

STORMWATER MANAGEMENT REPORT

for

**Medway Municipal Complex
120 Main Street
Medway, MA**

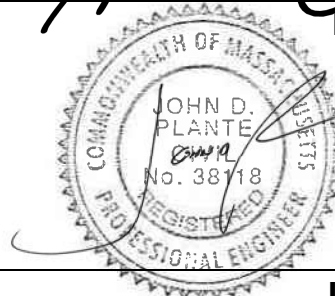
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**July 20, 2026
Revised September 18, 2026**

Langan Project No. 151072201

LANGAN

TABLE OF CONTENTS

	<u>Page No.</u>
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION.....	2
1.1 General	2
1.2 Site Location	2
1.3 Existing Conditions.....	2
1.4 Project Description	2
1.5 FEMA	3
1.6 Soil Conditions.....	3
2.0 STORMWATER MANAGEMENT	5
2.1 Mass DEP Stormwater Performance Standards	5
2.2 Town of Medway Stormwater Performance Standards	9
2.3 Design Criteria	10
2.4 Design Methodology	10
2.5 Existing Conditions Watersheds.....	11
2.6 Proposed Conditions Watersheds	11
3.0 STORMWATER QUALITY	13
3.1 Stormwater Quality Improvements	13
3.2 Retention and Infiltration Sizing.....	14
4.0 STORM DRAINAGE COLLECTION SYSTEM DESIGN	14
4.1 Design Criteria	14
4.2 Design Methodology	15
5.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN	15
5.1 Introduction.....	15
5.2 Construction Sequence	16
5.3 Construction Period Pollution Prevention Controls	17
5.4 Pollution Prevention Standards.....	20
5.5 Operation and Maintenance of Erosion Control	22
5.6 Inspection Schedule	23
6.0 CONCLUSION	23
7.0 REFERENCES	24

FIGURES

Figure 1	Site Location Map
Figure 2	Aerial Map
Figure 3	FEMA Flood Map
Figure 4	NRCS Soils Map
Figure 5	Zoning Map

DRAWINGS

Drawing EX-WS	Existing Watershed Plan
Drawing PR-WS	Proposed Watershed Plan
Drawing DA-CB	Catch Basin Drainage Area Plan

APPENDICES

Appendix A	Massachusetts DEP Checklist
Appendix B	Existing Stormwater Discharge Calculations
Appendix C	Proposed Stormwater Discharge Calculations
Appendix D	Stormwater Recharge Calculations
Appendix E	Water Quality Calculations
Appendix F	TSS & TP Removal Worksheets
Appendix G	Stormwater Collection System Calculations
Appendix H	Long Term Pollution Prevention Operation & Maintenance Plan
Appendix I	Illicit Discharge Compliance Statement
Appendix J	Test Pit and Boring Logs

EXECUTIVE SUMMARY

Langan Engineering & Environmental Services LLC (Langan) has prepared this Stormwater Management Report in support of the proposed municipal complex at 120 Main Street in Medway, Massachusetts. The site is identified as parcel 39-069 by the Town of Medway Assessor's Office and is approximately 8.3 acres.

The project site is currently vacant with remaining site features associated with a previously demolished concrete block manufacturing facility. The site is bound by residential properties to the north, a commercial development to the east, Main Street to the south, and Pond Street to the west.

The proposed Medway Municipal Complex includes site improvements to support the operation of a new Fire Department, Town Hall, and Police Department. The project proposes construction of a 41,500± square foot (sf) building and associated parking areas, access drives, fire apparatus circulation areas, pedestrian plazas and walkways, landscaping, lighting, utility infrastructure, and stormwater management facilities.

Langan designed an on-site stormwater management system in accordance with the current Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Handbook and Town of Medway Stormwater Management and Land Disturbance Rules and Regulations.

This report demonstrates the proposed stormwater system will effectively manage the quality and quantity of stormwater runoff for the proposed development. A comparative analysis is provided of the calculated pre- and post-development site runoff conditions, which shows peak runoff flow rates leaving the developed property in the 2-, 10-, 25-, and 100-year storm events will not exceed those in the existing condition. Calculations are also provided that demonstrate how the proposed stormwater system meets the state and local water quality requirements. In addition, the installation of erosion and sedimentation controls during demolition and construction periods is specified, as well as long term stabilization and pollution prevention on the site. The design in this report is further supported by the Medway Municipal Complex Permit Drawings prepared by Langan.

1.0 INTRODUCTION

1.1 General

Langan has prepared this Stormwater Management Report in support of the proposed municipal complex project at 120 Main Street in Medway, Massachusetts. The project proposes construction of a municipal building and associated parking areas, access drives, fire apparatus circulation areas, pedestrian plazas and walkways, landscaping, lighting, utility infrastructure, and stormwater management facilities.

This report documents the engineering design of the stormwater conveyance and management systems for the proposed development. The proposed stormwater management system follows the design criteria of the MassDEP Stormwater Management Handbook and the Town of Medway Stormwater Management and Land Disturbance Rules and Regulations.

All elevations in this report are referenced to the North American Vertical Datum of 1988 (NAVD88).

1.2 Site Location

The site is approximately 8.3 acres and is located at 120 Main Street in Medway, MA. The site is bound by residential properties to the north, a commercial development to the east, Main Street to the south, and Pond Street to the west.

1.3 Existing Conditions

The property is a previously developed parcel that has been cleared of its former buildings. Existing conditions include pavement, concrete pads, fencing, utility infrastructure, and other remnant site features associated with the former concrete block manufacturing facility.

The site topography ranges between elevation ± 265 and ± 235 and generally slopes from northeast to southwest.

1.4 Project Description

The proposed development includes site improvements to support the operation of a new Fire Department, Town Hall, and Police Department. The project proposes

construction of a 41,500± square foot (sf) building and associated parking areas, access drives, fire apparatus circulation areas, pedestrian plazas and walkways, landscaping, lighting, utility infrastructure, and stormwater management facilities.

For existing stormwater analysis, the project site was analyzed in its pre-demolition condition. In the existing condition, stormwater from most of the site sheet flows, untreated, to the municipal stormwater system in Main Street and Pond Street. A small portion of the site is collected by a trench drain and conveyed to a subsurface system where stormwater either infiltrates or overflows to the stormwater system in Main Street.

In the proposed condition, stormwater from paved areas is conveyed to surface infiltration basins or a subsurface detention system. Stormwater from landscaped berms around the perimeter of the site is collected via drainage swales for conveyance to various analyzed design points.

1.5 FEMA

The *Flood Insurance Rate Map for County, Norfolk County, Massachusetts* (Figure 3) conducted by the Federal Emergency Management Agency (FEMA) (map number 25021C0143F, effective July 8, 2025) indicates the site is in Zone X (unshaded), which denotes “areas determined to be outside the 0.2% floodplain (500-year floodplain)”.

1.6 Soil Conditions

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (Figure 4) the following soil types within the existing site.

Table 1: NRCS Soil Survey

Map Unit Symbol	Map Unit Name	Rating
602	Urban land, 0 to 15 percent slopes	N/A
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C
310B	Woodbridge fine sandy loam, 0 to 3 percent slopes	C/D

Geotechnical investigations and evaluations were performed by Langan in addition to reviewing the NRCS Web Soils Survey.

Langan observed 28 borings and 21 test pits in April 2026. The subsurface conditions generally consist of a surficial layer of fill or topsoil underlain by sand, gravel, silty sand, and sandy silt (till). These observations were confirmed by analysis of laboratory samples for grain size and textural classification. Groundwater was encountered at depths of about 4 to 9 feet below grade, between elevation 234 and 254.

Additional information can be found in the enclosed Test Pit and Boring Logs (Appendix J).

For purposes of stormwater modeling, soils are classified into hydrologic soil groups (HSG) to indicate expected rates of infiltration for bare soil after prolonged wetting. The four HSGs A, B, C and D are one element used to determine runoff curve numbers and analyzing stormwater characteristics of a site. Table 2.3.3 1982 Rawls Rates from the Massachusetts Stormwater Handbook, Volume 3, outlines the infiltration rates associated with the various HSGs.

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.

Based on the geotechnical findings, the project site was modeled as HSG C for the purposes of stormwater modeling.

2.0 STORMWATER MANAGEMENT

2.1 Mass DEP Stormwater Performance Standards

A summary of Mass DEP Stormwater Performance Standards and a method for ensuring compliance with each standard are summarized below:

1. No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Response: No new untreated stormwater conveyances are proposed. Runoff from impervious areas is collected and treated on site via a combination of Stormwater Best Management Practices (BMPs) including deep-sump hooded catch basins, infiltration basins, and proprietary water quality units. The proposed stormwater management system replaces the existing untreated stormwater site condition. The project complies with Standard 1.

2. Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Response: Peak rates from the project site to the design points analyzed in the proposed condition will be equal to or less than the existing condition. The project complies with Standard 2.

See Table 2 for Peak Flow Runoff Rate Comparison for each design point analyzed for the 2-, 10-, 25- and 100-year storms. Stormwater discharge calculations are included in Appendices B and C.

3. Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best

management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Response: The project infiltrates the required recharge volume to the maximum extent practicable. The proposed development reduces the impervious coverage on site, increasing the opportunities for stormwater infiltration and groundwater recharge compared to the existing condition. The high groundwater table and existing HSG C soil condition limits the site's infiltration ability, but the project proposes two surface basins which are designed to infiltrate the water quality volumes associated with their respective drainage areas. The project complies with Standard 3 to the extent practicable.

Recharge calculations are included in Appendix D.

4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:
- Suitable practices for source control and pollution prevention are identified in a long-term pollution-prevention plan, and thereafter are implemented and maintained;
 - Structural stormwater best management practices are sized to capture the required water-quality volume determined in accordance with the *Massachusetts Stormwater Handbook*; and
 - Pretreatment is provided in accordance with the *Massachusetts Stormwater Handbook*.

Response: A Long-Term Pollution Prevention Operation & Maintenance Plan has been developed for this project and includes the operation and maintenance requirements for proposed Stormwater BMPs.

The stormwater system is designed to treat the required Water Quality Volume (WQV) of 0.5" over the impervious area as determined in accordance with the Massachusetts Stormwater Handbook. The project complies with Standard 4.

Water Quality Volume Calculations are included in Appendix E. TSS Removal Worksheets are included in Appendix F. The Long-Term Pollution Prevention Operation & Maintenance Plan for the proposed BMPs is included in Appendix H.

5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Response: This project is not classified as a land use with higher potential pollutant loads. Standard 5 is not applicable.

6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area, if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Response: The Project is not within a Zone II or IWPA and does not drain to an outstanding resource water. Standard 6 is not applicable.

7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Response: The project results in an 80,000± sf reduction in impervious area and qualifies as a redevelopment project. The project complies with all Stormwater Management Standards to the maximum extent practicable.

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

All redevelopment projects shall fully comply with Standard 8.

Response: Soil Erosion and Sediment Control Plans have been developed in accordance with the *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas* and a written Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan has been prepared. The project complies with Standard 8.

The Soil Erosion and Sediment Control Plans are included in the Permit Drawings (under separate cover). The Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Section 6 of this report.

9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Response: A Long-Term Pollution Prevention Operation & Maintenance Plan has been developed for this project and includes the operation and maintenance requirements for proposed Stormwater BMPs. The project complies with Standard 9.

The Long-Term Pollution Prevention Operation & Maintenance Plan is included in Appendix H.

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

Response: The stormwater management system for this project will not include any illicit connections to the stormwater system. The project complies with Standard 10.

The Illicit Discharge Compliance Statement is included in Appendix I.

Massachusetts DEP's Checklist for Stormwater Report is included in Appendix A.

2.2 Town of Medway Stormwater Performance Standards

A summary of Town of Medway Stormwater Management Rules and Regulations that exceed MassDEP Stormwater Performance Standards and a method for ensuring compliance with each are summarized below:

8.B.3bi Retain the volume of runoff equivalent to, or greater than, 0.80 inch multiplied by the total post-construction impervious surface area on the site

Response: The stormwater system is sized to retain 0.80 inch times the post-construction impervious area. Water Quality Volume Calculations are included in Appendix E.

8.B.3bii Remove 80% of the average annual post-construction load of Total Suspended Solids (TSS) generated from the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus (TP) generated from the total post construction impervious surface area on the site.

Response: The stormwater system is designed to remove 80% TSS and 50% TP. The TSS and TP Removal Worksheets are included in Appendix F.

2.3 Design Criteria

Peak flow rates at all points of incidental discharge from the site were analyzed to compare proposed discharge rates with the existing condition. These areas of incidental discharge are referred to as “Design Points” in the following analysis.

The storms analyzed include the following:

- A 2-year, 24-hour storm consisting of 3.37 inches of rain
- A 10-year, 24-hour storm consisting of 5.27 inches of rain
- A 25-year, 24-hour storm consisting of 6.45 inches of rain
- A 100-year, 24-hour storm consisting of 8.28 inches of rain

These events are based on National Atmospheric and Oceanic Administration (NOAA) Precipitation Frequency Data Server (PFDS) Type III, 24-hour storm.

2.4 Design Methodology

Langan used the Soil Conservation Service (SCS) methodology to calculate peak runoff flow rates. The SCS methodology outlines procedures for developing runoff hydrographs to determine peak runoff discharges for the existing and proposed conditions. Input values for area, curve number, and time of concentration were calculated for the existing and proposed conditions.

The curve number (CN) is a land-sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. The soils within the watershed are divided into hydrologic soil groups (A, B, C and D) as previously described.

The time of concentration, T_c , is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a point of interest. Values of time of concentration were determined for existing and proposed conditions based on land cover and slope of the flow path, using methods outlined in the SCS methodology.

2.5 Existing Conditions Watersheds

The site was analyzed in its pre-demolition condition for stormwater analysis. In the existing condition, the site is developed with various buildings, pavement, and perimeter vegetation. The existing watershed boundary is $9.31\pm$ acres and is broken into five sub-watershed areas with three design points. Refer to Appendix B for calculations.

Watershed EX-A, $6.11\pm$ acres, is the northwest part of the site and is comprised of building roofs, pavement, and wooded area. Runoff sheet flows to a swale along Pond Street and is conveyed to the municipal stormwater system via an existing drainage culvert (Design Point A).

Watershed EX-B1, $0.82\pm$ acres, is along the east side of the site and is comprised of pavement and a small section of wooded area. Runoff sheet flows to catch basins and is conveyed via a closed drainage network to the municipal stormwater system in Main Street (Design Point B).

Watershed EX-B2, $0.62\pm$ acres, is south of EX-B1 and is comprised of pavement and a small section of wooded area. Runoff sheet flows to a trench drain and enters a subsurface infiltration system stormwater is held and infiltrated. Overflow from the system is conveyed via a closed drainage network to the municipal stormwater system in Main Street (Design Point B).

Watershed EX-B3, $1.35\pm$ acres, is southern part of the site and is comprised of building roofs, pavement, wooded area, and grass. Runoff sheet flows to the municipal stormwater system in Main Street (Design Point B).

Watershed EX-C, $0.40\pm$ acres, is the southwest part of the site and is comprised of building roofs, pavement, and wooded area. Runoff sheet flows to the abutting property to the south (Design Point C).

2.6 Proposed Conditions Watersheds

The same overall $9.31\pm$ acre watershed boundary is used for the proposed watershed analysis. In the proposed condition, the site is broken into seven sub-watershed areas with the same three design points. The proposed flow rates are compared to the existing flow rates at the same design points to confirm there is no increase in peak flow rates at each design point. Refer to Appendix C for calculations.

Watershed PR-A1, 1.14± acres, is the parking area and driveway north of the building. Runoff is collected through catch basins and conveyed through the closed drainage network to Stormwater Basin A1 where it is held via an outlet control structure to promote infiltration to groundwater. Runoff that is not infiltrated will discharge to the swale along Pond Street and flow to Design Point A.

Watershed PR-A2, 0.67± acres, is the parking area west of the building and the rear apparatus apron. Runoff is collected through catch basins and conveyed through the closed drainage network to Stormwater Basin A2 where it is held via an outlet control structure to promote infiltration to groundwater. Runoff that is not infiltrated will discharge to the swale along Pond Street and flow to Design Point A.

Watershed PR-A3, 3.68± acres, is the landscape berms along the north and west sides of the property and a few pitches portions of the building roof. Runoff is collected through a series of swales and flows to Design Point A.

Watershed PR-B1, 2.23± acres, is the parking areas and driveways east of the building and the front apparatus apron. Runoff is collected through catch basins and conveyed through the closed drainage network to Stormwater System B1 where it is detained via an outlet control structure to reduce peak flow rates. Runoff discharges via the closed drainage network to Design Point B.

Watershed PR-B2, 1.32± acres, is the landscape area along the east side of the site and all building roofs. Runoff from the garage roof and landscape area is collected in a swale before entering the closed drainage network. Runoff from the building roof is collected through roof leaders and conveyed to the closed drainage network. All runoff discharges via the closed drainage network to Design Point B.

Watershed PR-B3, 0.15± acres, is the southern edge of the site. Runoff sheet flows as it does in the existing condition to Design Point B.

Watershed PR-C, 0.11± acres, is the southwest part of the site. Runoff sheet flows as it does in the existing condition to Design Point C.

Table 2: Peak Runoff Flow Rate Comparison in cubic feet per second (cfs)

Design Point		Storm Event			
		2-Year (3.37")	10-Year (5.27")	25-Year (6.45")	100-Year (8.28")
Design Point A	Existing (cfs)	15.33	27.38	34.84	46.33
	Proposed (cfs)	10.73	20.75	27.23	37.43
Design Point B	Existing (cfs)	6.30	10.54	17.67	23.76
	Proposed (cfs)	5.87	10.15	16.70	22.67
Design Point C	Existing (cfs)	1.16	1.95	2.44	3.19
	Proposed (cfs)	0.15	0.34	0.48	0.69

3.0 STORMWATER QUALITY

3.1 Stormwater Quality Improvements

The required Water Quality Volume (WQV) has been calculated per the Town of Medway definition of 0.8 inches over the impervious area. The WQV required for each subcatchment and the WQV provided by each infiltration BMP is summarized below.

Table 3: Water Quality Volume

Subcatchment	Required WQV (cf)	Provided WQV (cf)
PR-A1	2,606	2,716
PR-A2	1,517	1,712

Water Quality Volume Calculations are included in Appendix E.

The site utilizes a number of stormwater features to provide stormwater quality and attenuation. Below are the features used in the proposed design:

- Off-line catch basins with hoods and deep sumps: Hoods and sumps (minimum 4 feet) prevent discharge of oil and sediments.
- Proprietary Water Quality Units: Provide TSS removal and oil water separation.
- Surface Infiltration Basin: Provides TSS, nitrogen, phosphorous, heavy metal, and pathogen removal while encouraging groundwater recharge and reduced risk of flooding

3.2 Retention and Infiltration Sizing

The stormwater infiltration systems have been designed in accordance with the Massachusetts Stormwater Handbook to meet and surpass required volume and recharge rates as noted in the calculations below.

Refer to Appendix D for recharge volume and drawdown time calculations.

Total Required Recharge Volume (Rv) for the Project

Rv = Required Recharge Volume

F = Target Depth Factor associated with Hydrologic Soil Group (HSG)

A_{Imp} = Total Impervious cover associated with

$$Rv = \sum(F) \times (A_{Imp})$$

Drawdown Time

$$Time_{drawdown} = \frac{Rv}{(K)(Bottom\ Area)}$$
$$= \# \text{ hr} < 72 \text{ hr}$$

Rv = Design Storage Volume

K = Rawls rate per HSG

The stormwater infiltration systems have been designed using the STATIC method and assumes the entire recharge volume is discharged to the infiltration system before infiltration begins.

4.0 STORM DRAINAGE COLLECTION SYSTEM DESIGN

4.1 Design Criteria

Langan designed the storm drainage collection system to convey the 25-year design stormwater to the discharge locations while maintaining an HGL below the proposed grade.

4.2 Design Methodology

The storm drainage collection system was analyzed using the Rational Method to estimate runoff for a 25-year design storm. The site was divided into subareas – each contributing runoff to an individual catch basin or roof drain. A value for area, time of concentration, and runoff coefficient was calculated for each subarea.

Values of time of concentration were chosen based on land cover and flow path slope from the hydraulically most distant point in the subarea to the appropriate inlet. A minimum six-minute inlet time was assumed for each subarea.

The average runoff coefficient is the weighted average of the land uses within the drainage area. The runoff coefficient is an empirical coefficient representing the ratio of runoff to the rate of rainfall. The following runoff coefficients were used when calculating the average runoff coefficient for each drainage area:

<u>CONDITION</u>	<u>C</u>
Grass/Landscaping	0.30
Paved/Impervious	0.90

Rainfall intensities were taken from the intensity-duration-frequency curve for Massachusetts as presented in NOAA PFDS. Storm drainage pipes were sized based on calculated flows using Manning's Equation and were verified by solving for the hydraulic grade line. Starting hydraulic grade lines for the pipe networks were set to the calculated maximum water elevations in the respective underground systems for the 25-year-design storm event creating a conservative tail water condition.

Stormwater collection system calculations are included in Appendix G.

5.0 CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENTATION CONTROL PLAN

5.1 Introduction

The following sections describe the potential pollutant sources, controls to reduce the pollutants, construction sequence, and construction and earth movement schedules related to the project's soil disturbance. The Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan was developed to comply with standards set in the Environmental Protection Agency's (EPA) 2022 Construction General Permit (CGP). The Soil Erosion and Sediment Control Plans (CE series) can be found within the

Civil Drawings under separate cover.

5.2 Construction Sequence

The total limit of disturbance of the proposed development is 8.47± acres. While the project is anticipated to include the total limit of disturbance throughout construction, the project is broken into three phases:

- Phase 1: Installation of erosion and sediment control controls and demolition of existing site features and utilities.
 1. A pre-construction meeting shall be held by all members of the project team prior to land disturbing activities to discuss project staging and installation of erosion controls. Notify all appropriate local and state departments prior to commencement of on-site activities and in accordance with all approvals.
 2. Construct stabilized construction exits and entrances and install all required soil erosion and sediment controls: compost filter tubes, silt fences, and inlet protection at locations as shown on Site Preparation & Soil Erosion and Sediment Control plans.
 3. Prior to clearing closer than 100 feet of the intended clearing line, the edge of clearing shall be marked to prevent any inadvertent over clearing.
 4. Perform tree clearing. Stumping and grubbing shall be phased to the extent feasible to limit exposed soil. Additional erosion controls may be required, at the expense of the contractor, to compensate for stump and ground cover removal.
 5. Begin site demolition.
- Phase 2: Earthwork, site utilities, retaining walls, and stormwater management facilities.
 1. Maintain stabilized construction entrances, perimeter soil erosion and sediment controls, and inlet protection. Construct and install additional soil erosion and sediment controls: future infiltration basin protection area controls at locations as shown on Soil Erosion and Sediment Control plans.
 2. Begin earthwork, mass grading & site preparation, creation of soil and vegetation stockpiles requiring stabilization, and site utilities construction. Note: for stockpiles that will be unused for 14 or more days, provide cover or temporary stabilization consistent with Construction General Permit (CGP) Section 2.2.14.

3. Implement and maintain stabilization measures (e.g. seeding protected by erosion controls until vegetation is established, sodding, mulching erosion control blankets, hydromulch, gravel, etc.) that minimize erosion from exposed portions of the site in accordance with CGP 2.2.14a and 2.2.14b.
- Phase 3: Construction of building, final site paving, striping, site stabilization, and plantings.
 1. Maintain and install soil erosion and sediment control measures in locations as shown on Soil Erosion and Sediment Control plans.
 2. Begin building construction
 3. Establish uniform, perennial vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas for final stabilization.
 4. Complete building and site construction.
 5. Remove all soil erosion and sediment control measures, only after all exposed earth surfaces are stabilized.
 6. Remove stabilized construction exits/entrances only prior to pavement construction in these areas. Removal of all construction equipment and vehicles.

5.3 Construction Period Pollution Prevention Controls

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Controls to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter, and retain sediment. The contractor will minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities.

5.3.1 Natural Buffers

In order to minimize disturbed areas, work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor will be responsible to make sure that all their workers and any

subcontractors know the proper work limits and do not extend their work into the undisturbed areas. The protective controls are described in more detail in the following sections.

5.3.2 Perimeter Controls

Perimeter controls for this project will consist of the installation of a perimeter silt fence and compost filter tube. The silt fence will prevent sediment laden storm runoff from leaving the construction site or disturbed area. Perimeter controls will be installed before earth disturbing activities, pavement, and concrete slab removal.

5.3.3 Sediment Track-out Control

Stabilized construction entrance and stabilized construction pads shall be established on site within the drive aisles and throughout the construction area. The construction entrances are constructed in accordance with local regulatory criteria. The entrances are located within the perimeter silt fence.

5.3.4 Stockpiled Soil or Sediment

As part of the Phase I sediment controls, soils will be loaded directly into dump trucks and removed from the site, or soil stockpile areas will be established on-site. The stockpile areas will be surrounded by poly wrapped haybale berms as identified on the referenced drawings and stabilized if unused for more than 14-days (e.g., hydroseed with an appropriate annual or winter rye seed mix and tackifier). The initial stockpile area will be established at the outset of the construction activities on site. As construction progresses, stockpile areas may be relocated as needed but must maintain the erosion and sediment control protection described above.

5.3.5 Dust Control

Dust control will be accomplished by use of vegetative cover, mulch, spray-on adhesives, tillage, water sprinkling, dust barriers, or stone. Dust control will be applied on an as-needed basis, specifically when dry or windy weather increases site-wide dust kick-up.

5.3.6 Minimize Disturbance of Steep Slopes

There may be existing or proposed steep slopes at the site. In these areas the contractor will install soil erosion control blankets and provide soil roughening. Soil erosion control blankets will be installed upon completion of grading.

5.3.7 Soil Compaction

The majority of proposed construction will be building, asphalt, concrete, and gravel cover. The areas of vegetation will be accessible only to lightly loaded landscape equipment or hand-operated equipment and tools. Upon completion of grading, construction equipment and activities are to be avoided within areas designed for infiltration.

5.3.8 Storm Drain Inlet Protection

Where applicable, at-grade inlets and curb inlets will be provided with inlet protection throughout the construction activities until final stabilization is achieved. This inlet protection will be installed at the onset of the construction activities. The inlet protection shall consist of a silt filter bag which is placed under the grate. Straw bales or filter tubes may be placed around catch basins after the initial grading to filter and divert sediment until final paving is complete.

5.3.9 Dewatering

Based on the proposed construction activities, the depths of proposed excavations, and the known ground water table elevation, dewatering practices are not anticipated to be required for deeper excavations, foundations, and site features. If necessary, water infiltration to the foundation excavation can likely be controlled using gravity-fed sump pumps via gravel trenches or sumps assisted with collector trenches. The dewatering measures implemented should adequately dewater all foundation-related excavations such that compaction of footing subgrades is feasible. All dewatering activities shall be supervised and witnessed by the designated erosion control monitor. Dewatering activities shall be monitored daily by the erosion control monitor to ensure that sediment laden water is appropriately settled prior to discharge.

5.3.10 Site Stabilization

During construction, any area of exposed soils that will be left idle for more than 30 days shall be stabilized with a layer of mulch hay. For areas that are not meant to remain actively utilized, stabilization procedures will occur on the

following schedule in compliance with Section 2.2.14 of the CGP:

- Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days.
- Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.

All exposed soil finish grade surfaces shall be immediately landscaped and stabilized, loamed, seeded, and mulched with a layer of mulch hay. All disturbed areas must be graded, loamed, and seeded prior to November 1st of each year. Outside of the growing season, beyond November 15th of any construction year, exposed soil finish grade surfaces shall be stabilized with a layer of mulch hay, straw, tackifier or biodegradable erosion control blanket until climate conditions allow for seeding.

All temporary erosion and sedimentation controls will be removed after final site stabilization.

5.4 Pollution Prevention Standards

Potential sources of pollution during construction are:

- sediment from exposed soils and dewatering
- construction material debris
- human waste
- concrete washout
- diesel, gasoline, and hydraulic and engine oil

All sources of soil erosion pollution or construction pollution to stormwater bodies will be mitigated with the use of silt fence, compost filter tubes, and construction fencing around the construction area. To prevent prohibited non-stormwater discharge the good housekeeping practices must be followed.

5.4.1 Spill Prevention and Response

The Contractor will be responsible for preventing spills in accordance with the project specifications and applicable federal, state and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The

name(s) of the responsible spill personnel will be posted on-site.

Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary notification will be to the certified cleanup contractor if deemed necessary by fire and police personnel. The third level of notification (within 1 hour) is to the DEP or municipality's Licensed Site Professional (LSP). The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

5.4.2 Designated Washout Areas

Concrete waste will be placed in designated dumpster (or comparable structure) and concrete washout will occur in designated containment areas.

5.4.3 Proper Equipment, Vehicle Fueling, and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance off-site to reduce the risk of leakage. To ensure that leaks on stored equipment do not contaminate the site, oil-absorbing mats will be placed under oil-containing equipment during storage. Refueling will occur outside wetland resource areas and buffers. Any petroleum products will be stored in tightly sealed containers that are clearly labeled with spill control pads/socks placed under/around their perimeters.

5.4.4 Equipment and Vehicle Washing

No equipment, vehicles, and machines will be washed on-site.

5.4.5 Spill Control Equipment

Spill control and containment equipment will be kept in the work area. Materials and equipment necessary for spill cleanup will be kept either in the work area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms and mats, brooms, dust pans, mops, rags, gloves, goggles, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the contractor to ensure the inventory will be

readily accessible and maintained.

5.4.6 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

5.4.7 Hazardous Materials Spill Report

The contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above-mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

5.5 Operation and Maintenance of Erosion Control

The erosion control measures will be installed as detailed within the CE series. If there is a failure to the controls the contractor, under the supervision of the engineer, will be required to stop work until the failure is repaired. Periodically throughout the work, whenever the engineer deems it necessary, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

5.6 Inspection Schedule

During construction, the erosion and sedimentation controls will be inspected as detailed on the drawings and in the SWPPP. Once the Contractor is selected, an on-site inspector will be selected to work closely to make sure that erosion and sedimentation controls are in place and working properly.

The Owner must schedule the following site inspections with the Conservation Commission:

1. Initial Site Inspection: prior to approval of any Plan.
2. Project Progress Inspections: observe and document project progress at certain milestones.
 - a) Erosion and sediment control measures are in place and stabilized;
 - b) Site Clearing has been substantially completed;
 - c) Rough Grading has been substantially completed;
 - d) Final Grading has been substantially completed;
 - e) Close of the Construction Season;
 - f) Final Landscaping (permanent stabilization)
 - g) Project final completion.
3. Owner Inspections: weekly inspections and prior to and following any storm events with over 0.25" of precipitation.
4. Bury Inspection: prior to backfilling of drainage piping or stormwater conveyance structures.
5. Final Inspection: after construction is completed.

6.0 CONCLUSION

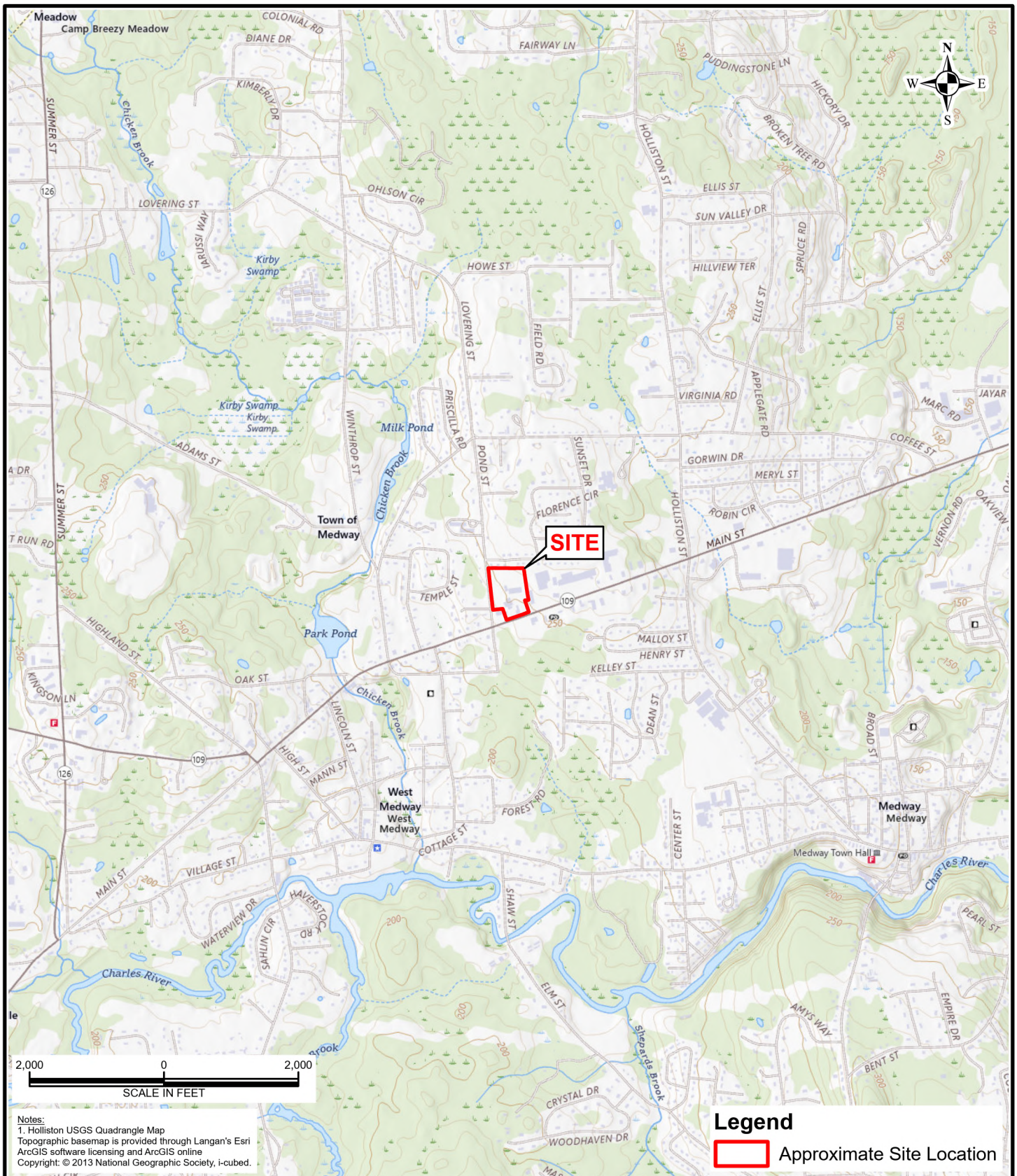
The proposed stormwater-management system has been designed in accordance with the Massachusetts Stormwater Management Handbook, Local Stormwater Bylaws and Rules and Regulations, and the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas. The system incorporates stormwater-quality measures and maintains or reduces the existing rate of runoff for all storms analyzed.

It is the opinion of this office, through the findings in this report, that the proposed stormwater system, as designed, will effectively manage quantity and quality of stormwater runoff for the proposed redevelopment.

7.0 REFERENCES

1. Stormwater Management Handbook, Massachusetts Department of Environmental Protection, 2008.
2. Hydrology Handbook For Conservation Commissioners, Massachusetts Department of Environmental Protection, 2002.
3. Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas, Department of Environmental Protection, Bureau of Resource Protection, May 2003.
4. Precipitation Frequency Data Server (PFDS) National Oceanic and Atmospheric Administration (NOAA). Retrieved November 21, 2024
5. USGS Web Soil Survey, United States National Resources Conservation Service, 2016
6. Urban Hydrology for Small Watersheds, Technical Release 55, United States Department of Agriculture, Soil Conservation Service, June 1986.
7. Project Development and Design Guide, Chapter 8 Drainage and Erosion Control, Massachusetts Department of Transportation, 2023.
8. Massachusetts Small MS4 General Permit 2016 Final Permit, effective July 1, 2018.

FIGURES



LANGAN

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Project

**120 MAIN
STREET**

MEDWAY

NORFOLK COUNTY

MA

Figure Title

**SITE
LOCATION MAP**

Project No.

151072201

Date

7/16/2026

Scale

1" = 2,000 feet

Drawn By

JJ

Figure

1



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Project

**120 MAIN
STREET**

MEDWAY

NORFOLK COUNTY

MA

Figure Title

**FEMA
FLOOD MAP**

Project No.
151072201

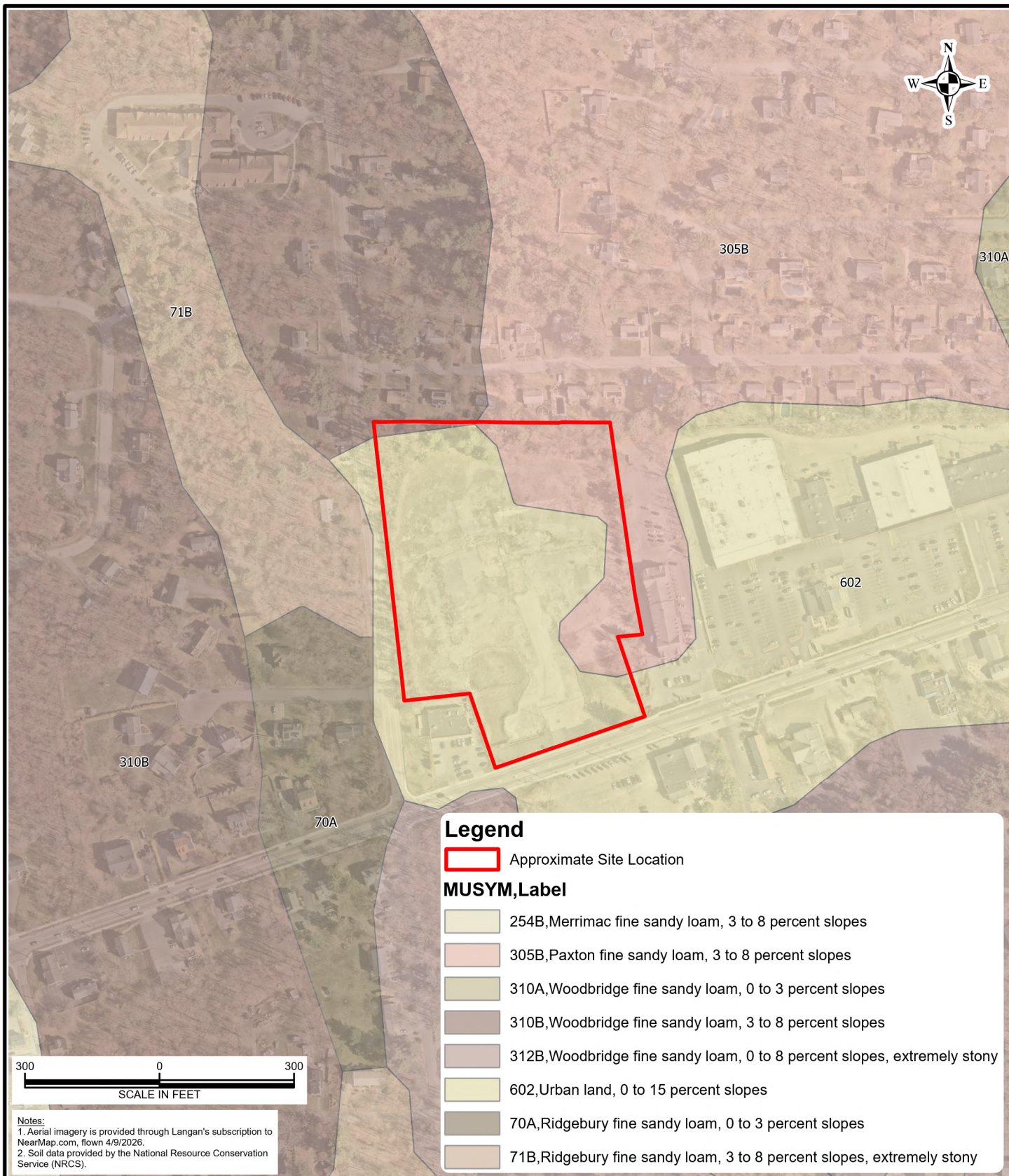
Date
7/16/2026

Scale
1" = 300 feet

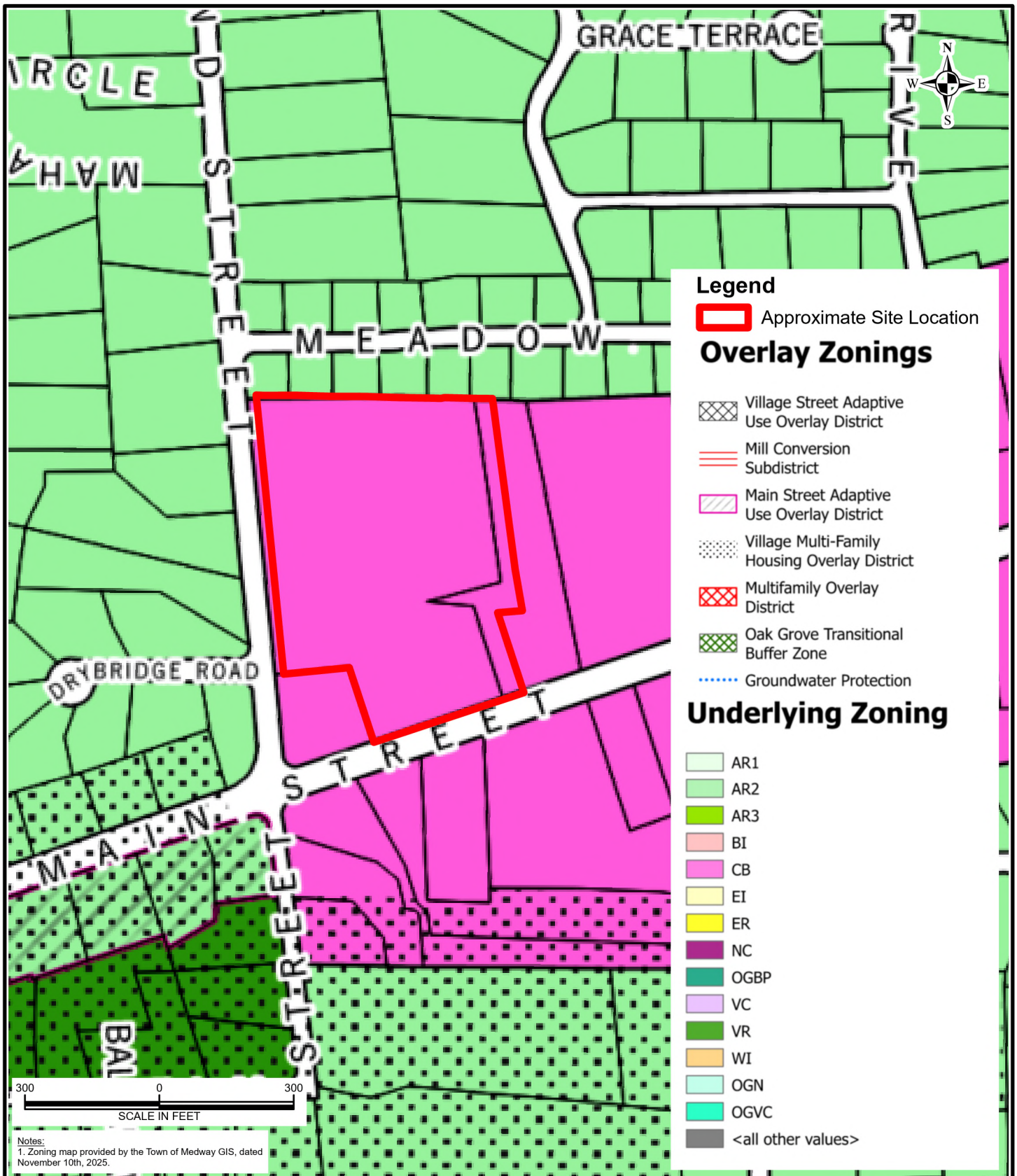
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JJ

Figure

3

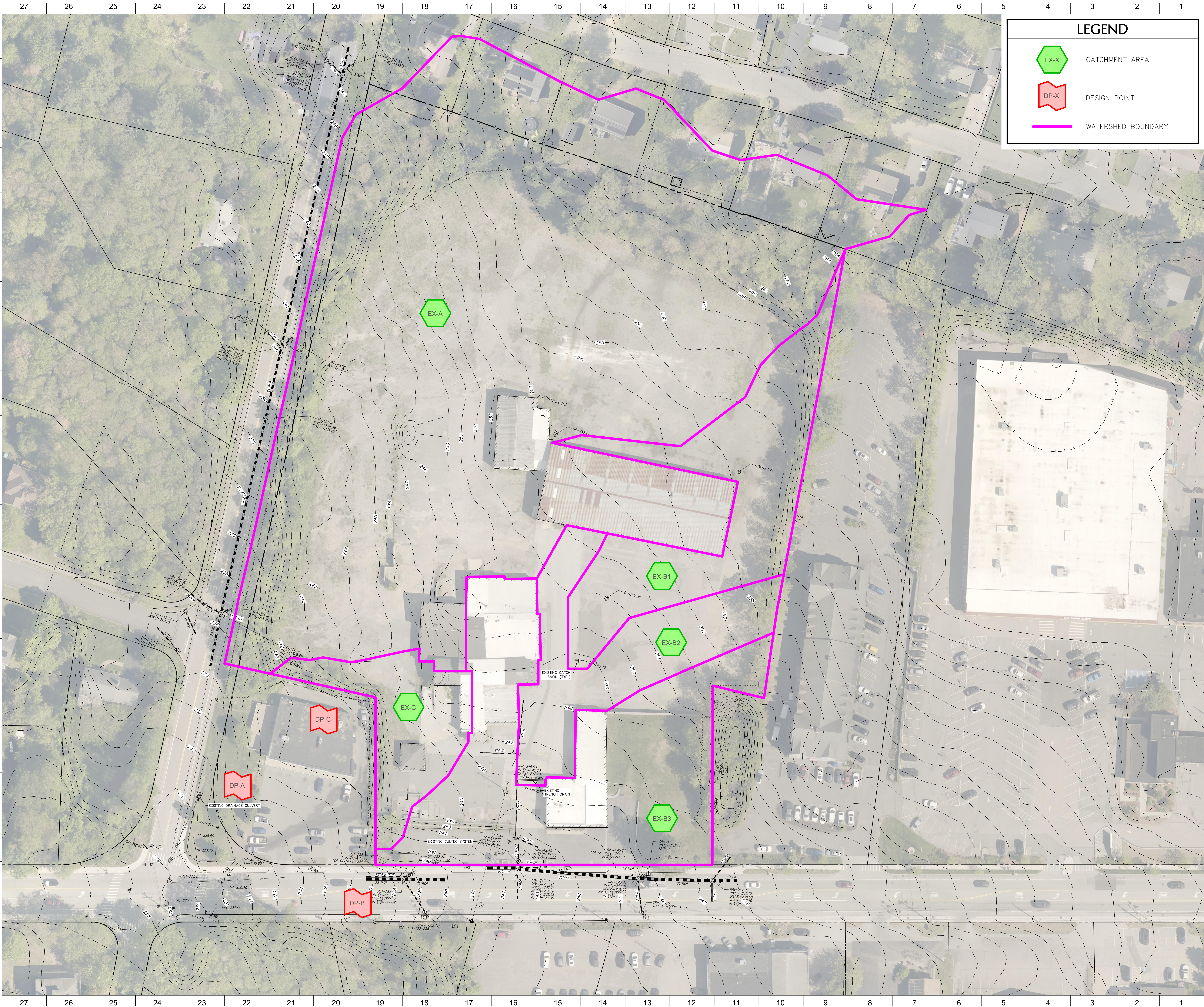


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<div><div><div>LANGAN</div><div>Langan Engineering and Environmental Services, LLC</div><div>100 Cambridge Street, Suite 1310 Boston, MA 02114</div><div>T: 617.824.9100 F: 617.824.9101 www.langan.com</div></div></div>	Project	<div><div>120 MAIN STREET</div><div>MEDWAY</div><div>NORFOLK COUNTYMA</div></div>	Figure Title	Project No. 151072201	<div><div>5</div></div>
	Date 7/16/2026				
	Scale 1" = 300 feet				
	Drawn By JJ				

DRAWINGS



LEGEND

EX-X

CATCHMENT AREA

DP-X

DESIGN POINT

WATERSHED BOUNDARY

dw

DORE + WHITTIER

MASSACHUSETTS
260 MERRIMAC STREET BUILDING 7, 2ND FLOOR
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COMPLEX
120 MAIN STREET,
MEDWAY, MA 02053

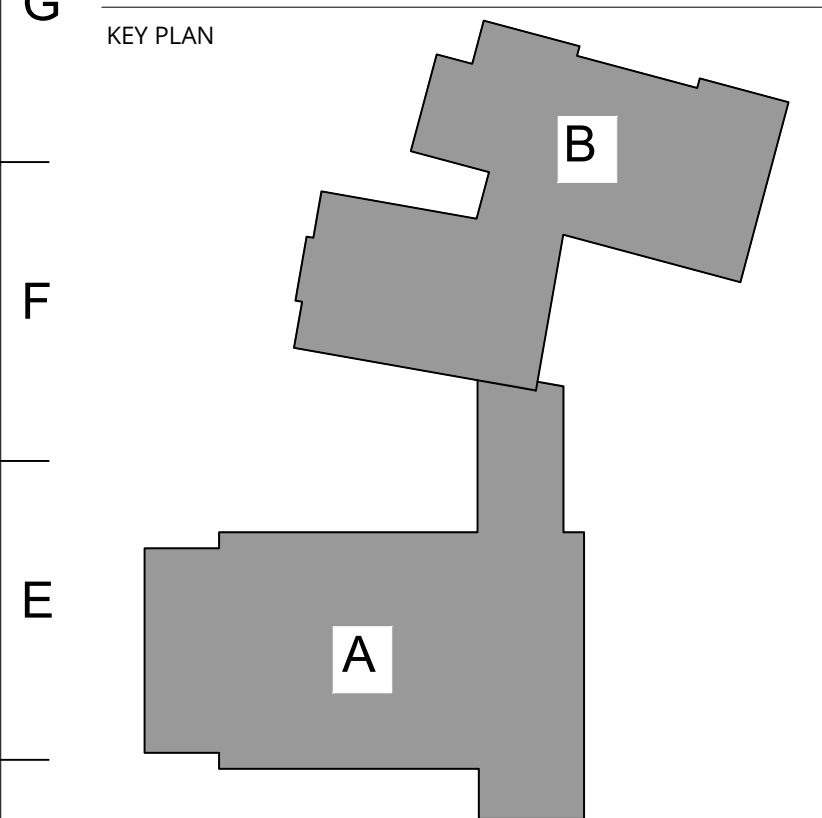
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SEAL AND SIGNATURE:

REVISIONS:			
NO.	DATE	PEER REVIEW	TITLE
	09/15/2026		

ISSUE TITLE AND DATE:
PERMIT DRAWINGS
7/20/2026

KEY PLAN



ORIENTATION AND SCALE:

N

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SCALE: 1" = 60'

0 10 20 30

SCALE: 1" = 30'

PROJECT NORTH

SHEET TITLE:

EXISTING
WATERSHED PLAN

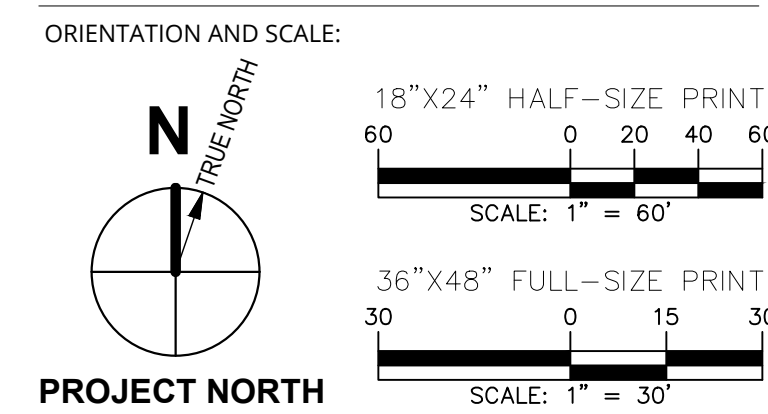
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EX-WS



SEAL AND SIGNATURE: _____

ISSUE TITLE AND DATE:
PERMIT DRAWINGS
7/20/2026

KEY PLAN



SHEET TITLE:

SHEET NUMBER:

PR-WS



dw

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MEDWAY MUNICIPAL
COMPLEX
120 MAIN STREET,
MEDWAY, MA 02053

PROJECT NUMBER:
151072201

SEAL AND SIGNATURE:

REVISIONS:

NO.	DATE	TITLE
1	09/15/2026	PEER REVIEW COMMENT RESPONSE

ISSUE TITLE AND DATE:
PERMIT DRAWINGS
7/20/2026

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KEY PLAN

B

A

ORIENTATION AND SCALE:

N

PROJECT NORTH

18"x24" HALF-SIZE PRINT
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SCALE: 1" = 60'

36"x48" FULL-SIZE PRINT
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SCALE: 1" = 30'

SHEET TITLE:
CATCH BASIN
DRAINAGE AREA
PLAN

SHEET NUMBER:
DA-CB

Date: 9/21/2026 Time: 04:55 User: hschur Style Table: Langan.stb Layout: DA-CB Document Code: 151072201-0203-CG104-0102

APPENDICES

APPENDIX A

Massachusetts DEP Checklist



Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

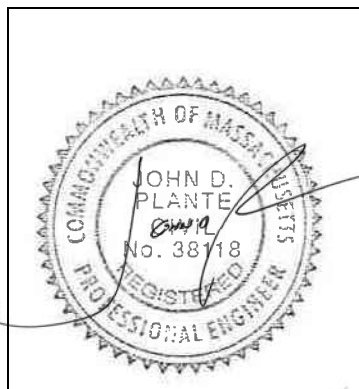
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date

7/20/2026

Checklist

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

Standard 3: Recharge

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

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



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

Standard 4: Water Quality

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

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



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☒ The BMP is sized (and calculations provided) based on:
 - ☒ The ½" or 1" Water Quality Volume or
 - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the 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.

(NOT APPLICABLE) 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.

(NOT APPLICABLE) 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

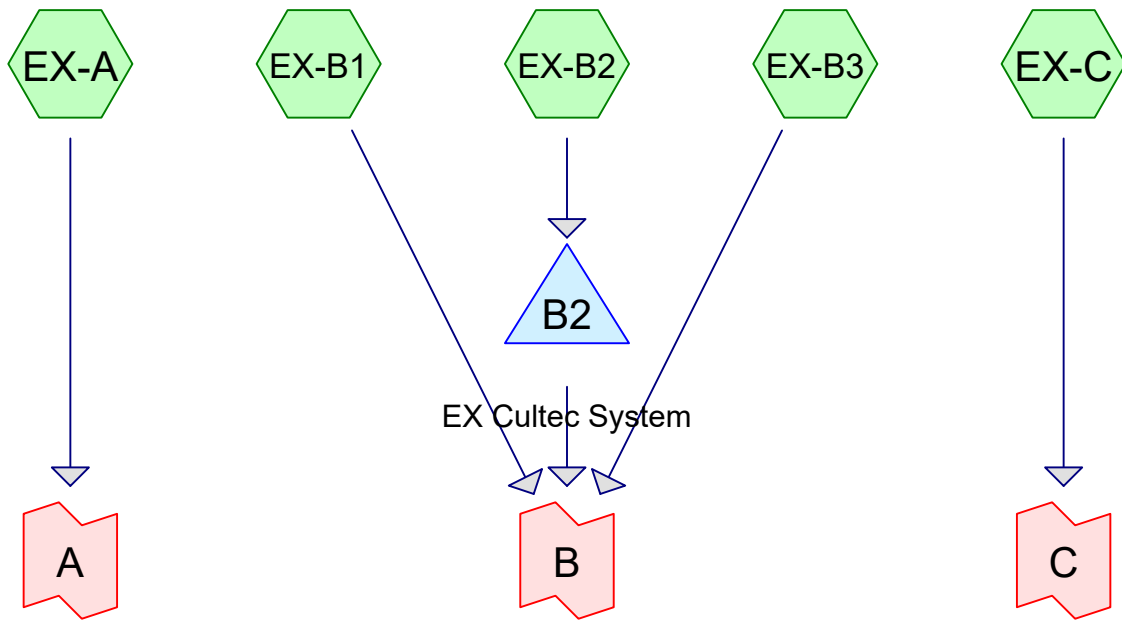
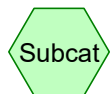
- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - ☒ Name of the stormwater management system owners;
 - ☒ Party responsible for operation and maintenance;
 - ☒ Schedule for implementation of routine and non-routine 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

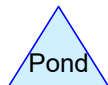
Existing Stormwater Discharge Calculations



Subcat



Reach



Pond



Link

Routing Diagram for 2026-09-18 MMC EXWS
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2026-09-18 MMC EXWS

Prepared by Langan Engineering

Printed 9/21/2026

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 yr	Type III 24-hr		Default	24.00	1	3.37	2
2	10 yr	Type III 24-hr		Default	24.00	1	5.27	2
3	25 yr	Type III 24-hr		Default	24.00	1	6.45	2
4	100 yr	Type III 24-hr		Default	24.00	1	8.28	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.144	74	Grass, Good, HSG C (EX-A, EX-B3)
5.426	98	Pavement (EX-A, EX-B1, EX-B2, EX-B3, EX-C)
0.959	98	Roofs (EX-A, EX-B3, EX-C)
1.779	70	Woods, Good, HSG C (EX-A, EX-B1, EX-B2, EX-B3, EX-C)
9.307	90	TOTAL AREA

2026-09-18 MMC EXWS

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.922	HSG C	EX-A, EX-B1, EX-B2, EX-B3, EX-C
0.000	HSG D	
6.385	Other	EX-A, EX-B1, EX-B2, EX-B3, EX-C
9.307		TOTAL AREA

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Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.144	0.000	0.000	1.144	Grass, Good	EX-A, EX-B3
0.000	0.000	0.000	0.000	5.426	5.426	Pavement	EX-A, EX-B1, EX-B2, EX-B3, EX-C
0.000	0.000	0.000	0.000	0.959	0.959	Roofs	EX-A, EX-B3, EX-C
0.000	0.000	1.779	0.000	0.000	1.779	Woods, Good	EX-A, EX-B1, EX-B2, EX-B3, EX-C
0.000	0.000	2.922	0.000	6.385	9.307	TOTAL AREA	

Summary for Subcatchment EX-A:

Runoff = 15.33 cfs @ 12.09 hrs, Volume= 1.095 af, Depth= 2.15"
Routed to Link A :

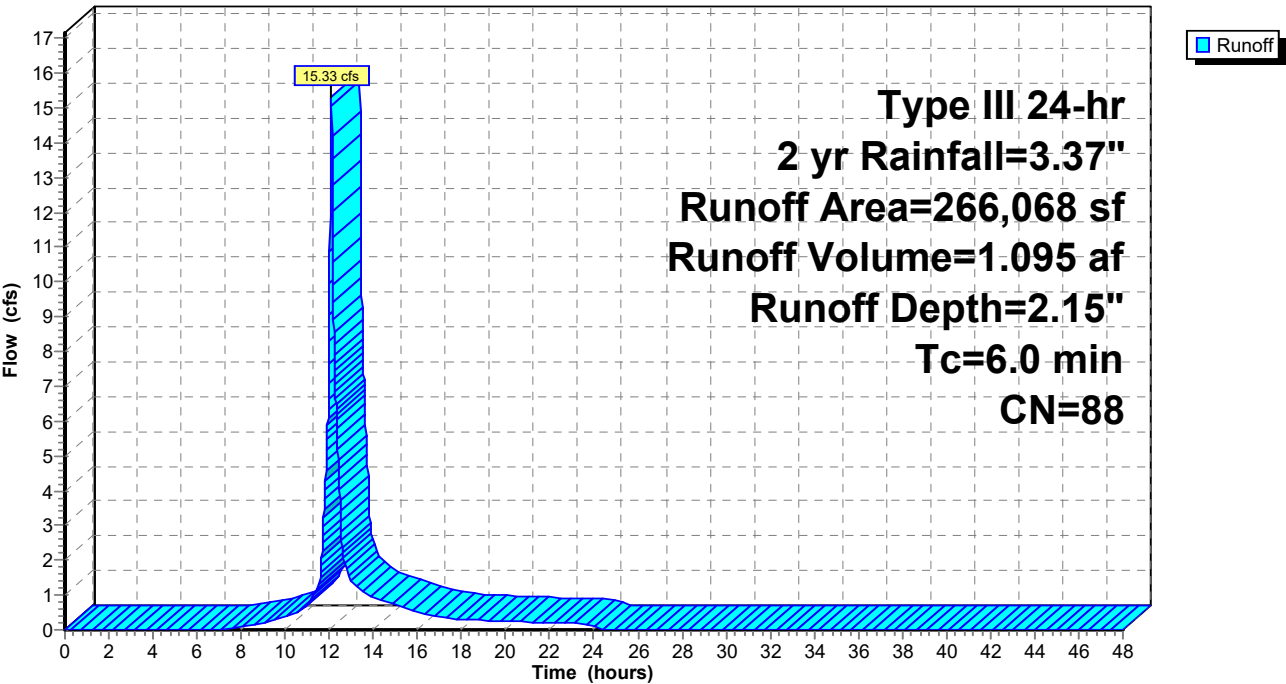
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
	64,758	70	Woods, Good, HSG C
*	36,252	74	Grass, Good, HSG C
*	23,489	98	Roofs
*	141,569	98	Pavement
	266,068	88	Weighted Average
	101,010		37.96% Pervious Area
	165,058		62.04% Impervious Area

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

Subcatchment EX-A:

Hydrograph



Summary for Subcatchment EX-B1:

Runoff = 2.55 cfs @ 12.08 hrs, Volume= 0.192 af, Depth= 2.81"
Routed to Link B :

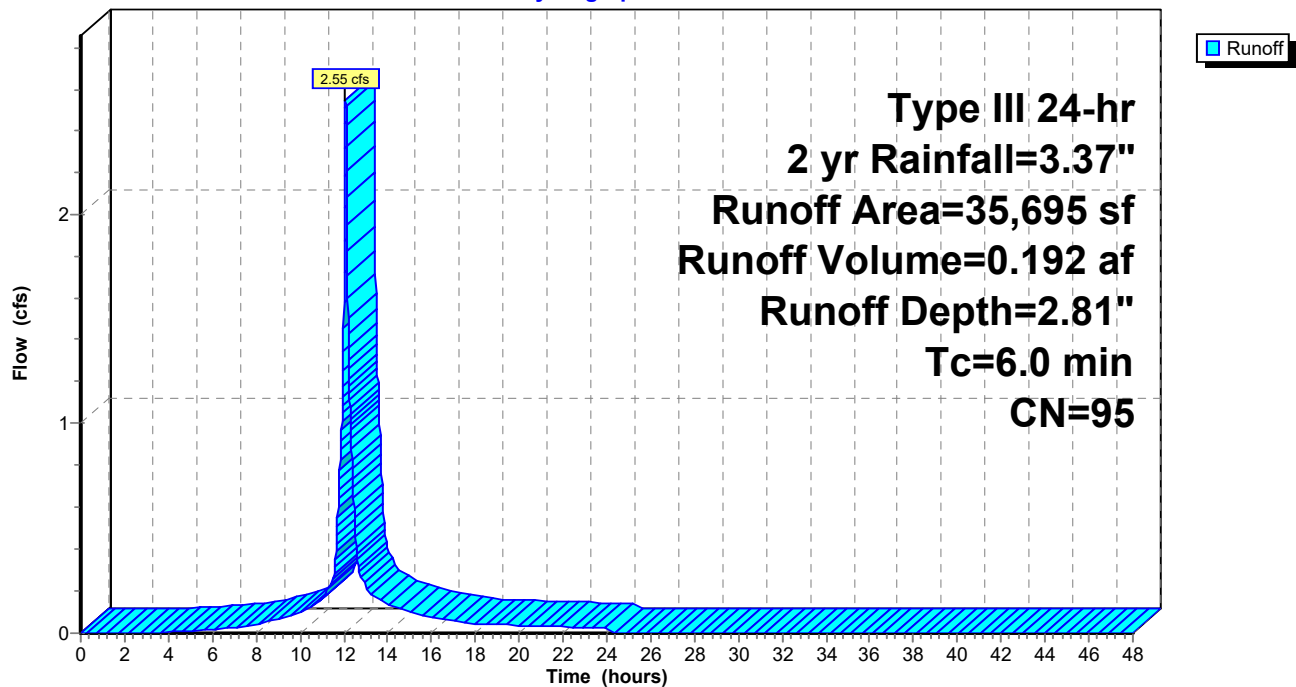
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

Area (sf)	CN	Description
4,407	70	Woods, Good, HSG C
* 31,288	98	Pavement
35,695	95	Weighted Average
4,407		12.35% Pervious Area
31,288		87.65% Impervious Area

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

Subcatchment EX-B1:

Hydrograph



Summary for Subcatchment EX-B2:

Runoff = 2.01 cfs @ 12.08 hrs, Volume= 0.157 af, Depth= 3.03"
Routed to Pond B2 : EX Cultec System

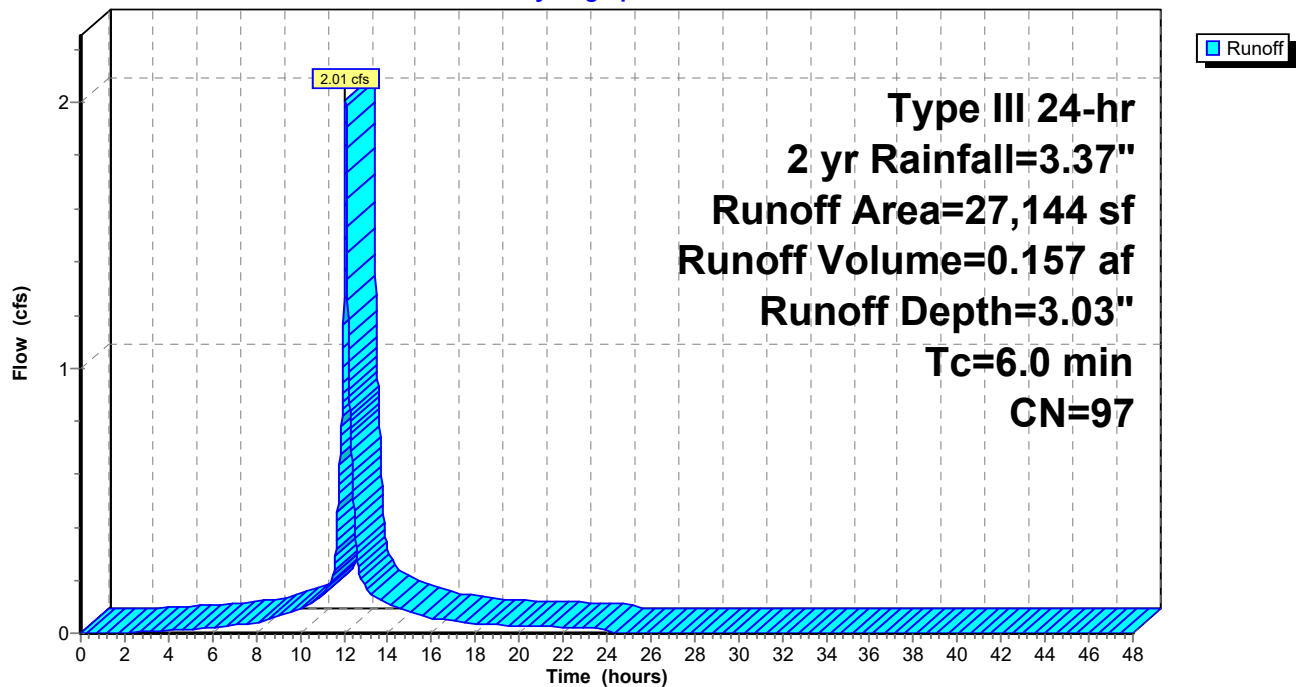
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	635	70	Woods, Good, HSG C
*	26,509	98	Pavement
	27,144	97	Weighted Average
	635		2.34% Pervious Area
	26,509		97.66% Impervious Area

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

Subcatchment EX-B2:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 3.76 cfs @ 12.09 hrs, Volume= 0.272 af, Depth= 2.42"
Routed to Link B :

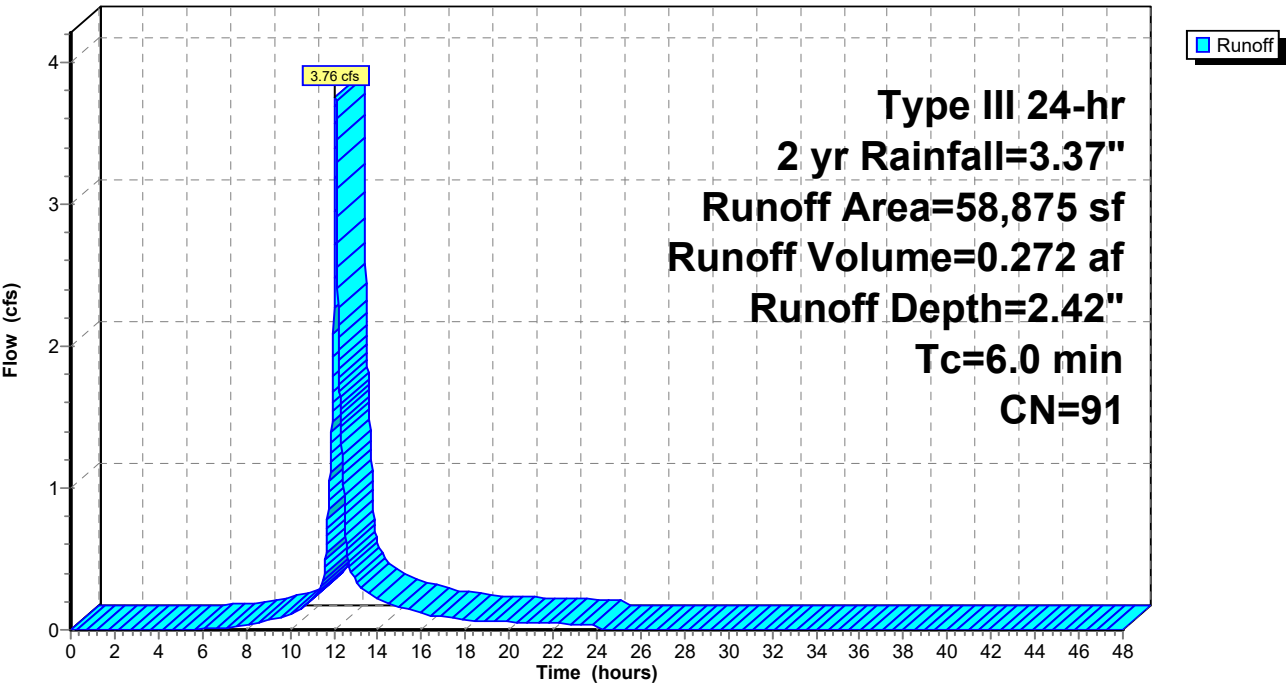
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
	3,649	70	Woods, Good, HSG C
*	13,566	74	Grass, Good, HSG C
*	16,354	98	Roofs
*	25,306	98	Pavement
	58,875	91	Weighted Average
	17,215		29.24% Pervious Area
	41,660		70.76% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment EX-C:

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.085 af, Depth= 2.51"
Routed to Link C :

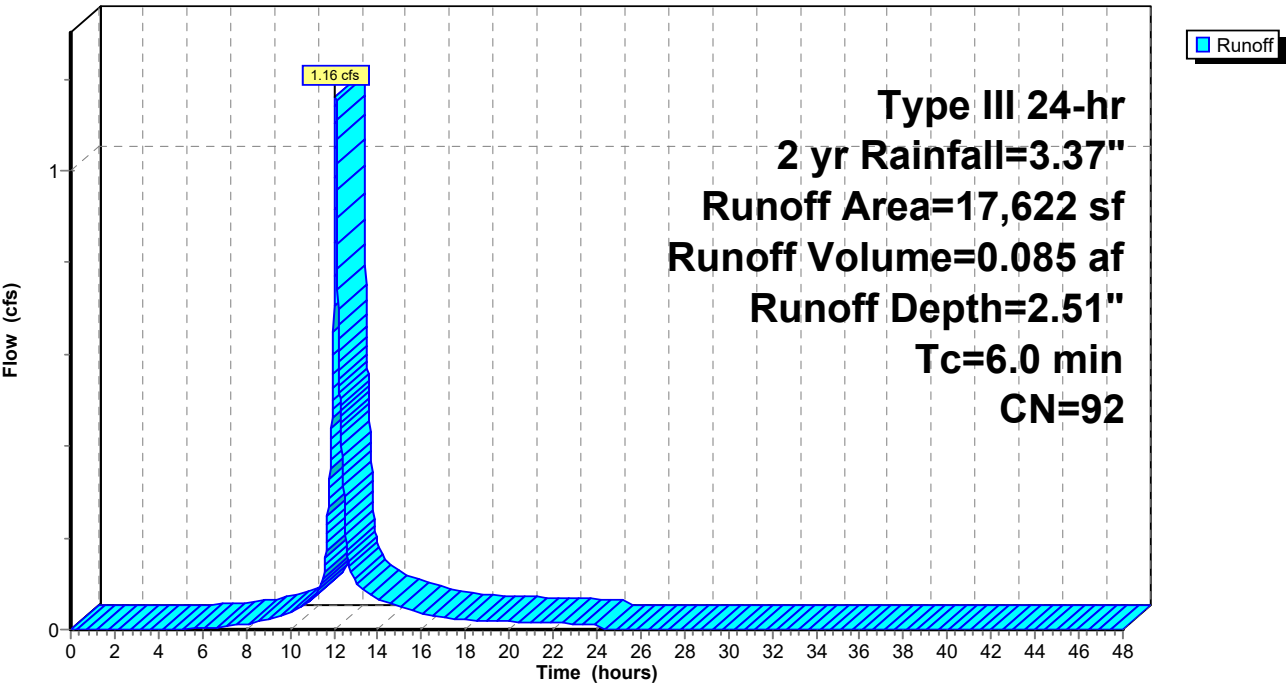
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	4,028	70	Woods, Good, HSG C
*	1,926	98	Roofs
*	11,668	98	Pavement
	17,622	92	Weighted Average
	4,028		22.86% Pervious Area
	13,594		77.14% Impervious Area

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

Subcatchment EX-C:

Hydrograph



Summary for Pond B2: EX Cultec System

Inflow Area = 0.623 ac, 97.66% Impervious, Inflow Depth = 3.03" for 2 yr event
 Inflow = 2.01 cfs @ 12.08 hrs, Volume= 0.157 af
 Outflow = 0.14 cfs @ 11.10 hrs, Volume= 0.157 af, Atten= 93%, Lag= 0.0 min
 Discarded = 0.14 cfs @ 11.10 hrs, Volume= 0.157 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 239.77' @ 13.35 hrs Surf.Area= 3,362 sf Storage= 2,717 cf

Plug-Flow detention time= 150.7 min calculated for 0.157 af (100% of inflow)
 Center-of-Mass det. time= 150.7 min (915.4 - 764.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	238.17'	2,092 cf	27.00'W x 124.50'L x 2.54'H Field A 8,544 cf Overall - 1,570 cf Embedded = 6,974 cf x 30.0% Voids
#2A	238.67'	1,570 cf	Cultec C-100HD x 112 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 7 rows
		3,662 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	238.17'	1.800 in/hr Exfiltration over Surface area
#2	Primary	240.54'	6.0" Round Culvert L= 12.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 240.54' / 240.05' S= 0.0408 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.14 cfs @ 11.10 hrs HW=238.20' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=238.17' (Free Discharge)
 ↑ **2=Culvert** (Controls 0.00 cfs)

Pond B2: EX Cultec System - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 7 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

16 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 120.50' Row Length +24.0" End Stone x 2 = 124.50' Base Length

7 Rows x 36.0" Wide + 4.0" Spacing x 6 + 24.0" Side Stone x 2 = 27.00' Base Width

6.0" Stone Base + 12.5" Chamber Height + 12.0" Stone Cover = 2.54' Field Height

112 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 7 Rows = 1,570.2 cf Chamber Storage

8,543.8 cf Field - 1,570.2 cf Chambers = 6,973.6 cf Stone x 30.0% Voids = 2,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 3,662.3 cf = 0.084 af

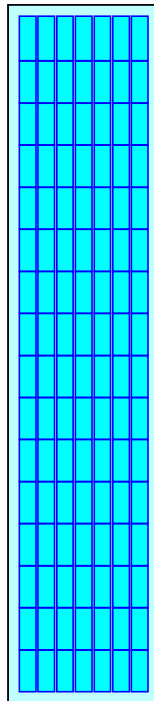
Overall Storage Efficiency = 42.9%

Overall System Size = 124.50' x 27.00' x 2.54'

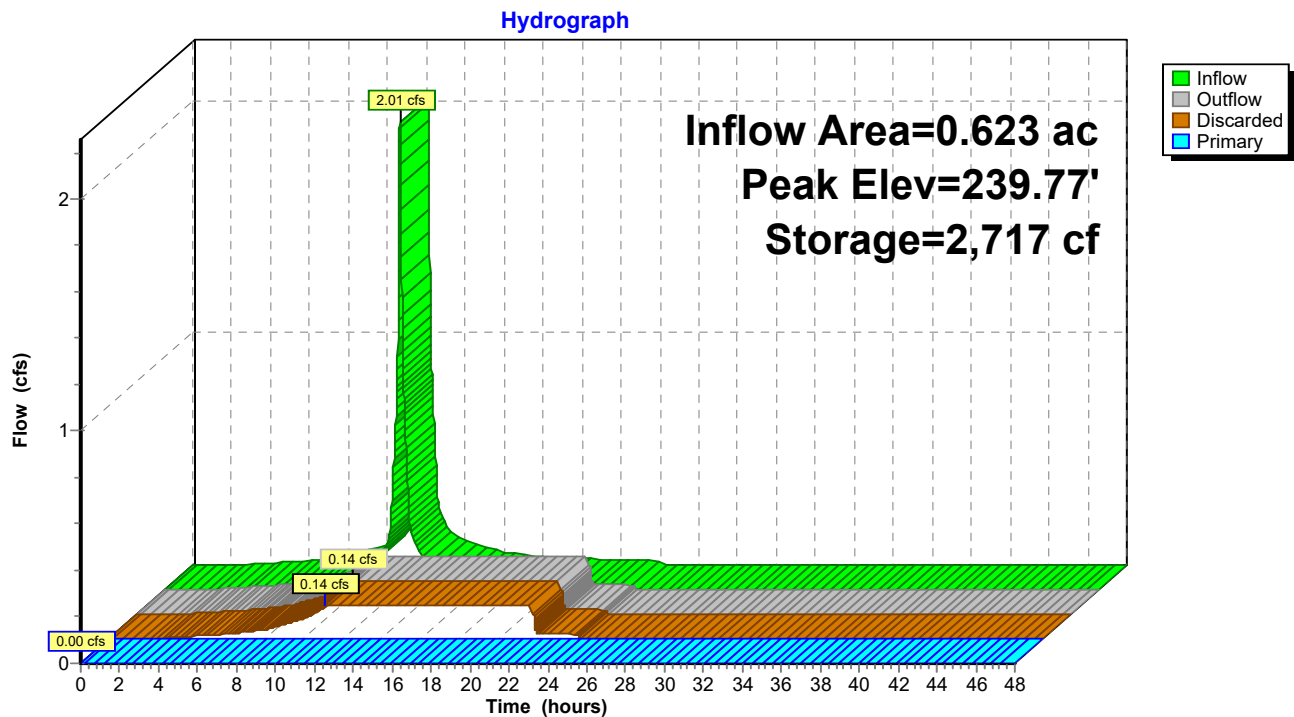
112 Chambers

316.4 cy Field

258.3 cy Stone



Pond B2: EX Cultec System



Stage-Area-Storage for Pond B2: EX Cultec System

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.17	3,362	0	240.77	3,362	3,662
238.22	3,362	50	240.82	3,362	3,662
238.27	3,362	101	240.87	3,362	3,662
238.32	3,362	151	240.92	3,362	3,662
238.37	3,362	202	240.97	3,362	3,662
238.42	3,362	252	241.02	3,362	3,662
238.47	3,362	303			
238.52	3,362	353			
238.57	3,362	403			
238.62	3,362	454			
238.67	3,362	504			
238.72	3,362	633			
238.77	3,362	759			
238.82	3,362	883			
238.87	3,362	1,005			
238.92	3,362	1,128			
238.97	3,362	1,249			
239.02	3,362	1,370			
239.07	3,362	1,489			
239.12	3,362	1,605			
239.17	3,362	1,720			
239.22	3,362	1,833			
239.27	3,362	1,943			
239.32	3,362	2,049			
239.37	3,362	2,151			
239.42	3,362	2,248			
239.47	3,362	2,339			
239.52	3,362	2,422			
239.57	3,362	2,495			
239.62	3,362	2,557			
239.67	3,362	2,612			
239.72	3,362	2,662			
239.77	3,362	2,713			
239.82	3,362	2,763			
239.87	3,362	2,813			
239.92	3,362	2,864			
239.97	3,362	2,914			
240.02	3,362	2,965			
240.07	3,362	3,015			
240.12	3,362	3,066			
240.17	3,362	3,116			
240.22	3,362	3,166			
240.27	3,362	3,217			
240.32	3,362	3,267			
240.37	3,362	3,318			
240.42	3,362	3,368			
240.47	3,362	3,419			
240.52	3,362	3,469			
240.57	3,362	3,519			
240.62	3,362	3,570			
240.67	3,362	3,620			
240.72	3,362	3,662			

