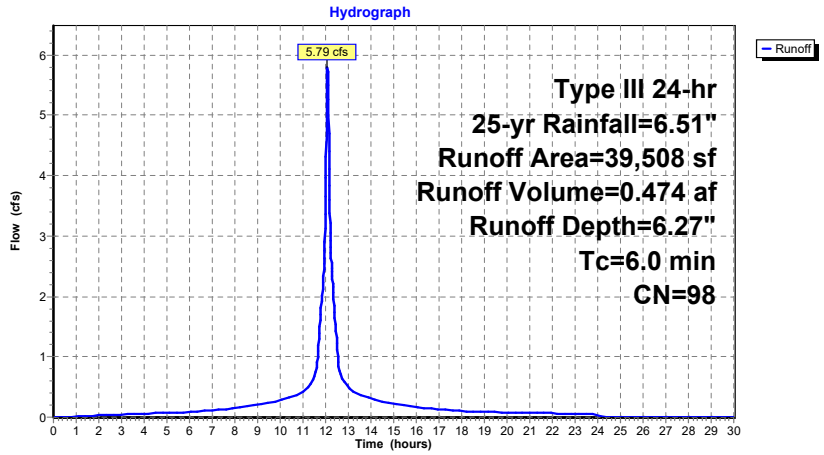
Runoff = 5.79 cfs @ 12.08 hrs, Volume= 0.474 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
39,508	98	Roofs, HSG A
39,508		100.00% Impervious Area

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

Subcatchment PR-4: BLDG A



Summary for Subcatchment PR-5: AMMENITY AREA

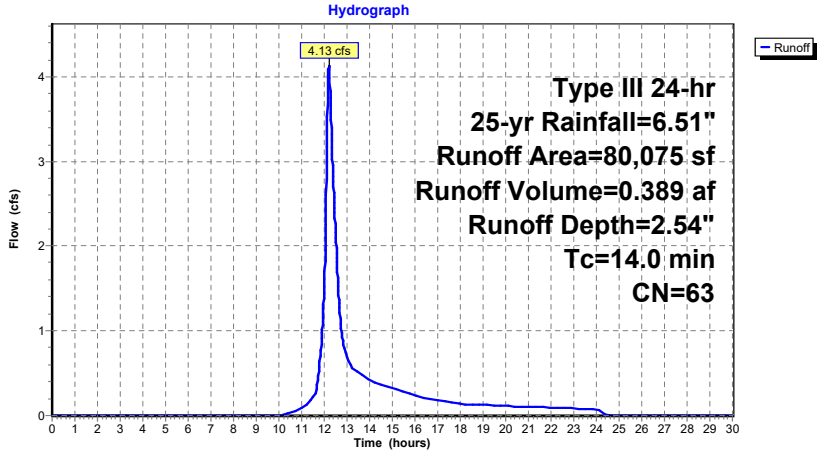
Runoff = 4.13 cfs @ 12.20 hrs, Volume= 0.389 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
19,934	96	Gravel surface, HSG A
8,965	98	Paved parking, HSG A
33,565	32	Woods/grass comb., Good, HSG A
17,611	68	<50% Grass cover, Poor, HSG A
80,075	63	Weighted Average
71,110		88.80% Pervious Area
8,965		11.20% Impervious Area

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

Subcatchment PR-5: AMMENITY AREA



Summary for Subcatchment PR-6: BLDG B PARKING

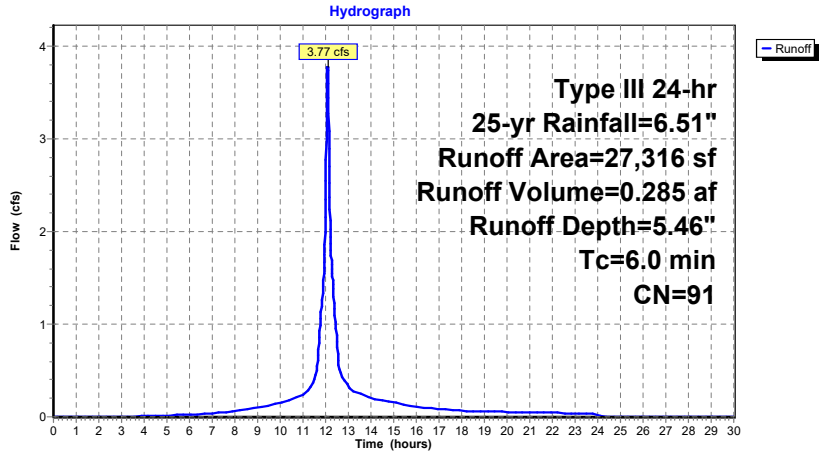
Runoff = 3.77 cfs @ 12.08 hrs, Volume= 0.285 af, Depth= 5.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
3,228	39	>75% Grass cover, Good, HSG A
24,088	98	Paved parking, HSG A
27,316	91	Weighted Average
3,228		11.82% Pervious Area
24,088		88.18% Impervious Area

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

Subcatchment PR-6: BLDG B PARKING



Summary for Subcatchment PR-7: EASTERN ENTRANCE

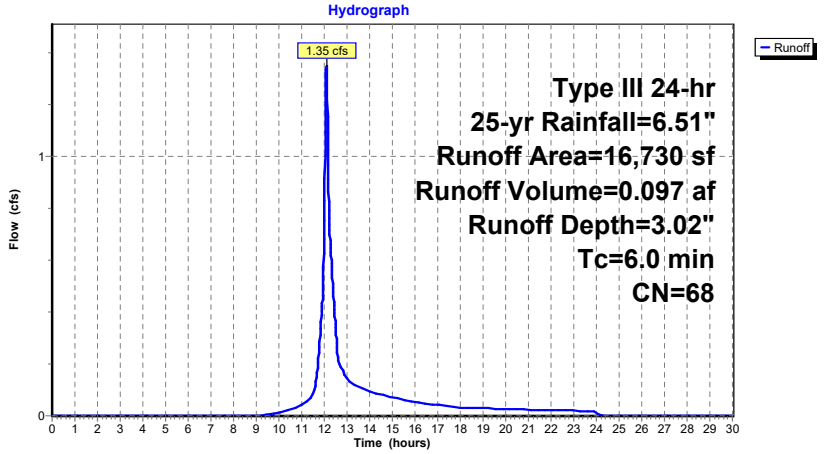
Runoff = 1.35 cfs @ 12.09 hrs, Volume= 0.097 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
8,678	98	Paved parking, HSG A
5,225	39	>75% Grass cover, Good, HSG A
2,827	32	Woods/grass comb., Good, HSG A
16,730	68	Weighted Average
8,052		48.13% Pervious Area
8,678		51.87% Impervious Area

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

Subcatchment PR-7: EASTERN ENTRANCE



Summary for Subcatchment PR-8: BLDG B

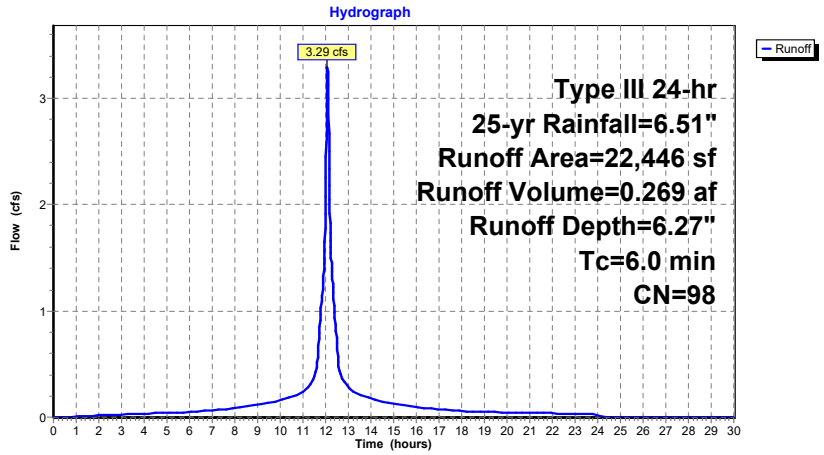
Runoff = 3.29 cfs @ 12.08 hrs, Volume= 0.269 af, Depth= 6.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Description
22,446	98	Roofs, HSG A
22,446		100.00% Impervious Area

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

Subcatchment PR-8: BLDG B



Summary for Subcatchment PR-9: DOG PARK

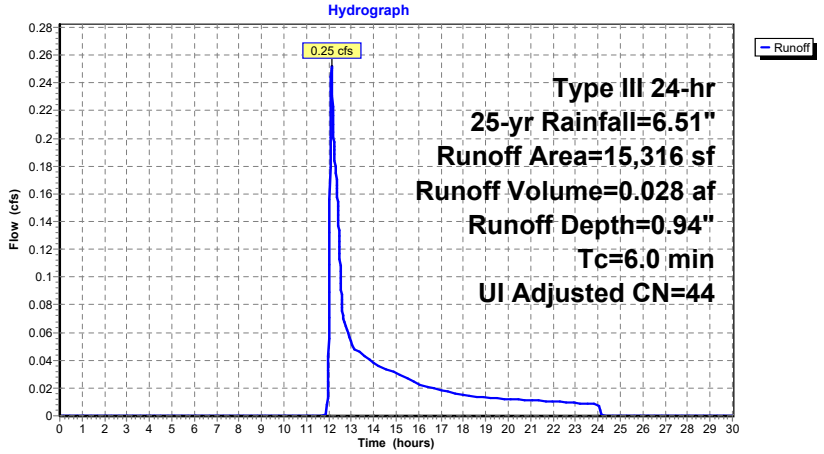
Runoff = 0.25 cfs @ 12.12 hrs, Volume= 0.028 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.51"

Area (sf)	CN	Adj	Description
12,553	39		>75% Grass cover, Good, HSG A
2,763	98		Unconnected pavement, HSG A
15,316	50	44	Weighted Average, UI Adjusted
12,553			81.96% Pervious Area
2,763			18.04% Impervious Area
2,763			100.00% Unconnected

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

Subcatchment PR-9: DOG PARK



Summary for Pond 1P: SIS-01

Inflow Area = 2.348 ac, 68.30% Impervious, Inflow Depth = 4.52" for 25-yr event
Inflow = 11.55 cfs @ 12.09 hrs, Volume= 0.884 af
Outflow = 3.51 cfs @ 12.42 hrs, Volume= 0.884 af, Atten= 70%, Lag= 19.8 min
Discarded = 0.43 cfs @ 10.39 hrs, Volume= 0.566 af
Primary = 3.08 cfs @ 12.42 hrs, Volume= 0.318 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 70.28' @ 12.42 hrs Surf.Area= 7,736 sf Storage= 12,287 cf

Plug-Flow detention time= 98.4 min calculated for 0.884 af (100% of inflow)
Center-of-Mass det. time= 98.4 min (882.1 - 783.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.00'	6,862 cf	**39.50'W x 195.86'L x 3.50'H Field A** 27,077 cf Overall - 9,923 cf Embedded = 17,154 cf x 40.0% Voids
#2A	68.50'	9,923 cf	**ADS_StormTech SC-740 +Cap** x 216 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 8 Rows of 27 Chambers
#3	68.00'	50 cf	**4.00'D x 4.00'H CBN-1**-Impervious
		16,835 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.12'	**12.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.12' / 67.00' S= 0.0255 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	68.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.43 cfs @ 10.39 hrs HW=68.04' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=3.08 cfs @ 12.42 hrs HW=70.28' (Free Discharge)
↑**1=Culvert** (Inlet Controls 3.08 cfs @ 3.92 fps)

Pond 1P: SIS-01 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

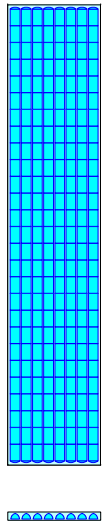
27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
8 Rows x 51.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 39.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

216 Chambers x 45.9 cf = 9,923.0 cf Chamber Storage

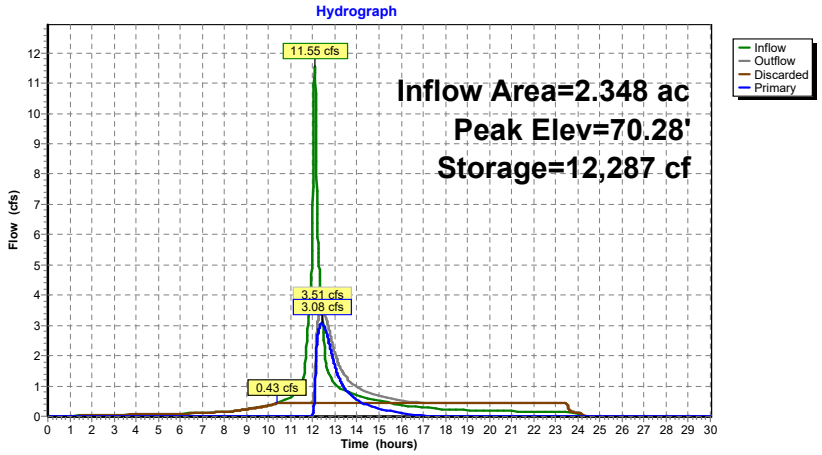
27,077.2 cf Field - 9,923.0 cf Chambers = 17,154.1 cf Stone x 40.0% Voids = 6,861.7 cf Stone Storage

Chamber Storage + Stone Storage = 16,784.7 cf = 0.385 af
Overall Storage Efficiency = 62.0%
Overall System Size = 195.86' x 39.50' x 3.50'

216 Chambers
1,002.9 cy Field
635.3 cy Stone



Pond 1P: SIS-01



Summary for Pond 2P: SIS-02

Inflow Area = 1.142 ac, 93.51% Impervious, Inflow Depth = 5.82" for 25-yr event
Inflow = 7.06 cfs @ 12.08 hrs, Volume= 0.554 af
Outflow = 2.04 cfs @ 12.41 hrs, Volume= 0.550 af, Atten= 71%, Lag= 19.7 min
Discarded = 0.27 cfs @ 9.56 hrs, Volume= 0.444 af
Primary = 1.77 cfs @ 12.41 hrs, Volume= 0.106 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.05' @ 12.41 hrs Surf.Area= 4,793 sf Storage= 9,138 cf

Plug-Flow detention time= 219.2 min calculated for 0.550 af (99% of inflow)
Center-of-Mass det. time= 214.1 min (975.9 - 761.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.20'	4,285 cf	**58.50'W x 81.94'L x 3.50'H Field A** 16,777 cf Overall - 6,064 cf Embedded = 10,712 cf x 40.0% Voids
#2A	68.70'	6,064 cf	**ADS_StormTech SC-740 +Cap** x 132 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 12 Rows of 11 Chambers
#3	64.00'	50 cf	**4.00'D x 4.00'H CBN-08**-Impervious
		10,399 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**20.0' long x 5.0' breadth Level Spreader** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Device 1	70.50'	**24.0" Round Culvert** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.50' / 65.00' S= 0.0705 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#3	Discarded	68.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.27 cfs @ 9.56 hrs HW=68.20' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=1.77 cfs @ 12.41 hrs HW=71.05' (Free Discharge)
└**1=Level Spreader** (Passes 1.77 cfs of 217.32 cfs potential flow)
└**2=Culvert** (Inlet Controls 1.77 cfs @ 2.52 fps)

Pond 2P: SIS-02 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

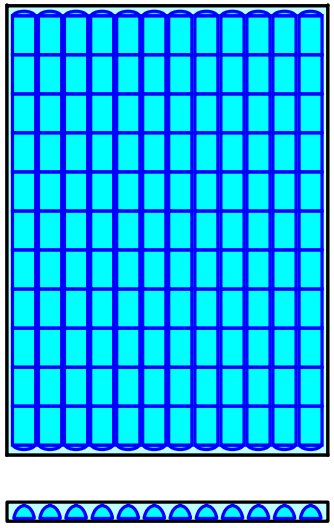
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

132 Chambers x 45.9 cf = 6,064.1 cf Chamber Storage

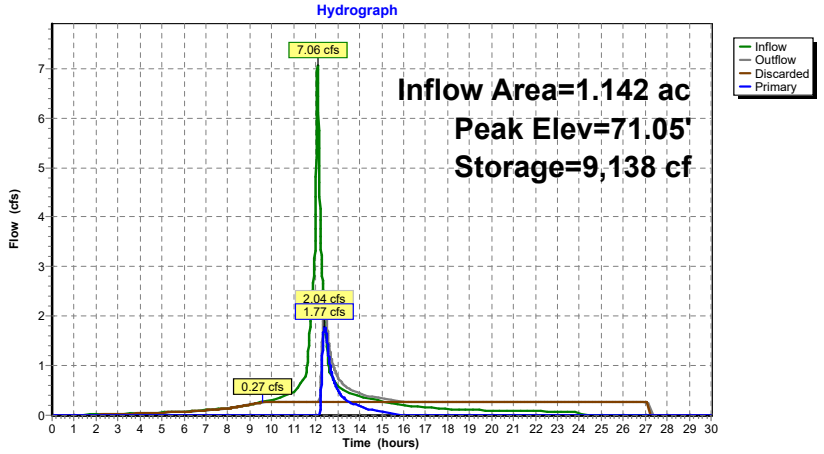
16,776.5 cf Field - 6,064.1 cf Chambers = 10,712.4 cf Stone x 40.0% Voids = 4,285.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,349.1 cf = 0.238 af
Overall Storage Efficiency = 61.7%
Overall System Size = 81.94' x 58.50' x 3.50'

132 Chambers
621.4 cy Field
396.8 cy Stone



Pond 2P: SIS-02



Summary for Pond 3P: SIS-03

Inflow Area = 0.169 ac,100.00% Impervious, Inflow Depth = 6.27" for 25-yr event
Inflow = 1.08 cfs @ 12.08 hrs, Volume= 0.088 af
Outflow = 0.11 cfs @ 12.82 hrs, Volume= 0.088 af, Atten= 90%, Lag= 44.4 min
Discarded = 0.04 cfs @ 9.46 hrs, Volume= 0.083 af
Primary = 0.06 cfs @ 12.82 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.52' @ 12.82 hrs Surf.Area= 804 sf Storage= 1,663 cf

Plug-Flow detention time= 284.9 min calculated for 0.088 af (100% of inflow)
Center-of-Mass det. time= 284.5 min (1,028.5 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	66.20'	758 cf	**20.50'W x 39.22'L x 3.50'H Field A** 2,814 cf Overall - 919 cf Embedded = 1,895 cf x 40.0% Voids
#2A	66.70'	919 cf	**ADS_StormTech SC-740 +Cap** x 20 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 4 Rows of 5 Chambers
#3	66.00'	50 cf	**4.00'D x 4.00'H WQI-01**-Impervious
		1,727 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.40' / 69.10' S= 0.0231 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	66.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 9.46 hrs HW=66.20' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.06 cfs @ 12.82 hrs HW=69.52' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.06 cfs @ 1.18 fps)

Pond 3P: SIS-03 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

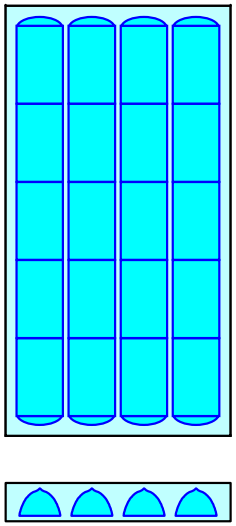
5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

20 Chambers x 45.9 cf = 918.8 cf Chamber Storage

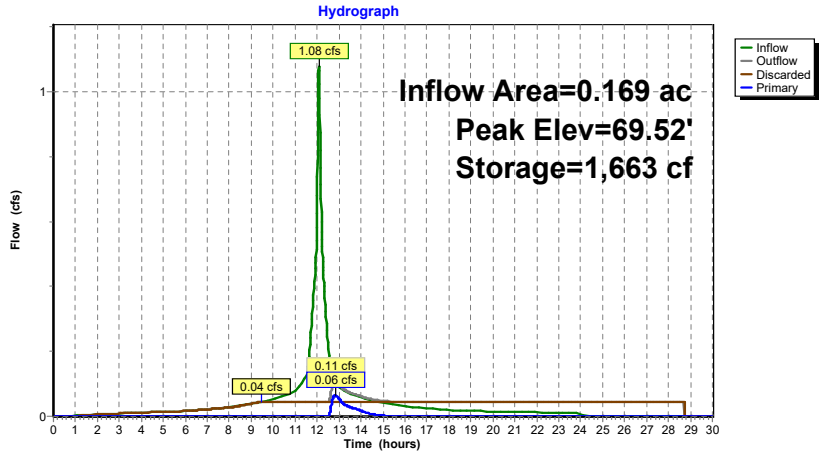
2,813.8 cf Field - 918.8 cf Chambers = 1,895.0 cf Stone x 40.0% Voids = 758.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,676.8 cf = 0.038 af
Overall Storage Efficiency = 59.6%
Overall System Size = 39.22' x 20.50' x 3.50'

20 Chambers
104.2 cy Field
70.2 cy Stone



Pond 3P: SIS-03

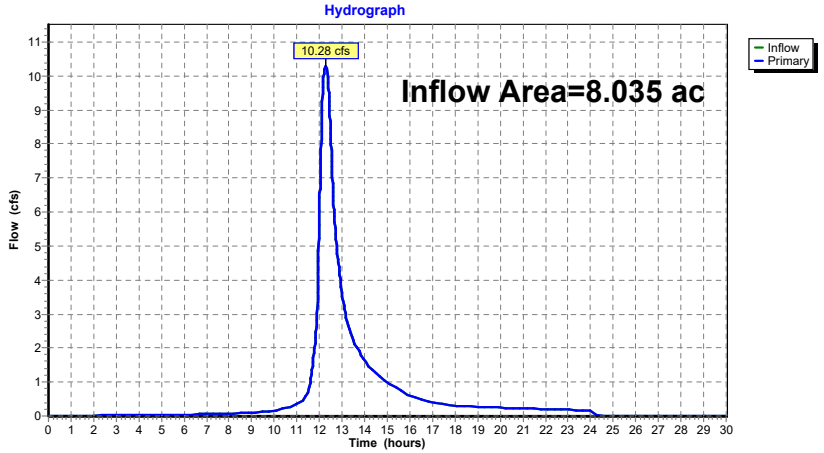


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 8.035 ac, 49.74% Impervious, Inflow Depth = 1.97" for 25-yr event
Inflow = 10.28 cfs @ 12.28 hrs, Volume= 1.320 af
Primary = 10.28 cfs @ 12.28 hrs, Volume= 1.320 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: PURGATORY BROOK

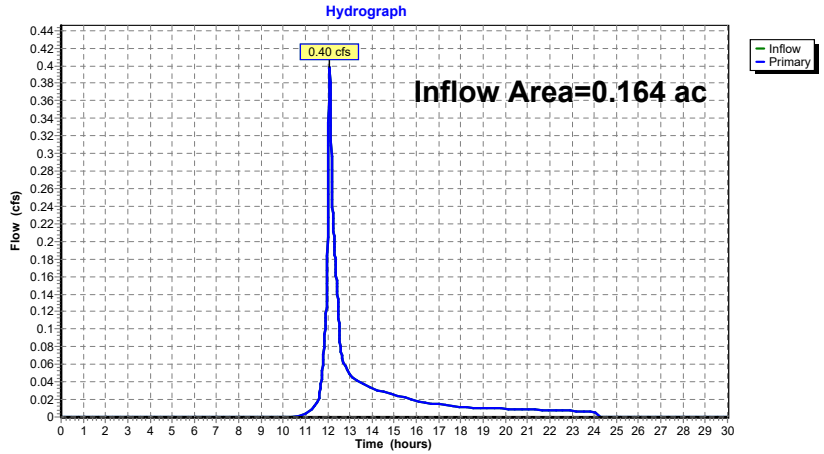


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.164 ac, 33.94% Impervious, Inflow Depth = 2.17" for 25-yr event
Inflow = 0.40 cfs @ 12.10 hrs, Volume= 0.030 af
Primary = 0.40 cfs @ 12.10 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-2: EVERETT STREET



Summary for Subcatchment PR-1: WESTERN ENTRANCE

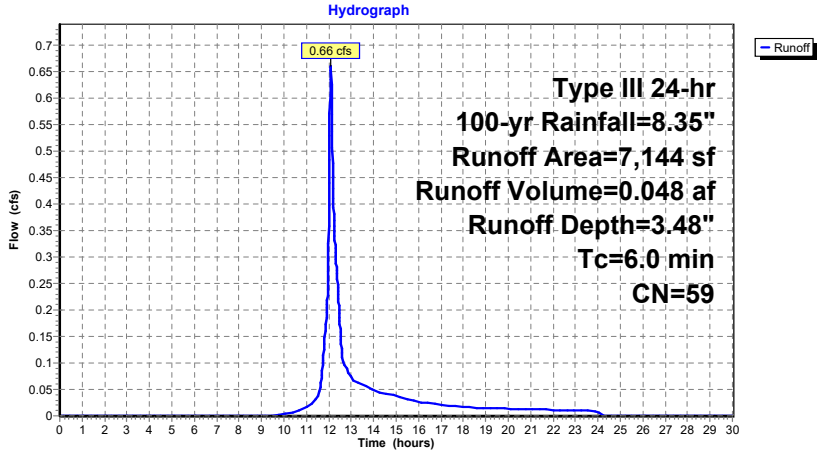
Runoff = 0.66 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 3.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
4,719	39	>75% Grass cover, Good, HSG A
2,425	98	Paved parking, HSG A
7,144	59	Weighted Average
4,719		66.06% Pervious Area
2,425		33.94% Impervious Area

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

Subcatchment PR-1: WESTERN ENTRANCE



Summary for Subcatchment PR-10: NORTHERN PORTION

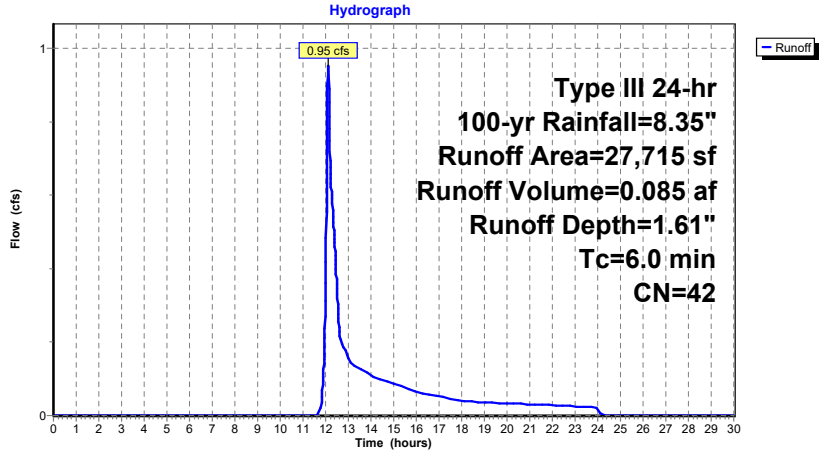
Runoff = 0.95 cfs @ 12.11 hrs, Volume= 0.085 af, Depth= 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
	9,680	32	Woods/grass comb., Good, HSG A
	1,360	98	Paved parking, HSG A
*	995	98	Paved parking, HSG A - rear building
	15,680	39	>75% Grass cover, Good, HSG A
	27,715	42	Weighted Average
	25,360		91.50% Pervious Area
	2,355		8.50% Impervious Area

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

Subcatchment PR-10: NORTHERN PORTION



Summary for Subcatchment PR-11: RIVER

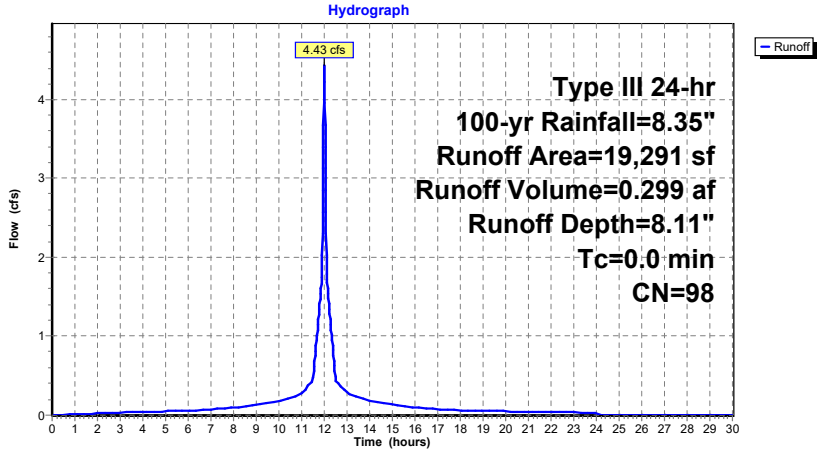
Runoff = 4.43 cfs @ 12.00 hrs, Volume= 0.299 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	19,291	98	Water Surface, HSG A, River
	19,291		100.00% Impervious Area

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

Subcatchment PR-11: RIVER



Summary for Subcatchment PR-2A: BLDG A PARKING

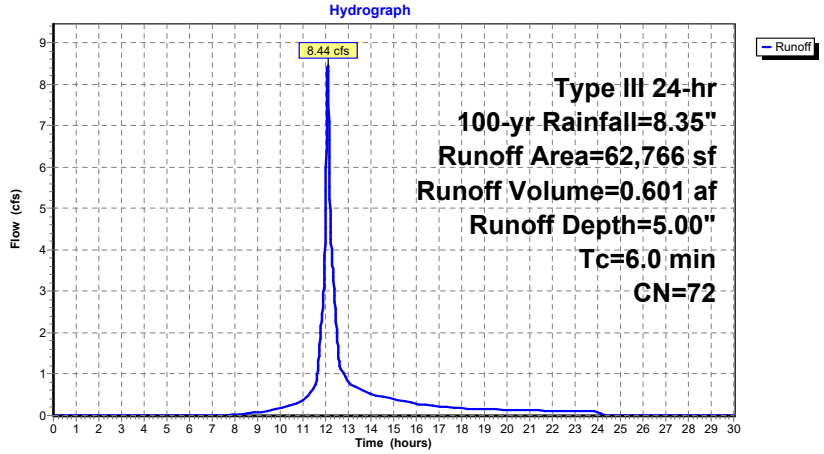
Runoff = 8.44 cfs @ 12.09 hrs, Volume= 0.601 af, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	6,650	96	Gravel surface, HSG A - Rail
*	30,345	98	Paved parking, HSG A - parking
	2,350	39	>75% Grass cover, Good, HSG A
	5,784	39	>75% Grass cover, Good, HSG A
	17,637	32	Woods/grass comb., Good, HSG A
	62,766	72	Weighted Average
	32,421		51.65% Pervious Area
	30,345		48.35% Impervious Area

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

Subcatchment PR-2A: BLDG A PARKING



Summary for Subcatchment PR-2B: BLDG A PARKING

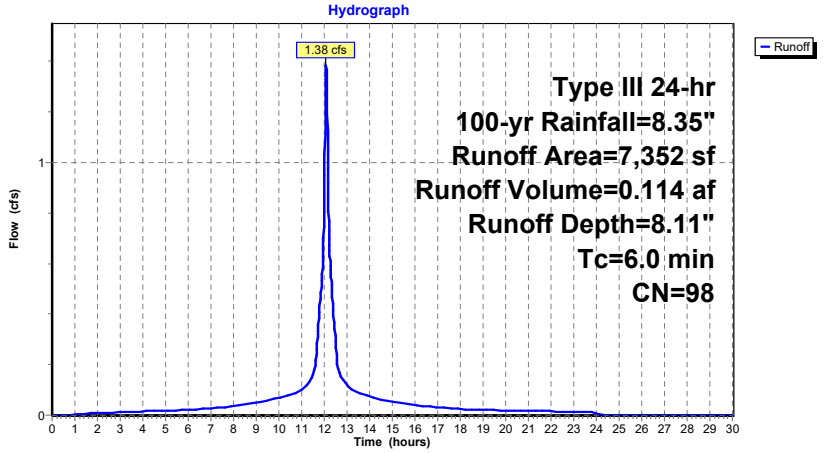
Runoff = 1.38 cfs @ 12.08 hrs, Volume= 0.114 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

	Area (sf)	CN	Description
*	7,352	98	Paved parking, HSG A-2B
	7,352		100.00% Impervious Area

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

Subcatchment PR-2B: BLDG A PARKING



Summary for Subcatchment PR-3: COURTYARD

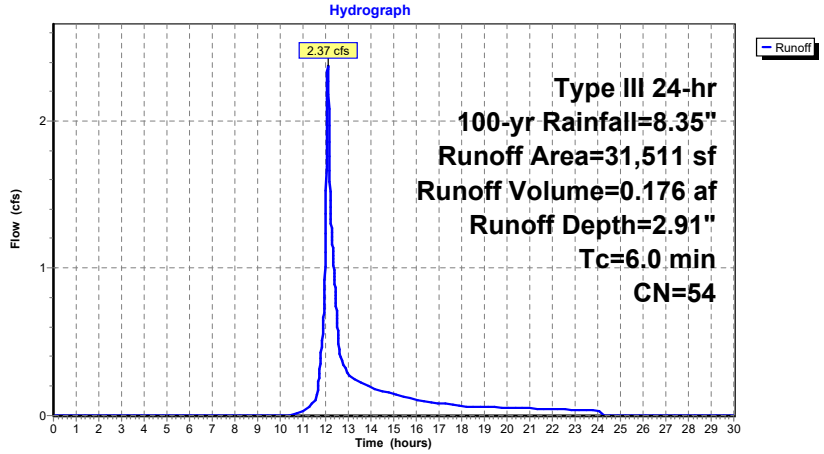
Runoff = 2.37 cfs @ 12.09 hrs, Volume= 0.176 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
6,167	32	Woods/grass comb., Good, HSG A
8,303	98	Paved parking, HSG A
591	96	Gravel surface, HSG A
16,450	39	>75% Grass cover, Good, HSG A
31,511	54	Weighted Average
23,208		73.65% Pervious Area
8,303		26.35% Impervious Area

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

Subcatchment PR-3: COURTYARD



Summary for Subcatchment PR-4: BLDG A

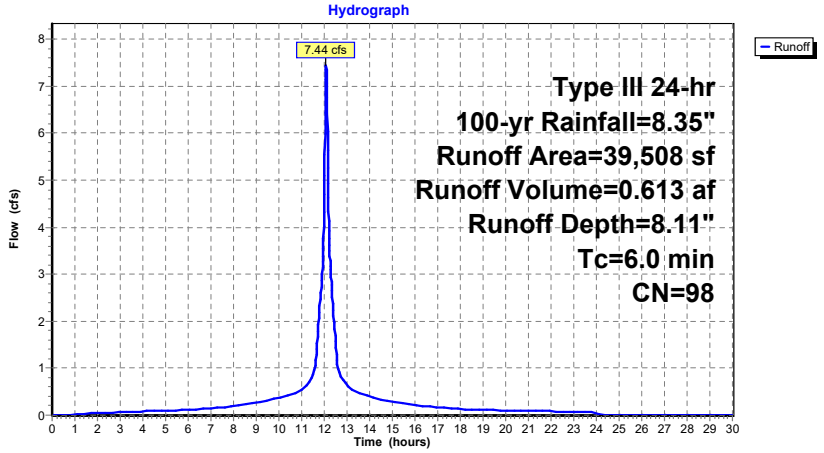
Runoff = 7.44 cfs @ 12.08 hrs, Volume= 0.613 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
39,508	98	Roofs, HSG A
39,508		100.00% Impervious Area

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

Subcatchment PR-4: BLDG A



Summary for Subcatchment PR-5: AMMENITY AREA

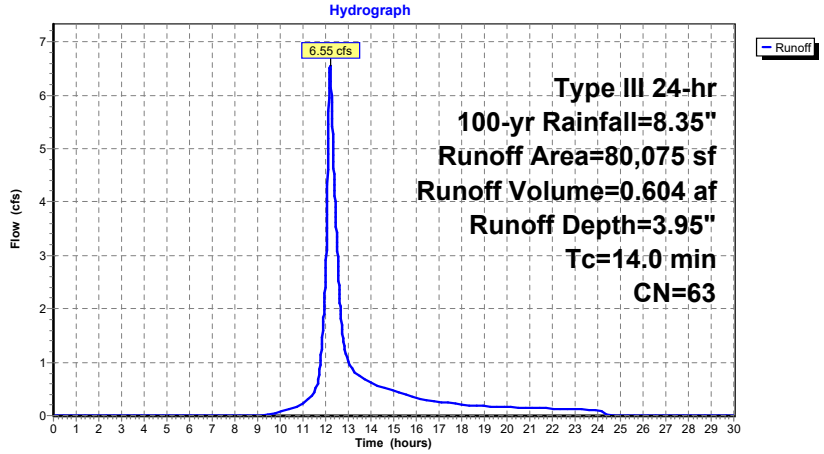
Runoff = 6.55 cfs @ 12.20 hrs, Volume= 0.604 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
19,934	96	Gravel surface, HSG A
8,965	98	Paved parking, HSG A
33,565	32	Woods/grass comb., Good, HSG A
17,611	68	<50% Grass cover, Poor, HSG A
80,075	63	Weighted Average
71,110		88.80% Pervious Area
8,965		11.20% Impervious Area

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

Subcatchment PR-5: AMMENITY AREA



Summary for Subcatchment PR-6: BLDG B PARKING

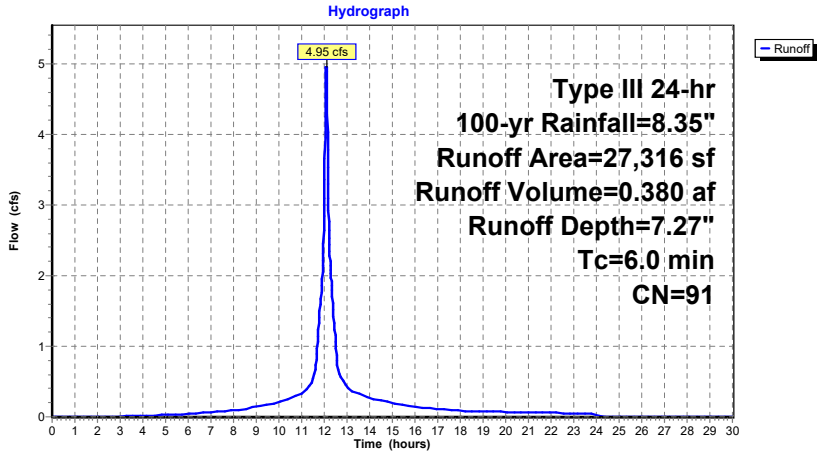
Runoff = 4.95 cfs @ 12.08 hrs, Volume= 0.380 af, Depth= 7.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
3,228	39	>75% Grass cover, Good, HSG A
24,088	98	Paved parking, HSG A
27,316	91	Weighted Average
3,228		11.82% Pervious Area
24,088		88.18% Impervious Area