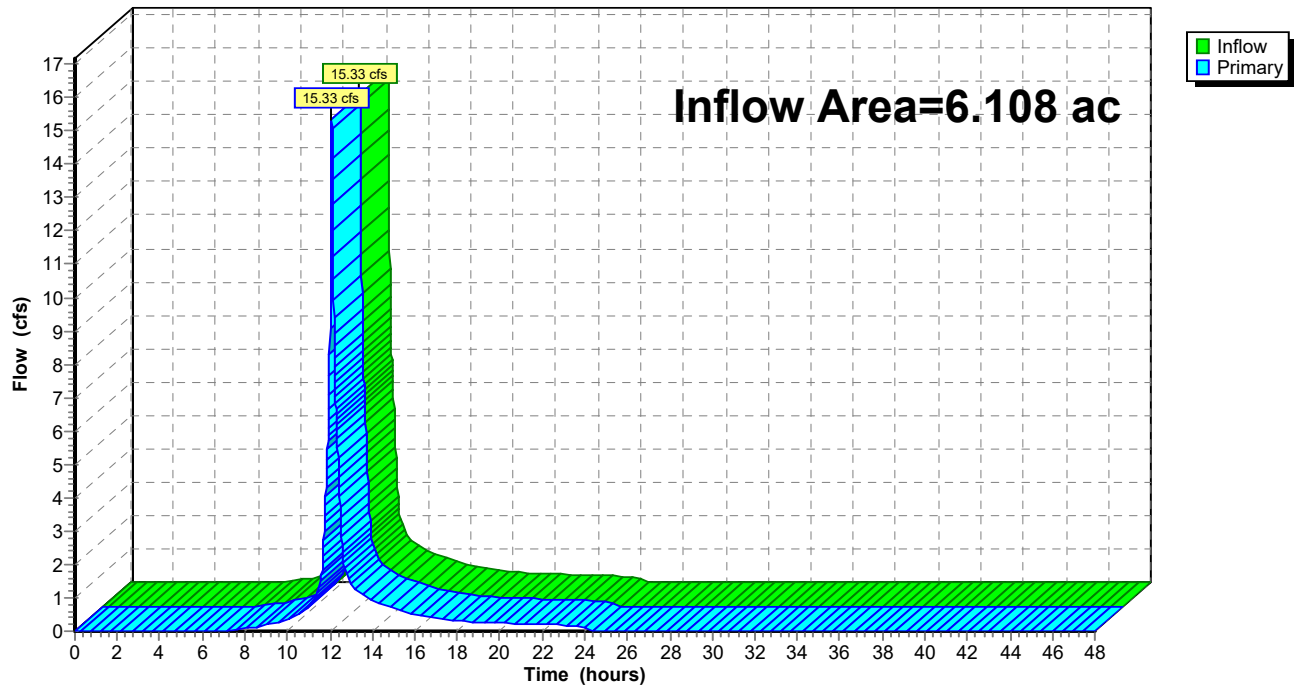
Summary for Link A:

Inflow Area = 6.108 ac, 62.04% Impervious, Inflow Depth = 2.15" for 2 yr event
Inflow = 15.33 cfs @ 12.09 hrs, Volume= 1.095 af
Primary = 15.33 cfs @ 12.09 hrs, Volume= 1.095 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

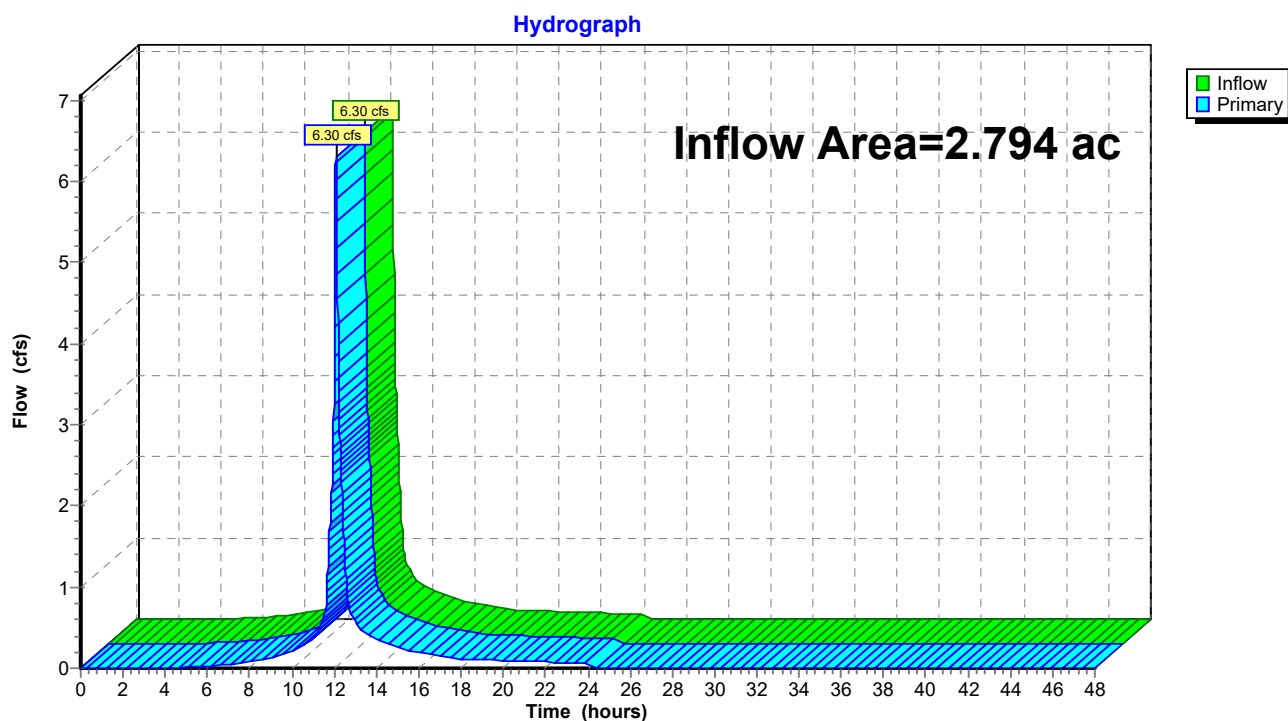
Hydrograph



Summary for Link B:

Inflow Area = 2.794 ac, 81.71% Impervious, Inflow Depth = 1.99" for 2 yr event
Inflow = 6.30 cfs @ 12.09 hrs, Volume= 0.464 af
Primary = 6.30 cfs @ 12.09 hrs, Volume= 0.464 af, Atten= 0%, Lag= 0.0 min

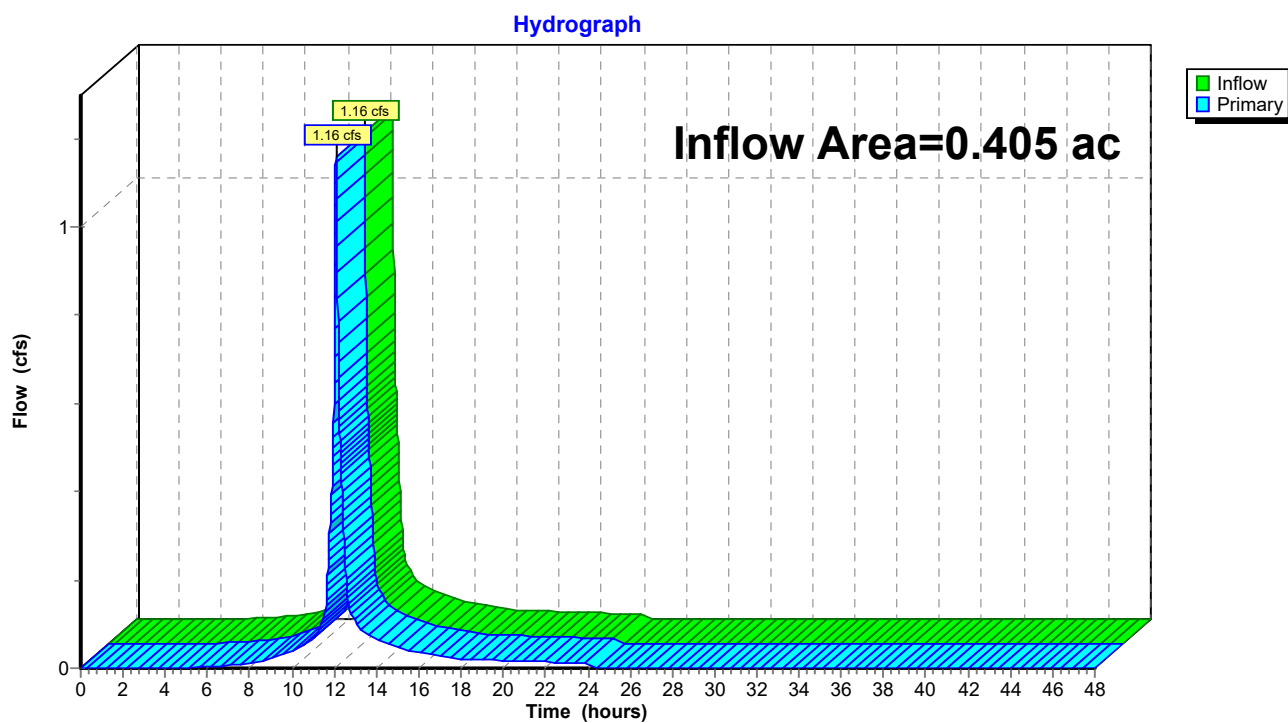
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

Summary for Link C:

Inflow Area = 0.405 ac, 77.14% Impervious, Inflow Depth = 2.51" for 2 yr event
Inflow = 1.16 cfs @ 12.09 hrs, Volume= 0.085 af
Primary = 1.16 cfs @ 12.09 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Summary for Subcatchment EX-A:

Runoff = 27.38 cfs @ 12.09 hrs, Volume= 1.998 af, Depth= 3.93"
Routed to Link A :

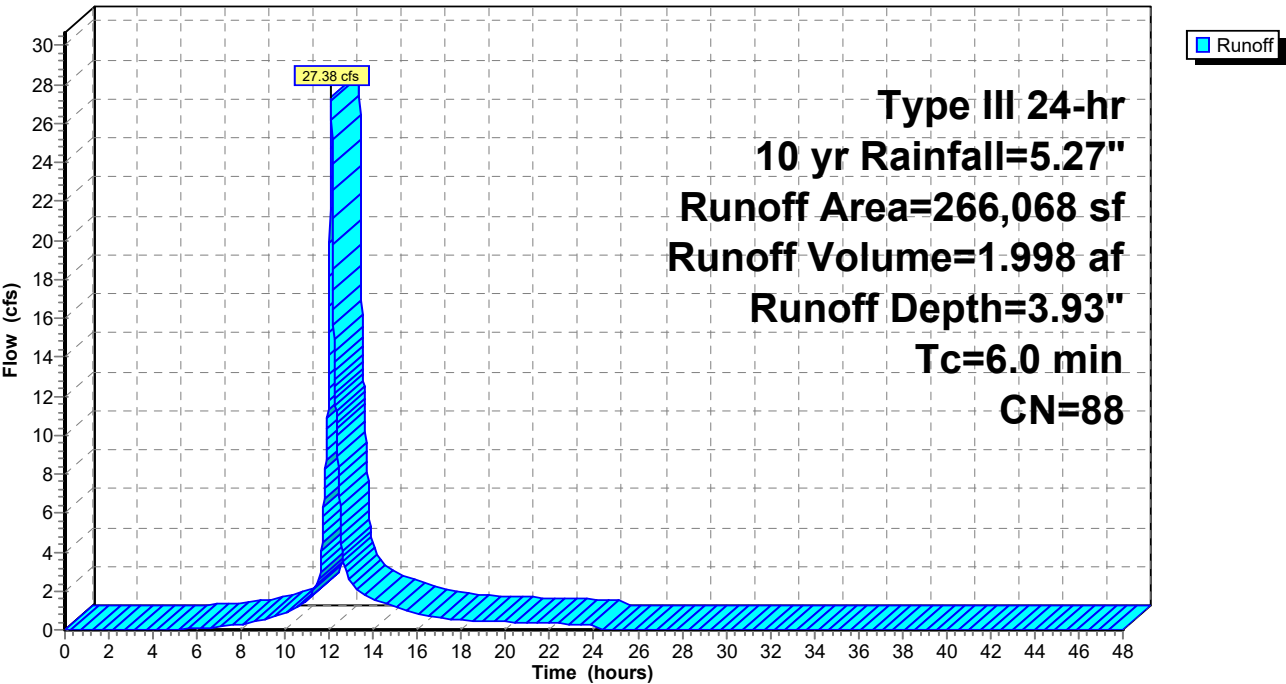
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
	64,758	70	Woods, Good, HSG C
*	36,252	74	Grass, Good, HSG C
*	23,489	98	Roofs
*	141,569	98	Pavement
	266,068	88	Weighted Average
	101,010		37.96% Pervious Area
	165,058		62.04% Impervious Area

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

Subcatchment EX-A:

Hydrograph



Summary for Subcatchment EX-B1:

Runoff = 4.12 cfs @ 12.08 hrs, Volume= 0.320 af, Depth= 4.69"
Routed to Link B :

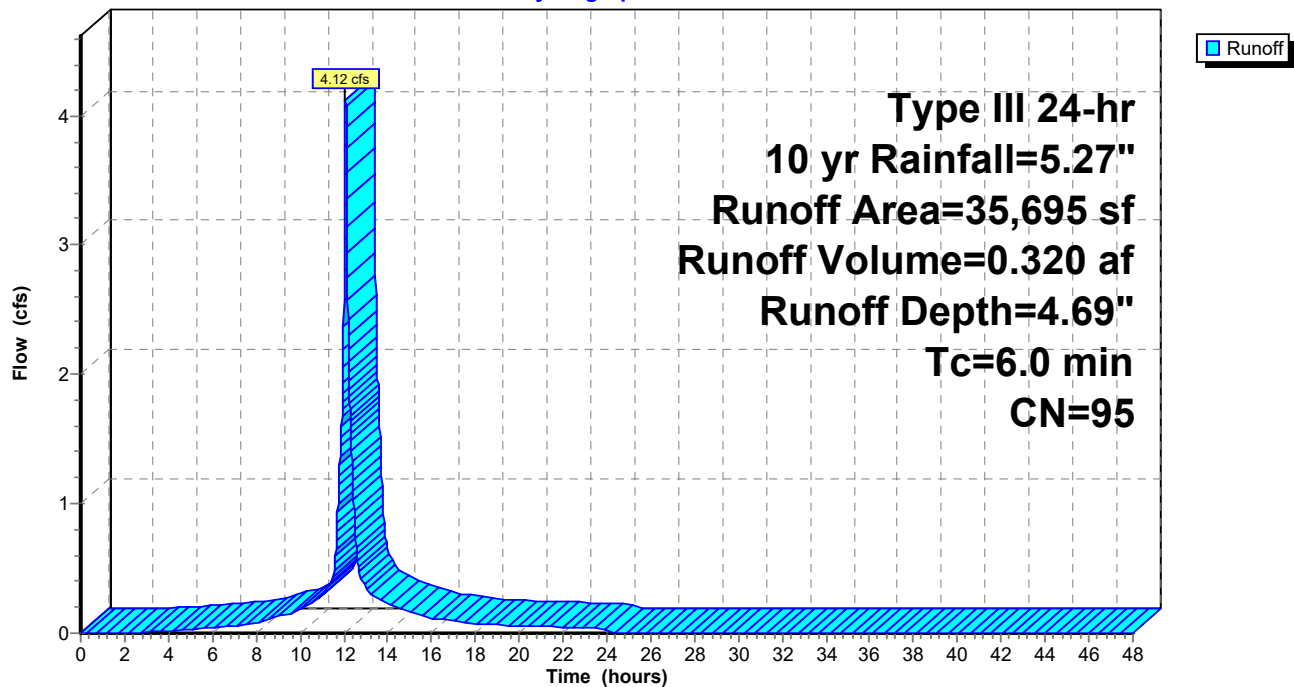
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

Area (sf)	CN	Description
4,407	70	Woods, Good, HSG C
* 31,288	98	Pavement
35,695	95	Weighted Average
4,407		12.35% Pervious Area
31,288		87.65% Impervious Area

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

Subcatchment EX-B1:

Hydrograph



Summary for Subcatchment EX-B2:

Runoff = 3.19 cfs @ 12.08 hrs, Volume= 0.255 af, Depth= 4.92"
Routed to Pond B2 : EX Cultec System

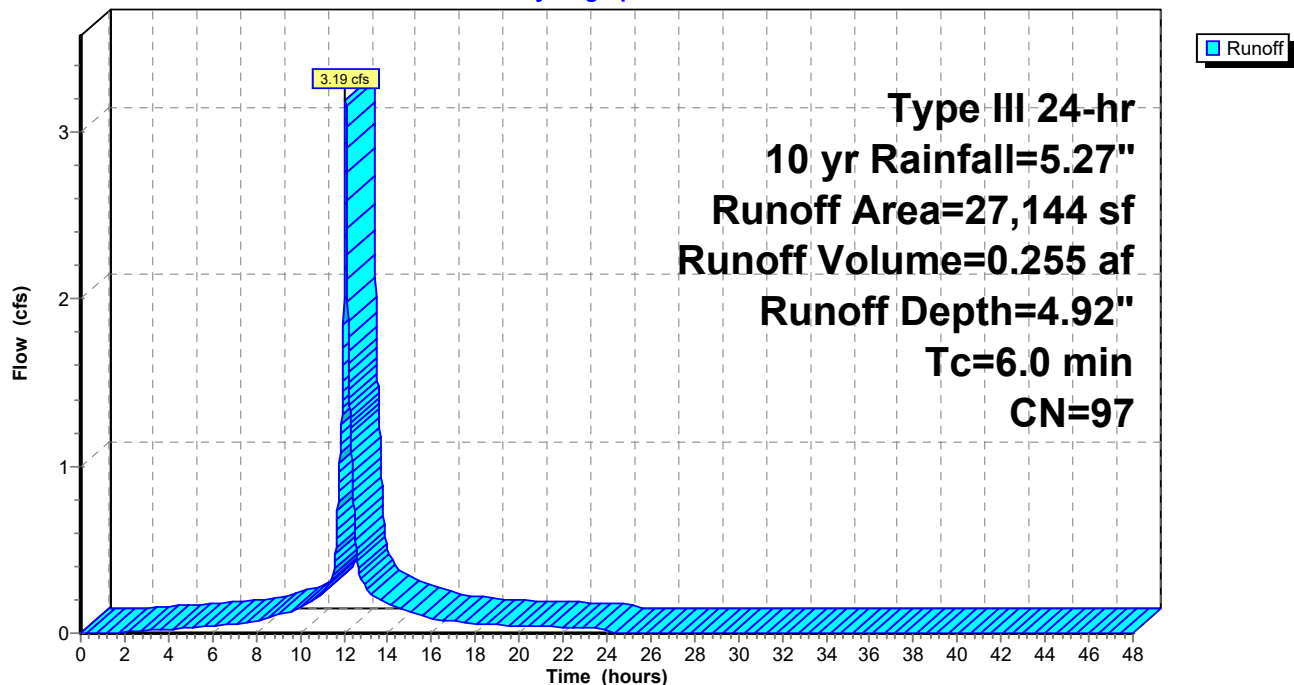
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	635	70	Woods, Good, HSG C
*	26,509	98	Pavement
	27,144	97	Weighted Average
	635		2.34% Pervious Area
	26,509		97.66% Impervious Area

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

Subcatchment EX-B2:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 6.42 cfs @ 12.08 hrs, Volume= 0.478 af, Depth= 4.24"
Routed to Link B :

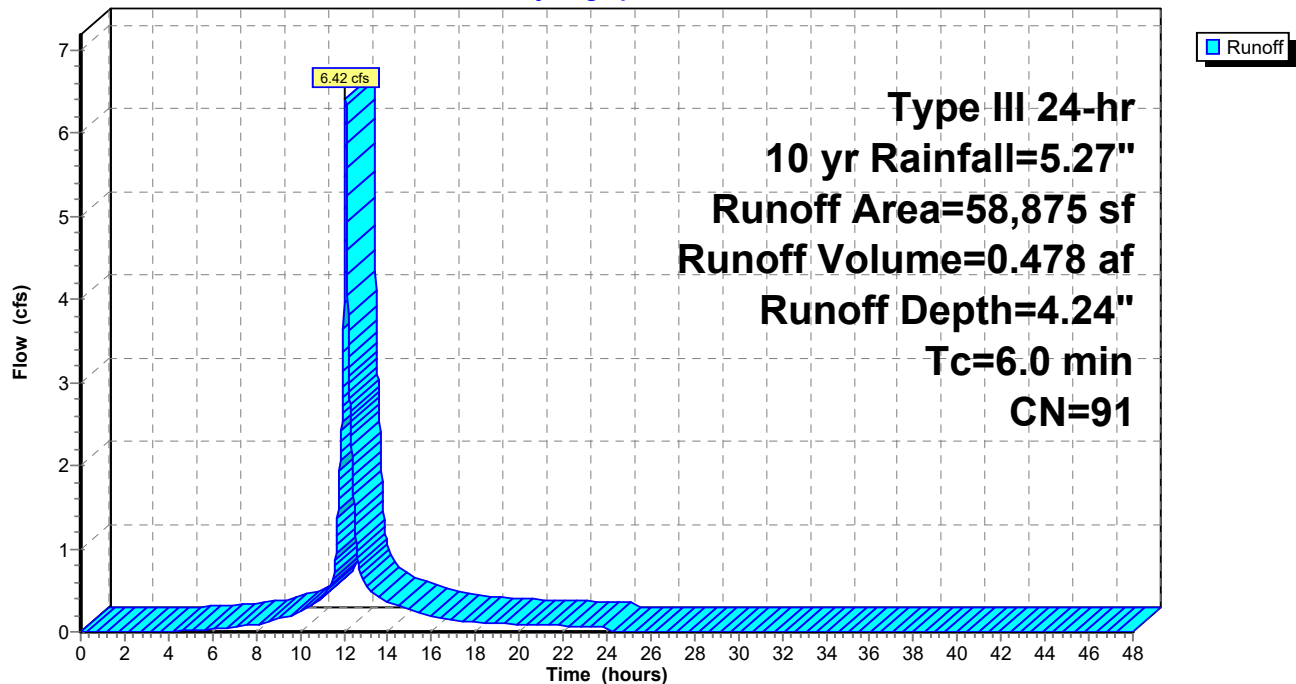
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
	3,649	70	Woods, Good, HSG C
*	13,566	74	Grass, Good, HSG C
*	16,354	98	Roofs
*	25,306	98	Pavement
	58,875	91	Weighted Average
	17,215		29.24% Pervious Area
	41,660		70.76% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment EX-C:

Runoff = 1.95 cfs @ 12.08 hrs, Volume= 0.147 af, Depth= 4.35"
Routed to Link C :

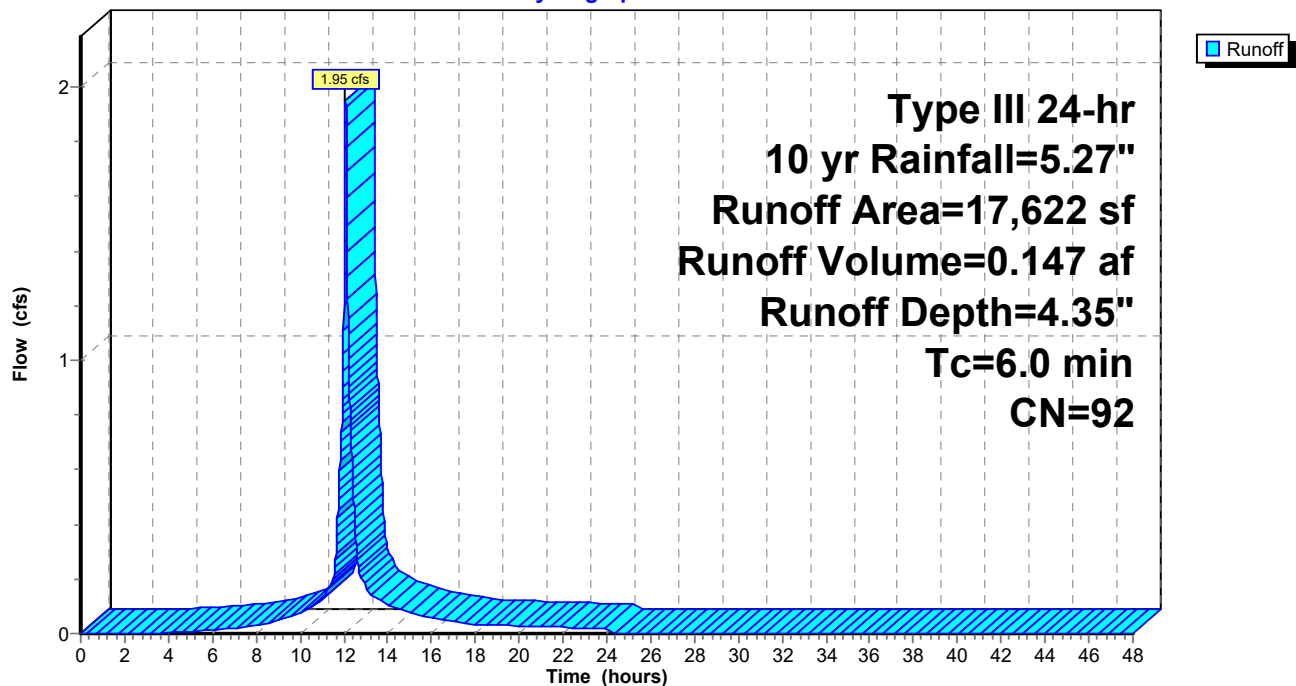
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	4,028	70	Woods, Good, HSG C
*	1,926	98	Roofs
*	11,668	98	Pavement
	17,622	92	Weighted Average
	4,028		22.86% Pervious Area
	13,594		77.14% Impervious Area

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

Subcatchment EX-C:

Hydrograph



Summary for Pond B2: EX Cultec System

Inflow Area = 0.623 ac, 97.66% Impervious, Inflow Depth = 4.92" for 10 yr event
 Inflow = 3.19 cfs @ 12.08 hrs, Volume= 0.255 af
 Outflow = 2.46 cfs @ 12.21 hrs, Volume= 0.255 af, Atten= 23%, Lag= 7.6 min
 Discarded = 0.14 cfs @ 10.02 hrs, Volume= 0.212 af
 Primary = 2.32 cfs @ 12.21 hrs, Volume= 0.043 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 250.30' @ 12.21 hrs Surf.Area= 3,362 sf Storage= 3,662 cf

Plug-Flow detention time= 182.1 min calculated for 0.255 af (100% of inflow)
 Center-of-Mass det. time= 182.1 min (936.8 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	238.17'	2,092 cf	27.00'W x 124.50'L x 2.54'H Field A 8,544 cf Overall - 1,570 cf Embedded = 6,974 cf x 30.0% Voids
#2A	238.67'	1,570 cf	Cultec C-100HD x 112 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 7 rows
		3,662 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	238.17'	1.800 in/hr Exfiltration over Surface area
#2	Primary	240.54'	6.0" Round Culvert L= 12.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 240.54' / 240.05' S= 0.0408 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.14 cfs @ 10.02 hrs HW=238.28' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=2.21 cfs @ 12.21 hrs HW=249.54' (Free Discharge)
 ↑ **2=Culvert** (Inlet Controls 2.21 cfs @ 11.24 fps)

Pond B2: EX Cultec System - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 7 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

16 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 120.50' Row Length +24.0" End Stone x 2 = 124.50' Base Length

7 Rows x 36.0" Wide + 4.0" Spacing x 6 + 24.0" Side Stone x 2 = 27.00' Base Width

6.0" Stone Base + 12.5" Chamber Height + 12.0" Stone Cover = 2.54' Field Height

112 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 7 Rows = 1,570.2 cf Chamber Storage

8,543.8 cf Field - 1,570.2 cf Chambers = 6,973.6 cf Stone x 30.0% Voids = 2,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 3,662.3 cf = 0.084 af

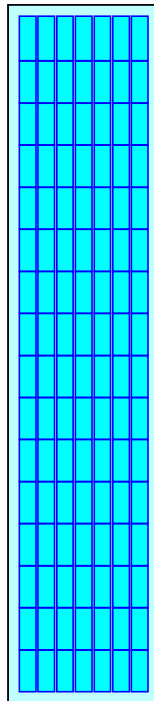
Overall Storage Efficiency = 42.9%

Overall System Size = 124.50' x 27.00' x 2.54'

112 Chambers

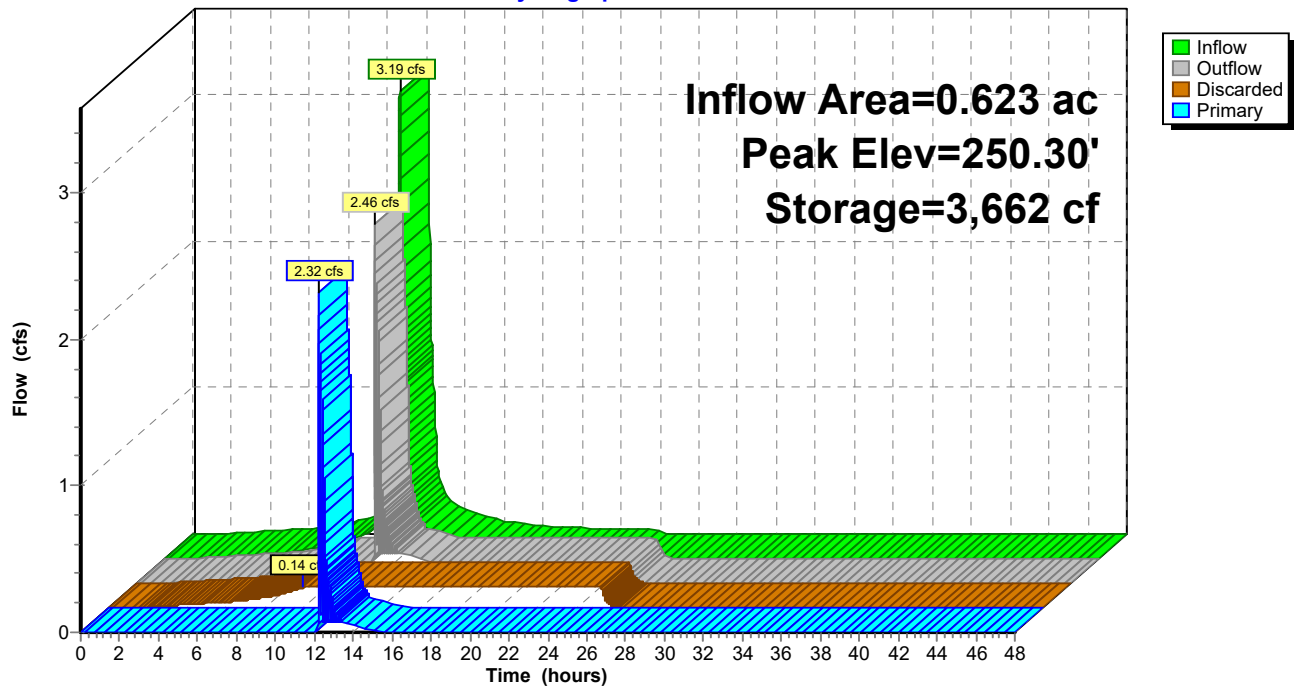
316.4 cy Field

258.3 cy Stone



Pond B2: EX Cultec System

Hydrograph



Stage-Area-Storage for Pond B2: EX Cultec System

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.17	3,362	0	248.57	3,362	3,662
238.37	3,362	202	248.77	3,362	3,662
238.57	3,362	403	248.97	3,362	3,662
238.77	3,362	759	249.17	3,362	3,662
238.97	3,362	1,249	249.37	3,362	3,662
239.17	3,362	1,720	249.57	3,362	3,662
239.37	3,362	2,151	249.77	3,362	3,662
239.57	3,362	2,495	249.97	3,362	3,662
239.77	3,362	2,713	250.17	3,362	3,662
239.97	3,362	2,914			
240.17	3,362	3,116			
240.37	3,362	3,318			
240.57	3,362	3,519			
240.77	3,362	3,662			
240.97	3,362	3,662			
241.17	3,362	3,662			
241.37	3,362	3,662			
241.57	3,362	3,662			
241.77	3,362	3,662			
241.97	3,362	3,662			
242.17	3,362	3,662			
242.37	3,362	3,662			
242.57	3,362	3,662			
242.77	3,362	3,662			
242.97	3,362	3,662			
243.17	3,362	3,662			
243.37	3,362	3,662			
243.57	3,362	3,662			
243.77	3,362	3,662			
243.97	3,362	3,662			
244.17	3,362	3,662			
244.37	3,362	3,662			
244.57	3,362	3,662			
244.77	3,362	3,662			
244.97	3,362	3,662			
245.17	3,362	3,662			
245.37	3,362	3,662			
245.57	3,362	3,662			
245.77	3,362	3,662			
245.97	3,362	3,662			
246.17	3,362	3,662			
246.37	3,362	3,662			
246.57	3,362	3,662			
246.77	3,362	3,662			
246.97	3,362	3,662			
247.17	3,362	3,662			
247.37	3,362	3,662			
247.57	3,362	3,662			
247.77	3,362	3,662			
247.97	3,362	3,662			
248.17	3,362	3,662			
248.37	3,362	3,662			

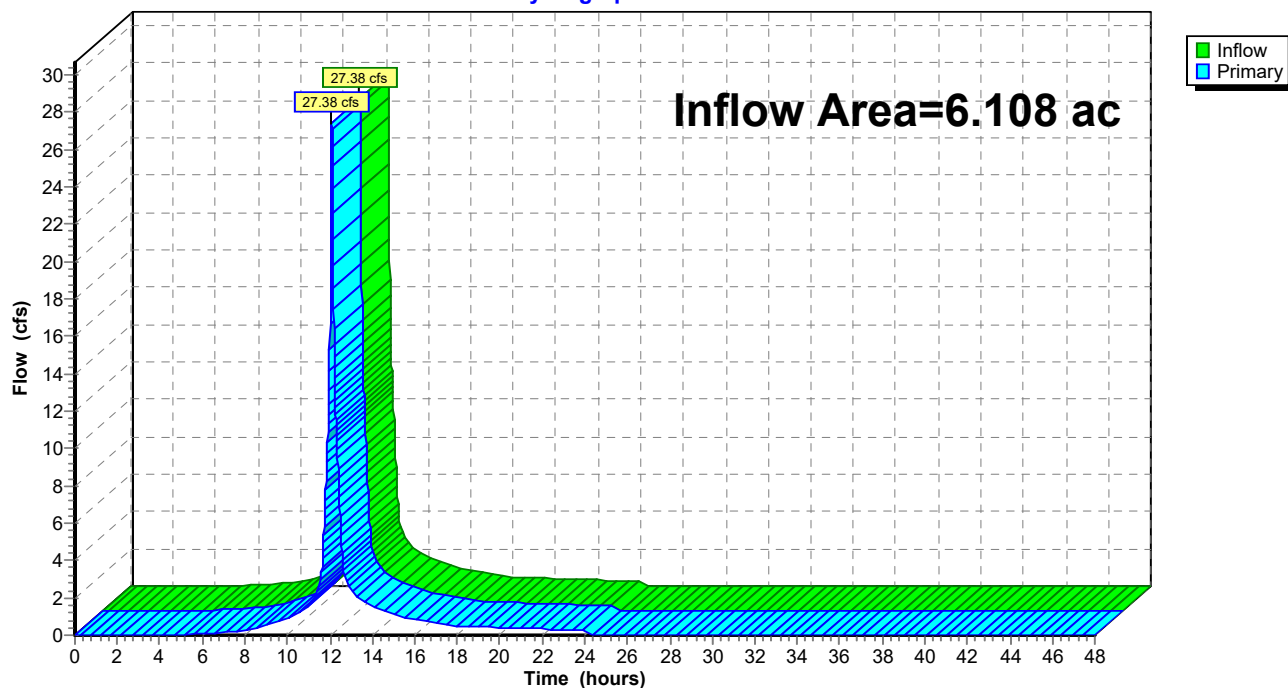
Summary for Link A:

Inflow Area = 6.108 ac, 62.04% Impervious, Inflow Depth = 3.93" for 10 yr event
Inflow = 27.38 cfs @ 12.09 hrs, Volume= 1.998 af
Primary = 27.38 cfs @ 12.09 hrs, Volume= 1.998 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



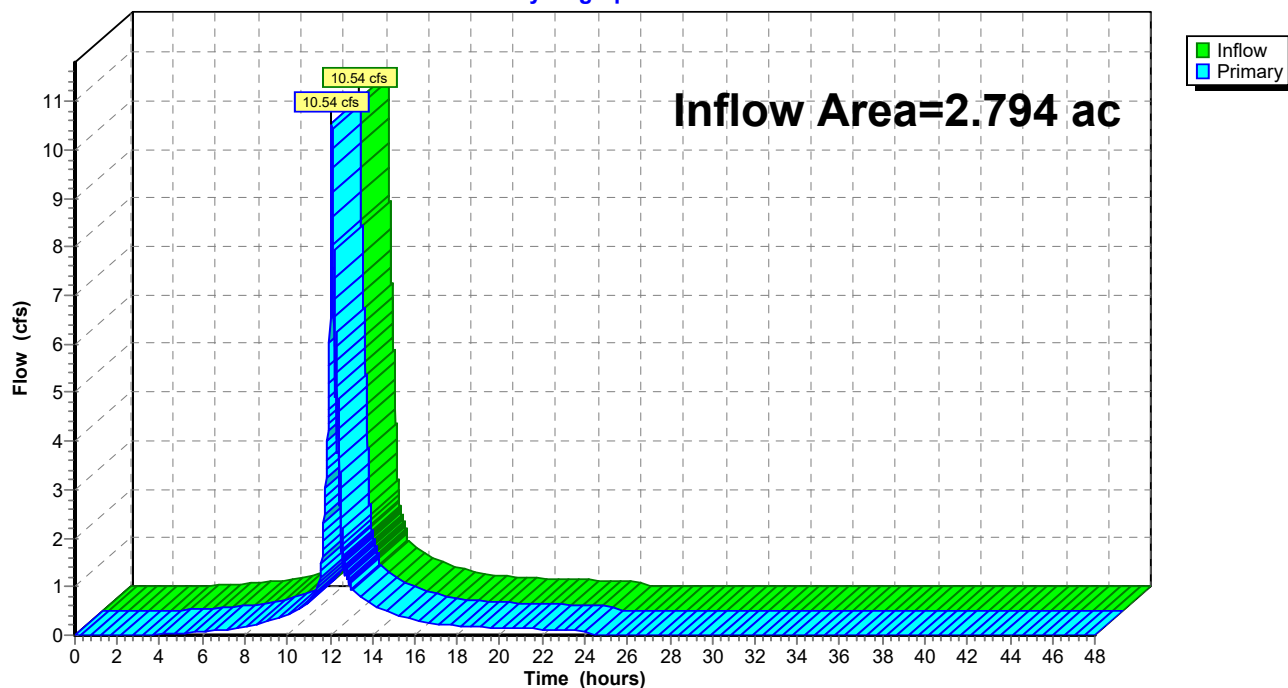
Summary for Link B:

Inflow Area = 2.794 ac, 81.71% Impervious, Inflow Depth = 3.61" for 10 yr event
Inflow = 10.54 cfs @ 12.08 hrs, Volume= 0.841 af
Primary = 10.54 cfs @ 12.08 hrs, Volume= 0.841 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

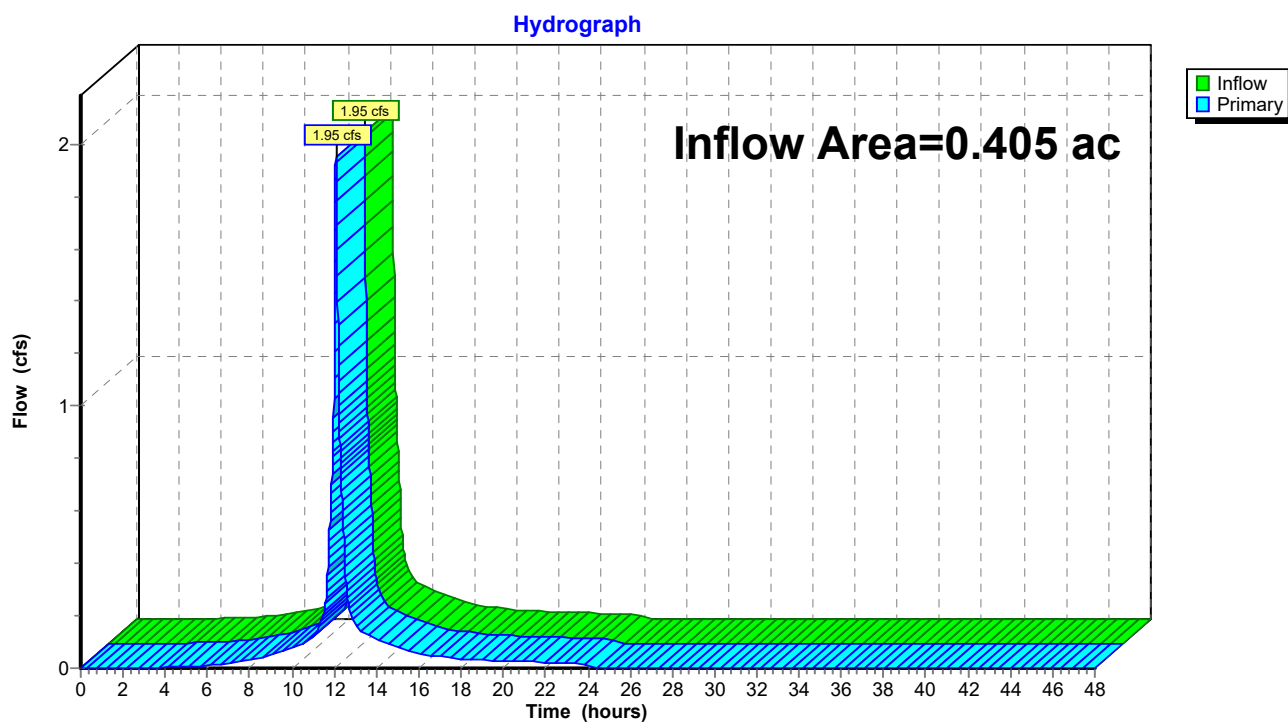
Hydrograph



Summary for Link C:

Inflow Area = 0.405 ac, 77.14% Impervious, Inflow Depth = 4.35" for 10 yr event
Inflow = 1.95 cfs @ 12.08 hrs, Volume= 0.147 af
Primary = 1.95 cfs @ 12.08 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Summary for Subcatchment EX-A:

Runoff = 34.84 cfs @ 12.08 hrs, Volume= 2.576 af, Depth= 5.06"
Routed to Link A :

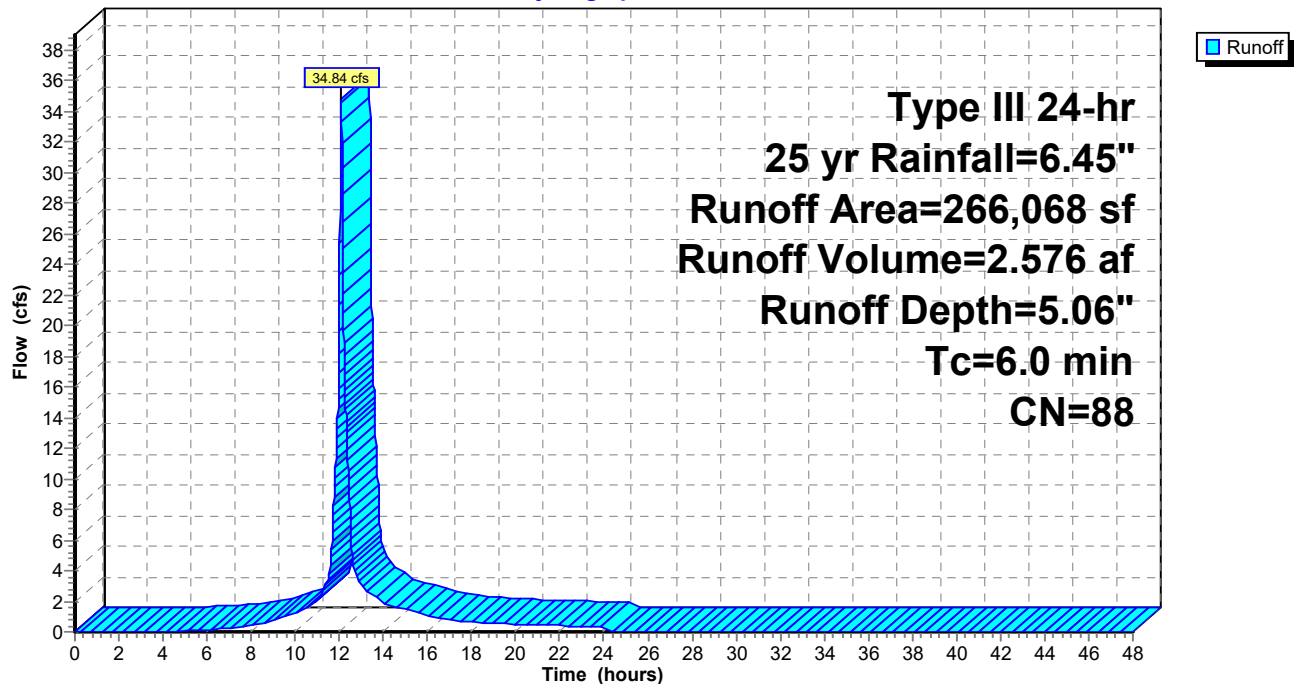
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
	64,758	70	Woods, Good, HSG C
*	36,252	74	Grass, Good, HSG C
*	23,489	98	Roofs
*	141,569	98	Pavement
	266,068	88	Weighted Average
	101,010		37.96% Pervious Area
	165,058		62.04% Impervious Area

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

Subcatchment EX-A:

Hydrograph



Summary for Subcatchment EX-B1:

Runoff = 5.09 cfs @ 12.08 hrs, Volume= 0.400 af, Depth= 5.86"
 Routed to Link B :

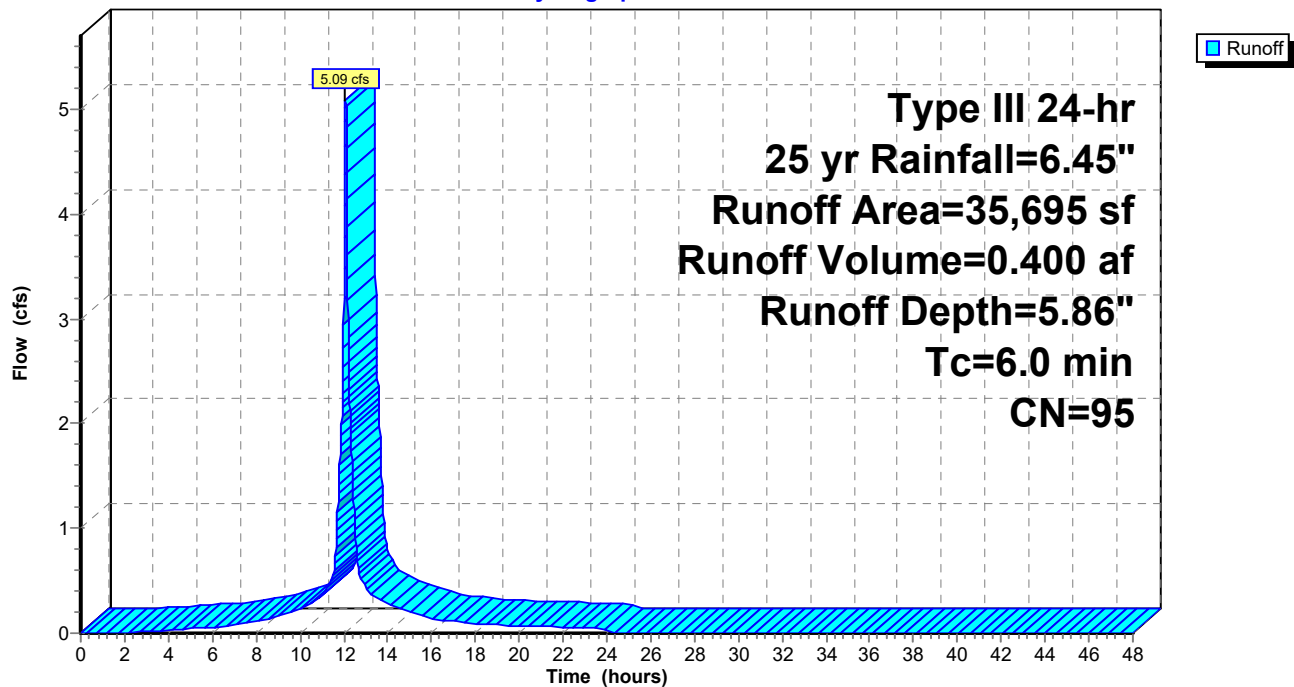
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 yr Rainfall=6.45"

Area (sf)	CN	Description
4,407	70	Woods, Good, HSG C
* 31,288	98	Pavement
35,695	95	Weighted Average
4,407		12.35% Pervious Area
31,288		87.65% Impervious Area

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

Subcatchment EX-B1:

Hydrograph



Summary for Subcatchment EX-B2:

Runoff = 3.92 cfs @ 12.08 hrs, Volume= 0.316 af, Depth= 6.09"
 Routed to Pond B2 : EX Cultec System

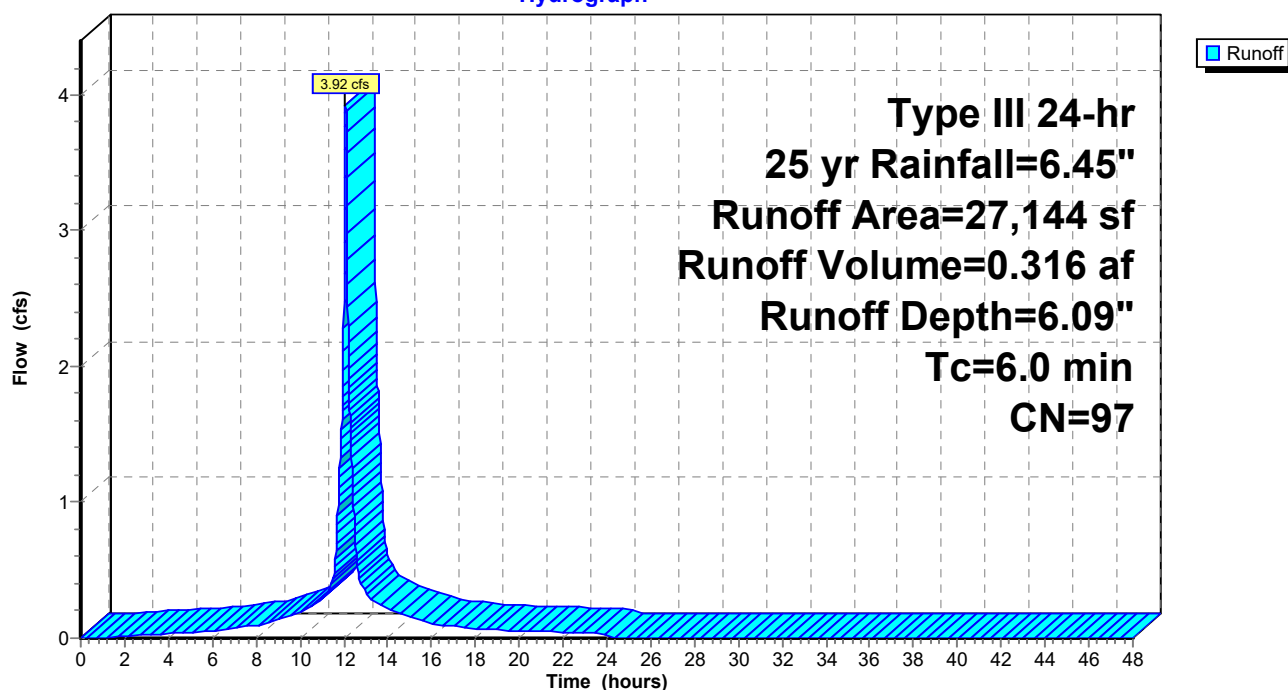
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	635	70	Woods, Good, HSG C
*	26,509	98	Pavement
	27,144	97	Weighted Average
	635		2.34% Pervious Area
	26,509		97.66% Impervious Area

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

Subcatchment EX-B2:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 8.05 cfs @ 12.08 hrs, Volume= 0.608 af, Depth= 5.40"
 Routed to Link B :

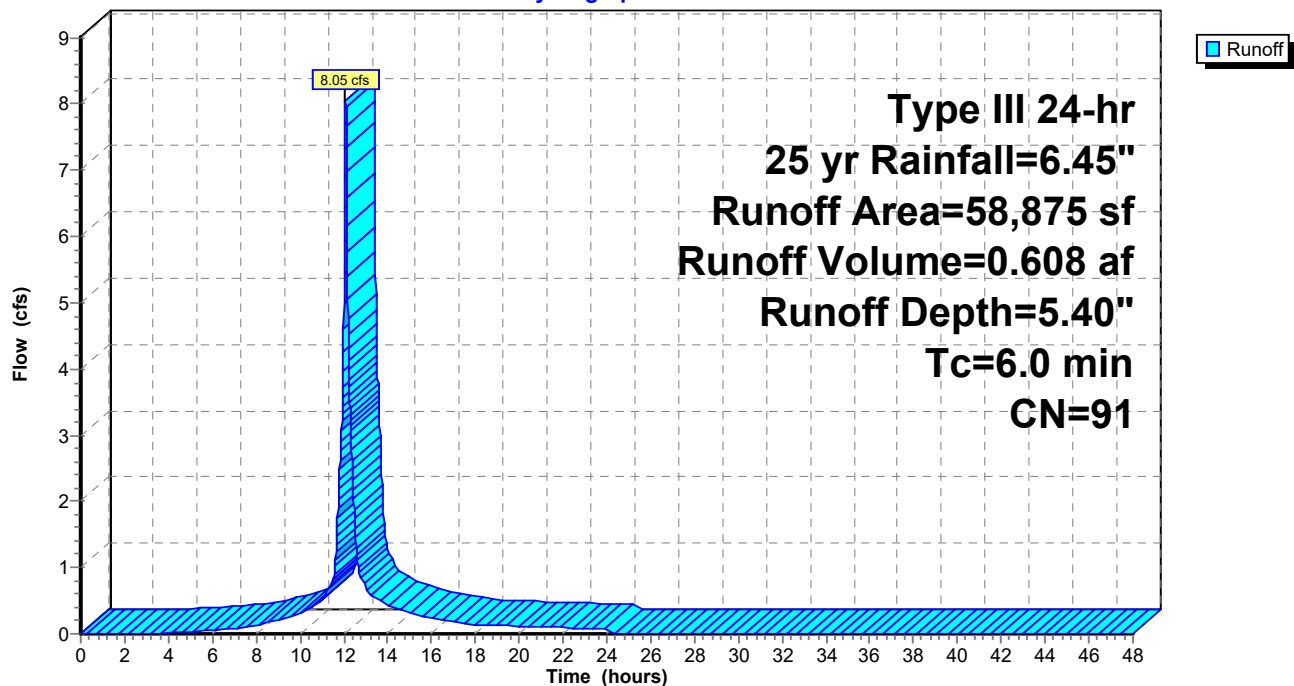
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
	3,649	70	Woods, Good, HSG C
*	13,566	74	Grass, Good, HSG C
*	16,354	98	Roofs
*	25,306	98	Pavement
	58,875	91	Weighted Average
	17,215		29.24% Pervious Area
	41,660		70.76% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment EX-C:

Runoff = 2.44 cfs @ 12.08 hrs, Volume= 0.186 af, Depth= 5.51"
Routed to Link C :

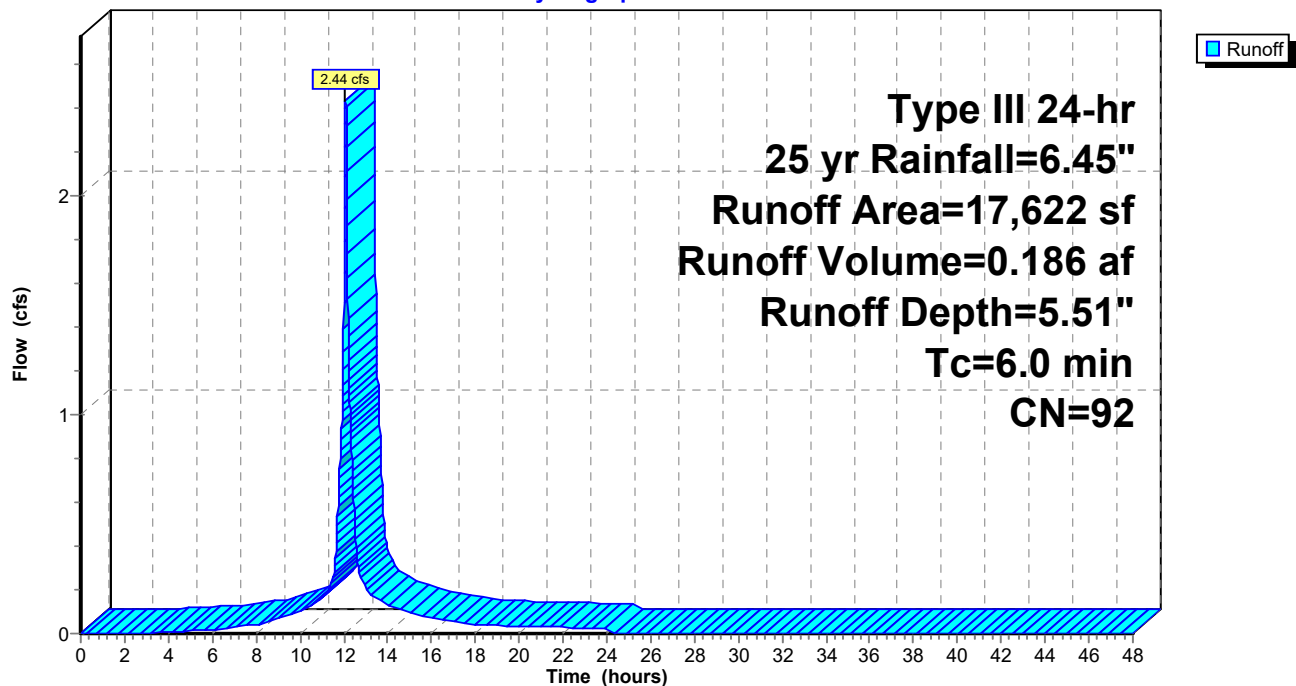
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	4,028	70	Woods, Good, HSG C
*	1,926	98	Roofs
*	11,668	98	Pavement
	17,622	92	Weighted Average
	4,028		22.86% Pervious Area
	13,594		77.14% Impervious Area

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

Subcatchment EX-C:

Hydrograph



Summary for Pond B2: EX Cultec System

Inflow Area = 0.623 ac, 97.66% Impervious, Inflow Depth = 6.09" for 25 yr event
 Inflow = 3.92 cfs @ 12.08 hrs, Volume= 0.316 af
 Outflow = 4.54 cfs @ 12.09 hrs, Volume= 0.316 af, Atten= 0%, Lag= 0.4 min
 Discarded = 0.14 cfs @ 9.51 hrs, Volume= 0.228 af
 Primary = 4.40 cfs @ 12.09 hrs, Volume= 0.088 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 276.18' @ 12.09 hrs Surf.Area= 3,362 sf Storage= 3,662 cf

Plug-Flow detention time= 165.5 min calculated for 0.316 af (100% of inflow)
 Center-of-Mass det. time= 165.5 min (916.3 - 750.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	238.17'	2,092 cf	27.00'W x 124.50'L x 2.54'H Field A 8,544 cf Overall - 1,570 cf Embedded = 6,974 cf x 30.0% Voids
#2A	238.67'	1,570 cf	Cultec C-100HD x 112 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 7 rows
		3,662 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	238.17'	1.800 in/hr Exfiltration over Surface area
#2	Primary	240.54'	6.0" Round Culvert L= 12.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 240.54' / 240.05' S= 0.0408 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.14 cfs @ 9.51 hrs HW=238.40' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=4.40 cfs @ 12.09 hrs HW=275.49' (Free Discharge)
 ↑ **2=Culvert** (Inlet Controls 4.40 cfs @ 22.39 fps)

Pond B2: EX Cultec System - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 7 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

16 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 120.50' Row Length +24.0" End Stone x 2 = 124.50' Base Length

7 Rows x 36.0" Wide + 4.0" Spacing x 6 + 24.0" Side Stone x 2 = 27.00' Base Width

6.0" Stone Base + 12.5" Chamber Height + 12.0" Stone Cover = 2.54' Field Height

112 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 7 Rows = 1,570.2 cf Chamber Storage

8,543.8 cf Field - 1,570.2 cf Chambers = 6,973.6 cf Stone x 30.0% Voids = 2,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 3,662.3 cf = 0.084 af

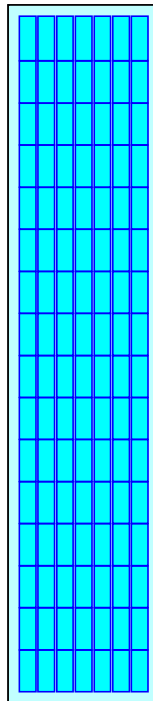
Overall Storage Efficiency = 42.9%

Overall System Size = 124.50' x 27.00' x 2.54'

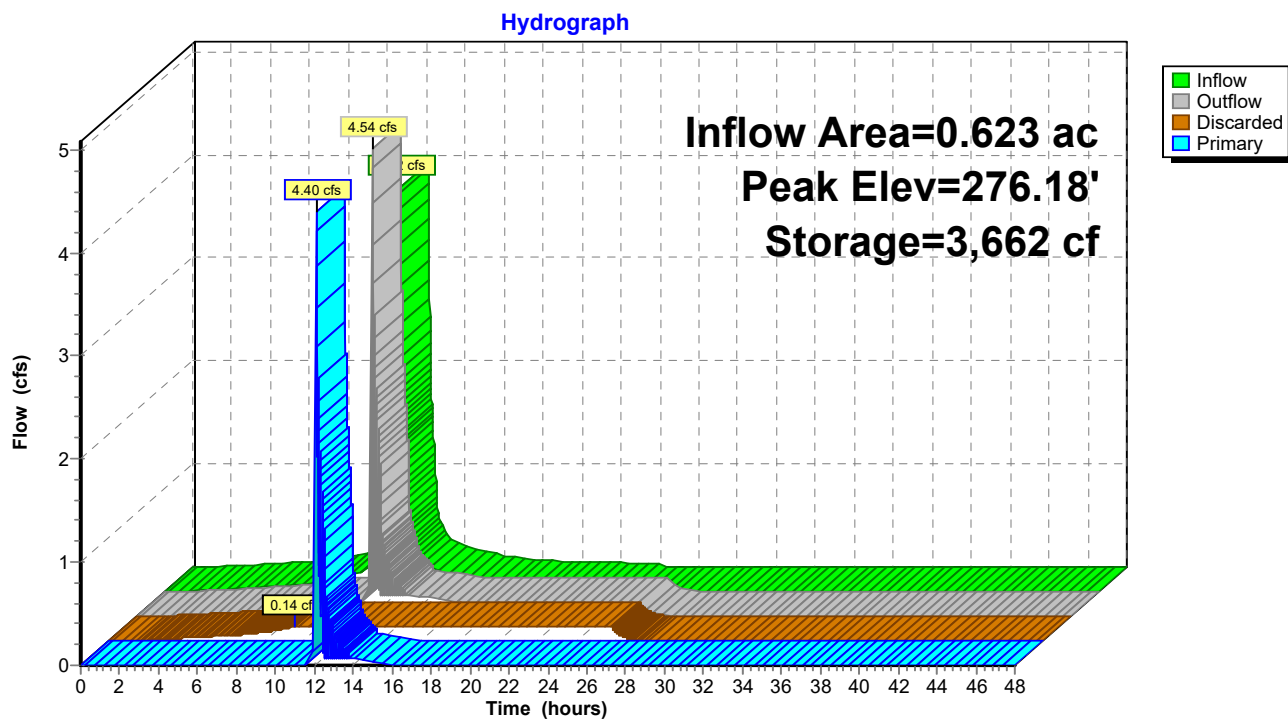
112 Chambers

316.4 cy Field

258.3 cy Stone



Pond B2: EX Cultec System



Stage-Area-Storage for Pond B2: EX Cultec System

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.17	3,362	0	264.17	3,362	3,662
238.67	3,362	504	264.67	3,362	3,662
239.17	3,362	1,720	265.17	3,362	3,662
239.67	3,362	2,612	265.67	3,362	3,662
240.17	3,362	3,116	266.17	3,362	3,662
240.67	3,362	3,620	266.67	3,362	3,662
241.17	3,362	3,662	267.17	3,362	3,662
241.67	3,362	3,662	267.67	3,362	3,662
242.17	3,362	3,662	268.17	3,362	3,662
242.67	3,362	3,662	268.67	3,362	3,662
243.17	3,362	3,662	269.17	3,362	3,662
243.67	3,362	3,662	269.67	3,362	3,662
244.17	3,362	3,662	270.17	3,362	3,662
244.67	3,362	3,662	270.67	3,362	3,662
245.17	3,362	3,662	271.17	3,362	3,662
245.67	3,362	3,662	271.67	3,362	3,662
246.17	3,362	3,662	272.17	3,362	3,662
246.67	3,362	3,662	272.67	3,362	3,662
247.17	3,362	3,662	273.17	3,362	3,662
247.67	3,362	3,662	273.67	3,362	3,662
248.17	3,362	3,662	274.17	3,362	3,662
248.67	3,362	3,662	274.67	3,362	3,662
249.17	3,362	3,662	275.17	3,362	3,662
249.67	3,362	3,662			
250.17	3,362	3,662			
250.67	3,362	3,662			
251.17	3,362	3,662			
251.67	3,362	3,662			
252.17	3,362	3,662			
252.67	3,362	3,662			
253.17	3,362	3,662			
253.67	3,362	3,662			
254.17	3,362	3,662			
254.67	3,362	3,662			
255.17	3,362	3,662			
255.67	3,362	3,662			
256.17	3,362	3,662			
256.67	3,362	3,662			
257.17	3,362	3,662			
257.67	3,362	3,662			
258.17	3,362	3,662			
258.67	3,362	3,662			
259.17	3,362	3,662			
259.67	3,362	3,662			
260.17	3,362	3,662			
260.67	3,362	3,662			
261.17	3,362	3,662			
261.67	3,362	3,662			
262.17	3,362	3,662			
262.67	3,362	3,662			
263.17	3,362	3,662			
263.67	3,362	3,662			

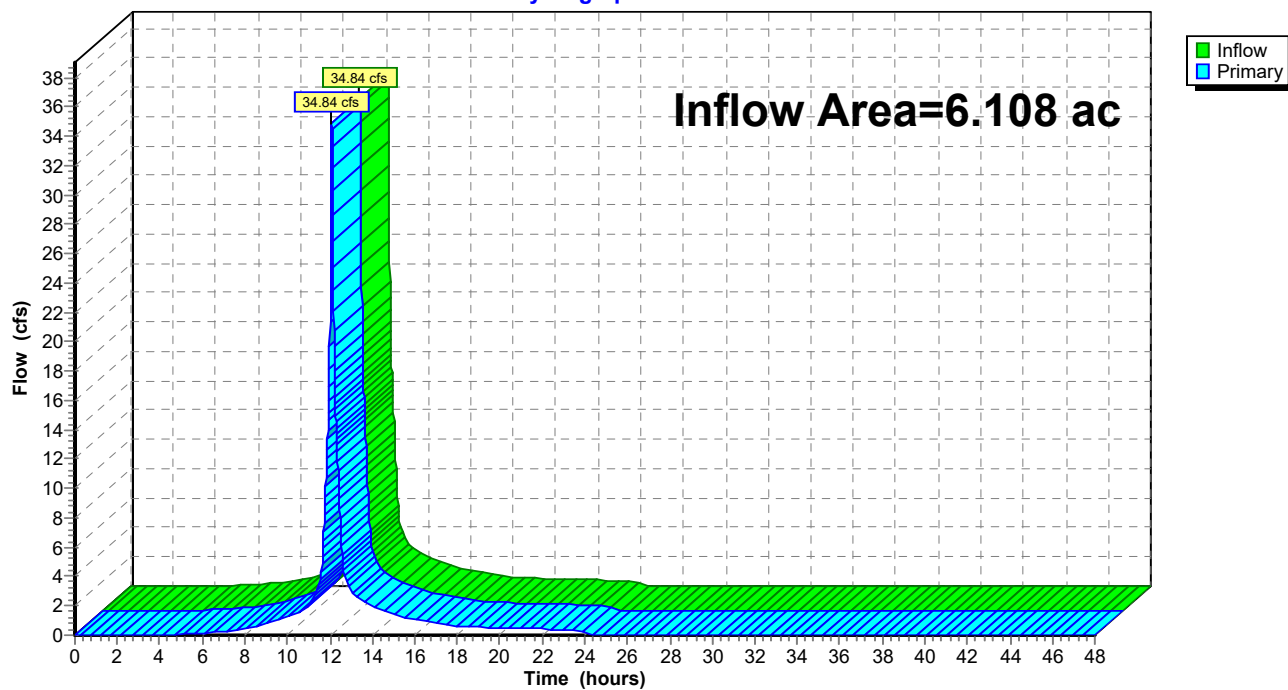
Summary for Link A:

Inflow Area = 6.108 ac, 62.04% Impervious, Inflow Depth = 5.06" for 25 yr event
Inflow = 34.84 cfs @ 12.08 hrs, Volume= 2.576 af
Primary = 34.84 cfs @ 12.08 hrs, Volume= 2.576 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



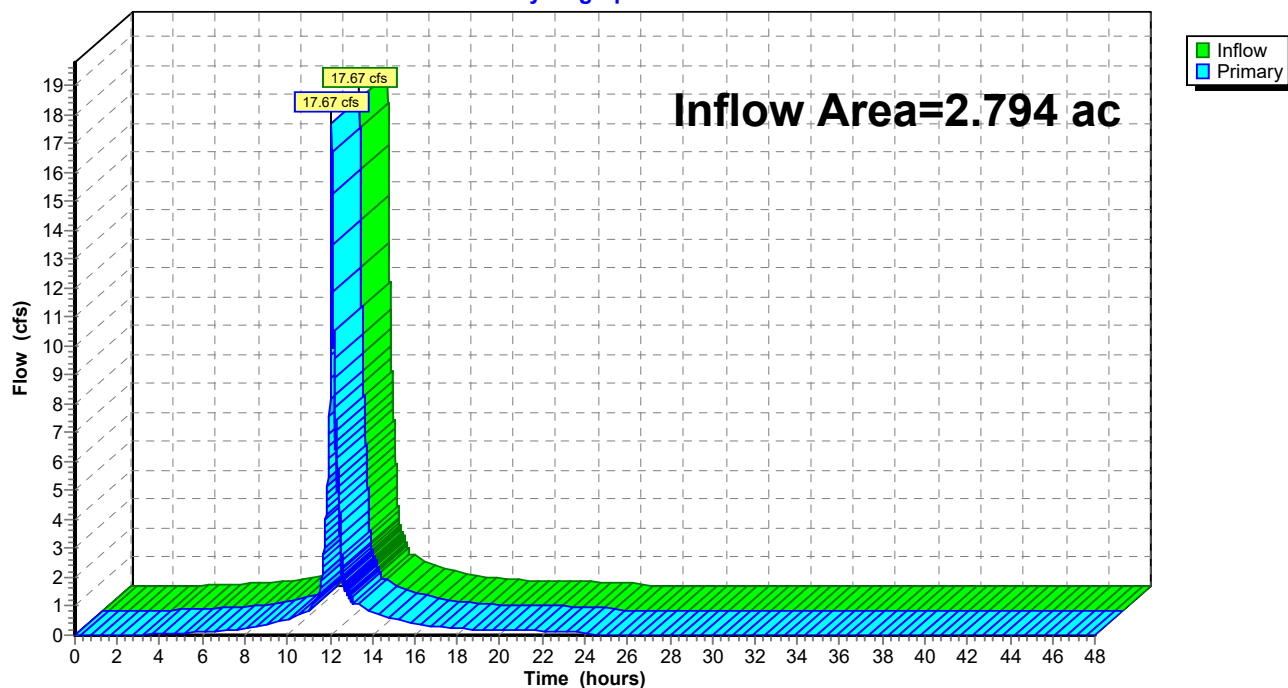
Summary for Link B:

Inflow Area = 2.794 ac, 81.71% Impervious, Inflow Depth = 4.71" for 25 yr event
Inflow = 17.67 cfs @ 12.09 hrs, Volume= 1.097 af
Primary = 17.67 cfs @ 12.09 hrs, Volume= 1.097 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

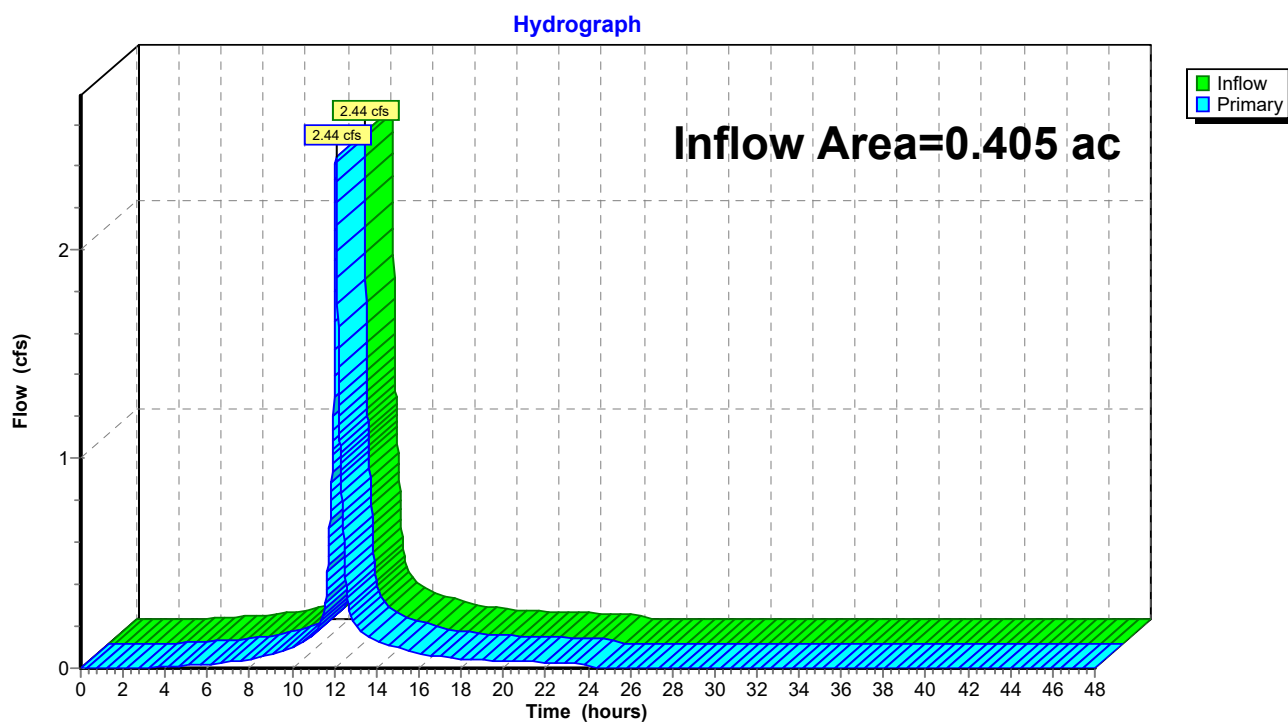
Hydrograph



Summary for Link C:

Inflow Area = 0.405 ac, 77.14% Impervious, Inflow Depth = 5.51" for 25 yr event
Inflow = 2.44 cfs @ 12.08 hrs, Volume= 0.186 af
Primary = 2.44 cfs @ 12.08 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Summary for Subcatchment EX-A:

Runoff = 46.33 cfs @ 12.08 hrs, Volume= 3.483 af, Depth= 6.84"
Routed to Link A :

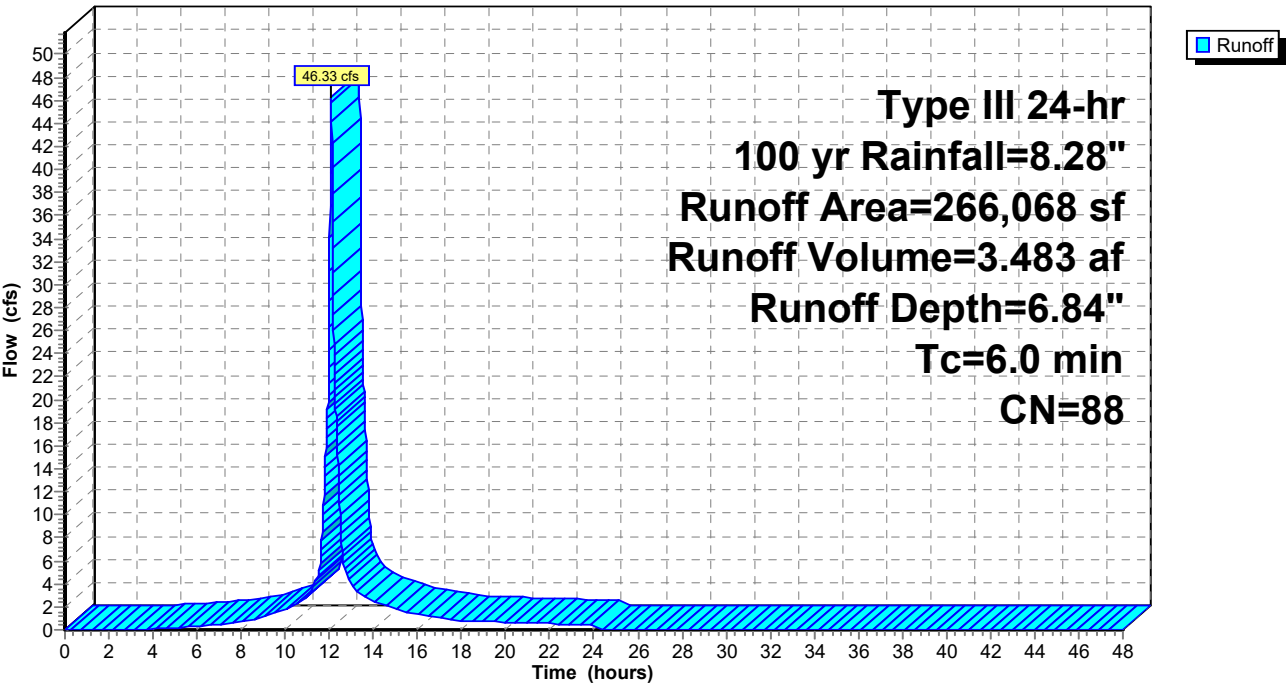
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
	64,758	70	Woods, Good, HSG C
*	36,252	74	Grass, Good, HSG C
*	23,489	98	Roofs
*	141,569	98	Pavement
	266,068	88	Weighted Average
	101,010		37.96% Pervious Area
	165,058		62.04% Impervious Area

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

Subcatchment EX-A:

Hydrograph



Summary for Subcatchment EX-B1:

Runoff = 6.59 cfs @ 12.08 hrs, Volume= 0.524 af, Depth= 7.68"
 Routed to Link B :

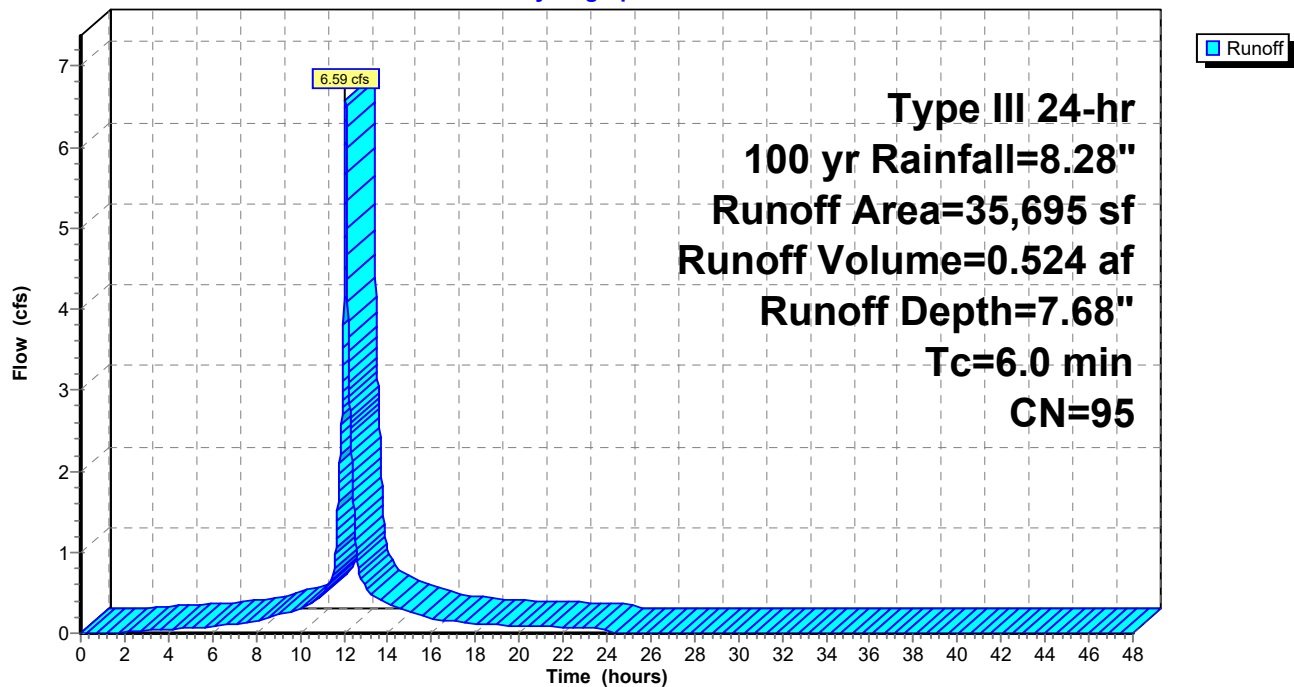
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 yr Rainfall=8.28"

Area (sf)	CN	Description
4,407	70	Woods, Good, HSG C
* 31,288	98	Pavement
35,695	95	Weighted Average
4,407		12.35% Pervious Area
31,288		87.65% Impervious Area

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

Subcatchment EX-B1:

Hydrograph



Summary for Subcatchment EX-B2:

Runoff = 5.05 cfs @ 12.08 hrs, Volume= 0.411 af, Depth= 7.92"
 Routed to Pond B2 : EX Cultec System

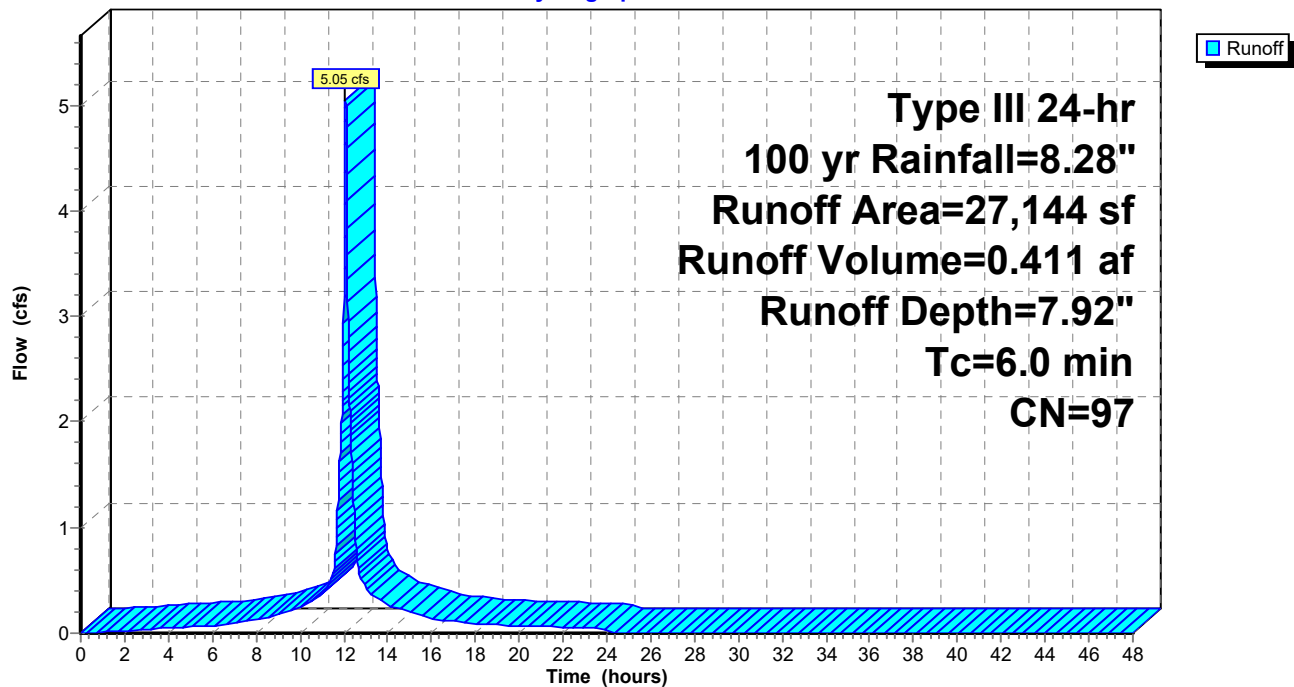
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	635	70	Woods, Good, HSG C
*	26,509	98	Pavement
	27,144	97	Weighted Average
	635		2.34% Pervious Area
	26,509		97.66% Impervious Area

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

Subcatchment EX-B2:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 10.56 cfs @ 12.08 hrs, Volume= 0.811 af, Depth= 7.20"
Routed to Link B :

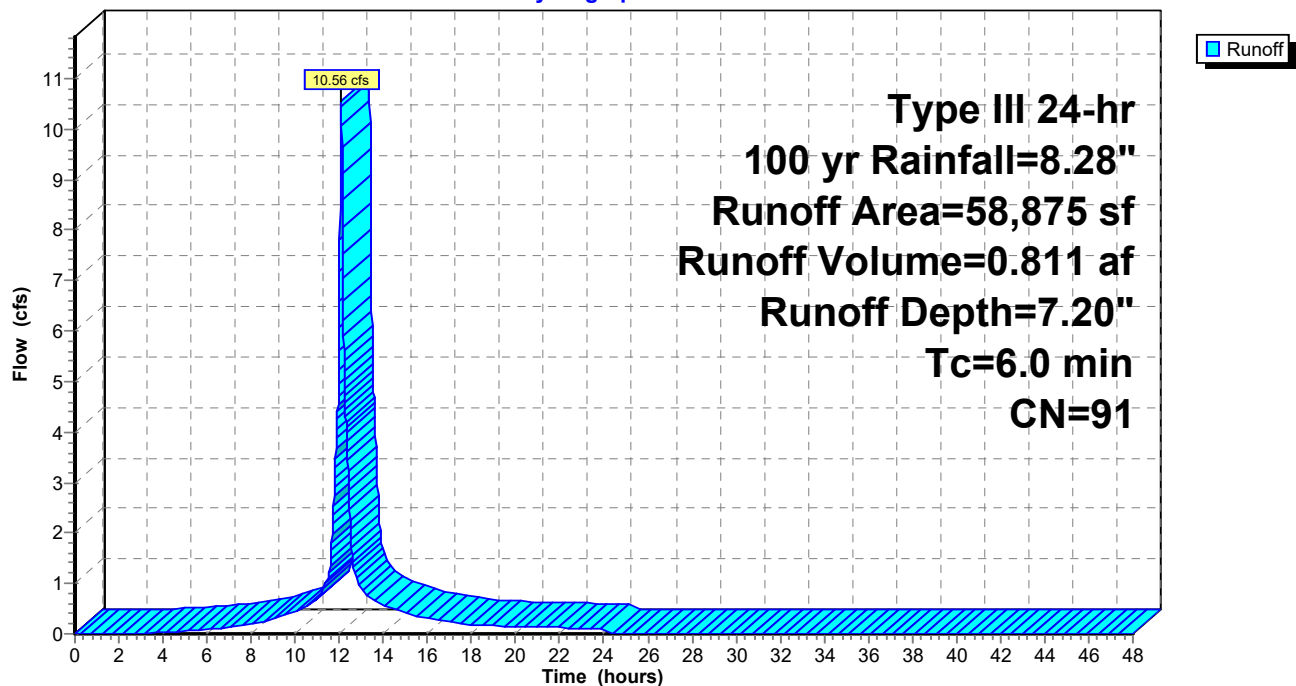
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
	3,649	70	Woods, Good, HSG C
*	13,566	74	Grass, Good, HSG C
*	16,354	98	Roofs
*	25,306	98	Pavement
	58,875	91	Weighted Average
	17,215		29.24% Pervious Area
	41,660		70.76% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment EX-C:

Runoff = 3.19 cfs @ 12.08 hrs, Volume= 0.247 af, Depth= 7.32"
Routed to Link C :

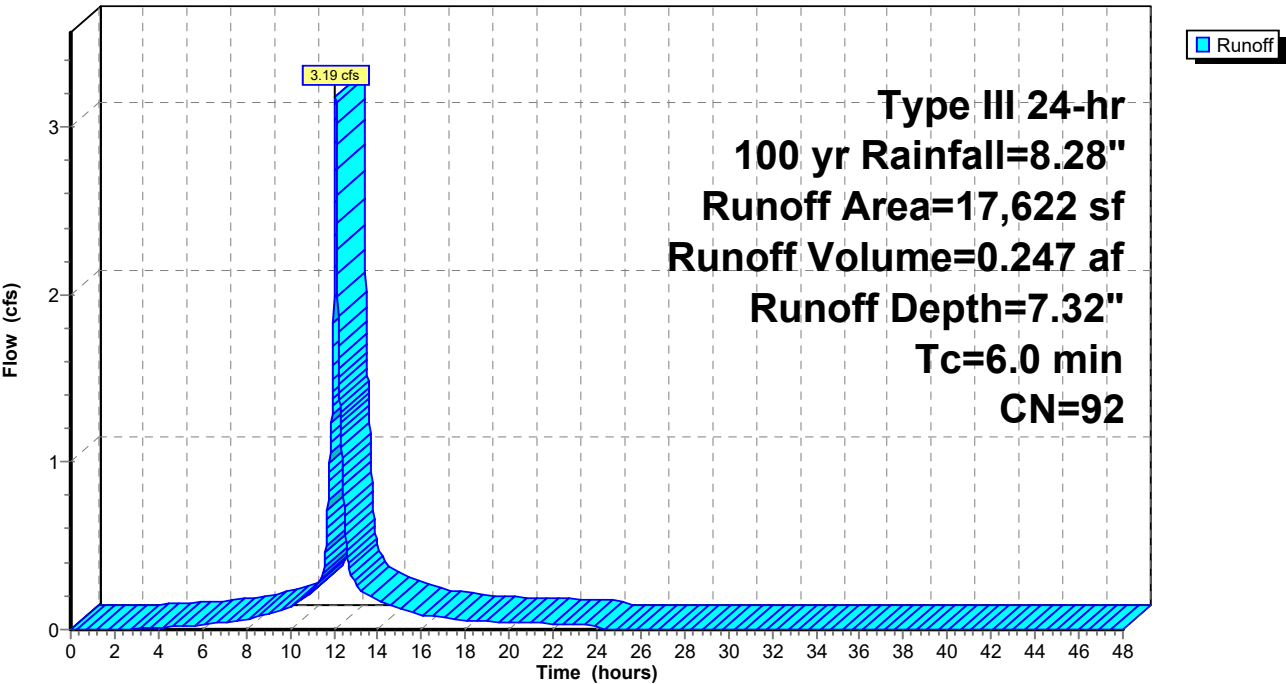
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	4,028	70	Woods, Good, HSG C
*	1,926	98	Roofs
*	11,668	98	Pavement
	17,622	92	Weighted Average
	4,028		22.86% Pervious Area
	13,594		77.14% Impervious Area

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

Subcatchment EX-C:

Hydrograph



Summary for Pond B2: EX Cultec System

Inflow Area = 0.623 ac, 97.66% Impervious, Inflow Depth = 7.92" for 100 yr event
 Inflow = 5.05 cfs @ 12.08 hrs, Volume= 0.411 af
 Outflow = 6.77 cfs @ 12.08 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.14 cfs @ 9.06 hrs, Volume= 0.247 af
 Primary = 6.63 cfs @ 12.08 hrs, Volume= 0.164 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 319.73' @ 12.08 hrs Surf.Area= 3,362 sf Storage= 3,662 cf

Plug-Flow detention time= 150.3 min calculated for 0.411 af (100% of inflow)
 Center-of-Mass det. time= 150.4 min (897.0 - 746.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	238.17'	2,092 cf	27.00'W x 124.50'L x 2.54'H Field A 8,544 cf Overall - 1,570 cf Embedded = 6,974 cf x 30.0% Voids
#2A	238.67'	1,570 cf	Cultec C-100HD x 112 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 7 rows
		3,662 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	238.17'	1.800 in/hr Exfiltration over Surface area
#2	Primary	240.54'	6.0" Round Culvert L= 12.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 240.54' / 240.05' S= 0.0408 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.14 cfs @ 9.06 hrs HW=238.63' (Free Discharge)
 ↑ **1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=6.62 cfs @ 12.08 hrs HW=319.52' (Free Discharge)
 ↑ **2=Culvert** (Inlet Controls 6.62 cfs @ 33.73 fps)

Pond B2: EX Cultec System - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 7 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

16 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 120.50' Row Length +24.0" End Stone x 2 = 124.50' Base Length

7 Rows x 36.0" Wide + 4.0" Spacing x 6 + 24.0" Side Stone x 2 = 27.00' Base Width

6.0" Stone Base + 12.5" Chamber Height + 12.0" Stone Cover = 2.54' Field Height

112 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 7 Rows = 1,570.2 cf Chamber Storage

8,543.8 cf Field - 1,570.2 cf Chambers = 6,973.6 cf Stone x 30.0% Voids = 2,092.1 cf Stone Storage

Chamber Storage + Stone Storage = 3,662.3 cf = 0.084 af

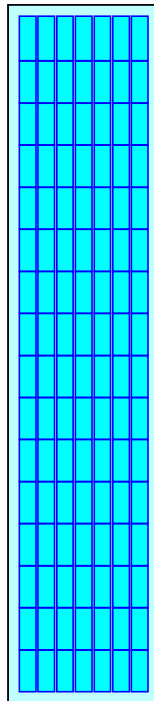
Overall Storage Efficiency = 42.9%

Overall System Size = 124.50' x 27.00' x 2.54'

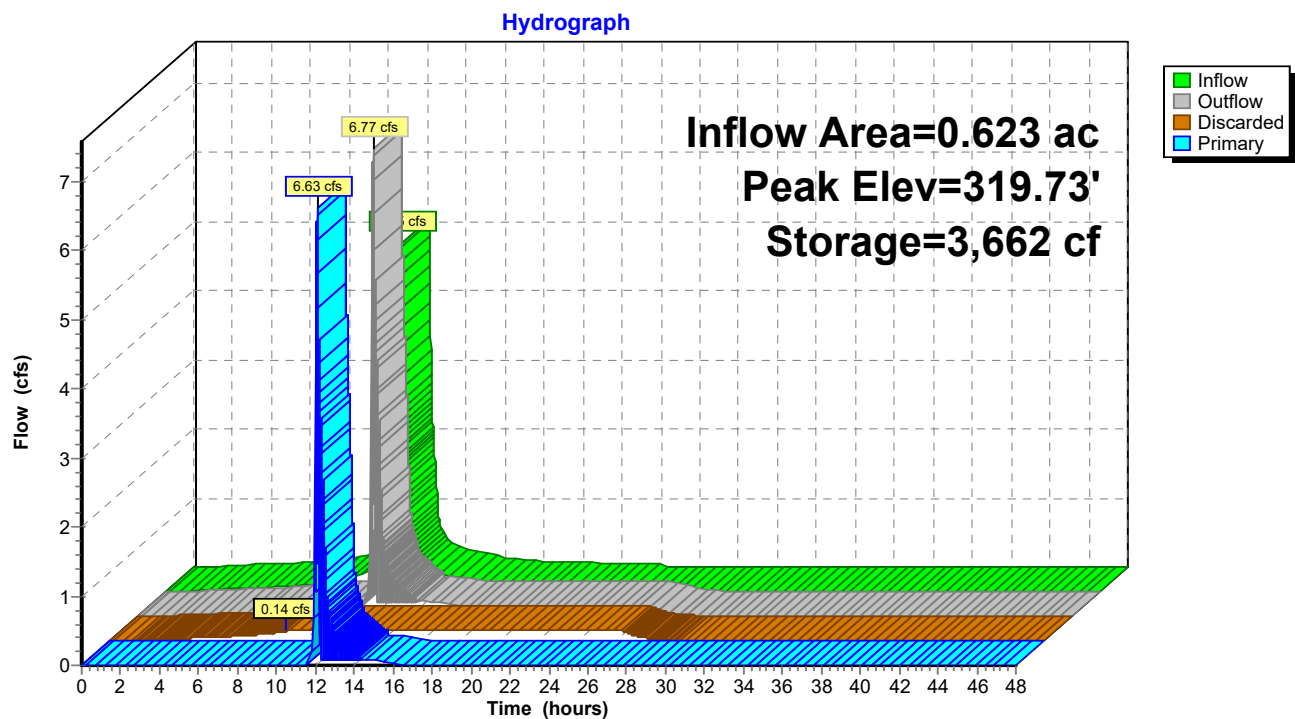
112 Chambers

316.4 cy Field

258.3 cy Stone



Pond B2: EX Cultec System



Stage-Area-Storage for Pond B2: EX Cultec System

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.17	3,362	0	290.17	3,362	3,662
239.17	3,362	1,720	291.17	3,362	3,662
240.17	3,362	3,116	292.17	3,362	3,662
241.17	3,362	3,662	293.17	3,362	3,662
242.17	3,362	3,662	294.17	3,362	3,662
243.17	3,362	3,662	295.17	3,362	3,662
244.17	3,362	3,662	296.17	3,362	3,662
245.17	3,362	3,662	297.17	3,362	3,662
246.17	3,362	3,662	298.17	3,362	3,662
247.17	3,362	3,662	299.17	3,362	3,662
248.17	3,362	3,662	300.17	3,362	3,662
249.17	3,362	3,662	301.17	3,362	3,662
250.17	3,362	3,662	302.17	3,362	3,662
251.17	3,362	3,662	303.17	3,362	3,662
252.17	3,362	3,662	304.17	3,362	3,662
253.17	3,362	3,662	305.17	3,362	3,662
254.17	3,362	3,662	306.17	3,362	3,662
255.17	3,362	3,662	307.17	3,362	3,662
256.17	3,362	3,662	308.17	3,362	3,662
257.17	3,362	3,662	309.17	3,362	3,662
258.17	3,362	3,662	310.17	3,362	3,662
259.17	3,362	3,662	311.17	3,362	3,662
260.17	3,362	3,662	312.17	3,362	3,662
261.17	3,362	3,662	313.17	3,362	3,662
262.17	3,362	3,662	314.17	3,362	3,662
263.17	3,362	3,662	315.17	3,362	3,662
264.17	3,362	3,662	316.17	3,362	3,662
265.17	3,362	3,662	317.17	3,362	3,662
266.17	3,362	3,662	318.17	3,362	3,662
267.17	3,362	3,662	319.17	3,362	3,662
268.17	3,362	3,662			
269.17	3,362	3,662			
270.17	3,362	3,662			
271.17	3,362	3,662			
272.17	3,362	3,662			
273.17	3,362	3,662			
274.17	3,362	3,662			
275.17	3,362	3,662			
276.17	3,362	3,662			
277.17	3,362	3,662			
278.17	3,362	3,662			
279.17	3,362	3,662			
280.17	3,362	3,662			
281.17	3,362	3,662			
282.17	3,362	3,662			
283.17	3,362	3,662			
284.17	3,362	3,662			
285.17	3,362	3,662			
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287.17	3,362	3,662			
288.17	3,362	3,662			
289.17	3,362	3,662			

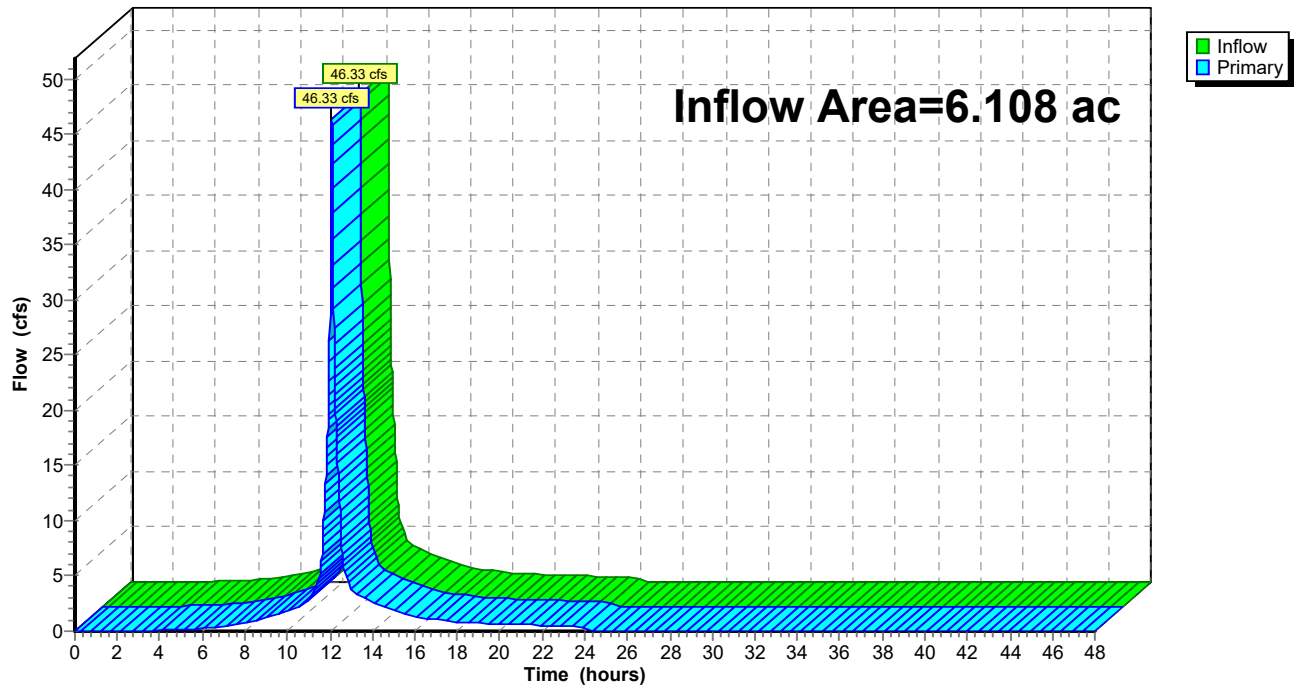
Summary for Link A:

Inflow Area = 6.108 ac, 62.04% Impervious, Inflow Depth = 6.84" for 100 yr event
Inflow = 46.33 cfs @ 12.08 hrs, Volume= 3.483 af
Primary = 46.33 cfs @ 12.08 hrs, Volume= 3.483 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



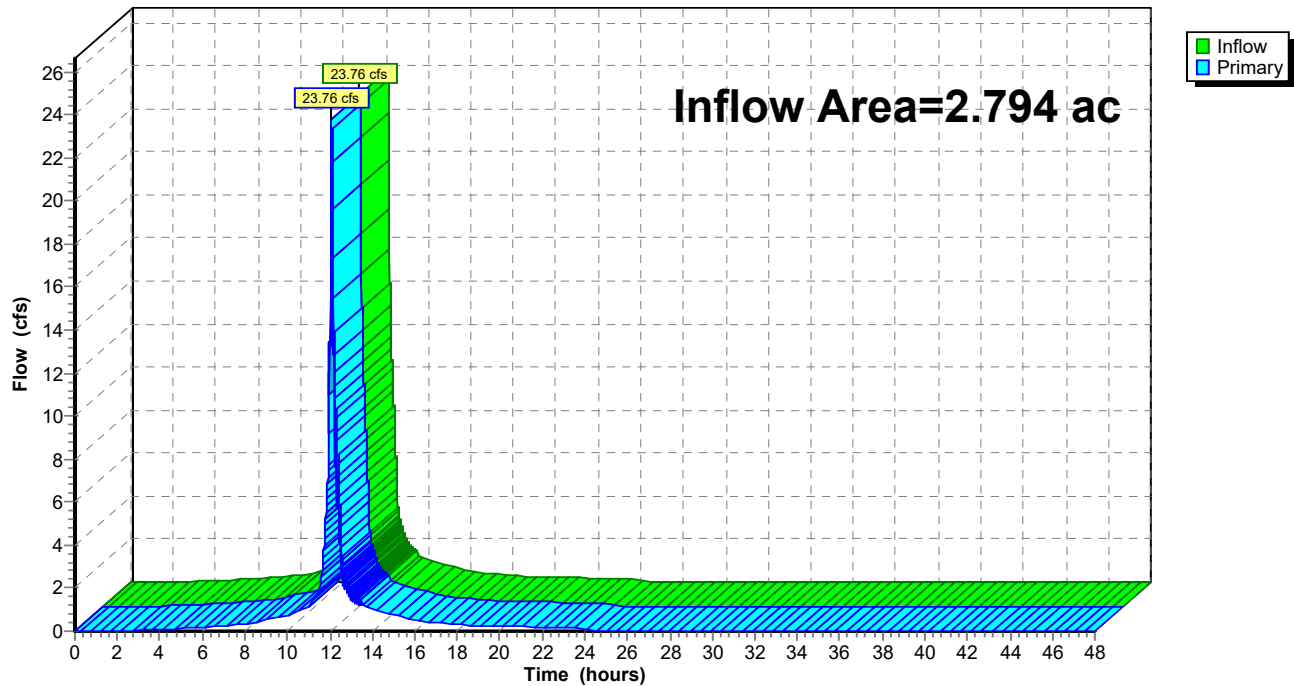
Summary for Link B:

Inflow Area = 2.794 ac, 81.71% Impervious, Inflow Depth = 6.44" for 100 yr event
Inflow = 23.76 cfs @ 12.08 hrs, Volume= 1.500 af
Primary = 23.76 cfs @ 12.08 hrs, Volume= 1.500 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

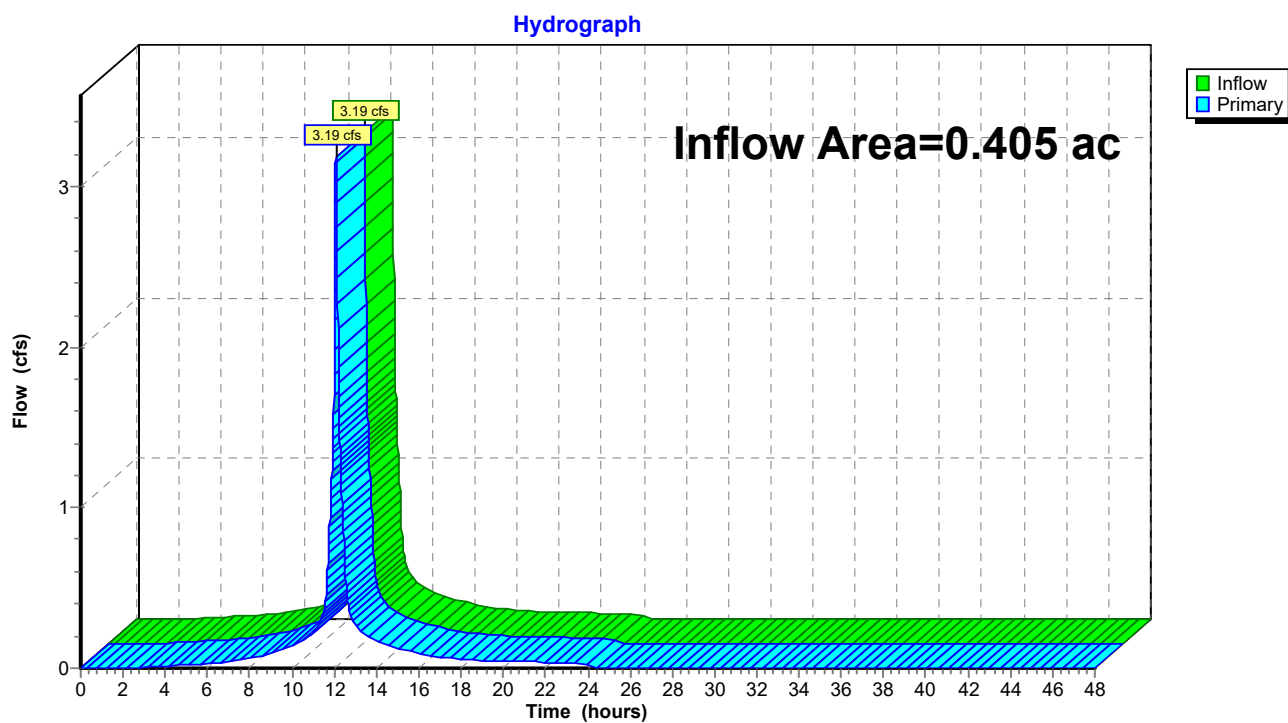
Hydrograph



Summary for Link C:

Inflow Area = 0.405 ac, 77.14% Impervious, Inflow Depth = 7.32" for 100 yr event
Inflow = 3.19 cfs @ 12.08 hrs, Volume= 0.247 af
Primary = 3.19 cfs @ 12.08 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.0 min

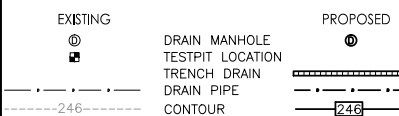
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

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LEGEND



NOTES:

- CONTRACTOR TO EXCAVATE SEVERAL TESTPITS TO LOCATE EXISTING 4-INCH DIA. PVC REMEDIATION PIPELINE BEFORE COMMENCING WITH CULTEC SYSTEM INSTALLATION.

Revision

Issued

File Name: L.K.H. W.C.P. W.C.P. 09/15/2016
Dwn. Chkd. Dsgn.

Permit-Seal

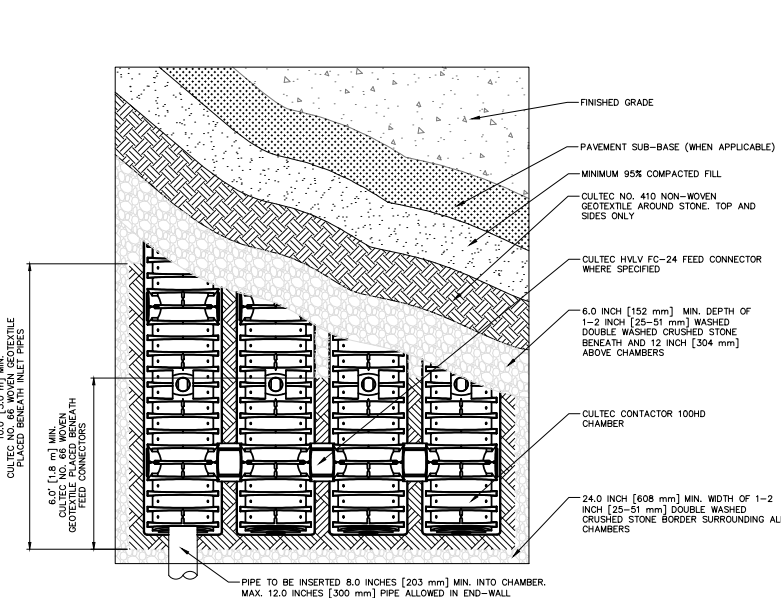


Client/Project

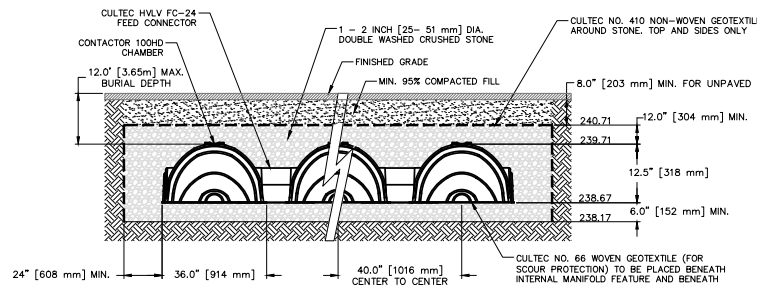
MEDWAY BLOCK
120 MAIN STREET
MEDWAY, MASSACHUSETTS

Title
PROPOSED DRAINAGE
IMPROVEMENTS PLAN
120 MAIN ROAD
MEDWAY, MASSACHUSETTS

Project No: 191750222 Scale: AS SHOWN Date: 10/11/2016



CULTEC CONTACTOR 100HD PLAN VIEW
NOT TO SCALE

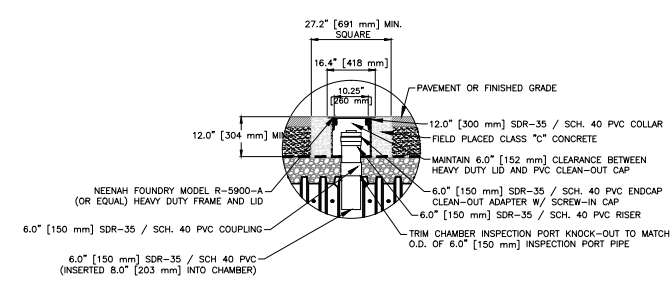


GENERAL NOTES

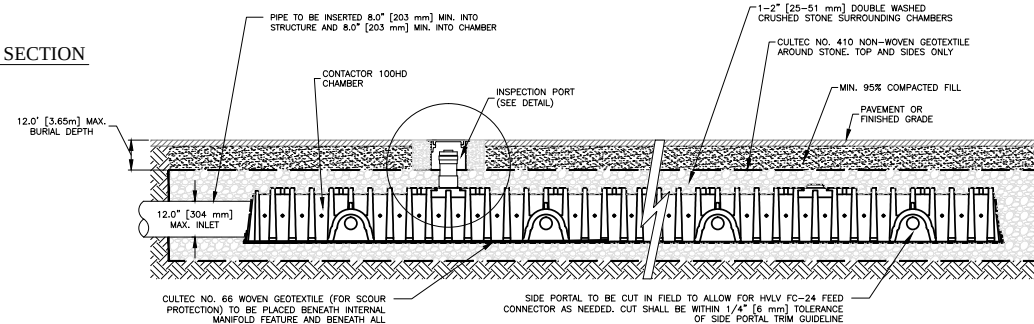
CONTACTOR 100HD BY CULTEC, INC. OF BROOKFIELD, CT. STORAGE PROVIDED = 3.84 CF/FT (0.36 m³/m) PER DESIGN UNIT. REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
MAXIMUM ALLOWED COVER OVER TOP OF UNIT SHALL BE 12' (3.65m). THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.

ALL CONTACTOR 100HD UNITS ARE MARKED WITH A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.
ALL CONTACTOR 100HD CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

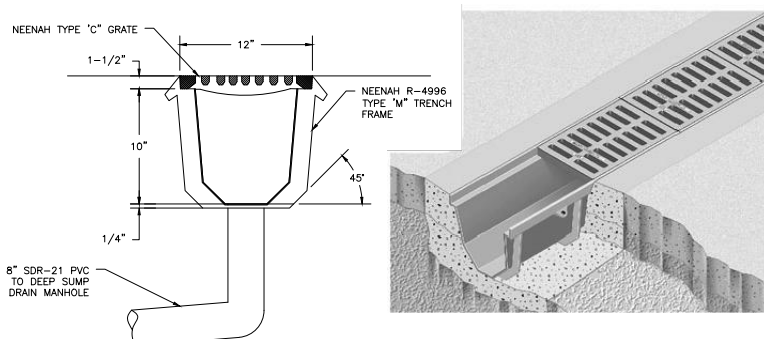
CULTEC CONTACTOR 100HD TYPICAL CROSS SECTION
NOT TO SCALE



INSPECTION PORT - ZOOM DETAIL
NOT TO SCALE



CULTEC INTERNAL MANIFOLD DETAIL
NOT TO SCALE

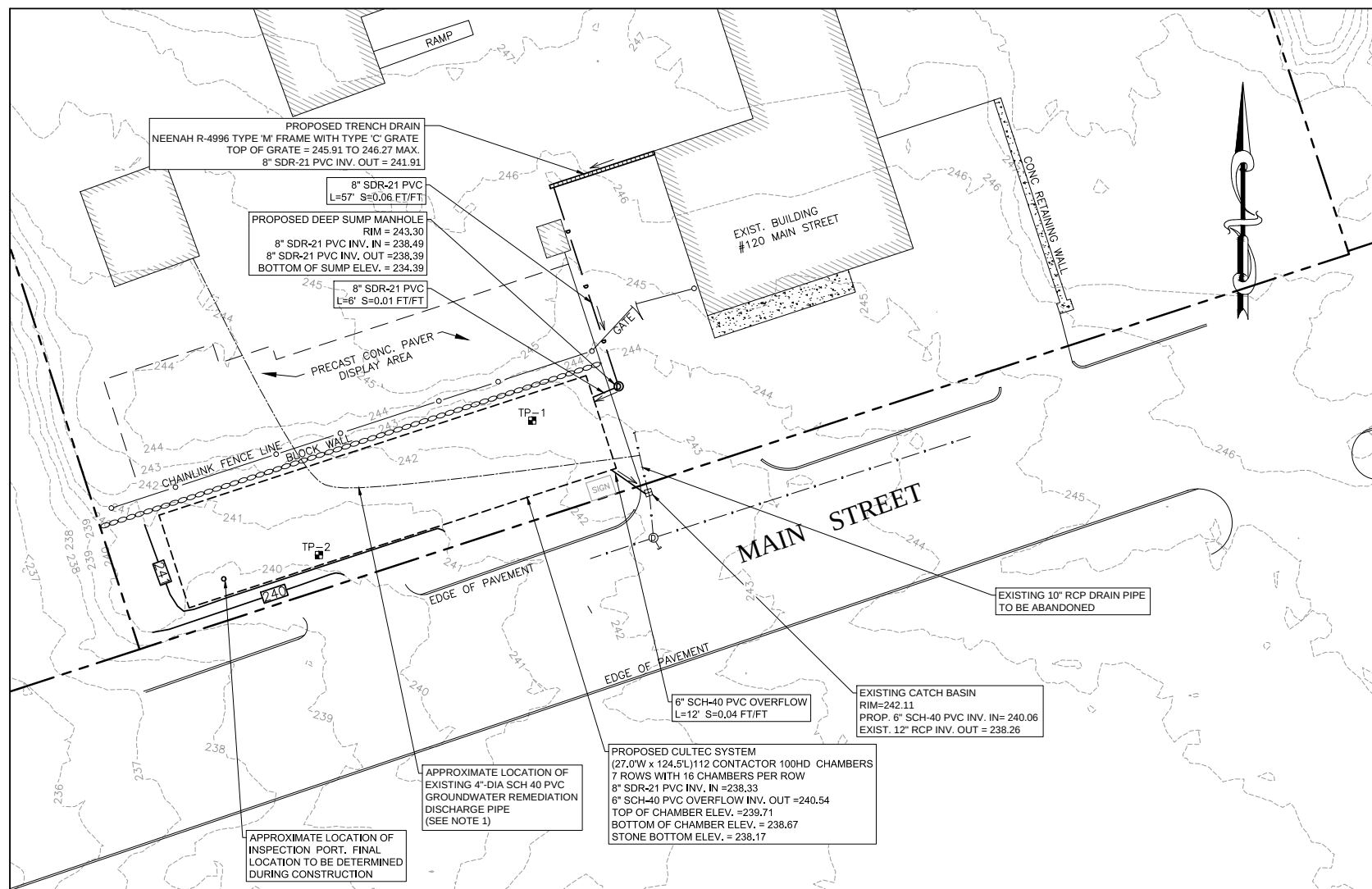


TRENCH DRAIN DETAIL
NOT TO SCALE

TEST PIT LOGS

Soil Evaluator Name: Nate Gardner				
Project # 191750222				
Date: 5/18/2016				
Location: Northeast corner of existing gravel parking lot				
Pit #: TP-1				
Depth (in.)	Soil Horizon/ Layer	Soil Matrix Color: Moist (Munsell)	Redoximorphic Features (mottles)	Soil Texture (USDA)
0-28		10 YR 4/6	Depth Color	Sandy Loam
28-71		2.5 Y 5/2		Sandy Loam
71-123		2.5 Y 5/2		Sandy Loam
Notes: ESHOW @ 236.17 surface grade at approximately 242.5 Wet @ 76"; standing water @ 112"				
Per test @ 38" - 32 min/inch				

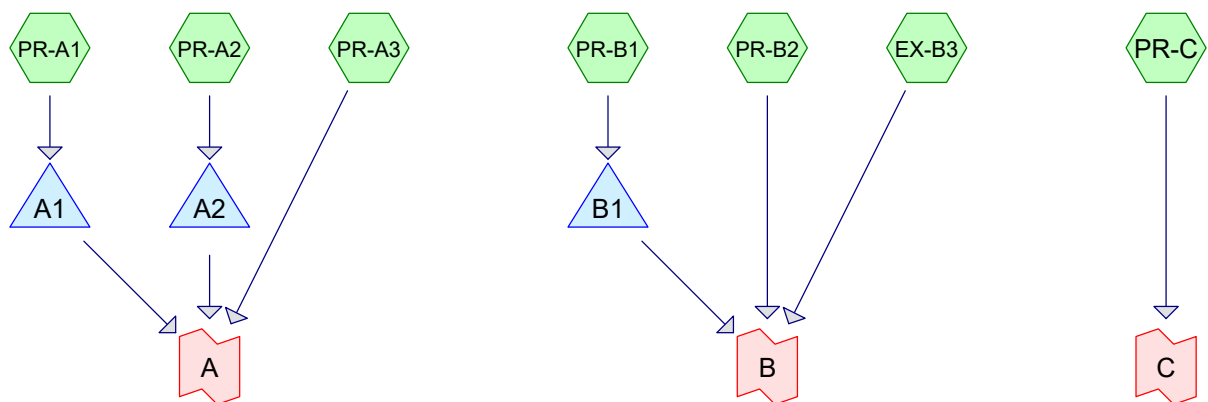
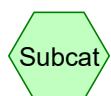
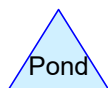
Soil Evaluator Name: Nate Gardner				
Project # 191750222				
Date: 5/18/2016				
Location: Southwest corner of existing gravel parking lot				
Pit #: TP-2				
Depth (in.)	Soil Horizon/ Layer	Soil Matrix Color: Moist (Munsell)	Redoximorphic Features (mottles)	Soil Texture (USDA)
0-20/28		10 YR 4/6	Depth Color	Sandy Loam
20/28-75		2.5 Y 5/2		Sandy Loam
75-90		2.5 Y 5/2		Loamy Sand
Notes: ESHOW @ 234.58 grade at approximately 240.5, standing water @ 84". Slight petroleum odor in soil at water table				
Redox @ 71"				



THESE PLANS SHALL NOT BE UTILIZED FOR CONSTRUCTION UNTIL WRITTEN AUTHORIZATION IS OBTAINED FROM THE ENGINEER

APPENDIX C

Proposed Stormwater Discharge Calculations



2026-09-18 MMC PRWS

Prepared by Langan Engineering

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 yr	Type III 24-hr		Default	24.00	1	3.37	2
2	10 yr	Type III 24-hr		Default	24.00	1	5.27	2
3	25 yr	Type III 24-hr		Default	24.00	1	6.45	2
4	100 yr	Type III 24-hr		Default	24.00	1	8.28	2

2026-09-18 MMC PRWS

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.108	98	Basin (PR-A1, PR-A2)
4.280	74	Grass, Good, HSG C (EX-B3, PR-A1, PR-A2, PR-A3, PR-B1, PR-B2, PR-C)
3.474	98	Pavement (EX-B3, PR-A1, PR-A2, PR-A3, PR-B1, PR-B2)
1.053	98	Roofs (PR-A3, PR-B2)
0.392	70	Woods, Good, HSG C (PR-A3)
9.307	86	TOTAL AREA

2026-09-18 MMC PRWS

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.672	HSG C	EX-B3, PR-A1, PR-A2, PR-A3, PR-B1, PR-B2, PR-C
0.000	HSG D	
4.635	Other	EX-B3, PR-A1, PR-A2, PR-A3, PR-B1, PR-B2
9.307		TOTAL AREA

2026-09-18 MMC PRWS

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Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.108	0.108	Basin	PR-A1, PR-A2
0.000	0.000	4.280	0.000	0.000	4.280	Grass, Good	EX-B3, PR-A1, PR-A2, PR-A3, PR-B1, PR-B2, PR-C
0.000	0.000	0.000	0.000	3.474	3.474	Pavement	EX-B3, PR-A1, PR-A2, PR-A3, PR-B1, PR-B2
0.000	0.000	0.000	0.000	1.053	1.053	Roofs	PR-A3, PR-B2
0.000	0.000	0.392	0.000	0.000	0.392	Woods, Good	PR-A3
0.000	0.000	4.672	0.000	4.635	9.307	TOTAL AREA	

Summary for Subcatchment EX-B3:

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af, Depth= 1.60"
Routed to Link B :

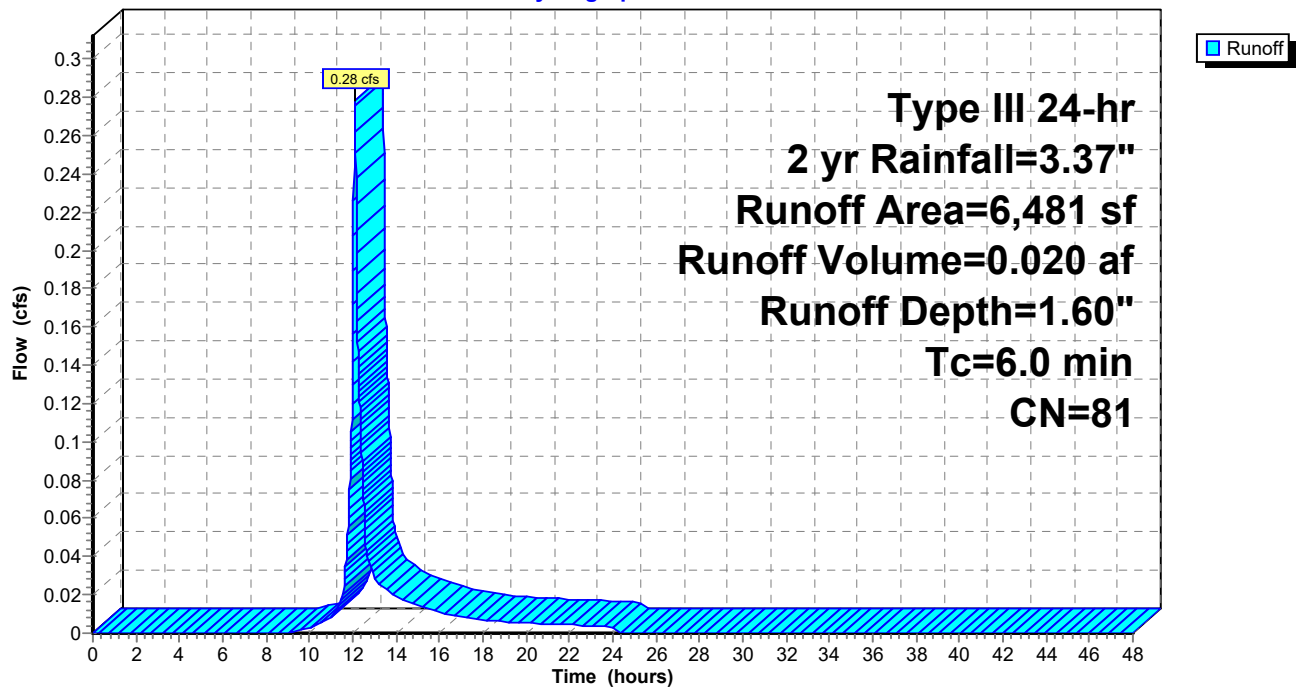
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	4,687	74	Grass, Good, HSG C
*	1,794	98	Pavement
	6,481	81	Weighted Average
	4,687		72.32% Pervious Area
	1,794		27.68% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment PR-A1:

Runoff = 3.46 cfs @ 12.08 hrs, Volume= 0.257 af, Depth= 2.71"
Routed to Pond A1 :

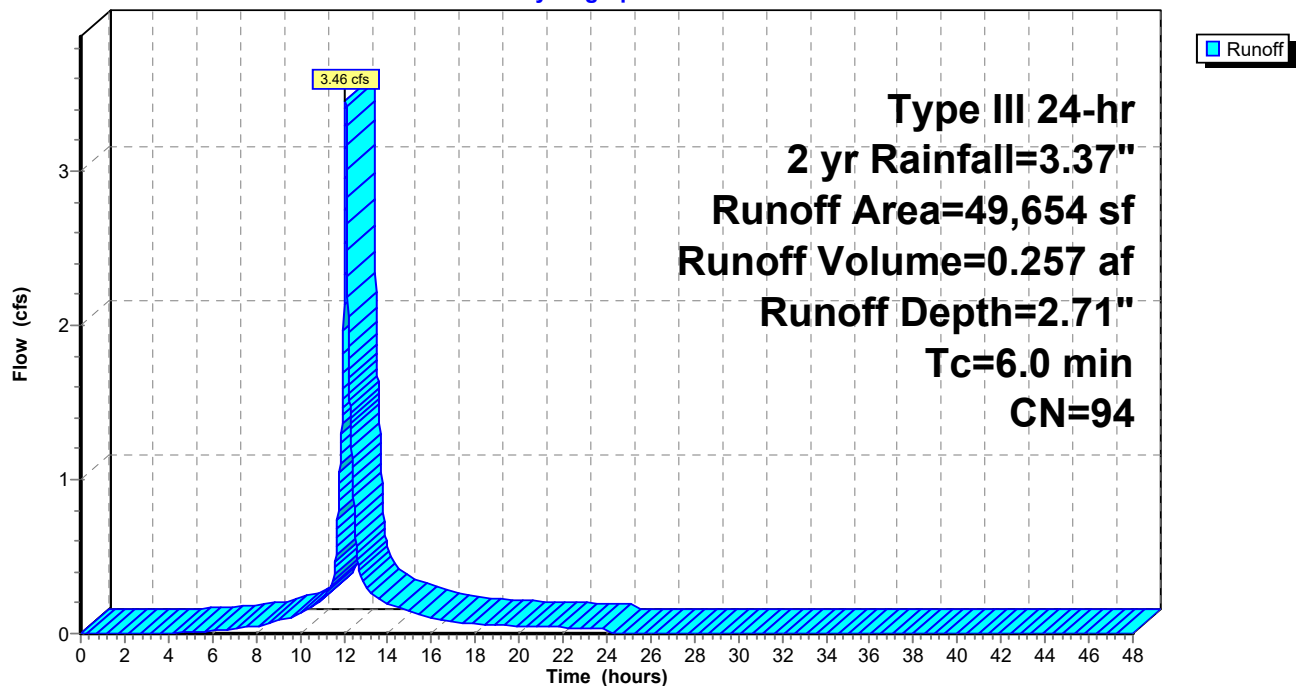
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	8,212	74	Grass, Good, HSG C
*	39,079	98	Pavement
*	2,363	98	Basin
	49,654	94	Weighted Average
	8,212		16.54% Pervious Area
	41,442		83.46% Impervious Area

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

Subcatchment PR-A1:

Hydrograph



Summary for Subcatchment PR-A2:

Runoff = 2.09 cfs @ 12.08 hrs, Volume= 0.157 af, Depth= 2.81"
Routed to Pond A2 :

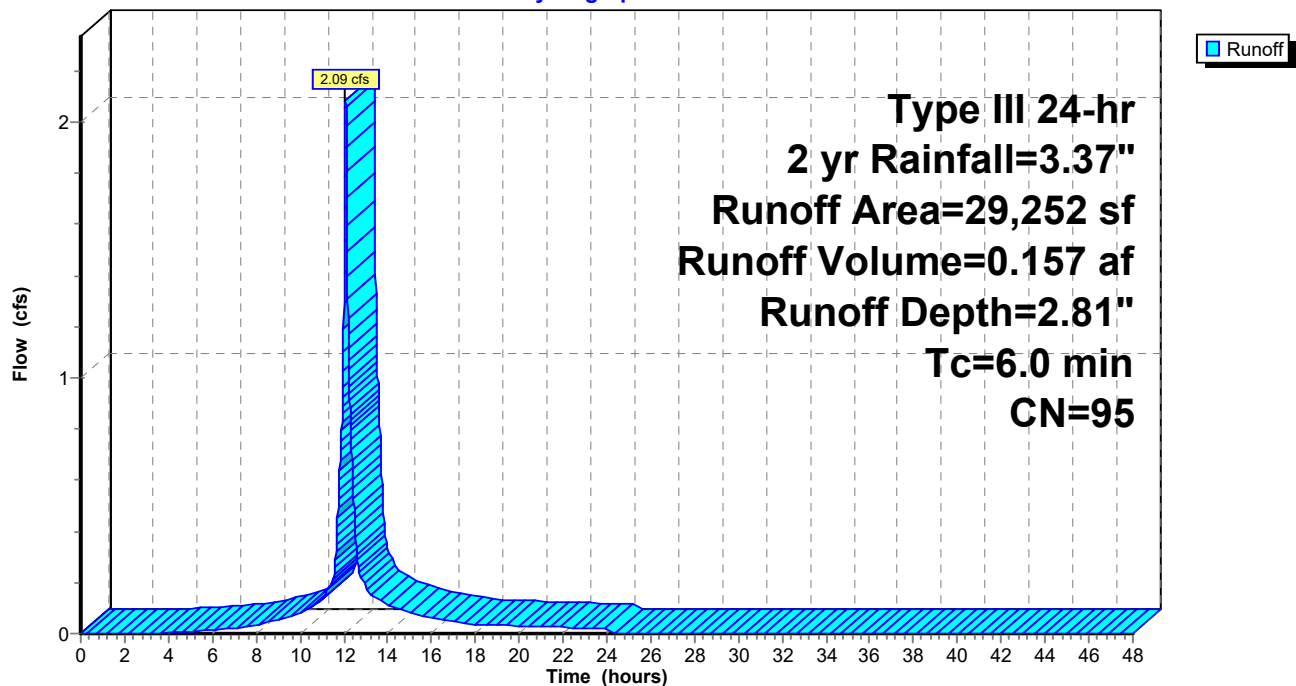
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	4,147	74	Grass, Good, HSG C
*	22,760	98	Pavement
*	2,345	98	Basin
	29,252	95	Weighted Average
	4,147		14.18% Pervious Area
	25,105		85.82% Impervious Area

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

Subcatchment PR-A2:

Hydrograph



Summary for Subcatchment PR-A3:

Runoff = 5.35 cfs @ 12.09 hrs, Volume= 0.390 af, Depth= 1.27"
Routed to Link A :

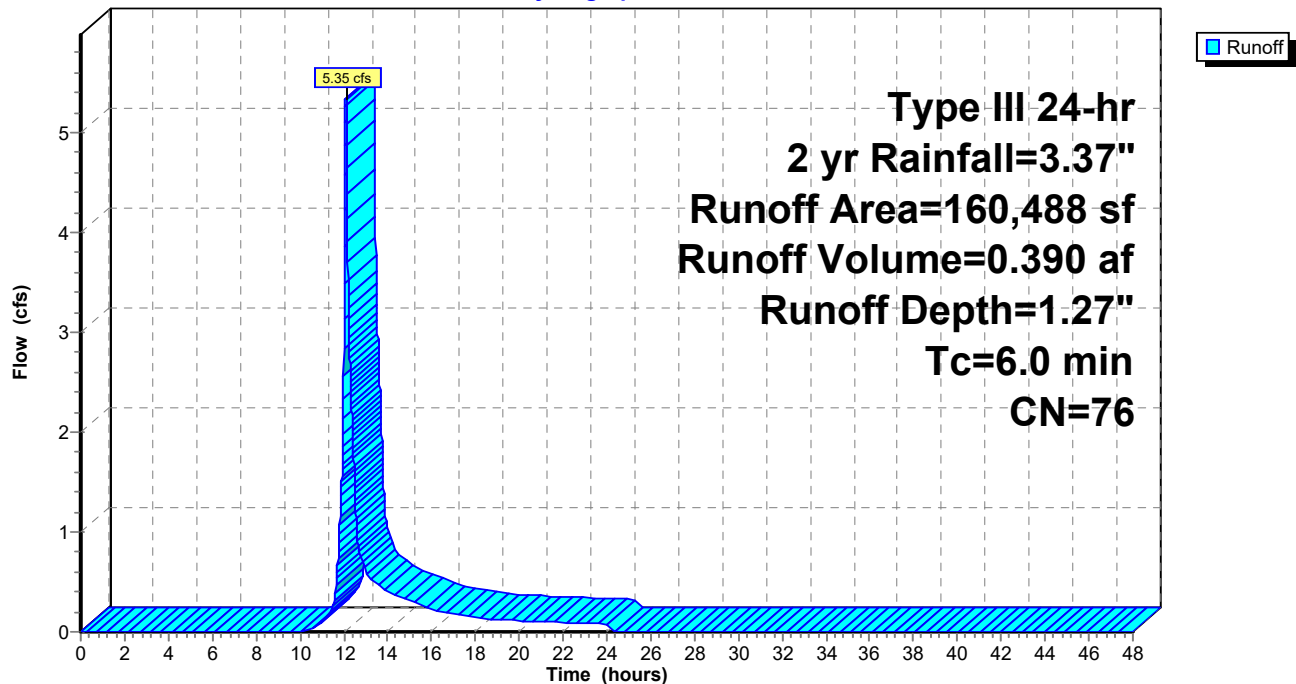
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	17,076	70	Woods, Good, HSG C
*	126,592	74	Grass, Good, HSG C
*	4,664	98	Roofs
*	12,156	98	Pavement
	160,488	76	Weighted Average
	143,668		89.52% Pervious Area
	16,820		10.48% Impervious Area

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

Subcatchment PR-A3:

Hydrograph



Summary for Subcatchment PR-B1:

Runoff = 6.39 cfs @ 12.09 hrs, Volume= 0.466 af, Depth= 2.51"
Routed to Pond B1 :

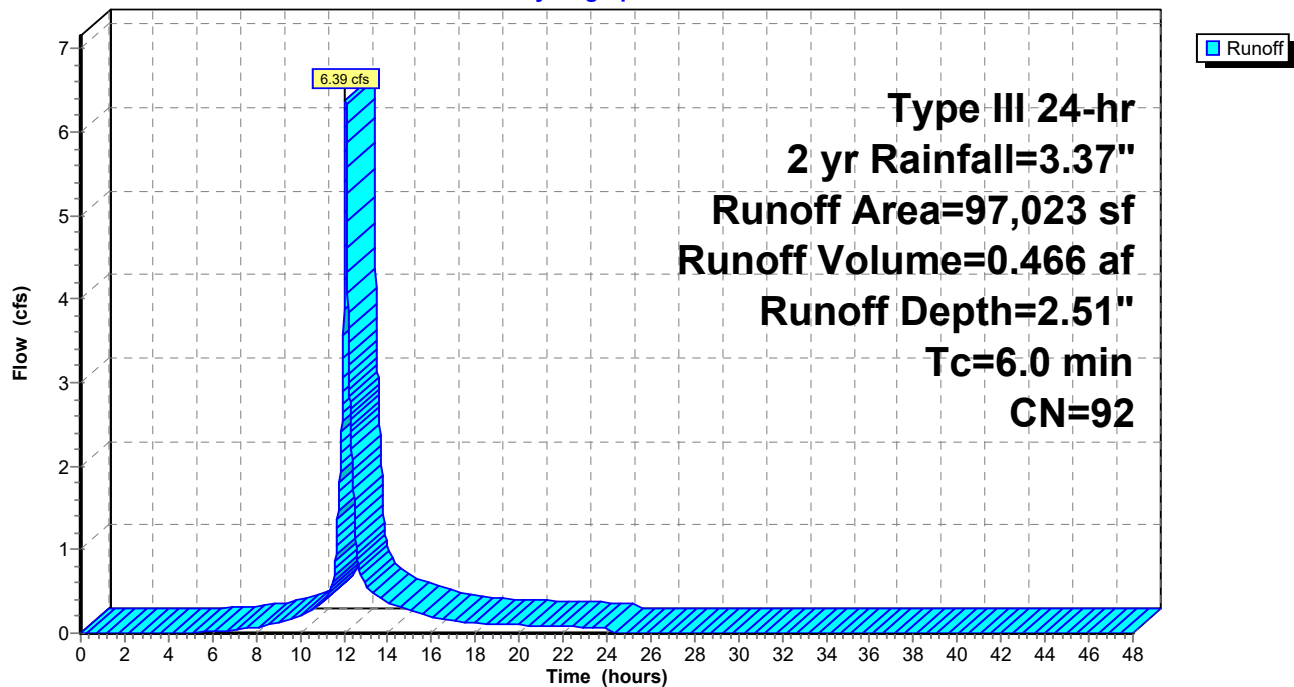
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	23,813	74	Grass, Good, HSG C
*	73,210	98	Pavement
	97,023	92	Weighted Average
	23,813		24.54% Pervious Area
	73,210		75.46% Impervious Area

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

Subcatchment PR-B1:

Hydrograph



Summary for Subcatchment PR-B2:

Runoff = 3.79 cfs @ 12.09 hrs, Volume= 0.277 af, Depth= 2.51"
Routed to Link B :

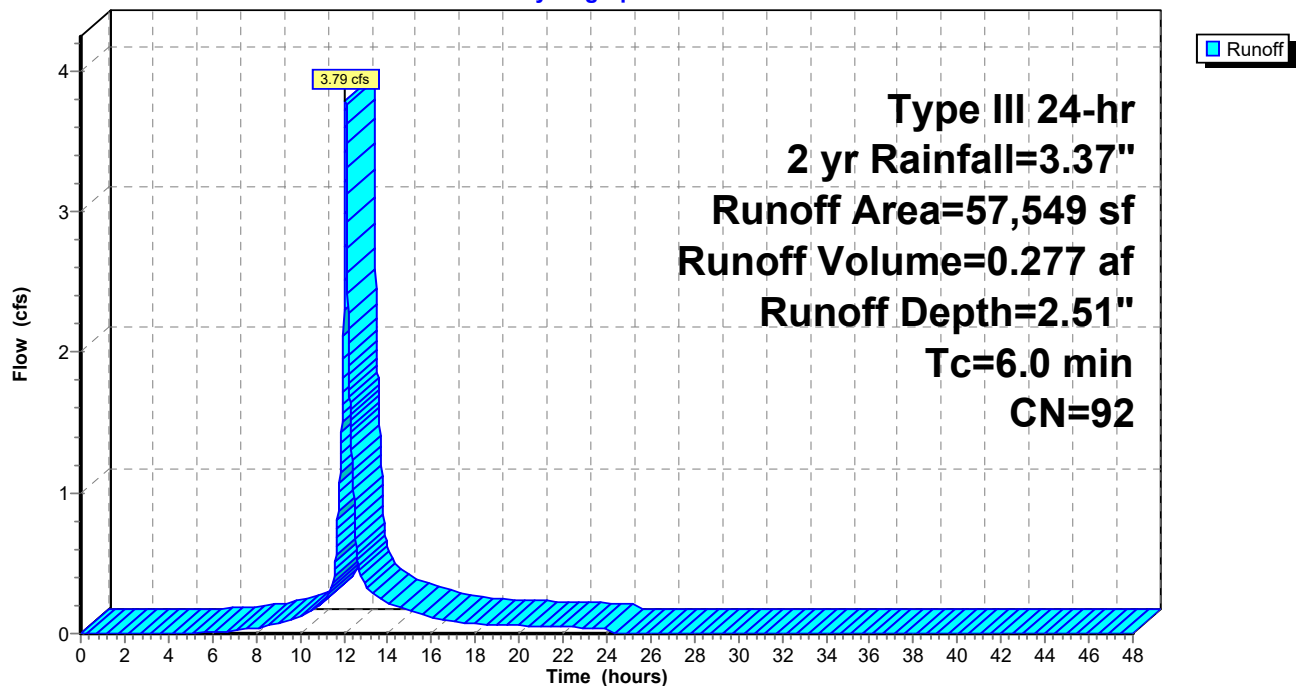
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

	Area (sf)	CN	Description
*	14,041	74	Grass, Good, HSG C
*	41,190	98	Roofs
*	2,318	98	Pavement
	57,549	92	Weighted Average
	14,041		24.40% Pervious Area
	43,508		75.60% Impervious Area

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

Subcatchment PR-B2:

Hydrograph



Summary for Subcatchment PR-C:

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 1.15"

Routed to Link C :

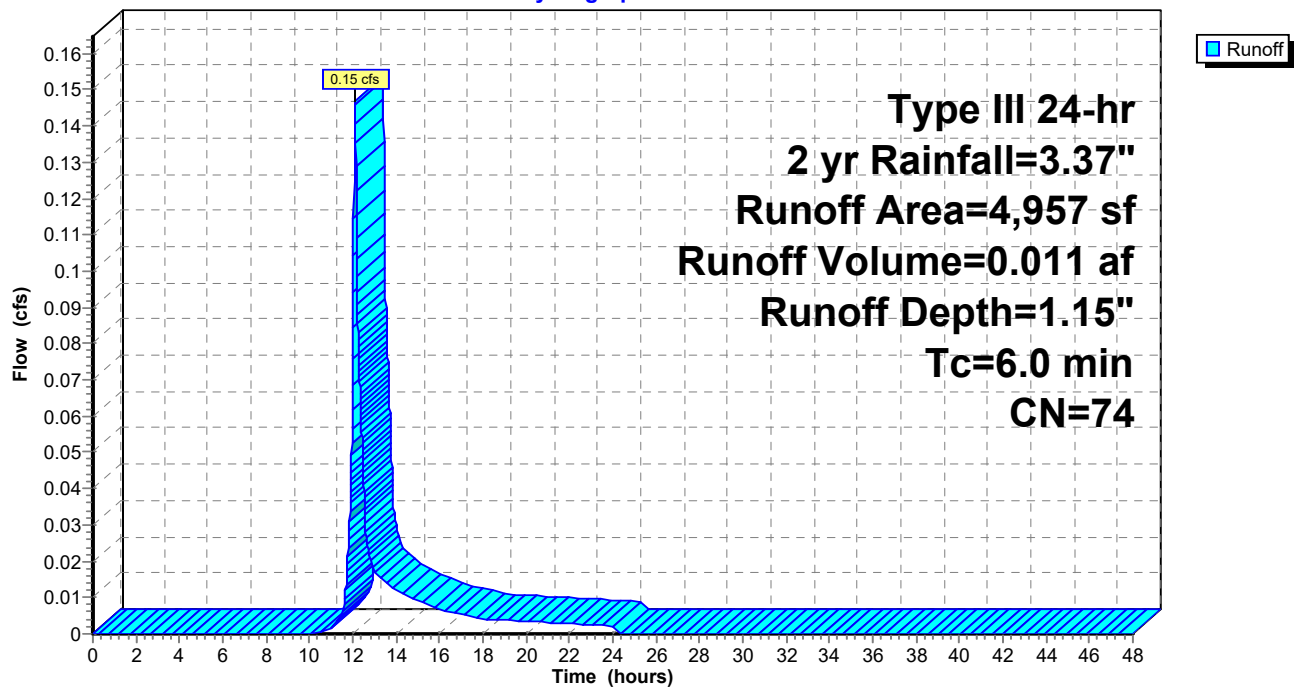
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.37"

Area (sf)	CN	Description
* 4,957	74	Grass, Good, HSG C
4,957		100.00% Pervious Area

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

Subcatchment PR-C:

Hydrograph



Summary for Pond A1:

Inflow Area = 1.140 ac, 83.46% Impervious, Inflow Depth = 2.71" for 2 yr event
 Inflow = 3.46 cfs @ 12.08 hrs, Volume= 0.257 af
 Outflow = 3.40 cfs @ 12.10 hrs, Volume= 0.195 af, Atten= 2%, Lag= 0.9 min
 Primary = 3.40 cfs @ 12.10 hrs, Volume= 0.195 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 242.76' @ 12.10 hrs Surf.Area= 1,698 sf Storage= 2,984 cf

Plug-Flow detention time= 139.8 min calculated for 0.195 af (76% of inflow)
 Center-of-Mass det. time= 56.6 min (842.1 - 785.4)

Volume	Invert	Avail.Storage	Storage Description
#1	240.00'	3,403 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	544	94.0	0	0	544
241.00	905	124.0	717	717	1,076
242.00	1,337	150.0	1,114	1,831	1,659
243.00	1,820	170.0	1,572	3,403	2,193

Device	Routing	Invert	Outlet Devices
#1	Primary	238.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	242.60'	24.0" x 24.0" Horiz. Grate X 2.00 C= 0.600 Limited to weir flow at low heads

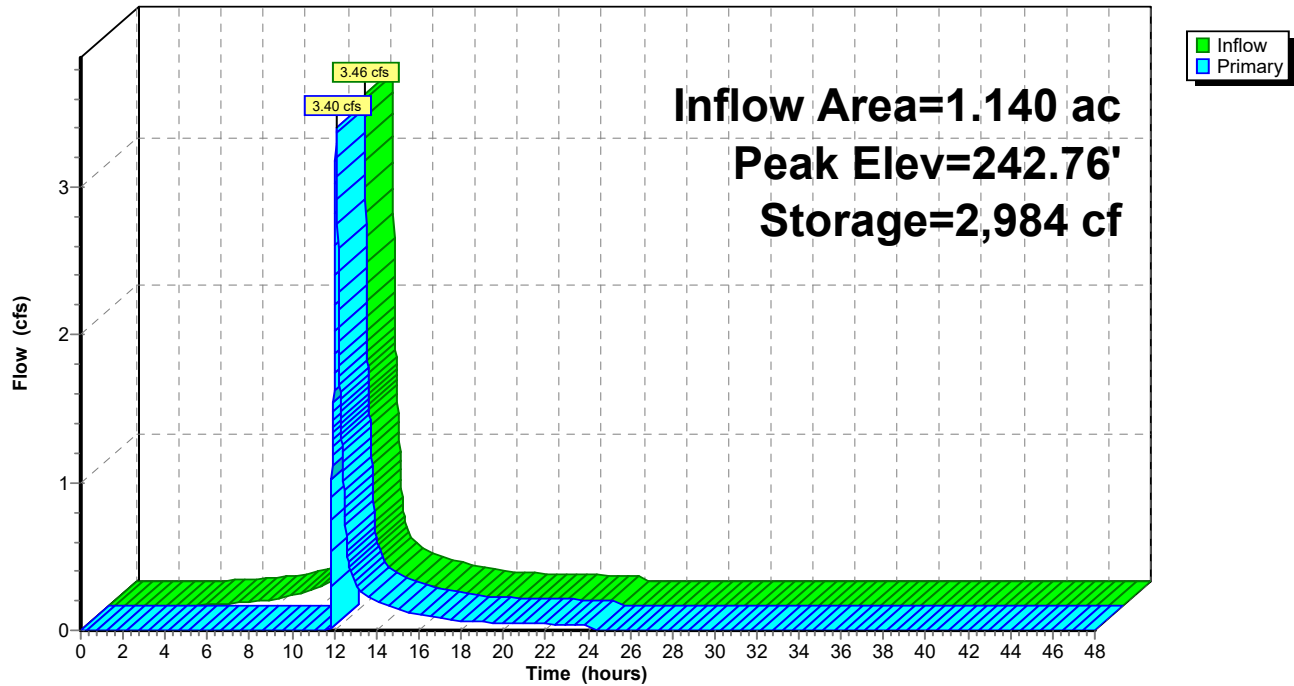
Primary OutFlow Max=3.40 cfs @ 12.10 hrs HW=242.76' (Free Discharge)

↑ **1=Culvert** (Passes 3.40 cfs of 13.45 cfs potential flow)

↑ **2=Grate** (Weir Controls 3.40 cfs @ 1.31 fps)

Pond A1:

Hydrograph



Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Summary for Pond A2:

Inflow Area = 0.672 ac, 85.82% Impervious, Inflow Depth = 2.81" for 2 yr event
 Inflow = 2.09 cfs @ 12.08 hrs, Volume= 0.157 af
 Outflow = 2.01 cfs @ 12.11 hrs, Volume= 0.118 af, Atten= 4%, Lag= 1.4 min
 Primary = 2.01 cfs @ 12.11 hrs, Volume= 0.118 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 240.48' @ 12.11 hrs Surf.Area= 1,421 sf Storage= 1,959 cf

Plug-Flow detention time= 146.3 min calculated for 0.118 af (75% of inflow)
 Center-of-Mass det. time= 61.9 min (841.3 - 779.4)

Volume	Invert	Avail.Storage	Storage Description
#1	238.00'	2,778 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	263	83.0	0	0	263
239.00	657	138.0	445	445	1,237
240.00	1,158	169.0	896	1,341	2,009
241.00	1,735	194.0	1,437	2,778	2,754

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	24.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 237.00' / 236.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	240.30'	24.0" x 24.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

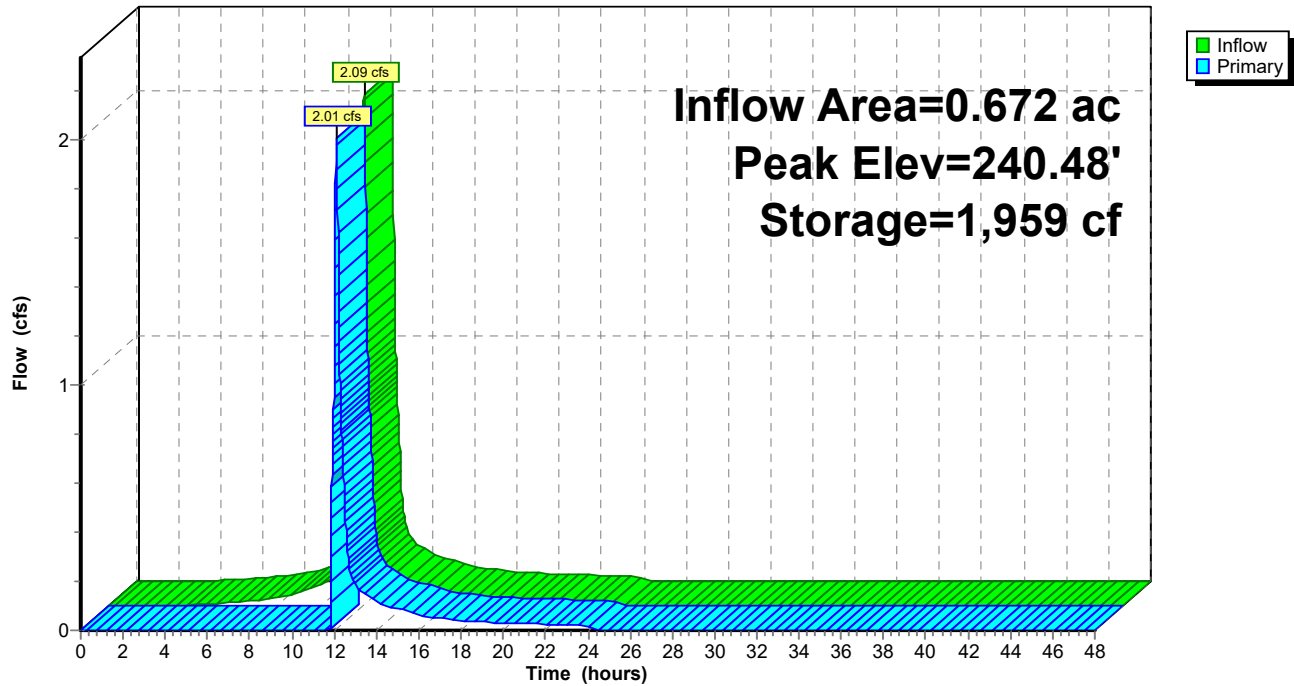
Primary OutFlow Max=2.00 cfs @ 12.11 hrs HW=240.48' (Free Discharge)

↑ **1=Culvert** (Passes 2.00 cfs of 18.81 cfs potential flow)

↑ **2=Grate** (Weir Controls 2.00 cfs @ 1.39 fps)

Pond A2:

Hydrograph



Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

Summary for Pond B1:

Inflow Area = 2.227 ac, 75.46% Impervious, Inflow Depth = 2.51" for 2 yr event
 Inflow = 6.39 cfs @ 12.09 hrs, Volume= 0.466 af
 Outflow = 2.21 cfs @ 12.36 hrs, Volume= 0.466 af, Atten= 65%, Lag= 16.7 min
 Primary = 2.21 cfs @ 12.36 hrs, Volume= 0.466 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 237.90' @ 12.36 hrs Surf.Area= 3,072 sf Storage= 5,137 cf

Plug-Flow detention time= 42.5 min calculated for 0.466 af (100% of inflow)
 Center-of-Mass det. time= 42.4 min (838.3 - 795.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.00'	0 cf	24.00'W x 128.00'L x 4.67'H Field A 14,336 cf Overall - 14,336 cf Embedded = 0 cf x 30.0% Voids
#2A	236.00'	10,798 cf	retain_it retain_it 4.0' x 48 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 286.9 cf perimeter wall
		10,798 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	236.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 236.00' / 235.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	236.00'	4.0" Vert. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	238.20'	20.0" W x 3.0" H Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	238.75'	4.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=2.21 cfs @ 12.36 hrs HW=237.90' (Free Discharge)

- 1=Culvert (Passes 2.21 cfs of 7.21 cfs potential flow)
- 2=Orifice (Orifice Controls 2.21 cfs @ 6.34 fps)
- 3=Orifice (Controls 0.00 cfs)
- 4=Weir (Controls 0.00 cfs)

Pond B1: - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)

Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf

Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf

3 Rows adjusted for 286.9 cf perimeter wall

16 Chambers/Row x 8.00' Long = 128.00' Row Length

3 Rows x 96.0" Wide = 24.00' Base Width

56.0" Chamber Height = 4.67' Field Height

7.5 cf Sidewall x 16 x 2 + 7.5 cf Endwall x 3 x 2 = 286.9 cf Perimeter Wall

48 Chambers x 230.9 cf - 286.9 cf Perimeter wall = 10,798.2 cf Chamber Storage

48 Chambers x 298.7 cf = 14,336.0 cf Displacement

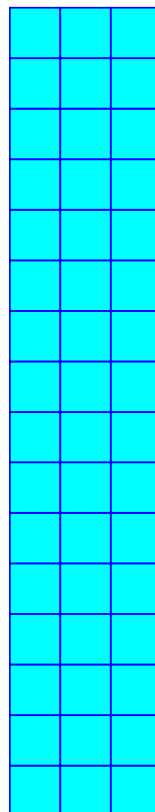
Chamber Storage = 10,798.2 cf = 0.248 af

Overall Storage Efficiency = 75.3%

Overall System Size = 128.00' x 24.00' x 4.67'