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

Subcatchment PR-6: BLDG B PARKING



Summary for Subcatchment PR-7: EASTERN ENTRANCE

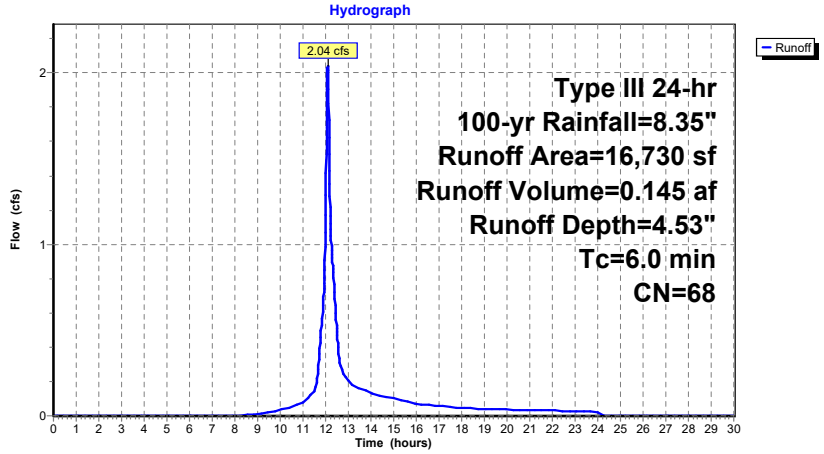
Runoff = 2.04 cfs @ 12.09 hrs, Volume= 0.145 af, Depth= 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
8,678	98	Paved parking, HSG A
5,225	39	>75% Grass cover, Good, HSG A
2,827	32	Woods/grass comb., Good, HSG A
16,730	68	Weighted Average
8,052		48.13% Pervious Area
8,678		51.87% Impervious Area

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

Subcatchment PR-7: EASTERN ENTRANCE



Summary for Subcatchment PR-8: BLDG B

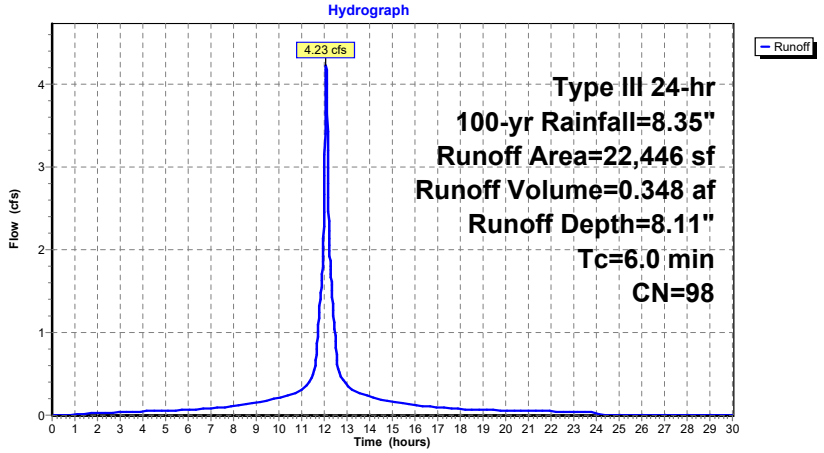
Runoff = 4.23 cfs @ 12.08 hrs, Volume= 0.348 af, Depth= 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Description
22,446	98	Roofs, HSG A
22,446		100.00% Impervious Area

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

Subcatchment PR-8: BLDG B



Summary for Subcatchment PR-9: DOG PARK

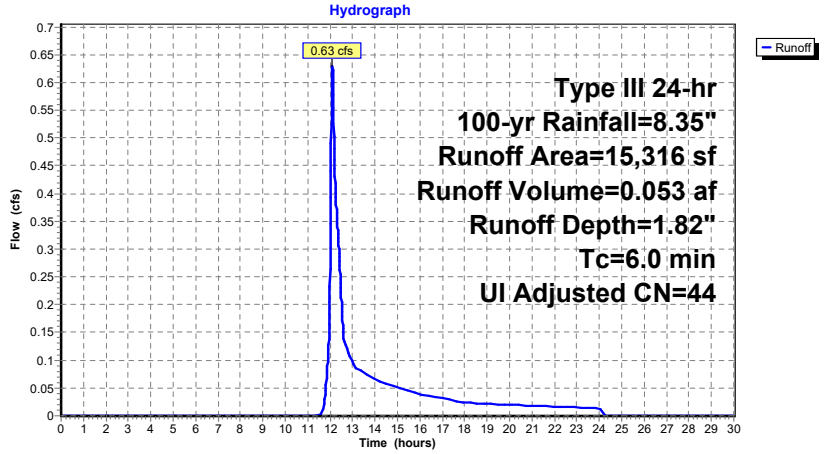
Runoff = 0.63 cfs @ 12.10 hrs, Volume= 0.053 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.35"

Area (sf)	CN	Adj	Description
12,553	39		>75% Grass cover, Good, HSG A
2,763	98		Unconnected pavement, HSG A
15,316	50	44	Weighted Average, UI Adjusted
12,553			81.96% Pervious Area
2,763			18.04% Impervious Area
2,763			100.00% Unconnected

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

Subcatchment PR-9: DOG PARK



Summary for Pond 1P: SIS-01

Inflow Area = 2.348 ac, 68.30% Impervious, Inflow Depth = 6.20" for 100-yr event
Inflow = 15.87 cfs @ 12.09 hrs, Volume= 1.214 af
Outflow = 5.51 cfs @ 12.37 hrs, Volume= 1.214 af, Atten= 65%, Lag= 16.8 min
Discarded = 0.43 cfs @ 9.54 hrs, Volume= 0.642 af
Primary = 5.08 cfs @ 12.37 hrs, Volume= 0.571 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.42' @ 12.37 hrs Surf.Area= 7,736 sf Storage= 16,587 cf

Plug-Flow detention time= 91.6 min calculated for 1.214 af (100% of inflow)
Center-of-Mass det. time= 91.6 min (870.9 - 779.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.00'	6,862 cf	**39.50'W x 195.86'L x 3.50'H Field A** 27,077 cf Overall - 9,923 cf Embedded = 17,154 cf x 40.0% Voids
#2A	68.50'	9,923 cf	**ADS_StormTech SC-740 +Cap** x 216 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 8 Rows of 27 Chambers
#3	68.00'	50 cf	**4.00'D x 4.00'H CBN-1**-Impervious
		16,835 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.12'	**12.0" Round Culvert** L= 83.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.12' / 67.00' S= 0.0255 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	68.00'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.43 cfs @ 9.54 hrs HW=68.04' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=5.08 cfs @ 12.37 hrs HW=71.42' (Free Discharge)
↑**1=Culvert** (Inlet Controls 5.08 cfs @ 6.46 fps)

Pond 1P: SIS-01 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

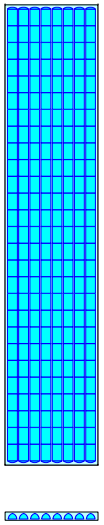
27 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 193.86' Row Length +12.0" End Stone x 2 = 195.86' Base Length
8 Rows x 51.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 39.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

216 Chambers x 45.9 cf = 9,923.0 cf Chamber Storage

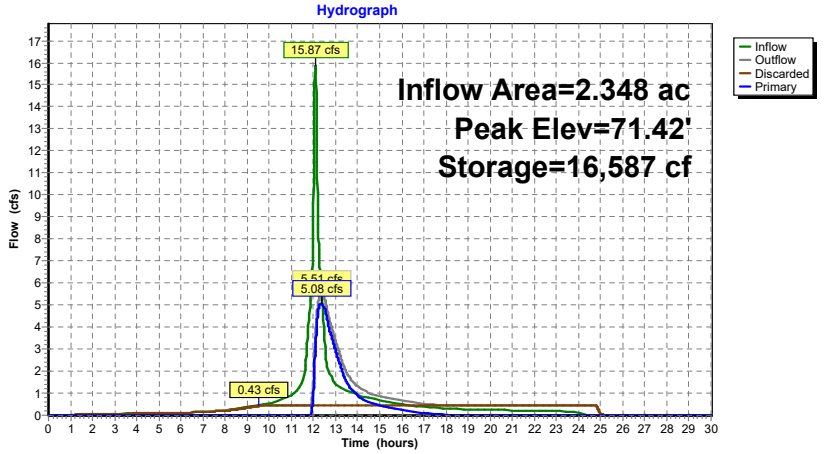
27,077.2 cf Field - 9,923.0 cf Chambers = 17,154.1 cf Stone x 40.0% Voids = 6,861.7 cf Stone Storage

Chamber Storage + Stone Storage = 16,784.7 cf = 0.385 af
Overall Storage Efficiency = 62.0%
Overall System Size = 195.86' x 39.50' x 3.50'

216 Chambers
1,002.9 cy Field
635.3 cy Stone



Pond 1P: SIS-01



Summary for Pond 2P: SIS-02

Inflow Area = 1.142 ac, 93.51% Impervious, Inflow Depth = 7.65" for 100-yr event
Inflow = 9.17 cfs @ 12.08 hrs, Volume= 0.728 af
Outflow = 5.40 cfs @ 12.19 hrs, Volume= 0.731 af, Atten= 41%, Lag= 6.4 min
Discarded = 0.27 cfs @ 8.65 hrs, Volume= 0.496 af
Primary = 5.13 cfs @ 12.19 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 71.48' @ 12.19 hrs Surf.Area= 4,793 sf Storage= 9,971 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 179.3 min (936.0 - 756.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	68.20'	4,285 cf	**58.50'W x 81.94'L x 3.50'H Field A** 16,777 cf Overall - 6,064 cf Embedded = 10,712 cf x 40.0% Voids
#2A	68.70'	6,064 cf	**ADS_StormTech SC-740 +Cap** x 132 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 12 Rows of 11 Chambers
#3	64.00'	50 cf	**4.00'D x 4.00'H CBN-08**-Impervious
		10,399 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	68.50'	**20.0' long x 5.0' breadth Level Spreader** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Device 1	70.50'	**24.0" Round Culvert** L= 78.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 70.50' / 65.00' S= 0.0705 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#3	Discarded	68.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.27 cfs @ 8.65 hrs HW=68.20' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=5.13 cfs @ 12.19 hrs HW=71.48' (Free Discharge)
└**1=Level Spreader** (Passes 5.13 cfs of 273.27 cfs potential flow)
└**2=Culvert** (Inlet Controls 5.13 cfs @ 3.36 fps)

Pond 2P: SIS-02 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

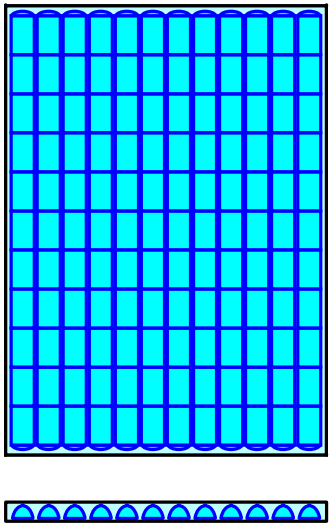
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

132 Chambers x 45.9 cf = 6,064.1 cf Chamber Storage

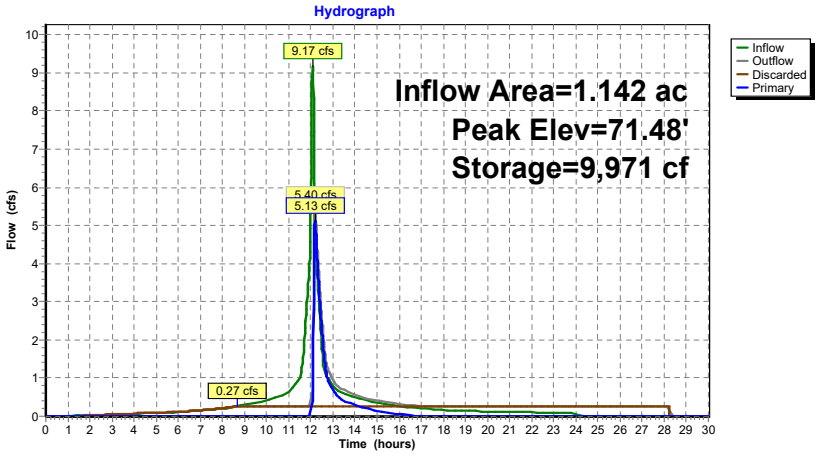
16,776.5 cf Field - 6,064.1 cf Chambers = 10,712.4 cf Stone x 40.0% Voids = 4,285.0 cf Stone Storage

Chamber Storage + Stone Storage = 10,349.1 cf = 0.238 af
Overall Storage Efficiency = 61.7%
Overall System Size = 81.94' x 58.50' x 3.50'

132 Chambers
621.4 cy Field
396.8 cy Stone



Pond 2P: SIS-02



Summary for Pond 3P: SIS-03

Inflow Area = 0.169 ac,100.00% Impervious, Inflow Depth = 8.11" for 100-yr event
Inflow = 1.38 cfs @ 12.08 hrs, Volume= 0.114 af
Outflow = 0.76 cfs @ 12.21 hrs, Volume= 0.114 af, Atten= 45%, Lag= 7.9 min
Discarded = 0.04 cfs @ 8.66 hrs, Volume= 0.090 af
Primary = 0.72 cfs @ 12.21 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 69.83' @ 12.21 hrs Surf.Area= 804 sf Storage= 1,725 cf

Plug-Flow detention time= 245.9 min calculated for 0.114 af (100% of inflow)
Center-of-Mass det. time= 245.9 min (986.6 - 740.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	66.20'	758 cf	**20.50'W x 39.22'L x 3.50'H Field A** 2,814 cf Overall - 919 cf Embedded = 1,895 cf x 40.0% Voids
#2A	66.70'	919 cf	**ADS_StormTech SC-740 +Cap** x 20 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 4 Rows of 5 Chambers
#3	66.00'	50 cf	**4.00'D x 4.00'H WQI-01**-Impervious
		1,727 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	69.40'	**12.0" Round Culvert** L= 13.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 69.40' / 69.10' S= 0.0231 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Discarded	66.20'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 8.66 hrs HW=66.20' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.67 cfs @ 12.21 hrs HW=69.81' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.67 cfs @ 2.19 fps)

Pond 3P: SIS-03 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
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

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

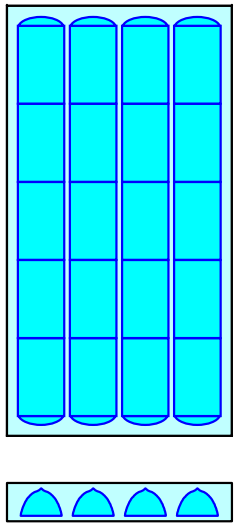
5 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 37.22' Row Length +12.0" End Stone x 2 = 39.22' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

20 Chambers x 45.9 cf = 918.8 cf Chamber Storage

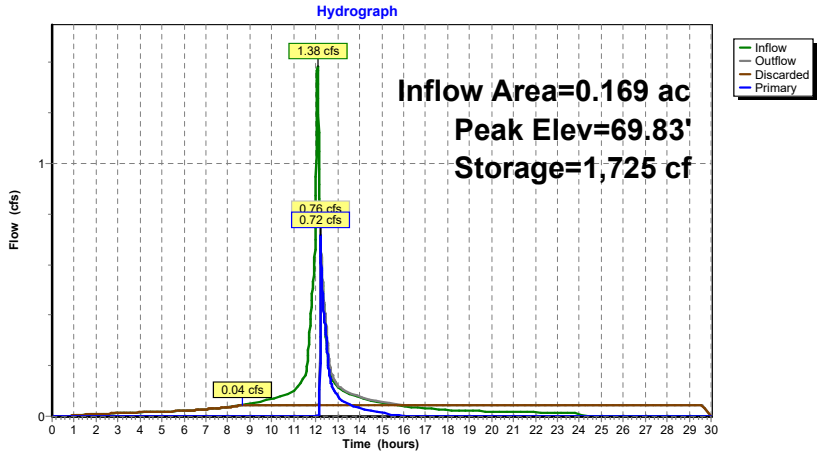
2,813.8 cf Field - 918.8 cf Chambers = 1,895.0 cf Stone x 40.0% Voids = 758.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,676.8 cf = 0.038 af
Overall Storage Efficiency = 59.6%
Overall System Size = 39.22' x 20.50' x 3.50'

20 Chambers
104.2 cy Field
70.2 cy Stone



Pond 3P: SIS-03

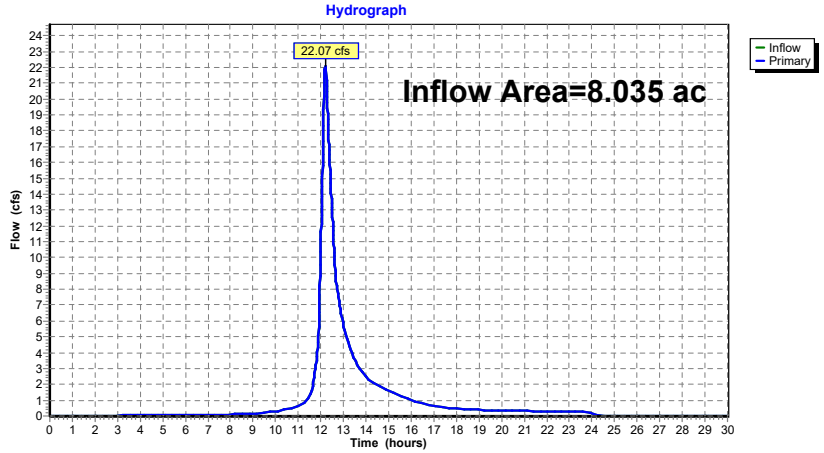


Summary for Link DP-1: PURGATORY BROOK

Inflow Area = 8.035 ac, 49.74% Impervious, Inflow Depth = 3.28" for 100-yr event
Inflow = 22.07 cfs @ 12.21 hrs, Volume= 2.193 af
Primary = 22.07 cfs @ 12.21 hrs, Volume= 2.193 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-1: PURGATORY BROOK

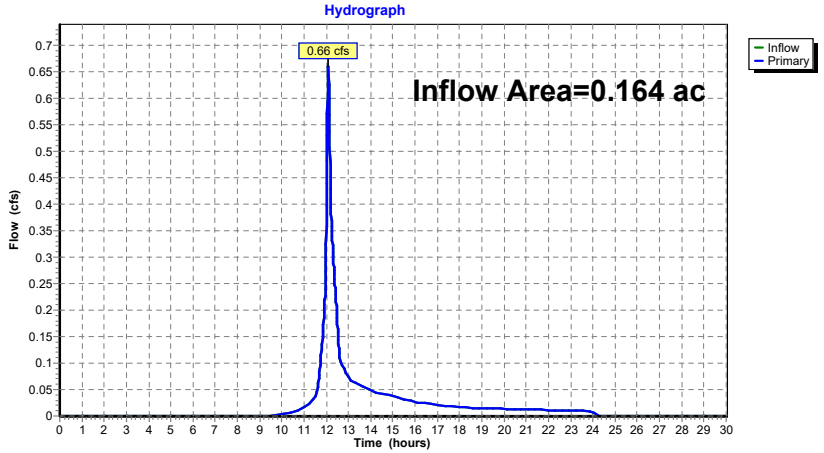


Summary for Link DP-2: EVERETT STREET

Inflow Area = 0.164 ac, 33.94% Impervious, Inflow Depth = 3.48" for 100-yr event
Inflow = 0.66 cfs @ 12.09 hrs, Volume= 0.048 af
Primary = 0.66 cfs @ 12.09 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link DP-2: EVERETT STREET



APPENDIX F: STORMWATER CALCULATIONS

- *MA STANDARD #3 – RECHARGE AND DRAWDOWN TIME*
- *MA STANDARD #4 – WATER QUALITY AND TSS REMOVAL*
- *NOAA RAINFALL DATA*
- *PIPE SIZING*
- *PHOSPHORUS REMOVAL*
- *MOUNDING ANALYSIS AND NARRATIVE*

Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 3: Recharge Volume Calculations

Required Recharge Volume - A Soils (0.60 in.)	
Existing Site Impervious Area (ac)	3.873
Proposed Site Impervious Area (ac)	4.052
Proposed Increase in Site Impervious Area (ac)	0.179
Recharge Volume Required (cf)	**389**

Total Recharge Volume Required (cf)	**389**

Recharge Volume Adjustment Factor	
Impervious Area Directed to Infiltration BMP (ac)	**2.951**
%Impervious Directed to Infiltration BMP	73%
Adjustment Factor	1.37
Adjusted Total Recharge Volume Required (cf)	**534**

Provided Recharge Volume*	
1P	5,546
2P	7,649
3P	1,623
Total Recharge Volume Provided (cf)	**14,818**

Provided greater than or Equal to Required

*Volume provided below lowest outlet in cubic feet (cf)

Prepared By:
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Boston, MA 02110

Proposed Multi-Family/Retail
22 Everett Street
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March 17, 2023

MA DEP Standard 3: Drawdown Time Calculations

Drawdown Time - 1P	
Volume below outlet pipe (Rv) (cf)	5,546
Soil Type	Loamy Sand - A
Infiltration rate (K)*	2.41
Bottom Area (sf)	3,500
Drawdown time (Hours)*	**7.9**
Drawdown Time - 2P	
Volume below outlet pipe (Rv) (cf)	7,649
Soil Type	Loamy Sand - A
Infiltration rate (K)*	2.41
Bottom Area (sf)	4,825
Drawdown time (Hours)**	**7.9**
Drawdown Time - 3P	
Volume below outlet pipe (Rv) (cf)	1,623
Soil Type	Loamy Sand - A
Infiltration rate (K)*	2.41
Bottom Area (sf)	960
Drawdown time (Hours)**	**8.4**

*Infiltration Rates taken from Rawls Table
**Drawdown time = Rv / (K) x (bottom area)

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Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: Water Quality Volume Calculations

Water Quality Volume Required	
Water Quality Volume runoff (in.)*	1.0
Total Post Development Impervious Area (sf)	176,488
Required Water Quality Volume (cf)	**14,707**
*Water Quality volume runoff is equal to 1.0 inch of runoff times the total impervious area of the post development project site.	

Water Quality Volume Provided*	
1P	5,546
2P	7,649
3P	1,623
Total Provided Water Quality Volume (cf)	**14,818**

Required Recharge Provided

Prepared By:
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Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 1 - (CBN-01, CBN-02) to WQU-01 to Infiltration System

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
CDS Water Quality Unit 01	**0.91**	**0.75**	**0.68**	**0.07**
Infiltration System	**0.80**	**0.07**	**0.05**	**0.01**
		Total TSS Removal =	**99%**	

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

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Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 2 - WQI-02 to Infiltration System

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Stormceptor Water Quality Inlet 02	**0.96**	**1.00**	**0.96**	**0.75**
Infiltration System	**0.80**	**0.04**	**0.03**	**0.07**
		Total TSS Removal =	**99%**	

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

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Proposed Multi-Family/Retail
22 Everett Street
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Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 3 - WQI-01 to Infiltration System

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Stormceptor Water Quality Inlet 01	**0.96**	**1.00**	**0.96**	**0.04**
Infiltration System	**0.80**	**0.04**	**0.03**	**0.01**
		Total TSS Removal =	**99%**	

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

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Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 4 - WQI-02, 05 to Infiltration System

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Stormceptor Water Quality Inlet 02, 05	**0.96**	**1.00**	**0.96**	**0.04**
Infiltration System	**0.80**	**0.04**	**0.03**	**0.01**
		Total TSS Removal =	**99%**	

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

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Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 5 - WQU-03 to Infiltration System

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
CDS Water Quality Unit 03	**0.91**	**0.75**	**0.68**	**0.07**
Infiltration System	**0.80**	**0.07**	**0.05**	**0.01**
		Total TSS Removal =	**99%**	

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

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Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 6 - WQI-04 to Level Spreader

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
CDS Water Quality Inlet 04	**0.90**	**1.00**	**0.90**	**0.10**
		Total TSS Removal =	**90%**	

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

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Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: Treatment Train 7 - WQU-03 to Flared End Section

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
CDS Water Quality Inlet 04	**0.90**	**1.00**	**0.90**	**0.10**
		Total TSS Removal =	**90%**	

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

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Proposed Multi-Family/Retail
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 17, 2023

MA DEP Standard 4: Weighted TSS Removal Rate

Design Point - Treatment Train Description(s)	TSS Removal (%)	Treated Imp. Area* (ac)
DP-1 - Treatment Train 1	99	0.290
DP-1 - Treatment Train 2	99	0.430
DP-1 - Treatment Train 3	99	0.100
DP-1 - Treatment Train 4	98	0.380
DP-1 - Treatment Train 6	99	0.380
DP-1 - Treatment Train 7	90	0.349
**Untreated Impervious	0	0.418
Weighted TSS Removal Rate	**80**	

*Excludes roof runoff
**Area of Purgatory Brook excluded in calculation

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Southborough, MA 01772
(508) 480-9900

Project: 22 Everett St
Location: Westwood, MA
Prepared For: Bohler, Boston Office / Angela Botto

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

Q = (qu) (A) (WQV)

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQU-01	0.35	0.0005469	5.0	0.083	1.00	795.00	0.43
WQU-02	0.43	0.0006719	5.0	0.083	1.00	795.00	0.53
WQU-03	0.38	0.0005938	5.0	0.083	1.00	795.00	0.47
WQI-O1	0.10	0.0001563	5.0	0.083	1.00	795.00	0.12
WQI-02	0.27	0.0004219	5.0	0.083	1.00	795.00	0.34
WQI-03	0.11	0.0001719	5.0	0.083	1.00	795.00	0.14

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

Brief Stormceptor Sizing Report - WQI-01

Project Information & Location			
Project Name	22 Everett St	**Project Number**	746333
City	Westwood	**State/ Province**	Massachusetts
Country	United States of America	**Date**	3/8/2023
Designer Information		**EOR Information (optional)**	
Name	Jim Lyons	**Name**	Angela Botto
Company	Contech Engineered Solutions	**Company**	Bohler Engineering
Phone #	413-246-5151	**Phone #**	617-849-8040
Email	james.lyons@conteches.com	**Email**	abotto@bohlereng.com

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQI-01
Target TSS Removal (%)	80
TSS Removal (%) Provided	96
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	96
STC 900	98
STC 1200	98
STC 1800	98
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details

Drainage Area	
Total Area (acres)	0.10
Imperviousness %	100.0

Rainfall	
Station Name	BLUE HILL
State/Province	Massachusetts
Station ID #	0736
Years of Records	58
Latitude	42°12'44"N
Longitude	71°6'53"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	0.12

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

Brief Stormceptor Sizing Report - WQI-02

Project Information & Location			
Project Name	22 Everett St	**Project Number**	746333
City	Westwood	**State/ Province**	Massachusetts
Country	United States of America	**Date**	3/8/2023
Designer Information		**EOR Information (optional)**	
Name	Jim Lyons	**Name**	Angela Botto
Company	Contech Engineered Solutions	**Company**	Bohler Engineering
Phone #	413-246-5151	**Phone #**	617-849-8040
Email	james.lyons@conteches.com	**Email**	abotto@bohlereng.com

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQI-02
Target TSS Removal (%)	80
TSS Removal (%) Provided	92
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	92
STC 900	96
STC 1200	96
STC 1800	96
STC 2400	97
STC 3600	98
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

Sizing Details

Drainage Area	
Total Area (acres)	0.27
Imperviousness %	100.0

Rainfall	
Station Name	BLUE HILL
State/Province	Massachusetts
Station ID #	0736
Years of Records	58
Latitude	42°12'44"N
Longitude	71°6'53"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	0.34

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

Brief Stormceptor Sizing Report - WQI-03

Project Information & Location			
Project Name	22 Everett St	**Project Number**	746333
City	Westwood	**State/ Province**	Massachusetts
Country	United States of America	**Date**	3/8/2023
Designer Information		**EOR Information (optional)**	
Name	Jim Lyons	**Name**	Angela Botto
Company	Contech Engineered Solutions	**Company**	Bohler Engineering
Phone #	413-246-5151	**Phone #**	617-849-8040
Email	james.lyons@conteches.com	**Email**	abotto@bohlereng.com

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQI-03
Target TSS Removal (%)	80
TSS Removal (%) Provided	96
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	96
STC 900	98
STC 1200	98
STC 1800	99
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	100
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details

Drainage Area	
Total Area (acres)	0.11
Imperviousness %	73.0

Rainfall	
Station Name	BLUE HILL
State/Province	Massachusetts
Station ID #	0736
Years of Records	58
Latitude	42°12'44"N
Longitude	71°6'53"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	0.14

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
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CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

22 EVERETT ST
WESTWOOD, MA

Area	0.35 ac	Unit Site Designation	WQU-01
Weighted C	0.9	Rainfall Station #	68
t_c	5 min		
CDS Model	1515-3	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.3
0.04	9.5%	18.8%	0.01	0.01	9.5
0.06	8.7%	27.5%	0.02	0.02	8.7
0.08	10.1%	37.6%	0.03	0.03	10.1
0.10	7.2%	44.8%	0.03	0.03	7.2
0.12	6.0%	50.8%	0.04	0.04	6.0
0.14	6.3%	57.1%	0.04	0.04	6.3
0.16	5.6%	62.7%	0.05	0.05	5.5
0.18	4.7%	67.4%	0.06	0.06	4.6
0.20	3.6%	71.0%	0.06	0.06	3.6
0.25	8.2%	79.1%	0.08	0.08	8.0
0.50	14.9%	94.0%	0.16	0.16	14.0
0.75	3.2%	97.3%	0.24	0.24	2.9
1.00	1.2%	98.5%	0.32	0.32	1.1
1.50	0.7%	99.2%	0.47	0.47	0.6
2.00	0.8%	100.0%	0.63	0.63	0.6
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					97.8
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**91.3%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

22 EVERETT ST
WESTWOOD, MA

Area	**0.43 ac**	Unit Site Designation	**WQU-02**
Weighted C	**0.9**	Rainfall Station #	**68**
t_c	**5 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.3
0.04	9.5%	18.8%	0.02	0.02	9.5
0.06	8.7%	27.5%	0.02	0.02	8.7
0.08	10.1%	37.6%	0.03	0.03	10.1
0.10	7.2%	44.8%	0.04	0.04	7.1
0.12	6.0%	50.8%	0.05	0.05	6.0
0.14	6.3%	57.1%	0.05	0.05	6.2
0.16	5.6%	62.7%	0.06	0.06	5.5
0.18	4.7%	67.4%	0.07	0.07	4.6
0.20	3.6%	71.0%	0.08	0.08	3.5
0.25	8.2%	79.1%	0.10	0.10	7.9
0.50	14.9%	94.0%	0.19	0.19	13.7
0.75	3.2%	97.3%	0.29	0.29	2.8
1.00	1.2%	98.5%	0.39	0.39	1.0
1.50	0.7%	99.2%	0.58	0.58	0.5
2.00	0.8%	100.0%	0.77	0.77	0.5
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					97.1
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**90.6%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

22 EVERETT ST
WESTWOOD, MA

Area	**0.38 ac**	Unit Site Designation	**WQU-03**
Weighted C	**0.9**	Rainfall Station #	**68**
t_c	**5 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.3
0.04	9.5%	18.8%	0.01	0.01	9.5
0.06	8.7%	27.5%	0.02	0.02	8.7
0.08	10.1%	37.6%	0.03	0.03	10.1
0.10	7.2%	44.8%	0.03	0.03	7.1
0.12	6.0%	50.8%	0.04	0.04	6.0
0.14	6.3%	57.1%	0.05	0.05	6.3
0.16	5.6%	62.7%	0.05	0.05	5.5
0.18	4.7%	67.4%	0.06	0.06	4.6
0.20	3.6%	71.0%	0.07	0.07	3.5
0.25	8.2%	79.1%	0.09	0.09	7.9
0.50	14.9%	94.0%	0.17	0.17	13.9
0.75	3.2%	97.3%	0.26	0.26	2.9
1.00	1.2%	98.5%	0.34	0.34	1.1
1.50	0.7%	99.2%	0.51	0.51	0.6
2.00	0.8%	100.0%	0.68	0.68	0.5
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					97.5
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**91.1%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

NOAA Atlas 14, Volume 10, Version 3
Location name: Norwood, Massachusetts, USA*
Latitude: 42.2139°, Longitude: -71.1886°
Elevation: 70.42 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.311 (0.242-0.399)	0.383 (0.298-0.493)	0.501 (0.387-0.646)	0.599 (0.462-0.778)	0.734 (0.549-1.00)	0.834 (0.612-1.17)	0.942 (0.675-1.38)	1.07 (0.720-1.59)	1.27 (0.819-1.95)	1.43 (0.906-2.25)
10-min	0.441 (0.343-0.566)	0.543 (0.422-0.698)	0.710 (0.550-0.916)	0.849 (0.654-1.10)	1.04 (0.778-1.42)	1.18 (0.868-1.66)	1.33 (0.956-1.95)	1.52 (1.02-2.25)	1.79 (1.16-2.77)	2.03 (1.28-3.19)
15-min	0.519 (0.404-0.666)	0.639 (0.497-0.821)	0.836 (0.647-1.08)	0.999 (0.769-1.30)	1.22 (0.915-1.67)	1.39 (1.02-1.95)	1.57 (1.12-2.30)	1.79 (1.20-2.65)	2.11 (1.37-3.25)	2.38 (1.51-3.76)
30-min	0.709 (0.552-0.910)	0.878 (0.682-1.13)	1.15 (0.893-1.49)	1.38 (1.07-1.79)	1.70 (1.27-2.32)	1.93 (1.42-2.70)	2.18 (1.56-3.19)	2.48 (1.67-3.69)	2.94 (1.90-4.53)	3.32 (2.10-5.23)
60-min	0.900 (0.700-1.15)	1.12 (0.867-1.43)	1.47 (1.14-1.90)	1.76 (1.36-2.29)	2.17 (1.62-2.96)	2.47 (1.81-3.46)	2.79 (2.00-4.09)	3.18 (2.14-4.72)	3.76 (2.44-5.81)	4.26 (2.70-6.71)
2-hr	1.14 (0.894-1.46)	1.44 (1.12-1.84)	1.92 (1.50-2.47)	2.33 (1.80-3.00)	2.88 (2.16-3.91)	3.29 (2.43-4.58)	3.73 (2.69-5.44)	4.27 (2.88-6.30)	5.10 (3.31-7.80)	5.82 (3.69-9.07)
3-hr	1.33 (1.04-1.69)	1.67 (1.31-2.13)	2.24 (1.75-2.86)	2.71 (2.10-3.48)	3.35 (2.53-4.55)	3.83 (2.84-5.32)	4.35 (3.15-6.32)	4.98 (3.37-7.31)	5.96 (3.88-9.07)	6.81 (4.33-10.6)
6-hr	1.74 (1.37-2.20)	2.17 (1.71-2.74)	2.87 (2.25-3.64)	3.46 (2.70-4.41)	4.26 (3.23-5.72)	4.85 (3.61-6.68)	5.49 (3.99-7.91)	6.28 (4.26-9.13)	7.48 (4.88-11.3)	8.51 (5.43-13.1)
12-hr	2.27 (1.80-2.86)	2.79 (2.21-3.50)	3.63 (2.86-4.57)	4.32 (3.39-5.48)	5.28 (4.01-7.04)	5.99 (4.47-8.18)	6.76 (4.91-9.62)	7.68 (5.23-11.1)	9.07 (5.94-13.5)	10.3 (6.57-15.6)
24-hr	2.78 (2.22-3.47)	3.42 (2.72-4.27)	4.46 (3.54-5.59)	5.32 (4.20-6.71)	6.51 (4.98-8.63)	7.39 (5.55-10.0)	8.35 (6.11-11.8)	9.51 (6.50-13.6)	11.3 (7.43-16.7)	12.9 (8.25-19.4)
2-day	3.18 (2.55-3.94)	3.99 (3.19-4.95)	5.31 (4.23-6.61)	6.41 (5.08-8.02)	7.92 (6.10-10.5)	9.02 (6.83-12.2)	10.2 (7.58-14.5)	11.8 (8.09-16.7)	14.3 (9.40-20.9)	16.5 (10.6-24.6)
3-day	3.48 (2.80-4.30)	4.36 (3.50-5.39)	5.79 (4.63-7.19)	6.98 (5.54-8.71)	8.61 (6.65-11.3)	9.81 (7.44-13.2)	11.1 (8.27-15.7)	12.8 (8.81-18.1)	15.6 (10.3-22.7)	18.0 (11.6-26.7)
4-day	3.77 (3.04-4.65)	4.68 (3.76-5.77)	6.16 (4.93-7.62)	7.38 (5.88-9.19)	9.07 (7.02-11.9)	10.3 (7.84-13.9)	11.7 (8.69-16.4)	13.4 (9.24-18.9)	16.3 (10.8-23.7)	18.8 (12.1-27.8)
7-day	4.57 (3.69-5.60)	5.51 (4.45-6.76)	7.05 (5.67-8.68)	8.33 (6.66-10.3)	10.1 (7.83-13.1)	11.4 (8.67-15.2)	12.8 (9.53-17.8)	14.6 (10.1-20.4)	17.5 (11.6-25.2)	20.0 (13.0-29.4)
10-day	5.31 (4.31-6.49)	6.28 (5.08-7.68)	7.86 (6.34-9.64)	9.17 (7.35-11.3)	11.0 (8.53-14.2)	12.3 (9.38-16.3)	13.8 (10.2-19.0)	15.6 (10.8-21.6)	18.4 (12.2-26.4)	20.9 (13.5-30.4)
20-day	7.47 (6.09-9.07)	8.51 (6.93-10.3)	10.2 (8.28-12.5)	11.6 (9.37-14.2)	13.6 (10.6-17.3)	15.0 (11.4-19.5)	16.6 (12.2-22.3)	18.3 (12.7-25.1)	20.8 (13.9-29.5)	22.9 (14.9-33.1)
30-day	9.24 (7.55-11.2)	10.3 (8.44-12.5)	12.1 (9.87-14.7)	13.6 (11.0-16.6)	15.7 (12.2-19.8)	17.3 (13.1-22.2)	18.8 (13.8-25.0)	20.5 (14.3-28.0)	22.8 (15.3-32.1)	24.5 (16.0-35.2)
45-day	11.4 (9.38-13.8)	12.6 (10.3-15.2)	14.5 (11.8-17.5)	16.1 (13.0-19.5)	18.2 (14.2-22.8)	19.9 (15.2-25.4)	21.6 (15.8-28.2)	23.1 (16.2-31.4)	25.1 (16.9-35.2)	26.6 (17.3-38.0)
60-day	13.3 (10.9-16.0)	14.5 (11.9-17.4)	16.4 (13.5-19.8)	18.1 (14.7-21.9)	20.3 (15.9-25.3)	22.1 (16.8-28.0)	23.8 (17.4-30.8)	25.3 (17.8-34.1)	27.1 (18.3-37.8)	28.3 (18.5-40.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

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

Please refer to NOAA Atlas 14 document for more information.