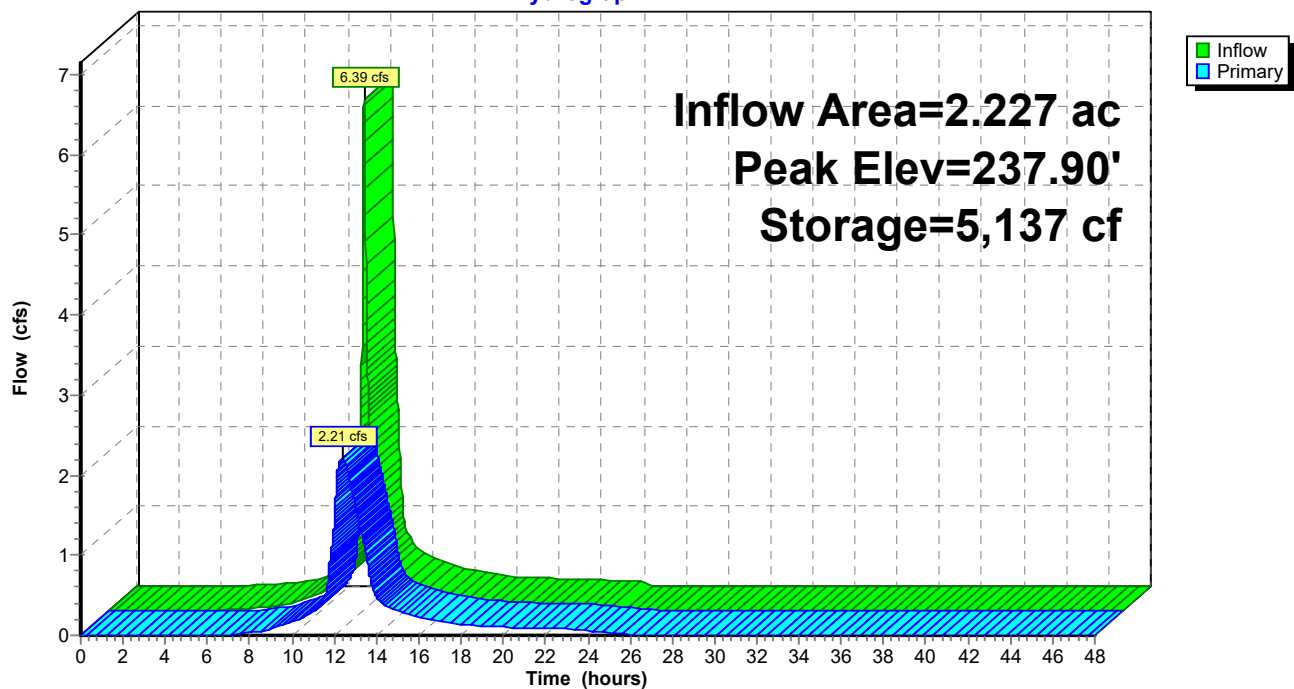
48 Chambers

531.0 cy Field



Pond B1:

Hydrograph



Stage-Area-Storage for Pond B1:

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
236.00	0	238.60	7,019
236.05	135	238.65	7,154
236.10	270	238.70	7,289
236.15	405	238.75	7,424
236.20	540	238.80	7,559
236.25	675	238.85	7,694
236.30	810	238.90	7,829
236.35	945	238.95	7,964
236.40	1,080	239.00	8,099
236.45	1,215	239.05	8,234
236.50	1,350	239.10	8,369
236.55	1,485	239.15	8,504
236.60	1,620	239.20	8,639
236.65	1,755	239.25	8,774
236.70	1,890	239.30	8,909
236.75	2,025	239.35	9,044
236.80	2,160	239.40	9,178
236.85	2,295	239.45	9,313
236.90	2,430	239.50	9,448
236.95	2,565	239.55	9,583
237.00	2,700	239.60	9,718
237.05	2,835	239.65	9,853
237.10	2,970	239.70	9,988
237.15	3,104	239.75	10,123
237.20	3,239	239.80	10,258
237.25	3,374	239.85	10,393
237.30	3,509	239.90	10,528
237.35	3,644	239.95	10,663
237.40	3,779	240.00	10,798
237.45	3,914	240.05	10,798
237.50	4,049	240.10	10,798
237.55	4,184	240.15	10,798
237.60	4,319	240.20	10,798
237.65	4,454	240.25	10,798
237.70	4,589	240.30	10,798
237.75	4,724	240.35	10,798
237.80	4,859	240.40	10,798
237.85	4,994	240.45	10,798
237.90	5,129	240.50	10,798
237.95	5,264	240.55	10,798
238.00	5,399	240.60	10,798
238.05	5,534	240.65	10,798
238.10	5,669		
238.15	5,804		
238.20	5,939		
238.25	6,074		
238.30	6,209		
238.35	6,344		
238.40	6,479		
238.45	6,614		
238.50	6,749		
238.55	6,884		

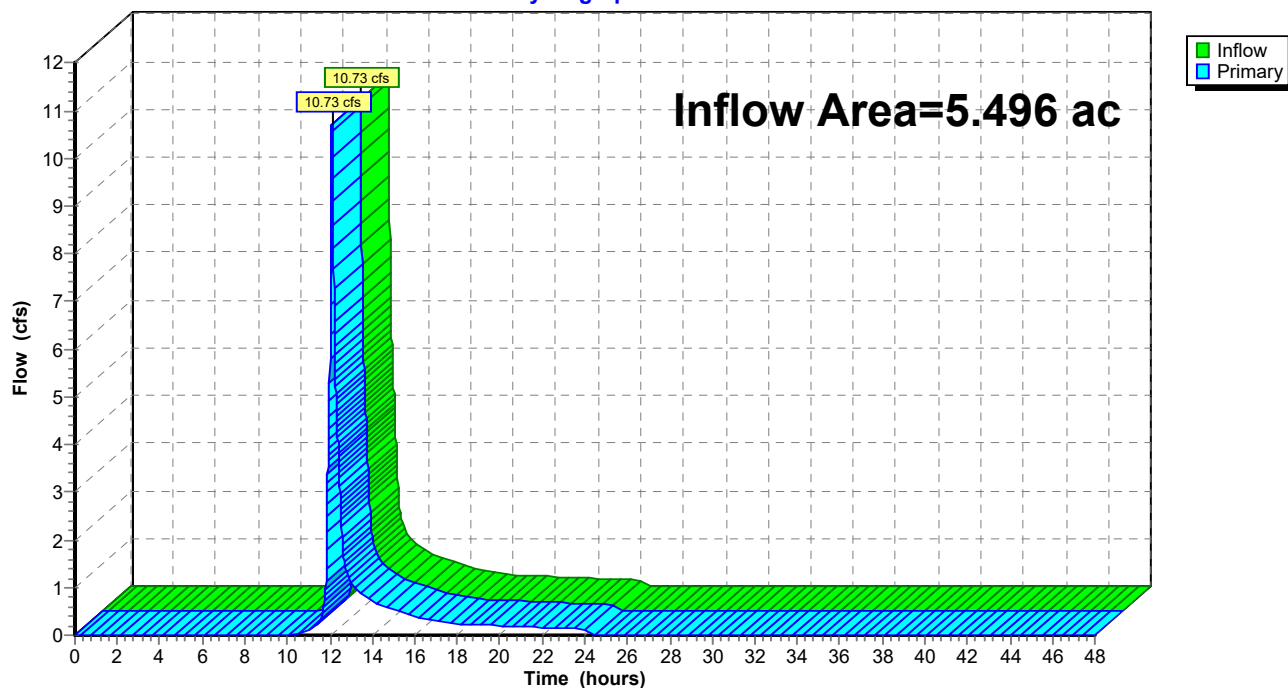
Summary for Link A:

Inflow Area = 5.496 ac, 34.82% Impervious, Inflow Depth = 1.54" for 2 yr event
Inflow = 10.73 cfs @ 12.10 hrs, Volume= 0.703 af
Primary = 10.73 cfs @ 12.10 hrs, Volume= 0.703 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



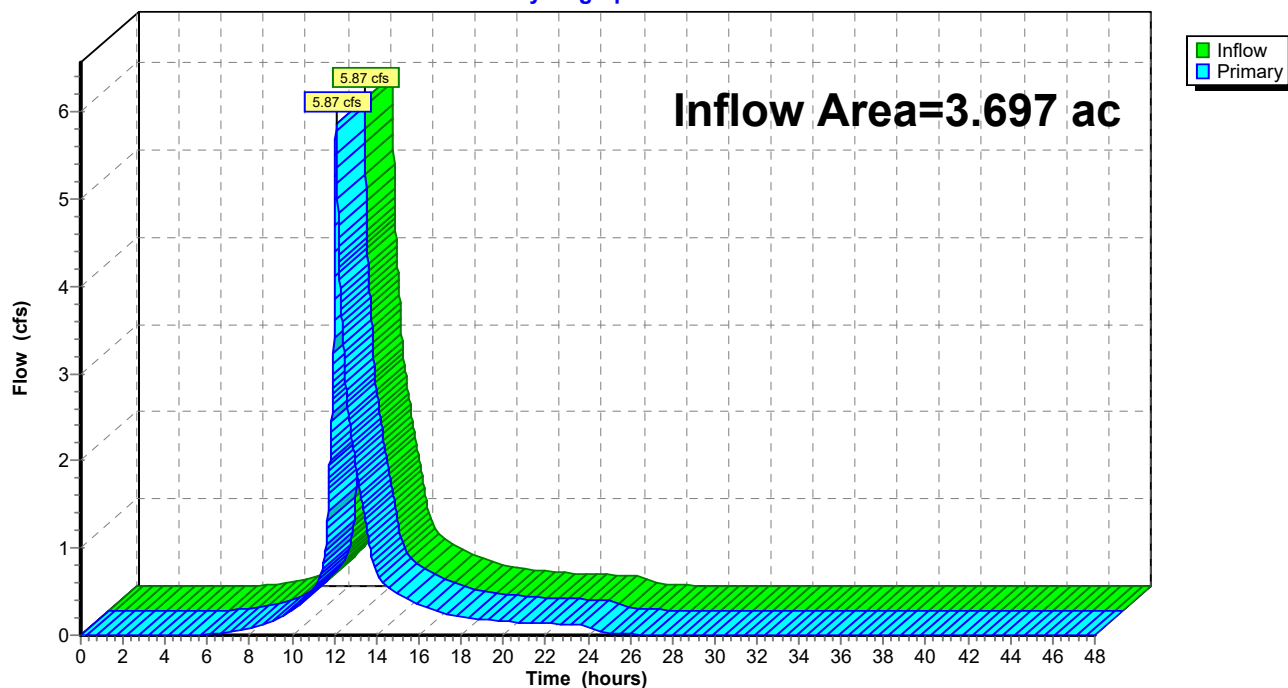
Summary for Link B:

Inflow Area = 3.697 ac, 73.59% Impervious, Inflow Depth = 2.48" for 2 yr event
Inflow = 5.87 cfs @ 12.09 hrs, Volume= 0.763 af
Primary = 5.87 cfs @ 12.09 hrs, Volume= 0.763 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

Hydrograph



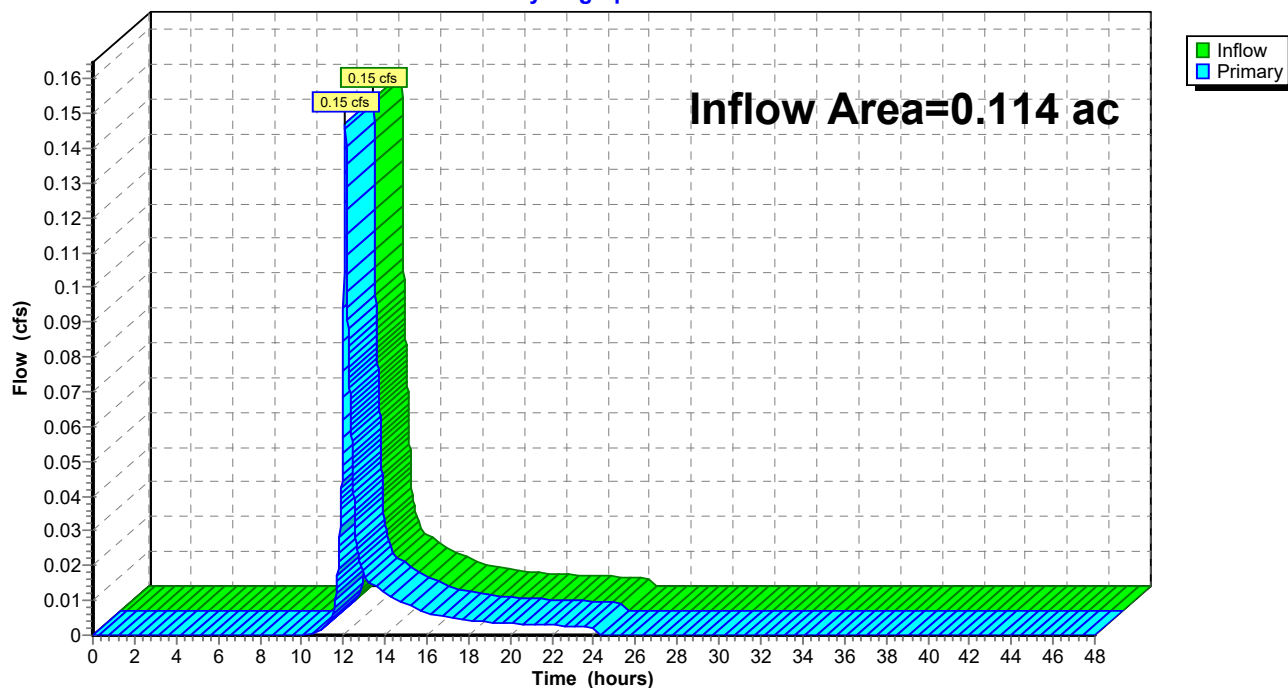
Summary for Link C:

Inflow Area = 0.114 ac, 0.00% Impervious, Inflow Depth = 1.15" for 2 yr event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Primary = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 0.56 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 3.23"
Routed to Link B :

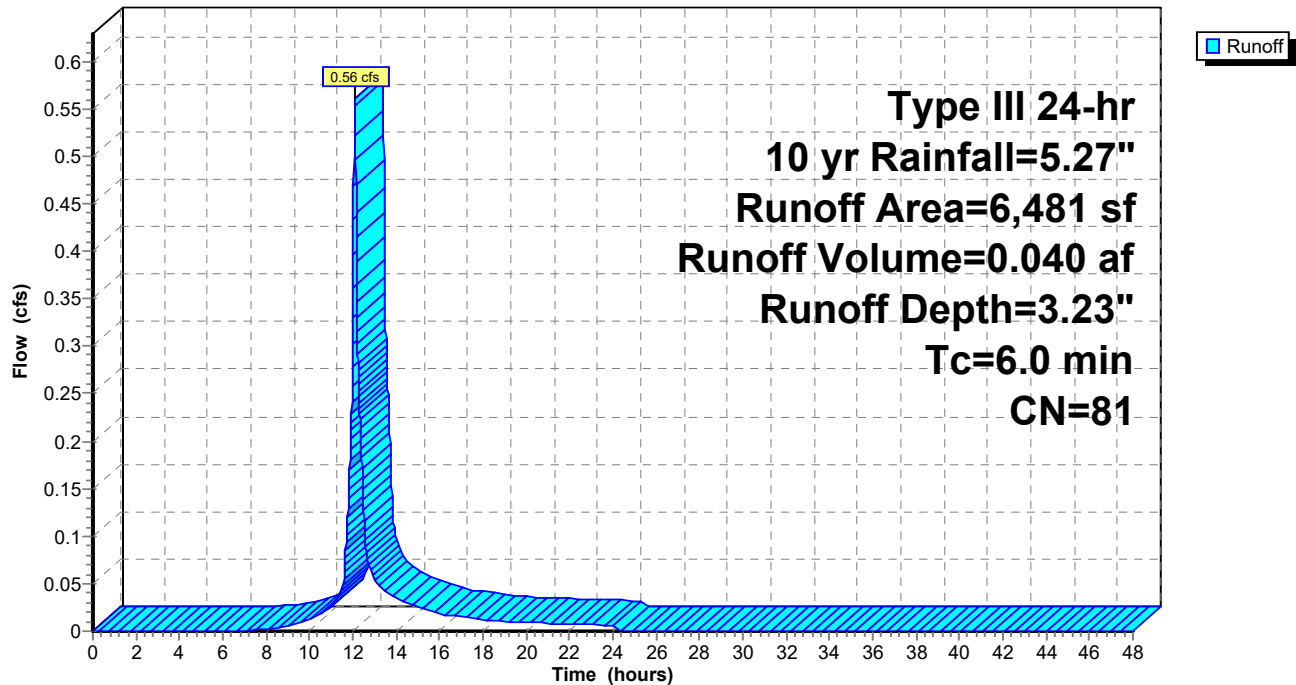
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	4,687	74	Grass, Good, HSG C
*	1,794	98	Pavement
	6,481	81	Weighted Average
	4,687		72.32% Pervious Area
	1,794		27.68% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment PR-A1:

Runoff = 5.66 cfs @ 12.08 hrs, Volume= 0.435 af, Depth= 4.57"
Routed to Pond A1 :

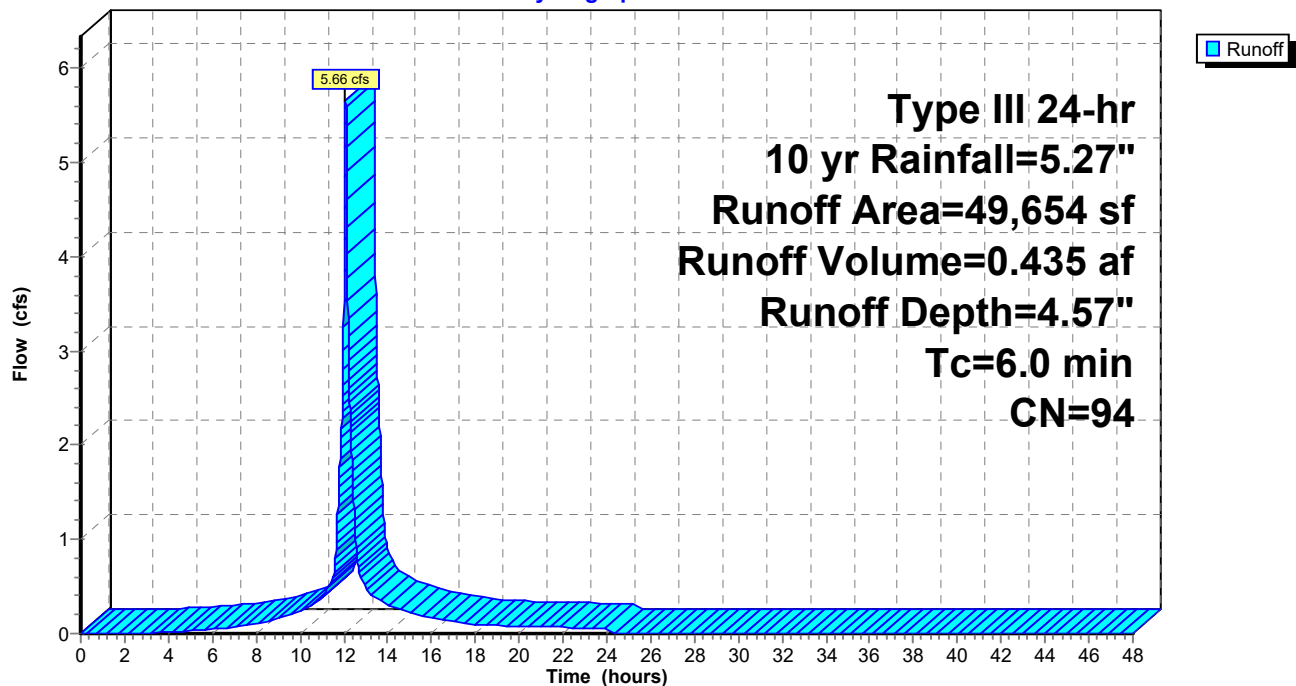
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	8,212	74	Grass, Good, HSG C
*	39,079	98	Pavement
*	2,363	98	Basin
	49,654	94	Weighted Average
	8,212		16.54% Pervious Area
	41,442		83.46% Impervious Area

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

Subcatchment PR-A1:

Hydrograph



Summary for Subcatchment PR-A2:

Runoff = 3.38 cfs @ 12.08 hrs, Volume= 0.262 af, Depth= 4.69"
Routed to Pond A2 :

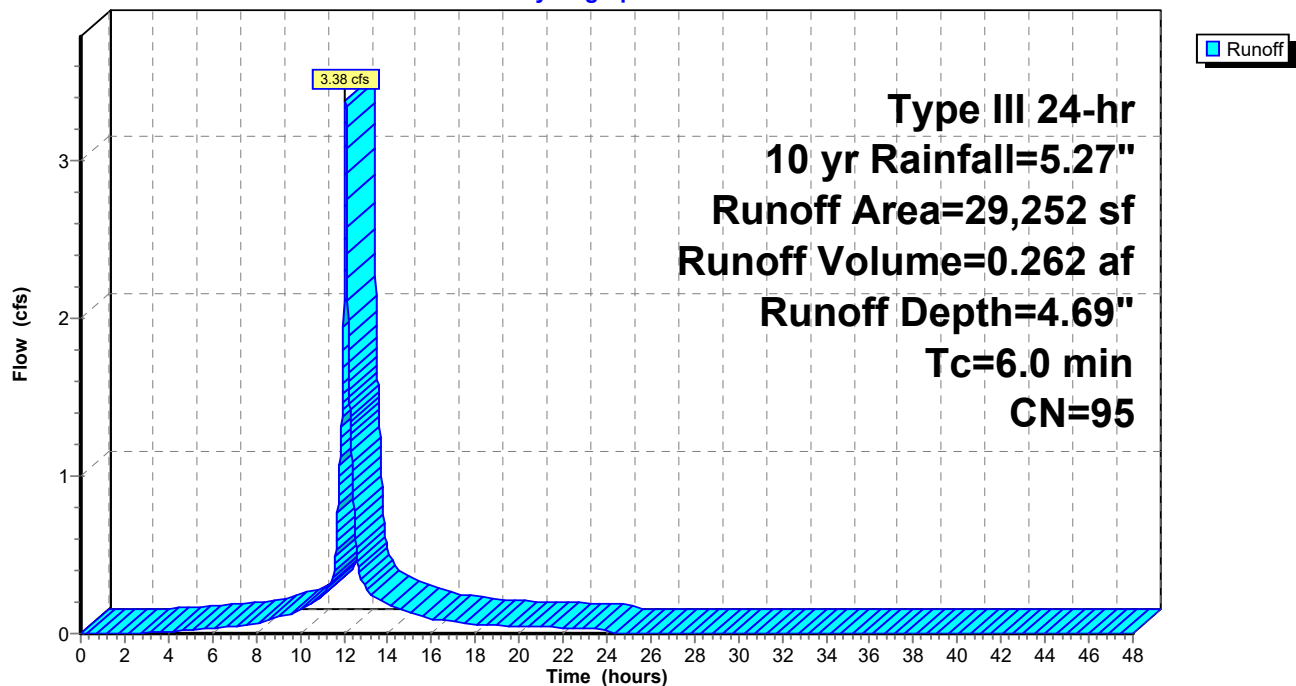
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	4,147	74	Grass, Good, HSG C
*	22,760	98	Pavement
*	2,345	98	Basin
	29,252	95	Weighted Average
	4,147		14.18% Pervious Area
	25,105		85.82% Impervious Area

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

Subcatchment PR-A2:

Hydrograph



Summary for Subcatchment PR-A3:

Runoff = 11.92 cfs @ 12.09 hrs, Volume= 0.847 af, Depth= 2.76"
Routed to Link A :

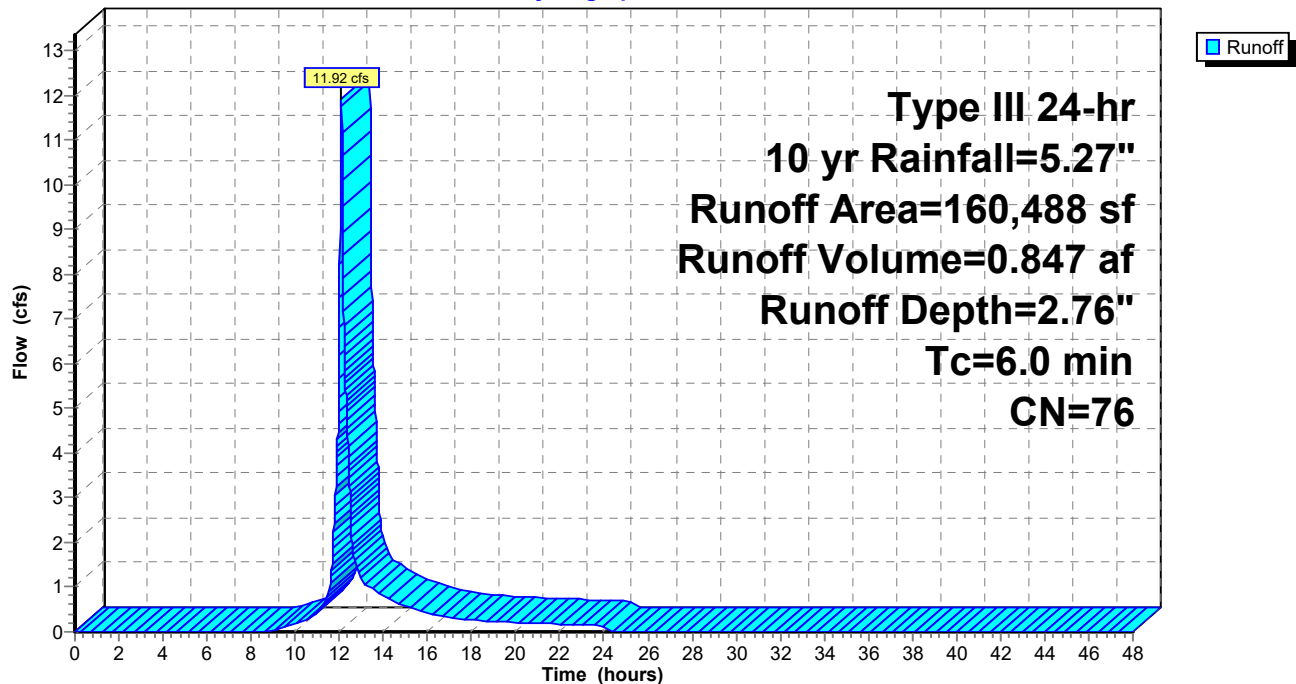
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	17,076	70	Woods, Good, HSG C
*	126,592	74	Grass, Good, HSG C
*	4,664	98	Roofs
*	12,156	98	Pavement
	160,488	76	Weighted Average
	143,668		89.52% Pervious Area
	16,820		10.48% Impervious Area

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

Subcatchment PR-A3:

Hydrograph



Summary for Subcatchment PR-B1:

Runoff = 10.75 cfs @ 12.08 hrs, Volume= 0.808 af, Depth= 4.35"
Routed to Pond B1 :

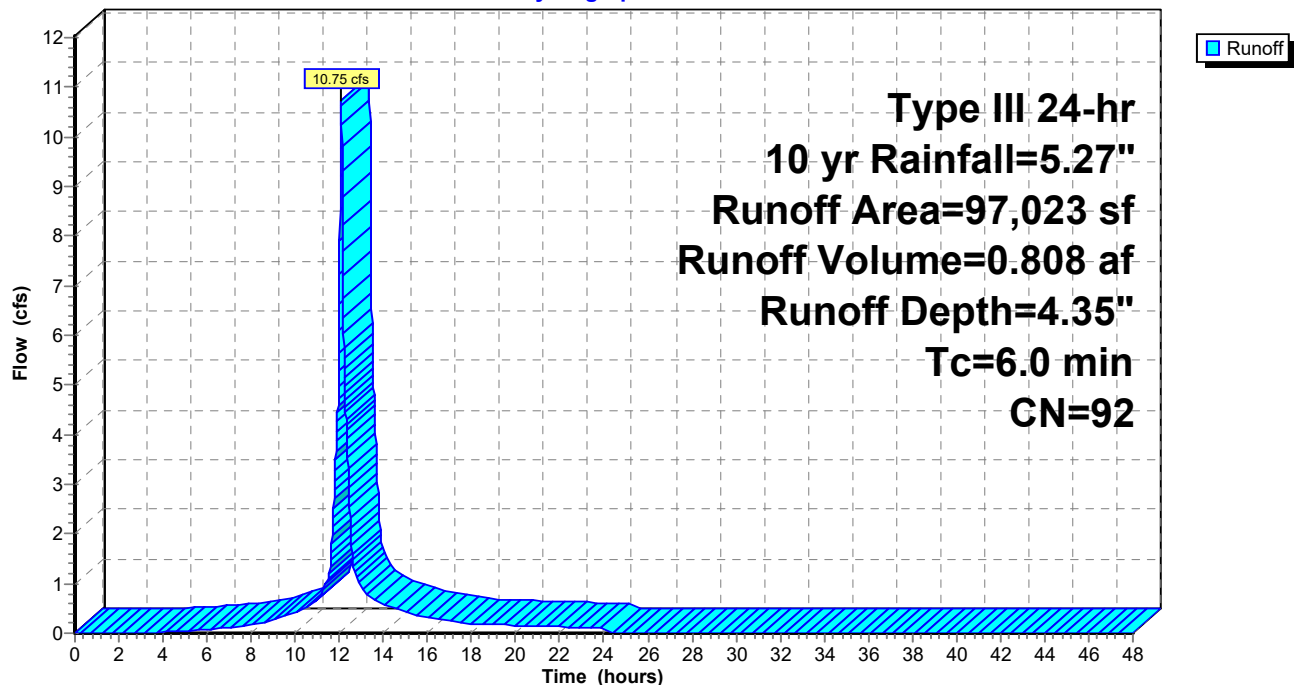
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	23,813	74	Grass, Good, HSG C
*	73,210	98	Pavement
	97,023	92	Weighted Average
	23,813		24.54% Pervious Area
	73,210		75.46% Impervious Area

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

Subcatchment PR-B1:

Hydrograph



Summary for Subcatchment PR-B2:

Runoff = 6.38 cfs @ 12.08 hrs, Volume= 0.479 af, Depth= 4.35"
Routed to Link B :

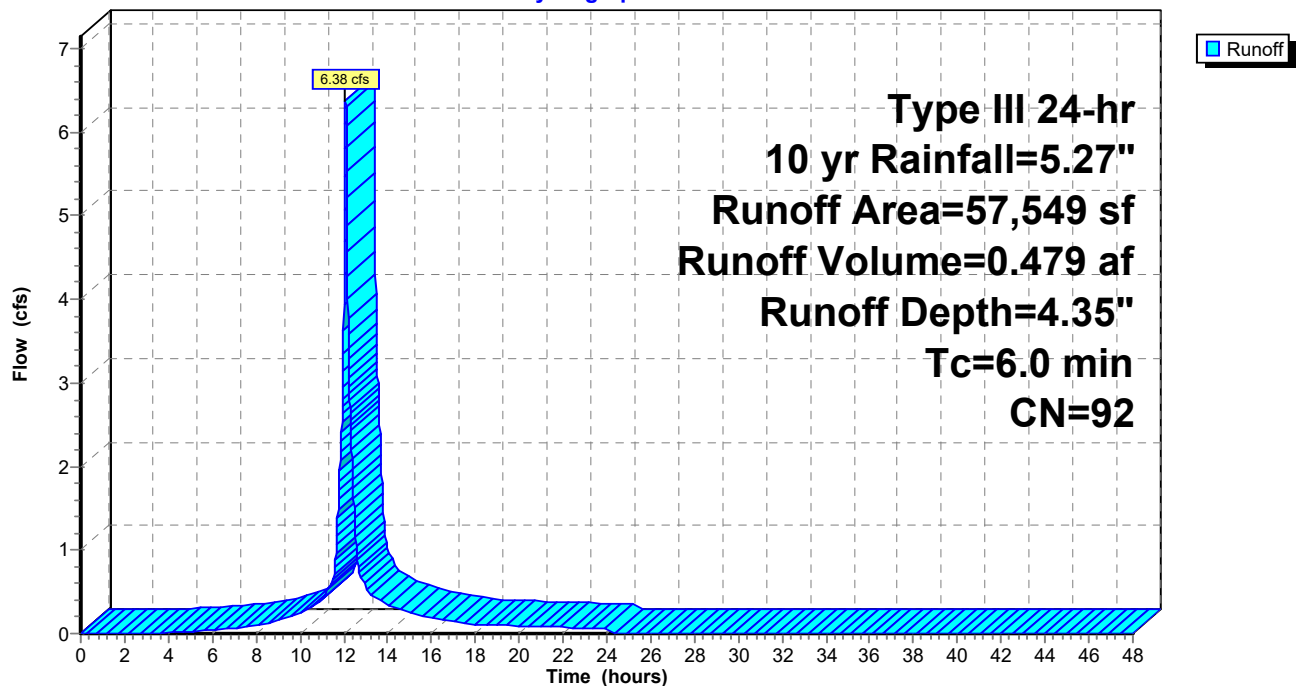
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

	Area (sf)	CN	Description
*	14,041	74	Grass, Good, HSG C
*	41,190	98	Roofs
*	2,318	98	Pavement
	57,549	92	Weighted Average
	14,041		24.40% Pervious Area
	43,508		75.60% Impervious Area

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

Subcatchment PR-B2:

Hydrograph



Summary for Subcatchment PR-C:

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 2.58"
Routed to Link C :

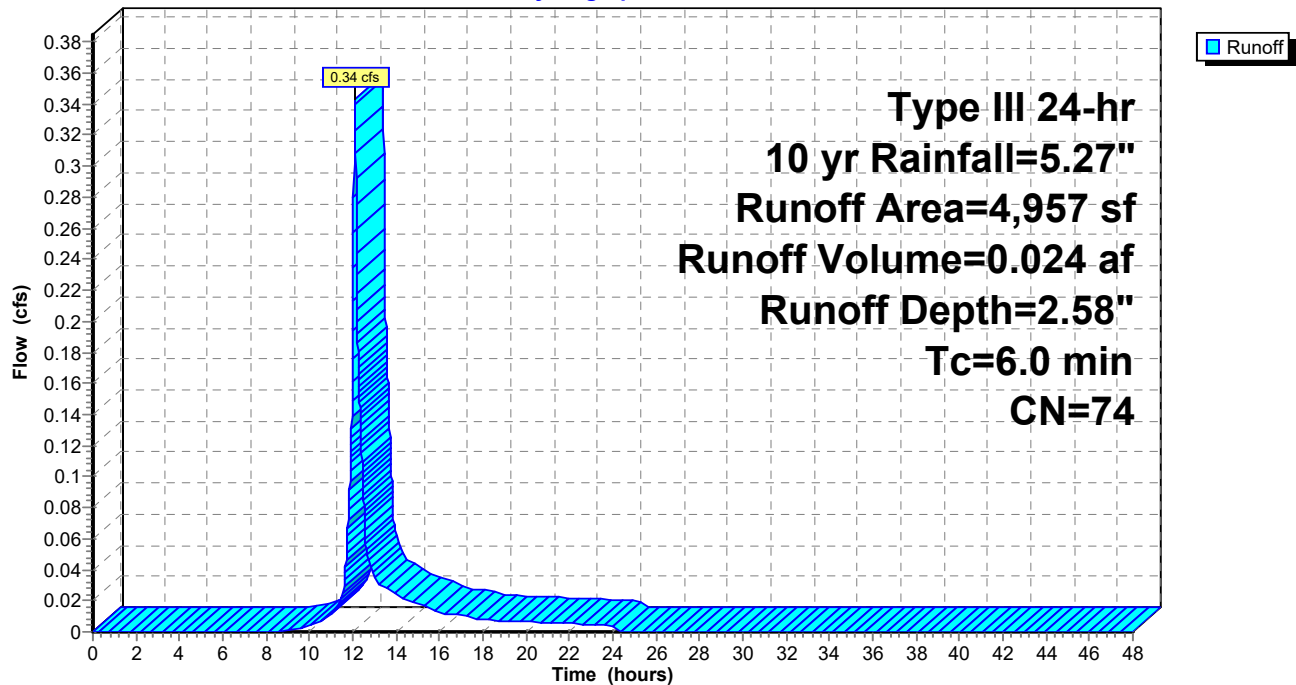
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.27"

Area (sf)	CN	Description
* 4,957	74	Grass, Good, HSG C
4,957		100.00% Pervious Area

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

Subcatchment PR-C:

Hydrograph



Summary for Pond A1:

Inflow Area = 1.140 ac, 83.46% Impervious, Inflow Depth = 4.57" for 10 yr event
 Inflow = 5.66 cfs @ 12.08 hrs, Volume= 0.435 af
 Outflow = 5.59 cfs @ 12.10 hrs, Volume= 0.372 af, Atten= 1%, Lag= 0.8 min
 Primary = 5.59 cfs @ 12.10 hrs, Volume= 0.372 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 242.83' @ 12.10 hrs Surf.Area= 1,730 sf Storage= 3,093 cf

Plug-Flow detention time= 106.9 min calculated for 0.372 af (86% of inflow)
 Center-of-Mass det. time= 44.7 min (816.7 - 772.0)

Volume	Invert	Avail.Storage	Storage Description
#1	240.00'	3,403 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	544	94.0	0	0	544
241.00	905	124.0	717	717	1,076
242.00	1,337	150.0	1,114	1,831	1,659
243.00	1,820	170.0	1,572	3,403	2,193

Device	Routing	Invert	Outlet Devices
#1	Primary	238.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	242.60'	24.0" x 24.0" Horiz. Grate X 2.00 C= 0.600 Limited to weir flow at low heads

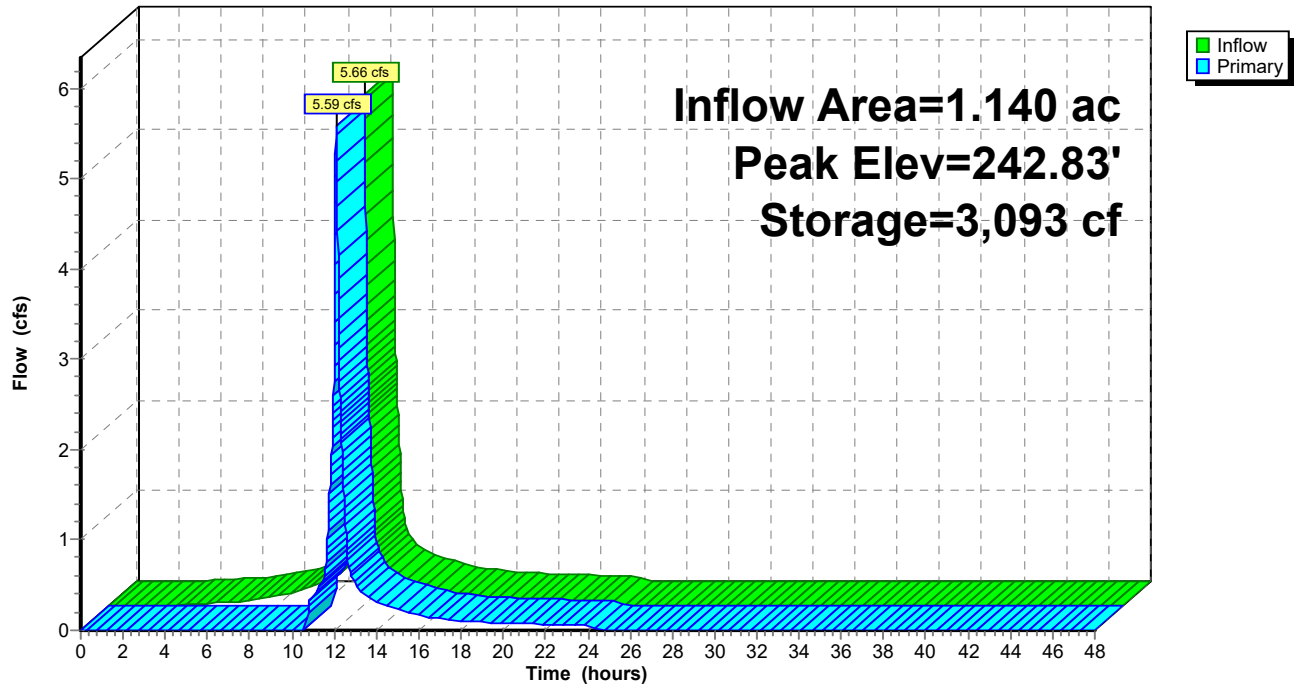
Primary OutFlow Max=5.58 cfs @ 12.10 hrs HW=242.82' (Free Discharge)

↑ **1=Culvert** (Passes 5.58 cfs of 13.56 cfs potential flow)

↑ **2=Grate** (Weir Controls 5.58 cfs @ 1.55 fps)

Pond A1:

Hydrograph



Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Summary for Pond A2:

Inflow Area = 0.672 ac, 85.82% Impervious, Inflow Depth = 4.69" for 10 yr event
 Inflow = 3.38 cfs @ 12.08 hrs, Volume= 0.262 af
 Outflow = 3.28 cfs @ 12.10 hrs, Volume= 0.223 af, Atten= 3%, Lag= 1.2 min
 Primary = 3.28 cfs @ 12.10 hrs, Volume= 0.223 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 240.55' @ 12.10 hrs Surf.Area= 1,461 sf Storage= 2,060 cf

Plug-Flow detention time= 113.3 min calculated for 0.223 af (85% of inflow)
 Center-of-Mass det. time= 49.3 min (816.2 - 766.9)

Volume	Invert	Avail.Storage	Storage Description
#1	238.00'	2,778 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	263	83.0	0	0	263
239.00	657	138.0	445	445	1,237
240.00	1,158	169.0	896	1,341	2,009
241.00	1,735	194.0	1,437	2,778	2,754

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	24.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 237.00' / 236.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	240.30'	24.0" x 24.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

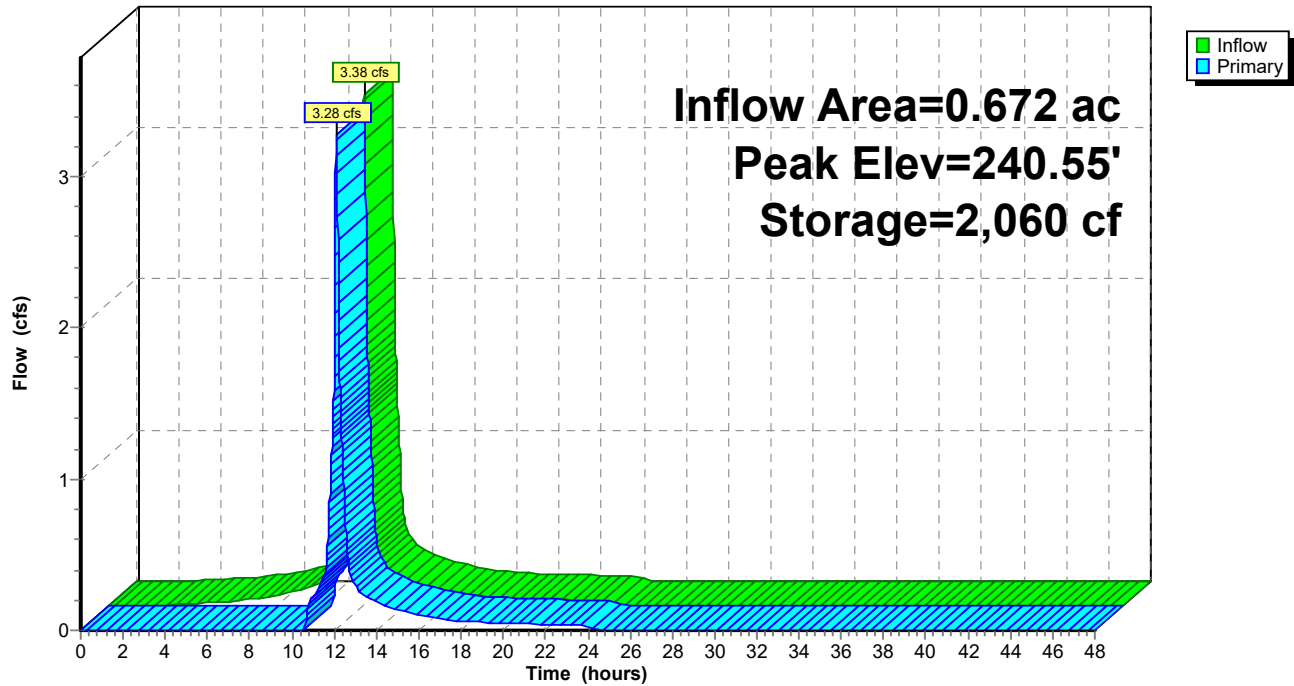
Primary OutFlow Max=3.27 cfs @ 12.10 hrs HW=240.55' (Free Discharge)

↑ **1=Culvert** (Passes 3.27 cfs of 19.07 cfs potential flow)

↑ **2=Grate** (Weir Controls 3.27 cfs @ 1.64 fps)

Pond A2:

Hydrograph



Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

Summary for Pond B1:

Inflow Area = 2.227 ac, 75.46% Impervious, Inflow Depth = 4.35" for 10 yr event
 Inflow = 10.75 cfs @ 12.08 hrs, Volume= 0.808 af
 Outflow = 5.67 cfs @ 12.21 hrs, Volume= 0.808 af, Atten= 47%, Lag= 7.8 min
 Primary = 5.67 cfs @ 12.21 hrs, Volume= 0.808 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 238.96' @ 12.21 hrs Surf.Area= 3,072 sf Storage= 7,994 cf

Plug-Flow detention time= 36.9 min calculated for 0.808 af (100% of inflow)
 Center-of-Mass det. time= 36.8 min (817.9 - 781.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.00'	0 cf	24.00'W x 128.00'L x 4.67'H Field A 14,336 cf Overall - 14,336 cf Embedded = 0 cf x 30.0% Voids
#2A	236.00'	10,798 cf	retain_it retain_it 4.0' x 48 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 286.9 cf perimeter wall
		10,798 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	236.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 236.00' / 235.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	236.00'	4.0" Vert. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	238.20'	20.0" W x 3.0" H Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	238.75'	4.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=5.66 cfs @ 12.21 hrs HW=238.96' (Free Discharge)

- 1=Culvert (Passes 5.66 cfs of 9.99 cfs potential flow)
- 2=Orifice (Orifice Controls 2.81 cfs @ 8.05 fps)
- 3=Orifice (Orifice Controls 1.60 cfs @ 3.83 fps)
- 4=Weir (Weir Controls 1.25 cfs @ 1.50 fps)

Pond B1: - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)

Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf

Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf

3 Rows adjusted for 286.9 cf perimeter wall

16 Chambers/Row x 8.00' Long = 128.00' Row Length

3 Rows x 96.0" Wide = 24.00' Base Width

56.0" Chamber Height = 4.67' Field Height

7.5 cf Sidewall x 16 x 2 + 7.5 cf Endwall x 3 x 2 = 286.9 cf Perimeter Wall

48 Chambers x 230.9 cf - 286.9 cf Perimeter wall = 10,798.2 cf Chamber Storage

48 Chambers x 298.7 cf = 14,336.0 cf Displacement

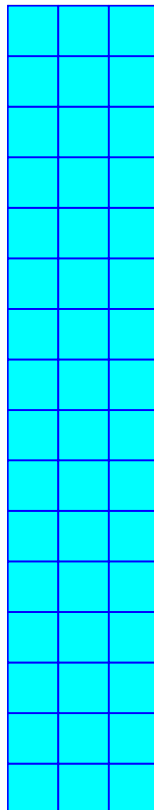
Chamber Storage = 10,798.2 cf = 0.248 af

Overall Storage Efficiency = 75.3%

Overall System Size = 128.00' x 24.00' x 4.67'

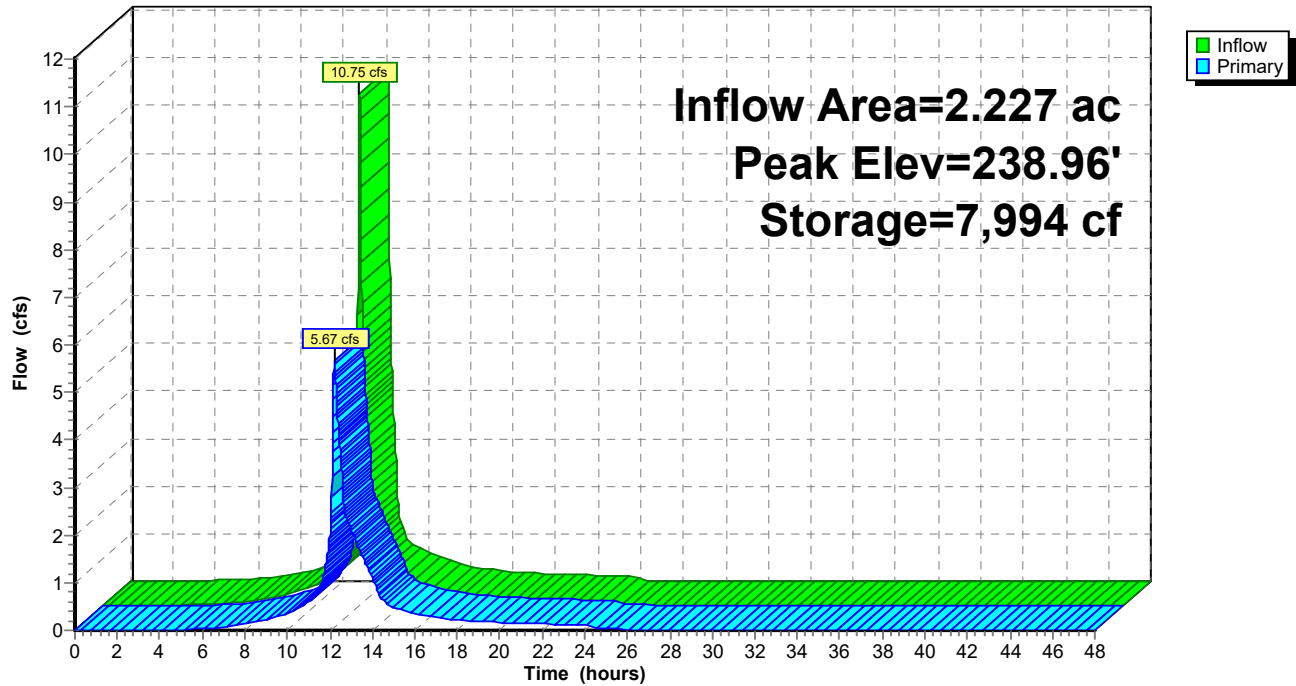
48 Chambers

531.0 cy Field



Pond B1:

Hydrograph



Stage-Area-Storage for Pond B1:

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
236.00	0	238.60	7,019
236.05	135	238.65	7,154
236.10	270	238.70	7,289
236.15	405	238.75	7,424
236.20	540	238.80	7,559
236.25	675	238.85	7,694
236.30	810	238.90	7,829
236.35	945	238.95	7,964
236.40	1,080	239.00	8,099
236.45	1,215	239.05	8,234
236.50	1,350	239.10	8,369
236.55	1,485	239.15	8,504
236.60	1,620	239.20	8,639
236.65	1,755	239.25	8,774
236.70	1,890	239.30	8,909
236.75	2,025	239.35	9,044
236.80	2,160	239.40	9,178
236.85	2,295	239.45	9,313
236.90	2,430	239.50	9,448
236.95	2,565	239.55	9,583
237.00	2,700	239.60	9,718
237.05	2,835	239.65	9,853
237.10	2,970	239.70	9,988
237.15	3,104	239.75	10,123
237.20	3,239	239.80	10,258
237.25	3,374	239.85	10,393
237.30	3,509	239.90	10,528
237.35	3,644	239.95	10,663
237.40	3,779	240.00	10,798
237.45	3,914	240.05	10,798
237.50	4,049	240.10	10,798
237.55	4,184	240.15	10,798
237.60	4,319	240.20	10,798
237.65	4,454	240.25	10,798
237.70	4,589	240.30	10,798
237.75	4,724	240.35	10,798
237.80	4,859	240.40	10,798
237.85	4,994	240.45	10,798
237.90	5,129	240.50	10,798
237.95	5,264	240.55	10,798
238.00	5,399	240.60	10,798
238.05	5,534	240.65	10,798
238.10	5,669		
238.15	5,804		
238.20	5,939		
238.25	6,074		
238.30	6,209		
238.35	6,344		
238.40	6,479		
238.45	6,614		
238.50	6,749		
238.55	6,884		

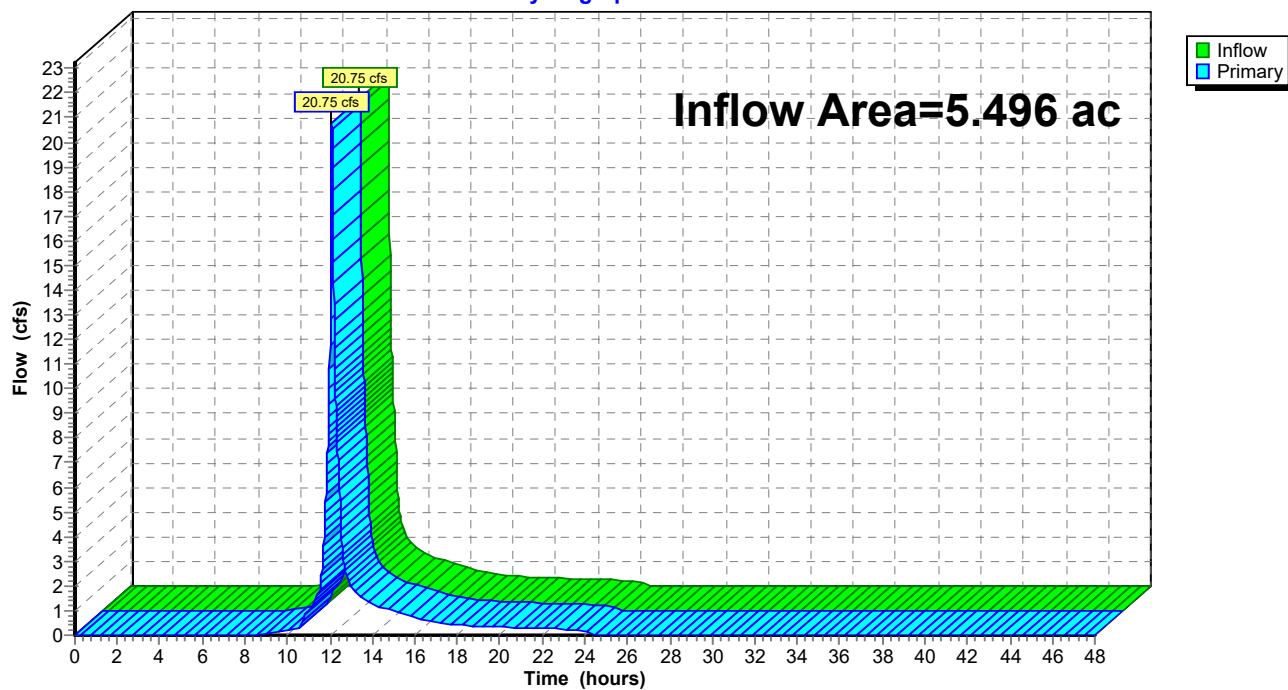
Summary for Link A:

Inflow Area = 5.496 ac, 34.82% Impervious, Inflow Depth = 3.15" for 10 yr event
Inflow = 20.75 cfs @ 12.09 hrs, Volume= 1.442 af
Primary = 20.75 cfs @ 12.09 hrs, Volume= 1.442 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



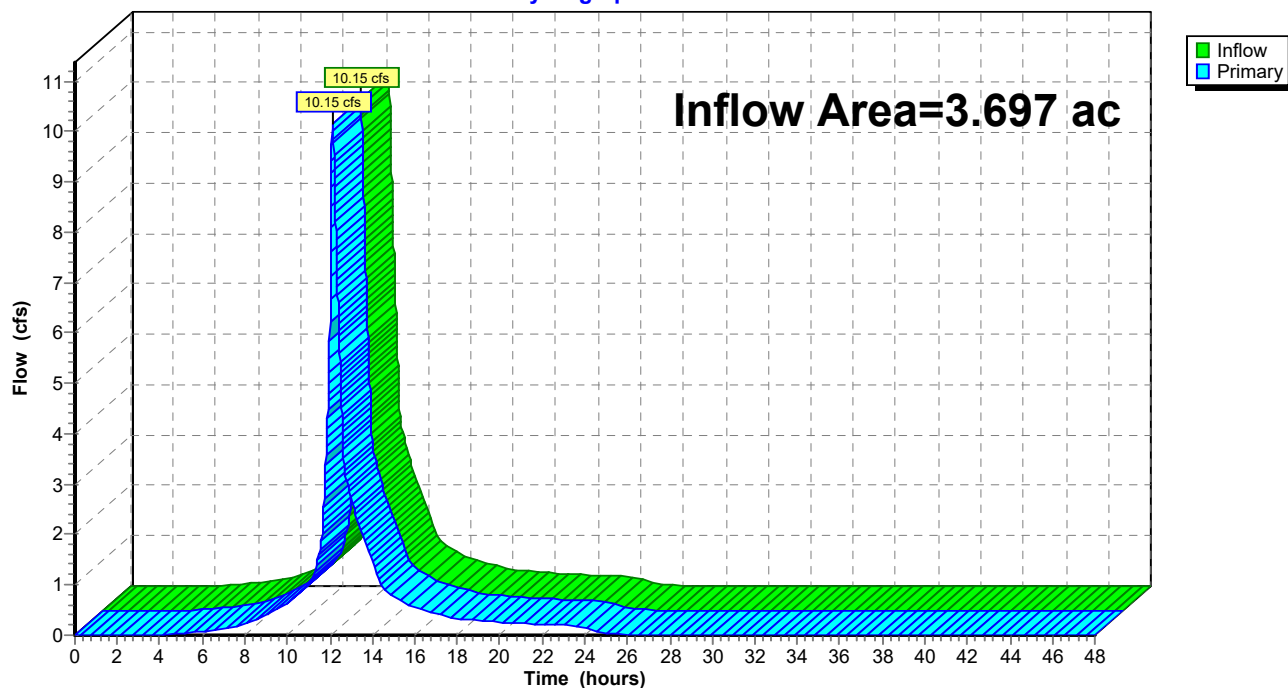
Summary for Link B:

Inflow Area = 3.697 ac, 73.59% Impervious, Inflow Depth = 4.31" for 10 yr event
Inflow = 10.15 cfs @ 12.11 hrs, Volume= 1.327 af
Primary = 10.15 cfs @ 12.11 hrs, Volume= 1.327 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

Hydrograph



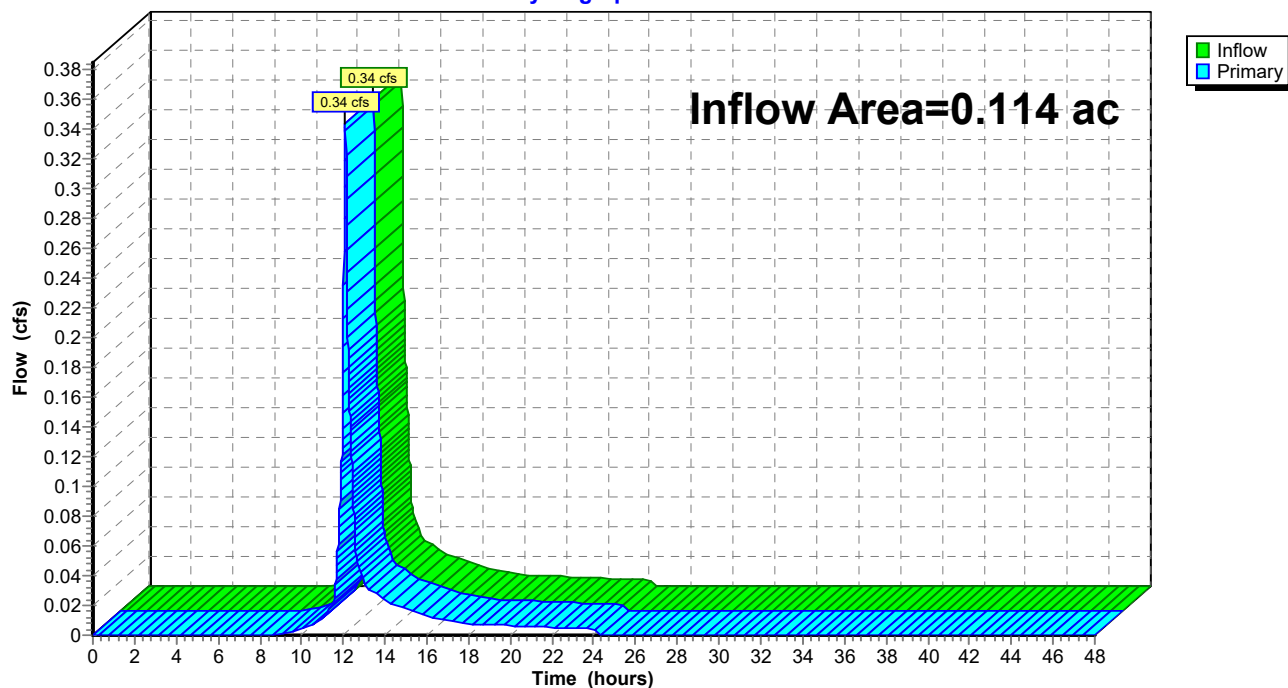
Summary for Link C:

Inflow Area = 0.114 ac, 0.00% Impervious, Inflow Depth = 2.58" for 10 yr event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af
Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 0.74 cfs @ 12.09 hrs, Volume= 0.053 af, Depth= 4.30"
Routed to Link B :

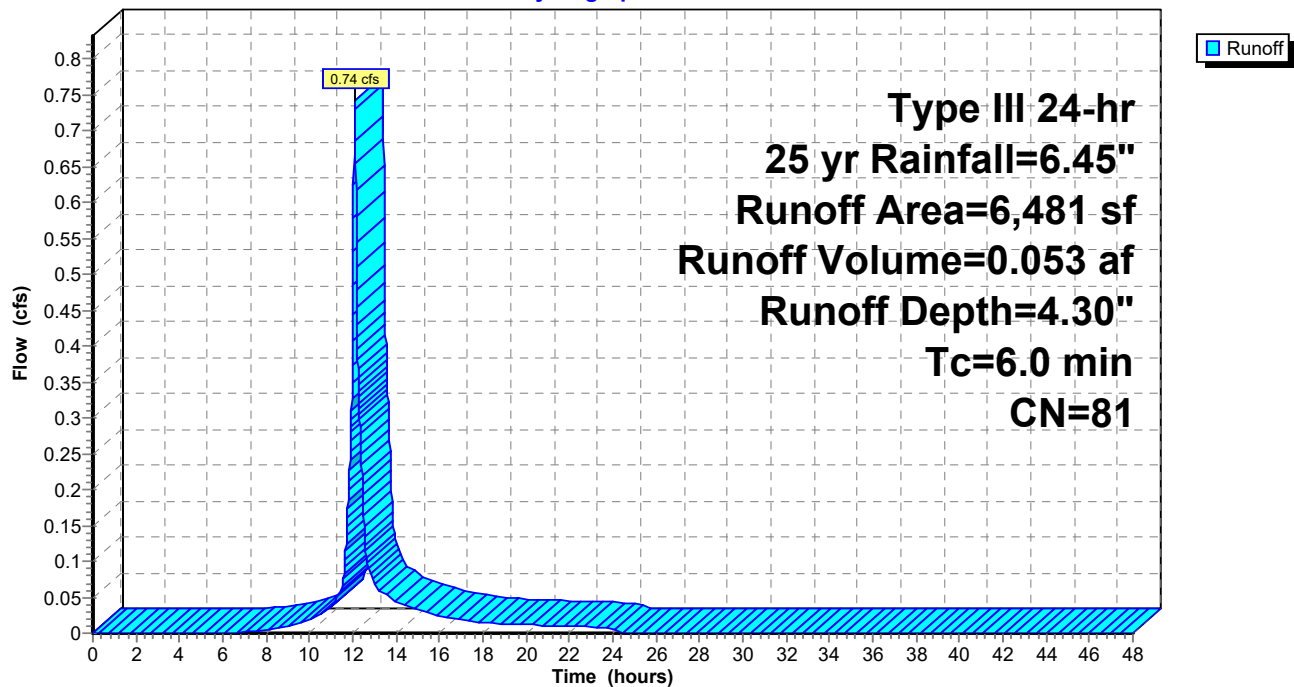
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	4,687	74	Grass, Good, HSG C
*	1,794	98	Pavement
	6,481	81	Weighted Average
	4,687		72.32% Pervious Area
	1,794		27.68% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment PR-A1:

Runoff = 7.02 cfs @ 12.08 hrs, Volume= 0.545 af, Depth= 5.74"
Routed to Pond A1 :

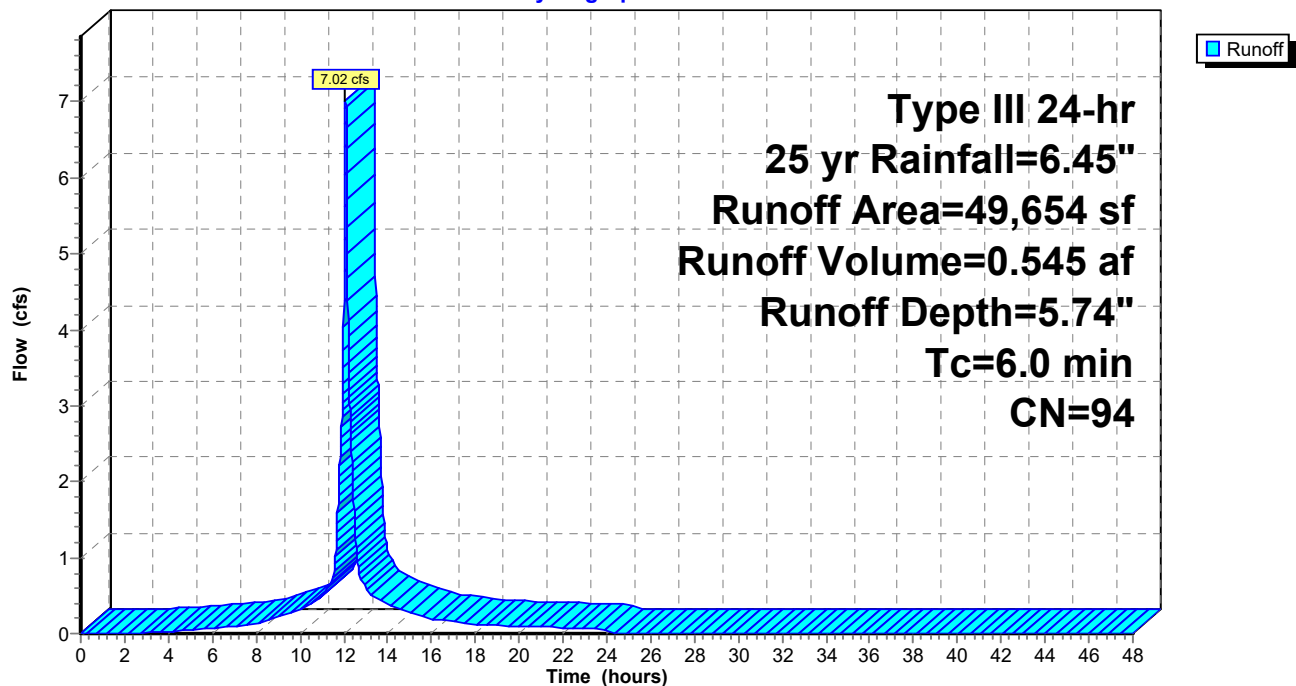
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	8,212	74	Grass, Good, HSG C
*	39,079	98	Pavement
*	2,363	98	Basin
	49,654	94	Weighted Average
	8,212		16.54% Pervious Area
	41,442		83.46% Impervious Area

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

Subcatchment PR-A1:

Hydrograph



Summary for Subcatchment PR-A2:

Runoff = 4.17 cfs @ 12.08 hrs, Volume= 0.328 af, Depth= 5.86"
Routed to Pond A2 :

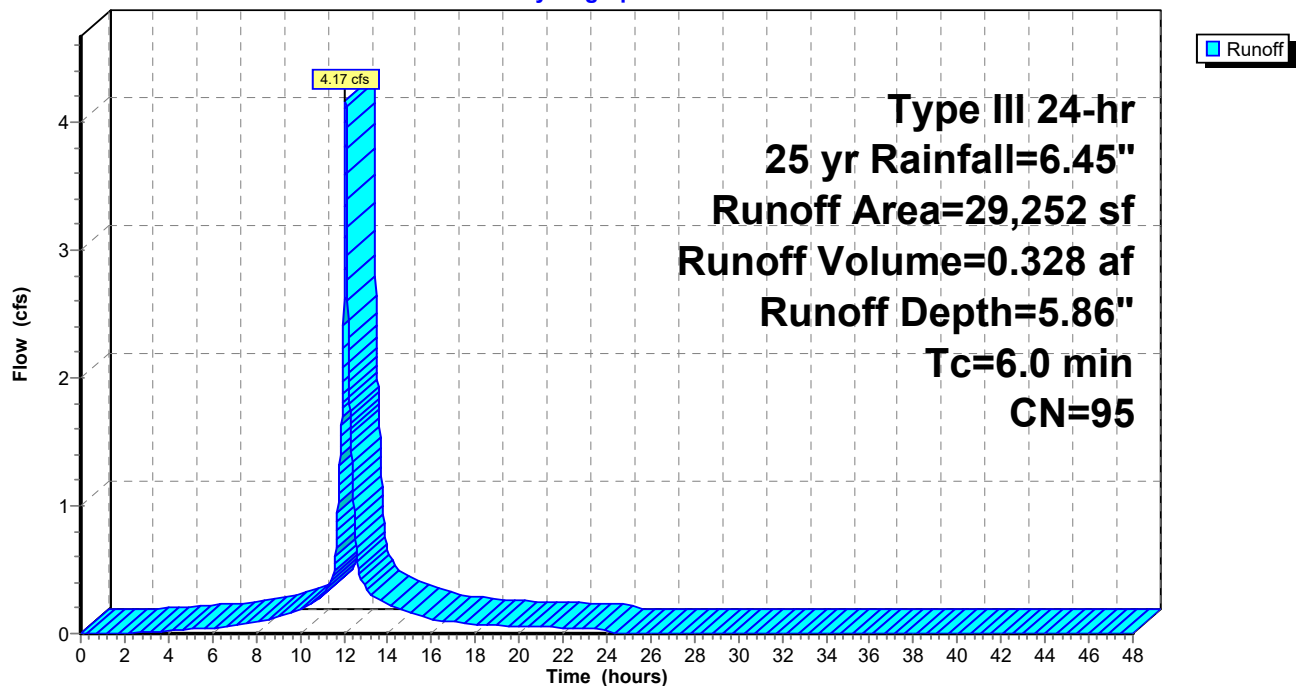
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	4,147	74	Grass, Good, HSG C
*	22,760	98	Pavement
*	2,345	98	Basin
	29,252	95	Weighted Average
	4,147		14.18% Pervious Area
	25,105		85.82% Impervious Area

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

Subcatchment PR-A2:

Hydrograph



Summary for Subcatchment PR-A3:

Runoff = 16.29 cfs @ 12.09 hrs, Volume= 1.158 af, Depth= 3.77"
Routed to Link A :

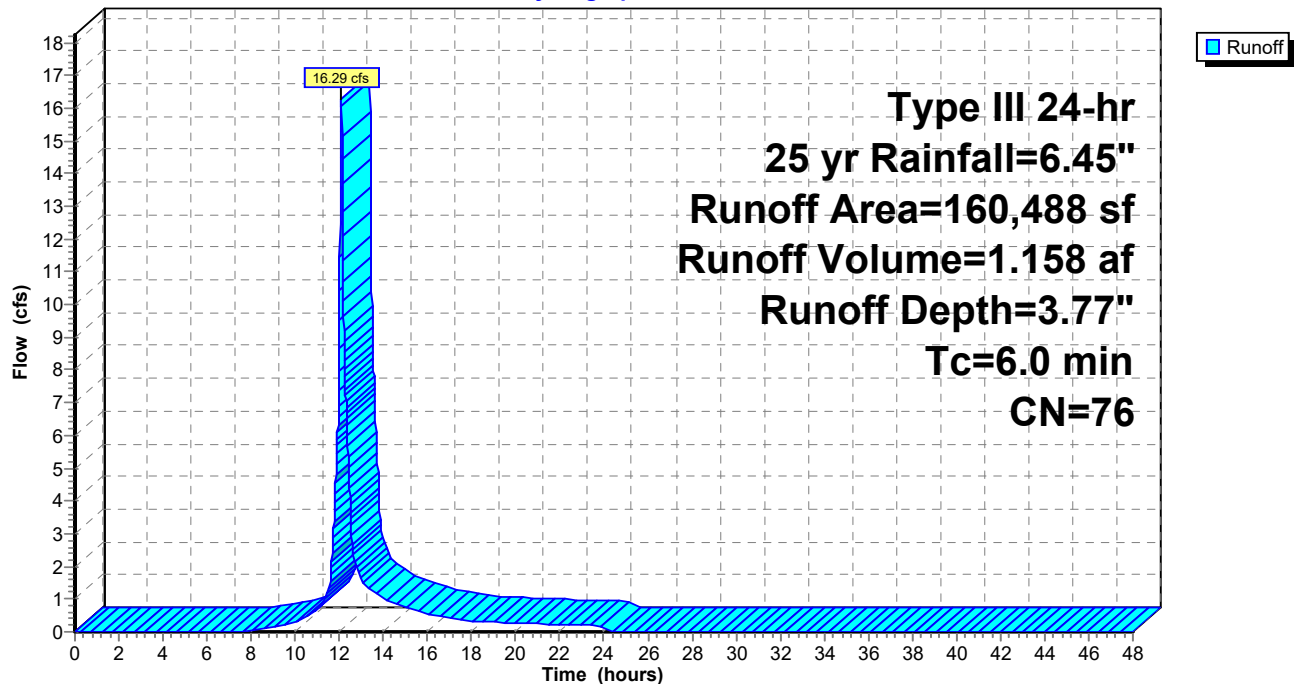
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	17,076	70	Woods, Good, HSG C
*	126,592	74	Grass, Good, HSG C
*	4,664	98	Roofs
*	12,156	98	Pavement
	160,488	76	Weighted Average
	143,668		89.52% Pervious Area
	16,820		10.48% Impervious Area

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

Subcatchment PR-A3:

Hydrograph



Summary for Subcatchment PR-B1:

Runoff = 13.43 cfs @ 12.08 hrs, Volume= 1.023 af, Depth= 5.51"
Routed to Pond B1 :

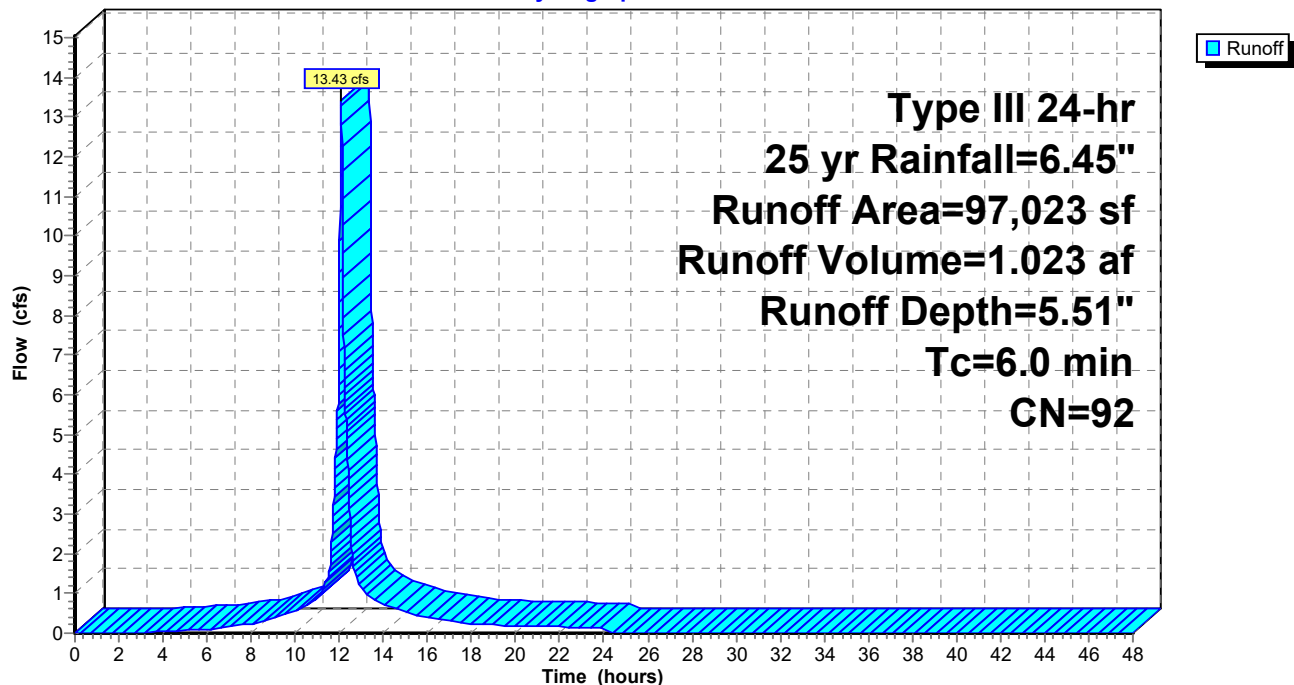
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	23,813	74	Grass, Good, HSG C
*	73,210	98	Pavement
	97,023	92	Weighted Average
	23,813		24.54% Pervious Area
	73,210		75.46% Impervious Area

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

Subcatchment PR-B1:

Hydrograph



Summary for Subcatchment PR-B2:

Runoff = 7.97 cfs @ 12.08 hrs, Volume= 0.607 af, Depth= 5.51"
Routed to Link B :

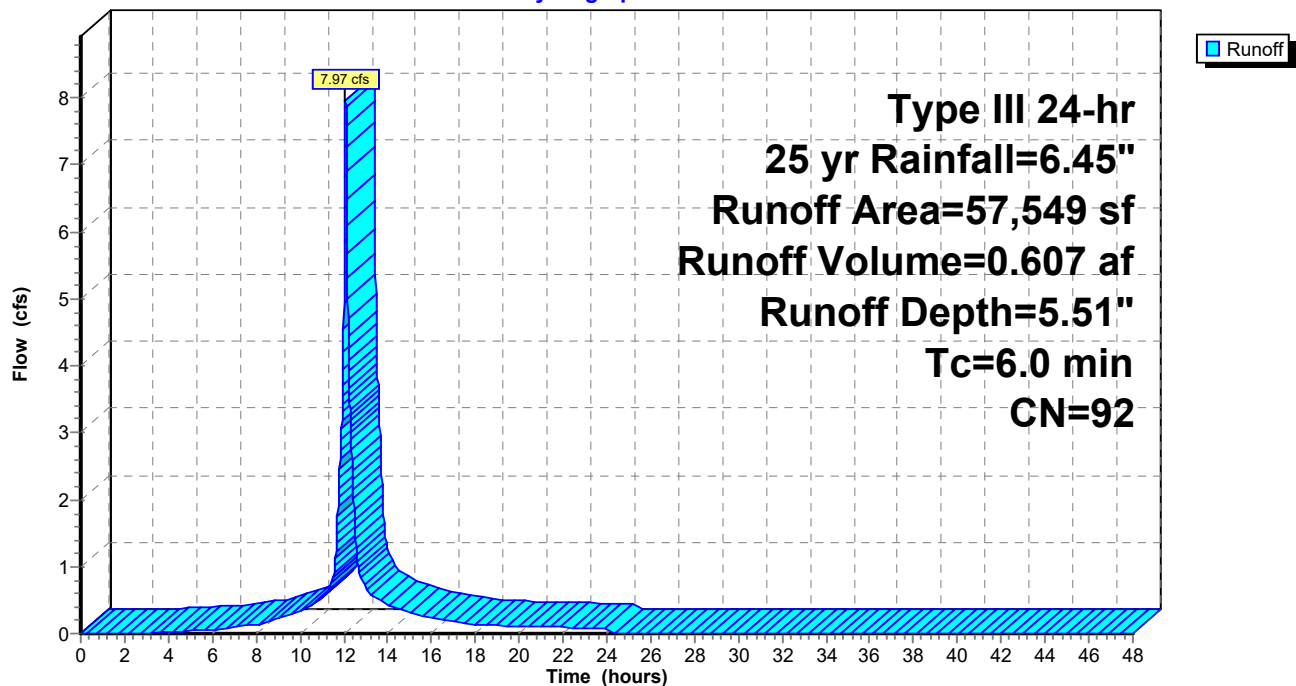
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	14,041	74	Grass, Good, HSG C
*	41,190	98	Roofs
*	2,318	98	Pavement
	57,549	92	Weighted Average
	14,041		24.40% Pervious Area
	43,508		75.60% Impervious Area

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

Subcatchment PR-B2:

Hydrograph



Summary for Subcatchment PR-C:

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 3.57"
Routed to Link C :

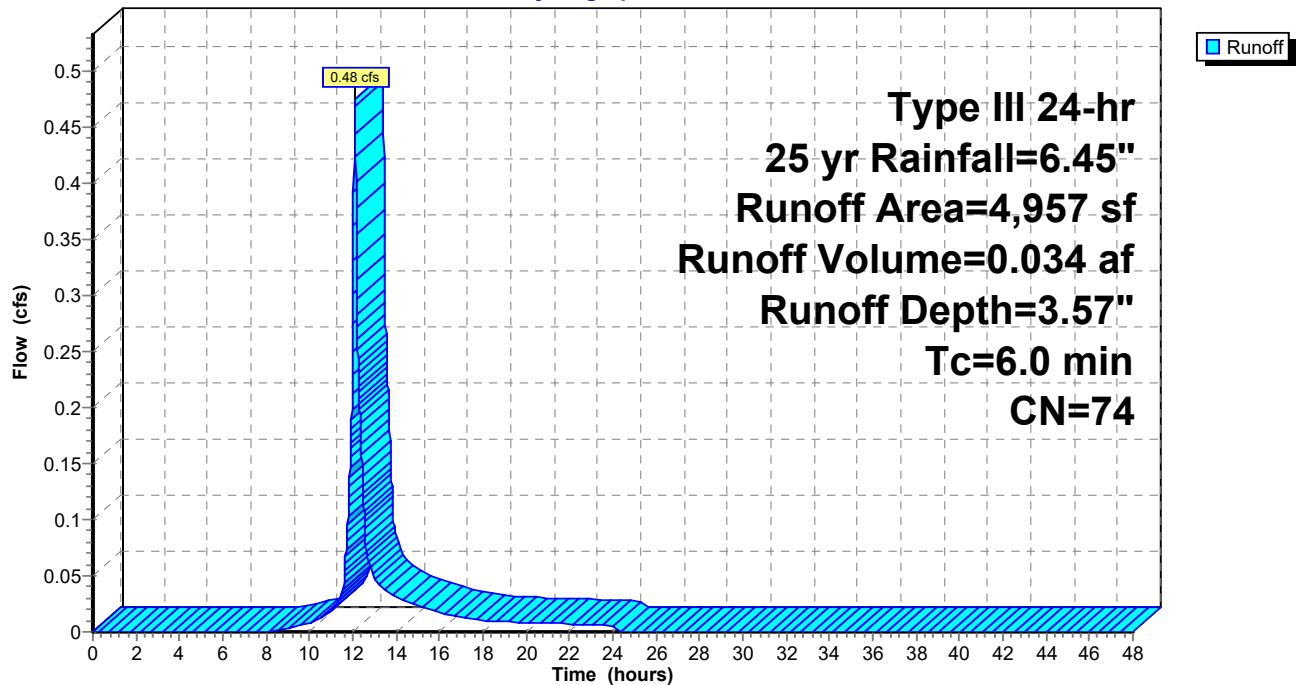
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

Area (sf)	CN	Description
* 4,957	74	Grass, Good, HSG C
4,957		100.00% Pervious Area

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

Subcatchment PR-C:

Hydrograph



Summary for Pond A1:

Inflow Area = 1.140 ac, 83.46% Impervious, Inflow Depth = 5.74" for 25 yr event
 Inflow = 7.02 cfs @ 12.08 hrs, Volume= 0.545 af
 Outflow = 6.94 cfs @ 12.10 hrs, Volume= 0.483 af, Atten= 1%, Lag= 0.7 min
 Primary = 6.94 cfs @ 12.10 hrs, Volume= 0.483 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 242.86' @ 12.10 hrs Surf.Area= 1,748 sf Storage= 3,153 cf

Plug-Flow detention time= 94.1 min calculated for 0.483 af (89% of inflow)
 Center-of-Mass det. time= 40.3 min (806.9 - 766.6)

Volume	Invert	Avail.Storage	Storage Description
#1	240.00'	3,403 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	544	94.0	0	0	544
241.00	905	124.0	717	717	1,076
242.00	1,337	150.0	1,114	1,831	1,659
243.00	1,820	170.0	1,572	3,403	2,193

Device	Routing	Invert	Outlet Devices
#1	Primary	238.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	242.60'	24.0" x 24.0" Horiz. Grate X 2.00 C= 0.600 Limited to weir flow at low heads

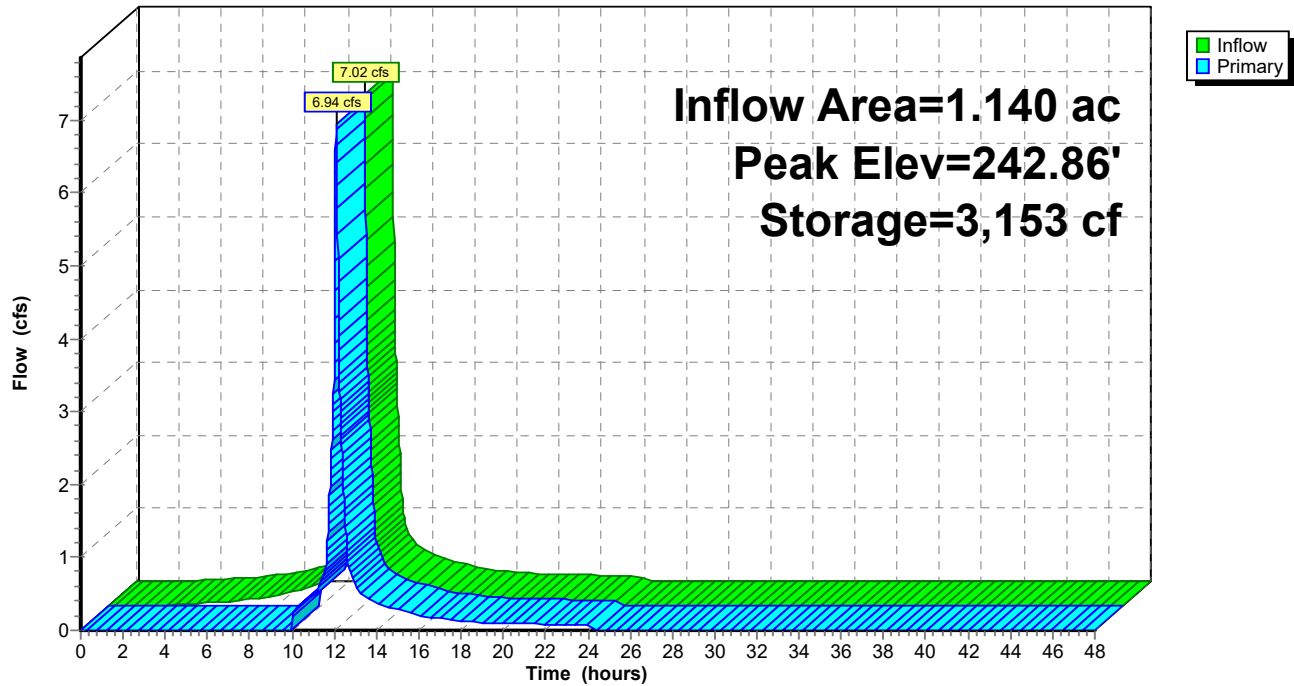
Primary OutFlow Max=6.92 cfs @ 12.10 hrs HW=242.86' (Free Discharge)

↑ **1=Culvert** (Passes 6.92 cfs of 13.62 cfs potential flow)

↑ **2=Grate** (Weir Controls 6.92 cfs @ 1.67 fps)

Pond A1:

Hydrograph



Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Summary for Pond A2:

Inflow Area = 0.672 ac, 85.82% Impervious, Inflow Depth = 5.86" for 25 yr event
 Inflow = 4.17 cfs @ 12.08 hrs, Volume= 0.328 af
 Outflow = 4.06 cfs @ 12.10 hrs, Volume= 0.289 af, Atten= 3%, Lag= 1.2 min
 Primary = 4.06 cfs @ 12.10 hrs, Volume= 0.289 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 240.59' @ 12.10 hrs Surf.Area= 1,484 sf Storage= 2,117 cf

Plug-Flow detention time= 100.3 min calculated for 0.288 af (88% of inflow)
 Center-of-Mass det. time= 44.6 min (806.5 - 761.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	238.00'	2,778 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	263	83.0	0	0	263
239.00	657	138.0	445	445	1,237
240.00	1,158	169.0	896	1,341	2,009
241.00	1,735	194.0	1,437	2,778	2,754

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	24.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 237.00' / 236.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	240.30'	24.0" x 24.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

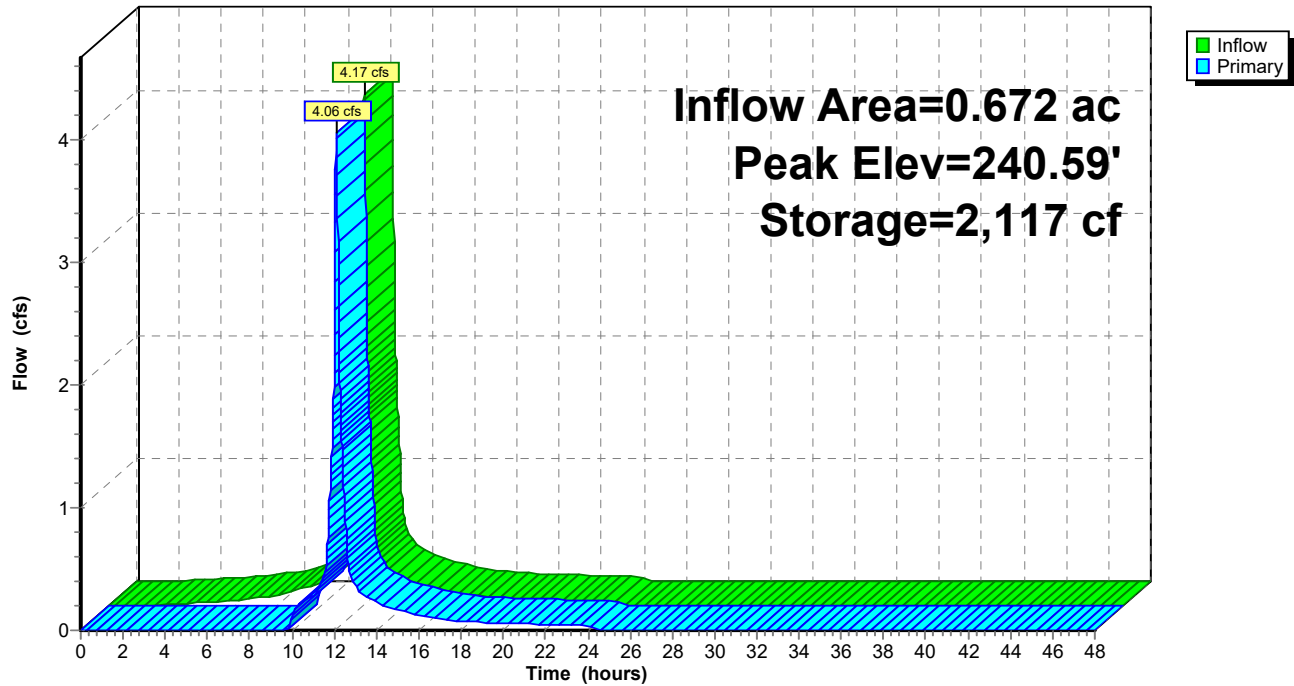
Primary OutFlow Max=4.05 cfs @ 12.10 hrs HW=240.59' (Free Discharge)

↑ **1=Culvert** (Passes 4.05 cfs of 19.21 cfs potential flow)

↑ **2=Grate** (Weir Controls 4.05 cfs @ 1.76 fps)

Pond A2:

Hydrograph



Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

Summary for Pond B1:

Inflow Area = 2.227 ac, 75.46% Impervious, Inflow Depth = 5.51" for 25 yr event
 Inflow = 13.43 cfs @ 12.08 hrs, Volume= 1.023 af
 Outflow = 9.76 cfs @ 12.16 hrs, Volume= 1.023 af, Atten= 27%, Lag= 4.4 min
 Primary = 9.76 cfs @ 12.16 hrs, Volume= 1.023 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 239.27' @ 12.16 hrs Surf.Area= 3,072 sf Storage= 8,840 cf

Plug-Flow detention time= 33.2 min calculated for 1.023 af (100% of inflow)
 Center-of-Mass det. time= 33.4 min (808.4 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.00'	0 cf	24.00'W x 128.00'L x 4.67'H Field A 14,336 cf Overall - 14,336 cf Embedded = 0 cf x 30.0% Voids
#2A	236.00'	10,798 cf	retain_it retain_it 4.0' x 48 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 286.9 cf perimeter wall
		10,798 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	236.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 236.00' / 235.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	236.00'	4.0" Vert. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	238.20'	20.0" W x 3.0" H Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	238.75'	4.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=9.75 cfs @ 12.16 hrs HW=239.27' (Free Discharge)

- 1=Culvert (Passes 9.75 cfs of 10.67 cfs potential flow)
- 2=Orifice (Orifice Controls 2.96 cfs @ 8.49 fps)
- 3=Orifice (Orifice Controls 1.95 cfs @ 4.69 fps)
- 4=Weir (Weir Controls 4.83 cfs @ 2.37 fps)

Pond B1: - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)

Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf

Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf

3 Rows adjusted for 286.9 cf perimeter wall

16 Chambers/Row x 8.00' Long = 128.00' Row Length

3 Rows x 96.0" Wide = 24.00' Base Width

56.0" Chamber Height = 4.67' Field Height

7.5 cf Sidewall x 16 x 2 + 7.5 cf Endwall x 3 x 2 = 286.9 cf Perimeter Wall

48 Chambers x 230.9 cf - 286.9 cf Perimeter wall = 10,798.2 cf Chamber Storage

48 Chambers x 298.7 cf = 14,336.0 cf Displacement

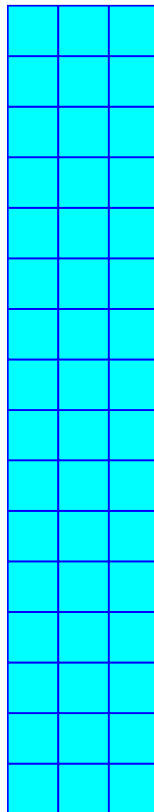
Chamber Storage = 10,798.2 cf = 0.248 af

Overall Storage Efficiency = 75.3%

Overall System Size = 128.00' x 24.00' x 4.67'

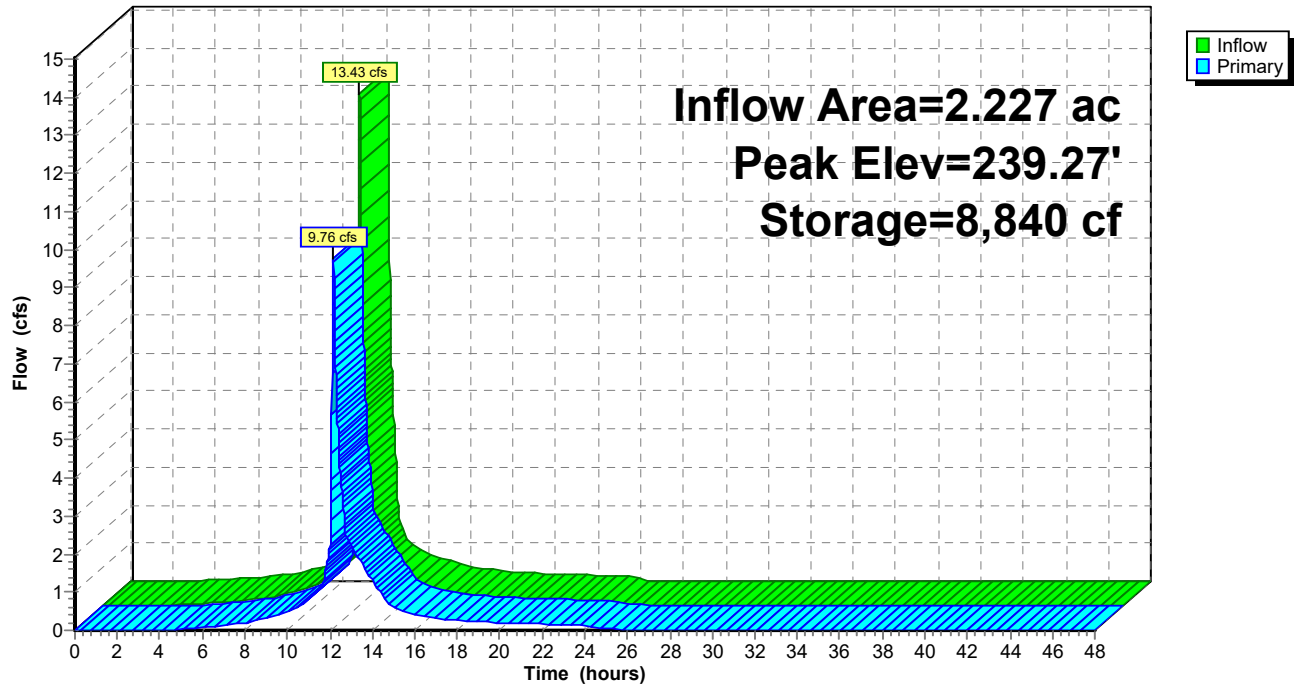
48 Chambers

531.0 cy Field



Pond B1:

Hydrograph



Stage-Area-Storage for Pond B1:

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
236.00	0	238.60	7,019
236.05	135	238.65	7,154
236.10	270	238.70	7,289
236.15	405	238.75	7,424
236.20	540	238.80	7,559
236.25	675	238.85	7,694
236.30	810	238.90	7,829
236.35	945	238.95	7,964
236.40	1,080	239.00	8,099
236.45	1,215	239.05	8,234
236.50	1,350	239.10	8,369
236.55	1,485	239.15	8,504
236.60	1,620	239.20	8,639
236.65	1,755	239.25	8,774
236.70	1,890	239.30	8,909
236.75	2,025	239.35	9,044
236.80	2,160	239.40	9,178
236.85	2,295	239.45	9,313
236.90	2,430	239.50	9,448
236.95	2,565	239.55	9,583
237.00	2,700	239.60	9,718
237.05	2,835	239.65	9,853
237.10	2,970	239.70	9,988
237.15	3,104	239.75	10,123
237.20	3,239	239.80	10,258
237.25	3,374	239.85	10,393
237.30	3,509	239.90	10,528
237.35	3,644	239.95	10,663
237.40	3,779	240.00	10,798
237.45	3,914	240.05	10,798
237.50	4,049	240.10	10,798
237.55	4,184	240.15	10,798
237.60	4,319	240.20	10,798
237.65	4,454	240.25	10,798
237.70	4,589	240.30	10,798
237.75	4,724	240.35	10,798
237.80	4,859	240.40	10,798
237.85	4,994	240.45	10,798
237.90	5,129	240.50	10,798
237.95	5,264	240.55	10,798
238.00	5,399	240.60	10,798
238.05	5,534	240.65	10,798
238.10	5,669		
238.15	5,804		
238.20	5,939		
238.25	6,074		
238.30	6,209		
238.35	6,344		
238.40	6,479		
238.45	6,614		
238.50	6,749		
238.55	6,884		

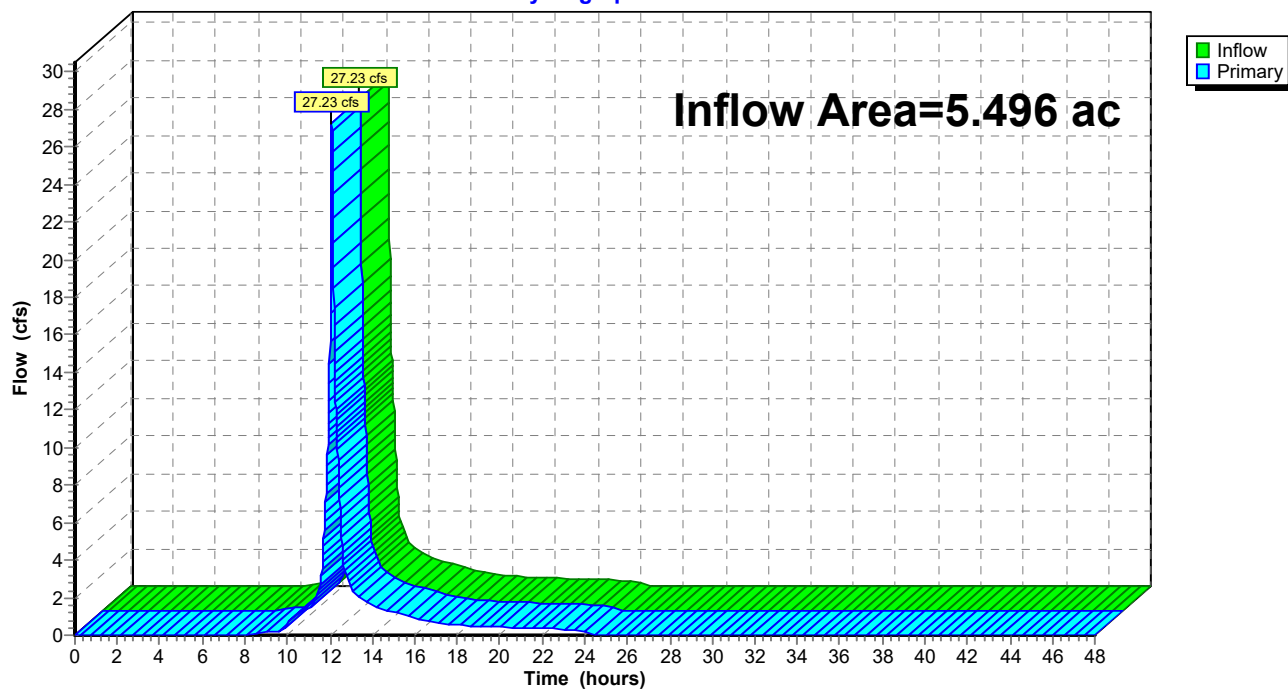
Summary for Link A:

Inflow Area = 5.496 ac, 34.82% Impervious, Inflow Depth = 4.21" for 25 yr event
Inflow = 27.23 cfs @ 12.09 hrs, Volume= 1.930 af
Primary = 27.23 cfs @ 12.09 hrs, Volume= 1.930 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



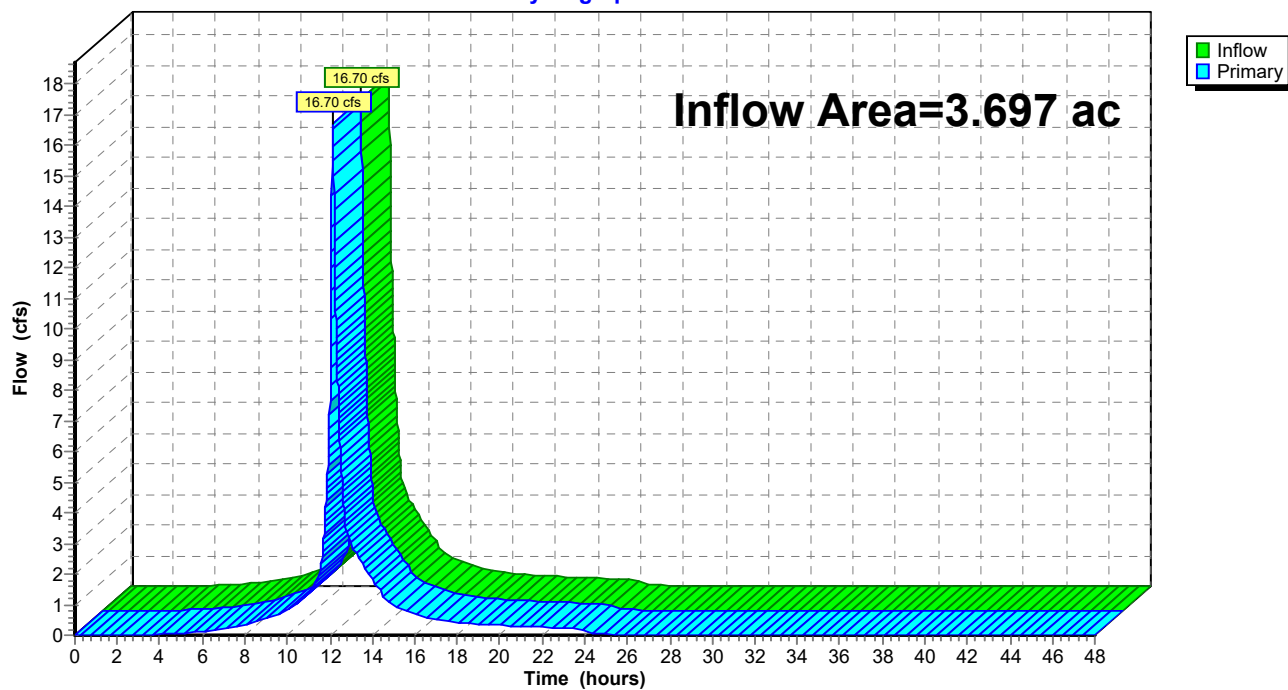
Summary for Link B:

Inflow Area = 3.697 ac, 73.59% Impervious, Inflow Depth = 5.46" for 25 yr event
Inflow = 16.70 cfs @ 12.13 hrs, Volume= 1.683 af
Primary = 16.70 cfs @ 12.13 hrs, Volume= 1.683 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

Hydrograph



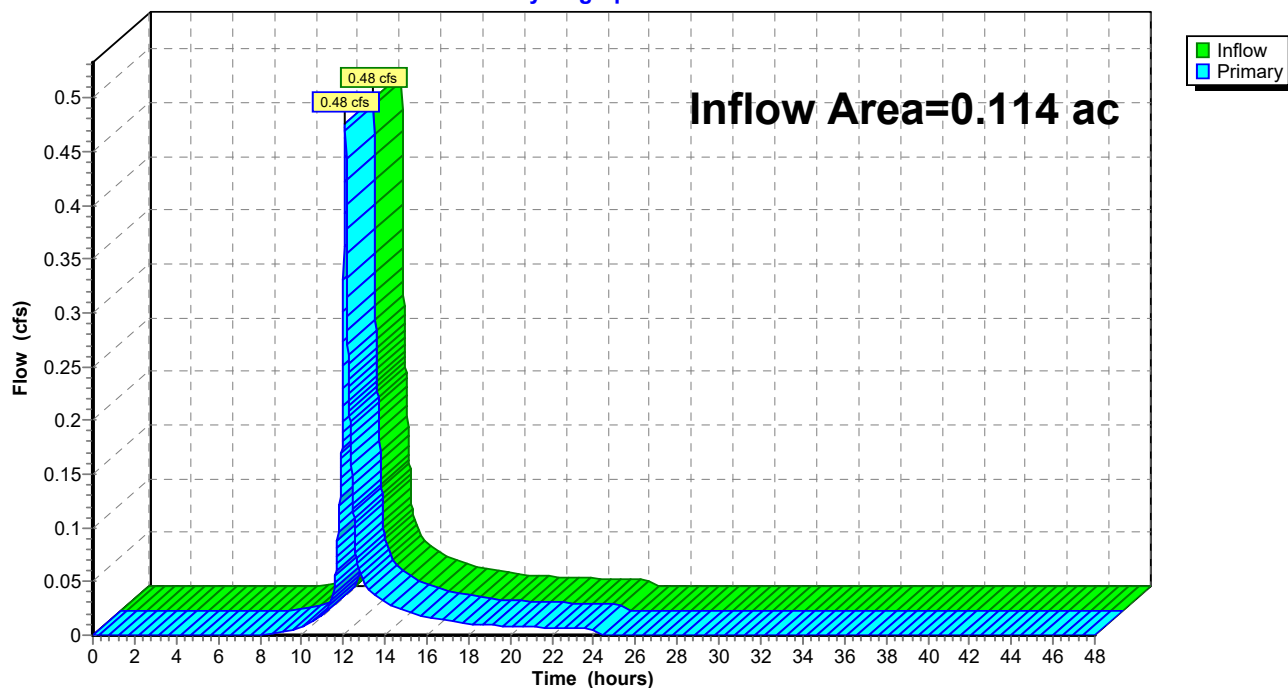
Summary for Link C:

Inflow Area = 0.114 ac, 0.00% Impervious, Inflow Depth = 3.57" for 25 yr event
Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af
Primary = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Hydrograph



Summary for Subcatchment EX-B3:

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 6.01"
Routed to Link B :

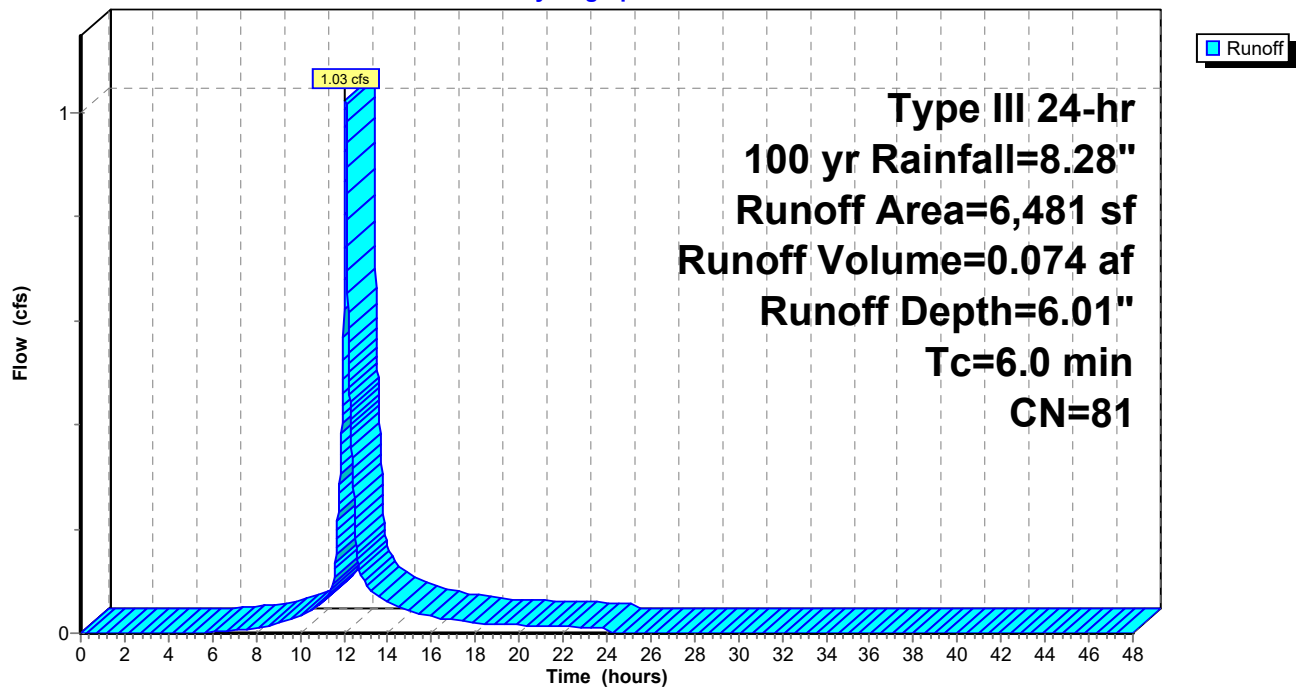
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	4,687	74	Grass, Good, HSG C
*	1,794	98	Pavement
	6,481	81	Weighted Average
	4,687		72.32% Pervious Area
	1,794		27.68% Impervious Area

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

Subcatchment EX-B3:

Hydrograph



Summary for Subcatchment PR-A1:

Runoff = 9.11 cfs @ 12.08 hrs, Volume= 0.718 af, Depth= 7.56"
Routed to Pond A1 :

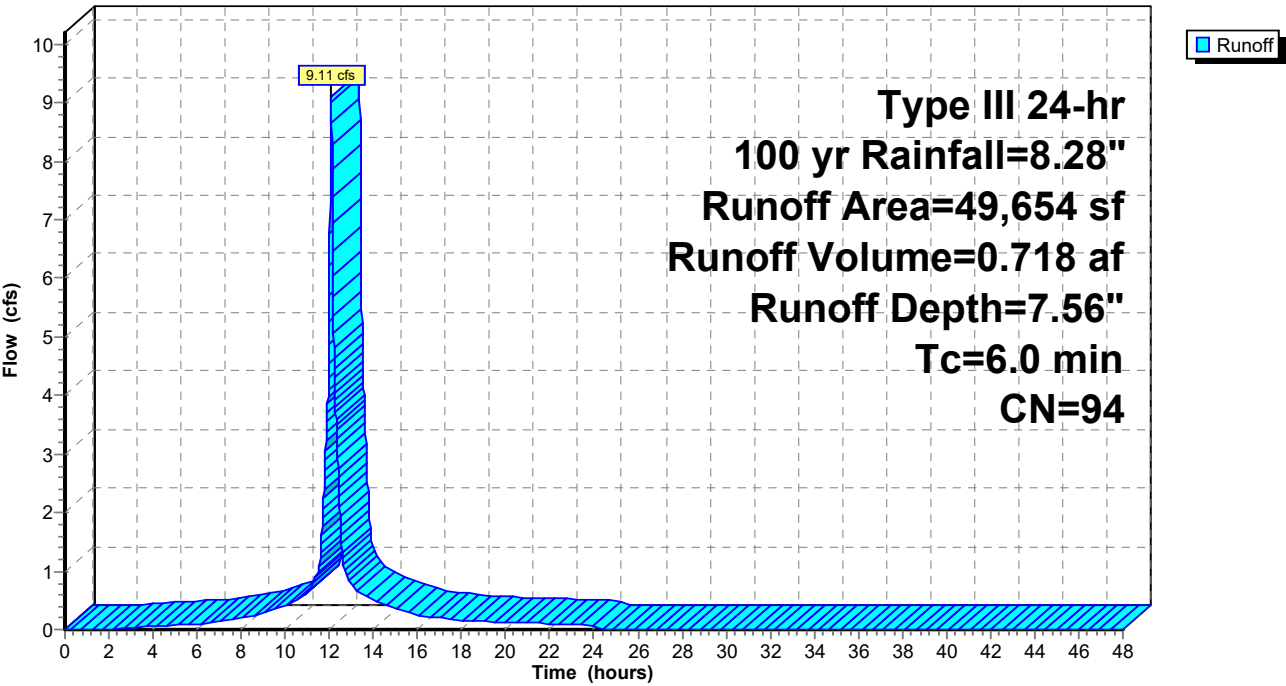
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	8,212	74	Grass, Good, HSG C
*	39,079	98	Pavement
*	2,363	98	Basin
	49,654	94	Weighted Average
	8,212		16.54% Pervious Area
	41,442		83.46% Impervious Area

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

Subcatchment PR-A1:

Hydrograph



Summary for Subcatchment PR-A2:

Runoff = 5.40 cfs @ 12.08 hrs, Volume= 0.430 af, Depth= 7.68"
Routed to Pond A2 :

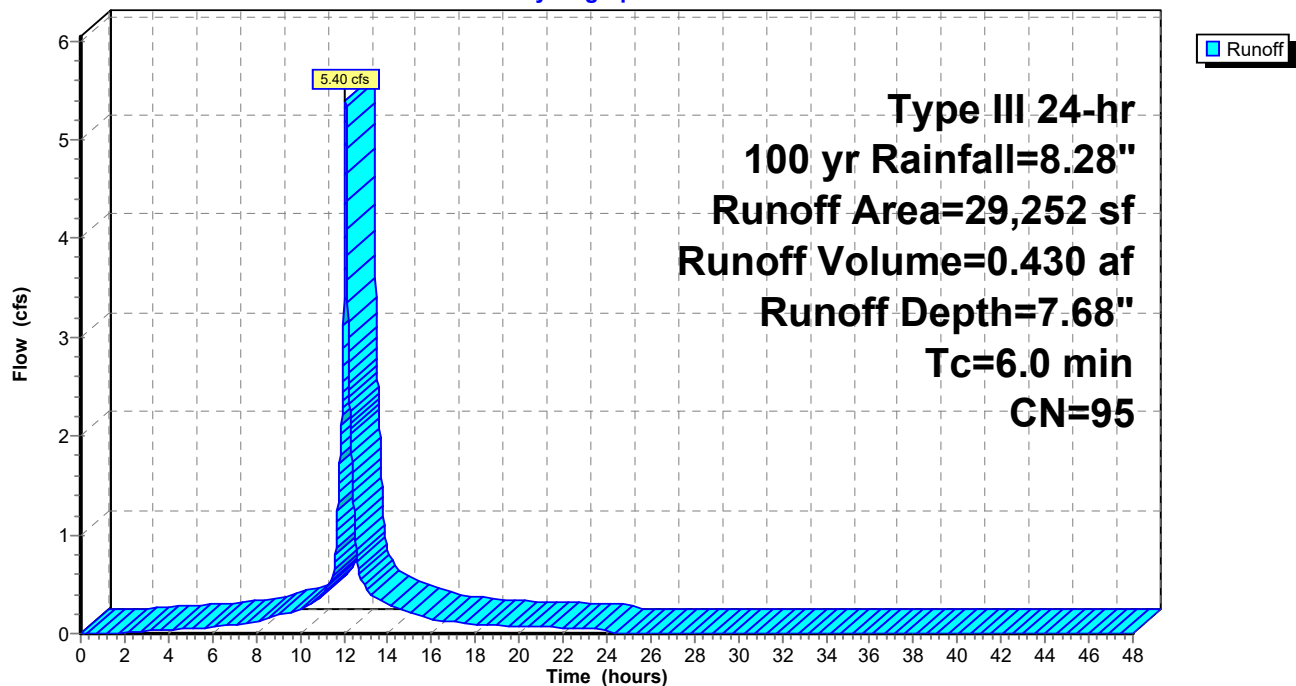
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	4,147	74	Grass, Good, HSG C
*	22,760	98	Pavement
*	2,345	98	Basin
	29,252	95	Weighted Average
	4,147		14.18% Pervious Area
	25,105		85.82% Impervious Area

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

Subcatchment PR-A2:

Hydrograph



Summary for Subcatchment PR-A3:

Runoff = 23.22 cfs @ 12.09 hrs, Volume= 1.662 af, Depth= 5.41"
Routed to Link A :

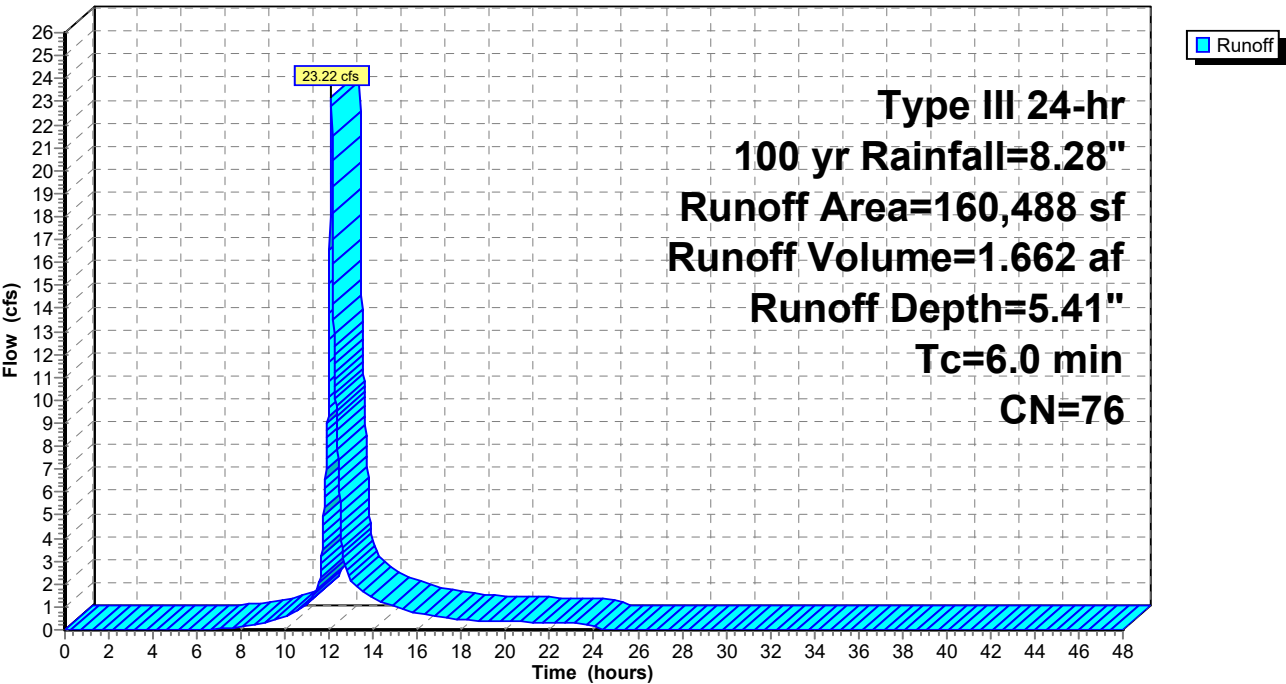
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	17,076	70	Woods, Good, HSG C
*	126,592	74	Grass, Good, HSG C
*	4,664	98	Roofs
*	12,156	98	Pavement
	160,488	76	Weighted Average
	143,668		89.52% Pervious Area
	16,820		10.48% Impervious Area

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

Subcatchment PR-A3:

Hydrograph



Summary for Subcatchment PR-B1:

Runoff = 17.55 cfs @ 12.08 hrs, Volume= 1.359 af, Depth= 7.32"
Routed to Pond B1 :

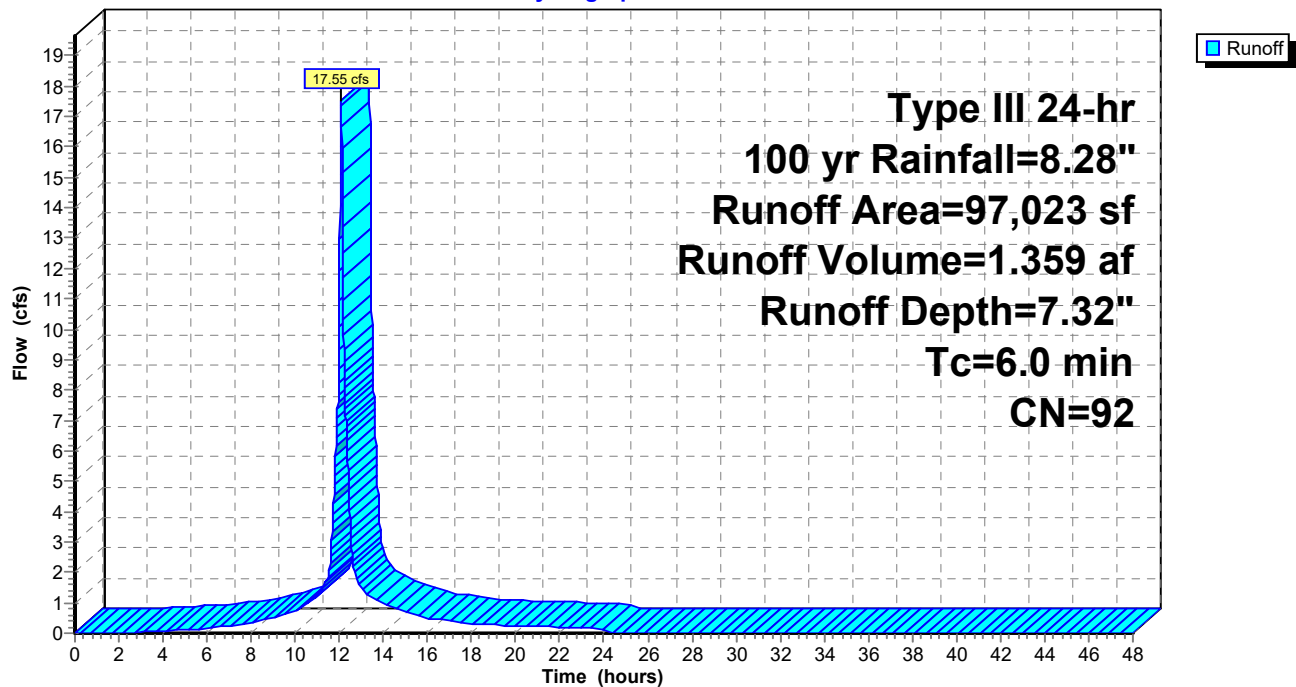
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	23,813	74	Grass, Good, HSG C
*	73,210	98	Pavement
	97,023	92	Weighted Average
	23,813		24.54% Pervious Area
	73,210		75.46% Impervious Area

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

Subcatchment PR-B1:

Hydrograph



Summary for Subcatchment PR-B2:

Runoff = 10.41 cfs @ 12.08 hrs, Volume= 0.806 af, Depth= 7.32"
Routed to Link B :

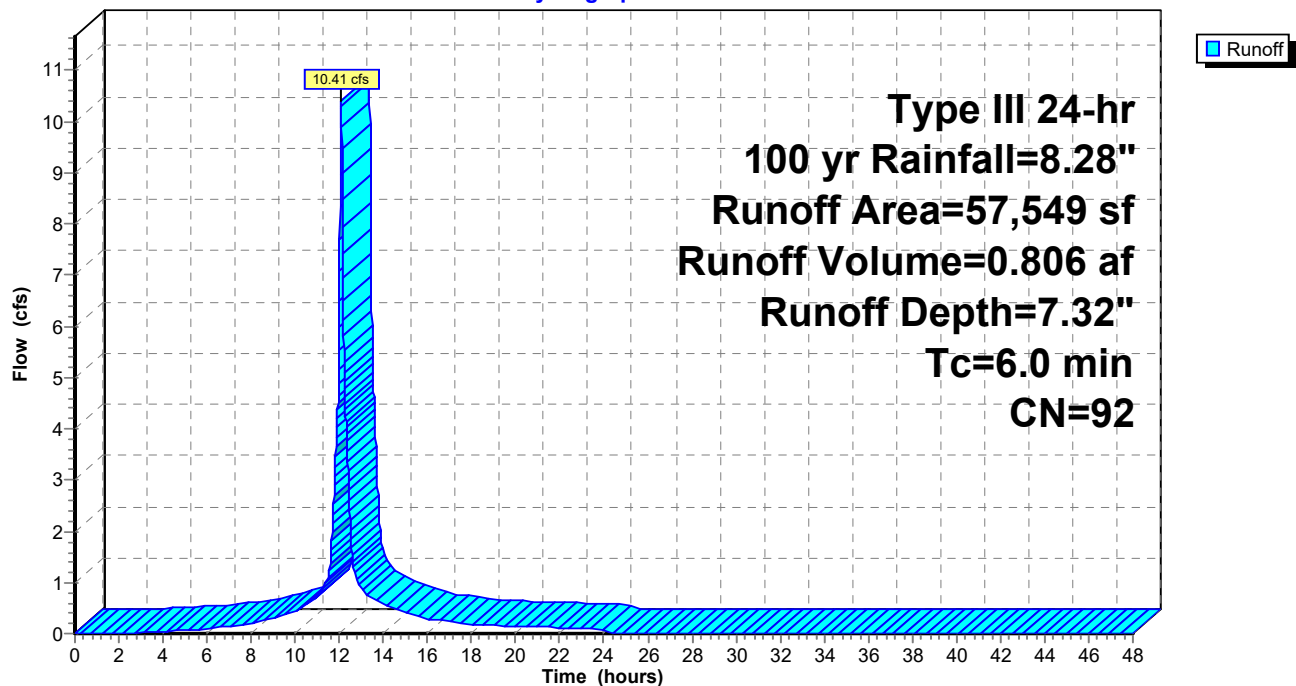
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=8.28"

	Area (sf)	CN	Description
*	14,041	74	Grass, Good, HSG C
*	41,190	98	Roofs
*	2,318	98	Pavement
	57,549	92	Weighted Average
	14,041		24.40% Pervious Area
	43,508		75.60% Impervious Area

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

Subcatchment PR-B2:

Hydrograph



Summary for Subcatchment PR-C:

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 5.18"
 Routed to Link C :

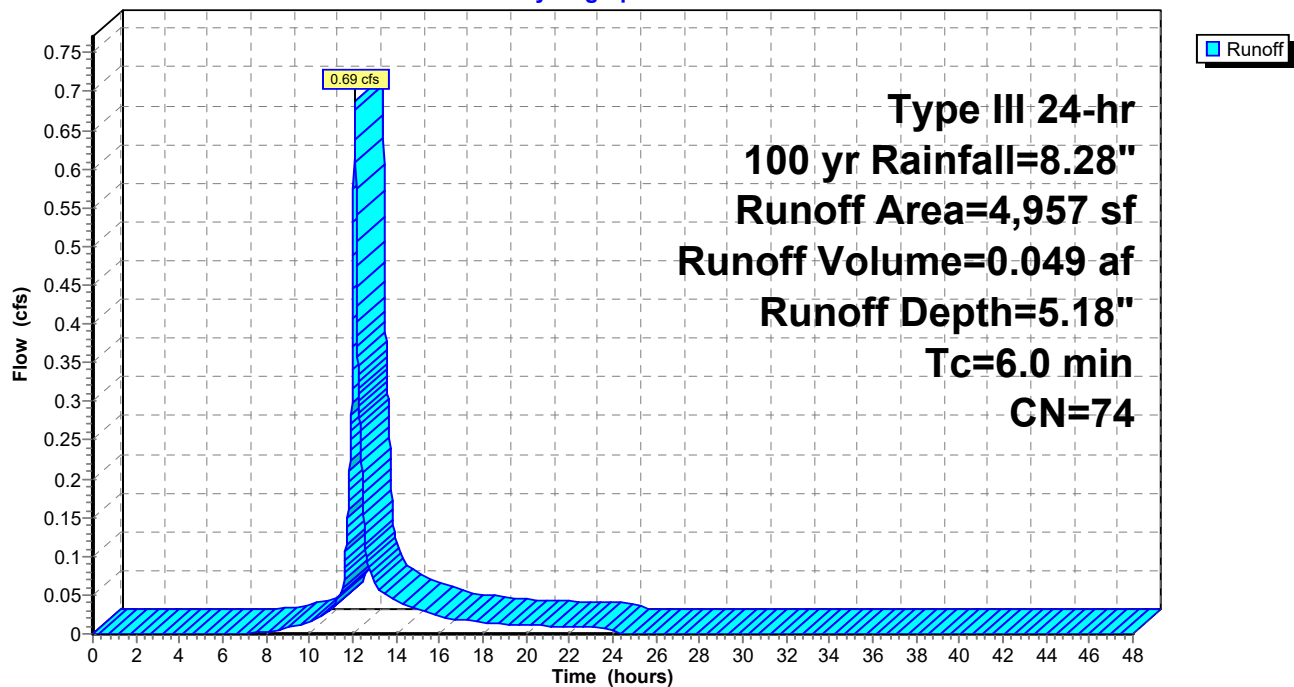
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 yr Rainfall=8.28"

Area (sf)	CN	Description
* 4,957	74	Grass, Good, HSG C
4,957		100.00% Pervious Area

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

Subcatchment PR-C:

Hydrograph



Summary for Pond A1:

Inflow Area = 1.140 ac, 83.46% Impervious, Inflow Depth = 7.56" for 100 yr event
 Inflow = 9.11 cfs @ 12.08 hrs, Volume= 0.718 af
 Outflow = 9.02 cfs @ 12.10 hrs, Volume= 0.656 af, Atten= 1%, Lag= 0.7 min
 Primary = 9.02 cfs @ 12.10 hrs, Volume= 0.656 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 242.91' @ 12.10 hrs Surf.Area= 1,773 sf Storage= 3,241 cf

Plug-Flow detention time= 79.8 min calculated for 0.656 af (91% of inflow)
 Center-of-Mass det. time= 35.3 min (795.9 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1	240.00'	3,403 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	544	94.0	0	0	544
241.00	905	124.0	717	717	1,076
242.00	1,337	150.0	1,114	1,831	1,659
243.00	1,820	170.0	1,572	3,403	2,193

Device	Routing	Invert	Outlet Devices
#1	Primary	238.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	242.60'	24.0" x 24.0" Horiz. Grate X 2.00 C= 0.600 Limited to weir flow at low heads

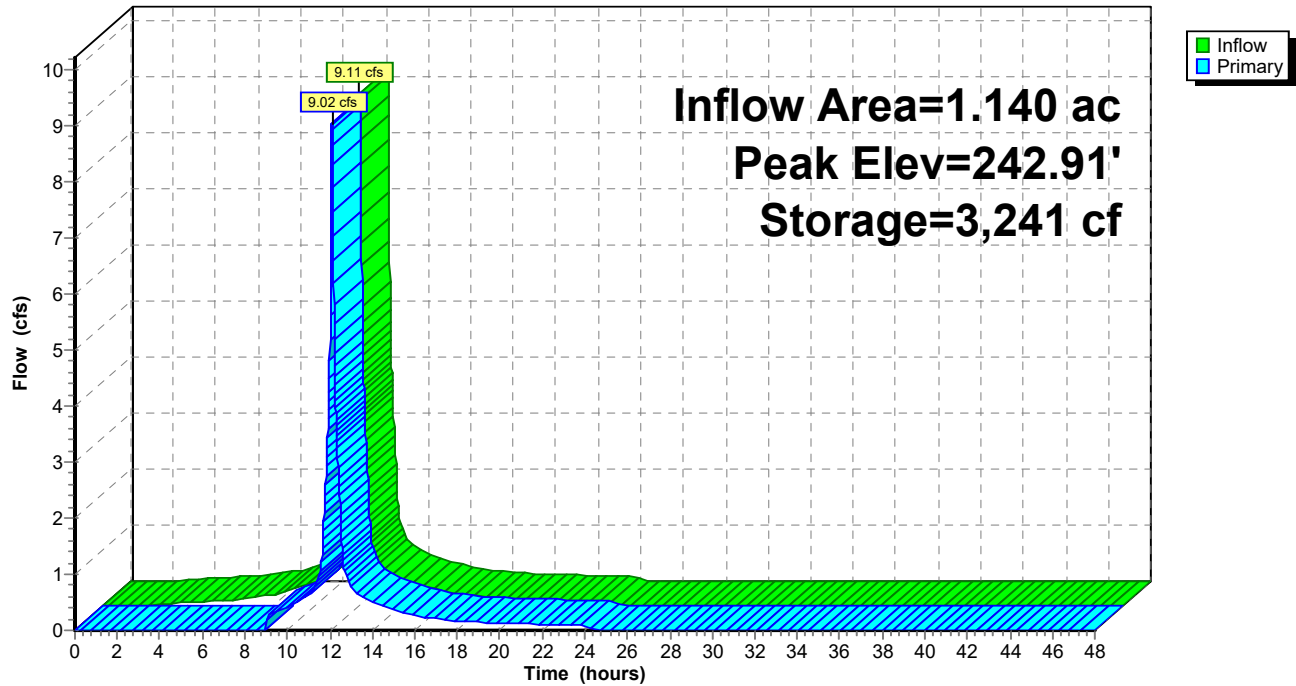
Primary OutFlow Max=9.00 cfs @ 12.10 hrs HW=242.91' (Free Discharge)

↑ **1=Culvert** (Passes 9.00 cfs of 13.70 cfs potential flow)

↑ **2=Grate** (Weir Controls 9.00 cfs @ 1.82 fps)

Pond A1:

Hydrograph



Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Summary for Pond A2:

Inflow Area = 0.672 ac, 85.82% Impervious, Inflow Depth = 7.68" for 100 yr event
 Inflow = 5.40 cfs @ 12.08 hrs, Volume= 0.430 af
 Outflow = 5.27 cfs @ 12.10 hrs, Volume= 0.390 af, Atten= 2%, Lag= 1.1 min
 Primary = 5.27 cfs @ 12.10 hrs, Volume= 0.390 af
 Routed to Link A :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 240.64' @ 12.10 hrs Surf.Area= 1,516 sf Storage= 2,199 cf

Plug-Flow detention time= 85.6 min calculated for 0.390 af (91% of inflow)
 Center-of-Mass det. time= 39.1 min (795.4 - 756.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	238.00'	2,778 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	263	83.0	0	0	263
239.00	657	138.0	445	445	1,237
240.00	1,158	169.0	896	1,341	2,009
241.00	1,735	194.0	1,437	2,778	2,754

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	24.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 237.00' / 236.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	240.30'	24.0" x 24.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

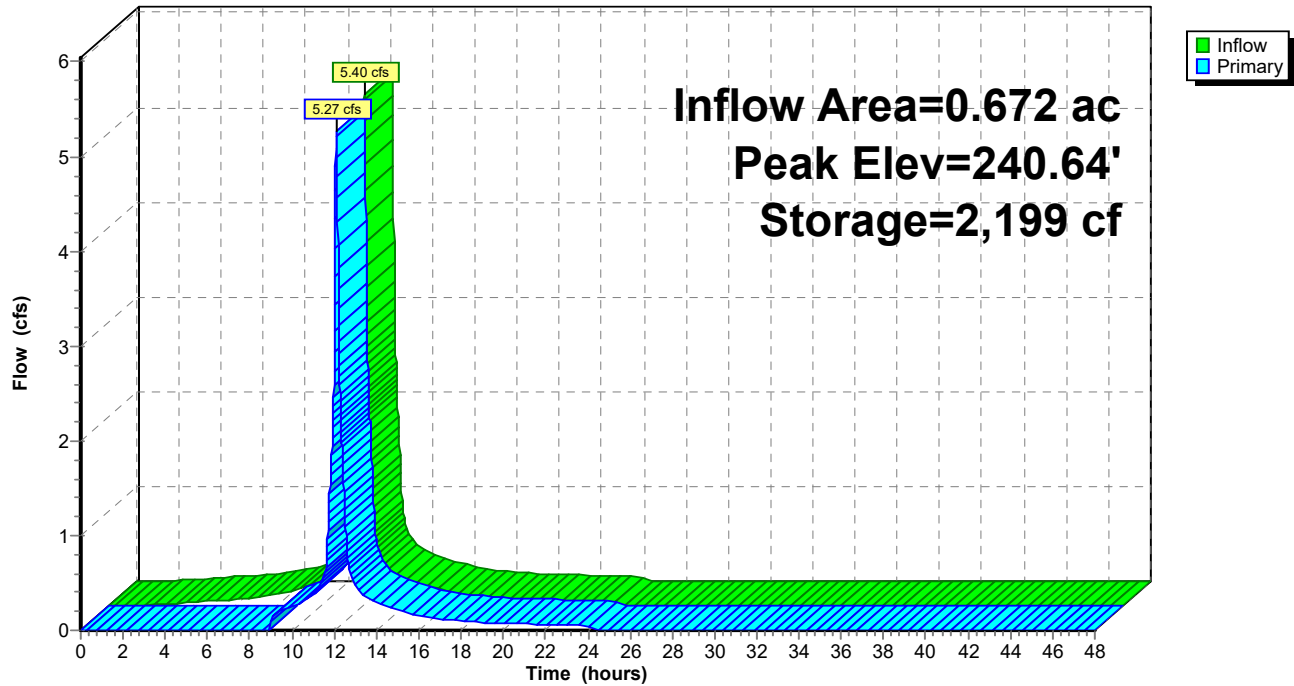
Primary OutFlow Max=5.26 cfs @ 12.10 hrs HW=240.64' (Free Discharge)

↑ **1=Culvert** (Passes 5.26 cfs of 19.42 cfs potential flow)

↑ **2=Grate** (Weir Controls 5.26 cfs @ 1.92 fps)

Pond A2:

Hydrograph



Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

Summary for Pond B1:

Inflow Area = 2.227 ac, 75.46% Impervious, Inflow Depth = 7.32" for 100 yr event
 Inflow = 17.55 cfs @ 12.08 hrs, Volume= 1.359 af
 Outflow = 11.93 cfs @ 12.17 hrs, Volume= 1.359 af, Atten= 32%, Lag= 5.0 min
 Primary = 11.93 cfs @ 12.17 hrs, Volume= 1.359 af
 Routed to Link B :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 239.90' @ 12.17 hrs Surf.Area= 3,072 sf Storage= 10,539 cf

Plug-Flow detention time= 30.1 min calculated for 1.359 af (100% of inflow)
 Center-of-Mass det. time= 30.1 min (798.3 - 768.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	236.00'	0 cf	24.00'W x 128.00'L x 4.67'H Field A 14,336 cf Overall - 14,336 cf Embedded = 0 cf x 30.0% Voids
#2A	236.00'	10,798 cf	retain_it retain_it 4.0' x 48 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 286.9 cf perimeter wall
		10,798 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	236.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 236.00' / 235.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	236.00'	4.0" Vert. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#3	Device 1	238.20'	20.0" W x 3.0" H Vert. Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	238.75'	4.0' long Weir 2 End Contraction(s)

Primary OutFlow Max=11.93 cfs @ 12.17 hrs HW=239.90' (Free Discharge)

- 1=Culvert (Inlet Controls 11.93 cfs @ 6.75 fps)
- 2=Orifice (Passes < 3.25 cfs potential flow)
- 3=Orifice (Passes < 2.52 cfs potential flow)
- 4=Weir (Passes < 15.26 cfs potential flow)

Pond B1: - Chamber Wizard Field A

Chamber Model = retain_it retain_it 4.0' (retain-it®)

Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf

Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf

3 Rows adjusted for 286.9 cf perimeter wall

16 Chambers/Row x 8.00' Long = 128.00' Row Length

3 Rows x 96.0" Wide = 24.00' Base Width

56.0" Chamber Height = 4.67' Field Height

7.5 cf Sidewall x 16 x 2 + 7.5 cf Endwall x 3 x 2 = 286.9 cf Perimeter Wall

48 Chambers x 230.9 cf - 286.9 cf Perimeter wall = 10,798.2 cf Chamber Storage

48 Chambers x 298.7 cf = 14,336.0 cf Displacement

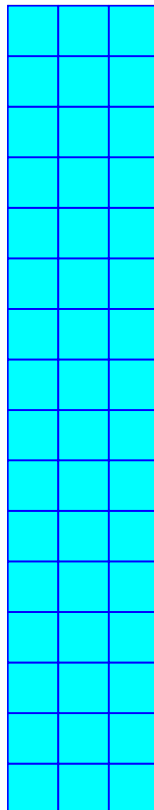
Chamber Storage = 10,798.2 cf = 0.248 af

Overall Storage Efficiency = 75.3%

Overall System Size = 128.00' x 24.00' x 4.67'

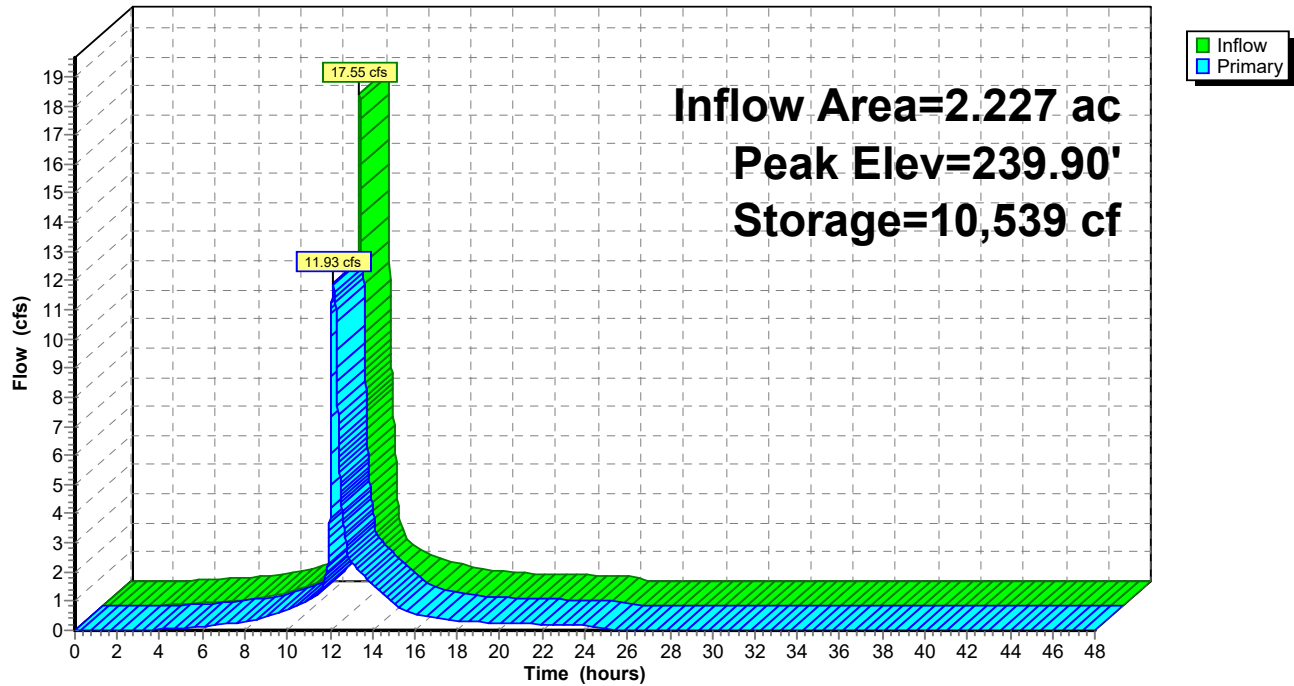
48 Chambers

531.0 cy Field



Pond B1:

Hydrograph



Stage-Area-Storage for Pond B1:

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
236.00	0	238.60	7,019
236.05	135	238.65	7,154
236.10	270	238.70	7,289
236.15	405	238.75	7,424
236.20	540	238.80	7,559
236.25	675	238.85	7,694
236.30	810	238.90	7,829
236.35	945	238.95	7,964
236.40	1,080	239.00	8,099
236.45	1,215	239.05	8,234
236.50	1,350	239.10	8,369
236.55	1,485	239.15	8,504
236.60	1,620	239.20	8,639
236.65	1,755	239.25	8,774
236.70	1,890	239.30	8,909
236.75	2,025	239.35	9,044
236.80	2,160	239.40	9,178
236.85	2,295	239.45	9,313
236.90	2,430	239.50	9,448
236.95	2,565	239.55	9,583
237.00	2,700	239.60	9,718
237.05	2,835	239.65	9,853
237.10	2,970	239.70	9,988
237.15	3,104	239.75	10,123
237.20	3,239	239.80	10,258
237.25	3,374	239.85	10,393
237.30	3,509	239.90	10,528
237.35	3,644	239.95	10,663
237.40	3,779	240.00	10,798
237.45	3,914	240.05	10,798
237.50	4,049	240.10	10,798
237.55	4,184	240.15	10,798
237.60	4,319	240.20	10,798
237.65	4,454	240.25	10,798
237.70	4,589	240.30	10,798
237.75	4,724	240.35	10,798
237.80	4,859	240.40	10,798
237.85	4,994	240.45	10,798
237.90	5,129	240.50	10,798
237.95	5,264	240.55	10,798
238.00	5,399	240.60	10,798
238.05	5,534	240.65	10,798
238.10	5,669		
238.15	5,804		
238.20	5,939		
238.25	6,074		
238.30	6,209		
238.35	6,344		
238.40	6,479		
238.45	6,614		
238.50	6,749		
238.55	6,884		

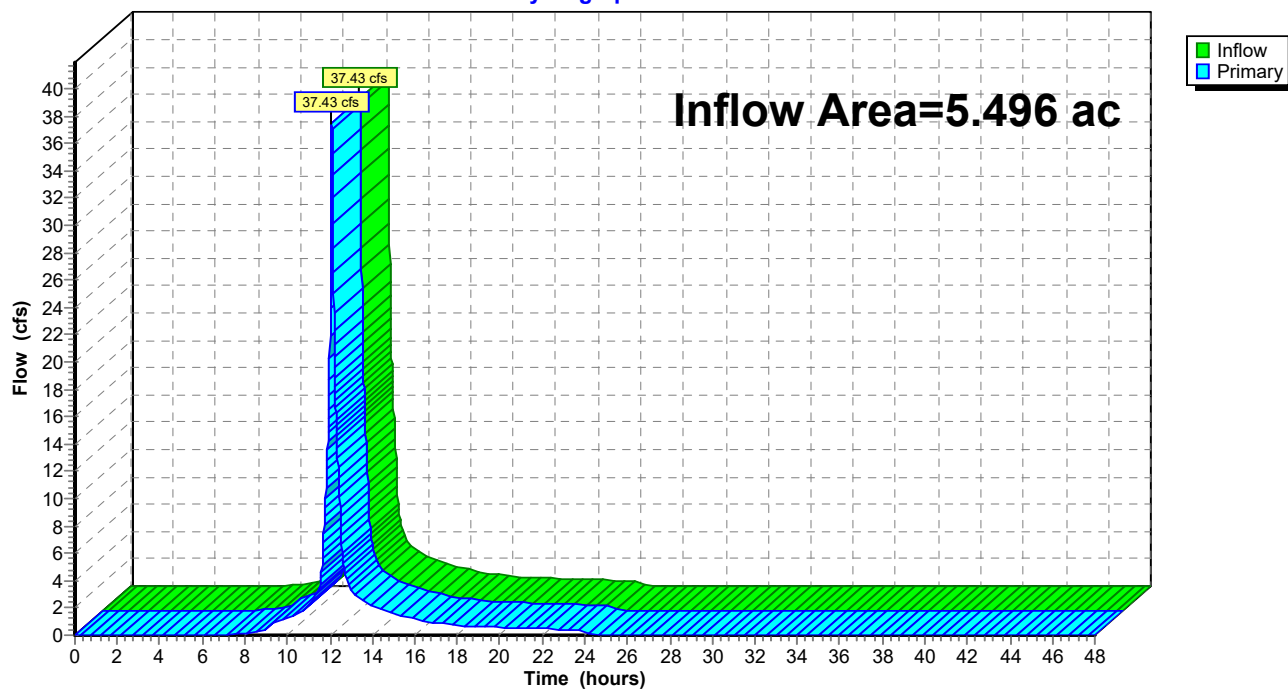
Summary for Link A:

Inflow Area = 5.496 ac, 34.82% Impervious, Inflow Depth = 5.91" for 100 yr event
Inflow = 37.43 cfs @ 12.09 hrs, Volume= 2.708 af
Primary = 37.43 cfs @ 12.09 hrs, Volume= 2.708 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link A:

Hydrograph



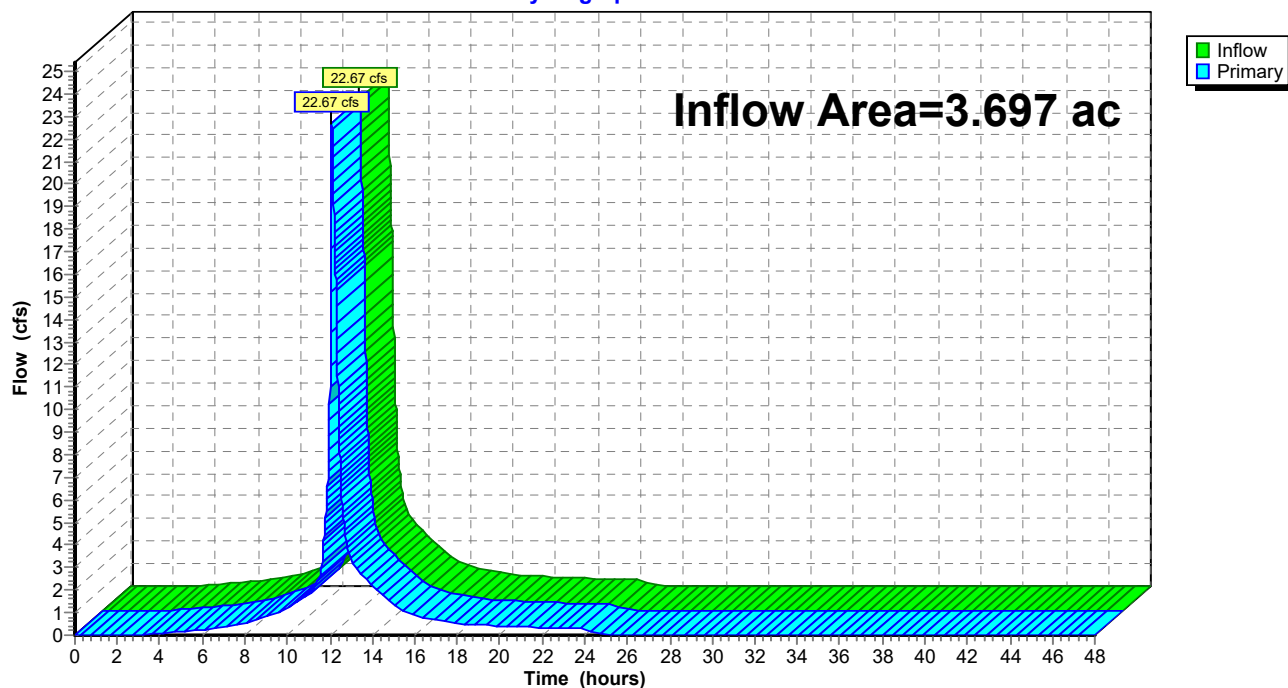
Summary for Link B:

Inflow Area = 3.697 ac, 73.59% Impervious, Inflow Depth = 7.27" for 100 yr event
Inflow = 22.67 cfs @ 12.09 hrs, Volume= 2.239 af
Primary = 22.67 cfs @ 12.09 hrs, Volume= 2.239 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link B:

Hydrograph



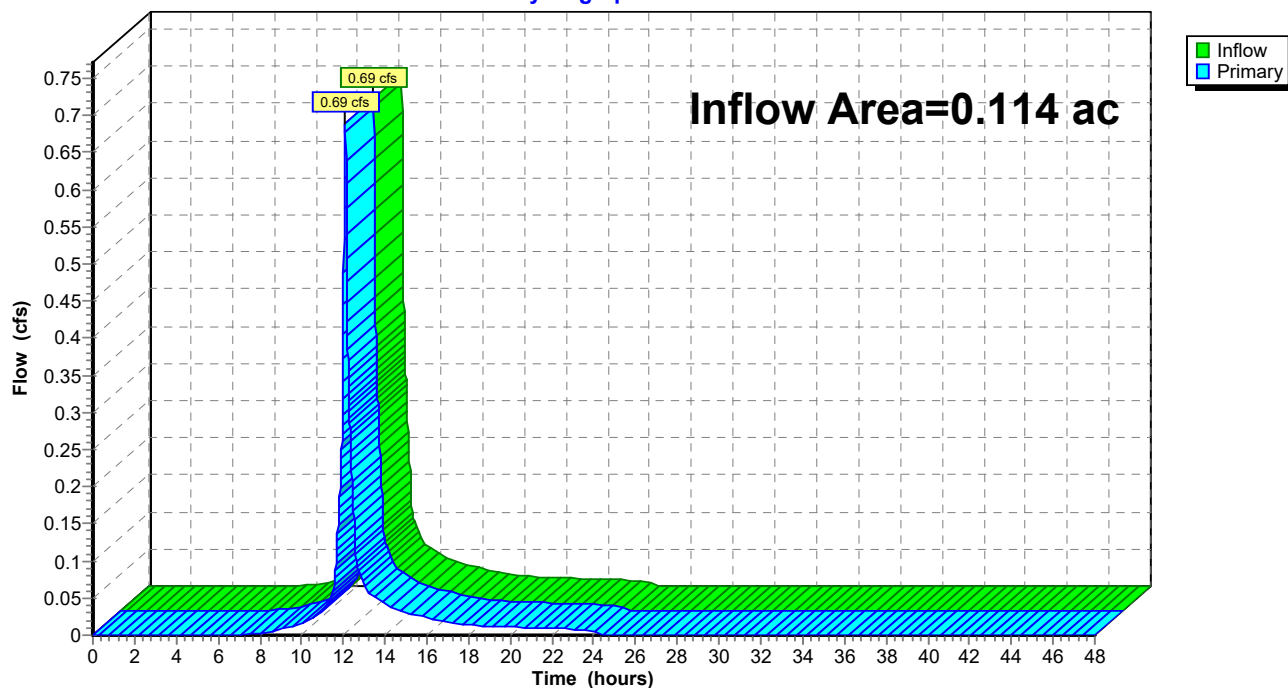
Summary for Link C:

Inflow Area = 0.114 ac, 0.00% Impervious, Inflow Depth = 5.18" for 100 yr event
Inflow = 0.69 cfs @ 12.09 hrs, Volume= 0.049 af
Primary = 0.69 cfs @ 12.09 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link C:

Hydrograph



APPENDIX D

Stormwater Recharge Calculations

Medway Municipal Complex
 Langan Engineering & Environmental Services, LLC
 Project Number: 151072201
 7/20/2026

Standard 3: Recharge

Total Impervious Coverage	197,427	sf	4.53	ac
Impervious Coverage HSG-A	0	sf	0.00	ac
Impervious Coverage HSG-B	0	sf	0.00	ac
Impervious Coverage HSG-C	197,427	sf	0.00	ac
Impervious Coverage HSG-D	0	sf	0.00	ac

HSG	F (in)	A _{Imp} (sf)	Rv (cf)
A	0.60	0	0
B	0.35	0	0
C	0.25	197,427	4,113
D	0.10	0	0
Total Required Recharge Volume, Rv			4,113

Total Recharge Provided (CF)	4,428
------------------------------	-------

Recharge Volume Provided by:			
		cf	ac-ft
Basins	A1	2,716	0.062
	A2	1,712	0.039
	Total	4,428	0.102

Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

Standard 3: 72-hour Drawdown Analysis

Table 2.3.3. 1982 Rawls Rates¹⁸

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

Table 2.3.3 from Massachusetts Stormwater Handbook; Volume 3, pg. 22

$$\text{Drawdown Time} = \frac{R_v}{(K) (\text{Bottom Area})} \quad \text{where:} \quad \begin{array}{l} R_v = \text{Storage Volume Below Outlet [Ac-ft]} \\ K = \text{Infiltration Rate [in/hr]} \\ \text{Bottom Area} = \text{Bottom Area of Recharge System [Ac]} \end{array}$$

Stormwater Basin A1

$$R_v = 0.062 \text{ Ac-ft}$$

$$K = 0.270 \text{ in/hr}$$

$$\text{Bottom Area} = 1820 \text{ sf}$$

$$\text{Bottom Area} = 0.042 \text{ acres}$$

$$\text{Drawdown Time} = 66.3 \text{ Hours} < 72 \text{ Hours, Design is in compliance with the standard.}$$

Underground Infiltration System (UG-B)

$$R_v = 0.039 \text{ Ac-ft}$$

$$K = 0.270 \text{ in/hr}$$

$$\text{Bottom Area} = 1735 \text{ sf}$$

$$\text{Bottom Area} = 0.040 \text{ acres}$$

$$\text{Drawdown Time} = 43.9 \text{ Hours} < 72 \text{ Hours, Design is in compliance with the standard.}$$

APPENDIX E

Water Quality Calculations

Stormwater Quality Calculations

Calculation

Stormwater Quality Volume (WQV)
Stormwater Quality Flow (WQF)

Design Guideline

Massachusetts Stormwater Handbook / MS4 Watershed
MassDEP & Urban Hydrology for Small Watersheds TR-55

Proposed Watershed

PR-A1

Watershed Characteristics

Total Watershed Area	49,671	sf		
Impervious Area	39,096	sf	>>>	<u>0.0014</u> mi ²
Time of Concentration, T _c	6	min	>>>	<u>0.1</u> hr

Water Quality Volume (WQV)

$$WQV = (Q_{WQV}) * (A_{Imp})$$

Water Quality Depth, Q _{WQV}	0.8	in
Impervious Area, A _{imp}	0.90	ac

Water Quality Volume, WQV	<u>0.06</u>	ac-ft	>>>	<u>2,606</u>	ft ³
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Water Quality Flow (WQF)

$$WQF = (q_u) * (A_{Imp}) * (Q_{WQV})$$

q_u = Unit Peak Discharge (csm/in)

A = drainage area (mi²)

Water Quality Depth, Q _{WQV}	0.8	in
CN =	98	
T _c =	0.1	hr
I _a =	0.041	
P =	1.2	in
I _a / P =	0.034	
Unit Peak Discharge, q _u	774	csm/in

Water Quality Flow, WQF =	<u>0.87</u>	cfs
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Determine q_u, using *MassDEP Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices*
Figure 3 or 4 for I_a/P = 0.034 for 1" Q_{WQV}

Medway Municipal Complex	BY	HES	DATE	7/20/2026	PROJ NO. 151072201
					SHEET 1

Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Stormwater Quality Calculations

Calculation

Design Guideline

Stormwater Quality Volume (WQV)
Stormwater Quality Flow (WQF)

Massachusetts Stormwater Handbook / MS4 Watershed
MassDEP & Urban Hydrology for Small Watersheds TR-55

Proposed Watershed

PR-A2

Watershed Characteristics

Total Watershed Area	29,253	sf			
Impervious Area	22,759	sf	>>>	<u>0.0008</u>	mi ²
Time of Concentration, T _c	6	min	>>>	<u>0.1</u>	hr

Water Quality Volume (WQV)

$$WQV = (Q_{WQV}) * (A_{Imp})$$

Water Quality Depth, Q _{WQV}	0.8	in
Impervious Area, A _{imp}	0.52	ac

Water Quality Volume, WQV	<u>0.03</u>	ac-ft	>>>	<u>1,517</u>	ft ³
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Water Quality Flow (WQF)

$$WQF = (q_u) * (A_{Imp}) * (Q_{WQV})$$

q_u = Unit Peak Discharge (csm/in)

A = drainage area (mi²)

Water Quality Depth, Q _{WQV}	0.8	in
CN =	98	
T _c =	0.1	hr
I _a =	0.041	
P =	1.2	in
I _a / P =	0.034	
Unit Peak Discharge, q _u	774	csm/in

Water Quality Flow, WQF =	<u>0.50</u>	cfs
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Determine q_u, using *MassDEP Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices*
Figure 3 or 4 for I_a/P = 0.034 for 1" Q_{WQV}

Medway Municipal Complex	BY HES	DATE 7/20/2026	PROJ NO. 151072201
			SHEET 1

Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

Stormwater Quality Calculations

Calculation

Design Guideline

Stormwater Quality Volume (WQV)
Stormwater Quality Flow (WQF)

Massachusetts Stormwater Handbook / MS4 Watershed
MassDEP & Urban Hydrology for Small Watersheds TR-55

Proposed Watershed

PR-B1

Watershed Characteristics

Total Watershed Area	96,160	sf			
Impervious Area	69,606	sf	>>>	<u>0.0025</u>	mi ²
Time of Concentration, T _c	6	min	>>>	<u>0.1</u>	hr

Water Quality Volume (WQV)

$$WQV = (Q_{WQV}) * (A_{Imp})$$

Water Quality Depth, Q _{WQV}	0.8	in
Impervious Area, A _{imp}	1.60	ac

Water Quality Volume, WQV	<u>0.11</u>	ac-ft	>>>	<u>4,640</u>	ft ³
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Water Quality Flow (WQF)

$$WQF = (q_u) * (A_{Imp}) * (Q_{WQV})$$

q_u = Unit Peak Discharge (csm/in)

A = drainage area (mi²)

Water Quality Depth, Q _{WQV}	0.8	in
CN =	98	
T _c =	0.1	hr
I _a =	0.041	
P =	1.2	in
I _a / P =	0.034	
Unit Peak Discharge, q _u	<u>774</u>	csm/in

Water Quality Flow, WQF =	<u>1.55</u>	cfs
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Determine q_u, using *MassDEP Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices*
Figure 3 or 4 for I_a/P = 0.034 for 1" Q_{WQV}

Medway Municipal Complex	BY HES DATE 7/20/2026	PROJ NO. 151072201
		SHEET 1

APPENDIX F

TSS & TP Removal Worksheets

100 Cambridge Street, Suite 1310
Boston, MA 02114

Project Name: Medway Municipal
Project Number: 151072201
Location: Medway, MA
Discharge Point: A
Drainage Area(s): PR-A1,PR-A2

Sheet: 1
Date: 20-Jul-2026
Computed by: HES
Checked by: JMP

A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Street Sweeping - 5% (Quarterly)	5%	1.00	0.05	0.95
Deep Sump and Hooded Catch Basin	25%	0.95	0.24	0.71
Infiltration Basin	80%	0.71	0.57	0.14
	0%	0.14	0.00	0.14
	0%	0.14	0.00	0.14

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.
Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).