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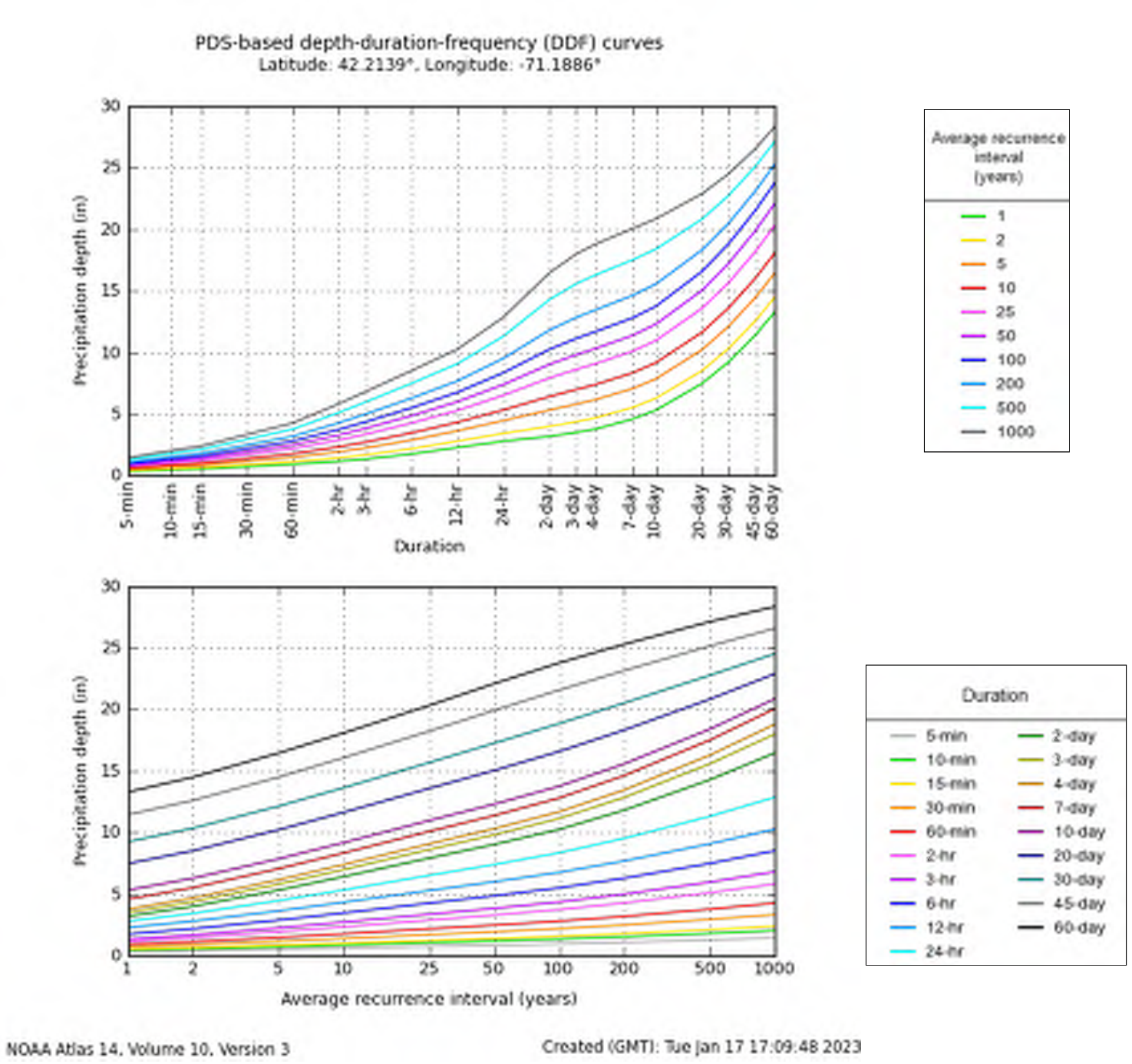
PF graphical



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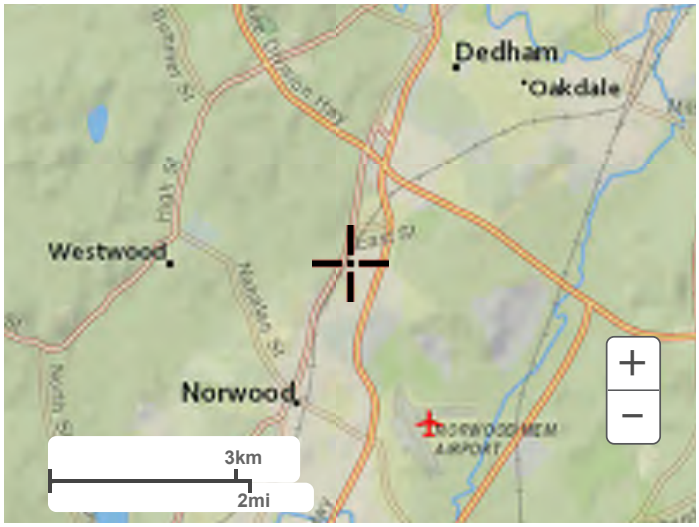
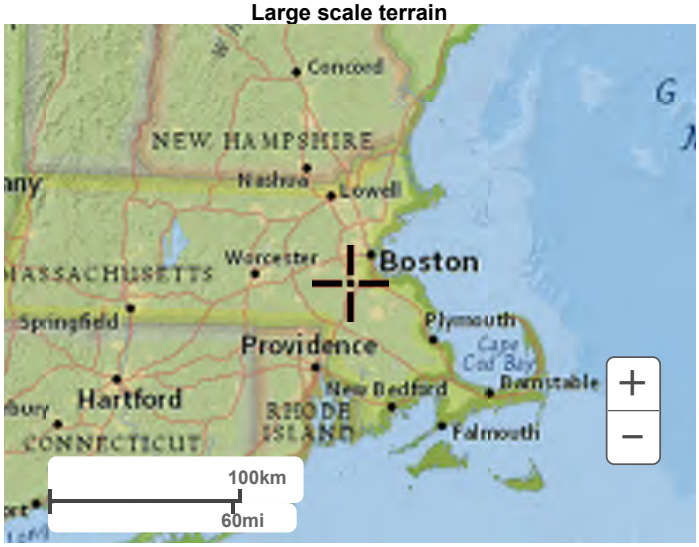
Maps & aerials

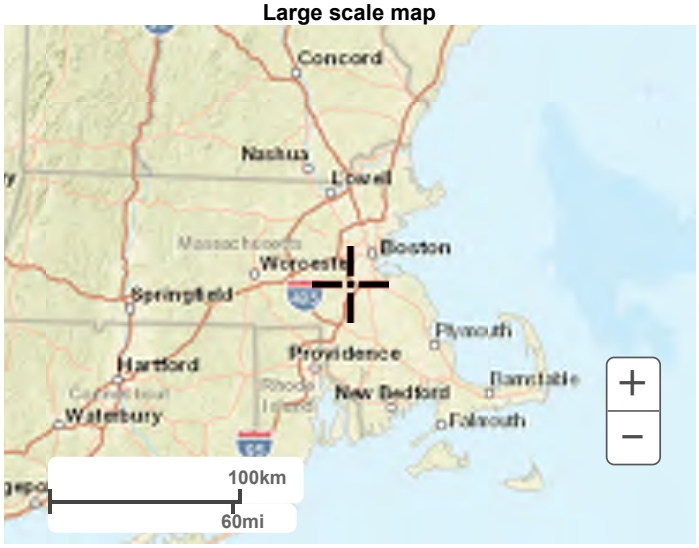
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

GROUNDWATER MOUNDING CALCULATIONS

Proposed Mixed-Use Development
22 Everett
Westwood, MA
M211078

Methodology

Pond 1, Pond 2, and Pond 3 for this project are designed with less than 4 feet of groundwater separation. They are also designed to attenuate the 10-year storm event or larger. Therefore, groundwater mounding calculations are required according to MA DEP Stormwater Management Guidelines. The purpose of the calculations is to ensure that the mound will not prevent the full draining of the basin. The mounding analysis must show that the recharge volume will exfiltrate within seventy-two (72) hours. Additionally, it should be verified that the mounding effect will not cause stormwater to surge above the lowest discharge point out of a basin (during the 24-hour period) or raise the water elevation in a nearby resource area.

The groundwater mounding analysis was performed by a proprietary program using the Hantush Method with Glover's Solution. Input parameters are site specific and determined based on existing and proposed conditions. The required input parameters are the following: application rate; duration of application; fillable porosity; hydraulic conductivity; initial saturated thickness; length of application area; width of application area; and distance to closest resource area (constant head boundary).

Calculations using the Hantush Method are considered conservative due to the fact that the unsaturated soil zone is not incorporated. In practice, this zone will have a significant positive effect on reducing the groundwater mounding under an infiltration basin by allowing horizontal migration. The unsaturated zones are approximately 2.0 feet for 1P, 2P and 3P.

Stormwater Basin	Unsaturated Zone (FT)	Depth Below Lowest Outlet (FT)	Mounding Storage Provided (FT)	Groundwater Mounding - Δh (FT)
P1	2.0	2.50	4.50	2.73
P2	2.0	2.50	4.50	2.76
P3	2.0	2.50	4.50	1.47

The application rate used is converted from the Rawls value selected for an exfiltration rate in HydroCAD. The duration of application used for the analysis is the 24-hour based duration of the storm event. The fillable porosity, hydraulic conductivity, and initial saturated thickness used for the analysis are based on the existing soil conditions.

Results

Based on the criteria mentioned above, the analysis (see attached) indicates the mound in each stormwater basin falls below the mounding storage provided. Given these results, we feel as though the basins recharge the stormwater volume within 72 hours as required.

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8200	R	Recharge (infiltration) rate (feet/day)
0.320	Sy	Specific yield, Sy (dimensionless, between 0 and 1)
48.20	K	Horizontal hydraulic conductivity, Kh (feet/day)*
45.150	x	1/2 length of basin (x direction, in feet)
19.350	y	1/2 width of basin (y direction, in feet)
1.000	t	duration of infiltration period (days)
30.000	hi(0)	initial thickness of saturated zone (feet)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

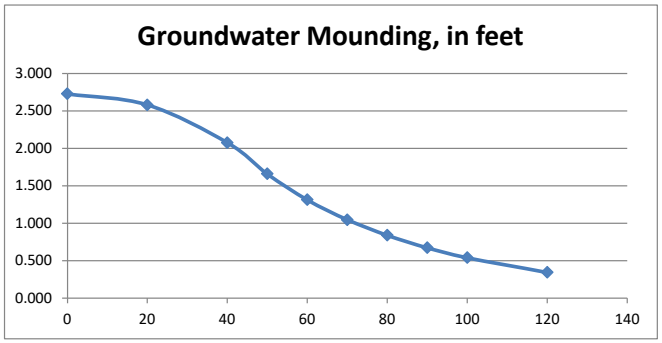
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

32.729	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
2.729	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.729	0
2.583	20
2.077	40
1.659	50
1.313	60
1.048	70
0.840	80
0.674	90
0.540	100
0.344	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8200	*R*	**Recharge (infiltration) rate (feet/day)**
0.320	Sy	**Specific yield, Sy (dimensionless, between 0 and 1)**
48.20	K	**Horizontal hydraulic conductivity, Kh (feet/day)***
29.750	x	**1/2 length of basin (x direction, in feet)**
36.330	y	**1/2 width of basin (y direction, in feet)**
1.000	t	**duration of infiltration period (days)**
40.000	hi(0)	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

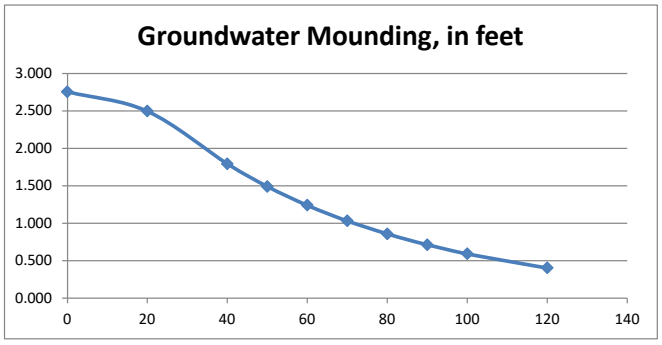
hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

42.756	h(max)	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.756	Δh(max)	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.756	0
2.498	20
1.795	40
1.491	50
1.241	60
1.033	70
0.859	80
0.714	90
0.592	100
0.404	120

Re-Calculate Now



Disclaimer

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The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Input Values		
4.8200	***R***	**Recharge (infiltration) rate (feet/day)**
0.320	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
48.20	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
22.050	**x**	**1/2 length of basin (x direction, in feet)**
10.900	**y**	**1/2 width of basin (y direction, in feet)**
1.000	**t**	**duration of infiltration period (days)**
20.000	**hi(0)**	**initial thickness of saturated zone (feet)**

Conversion Table

inch/hour	**feet/day**
0.67	1.33
2.00	4.00

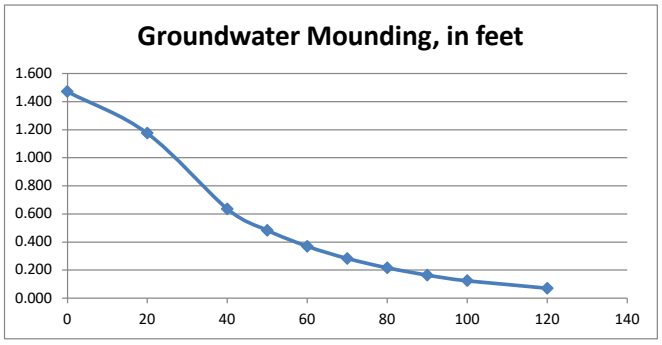
hours	**days**
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

21.471	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
1.471	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	**Distance from center of basin in x direction, in feet**
1.471	**0**
1.175	**20**
0.636	**40**
0.483	**50**
0.369	**60**
0.283	**70**
0.216	**80**
0.164	**90**
0.124	**100**
0.070	**120**

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

JOB NO. **M211078**
CALCULATED BY **AMB** DATE **03-16-23**
CHECKED BY **WNG**

Phosphorus Removal Calculations

The proposed Site consists of approximately 6.8 acres of land with a post construction impervious area of 176,488 SF. The project includes three (3) subsurface infiltration system that has a total volume of 14,818 CF for stormwater treatment. This storage volume results in an equivalent of 1.0 in of runoff from the post construction impervious area.

Based on the EPA BMP performance curve for infiltration basins (Figure 1), 1.0 inches of runoff from the impervious area will result in an average pollutant removal of 95% for the Site.

Table 3- 8: Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table

Infiltration Trench (IR = 2.41 in/hr) BMP Performance Table: Long-Term Phosphorus Load Reduction								
BMP Capacity: Depth of Runoff Treated from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	34.0%	54.7%	78.3%	88.4%	93.4%	96.0%	98.8%	99.8%
Cumulative Phosphorus Load Reduction	33%	55%	81%	91%	96%	95%	100%	100%

Figure 3- 5: BMP Performance Curve: Infiltration Trench (infiltration rate = 2.41 in/hr)

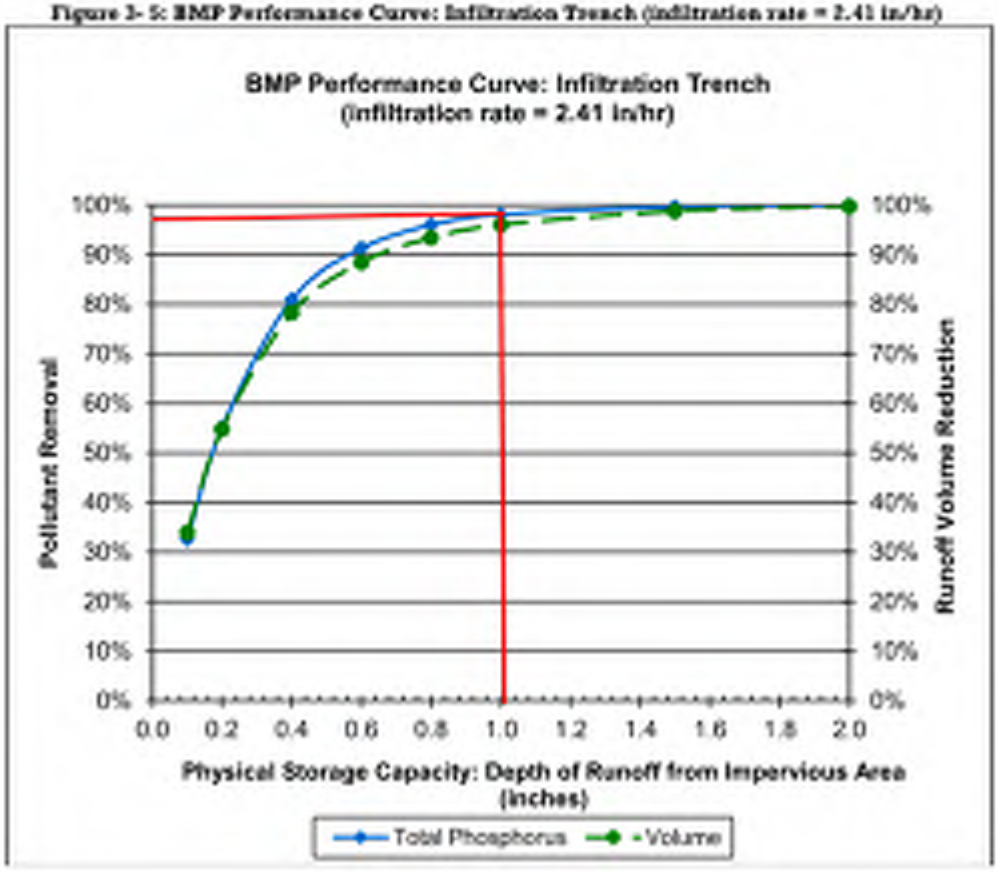


Figure 1

Source:
Methods to Calculate Phosphorus Load Reductions for Structural Stormwater Best Management Practices in the Watershed
https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixF-Attachment3.pdf