** Equals remaining load from previous BMP (E)

**Treatment Train
TSS Removal =**

86%

100 Cambridge Street, Suite 1310
Boston, MA 02114

Project Name: Medway Municipal
Project Number: 151072201
Location: Medway, MA
Discharge Point: B
Drainage Area(s): PR-B1

Sheet: 2
Date: 20-Jul-2026
Computed by: HES
Checked by: JMP

A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Street Sweeping - 5% (Quarterly)	5%	1.00	0.05	0.95
Deep Sump and Hooded Catch Basin	25%	0.95	0.24	0.71
Water Quality Unit	80%	0.71	0.57	0.14
	0%	0.14	0.00	0.14
	0%	0.14	0.00	0.14

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.
Removal rates for proprietary devices are from approved studies and/or manufacturer data (attach study or data source, or remove this sentence if not applicable).

** Equals remaining load from previous BMP (E)

**Treatment Train
TSS Removal =**

86%

Medway Municipal Complex
Langan Engineering & Environmental Services, LLC
Project Number: 151072201
7/20/2026

Infiltration Basin A1 - Phosphorus Removal	
Method Used:	MS4 Appendix F Attachment 3, Method 2 (100% Impervious Area)
BMP - Volume ft^3	2,716
Impervious Area (acres)	0.898
BMP - Volume IA-in	0.8
Infiltration Basin Cumulative Phosphorus Load Reduction	90%
BMP Load	1.598
Phosphorus BMP Reduction	1.438

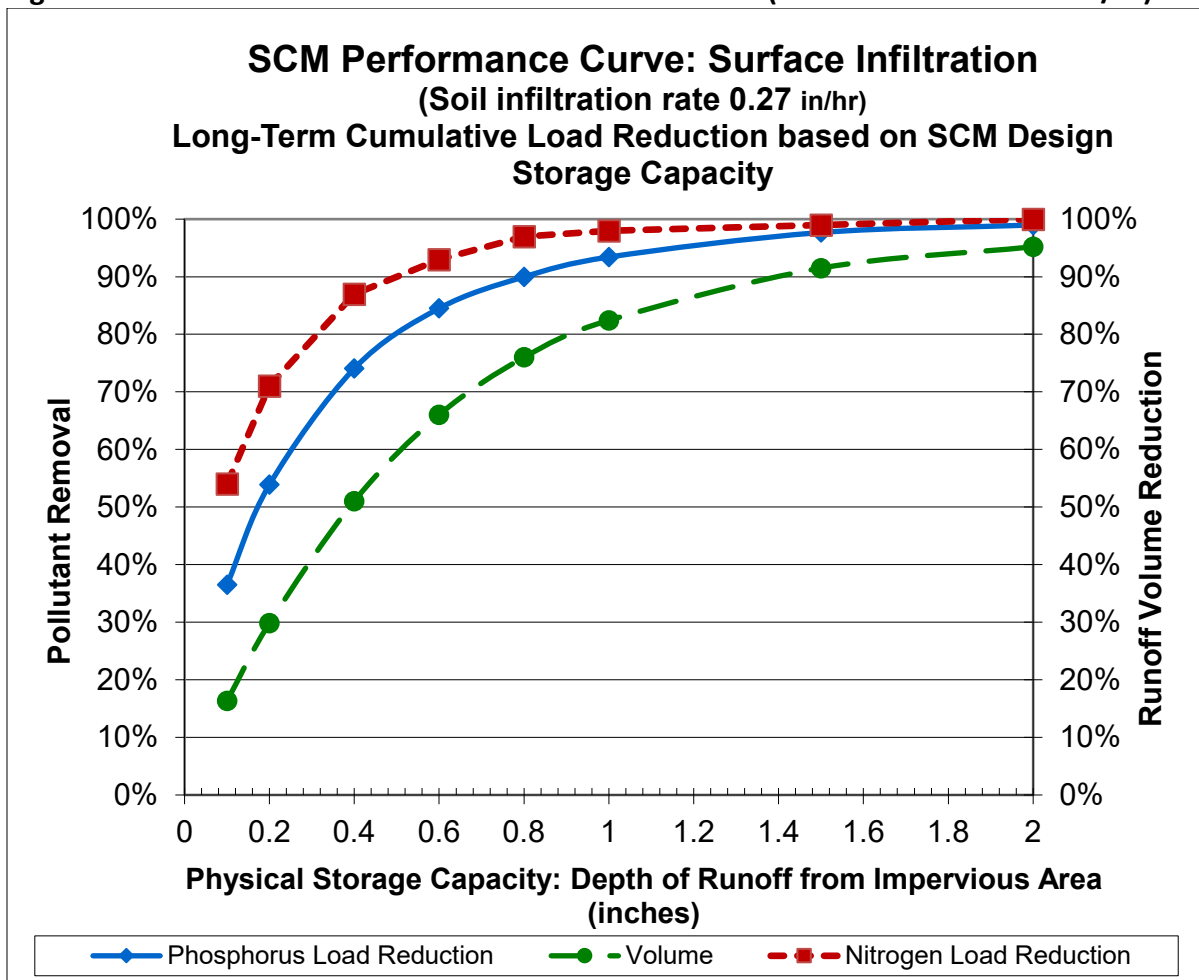
Infiltration Basin A2 - Phosphorus Removal	
Method Used:	MS4 Appendix F Attachment 3, Method 2 (100% Impervious Area)
BMP - Volume ft^3	1,712
Impervious Area (acres)	0.522
BMP - Volume IA-in	0.9
Infiltration Basin Cumulative Phosphorus Load Reduction (1.02 in/hr)	92% Table 3-15 - Infiltration Basin (0.27 in/hr). Interpolated to 0.9
BMP Load	0.930
Phosphorus BMP Reduction	0.851

Detention System B1 - Phosphorous Removal	
Method Used:	Provided TP load reduction from manufacturer
Cumulative Phosphorus Load Reduction	82%
BMP Load	2.894
Phosphorus BMP Reduction	2.373

BMP:	Total Imp. Area:	% Phos. Removed:	Total Imp. * % Phos.:
Infiltration A1	0.898	90%	0.81
Infiltration A2	0.522	92%	0.48
Detention B1	1.626	82%	1.33
% Total Phosphorus (TP) Removal			86%

Table 3- 15: Infiltration Basin (0.27 in/hr) SCM Performance Table

Surface Infiltration (0.27 in/hr) SCM Performance Table: Long-Term Phosphorus & Nitrogen Load Reduction								
SCM Capacity: Depth of Runoff from Impervious Area (inches)	0.1	0.2	0.4	0.6	0.8	1.0	1.5	2.0
Runoff Volume Reduction	16%	30%	51%	66%	76%	82%	91%	95%
Cumulative Phosphorus Load Reduction	37%	54%	74%	85%	90%	93%	98%	99%
Cumulative Nitrogen Load Reduction	54%	71%	87%	93%	97%	98%	99%	100%

Figure 3-10: SCM Performance Curve: Surface Infiltration (infiltration rate = 0.27 in/hr)

The Stormwater Management StormFilter®- PhosphoSorb®

Field Performance Summary

A three year field performance evaluation of The Stormwater Management StormFilter® (StormFilter) with PhosphoSorb® media operating at a specific flow rate of 1.67 gpm/ft² was completed at a 0.06 acre roadway site in Zigzag, Oregon. The Quality Assurance Project Plan (QAPP) for this evaluation followed the Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE, 2011). The StormFilter with PhosphoSorb Technical Evaluation Report resulted in a General Use Level Designation from Washington State Department of Ecology for Total Suspended Solids (TSS) and Total Phosphorus removal.

Results of the field performance evaluation for 17 qualified events are provided in Table 1.

Table 1. StormFilter with PhosphoSorb Field Evaluation Results

	Parameter	Sample population (n)	Average Influent (mg/L)	Average Effluent (mg/L)	Average Removal (%)	Aggregate Pollutant Load Reduction ¹ (%)
Solids	TSS	17	380	40	88	89
	SSC<500 µm	15	325	40	87	89
	Silt and Clay ²	16	153	32	78	82
Nutrients	Total Phosphorus	17	0.33	0.07	73	82
	Total Nitrogen	17	1.14	0.57	43	50
Metals	Total Zinc	15	0.129	0.024	78	81
	Dissolved Zinc	7	0.016	0.01	28	32
	Total Copper	15	0.026	0.005	79	82
	Dissolved Copper	7	0.004	0.003	30	28
	Total Aluminum	16	5.85	1.08	83	83
	Total Lead	15	0.009	0.003	64	70

¹ Treatment Efficiency Calculation, Method #2 (TAPE, 2008)

² Suspended Solids less than 62.5 microns

Load Reduction

89% TSS

82% Total Phosphorus

50% Total Nitrogen

Data were analyzed using the TAPE bootstrap confidence interval calculator for TSS and Total Phosphorus. The lower 95% confidence interval for TSS removal efficiency was 85%. The lower 95% confidence interval for total phosphorus removal efficiency was 67%. The upper 95% confidence interval for total phosphorus effluent concentration was 0.084 mg/L.

Over the entire 37 month evaluation period, the total effluent volume recorded at the site was 376,244 gallons. A total of 14,060 gallons were bypassed through the system accounting for 4% of the total recorded volume. A total of 26 events contained bypass flow, with 23 of those events producing peak flows exceeding the design treatment capacity of the system. The three events with bypass flows occurring below the design treatment capacity triggered maintenance. During the evaluation period, the system lasted between 10 and 12 months between maintenance events and retained an average of 291 pounds of sediment per maintenance event.

References

Contech Engineered Solutions, LLC. (2015). The Stormwater Management StormFilter® PhosphoSorb® at a Specific Flow Rate of 1.67 gpm/ft² General Use Level Designation Technical Evaluation Report. Portland, OR. Author.

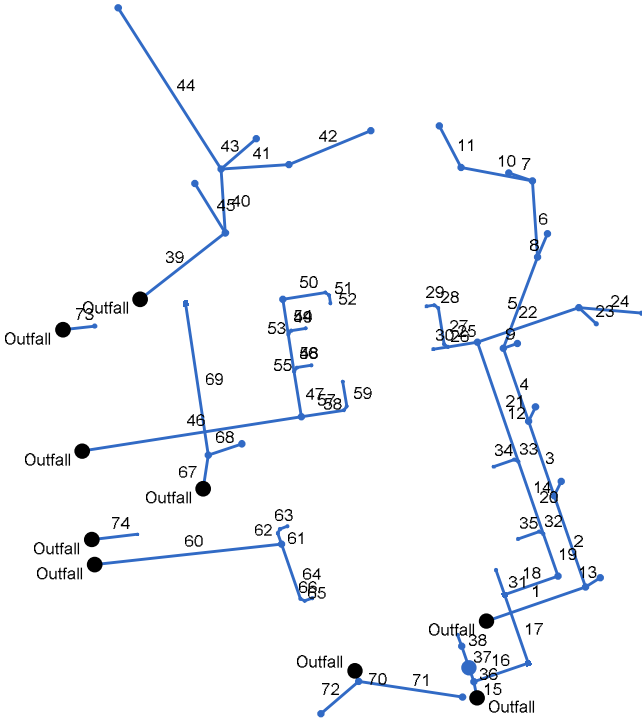
Washington State Department of Ecology (Ecology). (2011). Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE). Olympia, Washington. (Referred to as TAPE, 2011)

Washington State Department of Ecology (Ecology). (2008). Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE). Olympia, Washington. (Referred to as TAPE, 2008)

APPENDIX G

Stormwater Collection System Calculations

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 2026-09-18 MMC Storm Network.stm	Number of lines: 74	Date: 9/21/2026
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Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	92.504	-18.951	MH	0.00	0.00	0.00	0.0	237.50	1.01	238.43	24	Cir	0.012	1.00	244.63	DMH-B1-101 (WQU) T
2	1	85.421	-90.000	MH	0.00	0.00	0.00	0.0	238.50	1.00	239.35	24	Cir	0.012	0.75	243.59	DMH-B1-102 TO DMH-
3	2	69.829	0.000	MH	0.00	0.00	0.00	0.0	239.40	1.00	240.10	24	Cir	0.012	0.75	244.50	DMH-B1-103 TO DMH-
4	3	68.187	0.000	MH	0.00	0.00	0.00	0.0	240.20	1.00	240.88	24	Cir	0.012	1.00	247.47	DMH-B1-104 TO DMH-
5	4	86.300	39.461	MH	0.00	0.00	0.00	0.0	240.94	1.00	241.80	24	Cir	0.012	0.47	248.48	DMH-B1-105 TO DMH-
6	5	67.552	-24.461	MH	0.00	0.00	0.00	0.0	242.02	1.01	242.70	24	Cir	0.012	0.97	248.54	DMH-B1-106 TO DMH-
7	6	21.987	-67.257	MH	0.00	0.07	0.90	6.0	248.78	1.00	249.00	15	Cir	0.012	1.00	252.81	CB-B1-107 TO DMH-B
8	5	22.361	2.104	MH	0.00	0.23	0.90	6.0	243.95	2.01	244.40	12	Cir	0.012	1.00	247.82	CB-B1-105 TO DMH-B
9	4	13.000	90.000	MH	0.00	0.29	0.90	6.0	243.74	2.00	244.00	12	Cir	0.012	1.00	247.41	CB-B1-104 TO DMH-B
10	6	64.082	-75.311	MH	0.00	0.00	0.00	0.0	242.86	1.00	243.50	15	Cir	0.012	0.82	248.64	DMH-B1-201 TO DMH-
11	10	41.501	51.882	Grate	0.00	0.33	0.90	6.0	243.59	0.99	244.00	15	Cir	0.012	1.00	247.46	CB-B1-201 TO DMH-B
12	3	14.142	45.000	Grate	0.00	0.15	0.90	6.0	240.86	0.99	241.00	12	Cir	0.012	1.00	244.70	CB-B1-103 TO DMH-B
13	1	15.422	-13.436	MH	0.00	0.15	0.90	6.0	240.69	2.01	241.00	12	Cir	0.012	1.00	244.51	CB-B1-101 TO DMH-B
14	2	14.142	45.000	Grate	0.00	0.58	0.90	6.0	239.72	1.98	240.00	12	Cir	0.012	1.00	243.30	DCB-B1-102 TO DMH-
15	End	14.560	-101.056	MH	0.00	0.00	0.00	0.0	232.50	1.03	232.65	24	Cir	0.012	0.99	242.86	DMH-B3-102 TO DMH-
16	15	50.691	82.105	MH	0.00	0.00	0.00	0.0	233.49	1.01	234.00	24	Cir	0.012	1.00	245.95	DMH-B3-103 TO DMH-
17	16	64.417	-90.000	MH	0.00	0.00	0.00	0.0	234.41	1.01	235.06	24	Cir	0.012	1.00	246.43	DMH-B3-104 TO DMH-
18	17	49.813	90.000	MH	0.00	0.00	0.00	0.0	237.40	1.00	237.90	12	Cir	0.012	1.00	244.21	DMH-B3-105 TO DMH-
19	18	39.677	-90.000	MH	0.00	0.00	0.00	0.0	237.93	0.98	238.32	12	Cir	0.012	0.75	244.17	RL-B3-101B TO DMH-
20	19	67.594	0.000	MH	0.00	0.00	0.00	0.0	238.32	1.01	239.00	12	Cir	0.012	0.75	244.13	RL-B3-102B TO RL-B
21	20	111.736	0.000	MH	0.00	0.00	0.00	0.0	239.00	1.00	240.12	12	Cir	0.012	1.00	247.89	DMH-B3-106 TO RL-B
22	21	94.638	90.000	MH	0.00	0.00	0.00	0.0	243.05	1.00	244.00	12	Cir	0.012	0.90	248.98	DMH-B3-107 (WQU) T
23	22	21.037	61.618	Grate	0.00	0.10	0.90	6.0	245.29	1.00	245.50	12	Cir	0.012	1.00	249.54	YD-B3-107B TO DMH-
Project File: 2026-09-18 MMC Storm Network.stm												Number of lines: 74				Date: 9/21/2026	

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	22	55.746	23.835	Grate	0.00	0.27	0.30	6.0	244.44	1.00	245.00	12	Cir	0.012	1.00	248.97	YD-B3-107A TO DMH-
25	21	26.318	-80.000	MH	0.00	0.00	0.00	0.0	242.61	0.99	242.87	6	Cir	0.012	0.75	248.76	RL-B3-103A TO DMH-
26	25	4.243	45.000	MH	0.00	0.00	0.00	0.0	243.08	11.31	243.56	6	Cir	0.012	0.75	248.83	RL-B3-104C TO RL-B
27	26	32.359	45.000	MH	0.00	0.00	0.00	0.0	243.56	1.02	243.89	6	Cir	0.012	0.75	248.90	RL-B3-104B TO RL-B
28	27	4.243	-45.000	MH	0.00	0.00	0.00	0.0	243.89	0.94	243.93	6	Cir	0.012	0.75	248.93	RL-B3-104A TO RL-B
29	28	7.000	-45.000	MH	0.00	0.01	0.90	6.0	243.93	1.00	244.00	6	Cir	0.012	1.00	249.00	RL-B3-104 TO RL-B3
30	25	13.000	0.000	MH	0.00	0.01	0.90	6.0	242.87	1.00	243.00	6	Cir	0.012	1.00	249.00	RL-B3-103 TO RL-B3
31	17	23.000	0.000	MH	0.00	0.78	0.90	6.0	239.77	1.00	240.00	12	Cir	0.012	1.00	245.33	BUILDING OUTLET TO
32	19	4.243	-45.000	MH	0.00	0.00	0.00	0.0	239.87	1.18	239.92	6	Cir	0.012	0.75	244.22	RL-B3-101A TO RL-B
33	20	4.243	-45.000	MH	0.00	0.00	0.00	0.0	239.50	7.31	239.81	6	Cir	0.012	0.75	244.21	RL-B3-102A TO RL-B
34	33	19.146	-45.000	MH	0.00	0.02	0.90	6.0	239.81	0.99	240.00	6	Cir	0.012	1.00	245.00	RL-B3-102 TO RL-B3
35	32	19.459	-45.000	MH	0.00	0.02	0.90	6.0	239.81	0.98	240.00	6	Cir	0.012	1.00	245.00	RL-B3-101 TO RL-B3
36	15	13.417	-7.895	MH	0.00	0.00	0.00	0.0	232.67	0.97	232.80	12	Cir	0.012	0.15	243.40	WATER QUALITY VAUL
37	36	20.000	0.000	MH	0.00	0.00	0.00	0.0	235.80	1.00	236.00	12	Cir	0.012	0.15	244.18	OCS-B1-101 TO WATE
38	37	10.583	0.000	MH	9.76	0.00	0.00	0.0	236.00	0.00	236.00	12	Cir	0.012	1.00	244.45	OUTLET-B1-101 TO O
39	End	95.364	-37.861	MH	0.00	0.00	0.00	0.0	240.00	1.00	240.95	30	Cir	0.012	1.00	247.23	DMH-A1-101 (WQU) T
40	39	56.617	-56.090	MH	0.00	0.00	0.00	0.0	241.00	1.01	241.57	30	Cir	0.012	1.00	246.47	DMH-A1-102 TO DMH-
41	40	60.083	90.000	MH	0.00	0.00	0.00	0.0	241.90	1.00	242.50	15	Cir	0.012	0.37	247.66	DMH-A1-201 TO DMH-
42	41	78.346	-18.608	Grate	0.00	0.14	0.90	6.0	242.72	1.00	243.50	15	Cir	0.012	1.00	247.59	CB-A1-201 TO DMH-A
43	40	41.400	52.853	Grate	0.00	0.39	0.90	6.0	242.39	0.99	242.80	18	Cir	0.012	1.00	246.58	CB-A1-102B TO DMH-
44	40	169.294	-28.427	MH	0.00	0.24	0.90	6.0	241.81	1.00	243.50	15	Cir	0.012	1.00	247.56	CB-A1-102A TO DMH-
45	39	51.545	-83.840	MH	0.00	0.32	0.90	6.0	241.48	1.01	242.00	18	Cir	0.012	1.00	245.84	CB-A1-101 TO DMH-A
46	End	195.609	-8.951	MH	0.00	0.00	0.00	0.0	234.67	2.00	238.58	12	Cir	0.012	1.00	243.91	DMH-A3-201 TO OUTL
Project File: 2026-09-18 MMC Storm Network.stm												Number of lines: 74				Date: 9/21/2026	

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
47	46	40.667	-90.000	MH	0.00	0.00	0.00	0.0	240.48	1.99	241.29	12	Cir	0.012	0.75	248.14	RL-A3-202B TO DMH-
48	47	33.000	0.000	MH	0.00	0.00	0.00	0.0	241.29	2.00	241.95	12	Cir	0.012	0.75	248.85	RL-A3-203B TO RL-A
49	48	31.667	0.000	MH	0.00	0.00	0.00	0.0	241.95	1.99	242.58	12	Cir	0.012	1.00	248.13	DMH-A3-202 TO RL-A
50	49	38.000	90.000	MH	0.00	0.00	0.00	0.0	243.02	2.00	243.78	6	Cir	0.012	0.75	248.67	RL-A3-204B TO DMH-
51	50	4.243	45.000	MH	0.00	0.00	0.00	0.0	243.78	1.89	243.86	6	Cir	0.012	0.75	248.87	RL-A3-204A TO RL-A
52	51	7.000	45.000	MH	0.00	0.02	0.90	6.0	243.86	2.00	244.00	6	Cir	0.012	1.00	249.00	RL-A3-204 TO RL-A3
53	48	4.243	45.000	MH	0.00	0.00	0.00	0.0	242.20	29.93	243.47	6	Cir	0.012	0.75	248.86	RL-A3-203A TO RL-A
54	53	13.000	45.000	MH	0.00	0.02	0.90	6.0	243.74	2.00	244.00	6	Cir	0.012	1.00	249.00	RL-A3-203 TO RL-A3
55	47	4.243	45.000	MH	0.00	0.00	0.00	0.0	241.54	59.87	244.08	6	Cir	0.012	0.75	248.66	RL-A3-202A TO RL-A
56	55	13.000	45.000	MH	0.00	0.02	0.90	6.0	243.74	2.00	244.00	6	Cir	0.012	1.00	249.00	RL-A3-202 TO RL-A3
57	46	38.000	0.000	MH	0.00	0.00	0.00	0.0	238.72	2.00	239.48	6	Cir	0.012	0.75	244.26	RL-A3-201B TO DMH-
58	57	4.243	-45.000	MH	0.00	0.00	0.00	0.0	239.48	1.89	239.56	6	Cir	0.012	0.75	244.30	RL-A3-201A TO RL-A
59	58	22.000	-45.000	MH	0.00	0.02	0.90	6.0	239.56	2.00	240.00	6	Cir	0.012	1.00	244.60	RL-A3-201 TO RL-A3
60	End	165.841	-6.316	MH	0.00	0.00	0.00	0.0	234.46	2.00	237.78	6	Cir	0.012	1.00	244.94	DMH-A3-101 TO OUTL
61	60	10.084	-102.635	MH	0.00	0.00	0.00	0.0	239.57	2.08	239.78	6	Cir	0.012	0.75	244.92	RL-A3-102B TO DMH-
62	61	4.243	45.000	MH	0.00	0.00	0.00	0.0	239.78	1.89	239.86	6	Cir	0.012	0.75	244.95	RL-A3-102A TO RL-A
63	62	7.000	45.000	MH	0.00	0.01	0.90	6.0	239.86	2.00	240.00	6	Cir	0.012	1.00	245.00	RL-A3-102 TO RL-A3
64	60	51.270	77.365	MH	0.00	0.00	0.00	0.0	238.75	2.01	239.78	6	Cir	0.012	0.75	244.02	RL-A3-101B TO DMH-
65	64	4.243	-45.000	MH	0.00	0.00	0.00	0.0	239.78	1.89	239.86	6	Cir	0.012	0.75	244.00	RL-A3-101A TO RL-A
66	65	7.000	-45.000	MH	0.00	0.01	0.90	6.0	239.86	2.00	240.00	6	Cir	0.012	1.00	244.12	RL-A3-101 TO RL-A3
67	End	29.948	-81.278	MH	0.00	0.00	0.00	0.0	238.00	1.00	238.30	18	Cir	0.012	0.91	242.71	DMH-A2-101 (WQU) T
68	67	31.313	62.327	MH	0.00	0.37	0.90	6.0	238.87	2.01	239.50	15	Cir	0.012	1.00	243.14	DCB-A2-101B TO DMH
69	67	135.714	-17.240	MH	0.00	0.25	0.90	6.0	238.79	2.00	241.50	15	Cir	0.012	1.00	245.72	CB-A2-101A TO DMH-
Project File: 2026-09-18 MMC Storm Network.stm												Number of lines: 74				Date: 9/21/2026	

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
70	End	10.000	71.049	MH	0.00	0.00	0.00	0.0	236.30	1.00	236.40	12	Cir	0.012	0.94	243.70	DMH-B1-201 (WQU) T
71	70	92.650	-62.416	MH	0.00	0.11	0.90	6.0	237.57	1.00	238.50	12	Cir	0.012	1.00	242.00	CB-B1-201B TO DMH-
72	70	43.899	68.445	MH	0.00	0.31	0.90	6.0	236.46	1.00	236.90	12	Cir	0.012	1.00	240.13	CB-B1-201A TO DMH-
73	End	28.202	-6.534	Grate	6.94	0.00	0.00	0.0	236.87	4.01	238.00	18	Cir	0.012	1.00	242.60	OCS-A1-101 TO OUTL
74	End	40.701	-6.575	Grate	4.06	0.00	0.00	0.0	234.06	1.99	234.87	24	Cir	0.012	1.00	240.30	OCS-A2-101 TO OUTL
Project File: 2026-09-18 MMC Storm Network.stm												Number of lines: 74				Date: 9/21/2026	

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	DMH-B1-101 (WQU)	Manhole	244.63	Cir	4.00	4.00	24	Cir	238.43	24 12	Cir Cir	238.50 240.69
2	DMH-B1-102	Manhole	243.59	Cir	4.00	4.00	24	Cir	239.35	24 12	Cir Cir	239.40 239.72
3	DMH-B1-103	Manhole	244.50	Cir	4.00	4.00	24	Cir	240.10	24 12	Cir Cir	240.20 240.86
4	DMH-B1-104	Manhole	247.47	Cir	4.00	4.00	24	Cir	240.88	24 12	Cir Cir	240.94 243.74
5	DMH-B1-105	Manhole	248.48	Cir	4.00	4.00	24	Cir	241.80	24 12	Cir Cir	242.02 243.95
6	DMH-B1-106	Manhole	248.54	Cir	4.00	4.00	24	Cir	242.70	15 15	Cir Cir	248.78 242.86
7	CB-B1-107	Manhole	252.81	Cir	4.00	4.00	15	Cir	249.00			
8	CB-B1-105	Manhole	247.82	Cir	4.00	4.00	12	Cir	244.40			
9	CB-B1-104	Manhole	247.41	Cir	4.00	4.00	12	Cir	244.00			
10	DMH-B1-201	Manhole	248.64	Cir	4.00	4.00	15	Cir	243.50	15	Cir	243.59
11	CB-B1-201	Grate	247.46	Cir	4.00	4.00	15	Cir	244.00			
12	CB-B1-103	Grate	244.70	Cir	4.00	4.00	12	Cir	241.00			
13	CB-B1-101	Manhole	244.51	Cir	4.00	4.00	12	Cir	241.00			
14	DCB-B1-102	Grate	243.30	Cir	4.00	4.00	12	Cir	240.00			
15	DMH-B3-102	Manhole	242.86	Cir	4.00	4.00	24	Cir	232.65	24 12	Cir Cir	233.49 232.67
16	DMH-B3-103	Manhole	245.95	Rect	4.00	4.00	24	Cir	234.00	24	Cir	234.41
17	DMH-B3-104	Manhole	246.43	Rect	4.00	4.00	24	Cir	235.06	12 12	Cir Cir	237.40 239.77
18	DMH-B3-105	Manhole	244.21	Cir	4.00	4.00	12	Cir	237.90	12	Cir	237.93
19	RL-B3-101B	Manhole	244.17	Cir	0.83	0.83	12	Cir	238.32	12 6	Cir Cir	238.32 239.87
Project File: 2026-09-18 MMC Storm Network.stm							Number of Structures: 74			Run Date: 9/21/2026		

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
20	RL-B3-102B	Manhole	244.13	Cir	0.83	0.83	12	Cir	239.00	12 6	Cir Cir	239.00 239.50
21	DMH-B3-106	Manhole	247.89	Cir	4.00	4.00	12	Cir	240.12	12 6	Cir Cir	243.05 242.61
22	DMH-B3-107 (WQU)	Manhole	248.98	Cir	4.00	4.00	12	Cir	244.00	12 12	Cir Cir	245.29 244.44
23	YD-B3-107B	Grate	249.54	Cir	2.00	2.00	12	Cir	245.50			
24	YD-B3-107A	Grate	248.97	Cir	2.00	2.00	12	Cir	245.00			
25	RL-B3-103A	Manhole	248.76	Cir	0.83	0.83	6	Cir	242.87	6 6	Cir Cir	243.08 242.87
26	RL-B3-104C	Manhole	248.83	Cir	0.83	0.83	6	Cir	243.56	6	Cir	243.56
27	RL-B3-104B	Manhole	248.90	Cir	0.83	0.83	6	Cir	243.89	6	Cir	243.89
28	RL-B3-104A	Manhole	248.93	Cir	0.83	0.83	6	Cir	243.93	6	Cir	243.93
29	RL-B3-104	Manhole	249.00	Cir	0.83	0.83	6	Cir	244.00			
30	RL-B3-103	Manhole	249.00	Cir	0.83	0.83	6	Cir	243.00			
31	RL-B3-AREA A	Manhole	245.33	Cir	0.83	0.83	12	Cir	240.00			
32	RL-B3-101A	Manhole	244.22	Cir	0.83	0.83	6	Cir	239.92	6	Cir	239.81
33	RL-B3-102A	Manhole	244.21	Cir	0.83	0.83	6	Cir	239.81	6	Cir	239.81
34	RL-B3-102	Manhole	245.00	Cir	0.83	0.83	6	Cir	240.00			
35	RL-B3-101	Manhole	245.00	Cir	0.83	0.83	6	Cir	240.00			
36	WATER QUALITY VAULT B	Manhole	243.40	Cir	11.00	11.00	12	Cir	232.80	12	Cir	235.80
37	OCS-B1-101	Manhole	244.18	Cir	4.00	4.00	12	Cir	236.00	12	Cir	236.00
38	OUTLET-B1-101	Manhole	244.45	Cir	0.83	0.83	12	Cir	236.00			
39	DMH-A1-101 (WQU)	Manhole	247.23	Cir	4.00	4.00	30	Cir	240.95	30 18	Cir Cir	241.00 241.48
Project File: 2026-09-18 MMC Storm Network.stm							Number of Structures: 74			Run Date: 9/21/2026		

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
40	DMH-A1-102	Manhole	246.47	Cir	4.00	4.00	30	Cir	241.57	15 18 15	Cir Cir Cir	241.90 242.39 241.81
41	DMH-A1-201	Manhole	247.66	Cir	4.00	4.00	15	Cir	242.50	15	Cir	242.72
42	CB-A1-201	Grate	247.59	Cir	4.00	4.00	15	Cir	243.50			
43	CB-A1-102B	Grate	246.58	Cir	4.00	4.00	18	Cir	242.80			
44	CB-A1-102A	Manhole	247.56	Cir	4.00	4.00	15	Cir	243.50			
45	CB-A1-101	Manhole	245.84	Cir	4.00	4.00	18	Cir	242.00			
46	DMH-A3-201	Manhole	243.91	Cir	4.00	4.00	12	Cir	238.58	12 6	Cir Cir	240.48 238.72
47	RL-A3-202B	Manhole	248.14	Cir	0.83	0.83	12	Cir	241.29	12 6	Cir Cir	241.29 241.54
48	RL-A3-203B	Manhole	248.85	Cir	0.83	0.83	12	Cir	241.95	12 6	Cir Cir	241.95 242.20
49	DMH-A3-202	Manhole	248.13	Cir	4.00	4.00	12	Cir	242.58	6	Cir	243.02
50	RL-A3-204B	Manhole	248.67	Cir	0.83	0.83	6	Cir	243.78	6	Cir	243.78
51	RL-A3-204A	Manhole	248.87	Cir	0.83	0.83	6	Cir	243.86	6	Cir	243.86
52	RL-A3-204	Manhole	249.00	Cir	0.83	0.83	6	Cir	244.00			
53	RL-A3-203A	Manhole	248.86	Cir	0.83	0.83	6	Cir	243.47	6	Cir	243.74
54	RL-A3-203	Manhole	249.00	Cir	0.83	0.83	6	Cir	244.00			
55	RL-A3-202A	Manhole	248.66	Cir	0.83	0.83	6	Cir	244.08	6	Cir	243.74
56	RL-A3-202	Manhole	249.00	Cir	0.83	0.83	6	Cir	244.00			
57	RL-A3-201B	Manhole	244.26	Cir	0.83	0.83	6	Cir	239.48	6	Cir	239.48
58	RL-A3-201A	Manhole	244.30	Cir	0.83	0.83	6	Cir	239.56	6	Cir	239.56
59	RL-A3-201	Manhole	244.60	Cir	0.83	0.83	6	Cir	240.00			
Project File: 2026-09-18 MMC Storm Network.stm							Number of Structures: 74			Run Date: 9/21/2026		

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
60	DMH-A3-101	Manhole	244.94	Cir	4.00	4.00	6	Cir	237.78	6 6	Cir Cir	239.57 238.75
61	RL-A3-102B	Manhole	244.92	Cir	0.83	0.83	6	Cir	239.78	6	Cir	239.78
62	RL-A3-102A	Manhole	244.95	Cir	0.83	0.83	6	Cir	239.86	6	Cir	239.86
63	RL-A3-102	Manhole	245.00	Cir	0.83	0.83	6	Cir	240.00			
64	RL-A3-101B	Manhole	244.02	Cir	0.83	0.83	6	Cir	239.78	6	Cir	239.78
65	RL-A3-101A	Manhole	244.00	Cir	0.83	0.83	6	Cir	239.86	6	Cir	239.86
66	RL-A3-101	Manhole	244.12	Cir	0.83	0.83	6	Cir	240.00			
67	DMH-A2-101 (WQU)	Manhole	242.71	Cir	4.00	4.00	18	Cir	238.30	15 15	Cir Cir	238.87 238.79
68	DCB-A2-101B	Manhole	243.14	Cir	4.00	4.00	15	Cir	239.50			
69	CB-A2-101A	Manhole	245.72	Rect	4.00	4.00	15	Cir	241.50			
70	DMH-B1-201 (WQU)	Manhole	243.70	Cir	4.00	4.00	12	Cir	236.40	12 12	Cir Cir	237.57 236.46
71	CB-B1-201B	Manhole	242.00	Cir	4.00	4.00	12	Cir	238.50			
72	CB-B1-201A	Manhole	240.13	Cir	4.00	4.00	12	Cir	236.90			
73	OCS-A1-101	Grate	242.60	Cir	2.00	2.00	18	Cir	238.00			
74	OCS-A2-101	Grate	240.30	Rect	2.00	2.00	24	Cir	234.87			
Project File: 2026-09-18 MMC Storm Network.stm							Number of Structures: 74			Run Date: 9/21/2026		

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	DMH-B1-101 (WQU) TO INLET-B1-101	1.83	24	Cir	92.504	237.50	238.43	1.005	238.62	239.55	0.46	239.55	End	Manhole
2	DMH-B1-102 TO DMH-B1-101 (WQU)	0.21	24	Cir	85.421	238.50	239.35	0.995	239.55	240.43	0.33	240.43	1	Manhole
3	DMH-B1-103 TO DMH-B1-102	6.14	24	Cir	69.829	239.40	240.10	1.002	240.43	240.98	n/a	240.98 j	2	Manhole
4	DMH-B1-104 TO DMH-B1-103	5.45	24	Cir	68.187	240.20	240.88	0.997	240.98	241.70	0.31	241.70	3	Manhole
5	DMH-B1-105 TO DMH-B1-104	3.96	24	Cir	86.300	240.94	241.80	0.997	241.70	242.50	n/a	242.50 j	4	Manhole
6	DMH-B1-106 TO DMH-B1-105	2.73	24	Cir	67.552	242.02	242.70	1.007	242.50	243.28	0.20	243.28	5	Manhole
7	CB-B1-107 TO DMH-B1-107	0.51	15	Cir	21.987	248.78	249.00	1.001	249.01	249.28	n/a	249.28	6	Manhole
8	CB-B1-105 TO DMH-B1-105	1.67	12	Cir	22.361	243.95	244.40	2.012	244.33	244.95	n/a	244.95	5	Manhole
9	CB-B1-104 TO DMH-B1-104	2.11	12	Cir	13.000	243.74	244.00	2.000	244.17	244.62	0.26	244.62	4	Manhole
10	DMH-B1-201 TO DMH-B1-106	2.34	15	Cir	64.082	242.86	243.50	0.999	243.36	244.11	0.20	244.11	6	Manhole
11	CB-B1-201 TO DMH-B1-201	2.40	15	Cir	41.501	243.59	244.00	0.988	244.11	244.62	n/a	244.62	10	Grate
12	CB-B1-103 TO DMH-B1-103	1.09	12	Cir	14.142	240.86	241.00	0.990	241.23	241.44	n/a	241.44	3	Grate
13	CB-B1-101 TO DMH-B1-101 (WQU)	0.09	12	Cir	15.422	240.69	241.00	2.010	240.99	241.44	n/a	241.44	1	Manhole
14	DCB-B1-102 TO DMH-B1-102	4.22	12	Cir	14.142	239.72	240.00	1.980	240.43	240.87	n/a	240.87	2	Grate
15	DMH-B3-102 TO DMH-B3-101	15.06	24	Cir	14.560	232.50	232.65	1.030	233.90	234.05	n/a	234.05	End	Manhole
16	DMH-B3-103 TO DMH-B3-102	5.40	24	Cir	50.691	233.49	234.00	1.006	234.13	234.82	0.31	234.82	15	Manhole
17	DMH-B3-104 TO DMH-B3-103	5.54	24	Cir	64.417	234.41	235.06	1.009	235.06	235.89	n/a	235.89	16	Manhole
18	DMH-B3-105 TO DMH-B3-104	1.37	12	Cir	49.813	237.40	237.90	1.004	237.81	238.40	n/a	238.40	17	Manhole
19	RL-B3-101B TO DMH-B3-105	1.39	12	Cir	39.677	237.93	238.32	0.983	238.40	238.82	0.15	238.82	18	Manhole
20	RL-B3-102B TO RL-B3-101B	1.32	12	Cir	67.594	238.32	239.00	1.006	238.82	239.49	n/a	239.49 j	19	Manhole
21	DMH-B3-106 TO RL-B3-102B	1.28	12	Cir	111.736	239.00	240.12	1.002	239.49	240.60	n/a	240.60 j	20	Manhole
22	DMH-B3-107 (WQU) TO DMH-B3-102	1.28	12	Cir	94.638	243.05	244.00	1.004	243.45	244.48	n/a	244.48	21	Manhole
23	YD-B3-107B TO DMH-B3-107 (WQU)	0.73	12	Cir	21.037	245.29	245.50	0.998	245.58	245.86	n/a	245.86	22	Grate
24	YD-B3-107A TO DMH-B3-107 (WQU)	0.65	12	Cir	55.746	244.44	245.00	1.005	244.72	245.34	n/a	245.34	22	Grate

Project File: 2026-09-18 MMC Storm Network.stm

Number of lines: 74

Run Date: 9/21/2026

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	RL-B3-103A TO DMH-B3-106	0.13	6	Cir	26.318	242.61	242.87	0.988	242.77	243.05	0.05	243.05	21	Manhole
26	RL-B3-104C TO RL-B3-103A	0.06	6	Cir	4.243	243.08	243.56	11.314	243.14	243.68	0.03	243.68	25	Manhole
27	RL-B3-104B TO RL-B3-104C	0.07	6	Cir	32.359	243.56	243.89	1.020	243.68	244.02	n/a	244.02	26	Manhole
28	RL-B3-104A TO RL-B3-104B	0.07	6	Cir	4.243	243.89	243.93	0.943	244.02	244.06	0.04	244.06	27	Manhole
29	RL-B3-104 TO RL-B3-104A	0.07	6	Cir	7.000	243.93	244.00	1.000	244.06	244.13	0.05	244.13	28	Manhole
30	RL-B3-103 TO RL-B3-103A	0.07	6	Cir	13.000	242.87	243.00	1.000	243.05	243.13	n/a	243.13 j	25	Manhole
31	BUILDING OUTLET TO DMH-B3-106	16.67	12	Cir	23.000	239.77	240.00	1.000	240.77*	241.27*	0.81	242.08	17	Manhole
32	RL-B3-101A TO RL-B3-101B	0.14	6	Cir	4.243	239.87	239.92	1.179	240.03	240.11	0.05	240.11	19	Manhole
33	RL-B3-102A TO RL-B3-102B	0.14	6	Cir	4.243	239.50	239.81	7.307	239.60	240.00	0.05	240.00	20	Manhole
34	RL-B3-102 TO RL-B3-102A	0.15	6	Cir	19.146	239.81	240.00	0.992	240.00	240.19	n/a	240.19	33	Manhole
35	RL-B3-101 TO RL-B3-101A	0.15	6	Cir	19.459	239.81	240.00	0.976	240.11	240.19	n/a	240.19 j	32	Manhole
36	WATER QUALITY VAULT B1 TO OCS-B1-101	9.76	12	Cir	13.417	232.67	232.80	0.969	234.05*	234.91*	0.36	235.27	15	Manhole
37	OCS-B1-101 TO WATER QUALITY VAULT B1	9.76	12	Cir	20.000	235.80	236.00	1.000	236.80*	238.08*	0.36	238.44	36	Manhole
38	OUTLET-B1-101 TO OCS-B1-101	9.76	12	Cir	10.583	236.00	236.00	0.000	238.44*	239.12*	2.40	241.52	37	Manhole
39	DMH-A1-101 (WQU) TO FES-A1-101	16.29	30	Cir	95.364	240.00	240.95	0.996	240.83	241.78	n/a	241.78	End	Manhole
40	DMH-A1-102 TO DMH-A1-101 (WQU)	16.67	30	Cir	56.617	241.00	241.57	1.007	241.78	242.28	n/a	242.28 j	39	Manhole
41	DMH-A1-201 TO DMH-A1-102	0.91	15	Cir	60.083	241.90	242.50	0.999	242.28	242.88	n/a	242.88 j	40	Manhole
42	CB-A1-201 TO DMH-A1-201	1.02	15	Cir	78.346	242.72	243.50	0.996	243.04	243.90	n/a	243.90	41	Grate
43	CB-A1-102B TO DMH-A1-102	2.84	18	Cir	41.400	242.39	242.80	0.990	242.90	243.44	n/a	243.44	40	Grate
44	CB-A1-102A TO DMH-A1-102	1.75	15	Cir	169.294	241.81	243.50	0.998	242.28	244.02	n/a	244.02	40	Manhole
45	CB-A1-101 TO DMH-A1-101 (WQU)	12.33	18	Cir	51.545	241.48	242.00	1.009	241.94	242.58	n/a	242.58	39	Manhole
46	DMH-A3-201 TO OUTLET-A3-201	0.40	12	Cir	195.609	234.67	238.58	1.999	234.93	238.84	n/a	238.84	End	Manhole
47	RL-A3-202B TO DMH-A3-201	0.32	12	Cir	40.667	240.48	241.29	1.992	240.64	241.52	n/a	241.52	46	Manhole
48	RL-A3-203B TO RL-A3-202B	0.23	12	Cir	33.000	241.29	241.95	2.000	241.52	242.15	n/a	242.15 j	47	Manhole

Project File: 2026-09-18 MMC Storm Network.stm

Number of lines: 74

Run Date: 9/21/2026

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
49	DMH-A3-202 TO RL-A3-203B	0.13	12	Cir	31.667	241.95	242.58	1.989	242.15	242.73	n/a	242.73 j	48	Manhole
50	RL-A3-204B TO DMH-A3-202	0.14	6	Cir	38.000	243.02	243.78	2.000	243.16	243.97	0.05	243.97	49	Manhole
51	RL-A3-204A TO RL-A3-204B	0.14	6	Cir	4.243	243.78	243.86	1.886	243.97	244.05	0.05	244.05	50	Manhole
52	RL-A3-204 TO RL-A3-204A	0.15	6	Cir	7.000	243.86	244.00	2.000	244.05	244.19	n/a	244.19	51	Manhole
53	RL-A3-203A TO RL-A3-203B	0.14	6	Cir	4.243	242.20	243.47	29.934	242.27	243.66	n/a	243.66	48	Manhole
54	RL-A3-203 TO RL-A3-203A	0.15	6	Cir	13.000	243.74	244.00	2.000	243.88	244.19	n/a	244.19	53	Manhole
55	RL-A3-202A TO RL-A3-202B	0.14	6	Cir	4.243	241.54	244.08	59.869	241.60	244.27	n/a	244.27	47	Manhole
56	RL-A3-202 TO RL-A3-202A	0.15	6	Cir	13.000	243.74	244.00	2.000	244.27	244.26	0.03	244.29	55	Manhole
57	RL-A3-201B TO DMH-A3-201	0.14	6	Cir	38.000	238.72	239.48	2.000	238.86	239.67	n/a	239.67	46	Manhole
58	RL-A3-201A TO RL-A3-201B	0.14	6	Cir	4.243	239.48	239.56	1.886	239.67	239.75	0.05	239.75	57	Manhole
59	RL-A3-201 TO RL-A3-201A	0.15	6	Cir	22.000	239.56	240.00	2.000	239.75	240.19	n/a	240.19	58	Manhole
60	DMH-A3-101 TO OUTLET-A3-101	0.12	6	Cir	165.841	234.46	237.78	2.002	234.63	237.95	n/a	237.95	End	Manhole
61	RL-A3-102B TO DMH-A3-101	0.07	6	Cir	10.084	239.57	239.78	2.082	239.67	239.91	n/a	239.91	60	Manhole
62	RL-A3-102A TO RL-A3-102B	0.07	6	Cir	4.243	239.78	239.86	1.886	239.91	239.99	0.04	239.99	61	Manhole
63	RL-A3-102 TO RL-A3-102A	0.07	6	Cir	7.000	239.86	240.00	2.000	239.99	240.13	0.05	240.13	62	Manhole
64	RL-A3-101B TO DMH-A3-101	0.07	6	Cir	51.270	238.75	239.78	2.009	238.85	239.91	n/a	239.91	60	Manhole
65	RL-A3-101A TO RL-A3-101B	0.07	6	Cir	4.243	239.78	239.86	1.886	239.91	239.99	0.04	239.99	64	Manhole
66	RL-A3-101 TO RL-A3-101A	0.07	6	Cir	7.000	239.86	240.00	2.000	239.99	240.13	0.05	240.13	65	Manhole
67	DMH-A2-101 (WQU) TO FES-A2-101	0.06	18	Cir	29.948	238.00	238.30	1.002	238.77	239.07	0.28	239.07	End	Manhole
68	DCB-A2-101B TO DMH-A2-101 (WQU)	0.69	15	Cir	31.313	238.87	239.50	2.012	239.31	240.16	n/a	240.16	67	Manhole
69	CB-A2-101A TO DMH-A2-101 (WQU)	0.82	15	Cir	135.714	238.79	241.50	1.997	239.15	242.04	n/a	242.04	67	Manhole
70	DMH-B1-201 (WQU) TO INLET-B1-201	0.275	12	Cir	10.000	236.30	236.40	1.000	237.01	237.11	n/a	237.11	End	Manhole
71	CB-B1-201B TO DMH-B1-201 (WQU)	0.80	12	Cir	92.650	237.57	238.50	1.004	237.88	238.87	0.14	238.87	70	Manhole
72	CB-B1-201A TO DMH-B1-201 (WQU)	0.25	12	Cir	43.899	236.46	236.90	1.002	237.11	237.54	n/a	237.54 j	70	Manhole

Project File: 2026-09-18 MMC Storm Network.stm

Number of lines: 74

Run Date: 9/21/2026

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
73	OCS-A1-101 TO OUTLET-A1-101	6.94	18	Cir	28.202	236.87	238.00	4.007	237.89	239.02	0.46	239.02	End	Grate
74	OCS-A2-101 TO OUTLET-A2-101	4.06	24	Cir	40.701	234.06	234.87	1.990	234.77	235.58	n/a	235.58	End	Grate
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Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	92.504	0.00	1.80	0.00	0.00	1.62	0.0	10.8	6.1	9.83	24.57	5.43	24	1.01	237.50	238.43	238.62	239.55	244.72	244.63	DMH-B1-101 (WQ
2	1	85.421	0.00	1.65	0.00	0.00	1.49	0.0	10.4	6.2	9.21	24.44	5.41	24	1.00	238.50	239.35	239.55	240.43	244.63	243.59	DMH-B1-102 TO
3	2	69.829	0.00	1.07	0.00	0.00	0.96	0.0	9.8	6.4	6.14	24.53	4.19	24	1.00	239.40	240.10	240.43	240.98	243.59	244.50	DMH-B1-103 TO
4	3	68.187	0.00	0.92	0.00	0.00	0.83	0.0	9.2	6.6	5.45	24.47	4.65	24	1.00	240.20	240.88	240.98	241.70	244.50	247.47	DMH-B1-104 TO
5	4	86.300	0.00	0.63	0.00	0.00	0.57	0.0	8.2	7.0	3.96	24.46	3.83	24	1.00	240.94	241.80	241.70	242.50	247.47	248.48	DMH-B1-105 TO
6	5	67.552	0.00	0.40	0.00	0.00	0.36	0.0	6.9	7.6	2.73	24.58	4.20	24	1.01	242.02	242.70	242.50	243.28	248.48	248.54	DMH-B1-106 TO
7	6	21.987	0.07	0.07	0.90	0.06	0.06	6.0	6.0	8.1	0.51	7.00	2.91	15	1.00	248.78	249.00	249.01	249.28	248.54	252.81	CB-B1-107 TO D
8	5	22.361	0.23	0.23	0.90	0.21	0.21	6.0	6.0	8.1	1.67	5.47	4.95	12	2.01	243.95	244.40	244.33	244.95	248.48	247.82	CB-B1-105 TO D
9	4	13.000	0.29	0.29	0.90	0.26	0.26	6.0	6.0	8.1	2.11	5.46	5.31	12	2.00	243.74	244.00	244.17	244.62	247.47	247.41	CB-B1-104 TO D
10	6	64.082	0.00	0.33	0.00	0.00	0.30	0.0	6.4	7.9	2.34	6.99	4.53	15	1.00	242.86	243.50	243.36	244.11	248.54	248.64	DMH-B1-201 TO
11	10	41.501	0.33	0.33	0.90	0.30	0.30	6.0	6.0	8.1	2.40	6.95	4.46	15	0.99	243.59	244.00	244.11	244.62	248.64	247.46	CB-B1-201 TO D
12	3	14.142	0.15	0.15	0.90	0.14	0.14	6.0	6.0	8.1	1.09	3.84	3.75	12	0.99	240.86	241.00	241.23	241.44	244.50	244.70	CB-B1-103 TO D
13	1	15.422	0.15	0.15	0.90	0.14	0.14	6.0	6.0	8.1	1.09	5.47	4.36	12	2.01	240.69	241.00	240.99	241.44	244.63	244.51	CB-B1-101 TO D
14	2	14.142	0.58	0.58	0.90	0.52	0.52	6.0	6.0	8.1	4.22	5.43	6.44	12	1.98	239.72	240.00	240.43	240.87	243.59	243.30	DCB-B1-102 TO
15	End	14.560	0.00	1.21	0.00	0.00	0.93	0.0	12.0	5.7	15.06	24.87	6.42	24	1.03	232.50	232.65	233.90	234.05	242.28	242.86	DMH-B3-102 TO
16	15	50.691	0.00	1.21	0.00	0.00	0.93	0.0	11.6	5.8	5.40	24.58	5.36	24	1.01	233.49	234.00	234.13	234.82	242.86	245.95	DMH-B3-103 TO
17	16	64.417	0.00	1.21	0.00	0.00	0.93	0.0	11.1	6.0	5.54	24.61	5.41	24	1.01	234.41	235.06	235.06	235.89	245.95	246.43	DMH-B3-104 TO
18	17	49.813	0.00	0.43	0.00	0.00	0.23	0.0	10.7	6.1	1.37	3.87	4.02	12	1.00	237.40	237.90	237.81	238.40	246.43	244.21	DMH-B3-105 TO
19	18	39.677	0.00	0.43	0.00	0.00	0.23	0.0	10.4	6.2	1.39	3.83	3.73	12	0.98	237.93	238.32	238.40	238.82	244.21	244.17	RL-B3-101B TO D
20	19	67.594	0.00	0.41	0.00	0.00	0.21	0.0	9.8	6.4	1.32	3.87	3.43	12	1.01	238.32	239.00	238.82	239.49	244.17	244.13	RL-B3-102B TO R
21	20	111.736	0.00	0.39	0.00	0.00	0.19	0.0	8.8	6.8	1.28	3.86	3.41	12	1.00	239.00	240.12	239.49	240.60	244.13	247.89	DMH-B3-106 TO
22	21	94.638	0.00	0.37	0.00	0.00	0.17	0.0	7.1	7.5	1.28	3.87	3.94	12	1.00	243.05	244.00	243.45	244.48	247.89	248.98	DMH-B3-107 (WQ
Project File: 2026-09-18 MMC Storm Network.stm																Number of lines: 74				Run Date: 9/21/2026		
NOTES:Intensity = 40.05 / (Inlet time + 3.60) ^ 0.71; Return period =Yrs. 25 ; c = cir e = ellip b = box																						

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
23	22	21.037	0.10	0.10	0.90	0.09	0.09	6.0	6.0	8.1	0.73	3.85	3.34	12	1.00	245.29	245.50	245.58	245.86	248.98	249.54	YD-B3-107B TO
24	22	55.746	0.27	0.27	0.30	0.08	0.08	6.0	6.0	8.1	0.65	3.87	3.24	12	1.00	244.44	245.00	244.72	245.34	248.98	248.97	YD-B3-107A TO
25	21	26.318	0.00	0.02	0.00	0.00	0.02	0.0	8.2	7.0	0.13	0.60	2.23	6	0.99	242.61	242.87	242.77	243.05	247.89	248.76	RL-B3-103A TO D
26	25	4.243	0.00	0.01	0.00	0.00	0.01	0.0	8.0	7.1	0.06	2.04	3.19	6	11.31	243.08	243.56	243.14	243.68	248.76	248.83	RL-B3-104C TO R
27	26	32.359	0.00	0.01	0.00	0.00	0.01	0.0	6.5	7.8	0.07	0.61	1.79	6	1.02	243.56	243.89	243.68	244.02	248.83	248.90	RL-B3-104B TO R
28	27	4.243	0.00	0.01	0.00	0.00	0.01	0.0	6.3	7.9	0.07	0.59	1.74	6	0.94	243.89	243.93	244.02	244.06	248.90	248.93	RL-B3-104A TO R
29	28	7.000	0.01	0.01	0.90	0.01	0.01	6.0	6.0	8.1	0.07	0.61	1.76	6	1.00	243.93	244.00	244.06	244.13	248.93	249.00	RL-B3-104 TO RL
30	25	13.000	0.01	0.01	0.90	0.01	0.01	6.0	6.0	8.1	0.07	0.61	1.46	6	1.00	242.87	243.00	243.05	243.13	248.76	249.00	RL-B3-103 TO RL
31	17	23.000	0.78	0.78	0.90	0.70	0.70	6.0	6.0	8.1	5.67	3.86	7.22	12	1.00	239.77	240.00	240.77	241.27	246.43	245.33	BUILDING OUTL
32	19	4.243	0.00	0.02	0.00	0.00	0.02	0.0	6.4	7.8	0.14	0.66	2.39	6	1.18	239.87	239.92	240.03	240.11	244.17	244.22	RL-B3-101A TO R
33	20	4.243	0.00	0.02	0.00	0.00	0.02	0.0	6.4	7.8	0.14	1.64	3.61	6	7.31	239.50	239.81	239.60	240.00	244.13	244.21	RL-B3-102A TO R
34	33	19.146	0.02	0.02	0.90	0.02	0.02	6.0	6.0	8.1	0.15	0.61	2.16	6	0.99	239.81	240.00	240.00	240.19	244.21	245.00	RL-B3-102 TO RL
35	32	19.459	0.02	0.02	0.90	0.02	0.02	6.0	6.0	8.1	0.15	0.60	1.67	6	0.98	239.81	240.00	240.11	240.19	244.22	245.00	RL-B3-101 TO RL
36	15	13.417	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	9.76	3.80	12.43	12	0.97	232.67	232.80	234.05	234.91	242.86	243.40	WATER QUALITY
37	36	20.000	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	9.76	3.86	12.43	12	1.00	235.80	236.00	236.80	238.08	243.40	244.18	OCS-B1-101 TO
38	37	10.583	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	9.76	0.00	12.43	12	0.00	236.00	236.00	238.44	239.12	244.18	244.45	OUTLET-B1-101
39	End	95.364	0.00	1.09	0.00	0.00	0.98	0.0	9.7	6.4	6.29	44.34	4.42	30	1.00	240.00	240.95	240.83	241.78	242.83	247.23	DMH-A1-101 (WQ
40	39	56.617	0.00	0.77	0.00	0.00	0.69	0.0	8.8	6.7	4.67	44.58	3.81	30	1.01	241.00	241.57	241.78	242.28	247.23	246.47	DMH-A1-102 TO
41	40	60.083	0.00	0.14	0.00	0.00	0.13	0.0	7.6	7.3	0.91	6.99	2.92	15	1.00	241.90	242.50	242.28	242.88	246.47	247.66	DMH-A1-201 TO
42	41	78.346	0.14	0.14	0.90	0.13	0.13	6.0	6.0	8.1	1.02	6.98	3.55	15	1.00	242.72	243.50	243.04	243.90	247.66	247.59	CB-A1-201 TO D
43	40	41.400	0.39	0.39	0.90	0.35	0.35	6.0	6.0	8.1	2.84	11.32	4.64	18	0.99	242.39	242.80	242.90	243.44	246.47	246.58	CB-A1-102B TO
44	40	169.294	0.24	0.24	0.90	0.22	0.22	6.0	6.0	8.1	1.75	6.99	3.85	15	1.00	241.81	243.50	242.28	244.02	246.47	247.56	CB-A1-102A TO
Project File: 2026-09-18 MMC Storm Network.stm																Number of lines: 74				Run Date: 9/21/2026		
NOTES:Intensity = 40.05 / (Inlet time + 3.60) ^ 0.71; Return period =Yrs. 25 ; c = cir e = ellip b = box																						

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
45	39	51.545	0.32	0.32	0.90	0.29	0.29	6.0	6.0	8.1	2.33	11.43	4.40	18	1.01	241.48	242.00	241.94	242.58	247.23	245.84	CB-A1-101 TO D
46	End	195.609	0.00	0.08	0.00	0.00	0.07	0.0	12.8	5.5	0.40	5.45	2.45	12	2.00	234.67	238.58	234.93	238.84	237.26	243.91	DMH-A3-201 TO
47	46	40.667	0.00	0.06	0.00	0.00	0.05	0.0	11.6	5.9	0.32	5.44	3.04	12	1.99	240.48	241.29	240.64	241.52	243.91	248.14	RL-A3-202B TO D
48	47	33.000	0.00	0.04	0.00	0.00	0.04	0.0	10.0	6.3	0.23	5.46	1.87	12	2.00	241.29	241.95	241.52	242.15	248.14	248.85	RL-A3-203B TO R
49	48	31.667	0.00	0.02	0.00	0.00	0.02	0.0	7.1	7.5	0.13	5.44	1.53	12	1.99	241.95	242.58	242.15	242.73	248.85	248.13	DMH-A3-202 TO
50	49	38.000	0.00	0.02	0.00	0.00	0.02	0.0	6.3	7.9	0.14	0.86	2.68	6	2.00	243.02	243.78	243.16	243.97	248.13	248.67	RL-A3-204B TO D
51	50	4.243	0.00	0.02	0.00	0.00	0.02	0.0	6.2	8.0	0.14	0.83	2.13	6	1.89	243.78	243.86	243.97	244.05	248.67	248.87	RL-A3-204A TO R
52	51	7.000	0.02	0.02	0.90	0.02	0.02	6.0	6.0	8.1	0.15	0.86	2.14	6	2.00	243.86	244.00	244.05	244.19	248.87	249.00	RL-A3-204 TO RL
53	48	4.243	0.00	0.02	0.00	0.00	0.02	0.0	6.3	7.9	0.14	3.32	5.27	6	29.93	242.20	243.47	242.27	243.66	248.85	248.86	RL-A3-203A TO R
54	53	13.000	0.02	0.02	0.90	0.02	0.02	6.0	6.0	8.1	0.15	0.86	2.69	6	2.00	243.74	244.00	243.88	244.19	248.86	249.00	RL-A3-203 TO RL
55	47	4.243	0.00	0.02	0.00	0.00	0.02	0.0	6.3	7.9	0.14	4.70	6.43	6	59.87	241.54	244.08	241.60	244.27	248.14	248.66	RL-A3-202A TO R
56	55	13.000	0.02	0.02	0.90	0.02	0.02	6.0	6.0	8.1	0.15	0.86	1.07	6	2.00	243.74	244.00	244.27	244.26	248.66	249.00	RL-A3-202 TO RL
57	46	38.000	0.00	0.02	0.00	0.00	0.02	0.0	6.6	7.7	0.14	0.86	2.66	6	2.00	238.72	239.48	238.86	239.67	243.91	244.26	RL-A3-201B TO D
58	57	4.243	0.00	0.02	0.00	0.00	0.02	0.0	6.5	7.8	0.14	0.83	2.11	6	1.89	239.48	239.56	239.67	239.75	244.26	244.30	RL-A3-201A TO R
59	58	22.000	0.02	0.02	0.90	0.02	0.02	6.0	6.0	8.1	0.15	0.86	2.16	6	2.00	239.56	240.00	239.75	240.19	244.30	244.60	RL-A3-201 TO RL
60	End	165.841	0.00	0.02	0.00	0.00	0.02	0.0	8.8	6.7	0.12	0.86	2.02	6	2.00	234.46	237.78	234.63	237.95	235.63	244.94	DMH-A3-101 TO
61	60	10.084	0.00	0.01	0.00	0.00	0.01	0.0	6.5	7.8	0.07	0.88	2.20	6	2.08	239.57	239.78	239.67	239.91	244.94	244.92	RL-A3-102B TO D
62	61	4.243	0.00	0.01	0.00	0.00	0.01	0.0	6.3	7.9	0.07	0.83	1.74	6	1.89	239.78	239.86	239.91	239.99	244.92	244.95	RL-A3-102A TO R
63	62	7.000	0.01	0.01	0.90	0.01	0.01	6.0	6.0	8.1	0.07	0.86	1.76	6	2.00	239.86	240.00	239.99	240.13	244.95	245.00	RL-A3-102 TO RL
64	60	51.270	0.00	0.01	0.00	0.00	0.01	0.0	6.5	7.8	0.07	0.86	2.18	6	2.01	238.75	239.78	238.85	239.91	244.94	244.02	RL-A3-101B TO D
65	64	4.243	0.00	0.01	0.00	0.00	0.01	0.0	6.3	7.9	0.07	0.83	1.74	6	1.89	239.78	239.86	239.91	239.99	244.02	244.00	RL-A3-101A TO R
66	65	7.000	0.01	0.01	0.90	0.01	0.01	6.0	6.0	8.1	0.07	0.86	1.76	6	2.00	239.86	240.00	239.99	240.13	244.00	244.12	RL-A3-101 TO RL
Project File: 2026-09-18 MMC Storm Network.stm																Number of lines: 74				Run Date: 9/21/2026		
NOTES:Intensity = 40.05 / (Inlet time + 3.60) ^ 0.71; Return period =Yrs. 25 ; c = cir e = ellip b = box																						

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
67	End	29.948	0.00	0.62	0.00	0.00	0.56	0.0	7.5	7.3	4.06	11.39	4.44	18	1.00	238.00	238.30	238.77	239.07	239.75	242.71	DMH-A2-101 (WQ
68	67	31.313	0.37	0.37	0.90	0.33	0.33	6.0	6.0	8.1	2.69	9.92	5.49	15	2.01	238.87	239.50	239.31	240.16	242.71	243.14	DCB-A2-101B TO
69	67	135.714	0.25	0.25	0.90	0.23	0.23	6.0	6.0	8.1	1.82	9.89	4.88	15	2.00	238.79	241.50	239.15	242.04	242.71	245.72	CB-A2-101A TO
70	End	10.000	0.00	0.42	0.00	0.00	0.38	0.0	7.5	7.3	2.75	3.86	4.61	12	1.00	236.30	236.40	237.01	237.11	242.93	243.70	DMH-B1-201 (WQ
71	70	92.650	0.11	0.11	0.90	0.10	0.10	6.0	6.0	8.1	0.80	3.87	3.43	12	1.00	237.57	238.50	237.88	238.87	243.70	242.00	CB-B1-201B TO
72	70	43.899	0.31	0.31	0.90	0.28	0.28	6.0	6.0	8.1	2.25	3.86	4.20	12	1.00	236.46	236.90	237.11	237.54	243.70	240.13	CB-B1-201A TO
73	End	28.202	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.94	22.77	5.43	18	4.01	236.87	238.00	237.89	239.02	239.35	242.60	OCS-A1-101 TO
74	End	40.701	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.06	34.57	4.09	24	1.99	234.06	234.87	234.77	235.58	236.81	240.30	OCS-A2-101 TO
Project File: 2026-09-18 MMC Storm Network.stm																Number of lines: 74				Run Date: 9/21/2026		
NOTES:Intensity = 40.05 / (Inlet time + 3.60) ^ 0.71; Return period =Yrs. 25 ; c = cir e = ellip b = box																						

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
1	24	9.83	237.50	238.62	1.12	1.81	5.43	0.46	239.08	0.000	92.504	238.43	239.55	1.12**	1.81	5.43	0.46	240.01	0.000	0.000	n/a	1.00	0.46
2	24	9.21	238.50	239.55	1.05	1.67	5.51	0.44	239.99	0.000	85.421	239.35	240.43	1.08**	1.74	5.30	0.44	240.87	0.000	0.000	n/a	0.75	0.33
3	24	6.14	239.40	240.43	1.03	1.32	3.75	0.33	240.77	0.000	69.829	240.10	240.98 j	0.88**	1.32	4.64	0.33	241.31	0.000	0.000	n/a	0.75	n/a
4	24	5.45	240.20	240.98	0.78	1.13	4.84	0.31	241.29	0.000	68.187	240.88	241.70	0.82**	1.22	4.47	0.31	242.01	0.000	0.000	n/a	1.00	0.31
5	24	3.96	240.94	241.70	0.76	0.98	3.60	0.26	241.96	0.000	86.300	241.80	242.50 j	0.70**	0.98	4.07	0.26	242.75	0.000	0.000	n/a	0.47	n/a
6	24	2.73	242.02	242.50	0.48	0.58	4.74	0.21	242.70	0.000	67.552	242.70	243.28	0.58**	0.75	3.65	0.21	243.48	0.000	0.000	n/a	0.97	0.20
7	15	0.51	248.78	249.01	0.23*	0.15	3.32	0.10	249.11	0.000	21.987	249.00	249.28	0.28**	0.20	2.51	0.10	249.38	0.000	0.000	n/a	1.00	n/a
8	12	1.67	243.95	244.33	0.38*	0.27	6.12	0.22	244.55	0.000	22.361	244.40	244.95	0.55**	0.44	3.79	0.22	245.17	0.000	0.000	n/a	1.00	n/a
9	12	2.11	243.74	244.17	0.43*	0.32	6.50	0.26	244.44	0.000	13.000	244.00	244.62	0.62**	0.51	4.12	0.26	244.88	0.000	0.000	n/a	1.00	0.26
10	15	2.34	242.86	243.36	0.50*	0.46	5.13	0.24	243.60	0.000	64.082	243.50	244.11	0.61**	0.60	3.92	0.24	244.35	0.000	0.000	n/a	0.82	0.20
11	15	2.40	243.59	244.11	0.52	0.48	4.96	0.24	244.35	0.000	41.501	244.00	244.62	0.62**	0.61	3.96	0.24	244.86	0.000	0.000	n/a	1.00	n/a
12	12	1.09	240.86	241.23	0.37*	0.26	4.21	0.17	241.39	0.000	14.142	241.00	241.44	0.44**	0.33	3.29	0.17	241.61	0.000	0.000	n/a	1.00	n/a
13	12	1.09	240.69	240.99	0.30*	0.20	5.43	0.17	241.16	0.000	15.422	241.00	241.44	0.44**	0.33	3.29	0.17	241.61	0.000	0.000	n/a	1.00	n/a
14	12	4.22	239.72	240.43	0.71	0.60	7.04	0.53	240.96	0.000	14.142	240.00	240.87	0.87**	0.72	5.84	0.53	241.40	0.000	0.000	n/a	1.00	n/a
15	24	15.06	232.50	233.90	1.40*	2.34	6.42	0.64	234.54	0.000	14.560	232.65	234.05	1.40**	2.34	6.42	0.64	234.69	0.000	0.000	n/a	0.99	n/a
16	24	5.40	233.49	234.13	0.64*	0.86	6.27	0.31	234.44	0.000	50.691	234.00	234.82	0.82**	1.21	4.46	0.31	235.13	0.000	0.000	n/a	1.00	0.31
17	24	5.54	234.41	235.06	0.65*	0.88	6.32	0.31	235.37	0.000	64.417	235.06	235.89	0.83**	1.23	4.50	0.31	236.20	0.000	0.000	n/a	1.00	n/a
18	12	1.37	237.40	237.81	0.41*	0.30	4.50	0.19	238.01	0.000	49.813	237.90	238.40	0.50**	0.39	3.54	0.19	238.59	0.000	0.000	n/a	1.00	n/a
19	12	1.39	237.93	238.40	0.47	0.36	3.90	0.20	238.59	0.000	39.677	238.32	238.82	0.50**	0.39	3.56	0.20	239.02	0.000	0.000	n/a	0.75	0.15
20	12	1.32	238.32	238.82	0.50	0.38	3.37	0.19	239.01	0.000	67.594	239.00	239.49 j	0.49**	0.38	3.50	0.19	239.68	0.000	0.000	n/a	0.75	0.14
21	12	1.28	239.00	239.49	0.49	0.37	3.37	0.19	239.67	0.000	111.736	240.12	240.60 j	0.48**	0.37	3.45	0.19	240.78	0.000	0.000	n/a	1.00	0.19
22	12	1.28	243.05	243.45	0.40*	0.29	4.42	0.19	243.63	0.000	94.638	244.00	244.48	0.48**	0.37	3.46	0.19	244.66	0.000	0.000	n/a	0.90	n/a

Project File: 2026-09-18 MMC Storm Network.stm

Number of lines: 74

Run Date: 9/21/2026

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
23	12	0.73	245.29	245.58	0.29*	0.19	3.77	0.13	245.72	0.000	21.037	245.50	245.86	0.36**	0.25	2.90	0.13	245.99	0.000	0.000	n/a	1.00	n/a
24	12	0.65	244.44	244.72	0.28*	0.18	3.66	0.12	244.84	0.000	55.746	245.00	245.34	0.34**	0.23	2.82	0.12	245.46	0.000	0.000	n/a	1.00	n/a
25	6	0.13	242.61	242.77	0.16*	0.05	2.43	0.06	242.83	0.000	26.318	242.87	243.05	0.18**	0.06	2.04	0.06	243.11	0.000	0.000	n/a	0.75	0.05
26	6	0.06	243.08	243.14	0.06*	0.01	4.70	0.04	243.18	0.000	4.243	243.56	243.68	0.12**	0.04	1.68	0.04	243.73	0.000	0.000	n/a	0.75	0.03
27	6	0.07	243.56	243.68	0.12	0.04	1.85	0.05	243.73	0.000	32.359	243.89	244.02	0.13**	0.04	1.73	0.05	244.07	0.000	0.000	n/a	0.75	n/a
28	6	0.07	243.89	244.02	0.13	0.04	1.75	0.05	244.07	0.000	4.243	243.93	244.06	0.13**	0.04	1.73	0.05	244.11	0.000	0.000	n/a	0.75	0.04
29	6	0.07	243.93	244.06	0.13	0.04	1.77	0.05	244.11	0.000	7.000	244.00	244.13	0.13**	0.04	1.75	0.05	244.18	0.000	0.000	n/a	1.00	0.05
30	6	0.07	242.87	243.05	0.18	0.04	1.18	0.05	243.09	0.000	13.000	243.00	243.13 j	0.13**	0.04	1.75	0.05	243.18	0.000	0.000	n/a	1.00	0.05
31	12	5.67	239.77	240.77	1.00*	0.79	7.22	0.81	241.58	2.163	23.000	240.00	241.27	1.00	0.79	7.22	0.81	242.08	2.162	2.163	0.497	1.00	0.81
32	6	0.14	239.87	240.03	0.16*	0.05	2.67	0.07	240.10	0.000	4.243	239.92	240.11	0.19**	0.07	2.11	0.07	240.18	0.000	0.000	n/a	0.75	0.05
33	6	0.14	239.50	239.60	0.10*	0.03	5.11	0.07	239.67	0.000	4.243	239.81	240.00	0.19**	0.07	2.11	0.07	240.07	0.000	0.000	n/a	0.75	0.05
34	6	0.15	239.81	240.00	0.19	0.07	2.18	0.07	240.07	0.000	19.146	240.00	240.19	0.19**	0.07	2.13	0.07	240.26	0.000	0.000	n/a	1.00	n/a
35	6	0.15	239.81	240.11	0.30	0.07	1.20	0.07	240.18	0.000	19.459	240.00	240.19 j	0.19**	0.07	2.13	0.07	240.26	0.000	0.000	n/a	1.00	n/a
36	12	9.76	232.67	234.05	1.00	0.79	12.43	2.40	236.45	6.403	13.417	232.80	234.91	1.00**	0.79	12.43	2.40	237.31	6.400	6.401	0.859	0.15	0.36
37	12	9.76	235.80	236.80	1.00*	0.79	12.43	2.40	239.20	6.403	20.000	236.00	238.08	1.00**	0.79	12.43	2.40	240.48	6.400	6.401	1.280	0.15	0.36
38	12	9.76	236.00	238.44	1.00	0.79	12.43	2.40	240.84	6.403	10.583	236.00	239.12	1.00**	0.79	12.43	2.40	241.52	6.400	6.401	0.677	1.00	2.40
39	30	6.29	240.00	240.83	0.83*	1.42	4.42	0.30	241.13	0.000	95.364	240.95	241.78	0.83**	1.42	4.42	0.30	242.08	0.000	0.000	n/a	1.00	n/a
40	30	4.67	241.00	241.78	0.78	1.15	3.57	0.26	242.04	0.000	56.617	241.57	242.28 j	0.71**	1.15	4.06	0.26	242.54	0.000	0.000	n/a	1.00	0.26
41	15	0.91	241.90	242.28	0.38	0.31	2.89	0.14	242.42	0.000	60.083	242.50	242.88 j	0.38**	0.31	2.95	0.14	243.01	0.000	0.000	n/a	0.37	0.05
42	15	1.02	242.72	243.04	0.32*	0.25	4.06	0.14	243.19	0.000	78.346	243.50	243.90	0.40**	0.33	3.04	0.14	244.04	0.000	0.000	n/a	1.00	n/a
43	18	2.84	242.39	242.90	0.51*	0.53	5.32	0.24	243.14	0.000	41.400	242.80	243.44	0.64**	0.72	3.95	0.24	243.68	0.000	0.000	n/a	1.00	n/a
44	15	1.75	241.81	242.28	0.47	0.42	4.13	0.20	242.48	0.000	169.29	243.50	244.02	0.52**	0.49	3.57	0.20	244.22	0.000	0.000	n/a	1.00	n/a

Project File: 2026-09-18 MMC Storm Network.stm

Number of lines: 74

Run Date: 9/21/2026

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream								Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
45	18	2.33	241.48	241.94	0.46*	0.46	5.07	0.22	242.15	0.000	51.545	242.00	242.58	0.58**	0.63	3.72	0.22	242.79	0.000	0.000	n/a	1.00	n/a
46	12	0.40	234.67	234.93	0.26*	0.16	2.45	0.09	235.02	0.000	195.609	238.58	238.84	0.26**	0.16	2.45	0.09	238.93	0.000	0.000	n/a	1.00	n/a
47	12	0.32	240.48	240.64	0.16*	0.08	3.78	0.08	240.73	0.000	40.667	241.29	241.52	0.23**	0.14	2.30	0.08	241.60	0.000	0.000	n/a	0.75	n/a
48	12	0.23	241.29	241.52	0.23	0.11	1.65	0.07	241.59	0.000	33.000	241.95	242.15 j	0.20**	0.11	2.10	0.07	242.21	0.000	0.000	n/a	0.75	0.05
49	12	0.13	241.95	242.15	0.20	0.07	1.24	0.05	242.20	0.000	31.667	242.58	242.73 j	0.15**	0.07	1.82	0.05	242.78	0.000	0.000	n/a	1.00	n/a
50	6	0.14	243.02	243.16	0.14*	0.04	3.24	0.07	243.23	0.000	38.000	243.78	243.97	0.19**	0.07	2.12	0.07	244.04	0.000	0.000	n/a	0.75	0.05
51	6	0.14	243.78	243.97	0.19	0.07	2.13	0.07	244.04	0.000	4.243	243.86	244.05	0.19**	0.07	2.12	0.07	244.12	0.000	0.000	n/a	0.75	0.05
52	6	0.15	243.86	244.05	0.19	0.07	2.15	0.07	244.12	0.000	7.000	244.00	244.19	0.19**	0.07	2.13	0.07	244.26	0.000	0.000	n/a	1.00	n/a
53	6	0.14	242.20	242.27	0.07*	0.02	8.41	0.07	242.34	0.000	4.243	243.47	243.66	0.19**	0.07	2.12	0.07	243.73	0.000	0.000	n/a	0.75	n/a
54	6	0.15	243.74	243.88	0.14*	0.04	3.26	0.07	243.95	0.000	13.000	244.00	244.19	0.19**	0.07	2.13	0.07	244.26	0.000	0.000	n/a	1.00	n/a
55	6	0.14	241.54	241.60	0.06*	0.01	10.73	0.07	241.67	0.000	4.243	244.08	244.27	0.19**	0.07	2.12	0.07	244.34	0.000	0.000	n/a	0.75	n/a
56	6	0.15	243.74	244.27	0.50	0.20	0.74	0.01	244.28	0.057	13.000	244.00	244.26	0.26	0.10	1.39	0.03	244.29	0.194	0.126	0.016	1.00	0.03
57	6	0.14	238.72	238.86	0.14*	0.04	3.22	0.07	238.93	0.000	38.000	239.48	239.67	0.19**	0.07	2.10	0.07	239.73	0.000	0.000	n/a	0.75	n/a
58	6	0.14	239.48	239.67	0.19	0.07	2.12	0.07	239.73	0.000	4.243	239.56	239.75	0.19**	0.07	2.11	0.07	239.82	0.000	0.000	n/a	0.75	0.05
59	6	0.15	239.56	239.75	0.19	0.07	2.18	0.07	239.82	0.000	22.000	240.00	240.19	0.19**	0.07	2.13	0.07	240.26	0.000	0.000	n/a	1.00	n/a
60	6	0.12	234.46	234.63	0.17*	0.06	2.02	0.06	234.70	0.000	165.841	237.78	237.95	0.17**	0.06	2.02	0.06	238.02	0.000	0.000	n/a	1.00	n/a
61	6	0.07	239.57	239.67	0.10*	0.03	2.67	0.05	239.71	0.000	10.084	239.78	239.91	0.13**	0.04	1.73	0.05	239.96	0.000	0.000	n/a	0.75	n/a
62	6	0.07	239.78	239.91	0.13	0.04	1.75	0.05	239.96	0.000	4.243	239.86	239.99	0.13**	0.04	1.73	0.05	240.04	0.000	0.000	n/a	0.75	0.04
63	6	0.07	239.86	239.99	0.13	0.04	1.77	0.05	240.04	0.000	7.000	240.00	240.13	0.13**	0.04	1.75	0.05	240.18	0.000	0.000	n/a	1.00	0.05
64	6	0.07	238.75	238.85	0.10*	0.03	2.64	0.05	238.89	0.000	51.270	239.78	239.91	0.13**	0.04	1.73	0.05	239.96	0.000	0.000	n/a	0.75	n/a
65	6	0.07	239.78	239.91	0.13	0.04	1.75	0.05	239.96	0.000	4.243	239.86	239.99	0.13**	0.04	1.73	0.05	240.04	0.000	0.000	n/a	0.75	0.04
66	6	0.07	239.86	239.99	0.13	0.04	1.77	0.05	240.04	0.000	7.000	240.00	240.13	0.13**	0.04	1.75	0.05	240.18	0.000	0.000	n/a	1.00	0.05

Project File: 2026-09-18 MMC Storm Network.stm

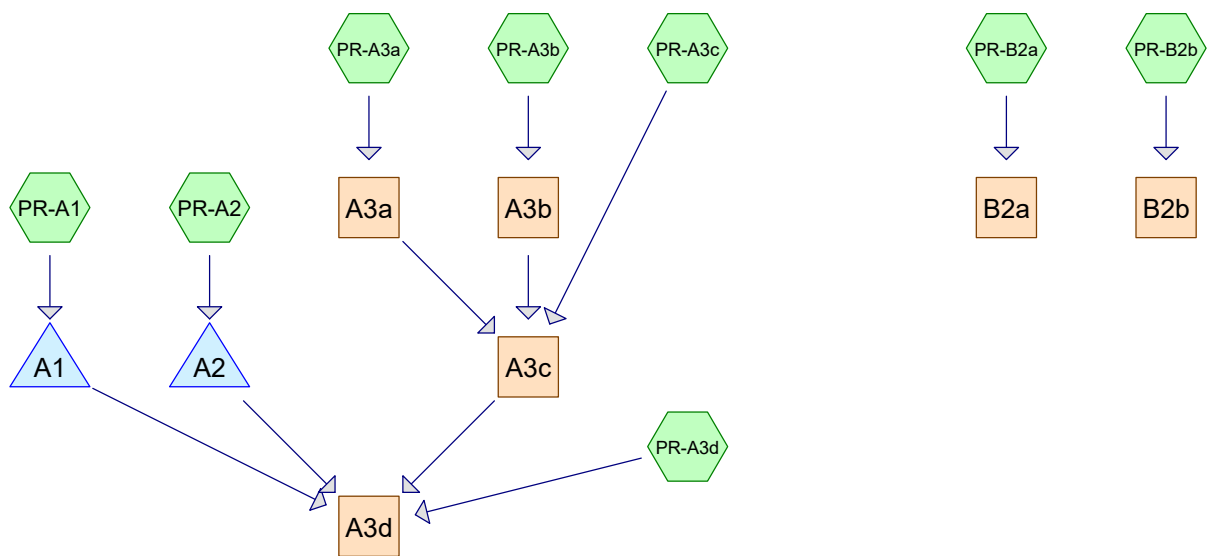
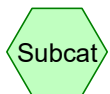
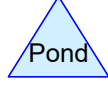
Number of lines: 74

Run Date: 9/21/2026

Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box

Hydraulic Grade Line Computations

Line	Size (in)	Q (cfs)	Downstream								Len (ft)	Upstream									Check		JL coeff (K)	Minor loss (ft)
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)			
67	18	4.06	238.00	238.77	0.77*	0.92	4.44	0.31	239.08	0.000	29.948	238.30	239.07	0.77**	0.92	4.44	0.31	239.38	0.000	0.000	n/a	0.91	0.28	
68	15	2.69	238.87	239.31	0.44*	0.39	6.87	0.26	239.58	0.000	31.313	239.50	240.16	0.66**	0.65	4.11	0.26	240.42	0.000	0.000	n/a	1.00	n/a	
69	15	1.82	238.79	239.15	0.36*	0.30	6.14	0.20	239.36	0.000	135.714	241.50	242.04	0.54**	0.50	3.62	0.20	242.24	0.000	0.000	n/a	1.00	n/a	
70	12	2.75	236.30	237.01	0.71*	0.60	4.61	0.33	237.34	0.000	10.000	236.40	237.11	0.71**	0.60	4.61	0.33	237.44	0.000	0.000	n/a	0.94	n/a	
71	12	0.80	237.57	237.88	0.31*	0.21	3.88	0.14	238.02	0.000	92.650	238.50	238.87	0.37**	0.27	2.99	0.14	239.01	0.000	0.000	n/a	1.00	0.14	
72	12	2.25	236.46	237.11	0.65	0.53	4.17	0.28	237.39	0.000	43.899	236.90	237.54 j	0.64**	0.53	4.23	0.28	237.82	0.000	0.000	n/a	1.00	0.28	
73	18	6.94	236.87	237.89	1.02*	1.28	5.43	0.46	238.35	0.000	28.202	238.00	239.02	1.02**	1.28	5.43	0.46	239.48	0.000	0.000	n/a	1.00	0.46	
74	24	4.06	234.06	234.77	0.71*	0.99	4.09	0.26	235.03	0.000	40.701	234.87	235.58	0.71**	0.99	4.09	0.26	235.84	0.000	0.000	n/a	1.00	n/a	
Project File: 2026-09-18 MMC Storm Network.stm														Number of lines: 74					Run Date: 9/21/2026					
Notes: * depth assumed; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box																								



2026-09-18 MMC Swales

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25 yr	Type III 24-hr		Default	24.00	1	6.45	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.108	98	Basin (PR-A1, PR-A2)
3.463	74	Grass, Good, HSG C (PR-A1, PR-A2, PR-A3a, PR-A3b, PR-A3c, PR-A3d, PR-B2a, PR-B2b)
1.699	98	Pavement (PR-A1, PR-A2, PR-A3d)
0.209	98	Roofs (PR-A3d, PR-B2a)
0.392	70	Woods, Good, HSG C (PR-A3a, PR-A3c)
5.871	82	TOTAL AREA

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
3.855	HSG C	PR-A1, PR-A2, PR-A3a, PR-A3b, PR-A3c, PR-A3d, PR-B2a, PR-B2b
0.000	HSG D	
2.016	Other	PR-A1, PR-A2, PR-A3d, PR-B2a
5.871		TOTAL AREA

2026-09-18 MMC Swales

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Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.108	0.108	Basin	PR-A1, PR-A2
0.000	0.000	3.463	0.000	0.000	3.463	Grass, Good	PR-A1, PR-A2, PR-A3a, PR-A3b, PR-A3c, PR-A3d, PR-B2a, PR-B2b
0.000	0.000	0.000	0.000	1.699	1.699	Pavement	PR-A1, PR-A2, PR-A3d
0.000	0.000	0.000	0.000	0.209	0.209	Roofs	PR-A3d, PR-B2a
0.000	0.000	0.392	0.000	0.000	0.392	Woods, Good	PR-A3a, PR-A3c
0.000	0.000	3.855	0.000	2.016	5.871	TOTAL AREA	

2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 6

Summary for Subcatchment PR-A1:

Runoff = 7.02 cfs @ 12.08 hrs, Volume= 0.545 af, Depth= 5.74"
Routed to Pond A1 :

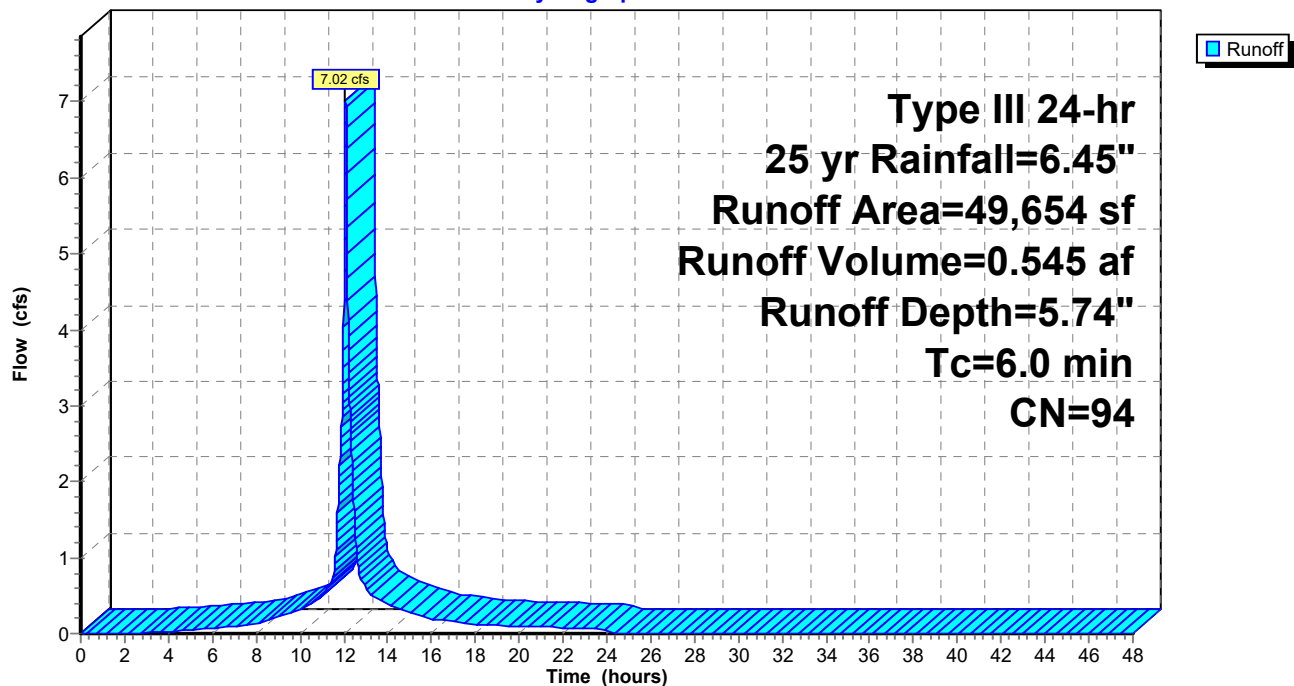
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	8,212	74	Grass, Good, HSG C
*	39,079	98	Pavement
*	2,363	98	Basin
	49,654	94	Weighted Average
	8,212		16.54% Pervious Area
	41,442		83.46% Impervious Area

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

Subcatchment PR-A1:

Hydrograph



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Type III 24-hr 25 yr Rainfall=6.45"

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Page 7

Summary for Subcatchment PR-A2:

Runoff = 4.17 cfs @ 12.08 hrs, Volume= 0.328 af, Depth= 5.86"
Routed to Pond A2 :

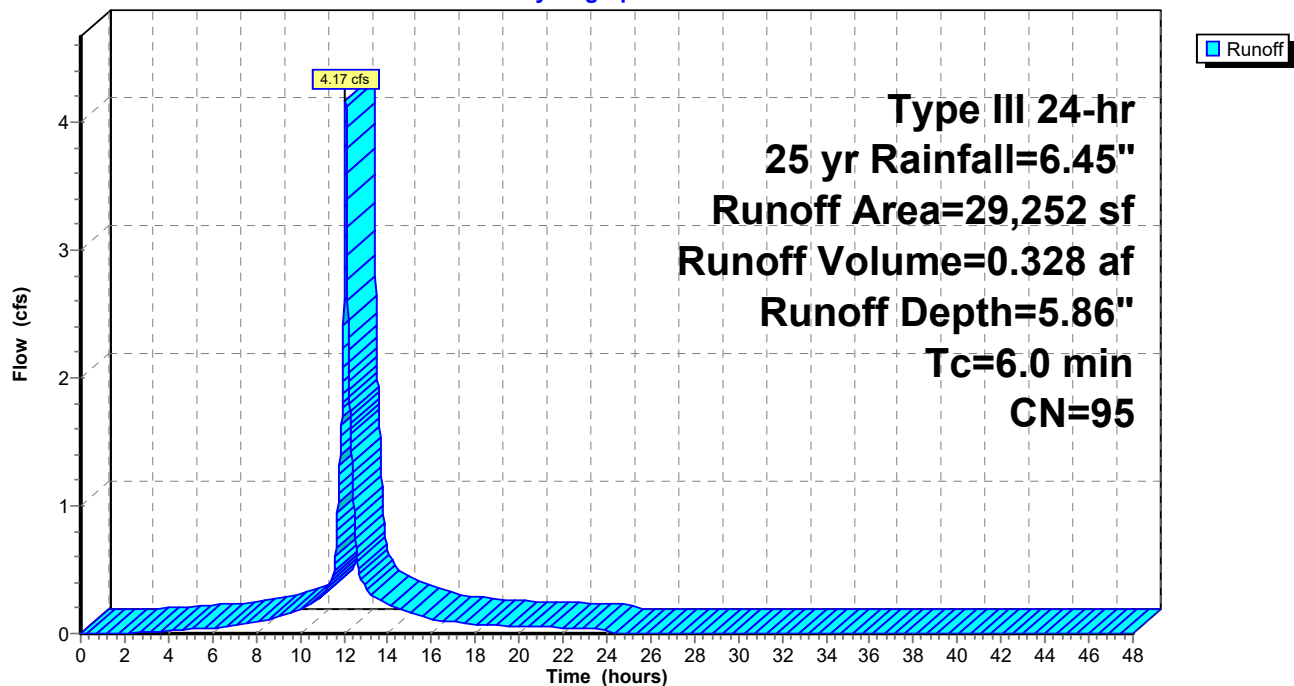
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	4,147	74	Grass, Good, HSG C
*	22,760	98	Pavement
*	2,345	98	Basin
	29,252	95	Weighted Average
	4,147		14.18% Pervious Area
	25,105		85.82% Impervious Area

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

Subcatchment PR-A2:

Hydrograph



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Type III 24-hr 25 yr Rainfall=6.45"

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Page 8

Summary for Subcatchment PR-A3a:

Runoff = 4.28 cfs @ 12.09 hrs, Volume= 0.304 af, Depth= 3.47"
Routed to Reach A3a :

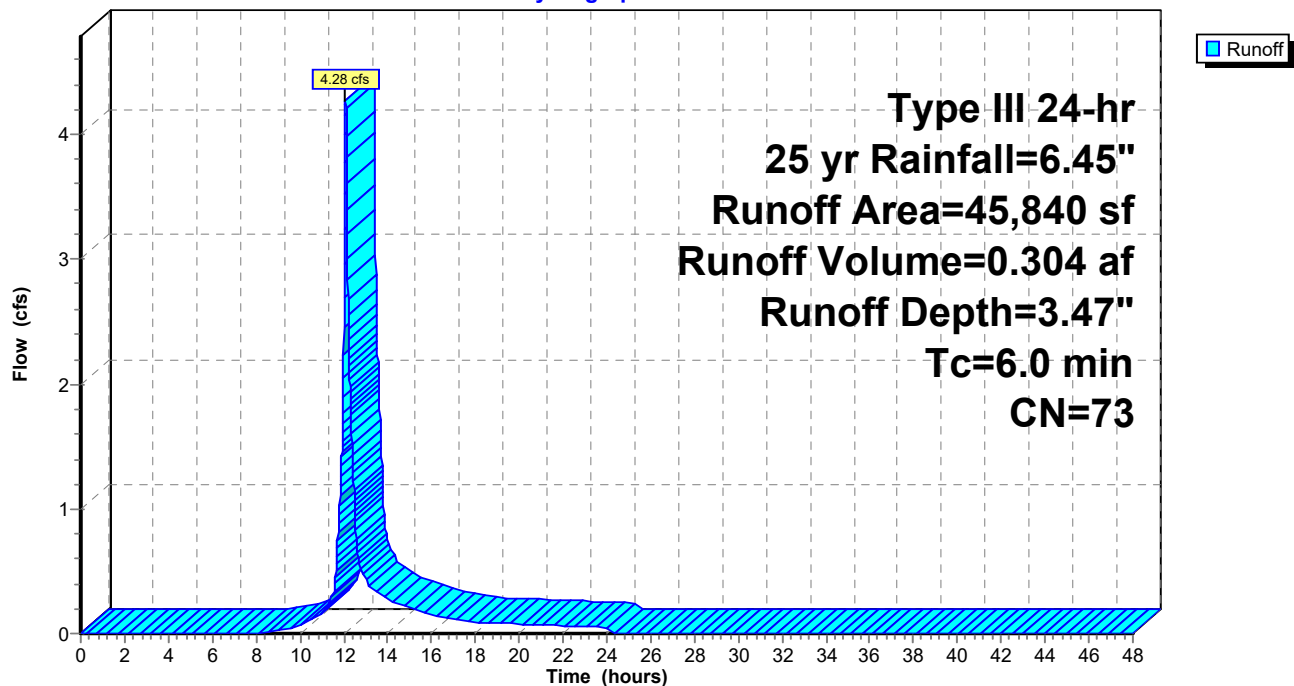
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	13,490	70	Woods, Good, HSG C
*	32,350	74	Grass, Good, HSG C
	45,840	73	Weighted Average
	45,840		100.00% Pervious Area

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

Subcatchment PR-A3a:

Hydrograph



Summary for Subcatchment PR-A3b:

Runoff = 1.12 cfs @ 12.09 hrs, Volume= 0.080 af, Depth= 3.57"

Routed to Reach A3b :

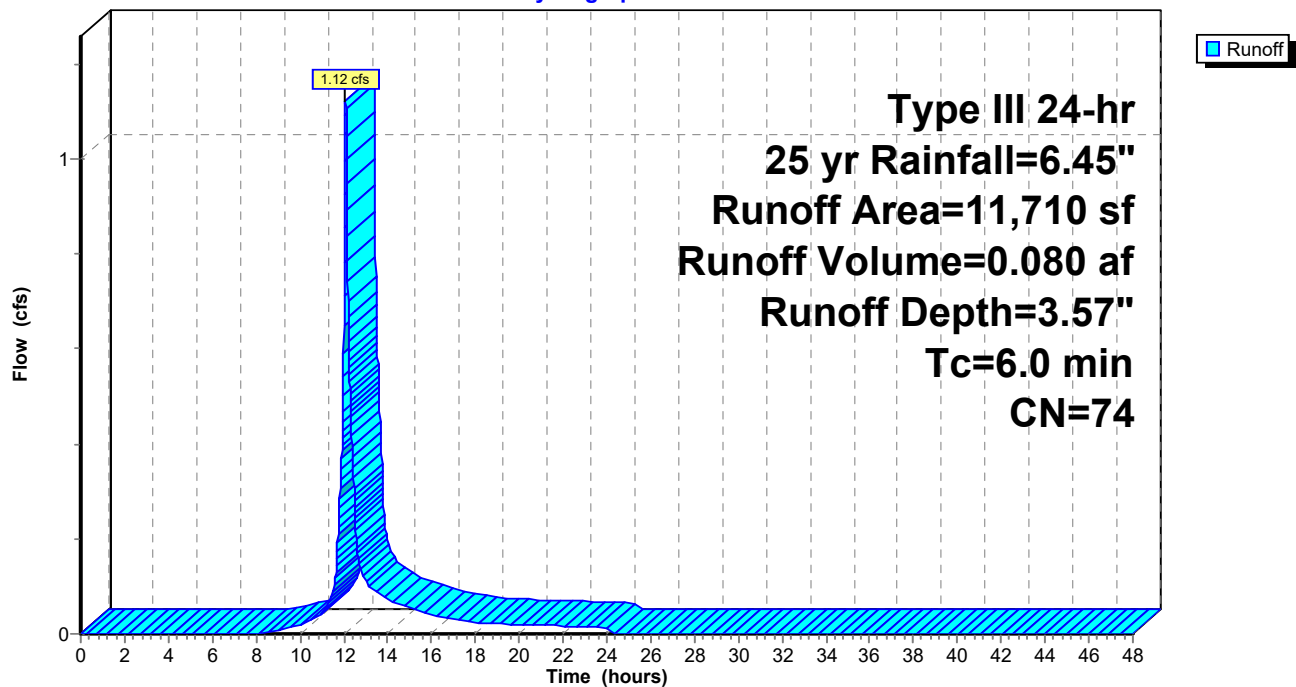
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

Area (sf)	CN	Description
* 11,710	74	Grass, Good, HSG C
11,710		100.00% Pervious Area

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

Subcatchment PR-A3b:

Hydrograph



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Type III 24-hr 25 yr Rainfall=6.45"

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Page 10

Summary for Subcatchment PR-A3c:

Runoff = 2.63 cfs @ 12.09 hrs, Volume= 0.187 af, Depth= 3.47"
Routed to Reach A3c :

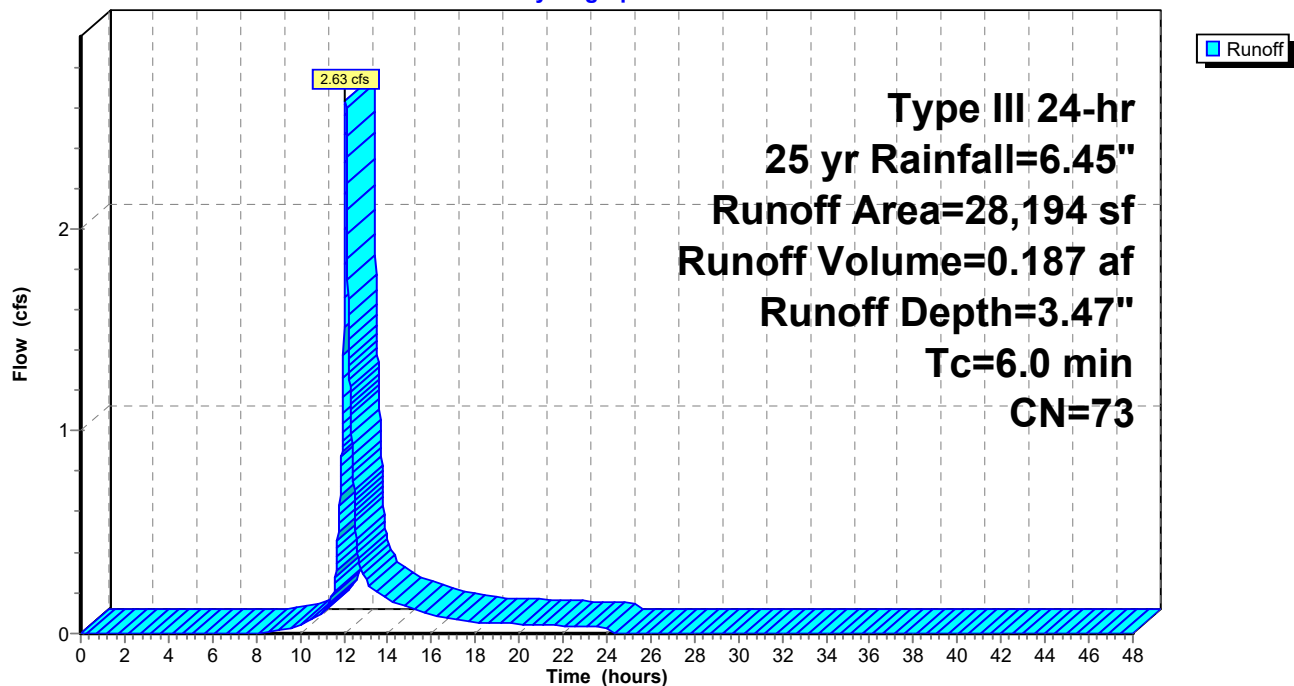
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	3,586	70	Woods, Good, HSG C
*	24,608	74	Grass, Good, HSG C
	28,194	73	Weighted Average
	28,194		100.00% Pervious Area

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

Subcatchment PR-A3c:

Hydrograph



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Type III 24-hr 25 yr Rainfall=6.45"

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Page 11

Summary for Subcatchment PR-A3d:

Runoff = 8.18 cfs @ 12.09 hrs, Volume= 0.584 af, Depth= 4.08"
Routed to Reach A3d :

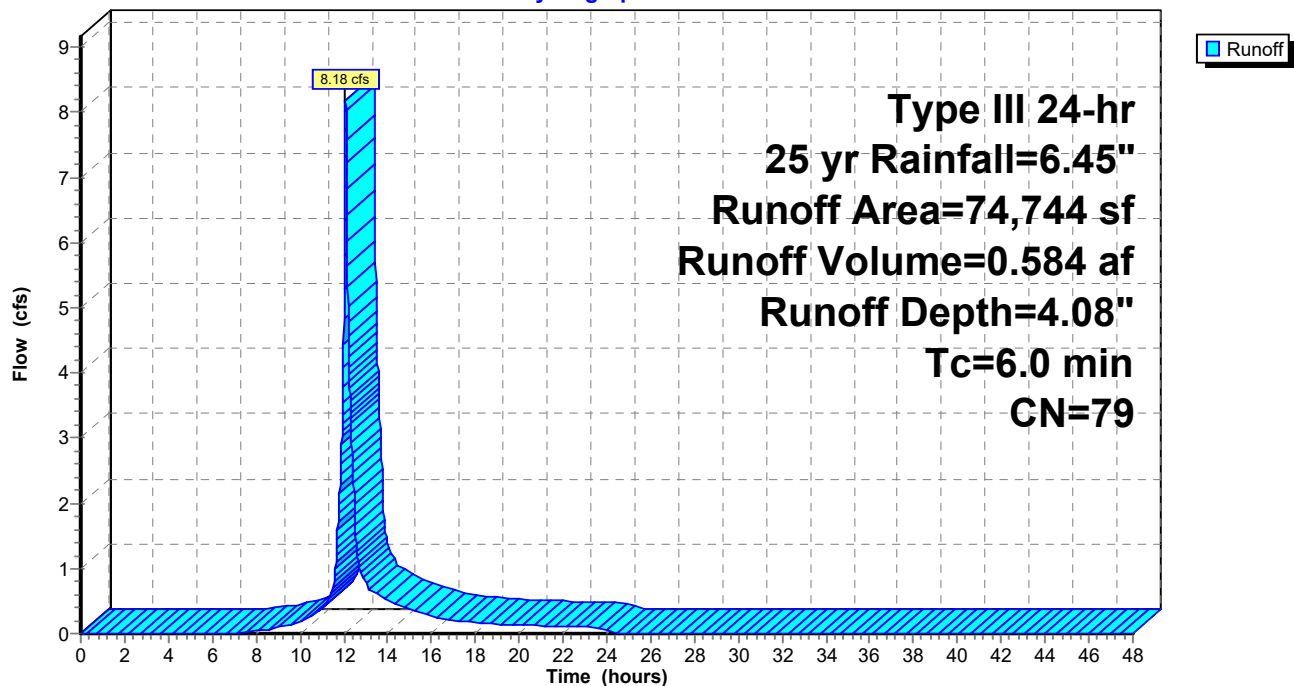
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	57,924	74	Grass, Good, HSG C
*	4,664	98	Roofs
*	12,156	98	Pavement
	74,744	79	Weighted Average
	57,924		77.50% Pervious Area
	16,820		22.50% Impervious Area

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

Subcatchment PR-A3d:

Hydrograph



Summary for Subcatchment PR-B2a:

Runoff = 1.59 cfs @ 12.09 hrs, Volume= 0.114 af, Depth= 4.40"
Routed to Reach B2a :

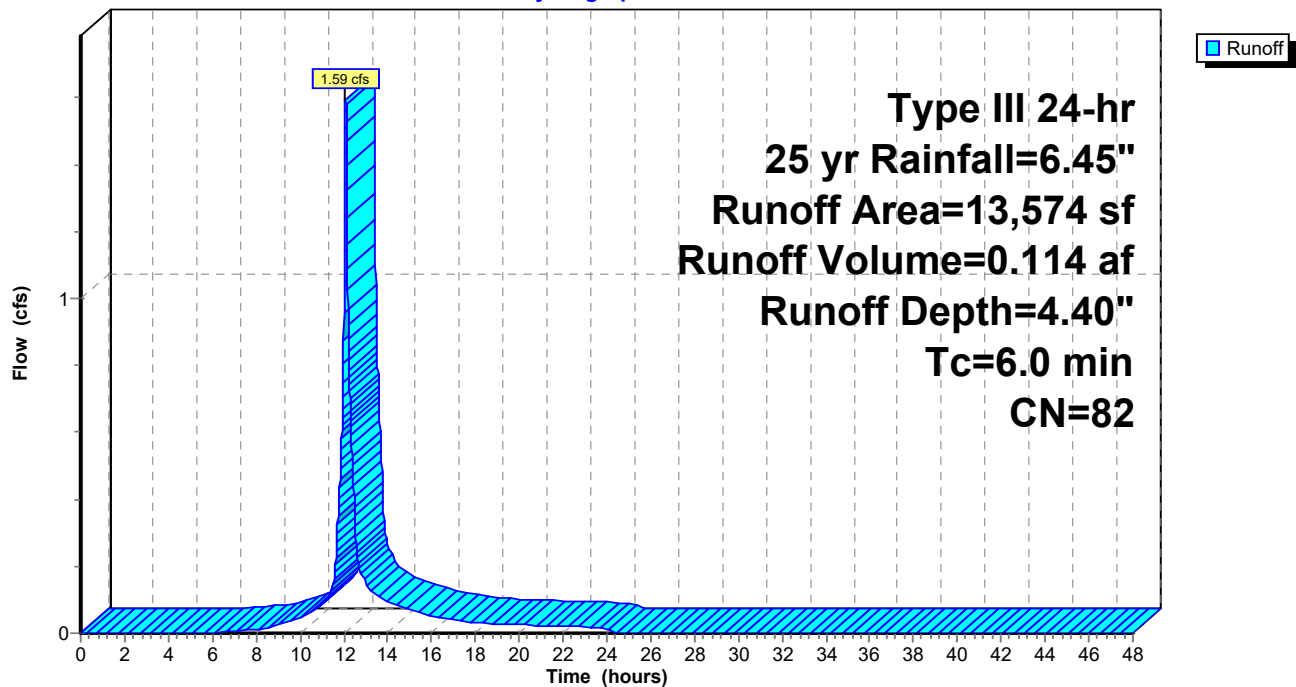
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	9,137	74	Grass, Good, HSG C
*	4,437	98	Roofs
	13,574	82	Weighted Average
	9,137		67.31% Pervious Area
	4,437		32.69% Impervious Area

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

Subcatchment PR-B2a:

Hydrograph



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Type III 24-hr 25 yr Rainfall=6.45"

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Page 13

Summary for Subcatchment PR-B2b:

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 3.57"
Routed to Reach B2b :

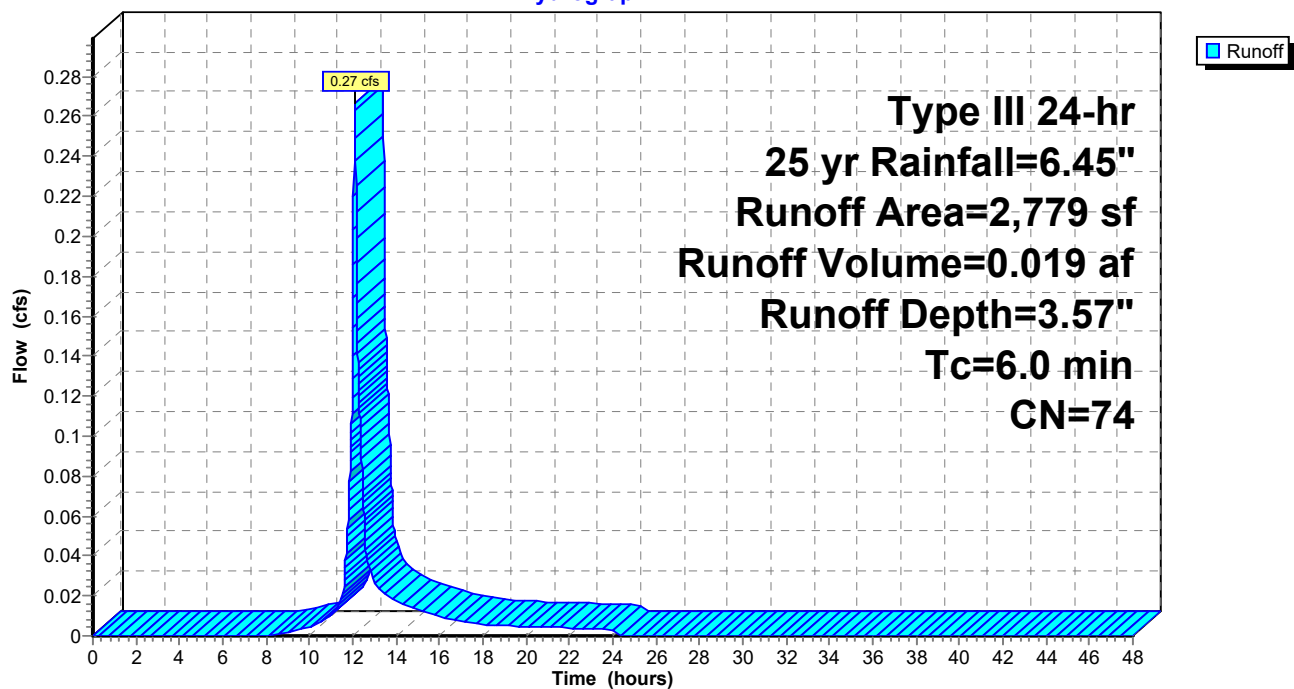
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=6.45"

	Area (sf)	CN	Description
*	2,779	74	Grass, Good, HSG C
	2,779		100.00% Pervious Area

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

Subcatchment PR-B2b:

Hydrograph



Summary for Reach A3a:

Inflow Area = 1.052 ac, 0.00% Impervious, Inflow Depth = 3.47" for 25 yr event
Inflow = 4.28 cfs @ 12.09 hrs, Volume= 0.304 af
Outflow = 4.15 cfs @ 12.14 hrs, Volume= 0.304 af, Atten= 3%, Lag= 2.9 min
Routed to Reach A3c :

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 4.54 fps, Min. Travel Time= 1.7 min

Avg. Velocity= 1.38 fps, Avg. Travel Time= 5.5 min

Peak Storage= 417 cf @ 12.11 hrs

Average Depth at Peak Storage= 0.31' , Surface Width= 3.87'

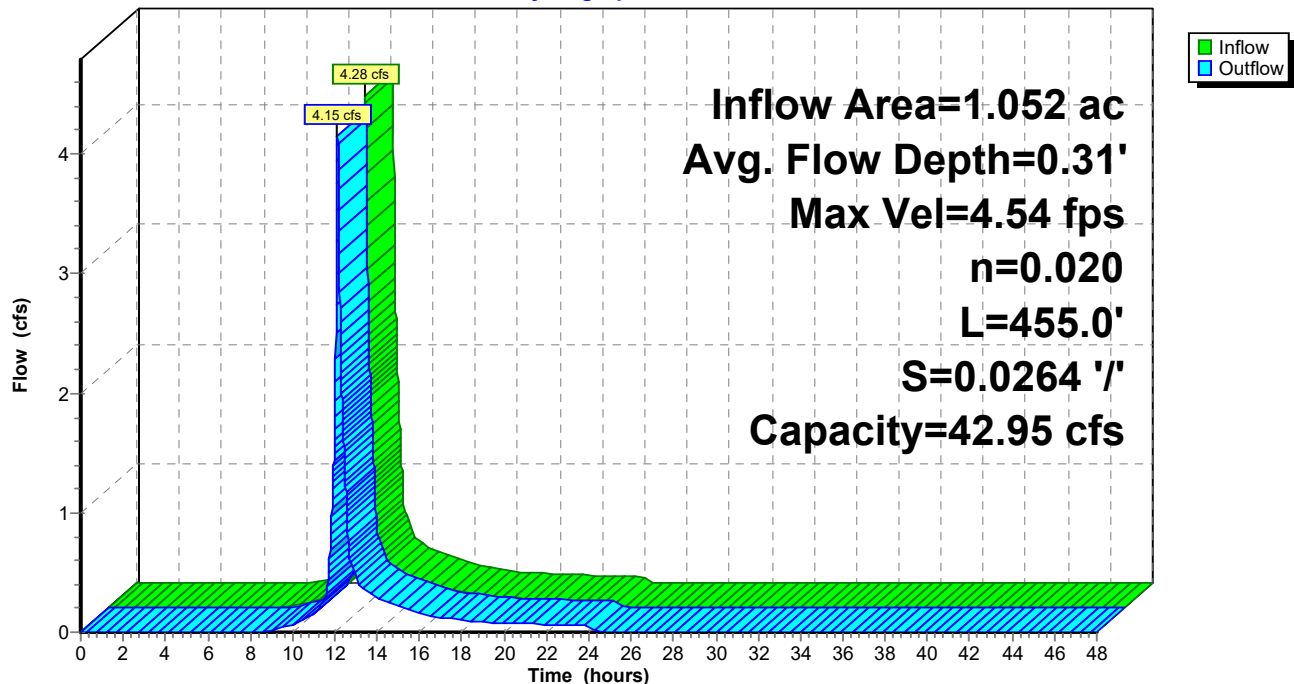
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 42.95 cfs

2.00' x 1.00' deep channel, n= 0.020

Side Slope Z-value= 3.0 '/' Top Width= 8.00'

Length= 455.0' Slope= 0.0264 '/'

Inlet Invert= 259.00', Outlet Invert= 247.00'

**Reach A3a:****Hydrograph**

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 15

Stage-Area-Storage for Reach A3a:

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
259.00	0.0	0	259.52	1.9	842
259.01	0.0	9	259.53	1.9	866
259.02	0.0	19	259.54	2.0	889
259.03	0.1	29	259.55	2.0	913
259.04	0.1	39	259.56	2.1	938
259.05	0.1	49	259.57	2.1	962
259.06	0.1	60	259.58	2.2	987
259.07	0.2	70	259.59	2.2	1,012
259.08	0.2	82	259.60	2.3	1,037
259.09	0.2	93	259.61	2.3	1,063
259.10	0.2	105	259.62	2.4	1,089
259.11	0.3	117	259.63	2.5	1,115
259.12	0.3	129	259.64	2.5	1,142
259.13	0.3	141	259.65	2.6	1,168
259.14	0.3	154	259.66	2.6	1,195
259.15	0.4	167	259.67	2.7	1,222
259.16	0.4	181	259.68	2.7	1,250
259.17	0.4	194	259.69	2.8	1,278
259.18	0.5	208	259.70	2.9	1,306
259.19	0.5	222	259.71	2.9	1,334
259.20	0.5	237	259.72	3.0	1,363
259.21	0.6	251	259.73	3.1	1,392
259.22	0.6	266	259.74	3.1	1,421
259.23	0.6	282	259.75	3.2	1,450
259.24	0.7	297	259.76	3.3	1,480
259.25	0.7	313	259.77	3.3	1,510
259.26	0.7	329	259.78	3.4	1,540
259.27	0.8	345	259.79	3.5	1,571
259.28	0.8	362	259.80	3.5	1,602
259.29	0.8	379	259.81	3.6	1,633
259.30	0.9	396	259.82	3.7	1,664
259.31	0.9	413	259.83	3.7	1,696
259.32	0.9	431	259.84	3.8	1,728
259.33	1.0	449	259.85	3.9	1,760
259.34	1.0	467	259.86	3.9	1,792
259.35	1.1	486	259.87	4.0	1,825
259.36	1.1	505	259.88	4.1	1,858
259.37	1.2	524	259.89	4.2	1,891
259.38	1.2	543	259.90	4.2	1,925
259.39	1.2	563	259.91	4.3	1,958
259.40	1.3	582	259.92	4.4	1,993
259.41	1.3	603	259.93	4.5	2,027
259.42	1.4	623	259.94	4.5	2,062
259.43	1.4	644	259.95	4.6	2,096
259.44	1.5	665	259.96	4.7	2,132
259.45	1.5	686	259.97	4.8	2,167
259.46	1.6	707	259.98	4.8	2,203
259.47	1.6	729	259.99	4.9	2,239
259.48	1.7	751	260.00	5.0	2,275
259.49	1.7	774			
259.50	1.8	796			
259.51	1.8	819			

Summary for Reach A3b:

Inflow Area = 0.269 ac, 0.00% Impervious, Inflow Depth = 3.57" for 25 yr event
Inflow = 1.12 cfs @ 12.09 hrs, Volume= 0.080 af
Outflow = 1.10 cfs @ 12.13 hrs, Volume= 0.080 af, Atten= 2%, Lag= 2.5 min
Routed to Reach A3c :

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.39 fps, Min. Travel Time= 1.5 min

Avg. Velocity= 1.00 fps, Avg. Travel Time= 5.1 min

Peak Storage= 99 cf @ 12.11 hrs

Average Depth at Peak Storage= 0.14' , Surface Width= 2.81'

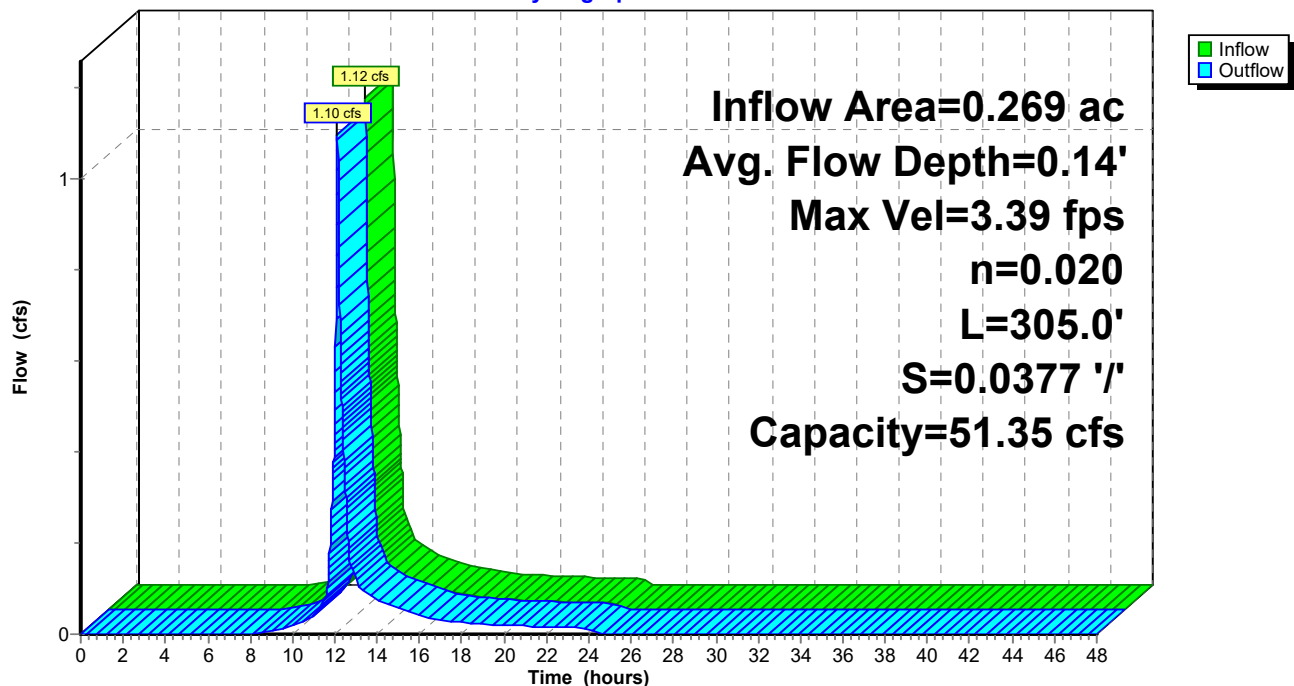
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 51.35 cfs

2.00' x 1.00' deep channel, n= 0.020

Side Slope Z-value= 3.0 ' / ' Top Width= 8.00'

Length= 305.0' Slope= 0.0377 ' / '

Inlet Invert= 258.50', Outlet Invert= 247.00'

**Reach A3b:****Hydrograph**

2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 17

Stage-Area-Storage for Reach A3b:

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
258.50	0.0	0	259.02	1.9	565
258.51	0.0	6	259.03	1.9	580
258.52	0.0	13	259.04	2.0	596
258.53	0.1	19	259.05	2.0	612
258.54	0.1	26	259.06	2.1	629
258.55	0.1	33	259.07	2.1	645
258.56	0.1	40	259.08	2.2	662
258.57	0.2	47	259.09	2.2	678
258.58	0.2	55	259.10	2.3	695
258.59	0.2	62	259.11	2.3	713
258.60	0.2	70	259.12	2.4	730
258.61	0.3	78	259.13	2.5	747
258.62	0.3	86	259.14	2.5	765
258.63	0.3	95	259.15	2.6	783
258.64	0.3	103	259.16	2.6	801
258.65	0.4	112	259.17	2.7	819
258.66	0.4	121	259.18	2.7	838
258.67	0.4	130	259.19	2.8	857
258.68	0.5	139	259.20	2.9	875
258.69	0.5	149	259.21	2.9	894
258.70	0.5	159	259.22	3.0	914
258.71	0.6	168	259.23	3.1	933
258.72	0.6	178	259.24	3.1	952
258.73	0.6	189	259.25	3.2	972
258.74	0.7	199	259.26	3.3	992
258.75	0.7	210	259.27	3.3	1,012
258.76	0.7	220	259.28	3.4	1,032
258.77	0.8	231	259.29	3.5	1,053
258.78	0.8	243	259.30	3.5	1,074
258.79	0.8	254	259.31	3.6	1,094
258.80	0.9	265	259.32	3.7	1,115
258.81	0.9	277	259.33	3.7	1,137
258.82	0.9	289	259.34	3.8	1,158
258.83	1.0	301	259.35	3.9	1,180
258.84	1.0	313	259.36	3.9	1,201
258.85	1.1	326	259.37	4.0	1,223
258.86	1.1	338	259.38	4.1	1,245
258.87	1.2	351	259.39	4.2	1,268
258.88	1.2	364	259.40	4.2	1,290
258.89	1.2	377	259.41	4.3	1,313
258.90	1.3	390	259.42	4.4	1,336
258.91	1.3	404	259.43	4.5	1,359
258.92	1.4	418	259.44	4.5	1,382
258.93	1.4	431	259.45	4.6	1,405
258.94	1.5	446	259.46	4.7	1,429
258.95	1.5	460	259.47	4.8	1,453
258.96	1.6	474	259.48	4.8	1,477
258.97	1.6	489	259.49	4.9	1,501
258.98	1.7	504	259.50	5.0	1,525
258.99	1.7	519			
259.00	1.8	534			
259.01	1.8	549			

Summary for Reach A3c:

Inflow Area = 1.968 ac, 0.00% Impervious, Inflow Depth = 3.48" for 25 yr event
 Inflow = 7.62 cfs @ 12.12 hrs, Volume= 0.571 af
 Outflow = 7.60 cfs @ 12.13 hrs, Volume= 0.571 af, Atten= 0%, Lag= 0.5 min
 Routed to Reach A3d :

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 5.20 fps, Min. Travel Time= 0.3 min
 Avg. Velocity= 1.64 fps, Avg. Travel Time= 0.9 min

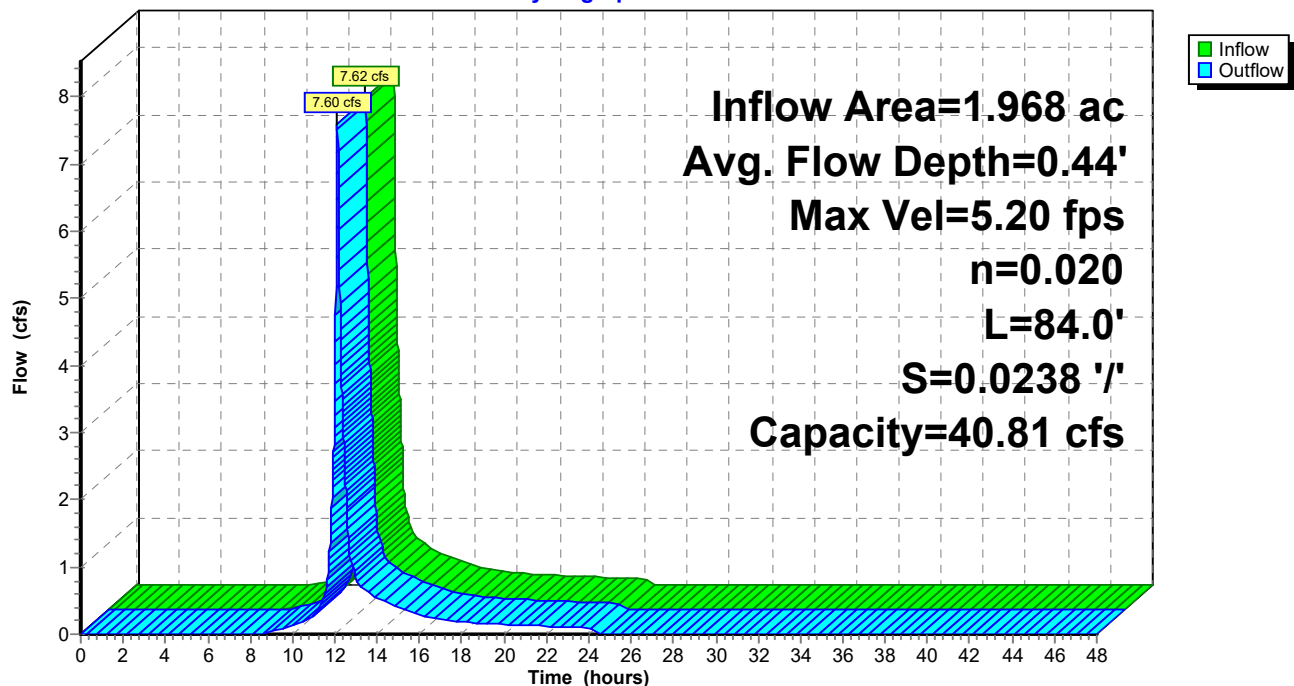
Peak Storage= 123 cf @ 12.13 hrs
 Average Depth at Peak Storage= 0.44' , Surface Width= 4.64'
 Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 40.81 cfs

2.00' x 1.00' deep channel, n= 0.020
 Side Slope Z-value= 3.0 '/' Top Width= 8.00'
 Length= 84.0' Slope= 0.0238 '/'
 Inlet Invert= 247.00', Outlet Invert= 245.00'



Reach A3c:

Hydrograph



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Type III 24-hr 25 yr Rainfall=6.45"

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Page 19

Stage-Area-Storage for Reach A3c:

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
247.00	0.0	0	247.52	1.9	156
247.01	0.0	2	247.53	1.9	160
247.02	0.0	3	247.54	2.0	164
247.03	0.1	5	247.55	2.0	169
247.04	0.1	7	247.56	2.1	173
247.05	0.1	9	247.57	2.1	178
247.06	0.1	11	247.58	2.2	182
247.07	0.2	13	247.59	2.2	187
247.08	0.2	15	247.60	2.3	192
247.09	0.2	17	247.61	2.3	196
247.10	0.2	19	247.62	2.4	201
247.11	0.3	22	247.63	2.5	206
247.12	0.3	24	247.64	2.5	211
247.13	0.3	26	247.65	2.6	216
247.14	0.3	28	247.66	2.6	221
247.15	0.4	31	247.67	2.7	226
247.16	0.4	33	247.68	2.7	231
247.17	0.4	36	247.69	2.8	236
247.18	0.5	38	247.70	2.9	241
247.19	0.5	41	247.71	2.9	246
247.20	0.5	44	247.72	3.0	252
247.21	0.6	46	247.73	3.1	257
247.22	0.6	49	247.74	3.1	262
247.23	0.6	52	247.75	3.2	268
247.24	0.7	55	247.76	3.3	273
247.25	0.7	58	247.77	3.3	279
247.26	0.7	61	247.78	3.4	284
247.27	0.8	64	247.79	3.5	290
247.28	0.8	67	247.80	3.5	296
247.29	0.8	70	247.81	3.6	301
247.30	0.9	73	247.82	3.7	307
247.31	0.9	76	247.83	3.7	313
247.32	0.9	80	247.84	3.8	319
247.33	1.0	83	247.85	3.9	325
247.34	1.0	86	247.86	3.9	331
247.35	1.1	90	247.87	4.0	337
247.36	1.1	93	247.88	4.1	343
247.37	1.2	97	247.89	4.2	349
247.38	1.2	100	247.90	4.2	355
247.39	1.2	104	247.91	4.3	362
247.40	1.3	108	247.92	4.4	368
247.41	1.3	111	247.93	4.5	374
247.42	1.4	115	247.94	4.5	381
247.43	1.4	119	247.95	4.6	387
247.44	1.5	123	247.96	4.7	394
247.45	1.5	127	247.97	4.8	400
247.46	1.6	131	247.98	4.8	407
247.47	1.6	135	247.99	4.9	413
247.48	1.7	139	248.00	5.0	420
247.49	1.7	143			
247.50	1.8	147			
247.51	1.8	151			

Summary for Reach A3d:

Inflow Area = 5.496 ac, 34.82% Impervious, Inflow Depth = 4.21" for 25 yr event
 Inflow = 26.27 cfs @ 12.10 hrs, Volume= 1.926 af
 Outflow = 25.81 cfs @ 12.14 hrs, Volume= 1.926 af, Atten= 2%, Lag= 2.3 min
 Routed to nonexistent node A

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Max. Velocity= 6.95 fps, Min. Travel Time= 1.3 min
 Avg. Velocity= 2.15 fps, Avg. Travel Time= 4.2 min

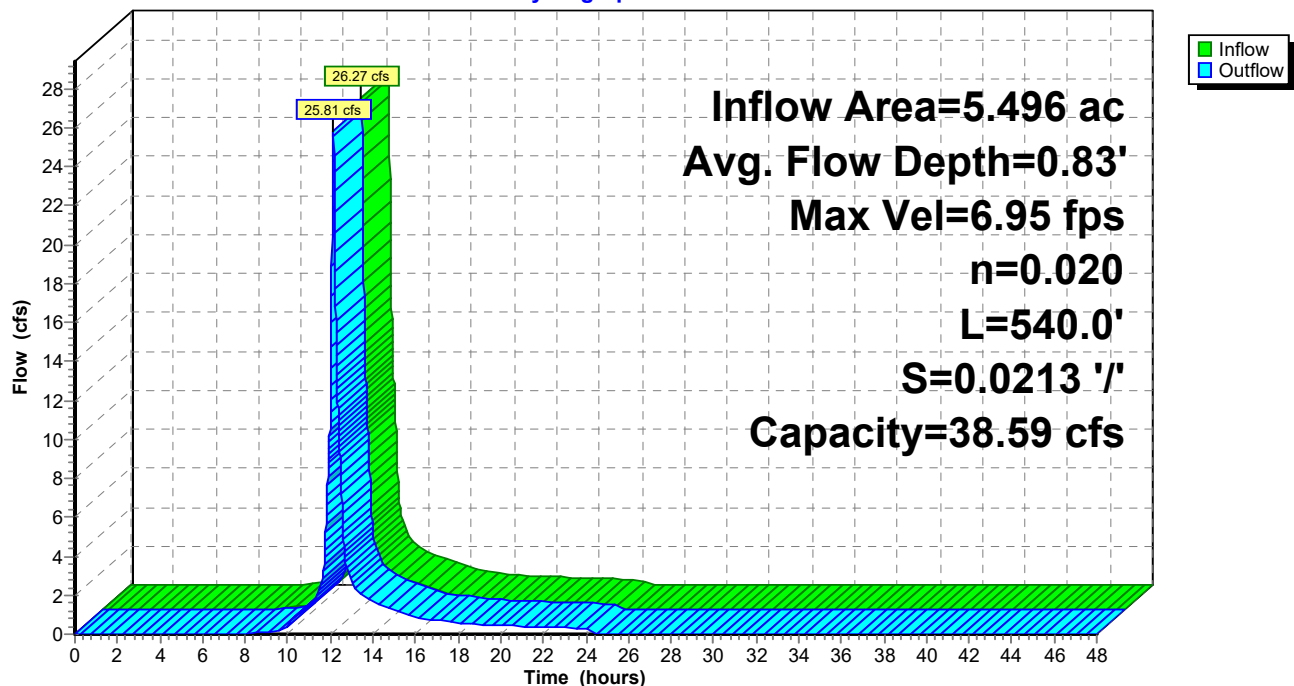
Peak Storage= 2,007 cf @ 12.12 hrs
 Average Depth at Peak Storage= 0.83' , Surface Width= 6.97'
 Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 38.59 cfs

2.00' x 1.00' deep channel, n= 0.020
 Side Slope Z-value= 3.0 '/' Top Width= 8.00'
 Length= 540.0' Slope= 0.0213 '/'
 Inlet Invert= 245.00', Outlet Invert= 233.50'



Reach A3d:

Hydrograph



2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 21

Stage-Area-Storage for Reach A3d:

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
245.00	0.0	0	245.52	1.9	1,000
245.01	0.0	11	245.53	1.9	1,027
245.02	0.0	22	245.54	2.0	1,056
245.03	0.1	34	245.55	2.0	1,084
245.04	0.1	46	245.56	2.1	1,113
245.05	0.1	58	245.57	2.1	1,142
245.06	0.1	71	245.58	2.2	1,171
245.07	0.2	84	245.59	2.2	1,201
245.08	0.2	97	245.60	2.3	1,231
245.09	0.2	110	245.61	2.3	1,262
245.10	0.2	124	245.62	2.4	1,292
245.11	0.3	138	245.63	2.5	1,323
245.12	0.3	153	245.64	2.5	1,355
245.13	0.3	168	245.65	2.6	1,386
245.14	0.3	183	245.66	2.6	1,418
245.15	0.4	198	245.67	2.7	1,451
245.16	0.4	214	245.68	2.7	1,483
245.17	0.4	230	245.69	2.8	1,516
245.18	0.5	247	245.70	2.9	1,550
245.19	0.5	264	245.71	2.9	1,583
245.20	0.5	281	245.72	3.0	1,617
245.21	0.6	298	245.73	3.1	1,652
245.22	0.6	316	245.74	3.1	1,686
245.23	0.6	334	245.75	3.2	1,721
245.24	0.7	353	245.76	3.3	1,757
245.25	0.7	371	245.77	3.3	1,792
245.26	0.7	390	245.78	3.4	1,828
245.27	0.8	410	245.79	3.5	1,864
245.28	0.8	429	245.80	3.5	1,901
245.29	0.8	449	245.81	3.6	1,938
245.30	0.9	470	245.82	3.7	1,975
245.31	0.9	490	245.83	3.7	2,012
245.32	0.9	511	245.84	3.8	2,050
245.33	1.0	533	245.85	3.9	2,088
245.34	1.0	554	245.86	3.9	2,127
245.35	1.1	576	245.87	4.0	2,166
245.36	1.1	599	245.88	4.1	2,205
245.37	1.2	621	245.89	4.2	2,244
245.38	1.2	644	245.90	4.2	2,284
245.39	1.2	668	245.91	4.3	2,324
245.40	1.3	691	245.92	4.4	2,365
245.41	1.3	715	245.93	4.5	2,406
245.42	1.4	739	245.94	4.5	2,447
245.43	1.4	764	245.95	4.6	2,488
245.44	1.5	789	245.96	4.7	2,530
245.45	1.5	814	245.97	4.8	2,572
245.46	1.6	840	245.98	4.8	2,614
245.47	1.6	865	245.99	4.9	2,657
245.48	1.7	892	246.00	5.0	2,700
245.49	1.7	918			
245.50	1.8	945			
245.51	1.8	972			

Summary for Reach B2a:

Inflow Area = 0.312 ac, 32.69% Impervious, Inflow Depth = 4.40" for 25 yr event
 Inflow = 1.59 cfs @ 12.09 hrs, Volume= 0.114 af
 Outflow = 1.56 cfs @ 12.12 hrs, Volume= 0.114 af, Atten= 2%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 3.66 fps, Min. Travel Time= 1.4 min

Avg. Velocity= 1.03 fps, Avg. Travel Time= 4.8 min

Peak Storage= 127 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.17' , Surface Width= 3.02'

Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 48.53 cfs

2.00' x 1.00' deep channel, n= 0.020

Side Slope Z-value= 3.0 ' / ' Top Width= 8.00'

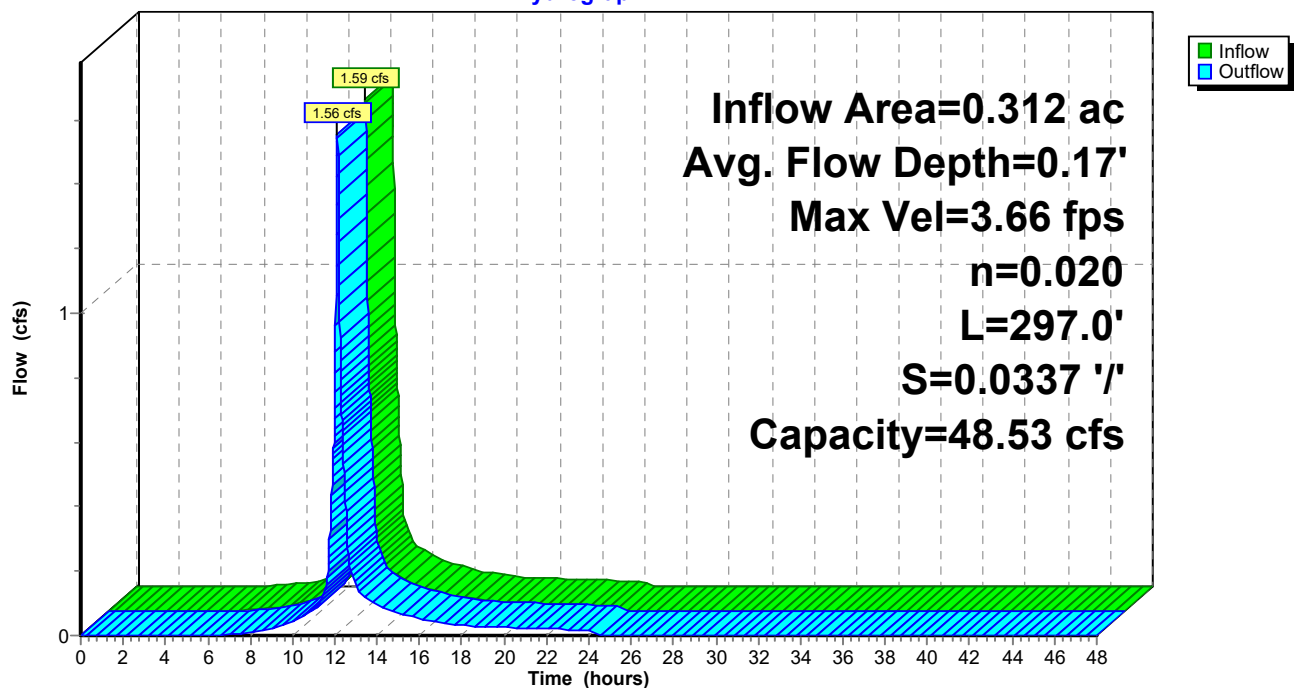
Length= 297.0' Slope= 0.0337 ' / '

Inlet Invert= 259.00', Outlet Invert= 249.00'



Reach B2a:

Hydrograph



2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 23

Stage-Area-Storage for Reach B2a:

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
259.00	0.0	0	259.52	1.9	550
259.01	0.0	6	259.53	1.9	565
259.02	0.0	12	259.54	2.0	581
259.03	0.1	19	259.55	2.0	596
259.04	0.1	25	259.56	2.1	612
259.05	0.1	32	259.57	2.1	628
259.06	0.1	39	259.58	2.2	644
259.07	0.2	46	259.59	2.2	661
259.08	0.2	53	259.60	2.3	677
259.09	0.2	61	259.61	2.3	694
259.10	0.2	68	259.62	2.4	711
259.11	0.3	76	259.63	2.5	728
259.12	0.3	84	259.64	2.5	745
259.13	0.3	92	259.65	2.6	763
259.14	0.3	101	259.66	2.6	780
259.15	0.4	109	259.67	2.7	798
259.16	0.4	118	259.68	2.7	816
259.17	0.4	127	259.69	2.8	834
259.18	0.5	136	259.70	2.9	852
259.19	0.5	145	259.71	2.9	871
259.20	0.5	154	259.72	3.0	890
259.21	0.6	164	259.73	3.1	908
259.22	0.6	174	259.74	3.1	927
259.23	0.6	184	259.75	3.2	947
259.24	0.7	194	259.76	3.3	966
259.25	0.7	204	259.77	3.3	986
259.26	0.7	215	259.78	3.4	1,005
259.27	0.8	225	259.79	3.5	1,025
259.28	0.8	236	259.80	3.5	1,045
259.29	0.8	247	259.81	3.6	1,066
259.30	0.9	258	259.82	3.7	1,086
259.31	0.9	270	259.83	3.7	1,107
259.32	0.9	281	259.84	3.8	1,128
259.33	1.0	293	259.85	3.9	1,149
259.34	1.0	305	259.86	3.9	1,170
259.35	1.1	317	259.87	4.0	1,191
259.36	1.1	329	259.88	4.1	1,213
259.37	1.2	342	259.89	4.2	1,234
259.38	1.2	354	259.90	4.2	1,256
259.39	1.2	367	259.91	4.3	1,278
259.40	1.3	380	259.92	4.4	1,301
259.41	1.3	393	259.93	4.5	1,323
259.42	1.4	407	259.94	4.5	1,346
259.43	1.4	420	259.95	4.6	1,368
259.44	1.5	434	259.96	4.7	1,391
259.45	1.5	448	259.97	4.8	1,415
259.46	1.6	462	259.98	4.8	1,438
259.47	1.6	476	259.99	4.9	1,461
259.48	1.7	490	260.00	5.0	1,485
259.49	1.7	505			
259.50	1.8	520			
259.51	1.8	535			

Summary for Reach B2b:

Inflow Area = 0.064 ac, 0.00% Impervious, Inflow Depth = 3.57" for 25 yr event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.27 cfs @ 12.11 hrs, Volume= 0.019 af, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Max. Velocity= 1.51 fps, Min. Travel Time= 0.8 min

Avg. Velocity = 0.48 fps, Avg. Travel Time= 2.4 min

Peak Storage= 12 cf @ 12.10 hrs

Average Depth at Peak Storage= 0.08' , Surface Width= 2.47'

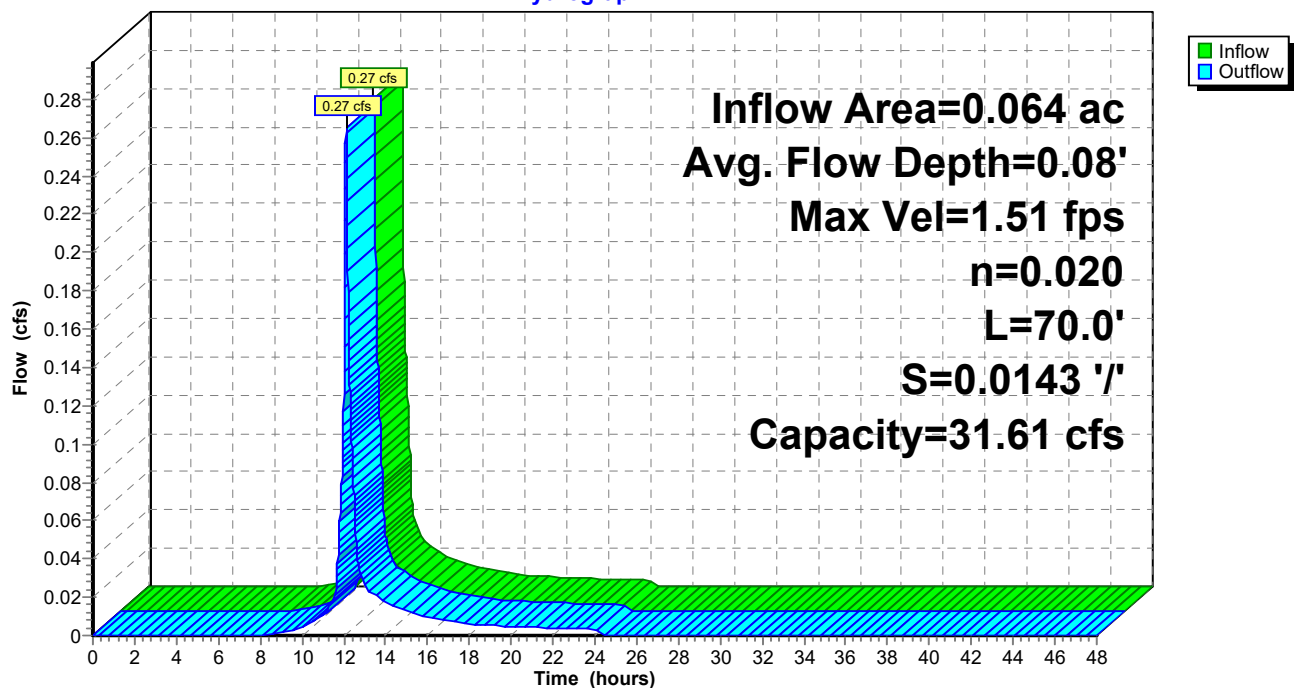
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 31.61 cfs

2.00' x 1.00' deep channel, n= 0.020

Side Slope Z-value= 3.0 '/' Top Width= 8.00'

Length= 70.0' Slope= 0.0143 '/'

Inlet Invert= 250.00', Outlet Invert= 249.00'

**Reach B2b:****Hydrograph**

2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 25

Stage-Area-Storage for Reach B2b:

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
250.00	0.0	0	250.52	1.9	130
250.01	0.0	1	250.53	1.9	133
250.02	0.0	3	250.54	2.0	137
250.03	0.1	4	250.55	2.0	141
250.04	0.1	6	250.56	2.1	144
250.05	0.1	8	250.57	2.1	148
250.06	0.1	9	250.58	2.2	152
250.07	0.2	11	250.59	2.2	156
250.08	0.2	13	250.60	2.3	160
250.09	0.2	14	250.61	2.3	164
250.10	0.2	16	250.62	2.4	168
250.11	0.3	18	250.63	2.5	172
250.12	0.3	20	250.64	2.5	176
250.13	0.3	22	250.65	2.6	180
250.14	0.3	24	250.66	2.6	184
250.15	0.4	26	250.67	2.7	188
250.16	0.4	28	250.68	2.7	192
250.17	0.4	30	250.69	2.8	197
250.18	0.5	32	250.70	2.9	201
250.19	0.5	34	250.71	2.9	205
250.20	0.5	36	250.72	3.0	210
250.21	0.6	39	250.73	3.1	214
250.22	0.6	41	250.74	3.1	219
250.23	0.6	43	250.75	3.2	223
250.24	0.7	46	250.76	3.3	228
250.25	0.7	48	250.77	3.3	232
250.26	0.7	51	250.78	3.4	237
250.27	0.8	53	250.79	3.5	242
250.28	0.8	56	250.80	3.5	246
250.29	0.8	58	250.81	3.6	251
250.30	0.9	61	250.82	3.7	256
250.31	0.9	64	250.83	3.7	261
250.32	0.9	66	250.84	3.8	266
250.33	1.0	69	250.85	3.9	271
250.34	1.0	72	250.86	3.9	276
250.35	1.1	75	250.87	4.0	281
250.36	1.1	78	250.88	4.1	286
250.37	1.2	81	250.89	4.2	291
250.38	1.2	84	250.90	4.2	296
250.39	1.2	87	250.91	4.3	301
250.40	1.3	90	250.92	4.4	307
250.41	1.3	93	250.93	4.5	312
250.42	1.4	96	250.94	4.5	317
250.43	1.4	99	250.95	4.6	323
250.44	1.5	102	250.96	4.7	328
250.45	1.5	106	250.97	4.8	333
250.46	1.6	109	250.98	4.8	339
250.47	1.6	112	250.99	4.9	344
250.48	1.7	116	251.00	5.0	350
250.49	1.7	119			
250.50	1.8	123			
250.51	1.8	126			

Summary for Pond A1:

Inflow Area = 1.140 ac, 83.46% Impervious, Inflow Depth = 5.74" for 25 yr event
 Inflow = 7.02 cfs @ 12.08 hrs, Volume= 0.545 af
 Outflow = 6.94 cfs @ 12.10 hrs, Volume= 0.483 af, Atten= 1%, Lag= 0.7 min
 Primary = 6.94 cfs @ 12.10 hrs, Volume= 0.483 af
 Routed to Reach A3d :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 242.86' @ 12.10 hrs Surf.Area= 1,748 sf Storage= 3,153 cf

Plug-Flow detention time= 94.1 min calculated for 0.483 af (89% of inflow)
 Center-of-Mass det. time= 40.3 min (806.9 - 766.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	240.00'	3,403 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
240.00	544	94.0	0	0	544
241.00	905	124.0	717	717	1,076
242.00	1,337	150.0	1,114	1,831	1,659
243.00	1,820	170.0	1,572	3,403	2,193

Device	Routing	Invert	Outlet Devices
#1	Primary	239.00'	18.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 239.00' / 238.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	242.60'	24.0" x 24.0" Horiz. Grate X 2.00 C= 0.600 Limited to weir flow at low heads

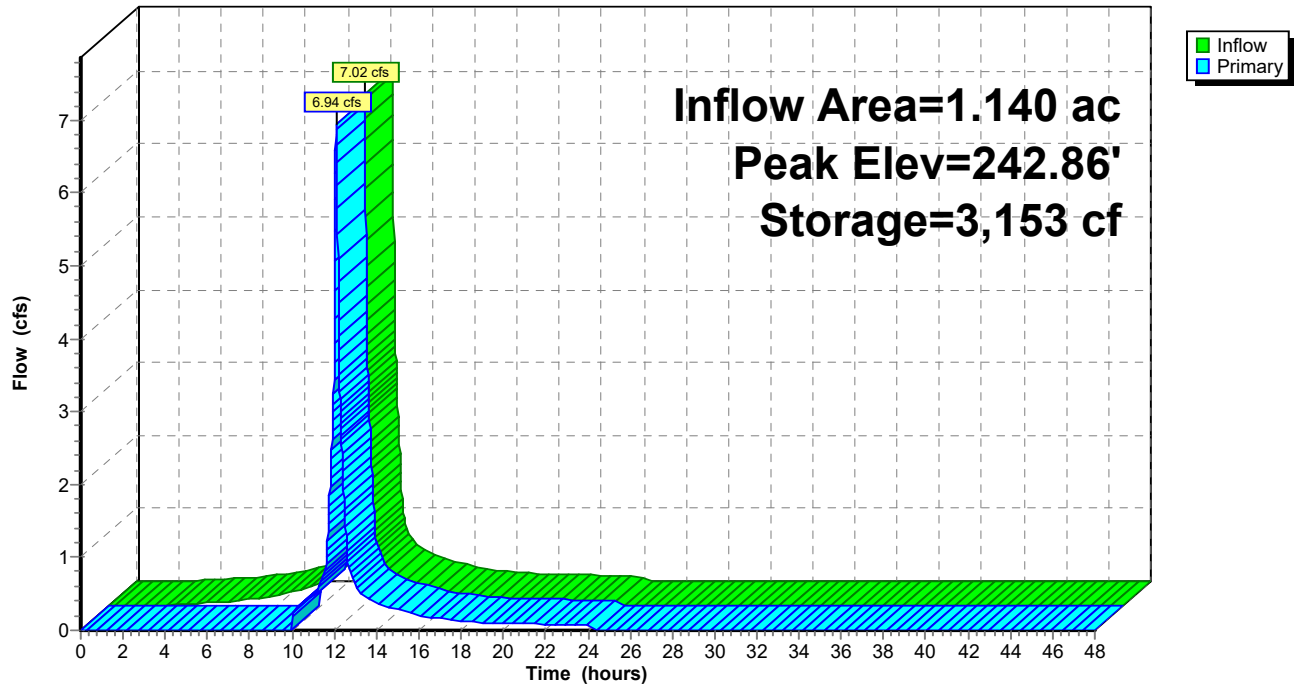
Primary OutFlow Max=6.92 cfs @ 12.10 hrs HW=242.86' (Free Discharge)

↑ **1=Culvert** (Passes 6.92 cfs of 11.85 cfs potential flow)

↑ **2=Grate** (Weir Controls 6.92 cfs @ 1.67 fps)

Pond A1:

Hydrograph



2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 28

Stage-Area-Storage for Pond A1:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
240.00	544	0	242.60	1,618	2,716
240.05	560	28	242.65	1,642	2,798
240.10	576	56	242.70	1,667	2,880
240.15	592	85	242.75	1,692	2,964
240.20	609	115	242.80	1,717	3,049
240.25	626	146	242.85	1,743	3,136
240.30	643	178	242.90	1,768	3,224
240.35	660	210	242.95	1,794	3,313
240.40	677	244	243.00	1,820	3,403
240.45	695	278			
240.50	713	313			
240.55	731	349			
240.60	750	386			
240.65	768	424			
240.70	787	463			
240.75	806	503			
240.80	825	544			
240.85	845	586			
240.90	865	628			
240.95	885	672			
241.00	905	717			
241.05	925	763			
241.10	944	809			
241.15	964	857			
241.20	985	906			
241.25	1,005	956			
241.30	1,026	1,006			
241.35	1,047	1,058			
241.40	1,068	1,111			
241.45	1,089	1,165			
241.50	1,110	1,220			
241.55	1,132	1,276			
241.60	1,154	1,333			
241.65	1,176	1,391			
241.70	1,199	1,451			
241.75	1,221	1,511			
241.80	1,244	1,573			
241.85	1,267	1,636			
241.90	1,290	1,700			
241.95	1,313	1,765			
242.00	1,337	1,831			
242.05	1,359	1,898			
242.10	1,382	1,967			
242.15	1,405	2,036			
242.20	1,428	2,107			
242.25	1,451	2,179			
242.30	1,474	2,252			
242.35	1,498	2,327			
242.40	1,521	2,402			
242.45	1,545	2,479			
242.50	1,569	2,557			
242.55	1,593	2,636			

Summary for Pond A2:

Inflow Area = 0.672 ac, 85.82% Impervious, Inflow Depth = 5.86" for 25 yr event
 Inflow = 4.17 cfs @ 12.08 hrs, Volume= 0.328 af
 Outflow = 4.06 cfs @ 12.10 hrs, Volume= 0.289 af, Atten= 3%, Lag= 1.2 min
 Primary = 4.06 cfs @ 12.10 hrs, Volume= 0.289 af
 Routed to Reach A3d :

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Peak Elev= 240.59' @ 12.10 hrs Surf.Area= 1,484 sf Storage= 2,117 cf

Plug-Flow detention time= 100.3 min calculated for 0.288 af (88% of inflow)
 Center-of-Mass det. time= 44.6 min (806.5 - 761.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	238.00'	2,778 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
238.00	263	83.0	0	0	263
239.00	657	138.0	445	445	1,237
240.00	1,158	169.0	896	1,341	2,009
241.00	1,735	194.0	1,437	2,778	2,754

Device	Routing	Invert	Outlet Devices
#1	Primary	237.00'	24.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 237.00' / 236.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	240.30'	24.0" x 24.0" Horiz. Grate C= 0.600 Limited to weir flow at low heads

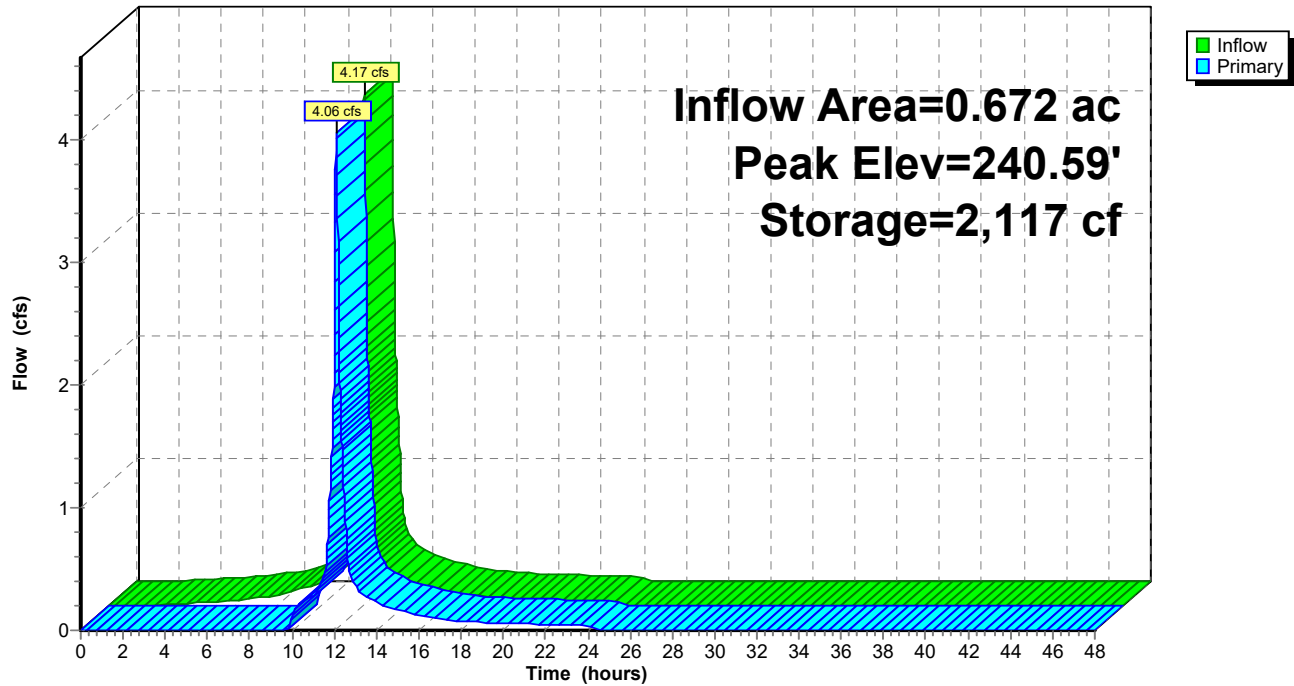
Primary OutFlow Max=4.05 cfs @ 12.10 hrs HW=240.59' (Free Discharge)

↑ **1=Culvert** (Passes 4.05 cfs of 19.21 cfs potential flow)

↑ **2=Grate** (Weir Controls 4.05 cfs @ 1.76 fps)

Pond A2:

Hydrograph



2026-09-18 MMC Swales

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Type III 24-hr 25 yr Rainfall=6.45"

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Page 31

Stage-Area-Storage for Pond A2:

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
238.00	263	0	240.60	1,490	2,133
238.05	278	14	240.65	1,520	2,209
238.10	294	28	240.70	1,550	2,285
238.15	311	43	240.75	1,580	2,364
238.20	328	59	240.80	1,610	2,443
238.25	345	76	240.85	1,641	2,525
238.30	363	93	240.90	1,672	2,607
238.35	381	112	240.95	1,703	2,692
238.40	399	132	241.00	1,735	2,778
238.45	418	152			
238.50	438	173			
238.55	458	196			
238.60	478	219			
238.65	499	244			
238.70	520	269			
238.75	542	296			
238.80	564	323			
238.85	587	352			
238.90	610	382			
238.95	633	413			
239.00	657	445			
239.05	679	479			
239.10	701	513			
239.15	723	549			
239.20	746	585			
239.25	769	623			
239.30	792	662			
239.35	816	703			
239.40	840	744			
239.45	865	787			
239.50	890	830			
239.55	915	876			
239.60	941	922			
239.65	967	970			
239.70	993	1,019			
239.75	1,020	1,069			
239.80	1,047	1,121			
239.85	1,074	1,174			
239.90	1,102	1,228			
239.95	1,130	1,284			
240.00	1,158	1,341			
240.05	1,184	1,400			
240.10	1,210	1,459			
240.15	1,237	1,521			
240.20	1,264	1,583			
240.25	1,291	1,647			
240.30	1,319	1,712			
240.35	1,347	1,779			
240.40	1,375	1,847			
240.45	1,403	1,916			
240.50	1,432	1,987			
240.55	1,461	2,060			

APPENDIX H

Long Term Pollution Prevention Operation & Maintenance Plan

OPERATION AND MAINTENANCE PLAN

Permanent Stormwater Best Management Practices (BMPs)

for

**Medway Municipal Complex
120 Main Street
Medway, MA**

Prepared For:

Town of Medway

Prepared By:

**Langan Engineering & Environmental Services, LLC
100 Cambridge Street, Suite 1310
Boston, MA 02114**

July 20, 2026

Revised September 18, 2026

Langan Project No. 151072201

Stormwater Operation and Maintenance Plan Medway Municipal Complex, Medway, MA

Long Term Pollution Prevention Operation and Maintenance Plan

The purpose of this Long Term Pollution Prevention Operation and Maintenance Plan ("O&M") is to provide project specific information related to the long term operation, maintenance, inspection, documentation, and performance of the structural and non-structural stormwater features. Regular inspection and maintenance of the stormwater management system is necessary to ensure proper operation of the system. The following O&M has been prepared to ensure the proposed system functions as intended. This O&M plan identifies maintenance procedures, schedules, and responsible parties.