Phosphorus Loading Calculation Proposed Conditions					
Subcatchment	**Design Point**	**Land Use**	**Area (sf)**	**Phosphorus Load Export (lbs/acre/year)**	**Phosphorus Load (lbs/year)**
PR-01	DP2	Multi-Family Residential	7,144	2.32	0.38
PR-02a	DP1	Multi-Family Residential	62,766	2.32	3.34
PR-02b	DP1	Multi-Family Residential	7,352	2.32	0.39
PR-03	DP1	Developed Land - HSG A	31,511	0.03	0.02
PR-04	DP1	Multi-Family Residential	39,508	2.32	2.10
PR-05	DP1	Developed Land - HSG A	80,075	0.03	0.06
PR-06	DP1	Multi-Family Residential	27,316	2.32	1.45
PR-07	DP1	Multi-Family Residential	16,730	2.32	0.89
PR-08	DP1	Multi-Family Residential	22,446	2.32	1.20
PR-09	DP1	Multi-Family Residential	15,316	2.32	0.82
PR-10	DP1	Developed Land - HSG A	27,715	0.03	0.02

DP Summary Table - Proposed Conditions	
Design Point	**Phosphorus Load Export (lbs/year)**
DP1	**6.95**
DP2	**0.38**

Subcatchment Summary Table - Proposed Conditions	
Subcatchment	**Phosphorus Load Export (lbs/year)**
PR-01	0.38
PR-02b	0.39
PR-03	0.02
PR-04	2.10
PR-05	0.06
PR-06	1.45
PR-07	0.89
PR-08	1.20
PR-09	0.82
PR-10	0.02
Total	7.33

Phosphorus Loading By Use Table	
Land Use	**Phosphorus Load Export (lbs/acre/year)**
Commercial	1.78
Industrial	1.78
Multi-Family Residential	2.32
High-Density Residential	2.32
Medium-Density Residential	1.96
Low-Density Residential	1.52
Highway	1.34
Forest - Impervious	1.52
Forest - Pervious	0.13
Open Land	1.52
Agriculture - Impervious	1.52
Agriculture - Pervious	0.45
Developed Land - HSG A	0.03
Developed Land - HSG B	0.12
Developed Land - HSG C	0.21
Developed Land - HSG C/D	0.29
Developed Land - HSG D	0.37

Prepared By:
BOHLER
45 Franklin Street, 5th Floor
Boston, MA 02110
(617) 849-8040

Proposed GMP Lab Facility Development
22 Everett Street
Westwood, MA
Bohler Job Number: M211078
March 15, 2023

Weighted Total Phosphorus Removal Rate

Structural BMP Phosphorus Removal

Subcatchment	Design Point	Phosphorus Loading (lbs/year)	Total Phosphorus Treatment Train	TP Removal (%)	TP Removal (lbs/year)
PR-01	DP2	0.38	n/a	0%	0.00
PR-02a	DP1	3.34	Subsurface Infiltration System	98%	3.28
PR-02b	DP1	0.39	Subsurface Infiltration System	98%	0.38
PR-03	DP1	0.02	n/a	0%	0.00
PR-04	DP1	2.10	Subsurface Infiltration System	98%	2.06
PR-05	DP1	0.06	n/a	0%	0.00
PR-06	DP1	1.45	Subsurface Infiltration System	98%	1.43
PR-07	DP1	0.89	n/a	0%	0.00
PR-08	DP1	1.20	Subsurface Infiltration System	98%	1.17
PR-09	DP1	0.82	n/a	0%	0.00
PR-10	DP1	0.02	n/a	0%	0.00
Total	-	**10.67**	-	-	**8.32**

Weighted Total Phosphorus Removal Rate (%)	**78.0%**

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APPENDIX G: OPERATION AND MAINTENANCE

- *STORMWATER OPERATION AND MAINTENANCE PLAN*
- *INSPECTION REPORT*
- *INSPECTION AND MAINTENANCE LOG FORM*
- *LONG-TERM POLLUTION PREVENTION PLAN*
- *ILLICIT DISCHARGE STATEMENT*
- *SPILL PREVENTION*
- *MANUFACTURER'S INSPECTION AND MAINTENANCE MANUALS*
- *BMP MAP*

STORMWATER OPERATION AND MAINTENANCE PLAN

Proposed Mixed-Use Residential Development
22 Everett St
Westwood, MA

RESPONSIBLE PARTY DURING CONSTRUCTION:

PP EVERETT STREET, LLC
21 Eastbrook Rd
Dedham, MA

RESPONSIBLE PARTY POST CONSTRUCTION:

PP EVERETT STREET, LLC
21 Eastbrook Rd
Dedham, MA

Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, the EPA Construction General Permit and the Stormwater Pollution Prevention Plan (SWPPP). Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Contact information of the OWNER and CONTRACTOR shall be listed in the SWPPP for this site. The SWPPP also includes information regarding construction period allowable and illicit discharges, housekeeping and emergency response procedures. Upon proper notice to the property owner, the Town/City or its authorized designee shall be allowed to enter the property at a reasonable time and in a reasonable manner for the purposes of inspection.

Post Development Controls

Once construction is completed, the post development stormwater controls are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. Parking lots: Sweep at least four (4) times per year and on a more frequent basis depending on sanding operations. All resulting sweepings shall be collected and properly disposed of offsite in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

2. Roadways: Sweep at least four (4) times per year and on a more frequent basis depending on sanding operations. All resulting sweepings shall be collected and properly disposed of off site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

3. Catch basins, yard drains, trench drains, manholes and piping: Inspect four (4) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned four (4) times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the catch basin or underground system. Accumulated sediment and hydrocarbons present must be removed and properly disposed of off-site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $500/year per structure.

4. Riprap apron / Scour Hole: Riprap and scour holes should be checked at least annually and after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for displaced stones, slumping, and erosion at edges, especially downstream or downslope. If the riprap is damaged, it should be repaired before further damage can take place. Note and repair any erosion, stone displacement or low spots in the areas. Woody vegetation should be removed from the riprap annually.

   Approximate Maintenance Budget: $250/year per location.

5. Water Quality Unit (Proprietary Separator): Follow manufacturer's recommendations (attached).

   Approximate Maintenance Budget: $1,000/year per unit.

6. Underground Infiltration Basins: Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: Cleaning - $1,000/year, Inspection - $200/year

All components of the stormwater system will be accessible by the owner or their assignee.

STORMWATER MANAGEMENT SYSTEM

POST-CONSTRUCTION INSPECTION REPORT

LOCATION:

Proposed Mixed-Use Residential Development
22 Everett St
Westwood, MA

RESPONSIBLE PARTY:

PP EVERETT STREET, LLC
21 Eastbrook Rd
Dedham, MA

NAME OF INSPECTOR:	INSPECTION DATE:
Note Condition of the Following (sediment depth, debris, standing water, damage, etc.):	
Catch Basins:	
Discharge Points/ Flared End Sections / Rip Rap:	
Underground Infiltration Basin:	
Water Quality Units:	
Other:	

Note Recommended Actions to be taken on the Following (sediment and/or debris removal, repairs, etc.):
Catch Basins:
Discharge Points / Flared End Sections / Rip Rap:
Underground Infiltration Basin:
Water Quality Units:
Other:
Comments:

STORMWATER INSPECTION AND MAINTENANCE LOG FORM

Proposed Mixed-Use Residential Development
22 Everett St - Westwood, MA

Stormwater Management Practice	Responsible Party	Date	Maintenance Activity Performed

LONG-TERM POLLUTION PREVENTION PLAN

Proposed Mixed-Use Residential Development
22 Everett St
Westwood, MA

RESPONSIBLE PARTY DURING CONSTRUCTION:

PP EVERETT STREET, LLC
21 Eastbrook Rd
Dedham, MA

RESPONSIBLE PARTY POST CONSTRUCTION:
PP EVERETT STREET, LLC
21 Eastbrook Rd
Dedham, MA

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.

- Proper storage and removal of solid waste (dumpsters).

- Sweeping of parking lots, drive aisles and access aisles a minimum of twice per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.

- Sweeping of roadways a minimum of twice per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.

- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".

- Snow removal shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in forebays, infiltration basins or similar stormwater controls. Salting and/or sanding of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals.

- No outdoor maintenance or washing of vehicles allowed.
- Trash and other debris shall be removed from all areas of the site at least twice yearly.
- Reseed any bare areas as soon as they occur. Erosion control measures shall be installed in these areas to prevent deposits of sediment from entering the drainage system.
- Grass shall be maintained at a minimum blade height of two to three inches and only 1/3 of the plant height shall be removed at a time. Clippings shall not be disposed of within stormwater management areas or adjacent resource areas.
- Plants shall be pruned as necessary.
- The use of fertilizers will be kept at a level consistent with typical residential use. Fertilizer will be applied a maximum of once to twice per year during the initial planting and stabilization of landscaped areas. Once plants are established and growing well fertilizer will be applied judiciously.
- The use of pesticides will be kept at a level consistent with typical residential use. Where possible mechanical methods (i.e. pest traps) or biological methods (i.e. beneficial insects) of pest control shall be implemented. If pesticides (insecticide, herbicide, and fungicide) are required to be used, a pesticide which poses the lowest risk to public health and the environment shall be used.
- Pet waste shall be disposed of in accordance with local regulations. Pet waste shall not be disposed of in a storm drain or catch basin.
- Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter into the soil, leaving behind sand and debris which can be removed in the springtime.
- In no case shall snow be disposed of or stored in resource areas (wetlands, floodplain, streams, or other water bodies).
- In no case shall snow be disposed of or stored in the detention basins, infiltration basins or bioretention areas.
- If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.
- The amount of sand and deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.
- Deicing chemicals are recommended as a pretreatment to storm events to minimize the amount of applied sand.

- Sand and deicing chemicals should be stockpiled under covered storage facilities that prevent precipitation and adjacent runoff from coming in contact with the deicing materials. Stockpile areas shall be located outside resource areas.

- The primary agents used for deicing at parking lots, sidewalks and the access roads shall consist of salt alternatives such as calcium carbonate (CaCO3) or potassium chloride (KCl) or sodium chloride.

- Deliveries shall be monitored by owner or owner's representative to ensure proper delivery and in the event that a spillage occurs it shall be contained and cleaned up immediately in accordance with the spill prevention program for the project.

- Recycle materials whenever possible. Provide separate containers for recycle materials. Recycling products will be removed by a certified waste hauler.

OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Spill Prevention Plan and response procedures. Annual training will include the following:

Discuss the Operations and Maintenance Plan

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures

Discuss the Spill Prevention and Response Procedures

- Explain the process in the event of a spill
- Identify potential sources of spills and procedures for cleanup and /or reporting and notification
- Complete a yearly inventory or Materials Safety Data sheets of all tenants and confirm that no potentially harmful chemicals are in use.

ILLICIT DISCHARGE STATEMENT

Certain types of non-stormwater discharges are allowed under the U.S. Environmental Protection Agency Construction General Permit. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures which have been outlined previously in this LTPPP will be strictly followed to ensure that no contamination of these non-storm water discharges takes place. Any existing illicit discharges, if discovered during the course of the work, will be reported to MassDEP and the local DPW, as applicable, to be addressed in accordance with their respective policies. No illicit discharges will be allowed in conjunction with the proposed improvements.

Duly Acknowledged:

3-8-23

Name & Title Date

SPILL PREVENTION AND RESPONSE PROCEDURES (POST CONSTRUCTION)

In order to prevent or minimize the potential for a spill of Hazardous Substances or Oil or come into contact with stormwater, the following steps will be implemented:

1. All Hazardous Substances or Oil (such as pesticides, petroleum products, fertilizers, detergents, acids, paints, paint solvents, cleaning solvents, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on site.

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on site.

4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

5. It is the OWNER's responsibility to ensure that all Hazardous Waste on site is disposed of properly by a licensed hazardous material disposal company. The OWNER is responsible for not exceeding Hazardous Waste storage requirements mandated by the EPA or state and local authorities.

In the event of a spill of Hazardous Substances or Oil, the following procedures should be followed:

1. All measures should be taken to contain and abate the spill and to prevent the discharge of the Hazardous Substance or Oil to stormwater or off-site. (The spill area should be kept well ventilated and personnel should wear appropriate protective clothing to prevent injury from contact with the Hazardous Substances.)

2. For spills of less than five (5) gallons of material, proceed with source control and containment, clean-up with absorbent materials or other applicable means unless an imminent hazard or other circumstances dictate that the spill should be treated by a professional emergency response contractor.

3. For spills greater than five (5) gallons of material immediately contact the MADEP at the toll-free 24-hour statewide emergency number: **1-888-304-1133**, the local fire department (**9-1-1**) and an approved emergency response contractor. Provide information on the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill to the emergency response contractor or coordinator, and proceed with prevention, containment and/or clean-up if so desired. (Use the form provided, or similar).

4. If there is a Reportable Quantity (RQ) release, then the National Response Center should be notified immediately at (800) 424-8802; within 14 days a report should be submitted to the EPA regional office describing the release, the date and circumstances of the release and the steps taken to prevent another release. This Pollution Prevention Plan should be updated to reflect any such steps or actions taken and measures to prevent the same from reoccurring.

SPILL PREVENTION CONTROL AND COUNTERMEASURE FORM

Proposed Mixed-Use Residential Development
22 Everett St
Westwood, MA

Where a release containing a hazardous substance occurs, the following steps shall be taken by the facility manager and/or supervisor:

1. Immediately notify The Westwood Fire Department (at **9-1-1**)

2. All measures must be taken to contain and abate the spill and to prevent the discharge of the pollutant(s) to off-site locations, receiving waters, wetlands and/or resource areas.

3. Notify the Westwood Board of Health at (781) 326-6450 and the Westwood Conservation Commission at (781) 251-2580.

4. Provide documentation from licensed contractor showing disposal and cleanup procedures were completed as well as details on chemicals that were spilled to the Westwood Board of Health and Conservation Commission.

Date of spill:_____ Time:_____ Reported By:_____

Weather Conditions:_____

Material Spilled	**Location of Spill**	**Approximate Quantity of Spill (in gallons)**	**Agency(s) Notified**	**Date of Notification**

Cause of Spill: _____

_____

Measures Taken to Clean up Spill: _____

_____

Type of equipment: _____ Make: _____ Size: _____

License or S/N: _____

Location and Method of Disposal _____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring: _____

_____

_____

Additional Contact Numbers:

- DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) EMERGENCY PHONE: 1-888-304-1133
- NATIONAL RESPONSE CENTER PHONE: (800) 424-8802
- U.S. ENVIRONMENTAL PROTECTION AGENCY PHONE: (888) 372-7341

CONTECH®
ENGINEERED SOLUTIONS

CDS Guide
Operation, Design, Performance and Maintenance

CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

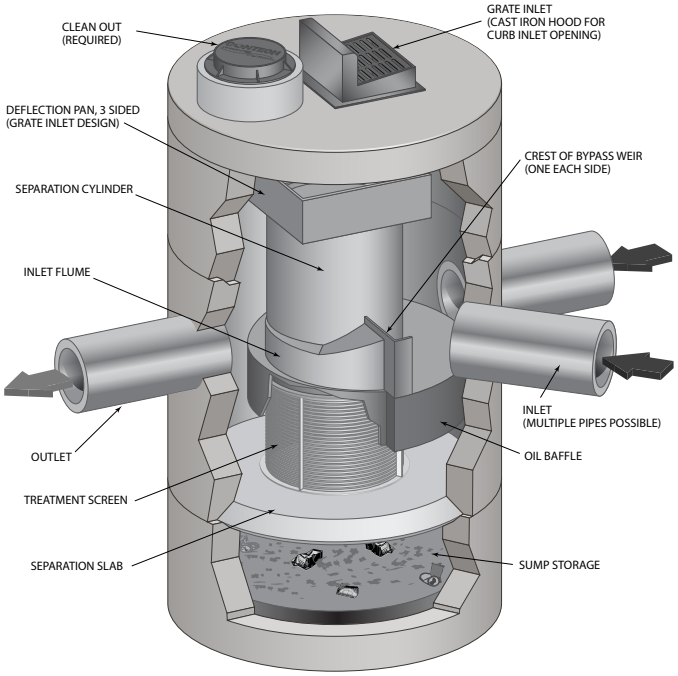
Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.



Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns (μm). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns (μm) or 50 microns (μm).

Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are

determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

Performance

Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 μm) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 μm) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

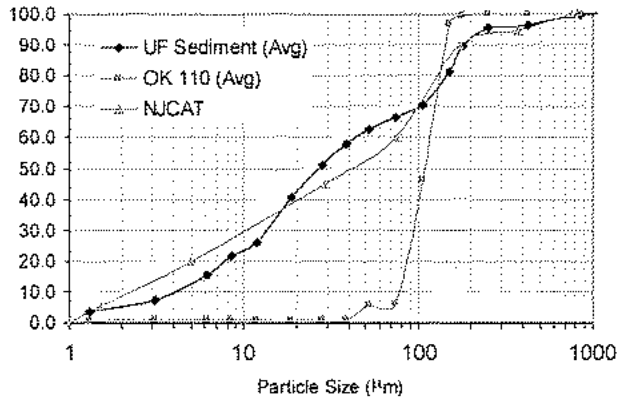


Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect

to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

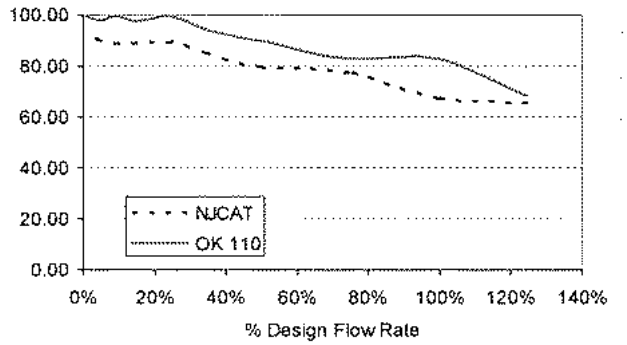


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 μm).

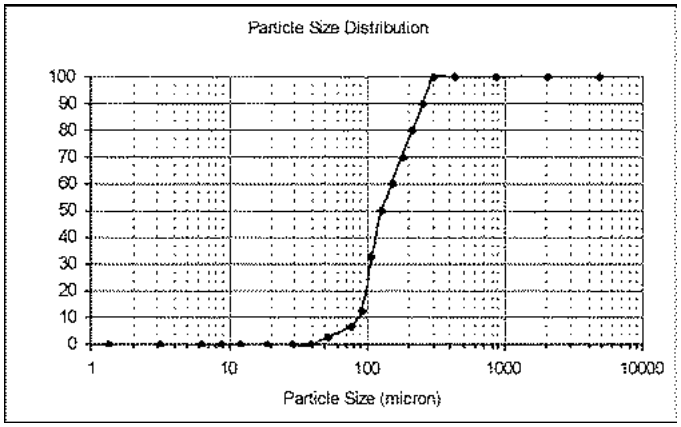


Figure 3. WASDOE PSD

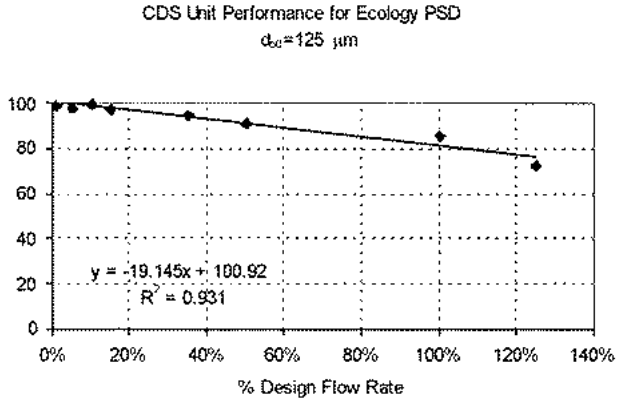


Figure 4. Modeled performance for WASDOE PSD.

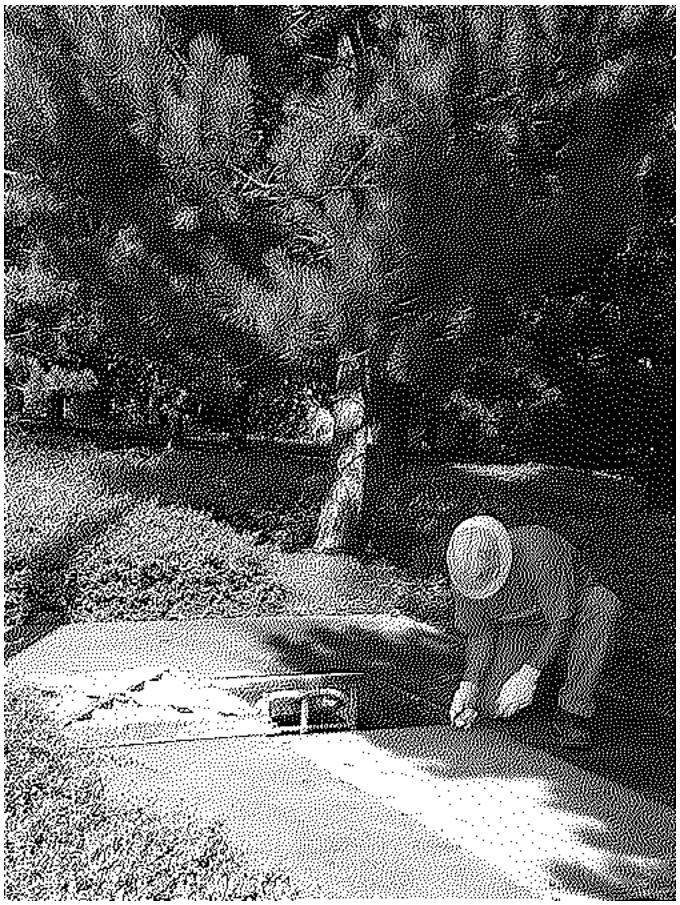
Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified



during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

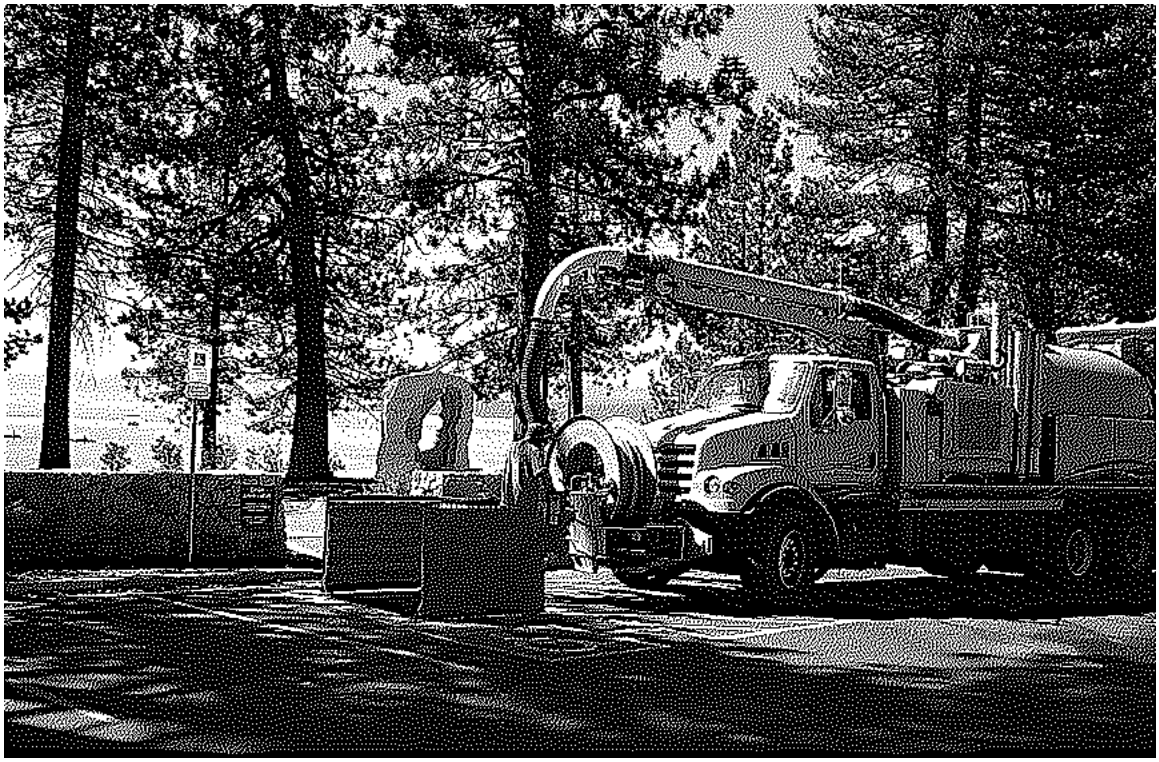
The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be cleaned to ensure it is free of trash and debris.

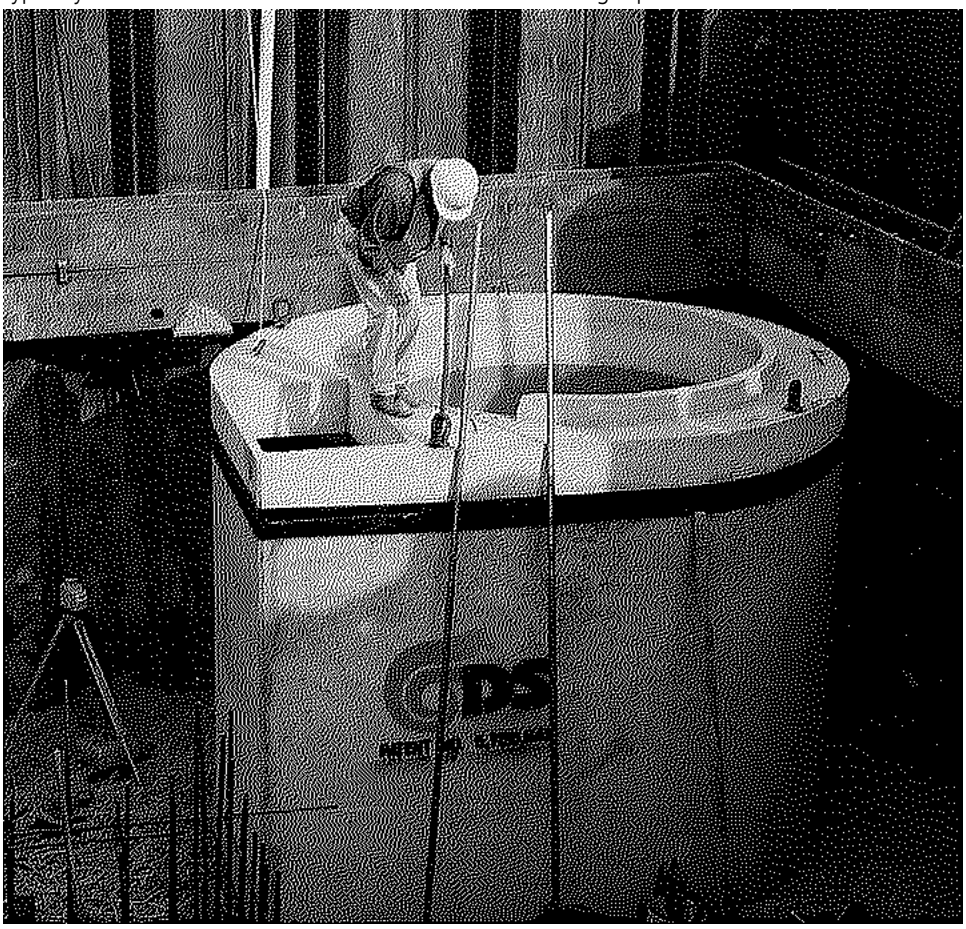
Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile**.

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; related foreign patents or other patents pending.

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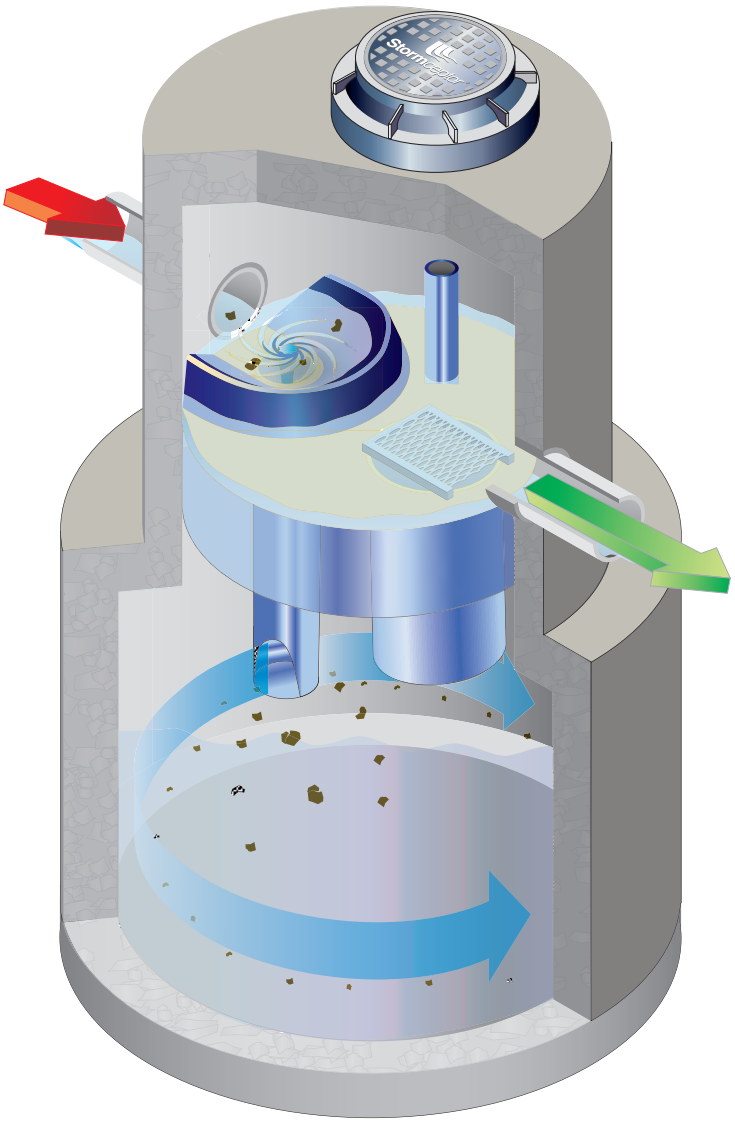
Stormceptor®

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,175,277
Canadian Patent No. 2,180,305
Canadian Patent No. 2,180,338
Canadian Patent No. 2,206,338
Canadian Patent No. 2,327,768
U.S. Patent No. 5,753,115
U.S. Patent No. 5,849,181
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 707,133
Australia Patent No. 729,096
Australia Patent No. 779,401
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Indonesia Patent No. 0007058
Japan Patent No. 3581233
Japan Patent No. 9-11476
Korean Patent No. 0519212
Malaysia Patent No. 118987
New Zealand Patent No. 314,646
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Other Patents Pending

Table of Contents

Congratulations!

Your selection of a Stormceptor® means that you have chosen the most recognized and efficient stormwater oil/sediment separator available for protecting the environment. Stormceptor is a pollution control device often referred to as a “Hydrodynamic Separator (HDS)” or an “Oil Grit Separator (OGS)”, engineered to remove and retain pollutants from stormwater runoff to protect our lakes, rivers and streams from the harmful effects of non-point source pollution.

1 – Stormceptor Overview

Stormceptor is a patented stormwater quality structure most often utilized as a treatment component of the underground storm drain network for stormwater pollution prevention. Stormceptor is designed to remove sediment, total suspended solids (TSS), other pollutants attached to sediment, hydrocarbons and free oil from stormwater runoff. Collectively the Stormceptor provides spill protection and prevents non-point source pollution from entering downstream waterways.

Key benefits of Stormceptor include:

- Removes sediment, suspended solids, debris, nutrients, heavy metals, and hydrocarbons (oil and grease) from runoff and snowmelt.
- Will not scour or re-suspend trapped pollutants.
- Provides sediment and oil storage.
- Provides spill control for accidents, commercial and industrial developments.
- Easy to inspect and maintain (vacuum truck).
- “STORMCEPTOR” is *clearly* marked on the access cover (excluding inlet designs).
- Relatively small footprint.
- 3rd Party tested and independently verified.
- Dedicated team of experts available to provide support.

Model Types:

- STC (Standard)
- STF (Fiberglass)
- EOS (Extended Oil Storage)
- OSR (Oil and Sand Removal)
- MAX (Custom designed unit, specific to site)

Configuration Types:

- Inlet unit (accommodates inlet flow entry, and multi-pipe entry)
- In-Line (accommodates multi-pipe entry)
- Submerged Unit (accommodates the site’s tailwater conditions)
- Series Unit (combines treatment in two systems)

Please Maintain Your Stormceptor

To ensure long-term environmental protection through continued performance as originally designed for your site, **Stormceptor must be maintained**, as any stormwater treatment practice does. The need for maintenance is determined through inspection of the Stormceptor. Procedures for inspection are provided within this document. Maintenance of the Stormceptor is performed from the surface via vacuum truck.

If you require information about Stormceptor, or assistance in finding resources to facilitate inspections or maintenance of your Stormceptor please call your local Stormceptor Licensee or Imbrium® Systems.

2 – Stormceptor Operation & Components

Stormceptor is a flexibly designed underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention using patented flow separation technology.

Stormceptor creates a non-turbulent treatment environment below the insert platform within the system. The insert diverts water into the lower chamber, allowing free oils and debris to rise, and sediment to settle under relatively low velocity conditions. These pollutants are trapped and stored below the insert and protected from large runoff events for later removal during the maintenance procedure.

With thousands of units operating worldwide, Stormceptor delivers reliable protection every day, in every storm. The patented Stormceptor design prohibits the scour and release of captured pollutants, ensuring superior water quality treatment and protection during even the most extreme storm events. Stormceptor's proven performance is backed by the longest record of lab and field verification in the industry.

Stormceptor Schematic and Component Functions

Below are schematics of two common Stormceptor configurations with key components identified and their functions briefly described.

Figure 1.

Inline Stormceptor

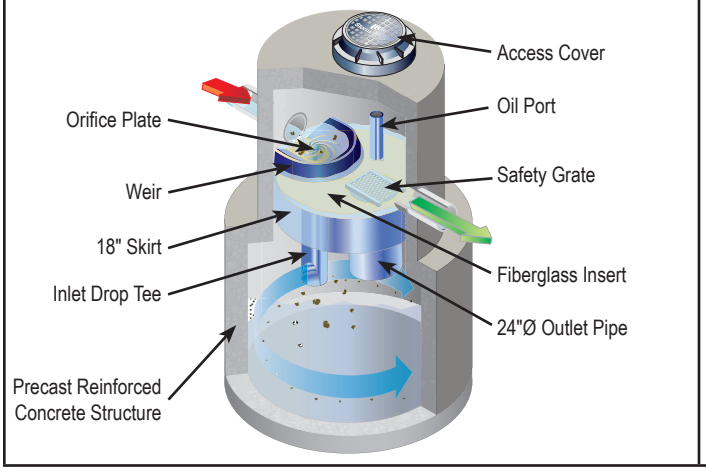
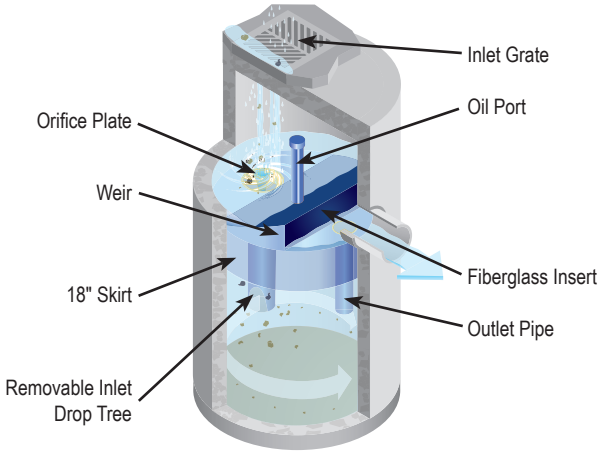


Figure 2.

Inlet Stormceptor



- **Manhole access cover** – provides access to the subsurface components
- **Precast reinforced concrete structure** – provides the vessel's watertight structural support
- **Fiberglass insert** – separates vessel into upper and lower chambers
- **Weir** – directs incoming stormwater and oil spills into the lower chamber
- **Orifice plate** – prevents scour of accumulated pollutants
- **Inlet drop tee** – conveys stormwater into the lower chamber
- **Fiberglass skirt** – provides double-wall containment of hydrocarbons
- **Outlet riser pipe** – conveys treated water to the upper chamber; primary vacuum line access port for sediment removal
- **Oil inspection port** – primary access for measuring oil depth and oil removal
- **Safety grate** – safety measure to cover riser pipe in the event of manned entry into vessel

3 – Stormceptor Identification

Stormceptor is available in both precast concrete and fiberglass vessels, with precast concrete often being the dominant material of construction.

In the Stormceptor, a patented, engineered fiberglass insert separates the structure into an upper chamber and lower chamber. The lower chamber will remain full of water, as this is where the pollutants are sequestered for later removal. Multiple Stormceptor model (STC, OSR, EOS, MAX and STF) configurations exist, each to be inspected and maintained in a similar fashion.

Each unit is easily identifiable as a Stormceptor by the trade name "Stormceptor" embossed on each access cover at the surface. To determine the location of "inlet" Stormceptor units with horizontal catch basin inlet, look down into the grate as the Stormceptor insert will be visible. The name "Stormceptor" is not embossed on inlet models due to the variability of inlet grates used/ approved across North America.

Once the location of the Stormceptor is determined, the model number may be identified by comparing the measured depth from the fiberglass insert level at the outlet pipe's invert (water level) to the bottom of the tank using **Table 1**.

In addition, starting in 1996 a metal serial number tag containing the model number has been affixed to the inside of the unit, on the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the unit using depth measurements, please contact your local Stormceptor Representative for assistance.

Sizes/Models

Typical general dimensions and capacities of the standard precast STC, EOS & OSR Stormceptor models in both USA and Canada/International (excluding South East Asia and Australia) are provided in **Tables 1 and 2**. Typical rim to invert measurements are provided later in this document. The total depth for cleaning will be the sum of the depth from outlet pipe invert (generally the water level) to rim (grade) and the depth from outlet pipe invert to the precast bottom of the unit. Note that depths and capacities may vary slightly between regions.

Table 1A. (US) Stormceptor Dimensions – Insert to Base of Structure

STC Model	Insert to Base (in.)
450	60
900	55
1200	71
1800	105
2400	94
3600	134
4800	128
6000	150
7200	134
11000*	128
13000*	150
16000*	134

EOS Model	Insert to Base (in.)
4-175	60
9-365	55
12-590	71
18-1000	105
24-1400	94
36-1700	134
48-2000	128
60-2500	150
72-3400	134
110-5000*	128
130-6000*	150
160-7800*	134

OSR Model	Insert to Base (in.)
65	60
140	55
250	94
390	128
560	134
780*	128
1125*	134

Typical STF m (in.)
1.5 (60)
1.5 (61)
1.8 (73)
2.9 (115)
2.3 (89)
3.2 (127)
2.9 (113)
3.5 (138)
3.3 (128)

Notes:

1. *Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.*

**Consist of two chamber structures in series.*

Table 1B. (CA & Int'l) Stormceptor Dimensions – Insert to Base of Structure

STC Model	Insert to Base (m)
300	1.5
750	1.5
1000	1.8
1500	2.8
2000	2.8
3000	3.7
4000	3.4
5000	4.0
6000	3.7
9000*	3.4
11000*	4.0
14000*	3.7

EOS Model	Insert to Base (m)
300	1.5
750	1.5
1000	1.8
2000	2.8
3000	3.7
4000	3.4
5000	4.0
6000	3.7
9000*	3.4
10000*	4.0
14000*	3.7

OSR Model	Insert to Base (m)
300	1.7
750	1.6
2000	2.6
4000	3.6
6000	3.7
9000*	3.6
14000*	3.7

Typical STF m (in.)
1.5 (60)
1.5 (61)
1.8 (73)
2.9 (115)
2.3 (89)
3.2 (127)
2.9 (113)
3.5 (138)
3.3 (128)

Notes:

1. *Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.*

**Consist of two chamber structures in series.*

Table 2A. (US) Storage Capacities

STC Model	Hydrocarbon Storage Capacity gal	Sediment Capacity ft^3	**EOS Model**	Hydrocarbon Storage Capacity gal	**OSR Model**	Hydrocarbon Storage Capacity gal	Sediment Capacity ft^3
450	86	46	**4-175**	175	**065**	115	46
900	251	89	**9-365**	365	**140**	233	58
1200	251	127	**12-590**	591			
1800	251	207	**18-1000**	1198			
2400	840	205	**24-1400**	1457	**250**	792	156
3600	840	373	**36-1700**	1773			
4800	909	543	**48-2000**	2005	**390**	1233	465
6000	909	687	**60-2500**	2514			
7200	1059	839	**72-3400**	3418	**560**	1384	690
11000*	2797	1089	**110-5000***	5023	**780***	2430	930
13000*	2797	1374	**130-6000***	6041			
16000*	3055	1677	**160-7800***	7850	**1125***	2689	1378

Notes:

1. *Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.*

**Consist of two chamber structures in series.*

Table 2B. (CA & Int'l) Storage Capacities

STC Model	Hydrocarbon Storage Capacity L	Sediment Capacity L	EOS Model	Hydrocarbon Storage Capacity L	OSR Model	Hydrocarbon Storage Capacity L	Sediment Capacity L
300	300	1450	**300**	662	**300**	300	1500
750	915	3000	**750**	1380	**750**	900	3000
1000	915	3800	**1000**	2235			
1500	915	6205					
2000	2890	7700	**2000**	5515	**2000**	2790	7700
3000	2890	11965	**3000**	6710			
4000	3360	16490	**4000**	7585	**4000**	4700	22200
5000	3360	20940	**5000**	9515			
6000	3930	26945	**6000**	12940	**6000**	5200	26900
9000*	10555	32980	**9000***	19010	**9000***	9300	33000
11000*	10555	37415	**10000***	22865			
14000*	11700	53890	**14000***	29715	**14000***	10500	53900

Notes:

1. *Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.*

**Consist of two chamber structures in series.*

4 – Stormceptor Inspection & Maintenance

Regular inspection and maintenance is a proven, cost-effective way to maximize water resource protection for all stormwater pollution control practices, and is required to insure proper functioning of the Stormceptor. Both inspection and maintenance of the Stormceptor is easily performed from the surface. Stormceptor's patented technology has no moving parts, simplifying the inspection and maintenance process.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess the sediment accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

When is maintenance cleaning needed?

- For optimum performance, the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, which is approximately 15% of the unit's total storage capacity (see **Table 2**). The frequency should be adjusted based on historical inspection results due to variable site pollutant loading.

- Sediment removal is easier when removed on a regular basis at or prior to the recommended maintenance sediment depths, as sediment build-up can compact making removal more difficult.
- The unit should be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise Stormceptor performance?

- If construction sediment and debris is not removed prior to activating the Stormceptor unit, maintenance frequency may be reduced.
- If the system is not maintained regularly and fills with sediment and debris beyond the capacity as indicated in **Table 2**, pollutant removal efficiency may be reduced.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured.
- If debris clogs the inlet of the system, removal efficiency of sediment and hydrocarbons may be reduced.
- If a downstream blockage occurs, a backwater condition may occur for the Stormceptor and removal efficiency of sediment and hydrocarbons may be reduced.

What training is required?

The Stormceptor is to be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. For typical inspection and maintenance activities, no specific supplemental training is required for the Stormceptor. Information provided within this Manual (provided to the site owner) contains sufficient guidance to maintain the system properly.

In unusual circumstances, such as if a damaged component needs replacement or some other condition requires manned entry into the vessel, confined space entry procedures must be followed. Only professional maintenance service providers trained in these procedures should enter the vessel. Service provider companies typically have personnel who are trained and certified in confined space entry procedures according to local, state, and federal standards.

What equipment is typically required for inspection?

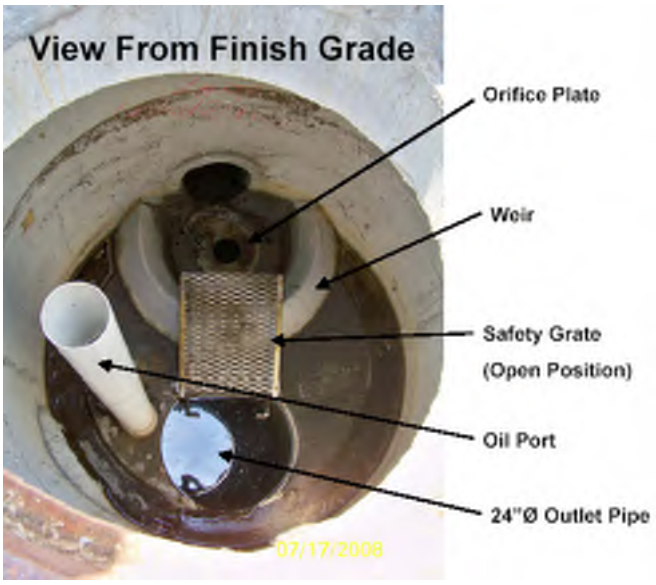
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

Recommended Stormceptor Inspection Procedure:

- Stormceptor is to be inspected from grade through a standard surface manhole access cover.
- Sediment and oil depth inspections are performed with a sediment probe and oil dipstick.
- Oil depth is measured through the oil inspection port, either a 4-inch (100 mm) or 6-inch (150 mm) diameter port.
- Sediment depth can be measured through the oil inspection port or the 24-inch (610 mm) diameter outlet riser pipe.
- Inspections also involve a visual inspection of the internal components of the system.

Figure 3.

Figure 4.



What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required

Recommended Stormceptor Maintenance Procedure

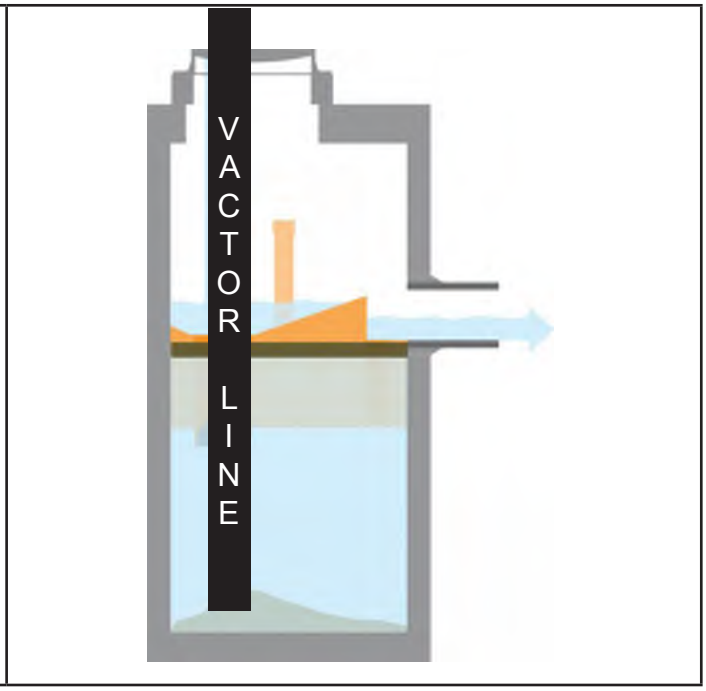
Maintenance of Stormceptor is performed using a vacuum truck.

No entry into the unit is required for maintenance. ***DO NOT ENTER THE STORMCEPTOR CHAMBER*** unless you have the proper personal safety equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (e.g. 29 CFR 1910.146 or Canada Occupational Safety and Health Regulations – SOR/86-304). Without the proper equipment, training and permit, entry into confined spaces can result in serious bodily harm and potentially death. Consult local, provincial, and/or state regulations to determine the requirements for confined space entry. Be aware, and take precaution that the Stormceptor fiberglass insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower chamber.

- Ideally maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is to be maintained through a standard surface manhole access cover.
- Insert the oil dipstick into the oil inspection port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing.
- Maintenance cleaning of accumulated sediment is performed with a vacuum truck.
    - For 6-ft (1800 mm) diameter models and larger, the vacuum hose is inserted into the lower chamber via the 24-inch (610 mm) outlet riser pipe.
    - For 4-ft (1200 mm) diameter model, the removable drop tee is lifted out, and the vacuum hose is inserted into the lower chamber via the 12-inch (305 mm) drop tee hole.

Figure 5.

Figure 6.



- Using the vacuum hose, decant the water from the lower chamber into a separate containment tank or to the sanitary sewer, if permitted by the local regulating authority.
- Remove the sediment sludge from the bottom of the unit using the vacuum hose. For large Stormceptor units, a flexible hose is often connected to the primary vacuum line for ease of movement in the lower chamber.
- Units that have not been maintained regularly, have surpassed the maximum recommended sediment capacity, or contain damaged components may require manned entry by trained personnel using safe and proper confined space entry procedures.

Figure 7.

Figure 8.

A maintenance worker stationed at the above ground surface uses a vacuum hose to evacuate water, sediment, and debris from the system.

What is required for proper disposal?

The requirements for the disposal of material removed from Stormceptor units are similar to that of any other stormwater treatment Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. This could be site and pollutant dependent. In some cases, approval from the disposal facility operator/agency may be required.

What about oil spills?

Stormceptor is often implemented in areas where there is high potential for oil, fuel or other hydrocarbon or chemical spills. Stormceptor units should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a hydrocarbon rainbow or sheen can be seen at

very small oil concentrations (< 10 ppm). Stormceptor is effective at removing 95% of free oil, and the appearance of a sheen at the outlet with high influent oil concentrations does not mean that the unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

What factors affect the costs involved with inspection/maintenance?
The Vacuum Service Industry for stormwater drainage and sewer systems is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean Stormceptor units will vary. Inspection and maintenance costs are most often based on unit size, the number of units on a site, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations.

What factors predict maintenance frequency?
Maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, site activity and use, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. If the sediment load is high from an unstable site or sediment loads transported from upstream catchments, maintenance may be required semi-annually. Conversely once a site has stabilized, maintenance may be required less frequently (for example: two to seven year, site and situation dependent). Maintenance should be performed immediately after an oil spill or once the sediment depth in Stormceptor reaches the value specified in **Table 3** based on the unit size.

Table 3A. (US) Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment depth (in)	EOS Model	Maintenance Sediment depth (in)	Oil Storage Depth (in)	OSR Model	Maintenance Sediment depth (in)
450	8	**4-175**	9	24	**065**	8
900	8	**9-365**	9	24	**140**	8
1200	10	**12-590**	11	39		
1800	15					
2400	12	**24-1400**	14	68	**250**	12
3600	17	**36-1700**	19	79		
4800	15	**48-2000**	16	68	**390**	17
6000	18	**60-2500**	20	79		
7200	15	**72-3400**	17	79	**560**	17
11000*	17	**110-5000***	16	68	**780***	17
13000*	20	**130-6000***	20	79		
16000*	17	**160-7800***	17	79	**1125***	17

Note:

1. *The values above are for typical standard units.*

**Per structure.*

Table 3B. (CA & Int'l) Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment depth (mm)	EOS Model	Maintenance Sediment depth (mm)	Oil Storage Depth (mm)	OSR Model	Maintenance Sediment depth (mm)
300	225	**300**	225	610	**300**	200
750	230	**750**	230	610	**750**	200
1000	275	**1000**	275	990		
1500	400					
2000	350	**2000**	350	1727	**2000**	300
3000	475	**3000**	475	2006		
4000	400	**4000**	400	1727	**4000**	375
5000	500	**5000**	500	2006		
6000	425	**6000**	425	2006	**6000**	375
9000*	400	**9000***	400	1727	**9000***	425
11000*	500	**10000***	500	2006		
14000*	425	**14000***	425	2006	**14000***	425

Note:

1. *The values above are for typical standard units.*

   **Per structure.*

Replacement parts

Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. Therefore, inspection and maintenance activities are generally focused on pollutant removal. However, if replacements parts are necessary, they may be purchased by contacting your local Stormceptor Representative, or Imbrium Systems.

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to Stormceptor's long and effective service life.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Allowable Sediment Depth: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Other Comments: _____

Contact Information

Questions regarding the Stormceptor can be addressed by contacting your area Stormceptor Licensee, Imbrium Systems, or visit our website at www.stormceptor.com.

Stormceptor Licensees:

CANADA

Lafarge Canada Inc.
www.lafargepipe.com

403-292-9502 / 1-888-422-4022	Calgary, AB
780-468-5910	Edmonton, AB
204-958-6348	Winnipeg, MB, NW. ON, SK

Langley Concrete Group
www.langleyconcretegroup.com

604-502-5236	BC

Hanson Pipe & Precast Inc.
www.hansonpipeandprecast.com

519-622-7574 / 1-888-888-3222	ON

Lécuyer et Fils Ltée.
www.lecuyerbeton.com

450-454-3928 / 1-800-561-0970	QC

Strescon Limited
www.strescon.com

902-494-7400	NS, NF
506-633-8877	NB, PE

UNITED STATES

Rinker Materials
www.rinkerstormceptor.com
1-800-909-7763

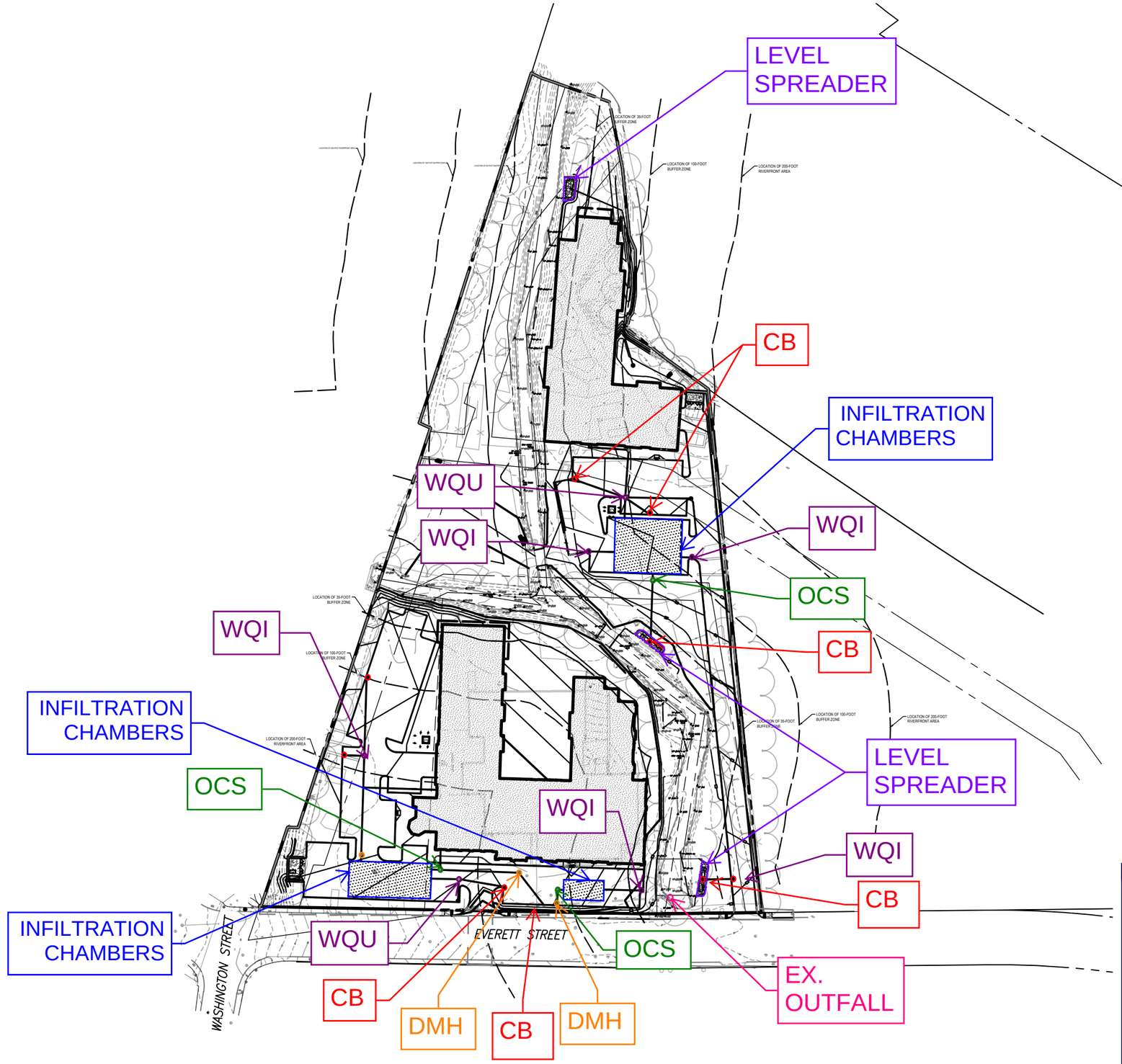
AUSTRALIA & SOUTHEAST ASIA, including New Zealand & Japan

Humes Water Solutions
www.humes.com.au
+61 7 3364 2894

Imbrium Systems Inc. & Imbrium Systems LLC

Canada	1-416-960-9900 / 1-800-565-4801
United States	1-301-279-8827 / 1-888-279-8826
International	+1-416-960-9900 / +1-301-279-8827
Email	info@imbriumsystems.com

www.imbriumsystems.com
www.stormceptor.com



BMP MAP

22 EVERETT ST
WESTWOOD, MA

PREPARED BY
BOHLER

SCALE:1"=120' DATE: 02/28/2023

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