The Long Term Pollution Prevention Operation and Maintenance Plan has been compiled in general accordance with Federal, State, and Local requirement in addition to stormwater best management practices ("BMPs").

Responsible Parties

The Responsible Party, or any successor of, shall be the party responsible for implementing this O&M plan.

Entity Name:

Town of Medway

Address:

155 Village Street

Medway, MA 02053

Tel. Number:

(508) 533-3264

Name & Title:

Michael E. Baynton Town Manager

Signature:

Michael E. Baynton

Date:

7/16/2024

Estimated Annual Costs

The estimated annual cost for the implementation of this plan is **\$5,000.**

Stormwater Operation and Maintenance Procedures

Procedures are obtained from the Massachusetts Stormwater Handbook. These procedures are for all structural and non-structural BMPs and are intended to eliminate or reduce the long term soil erosion and degradation of stormwater features following construction completion. The inspection and successful implementation of all stormwater measures, shall be the Property Manager's responsibility. The Property Manager is responsible for training employees to perform O&M and to provide ongoing training as needed in response to staff changes. Implement employee training program and hold session at least once a year.

Stormwater Operation and Maintenance Plan

Medway Municipal Complex, Medway, MA

Stormwater Management Plan Overview

Stormwater runoff is managed on site through the use of an underground closed pipe network with deep-sump catch basins, proprietary water quality structures, bioretention basins, and subsurface infiltration systems.

Structural Pretreatment BMPs

Deep Sump Catch Basins

Activity	Frequency
Inspect units	Four times per year
Clean units	Four 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 basin.

Proprietary Water Quality Structures

Activity	Frequency
Inspect in accordance with manufacturer requirements, but no less than twice a year following installation, and no less than once a year thereafter.	See activity
Remove sediment and other trapped pollutants at frequency or level specified by manufacturer.	See manufacturer information

- **Refer to manufacturer's maintenance procedures attached to this document.**

Surface BMPs

Infiltration Basins

Activity	Frequency
Preventative maintenance	Twice a year
Inspect to ensure proper functioning	After every major storm during first 3 months of operation and twice a year thereafter and when there are discharges through the high outlet orifice.
Mow the buffer area, side slopes, and basin bottom if grassed floor; rake if stone bottom; remove trash and debris; remove grass clippings and accumulated organic matter	Twice a year
Inspect and clean pretreatment devices	Every other month recommended and at least twice a year and after every major storm event.

- **A "major storm event" is defined as a storm that is equal to or greater than the 2-year, 24-hour storm which is 3.37 inches in a 24-hour period in Medway, MA.**
- **Shut off valve to remain "off" except when basin requires emergency drawdown for repairs.**

Stormwater Operation and Maintenance Plan

Medway Municipal Complex, Medway, MA

Underground Structural BMPs

Subsurface Detention System

Activity	Frequency
Inspect inlets and outlet control structures	Twice a year
Remove sediment, trash and other trapped pollutants.	As required.

- **Refer to manufacturer's maintenance procedures attached to this document.**

Non-Structural Pretreatment BMPs

Street Sweeping

Activity	Frequency
High Efficiently Vacuum	Quarterly Average, with sweeping scheduled primary in spring and fall
Regenerative Air Sweeper	Quarterly Average, with sweeping scheduled primary in spring and fall
Mechanical Sweeper	Monthly Average, with sweeping scheduled primarily in spring and fall

Meadow Vegetation

Several meadow mixes for vegetation are designated throughout the site on steep slopes, within basins, and other areas. Refer to the LP series plans. After the first growing season, and if the meadow mix is well established, the meadow mix shall be mowed only once annually. The typical height of the meadow mix will be taller than 12 inches. Annual maintenance mowing shall be done in late winter during the month of March.

Material and Equipment Storage

Material and equipment storage shall be done in a safe and orderly fashion. All debris and waste shall be collected and disposed of offsite in a legal manner in accordance with local and federal guidelines. The temporary storage of snow may be permitted in accordance with the locally approved permit plans in the pre-determined locations. Snow may not be disposed of in or around stormwater basins. The snow storage locations are shown in the attached permit drawings.

Spill Control & Containment

The following measures must be implemented to minimize, control, and contain spills:

- Store chemicals inside, when applicable
- Pick up litter

Stormwater Operation and Maintenance Plan Medway Municipal Complex, Medway, MA

- The spill shall be contained as close to the source as possible with a dike of absorbent materials from the spill cleanup equipment (such as socks, pads, pillows, or “pigs”). Additional dikes must be constructed to protect swales or other stormwater conveyances or streams. A cover or dike will shall protect any other stormwater structures such as catch basins.
- Implement employee training program and hold session at least once a year
- Identify spill control team. The name(s) of the responsible spill personnel will be posted on-site.
- Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures.
- In the event of a release of oil or hazardous waste to the storm drainage system, the person shall immediately notify the Conservation Commission and the Town’s Fire and Public Works Departments and the Board of Health.
- In the event of a release of a non-hazardous pollutant to the storm drainage system, the reporting person shall notify the Conservation Commission in person or by phone no later than 4:00 p.m. of the next business day.
- Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Conservation Commission within three business days of the phone notice.
- If the discharge of prohibited materials emanates from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained in accordance with the Massachusetts Public Records Law.

Pesticides and Fertilizers

- Pesticide/Herbicide Usage – No pesticides are to be used unless a single spot treatment is required for a specific control application.
- Fertilizer usage should be avoided. If deemed necessary, slow release fertilizer should be used. Fertilizer may be used to begin the establishment of vegetation in bare or damaged areas, but should not be applied on a regular basis unless necessary

**Stormwater Operation and Maintenance Plan
Medway Municipal Complex, Medway, MA**

STORMWATER MANAGEMENT SYSTEM INSPECTION AND MAINTENANCE CHECKLIST

Medway Municipal Complex, Medway, MA		Inspector:		
Date:	Time:	Site Conditions:		
Inspection & Maintenance Item	Schedule	Satisfactory? Yes (Y) or No (N)		Comments or Corrective Measures Taken
Deep Sump Catch Basins				
Inspect Units	Quarterly	Y	N	
Clean Units	Quarterly	Y	N	
Proprietary Water Quality Structures				
Inspect per Manufacture Recommendations - See manufacturer maintenance guide	2x a year	Y	N	
Remove Sediments and Pollutants	Level of sediment has reached 50% of sump capacity	Y	N	
Infiltration Basins				
Inspect Basin	2x a year	Y	N	
Mow Basin	2x a year	Y	N	
Check for accumulated sediment, trash, and debris. Remove as required.	Quarterly	Y	N	
Remove sediment from basin.	Quarterly	Y	N	
Inspect inlet & outlet structures	2x a year	Y	N	
Subsurface Detention System				
Inspect outlet and inlet structures	2x a year	Y	N	
Remove Sediments and Pollutants	Annually	Y	N	

Stormwater Operation and Maintenance Plan
Medway Municipal Complex, Medway, MA

Street Sweeping				
High Efficient Vacuum	Quarterly	Y	N	
Regenerative Air Sweeper	Quarterly	Y	N	
Mechanical Sweeper	Monthly	Y	N	

Stormwater Operation and Maintenance Plan Medway Municipal Complex, Medway, MA

STORMWATER MANAGEMENT SYSTEM MAINTENANCE LOG FORM

[illegible]

Stormwater Operation and Maintenance Plan

Medway Municipal Complex, Medway, MA

Operation and Maintenance Form

The purpose of this Operation and Maintenance Update Form is to document administrative or clerical updates to the Operation and Maintenance Plan. No Best Management Practices ("BMP") or site changes can be made without prior approval and recertification. At a minimum, an annual update is required by December 15 each year.

Date of update: ___/___/___

Last updated: ___/___/___

Completed by: _____ (print) _____ (sign)

UPDATED INFORMATION		Description
Accurate site personnel contact information	Yes ☐ No ☐	
Accurate BMP information, including source controls	Yes ☐ No ☐	
Previous inspection records included	Yes ☐ No ☐	
MAINTENANCE LOGS		Description
Accurately reflects and adheres to maintenance schedule	Yes ☐ No ☐	
TRAINING		Description
New employee training events	Yes ☐ No ☐	
New contractor training events	Yes ☐ No ☐	
Employee refresher training events	Yes ☐ No ☐	
Contractor refresher training events	Yes ☐ No ☐	
ANNUAL INSPECTION		Description
Overall site and O&M measures in good condition	Yes ☐ No ☐	
Evidence of sediment deposition	Yes ☐ No ☐	
Evidence of erosion	Yes ☐ No ☐	
BMPs performing as designed	Yes ☐ No ☐	
Evidence of flooding	Yes ☐ No ☐	
O&M plan is overall effective	Yes ☐ No ☐ <i>If no, provide corrective action</i>	

StormFilter Inspection and Maintenance Procedures



Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended::

1. Inspection

- Inspection of the vault interior to determine the need for maintenance.

2. Maintenance

- Cartridge replacement
- Sediment removal

Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.

In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

Maintenance Frequency

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-5 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

Regulatory requirements or a chemical spill can shift maintenance timing as well. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs..





Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

Important: Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit and the unit's role, relative to detention or retention facilities onsite.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to whether or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered).

Please note Stormwater Management StormFilter devices installed downstream of, or integrated within, a stormwater storage facility typically have different operational parameters (i.e. draindown time). In these cases, the inspector must understand the relationship between the retention/detention facility and the treatment system by evaluating site specific civil engineering plans, or contacting the engineer of record, and make adjustments to the below guidance as necessary. Sediment deposition depths and patterns within the StormFilter are likely to be quite different compared to systems without upstream storage and therefore shouldn't be used exclusively to evaluate a need for maintenance.

1. Sediment loading on the vault floor.
 - a. If $>4"$ of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
 - a. If $>1/4"$ of accumulation, maintenance is required.
3. Submerged cartridges.
 - a. If $>4"$ of static water above cartridge bottom for more than 24 hours after end of rain event, maintenance is required. (Catch basins have standing water in the cartridge bay.)
4. Plugged media.
 - a. While not required in all cases, inspection of the media within the cartridge may provide valuable additional information.
 - b. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
 - a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
 - a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
 - a. If pronounced scum line (say $\geq 1/4"$ thick) is present above top cap, maintenance is required.

Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from Contech Engineered Solutions.

Warning: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

- A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

- B. Remove the used cartridges (up to 250 lbs. each) from the vault.



Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner.

- C. Set the used cartridge aside or load onto the hauling truck.
- D. Continue steps a through c until all cartridges have been removed.

Method 2:

- A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.
- B. Unscrew the cartridge cap.
- C. Remove the cartridge hood and float.
- D. At location under structure access, tip the cartridge on its side.
- E. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.
- F. Set the empty, used cartridge aside or load onto the hauling truck.
- G. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

Related Maintenance Activities - Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.



Inspection Report

Date: _____ Personnel: _____

Location: _____ System Size: _____ Months in Service: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: _____

Sediment Thickness in Forebay: _____ Date: _____

Sediment Depth on Vault Floor: _____

Sediment Depth on Cartridge Top(s): _____

Structural Damage: _____

Estimated Flow from Drainage Pipes (if available): _____

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water: _____

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal: _____

☐ Minor Structural Repairs: _____

☐ Drainage Area Report _____

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

Items Needing Further Work: _____

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: _____

List Safety Procedures and Equipment Used: _____

System Observations

Months in Service: _____

Oil in Forebay (if present): Yes ☐ No ☐

Sediment Depth in Forebay (if present): _____

Sediment Depth on Vault Floor: _____

Sediment Depth on Cartridge Top(s): _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: _____

Replace Cartridges: Yes ☐ No ☐ Details: _____

Sediment Removed: Yes ☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?): _____

Minor Structural Repairs: Yes ☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes: _____



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Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other Contech division offerings, visit www.ContechES.com or call 800.338.1122.

Support

- Drawings and specifications are available at www.conteches.com.
- Site-specific design support is available from our engineers.

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Cascade Separator[®] Inspection and Maintenance Guide



Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump 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 (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. 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 in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

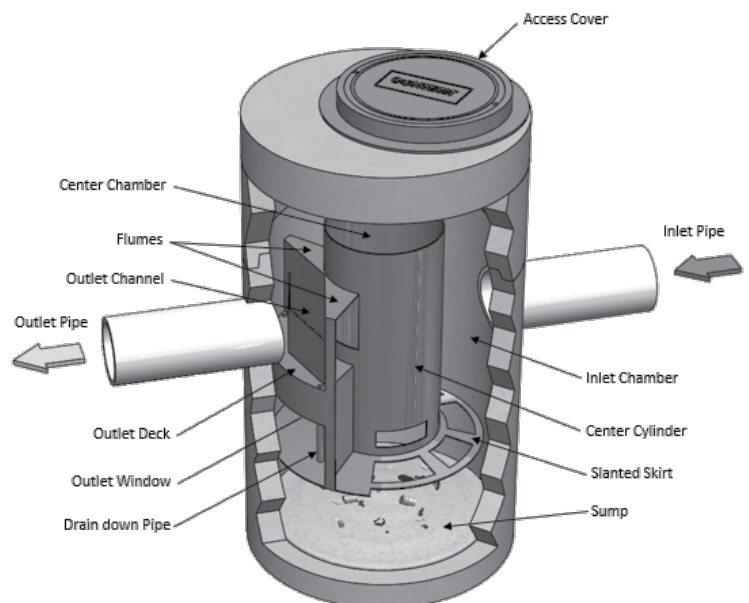
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) 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. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system 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 cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

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. Then the system should be power washed 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 to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

[illegible]

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. 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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CDS® Inspection and Maintenance Guide



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 allow 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 whether 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 system 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 should be cleaned out immediately. 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 power washed 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.



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	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	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



Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

[illegible]

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.

APPENDIX I

Illicit Discharge Compliance Statement

ILLCIT DISCHARGE COMPLIANCE STATEMENT

RESPONSIBILITY:

The Owner is responsible for ultimate compliance with all provisions of the Massachusetts Stormwater Management Policy and responsible for identifying and eliminating illicit discharges (as defined by USEPA).

OWNER NAME:

Town of Medway

ADDRESS:

155 Village Street Medway, MA 02053

TEL. NUMBER:

(508) 533-3264

OWNER'S COMPLIANCE STATEMENT:

To the best of my knowledge, the attached plans, computations and specifications meet the requirements of Standard 10 of the Massachusetts Stormwater Handbook regarding illicit discharges to the stormwater management system and that no detectable illicit discharges exist on the site. All documents and attachments were prepared under my direction and qualified personnel gathered and evaluated the information submitted, to the best of my knowledge.

Included with this statement are site plans, drawn to scale, that identify the location of systems for conveying stormwater on the site and show that these systems do not allow the entry of any illicit discharges into the stormwater management system. The plans also show any systems for conveying wastewater and/or groundwater on the site and show that there are no connections between the stormwater and wastewater systems.

For a redevelopment project (if applicable), all actions taken to identify and remove illicit discharges, including without limitation, visual screening, dye or smoke testing, and the removal of any sources of illicit discharges to the stormwater management system are documented and included with this statement.

Signature



APPENDIX J

Test Pit and Boring Logs



LEGEND

LB-##

BUILDING BORINGS

LB-##

SITE BORINGS

TP-##

TEST PITS

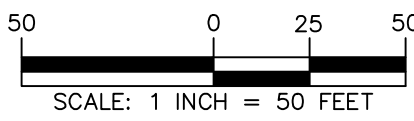
B-2

PAST BORINGS (BY OTHERS)

LIMITS OF PROPOSED BASEMENT

NOTES:

- ALL BORING AND TEST PIT LOCATIONS ARE APPROXIMATE.
- LANGAN BORINGS AND TEST PITS WERE PERFORMED BY NORTHERN DRILL SERVICE, INC. UNDER THE FULL TIME OBSERVATION OF A LANGAN ENGINEER.
- ELEVATIONS REFERENCE THE NORTH AMERICAN VERTICAL DATUM (NAVD88)



LANGAN
Langan Engineering and Environmental Services, LLC.
100 Cambridge Street, Suite 1310
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Project
D+W MEDWAY MUNICIPAL
MEDWAY
NORFOLK COUNTY MASSACHUSETTS

Drawing Title
EXPLORATION LOCATION PLAN

Date	Description	No.
Revisions		
Project No.	Drawing No.	
151072201	5	
Date		
4/28		
Drawn By		
ST	Sheet 0 of 1	
Checked By		
LHC		

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 258.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 16.2 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 4.0	Completion ▼ 14.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 254.0	Completion ▼ 244.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/13/2026 08:32 AM	4/21/2026 02:00 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60°)		
	SILTY SAND WITH GRAVEL (SM) [FILL] dark brown, loose, moist, medium to coarse sand, cobbles, roots, fibrous vegetation	+258.0	0							Precleared to 5ft depth by vacuum excavation. Grab sample at 0 and 4 ft. G1.
			1	G-1	GRAB					
	SANDY SILT (ML) gray, stiff, wet, low plasticity silt, cobbles, trace gravel	+256.5	2							G2.
			3							
			4	G-2	GRAB					
			5							
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, trace gravel		6	S-1	SPT	20	3 7 9 14	16 (0)		Drill to 5 ft. S-1 at 5 ft.
			7							
			8							
	SANDY SILT (ML) [TILL] dark gray, hard, wet, low plasticity silt, trace gravel		10							Drill to 10 ft. S-2 at 10 ft.
			11	S-2	SPT	18	11 42 49 61	91 (0)		
			12							
	SANDY SILT (ML) [TILL] dark gray, hard, wet, low plasticity silt, trace gravel, cobbles		13							Rig Chattering.
			14							
			15	S-3	SPT	16	23 78 111/2"	189 (0)		
			16							Drill to 15 ft. S-3 at 15 ft. Refusal at 16 ft.

Project Public Safety and Townhall Complex				Coordinates					
Location 120 Mainstreet, Medway, MA				Elevation and Datum Approx. el. 258.0 (NAVD 88)					
Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Remarks
				Number	Type	Recov. (in)	Blows/6in	N - Value (N60*)	
		+242.0	16						
	End of Boring at 16.2 ft.	+241.8							End of Boring. backfilled with soil cuttings.
			17						
			18						
			19						
			20						
			21						
			22						
			23						
			24						
			25						
			26						
			27						
			28						
			29						
			30						
			31						
			32						
			33						
			34						
			35						
			36						

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 256.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 17.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 13.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 243.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/16/2026 11:19 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) [FILL] dark brown, loose, moist, medium to coarse sand	+256.0	0							Precleared to 5ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			1							
			2							
	SILTY SAND (SM) grayish brown, medium dense, moist, few gravel	+253.5	3							S-1 at 5 ft. Drill to 5 ft.
			4							
			5							
	SILTY SAND with GRAVEL (SM) gray, medium dense, wet, few cobbles	+250.0	6	S-1A			3 13 40 33	53 (53)		Rig Chattering. cobble fragments in split spoon.
			7	S-1B						
			8							
	COBBLES (COBBLES)		9							Drill to 10 ft. S-2 at 10 ft.
			10							
			11							
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt, cobbles	+246.0	12							Return Water.
			13							
			14							
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt		15							S-3 at 15 ft.
			16							
			17							

Project Public Safety and Townhall Complex				Coordinates					
Location 120 Mainstreet, Medway, MA				Elevation and Datum Approx. el. 256.0 (NAVD 88)					
Material Symbol	Sample Description	Elev. (ft) +240.0	Depth Scale (ft) 16	Sample Data				Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/6in		
		+239.0	17	S-3		20	63 75 102	138 (138)	Hydraulic line blew up at 17 ft. (8.20 am to 11.00 am) Refusal encountered at 17 ft. Boring ended at 17 ft. backfilled with soil cuttings.
	End of Boring at 17.0 ft.		18						
			19						
			20						
			21						
			22						
			23						
			24						
			25						
			26						
			27						
			28						
			29						
			30						
			31						
			32						
			33						
			34						
			35						
			36						

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 254.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 21.2 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 5.0	Completion ▼ 19.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 249.0	Completion ▼ 235.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/17/2026 01:13 PM	4/17/2026 01:55 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+254.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] light brown, loose, moist, medium to coarse sand, some gravel	+253.8	1							Start Drilling: 0 ft, 12:48 PM. Jackhammer used to make 4 inch hole through 3 inch thick apron. Precleared to 5ft depth by vacuum excavation.
			2							
			3							
			4							
			5							
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] brown, dense, wet, medium to coarse sand	+247.5	6	S-1	SPT	16	8 5 4 14	9 (9)		Drill to 5 ft. S-1 at 5 ft.
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) light brown, loose, moist, medium to coarse sand, some gravel		7	S-2A						S-2 at 7 ft.
	POORLY GRADED SAND WITH GRAVEL (SP) brown, dense, wet, medium to coarse sand	+246.0	8	S-2B	SPT	24	14 14 15 23	29 (29)		
	SANDY SILT (ML) gray, very stiff, moist, low plasticity silt, few gravel		9							
		+244.0	10							Drill to 10 ft. S-3 at 10 ft.
	SANDY SILT (ML) gray, very stiff, moist, low plasticity silt, few gravel		11	S-3	SPT	6	30 29 30 43	59 (59)		
			12							
			13							Drill to 15 ft. S-4 at 15 ft. Refusal at 17 ft.
			14							
		+239.0	15							
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt, cobbles		16		SPT		21			

Project				Public Safety and Townhall Complex							Coordinates	
Location				120 Mainstreet, Medway, MA							Elevation and Datum	
				Approx. el. 254.0 (NAVD 88)								
Material Symbol		Sample Description		Elev. (ft)	Depth Scale (ft)	Sample Data				Shear Strength (ksf) [Test Type]	Remarks	
				+238.0	16	Number	Type	Recov. (in)	Blows/6in	N - Value (N60*)		
						S-4		20	45 58 53	103 (103)		
					17							
					18							
					19							
					20							
		SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt, trace gravel, cobbles			21	S-5	SPT	12	27 75 70/3"	145 (145)		
		End of Boring at 21.2 ft.		+232.8	22							
					23							
					24							
					25							
					26							
					27							
					28							
					29							
					30							
					31							
					32							
					33							
					34							
					35							
					36							
Drill to 20 ft. S-5 at 20 ft. Refusal at 21.25 ft. Boring ended at 21.25 ft. Hole backfilled with soil cuttings.												
Stop Drilling: 21.25 ft, 1:57 PM.												

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 253.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 27.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 21.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 232.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/15/2026 03:10 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] light brown, medium dense, moist, medium to coarse sand	+253.0	0							Precleared to 6 ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			1							
			2							
			3							
	SILTY SAND [FILL] gray, medium dense, moist, fine to medium sand	+249.0	4							S1 at 6 ft. Rig Chattering. Drill to 10 ft. S2 at 10 ft. No recovery at 10 to 12 ft. second split Sample inserted for Sample recovery. Rig Chattering. Drill to 15 ft. S3 at 15 ft. Rig Chattering. Return Water.
			5							
	SILTY SAND WITH GRAVEL (SM) dark brown, very dense, fine to medium sand	+247.0	6							
			7	S-1A	SPT	16	12 22 43 84	65 (65)		
	COBBLES (COBBLES)	+245.5	8	S-1B						
			9							
			10							
			11							
	SILTY SAND WITH GRAVEL (SM) dark gray, very dense, wet, medium to coarse sand	+243.0	12							
			13							
			14							
			15							
	SANDY SILT (ML) [TILL] dark gray, hard, moist, low plasticity silt, few gravel	+238.0	16		SPT		18			
			17							

Project				Public Safety and Townhall Complex				Coordinates				
Location				120 Mainstreet, Medway, MA				Elevation and Datum				
								Approx. el. 253.0 (NAVD 88)				
Material Symbol	Sample Description			Elev. (ft)	Depth Scale (ft)	Sample Data				Shear Strength (ksf) [Test Type]	Remarks	
						Number	Type	Recov. (in)	Blows/6in			N - Value (N60*)
				+237.0	16	S-3		18	21 22 28	43 (43)		
					17							
					18							
					19							
					20							Drill to 20 ft. S4 at 20 ft.
					21	S-4	SPT	16	12 29 42 58	71 (71)		
					22							
					23							
					24							
					25							Drill to 25 ft. S5 at 25 ft.
					26	S-5	SPT	20	20 52 96 83	148 (148)		
				+226.0	27							Refusal encountered at 27 ft. Refusal at 27 ft. Boring ended at 27 ft. backfilled with soil cuttings. Stop Drilling: 27 ft, 3:06 PM.
					28							
					29							
					30							
					31							
					32							
					33							
					34							
					35							
					36							

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 253.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 21.5 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 6.0	Completion ▼ 11.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 247.0	Completion ▼ 242.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/16/2026 12:48 PM	4/16/2026 01:32 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+253.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] grayish brown, medium dense, medium to coarse sand, cobbles	+252.7	1							Jackhammer used to make 4 inch hole through 4 inch thick apron. Precleared to 5ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] grayish brown, medium dense, medium to coarse sand, cobbles		2							
			3							
			4							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) dark gray, dense, medium to coarse sand, cobbles	+248.0	5							Drill to 5ft. S-1 at 5 ft.
			6	S-1	SPT	4	11 18 22 16	40 (40)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) dark gray, dense, medium to coarse sand	+245.0	7	S-2A						S-2 at 7 ft.
			8	S-2B	SPT	24	15 16 15 16	31 (31)		
	SANDY SILT (ML) [TILL] dark gray, very stiff, wet, low plasticity silt		9							Drill to 10 ft. S-3 at 10 ft.
			10							
	SANDY SILT (ML) [TILL] dark gray, very stiff, wet, low plasticity silt		11	S-3	SPT	6	15 17 15 19	32 (32)		
			12							Return Water.
			13							
			14							
	SANDY SILT (ML) [TILL] dark gray, hard, wet, low plasticity silt, few gravel		15							Drill to 15 ft. S-4 at 15 ft.
			16		SPT		19			

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 251.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 20.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 14.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 237.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/17/2026 11:22 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] light gray to gray, loose, moist, medium to coarse sand	+251.0	0							Precleared to 5ft depth by vacuum excavation. Grab sample at 2 and 4 ft. Grab sample at 2 and 4 ft.
			1							
			2							
			3							
			4							
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] dark brown, medium dense, moist, medium to coarse sand	+245.3	5	S-1A						S-1 at 5 ft.
	POORLY GRADED SAND WITH GRAVEL (SP) gray, medium dense, moist, medium to coarse sand		6	S-1B	SPT	24	12 18 18 19	36 (36)		
			7							
			8							
			9							
	SANDY SILT (ML) [TILL] gray, hard, wet, low plasticity silt, few gravel, cobbles	+241.0	10							Drill to 10 ft. S-2 at 10 ft.
			11	S-2	SPT	18	25 21 23 28	44 (44)		
			12							
			13							
			14							
	COBBLES (COBBLES) gray	+236.0	15	S-3	SPT	1	108	108 (108)		Drill to 15 ft. Obstruction at 15 ft. Refusal encountered. No recovery. S-3 at 15 ft.
			16							

Project				Coordinates						
Public Safety and Townhall Complex										
Location				Elevation and Datum						
120 Mainstreet, Medway, MA				Approx. el. 251.0 (NAVD 88)						
Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/6in	N - Value (N60°)		
	SANDY SILT (ML) gray, hard, moist, low plasticity silt, trace gravel, cobbles	+235.0	16							Drill to 18 ft. S-4 at 18 ft. Refusal at 20 ft. End of Boring at 20 ft.
		+233.0	18	S-4	SPT	20	12 39 49 72	88 (88)		
	End of Boring at 20.0 ft.	+231.0	20							Boring backfilled with soil cuttings. Stop Drilling: 20 ft, 11:23 AM.
			21							
			22							
			23							
			24							
			25							
			26							
			27							
			28							
			29							
			30							
			31							
	32									
	33									
	34									
	35									
	36									

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 251.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 21.5 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 5.0	Completion ▼ 12.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 246.0	Completion ▼ 239.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/15/2026 11:35 AM	4/15/2026 12:07 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+251.0	0							
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] dark brown, loose, moist, coarse to fine sand	+250.7	1							Jackhammer used to make 4 inch hole through 4 inch thick apron. Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
	SANDY ORGANIC SILT WITH ASH(OL) [FILL] dark , soft, moist, high plasticity silt, glass	+249.2	2							
			3							
			4							
	SILTY SAND WITH GRAVEL (SM) dark gray, medium dense, wet, cobbles	+247.0	5	S-1	SPT	18	6 10 14 19	24 (24)		
	SILTY SAND WITH GRAVEL (SM) dark gray, medium dense, wet, cobbles		6							
			7	S-2	SPT	24	16 22 24 35	46 (46)		
			8							
			9							
	SILTY SAND WITH GRAVEL (SM) dark gray, medium dense, wet, cobbles		10							
			11	S-3	SPT	18	13 21 19 24	40 (40)		
			12							Return Water.
			13							
			14							
			15							
	SILT WITH SAND (ML) [TILL] dark gray, hard, moist, low plasticity silt	+236.0	15				15			
			16		SPT					

Project				Public Safety and Townhall Complex						Coordinates									
Location				120 Mainstreet, Medway, MA						Elevation and Datum									
				Approx. el. 251.0 (NAVD 88)															
Material Symbol		Sample Description		Elev. (ft)		Depth Scale (ft)		Sample Data				Shear Strength (ksf) [Test Type]		Remarks					
								Number		Type						Recov. (in)		Blows/6in	
				+235.0		16		S-4				14		20 24 31		44 (44)			
						17													
						18													
						19													
						20													
		SANDY SILT (ML) [TILL] dark gray, hard, moist, low plasticity silt				21		S-5		SPT		12		19 22 125		147 (147)			
		End of Boring at 21.5 ft.		+229.5		22												Refusal encountered at 21.5 ft. >100 blow counts per 6 inches. Backfilled with soil cuttings. Bottom of Boring Encountered at 21.5 ft: 21.5 ft, 12:27 PM.	
						23													
						24													
						25													
						26													
						27													
						28													
						29													
						30													
						31													
						32													
						33													
						34													
						35													
						36													

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 249.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 31.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 14.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 235.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/17/2026 09:37 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+249.0	0							
	WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) [FILL] gray, loose, moist, medium to coarse sand	+248.7	1							Jackhammer used to make 4 inch hole through 4 inch thick apron. Precleared to 5ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			2							
	SILTY SAND WITH GRAVEL (SM) [FILL] dark brown, medium dense, moist, medium to coarse sand, cobbles		3							
			4							
	SILTY SAND WITH GRAVEL (SM) [FILL] dark brown to brown, dense, moist, medium to coarse sand		5							
		+243.0	6	S-1A	SPT	18	11 20 21 25	41 (41)		Drill to 5ft. S-1 at 5 ft.
	SANDY SILT (ML) gray, hard, moist, low plasticity silt, trace gravel		7	S-1B						
			8							
			9							
			10							
	COBBLES (COBBLES) gray to brown	+239.0	11	S-2A	SPT	18	41 39 35 26	74 (74)		
		+237.5	12	S-2B						
	SILTY SAND (SM) [FILL] gray, dense, moist, medium to coarse sand, cobbles		13							
			14							
		+234.0	15							
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt, few gravel, cobbles		16		SPT		14			Drill to 15 ft. S-3 at 15 ft.

Project				Coordinates					
Location				Elevation and Datum					
Public Safety and Townhall Complex				Approx. el. 249.0 (NAVD 88)					
120 Mainstreet, Medway, MA									
Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data				Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/6in		
		+233.0	16	S-3		18	18 20 22	38 (38)	
			17						
			18						
			19						
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt, cobbles		20						Drill to 20 ft. Return Water. S-4 at 20 ft.
			21	S-4	SPT	12	20 16 38 40	54 (54)	
			22						
			23						
			24						
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt		25						Drill to 25 ft. Drill to 25 ft. S-5 at 25 ft. Refusal encountered at 26.5 ft.
			26	S-5	SPT	18	9 95 82	177 (177)	
			27						
			28						
			29						
	SANDY SILT (ML) [TILL] gray, hard, moist, low plasticity silt, trace gravel		30						Drill to 30 ft. S-6 at 30 ft. Refusal at 31 ft. End boring at 31 ft. Backfilled with soil cuttings, asphalt patch.
			31	S-6	SPT	24	40 90	90 (90)	. Stop Drilling: 31 ft, 9:37 AM.
	End of Boring at 31.0 ft.	+218.0	31						
			32						
			33						
			34						
			35						
			36						

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 247.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 32.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 6.0	Completion ▼ 21.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 241.0	Completion ▼ 226.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/15/2026 08:45 AM	4/15/2026 10:25 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+247.0	0							
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] gray, medium dense, moist, medium to coarse sand	+246.7	1							Jackhammer used to make 4 inch hole through 4 inch thick apron. Precleared to 4ft depth by vacuum excavation. Drill from 0 to 4 ft. Grab sample at 2 and 4 ft.
			2							
			3							
			4							
	SANDY SILT (ML) dark gray, hard, moist	+243.0	5	S-1	SPT	4	5 20 20 24	40 (40)		Rig Chattering. Drill to 4 ft. S1 at 4 ft. Drill to 6 ft. S2 at 6 ft.
			6	S-2A						
	SANDY SILT (ML) dark gray, hard, moist	+240.5	7	S-2B	SPT	2	19 27 28 23	55 (55)		
	SILTY SAND WITH GRAVEL (SM) dark gray to brown, hard, wet, cobbles		8							
			9	S-3	SPT	24	8 17 11 10	28 (28)		
	SILTY SAND WITH GRAVEL (SM) dark gray to brown, hard, wet, cobbles		10							
		+237.0	11	S-4	SPT	18	8 7 10 11	17 (17)		
	SANDY SILT (ML) gray, very stiff, wet, few gravel		12							
			13							
			14							
	SANDY SILT WITH GRAVEL (ML) [TILL] gray, hard, wet		15				15			
			16		SPT					

Project				Coordinates					
Public Safety and Townhall Complex									
Location				Elevation and Datum					
120 Mainstreet, Medway, MA				Approx. el. 247.0 (NAVD 88)					
Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data				Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/6in		
		+231.0	16	S-5		20	18 18 24	36 (36)	
			17						
			18						
			19						
	SANDY SILT WITH GRAVEL (ML) [TILL] gray, hard, moist, cobbles		20						Return Water.
		▼	21	S-6	SPT	20	23 40 49 51	89 (89)	
			22						Rig Chattering.
			23						
			24						
	SANDY SILT (ML) [TILL] gray, hard, moist, trace gravel		25						
			26	S-7	SPT	20	29 57 46 51	103 (0)	
			27						Rig Chattering.
			28						
			29						
	SANDY SILT (ML) [TILL] gray, hard, moist, trace gravel		30						
			31	S-8	SPT	24	41 60 82 86	142 (0)	
	End of Boring at 32.0 ft.	+215.0	32						Bottom of Boring Encountered at 32 ft: 32 ft, 10:26 AM.
			33						
			34						
			35						
			36						

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

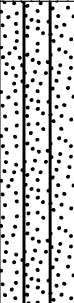
Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 247.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 21.1 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 18.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 229.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/16/2026 03:13 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+247.0	0							
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] gray to brown, medium dense, moist, medium to coarse sand, cobbles	+246.7	1							Start Drilling: 0 ft, 2:28 PM. Jackhammer used to make 4 inch hole through 4 inch thick apron. Precleared to 5ft depth by vacuum excavation.
			2							
			3							
			4							
		+242.0	5							Drill to 5 ft. Drill to 5 ft. S-1 at 5 ft. High blows count on final 6 in. likely due to spoon pushing on rock.
	SILTY SAND WITH FEW GRAVEL moist, dark gray, fine to medium sand, cobbles		6	S-1	SPT	16	13 20 18 51	38 (38)		
			7							
			8							
			9							Rig Chattering.
			10							
	SANDY SILT (ML) dark gray, hard, moist, low plasticity silt	+237.0	11	S-2	SPT	16	24 51 23 22	74 (74)		
	SANDY SILT (ML) dark gray, hard, moist, low plasticity silt, cobbles		12							
			13							Rig Chattering.
			14							
			15							
	SANDY SILT (ML) [TILL] dark gray, hard, moist, low plasticity silt, cobbles		16		SPT		68			

Project				Public Safety and Townhall Complex						Coordinates											
Location				120 Mainstreet, Medway, MA						Elevation and Datum											
				Approx. el. 247.0 (NAVD 88)																	
Material Symbol		Sample Description		Elev. (ft)		Depth Scale (ft)		Sample Data				Shear Strength (ksf) [Test Type]		Remarks							
								Number		Type						Recov. (in)		Blows/6in		N - Value (N60*)	
				+231.0		16		S-3				8		42 28 20		70 (70)				Drill to 20 ft. S-4 at 20 ft. Refusal encountered at 21.08 ft. Boring ended at 21 ft. Backfilled with soil cuttings. Refusal encountered at 21.08 ft. Stop Drilling: 21.08 ft, 3:16 PM.	
						17															
						18															
						19															
						20															
		SANDY SILT (ML) dark gray, hard, moist, low plasticity silt, cobbles				21		S-4		SPT		12		45 91 61/1"		152 (152)					
		End of Boring at 21.1 ft.		+225.9		22															
						23															
						24															
						25															
						26															
						27															
						28															
						29															
						30															
						31															
						32															
						33															
						34															
						35															
						36															

Template: Log-BH-USCS; Strip: Geotechnical; Printed on 06/17/2026

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 253.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.) ▽ N/A	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.) ▽ N/A	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks	
				Number	Type	Recov. (in)	Blows/in	N - Value (N60*)			
		+253.0	0								S-1 at 0 ft.
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, medium dense, medium sand		1	S-1	SPT	2	7 12 8 10	20 (20)			S-2 at 2 ft. Pushing cobbles.
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, medium dense, medium sand		2								
	3		S-2	SPT	4	10 19 29 18	48 (48)				
	4										
	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, fine sand	+249.0	5	S-3	SPT	18	13 19 24 21	43 (43)			Drill to 4 ft. Rig Chattering. Drill to 4 ft. S-3 at 4 ft.
	SILTY SAND (SM) dark gray, dense, fine sand, trace gravel		6								S-4 at 6 ft.
	7	S-4	SPT	16	20 25 16 12	41 (41)					
	8										
	End of Boring at 8.0 ft.	+245.0	9								End of Boring. Backfilled with soil cuttings.
			10								
			11								
			12								
			13								
			14								
			15								
			16								

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 253.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 12.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 9.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 244.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/20/2026 10:43 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] grayish brown, loose, moist, medium to coarse sand, cobbles, concrete	+253.0	0							Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			1							
	SILTY SAND WITH GRAVEL (SM) [FILL] light , medium dense, medium to coarse sand, cobbles		2							
			3							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) gray, medium to coarse sand, cobbles	+249.0	4							Drill to 4 ft. S-1 at 4 ft. Pushing cobbles.
			5	S-1	SPT	6	31 96 33 21	129 (129)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) gray, medium to coarse sand, cobbles		6	S-2A			18 76 26 14	102 (102)		
			7	S-2B	SPT	14				
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, cobbles	+246.0	8							Pushing cobbles. Drill to 8 ft. S-3 at 8 ft.
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, few gravel, cobbles		9	S-3	SPT	12	59 18 22 26	40 (40)		
			10							
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, cobbles, few gravel		11	S-4	SPT	24	59 18 22 26	40 (40)		
	End of Boring at 12.0 ft.	+241.0	12							End of Boring at 12 ft. backfilled with soil cuttings.
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 255.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.) First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A	
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.) First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A	
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks	
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60°)			
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] brown, loose, moist, medium to coarse sand, cobbles, concrete	+255.0	0							Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.	
			1								
			2								
			3								
		+251.0	4								Drill to 4 ft. S-1 at 4 ft.
	SILTY SAND WITH GRAVEL (SM) gray, dense, wet, medium to coarse sand, cobbles		5	S-1	SPT	18	14 16 21 47	37 (37)			
			6								S-2 at 6 ft.
	SILTY SAND WITH GRAVEL (SM) gray, dense, wet, medium to coarse sand, cobbles		7	S-2	SPT	24	21 25 32 58	57 (57)			
		+247.0	8								Rig Chattering. Auger refusal at 8 ft. End of Boring, backfilled with soil cuttings.
			9								
			10								
			11								
			12								
			13								
			14								
			15								
			16								

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 253.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 12.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 8.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 245.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/21/2026 02:50 PM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	SILTY SAND WITH GRAVEL (SM) [FILL] brown, loose, moist, medium to coarse sand, cobbles, fibrous vegetation	+253.0	0							Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			1							
			2							
			3							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) dark gray, dense, moist, medium sand, cobbles	+249.0	4							Drill to 4 ft. S-1 at 4 ft.
			5	S-1	SPT	12	10 16 20 29	36 (36)		
			6							
			7	S-2	SPT	16	17 18 12 21	30 (30)		
	SILTY SAND WITH GRAVEL (SM) dark gray, medium sand	+247.0	8							Drill to 8 ft. S-3 at 8 ft.
			9	S-3	SPT	6	23 48 41 39	89 (89)		
			10							
			11	S-4	SPT	24	24 24 22 38	46 (46)		
	SANDY SILT (ML) dark gray, hard, wet, low plasticity silt, cobbles	+243.0	12							End of Boring. Backfilled with soil cuttings.
			13							
			14							
			15							
	End of Boring at 12.0 ft.	+241.0	16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 255.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 12.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.) First ▽ N/A	Completion ▼ N/A	24 Hour ▼ 5.0	
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.) First ▽ N/A	Completion ▼ N/A	24 Hour ▼ 250.0	
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	4/13/2026 11:10 AM
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	SILTY SAND WITH GRAVEL (SM) [FILL] dark brown, loose, moist, coarse to medium sand, fibrous vegetation	+255.0	0							Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			1							
	SILTY SAND WITH GRAVEL (SM) gray, loose, moist, coarse to medium sand	+253.0	2							
			3							
	SILTY GRAVEL WITH SAND (GM) dark gray, wet, coarse angular gravel, cobbles	+251.0	4							Drill to 4 ft. S-1 at 4 ft.
			5	S-1	SPT	3	20 19 16 23	35 (35)		
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, trace gravel	+249.0	6							S-2 at 6 ft.
			7	S-2	SPT	24	22 16 16 22	32 (32)		
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, trace gravel		8							Drill to 8 ft. S-3 at 8 ft.
			9	S-3	SPT	14	14 29 19 25	48 (48)		
	SANDY SILT (ML) gray, hard, wet, low plasticity silt, few gravel		10							S-4 at 10 ft.
			11	S-4	SPT	12	15 31 22 27	53 (53)		
	End of Boring at 12.0 ft.	+243.0	12							Boring ended at 12 ft. Backfilled with soil cuttings.
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/13/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 257.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 12.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 5.0	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 252.0	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/13/2026 09:23 AM	N/A	N/A
Sampler Hammer Automatic	Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina	

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	SILTY SAND WITH GRAVEL (SM) [FILL] orange to brown, moist, medium to coarse sand	+257.0	0							Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft. G1.
			1							
			2							
			3							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) brown, medium dense, wet, medium to coarse sand	+253.0	4							Drill to 4 ft. S-1 at 4 ft.
			5	S-1	SPT	12	5 7 7 12	14 (0)		
			6	S-2A						
			7	S-2B	SPT	24	15 13 19 29	32 (0)		
	SANDY SILT (ML) gray, hard, moist, low plasticity silt	+250.0	8							Drill to 8ft. S-3 at 8 ft.
			9	S-3	SPT	18	13 18 27 40	45 (0)		
			10							
			11	S-4	SPT	18	31 40 60 77	100 (0)		
	SANDY SILT (ML) gray, hard, moist, low plasticity silt, cobbles	+245.0	12							Drilling ended at 12 ft. Hole back filled with soil cuttings.
			13							
			14							
			15							
	End of Boring at 12.0 ft.		16							

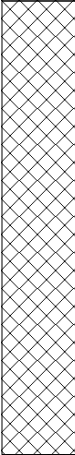
Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 250.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 10.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+250.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] brown, medium dense, moist, medium to coarse sand		1	S-1	SPT	6	6 10 4 4	14 (14)		S-1 at 0 ft.
		+248.0	2							
	SILTY SAND WITH GRAVEL (SM) brown to gray, medium sand, cobbles		3	S-2	SPT	18	8 17 13 14	30 (30)		S-2 at 2 ft.
	SILTY SAND WITH GRAVEL (SM) brown to gray, medium sand, cobbles		4							
			5	S-3	SPT	18	10 15 20 81	35 (35)		Rig Chattering. S-3 at 4 ft.
			6							Spoon Refusal at 6 ft.
			7							
	SILTY SAND WITH GRAVEL (SM) gray, wet, medium sand, cobbles		8							
			9	S-4	SPT	12	81 15 15 22	30 (30)		Drill to 8 ft. Pushing cobbles. S-4 at 8 ft.
	End of Boring at 10.0 ft.	+240.0	10							End of Boring at 10 ft. Backfilled with soil cuttings.
			11							
			12							
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 246.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+246.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray, loose, medium to coarse sand		1	S-1	SPT	6	3 2 3 2	5 (5)		S-1 at 0 ft.
		+244.0	2							S-2 at 2 ft.
	SILT WITH SAND (ML) orangish brown, soft, moist, low plasticity silt		3	S-2	SPT	10	2 2 2 9	4 (4)		
		+242.0	4							Drill to 4 ft. S-3 at 4 ft.
	SILTY SAND (SM) gray, medium to coarse sand		5	S-3	SPT	12	17 17 21 29	38 (38)		
		+240.0	6							S-4 at 6 ft.
	SANDY SILT (ML) dark gray, hard, wet, low plasticity silt, cobbles		7	S-4	SPT	8	37 35 40 50	75 (75)		
		+238.0	8							End of Boring. backfilled with soil cuttings.
	End of Boring at 8.0 ft.		9							
			10							
			11							
			12							
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 242.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 12.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] brown, very loose, moist, medium to coarse sand	+242.0	0							Start Drilling: 0 ft, 2:30 PM. Utility clearance exemption by client. S-1 at 0 ft. S-2 at 2 ft. S-3 at 4 ft. S-4 at 6 ft.
			1	S-1	SPT	12	3 2 2 1	4 (4)		
			2							
			3	S-2	SPT	6	2 2 3 2	5 (5)		
			4							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) brown, very loose, moist, medium to coarse sand, concrete	+236.0	5	S-3	SPT	2	5 3 5 4	8 (8)		Drill to 10 ft. End of Boring. backfilled with soil cuttings. S-5 at 10 ft.
			6							
			7	S-4	SPT	6	8 6 3 4	9 (9)		
			8							
			9							
	SANDY SILT (ML) dark gray, hard, low plasticity silt, few gravel	+232.0	10							Stop Drilling: 12 ft, 2:50 PM.
			11	S-5	SPT	20	13 15 18 27	33 (33)		
			12							
	End of Boring at 12.0 ft.	+230.0	13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 243.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.) ▽ N/A	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.) ▽ N/A	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	SILTY SAND WITH GRAVEL (SM) [FILL] brown, medium dense, moist, medium to coarse sand	+243.0	0							S-1 at 0 ft.
			1	S-1	SPT	8	3 8 10 8	18 (18)		
	SILTY SAND WITH GRAVEL (SM) [FILL] dark brown-gray, medium dense, moist, medium to coarse sand		2							S-2 at 2 ft.
			3	S-2	SPT	12	9 9 4 4	13 (13)		
	SILTY SAND WITH GRAVEL (SM) [FILL] gray, loose, moist, medium to coarse sand		4							Drill to 4 ft. S-3 at 4 ft.
			5	S-3	SPT	1	6 2 6 6	8 (8)		
		+237.0	6	S-4A						S-4 at 6 ft.
	SILTY SAND WITH GRAVEL (SM) gray, loose, moist, medium to coarse sand	+236.0	7							
	SANDY SILT (ML) dark brown, stiff, moist, low plasticity silt	+235.0	8	S-4B	SPT	14	30 54 7 7	61 (61)		
	End of Boring at 8.0 ft.		9							End of Boring. Backfilled with soil cuttings.
			10							
			11							
			12							
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 248.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 7.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 241.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/21/2026 10:33 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+248.0	0							
	SILT WITH SAND (FILL) dark brown-gray to , medium stiff, moist, low plasticity silt, roots		1	S-1	SPT	18	1 2 3 5	5 (5)		S-1 at 0 ft.
	SILT WITH SAND (ML) [FILL] dark brown-gray to , medium stiff, moist, low plasticity silt	+245.5	2	S-2A						S-2 at 2 ft.
	SILTY SAND (SM) gray, dense, moist, medium to coarse sand, trace gravel, cobbles		3	S-2B	SPT	18	4 14 22 26	36 (36)		
	SILTY SAND (SM) gray, dense, moist, medium to coarse sand, cobbles, trace gravel		4							Drill to 4 ft. S-3 at 4 ft.
			5	S-3	SPT	20	8 24 29 22	53 (53)		
			6							S-4 at 6 ft.
			7	S-4	SPT	20	16 15 13 10	28 (28)		
	End of Boring at 8.0 ft.	+240.0	8							End of Boring. backfilled with soil cuttings.
			9							
			10							
			11							
			12							
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 248.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	SILTY SAND (SM) [FILL] dark brown, loose, medium to coarse sand, roots	+248.0	0							S-1 at 0 ft.
			1	S-1	SPT	12	1 3 2 5	5 (5)		
	SILTY SAND (SM) brown, loose, medium to coarse sand, roots, cobbles	+246.0	2							S-2 at 2 ft.
			3	S-2	SPT	16	2 4 11 13	15 (15)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) brown, dense, moist, medium to coarse sand, cobbles	+244.0	4							Drill to 4 ft. S-3 at 4 ft.
			5	S-3	SPT	18	6 11 18 21	29 (29)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) brown, dense, moist, medium to coarse sand, cobbles	+241.0	6	S-4A						S-4 at 6 ft.
			7		SPT	16	20 17 25 26	42 (42)		
	SANDY SILT (ML) gray, hard, moist, low plasticity silt, cobbles	+240.0	8	S-4B						End of Boring at 8 ft. Backfilled with soil cuttings.
			9							
			10							
			11							
			12							
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 250.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 13.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 8.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 242.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/21/2026 08:43 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] grayish brown, loose, moist, medium to coarse sand, cobbles SILTY SAND (SM) [FILL] gray, loose, moist, medium to coarse sand, cobbles	+250.0	0							Start Drilling: 0 ft, 1:56 PM. Precleared to 5ft depth by vacuum excavation.
			1							
			2							
			3							
			4							
	SILTY SAND WITH GRAVEL (SM) dark gray, medium to coarse sand, cobbles SILTY SAND WITH GRAVEL (SM) dark gray, medium to coarse sand, cobbles SANDY SILT (ML) dark gray, hard, wet, low plasticity silt, trace gravel	+245.0	5							Drill to 5 ft. S-1 at 5 ft. S-2 at 7 ft. Drill to 9 ft. Drill to 9 ft. S-3 at 9 ft. S-3 at 9 ft.
			6	S-1	SPT	20	41 31 30 29	61 (61)		
			7							
			8	S-2	SPT	20	26 24 21 22	45 (45)		
			9							
	SILTY SAND (SM) dark gray, very dense, moist, fine to medium sand	+239.0	10	S-3	SPT	24	27 28 19 27	47 (47)		S-4 at 11 ft.
			11							
			12	S-4	SPT	24	41 40 52 46	92 (92)		
	End of Boring at 13.0 ft.	+237.0	13							End of Boring. backfilled with soil cuttings. Stop Drilling: 13 ft, 9:00 AM.
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 245.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 7.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 238.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/21/2026 09:45 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+245.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray to black, loose, moist, medium to coarse sand		1	S-1	SPT	12	4 5 6 3	11 (11)		S-1 at 0 ft.
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray to black, loose, moist, medium to coarse sand		2							S-2 at 2 ft.
			3	S-2	SPT	6	3 4 4 3	8 (8)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray to black, loose, moist, medium to coarse sand		4	S-3A						Drill to 4 ft. S-3 at 4 ft.
	SILTY SAND WITH GRAVEL (SM) gray, very dense, medium to coarse sand	+240.0	5	S-3B	SPT	14	8 5 10 18	15 (15)		
	SILTY SAND WITH GRAVEL (SM) gray, very dense, medium to coarse sand		6							S-4 at 6 ft.
			7	S-4	SPT	16	30 24 21 30	45 (45)		
	End of Boring at 8.0 ft.	+237.0	8							End of Boring. Backfilled with soil cuttings.
			9							
			10							
			11							
			12							
			13							
			14							
			15							
			16							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 257.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 10.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ 8.0	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ 249.0	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	4/20/2026 08:55 AM	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+257.0	0							
	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] gray to dark brown, medium dense, moist, medium to coarse sand, cobbles		1							Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			2							
			3							
			4							
	SILTY SAND WITH GRAVEL (SM) gray, dense, moist, medium to coarse sand, cobbles	+253.0	5	S-1	SPT	16	9 22 31 27	53 (53)		Drill to 4 ft. S-1 at 4 ft.
			6	S-2A						
			7	S-2B	SPT	24	12 20 25 26	45 (45)		
	SILTY SAND WITH GRAVEL (SM) gray, dense, moist, medium to coarse sand, cobbles	+250.0	8							S-2 at 6 ft. Drill to 8 ft.
			9	S-3	SPT	16	18 22 16 21	38 (38)		
			10							
	SANDY SILT WITH GRAVEL (ML) gray, low plasticity silt		11							S-3 at 8 ft.
			12							
	SANDY SILT (ML) brown to gray, hard, moist, low plasticity silt		13							Drilling ended at 12 ft.Backfilled with soil cuttings. Stop Drilling: 10 ft, 8:56 AM.
			14							
	End of Boring at 10.0 ft.	+247.0	15							
			16							
			17							
			18							

Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 249.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+249.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, medium dense, moist, medium sand		1	S-6	SPT	12	10 14 8 9	22 (0)		S-1 at 0 ft. S-6 at 0 ft.
		+247.0	2							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) brown, medium dense, moist, medium to coarse sand		3	S-3	SPT	20	7 7 11 16	18 (0)		S-3 at 2 ft.
			4							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) brown, medium dense, moist, medium to coarse sand		5	S-4	SPT	12	15 22 23 25	45 (0)		S-4 at 4 ft. Drill to 4 ft.
		+243.0	6							
	SILTY SAND (SM) brown, medium to coarse sand, few gravel, cobbles		7	S-5	SPT	18	25 21 20 23	41 (0)		S-5 at 6 ft.
		+241.0	8							
	End of Boring at 8.0 ft.		9							
			10							
			11							
			12							
			13							
			14							
			15							
			16							
										Stop Drilling: 13.33 ft, 1:46 PM. Start Drilling: 13.33 ft, 3:45 PM. Stop Drilling: 13.33 ft, 3:53 PM.

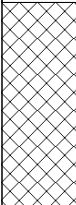
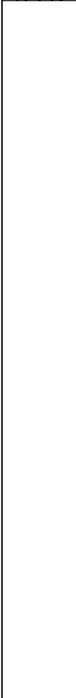
Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 245.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 8.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ N/A	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	N/A	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
		+245.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, medium dense, moist, medium to coarse sand, brick		1	S-1	SPT	6	5 6 8 6	14 (14)		S-1 at 0 ft.
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, very loose, moist, medium to coarse sand, brick		2							S-2 at 2 ft.
			3	S-2	SPT	2	3 2 2 2	4 (4)		
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, very loose, moist, medium to coarse sand, brick		4	S-3A						Drill to 4 ft. S-3 at 4 ft.
	SANDY SILT (ML) dark brown, stiff, moist, low plasticity silt, cobbles	+240.0	5		SPT	8	5 2 20 71	22 (22)		
		+239.0	6	S-3B						S-4 at 6 ft.
	SILTY SAND (SM) dark gray, dense, moist, medium to coarse sand, few gravel, cobbles		7	S-4	SPT	14	28 26 28 31	54 (54)		
	End of Boring at 8.0 ft.	+237.0	8							End of Boring. Backfilled with soil cuttings.
			9							
			10							
			11							
			12							
			13							
			14							
			15							
			16							

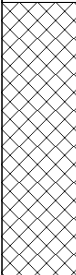
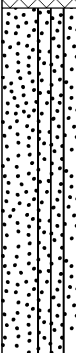
Project Public Safety and Townhall Complex			Date Started 4/24/2026		Date Finished 4/24/2026	
Location 120 Mainstreet, Medway, MA			Coordinates			
Drilling Contractor Northern Drill Service			Elevation and Datum Approx. el. 254.0 (NAVD 88)			
Drilling Method Auger Drilling			Completion Depth 12.0 ft		Rock Depth N/A	
Drilling Equipment Truck Rig			Water Depth (ft.)	First ▽ 6.0	Completion ▼ N/A	24 Hour ▼ N/A
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Elevation (ft.)	First ▽ 248.0	Completion ▼ N/A	24 Hour ▼ N/A
Sampler Split Spoon (2 in.)			Water Reading Date/Time	4/21/2026 11:56 AM	N/A	N/A
Sampler Hammer Automatic		Weight (lbs) 140	Drop (in) N/A	Drilling Foreman Carl B.		Field Engineer Sushant Timalisina

Material Symbol	Sample Description	Elev. (ft)	Depth Scale (ft)	Sample Data					Shear Strength (ksf) [Test Type]	Remarks
				Number	Type	Recov. (in)	Blows/ft	N - Value (N60*)		
	ASPHALT	+254.0	0							
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] grayish brown, loose to medium dense, moist, medium to coarse sand, brick	+253.7	1							Jackhammer used to make 4 inch hole through 4 inch thick apron. Precleared to 4ft depth by vacuum excavation. Grab sample at 2 and 4 ft.
			2							
			3							
		+250.0	4							Drill to 4 ft. S-1 at 4 ft.
	POORLY GRADED SAND WITH GRAVEL (SP) gray, dense, moist, medium to coarse sand, cobbles		5	S-1	SPT	8	24 51 24 21	75 (75)		
			6							S-2 at 6 ft.
	SANDY SILT WITH GRAVEL (ML) gray, hard, wet, low plasticity silt, cobbles	+248.0	7	S-2	SPT	20	12 19 13 16	32 (32)		
			8							Drill to 8 ft. S-3 at 8 ft.
	SANDY SILT (ML) gray, hard, low plasticity silt, trace gravel, cobbles		9	S-3	SPT	12	20 28 30 38	58 (58)		
			10							S-4 at 10 ft.
	SANDY SILT (ML) gray, hard, low plasticity silt, cobbles		11	S-4	SPT	18	11 27 44 59	71 (71)		
	End of Boring at 12.0 ft.	+242.0	12							End of Boring. backfilled with soil cuttings.
			13							
			14							
			15							
			16							

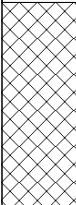
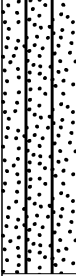
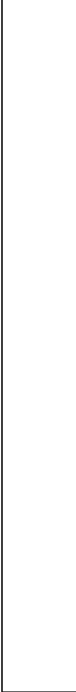
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 250.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ∇		Water Level - Completion		7.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

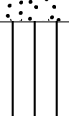
SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+250.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray, loose, moist, medium to fine sand, metal	0	G-1	GRAB	G-1 at 0 to 1 ft.
		SANDY SILT (ML) [FILL] dark brown, stiff, moist, medium plasticity silt, cobbles	1			
	+247.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	2	G-2	GRAB	G-2 at 2 to 3 ft.
			3			
	+240.0	End of Test Pit at 10.0ft.	4			
			5			
			6			
			7			
			8			
			9			
			10			Test pit ended at 10 ft. Sloughing of sidewalls observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 248.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ∇		Water Level - Completion		7.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalsina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+248.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray to brown, loose, moist, medium to coarse sand, cobbles	0	G-1	GRAB	G-1 at 0 to 1 ft.
	1					
	2					
	3					
	+244.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) gray, medium dense, moist, medium to coarse sand, cobbles	4	G-2	GRAB	G-2 at 4 to 9 ft.
	5					
	6					
	7					
	+239.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, medium to coarse sand	9	G-3	GRAB	G-3 at 9 ft.
	+238.0	End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Sloughing of sidewalls observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

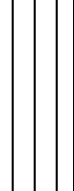
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 245.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		8.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+245.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray, loose, moist, medium to coarse sand, fabrics	0	G-1	GRAB	G-1 at 0 to 3 ft. G-1 at 0 ft.
	1					
	2					
	3					
	+242.0	SANDY ORGANIC SILT with ASH (OL) [TOPSOIL] black, stiff, moist, low plasticity silt	3	G-2	GRAB	G-2 at 3 to 4 ft.
	+241.0	SANDY SILT WITH GRAVEL (ML) dark gray-brown, stiff, moist, low plasticity silt	4	G-3	GRAB	G-3 at 4 to 6 ft.
	5					
	6					
	+239.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	6	G-4	GRAB	G-4 at 6 to 10 ft.
	7					
	8					
	9					
	10					
	11					
	+235.0	End of Test Pit at 10.0ft.	12			End of TP at 10 ft. Minor sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					

Project			Public Safety and Townhall Complex			Project No.			151072201			Date			4/24/2026														
Location						120 Mainstreet, Medway, MA						Elevation and Datum						Approx. el. 243.0 (NAVD 88)											
Excavation Company						Northern Drill Service						Depth			10.5 ft			Water Level - First			N/A ▽			Water Level - Completion			8.0 ▼		
Excavation Equipment						Hitachi ZX85USB-7						Excavation Foreman						Matt Denis			Field Engineer						Sushant Timalisina		
SYMBOL	Elev. (ft)	DESCRIPTION				Depth Scale	SAMPLE		REMARKS																				
							Number	Type																					
	+243.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, moist, medium sand, glass, concrete, brick				0	G-1	GRAB	G-1 at 0 ft.																				
	1																												
	2																												
	3																												
	+236.5	SANDY ORGANIC SILT (OL) [TOPSOIL] black, stiff, moist, few gravel				4	G-2	GRAB	G-2 at 6.5 ft.																				
	5																												
	+235.5	SANDY SILT (ML) dark gray, stiff, moist, trace gravel				6	G-3	GRAB	G-3 at 7.5 ft.																				
	7																												
	+234.0	SILTY SAND WITH GRAVEL (SM) dark gray, moist, medium to coarse sand, cobbles				8	G-4	GRAB	G-4 at 9 ft.																				
	9																												
	10																												
	11																												
	+232.5	End of Test Pit at 10.5ft.				12			End of TP at 10.5 ft. Minor sloughing of sidewalls observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.																				
	13																												
	14																												
	15																												
	16																												
	17																												
	18																												
	19																												
	20																												

Log of Test Pit **TP-05**

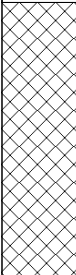
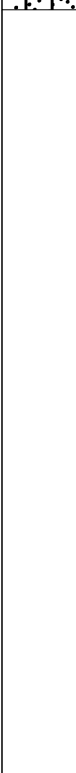
Sheet 1 of 1

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026	
Location				Elevation and Datum							
120 Mainstreet, Medway, MA				Approx. el. 242.0 (NAVD 88)							
Excavation Company				Depth		Water Level - First		Water Level - Completion			
Northern Drill Service				10.0 ft		N/A 		7.0 			
Excavation Equipment				Excavation Foreman				Field Engineer			
Hitachi ZX85USB-7				Matt Denis				Sushant Timalisina			
SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS					
				Number	Type						
	+242.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, moist, medium sand, concrete, metal, brick	0	G-1	GRAB	G-1 at 0 ft.					
	1										
	2										
	3										
	4										
	5										
	6										
	+235.0	SANDY SILT WITH GRAVEL (ML) dark gray-brown, stiff, moist, low plasticity silt	7	G-2	GRAB	G-2 at 7 ft.					
	8										
	9										
	+232.0	End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Minor sloughing of sidewalls. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.					
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										
	20										

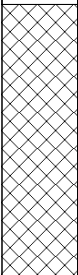
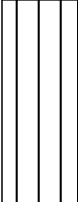
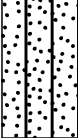
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 250.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		9.0 ft		Water Level - First		N/A ∇		Water Level - Completion		6.5 $\blacktriangledown$					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+250.0		0			
	+249.7	4" Thick ASPHALT				4 inch thick apron.
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] brown, loose, moist, medium to coarse sand, concrete, brick	1			G-1 at 0.33 ft.
			2			
			3	G-1	GRAB	
			4			
	+245.0	SILTY SAND WITH GRAVEL (SM) brown, medium to coarse sand, cobbles	5			G-2 at 5 ft.
			6	G-2	GRAB	
			7			
	+242.0	SILT WITH SAND (ML) dark gray, stiff, moist, medium plasticity silt, cobbles	8			G-3 at 8 ft.
			9	G-3	GRAB	
	+241.0	End of Test Pit at 9.0ft.	10			End of TP at 9 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

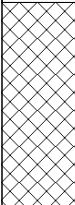
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 250.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		9.0 ft		Water Level - First		N/A ∇		Water Level - Completion		6.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+250.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, moist, medium to coarse sand, cobbles	0	G-1	GRAB	G-1 at 0 to 4 ft.
	1					
	2					
	3					
	+246.0	SILT WITH SAND (ML) dark gray-brown, stiff, moist, cobbles	4	G-2	GRAB	G-2 at 4 to 6 ft.
	5					
	+244.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	6	G-3	GRAB	G-3 at 6 to 9 ft.
	7					
	8					
	9					
	+241.0	End of Test Pit at 9.0ft.	9			End of TP at 9 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					

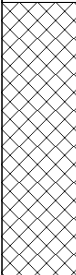
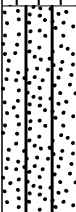
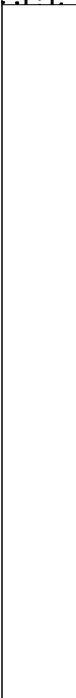
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 249.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		9.0 ft		Water Level - First		N/A 		Water Level - Completion		8.0 					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+249.0	SANDY ORGANIC SOIL (OL/OH) [FILL] black, moist, low plasticity organic soil, concrete, metal	0	G-1	GRAB	G-1 at 0 ft.
	1					
	2					
	3					
	+245.0	SANDY SILT WITH GRAVEL (ML) orangish brown, stiff, low plasticity silt, cobbles	4	G-2	GRAB	G-2 at 4 ft.
	5					
	6					
	7					
	+242.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	8	G-3	GRAB	G-3 at 7 ft.
	9					
	10					
	11					
	+240.0	End of Test Pit at 9.0ft.	12			End of TP at 9 ft. Vertical sidewalls maintained. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 248.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		8.0 ▽		Water Level - Completion		N/A ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+248.0	SANDY ORGANIC SOIL (OL/OH) [FILL] black, low plasticity organic soil, cobbles, brick, glass	0	G-1	GRAB	S-1 at 0 ft.
			1			
			2			
	+245.0	SANDY SILT WITH GRAVEL (ML) orangish brown, stiff, low plasticity silt, cobbles	3	G-2	GRAB	M-2 at 3 ft.
			4			
	+243.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	5	G-3	GRAB	S-3 at 5 ft.
			6			
			7			
			8			
			9			
			10			
			11			
			12			
	+238.0	End of Test Pit at 10.0ft.	13			End of TP at 10 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
	14					
	15					
	16					
	17					
	18					
	19					
	20					

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 247.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		9.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+247.0	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] dark gray, loose, moist, medium to coarse sand, cobbles	0	G-1	GRAB	G-1 at 0 ft.
	1					
	2					
	3					
	+243.0	SANDY SILT WITH GRAVEL (ML) orangish brown, stiff, moist, cobbles	4	G-2	GRAB	G-2 at 4 ft.
	5					
	6					
	7					
	+240.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	7	G-3	GRAB	G-3 at 7 ft.
	8					
	9					
	10					
	+237.0	End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Vertical sidewalls maintained. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 253.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		11.0 ft		Water Level - First		N/A 		Water Level - Completion		N/A 					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+253.0					
	+252.7	4" Thick ASPHALT	0			4 inch thick apron.
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] brown-gray, loose, moist, medium to coarse sand	1			G-1 at 0.33 ft.
			2	G-1	GRAB	
			3			
	+249.0	SILTY SAND WITH GRAVEL (SM) gray, dense, moist, medium to coarse sand, cobbles	4			G-2 at 4 ft.
			5			
			6	G-2	GRAB	
			7			
			8			G-3 at 8 ft.
		SILTY SAND (SM) gray, medium to coarse sand, few gravel	9			
			10	G-3	GRAB	
	+242.0	End of Test Pit at 11.0ft.	11			End of TP at 11 ft. Vertical sidewalls maintained. Groundwater not observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 253.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		5.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+253.0					
	+252.7	4" Thick ASPHALT	0			4 inch thick apron.
		POORLY GRADED SAND WITH GRAVEL (SP) [FILL] dark gray-brown, loose, moist, medium to coarse sand, trace silt	1	G-1	GRAB	G-1 at 0.33 ft.
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark red-gray, medium dense, moist, medium to coarse sand, cobbles	2			G-2 at 1 ft.
			3			
			4	G-2	GRAB	
			5			
	+247.0	SANDY SILT (ML) dark gray, stiff, moist, few gravel, cobbles	6			G-3 at 6 ft.
			7			
			8	G-3	GRAB	
			9			
	+243.0	End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 256.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		5.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+256.0		0			
	+255.7	4" Thick ASPHALT				4 inch thick apron.
		POORLY GRADED SAND WITH GRAVEL (SP) [FILL] dark gray, loose, medium sand, roots	1	G-1	GRAB	G-1 at 0.33 ft.
		SILTY SAND (SM) [FILL] reddish brown, medium dense, moist, medium sand, trace gravel	2	G-2	GRAB	G-2 at 1 ft.
	+253.0		3			G-3 at 3 ft.
		SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand	4			
			5			
			6			Hole cave in.
			7			
			8			
			9			
	+246.0	End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 247.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		8.0 ft		Water Level - First		N/A ∇		Water Level - Completion		N/A $\blacktriangledown$					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+247.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark gray-brown, medium to coarse sand, metal, concrete	0	G-1	GRAB	G-1 at 0 ft.
			1			
	+245.0	SILTY SAND (SM) orangish brown, moist, fine to medium sand, metal	2	G-2	GRAB	G-2 at 2 ft.
			3			
			4			
			5			
		SILTY SAND WITH GRAVEL (SM) dark gray, medium dense, moist, medium to coarse sand, cobbles	6	G-3	GRAB	G-3 at 5 ft.
			7			
			8			
			9			
	+239.0	End of Test Pit at 8.0ft.	10			Boulder refusal. Vertical sidewalls maintained.. No groundwater was observed. End of TP at 8 ft. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

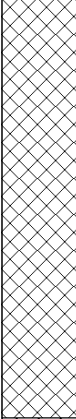
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 257.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		9.0 ft		Water Level - First		N/A ▽		Water Level - Completion		6.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS	
				Number	Type		
	+257.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, moist, fine to medium sand, roots, cobbles	0	G-1	GRAB	G-1 at 0 ft.	
			1				
			2				
	+254.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand	3	G-2	GRAB	G-2 at 3 ft.	
			4				
			5				
			6				
			7				
			8				
	+248.0	End of Test Pit at 9.0ft.	9			End of TP at 9 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.	
			10				
			11				
			12				
			13				
			14				
			15				
			16				
			17				
			18				
			19				
			20				

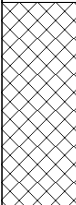
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 248.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		9.5 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+248.0		0			
	+247.0	SANDY ORGANIC SOIL (OL/OH) [FILL] black, moist, roots, brick	1	G-1	GRAB	G-1 at 0 ft.
	+245.0	SANDY SILT (ML) reddish brown, stiff, moist, medium plasticity silt, cobbles	2	G-2	GRAB	G-2 at 1 ft.
	+238.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand, cobbles	3	G-3	GRAB	G-3 at 3 ft.
		End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.

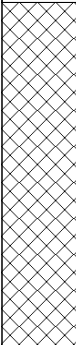
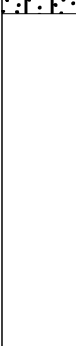
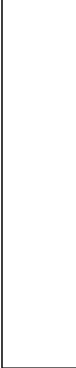
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 240.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		9.0 ft		Water Level - First		N/A ∇		Water Level - Completion		6.0 $\blacktriangledown$					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS	
				Number	Type		
	+240.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, medium to coarse sand, concrete	0	G-1	GRAB	G-1 at 0 ft.	
			1				
			2	G-2	GRAB	G-2 at 2 ft.	
			3				
		4					
		5					
	+234.0	SILTY SAND WITH GRAVEL (SM) [FILL] gray, medium dense, moist, medium sand, cobbles	6	G-3	GRAB	G-3 at 6 ft.	
			7				
			8				
			9				
			10				
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
	+231.0	End of Test Pit at 9.0ft.	20			End of TP at 9 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.	

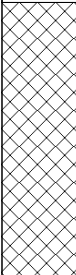
Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 256.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		5.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS	
				Number	Type		
	+256.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, moist, medium to coarse sand, roots	0	G-1	GRAB	G-1 at 0 ft.	
	+253.0	SILTY SAND (SM) dark gray, dense, moist, medium to coarse sand, cobbles	1				
			2				
	+246.0	End of Test Pit at 10.0ft.	3	G-2	GRAB	G-2 at 3 ft.	
			4				
			5				
			6				
			7				
			8				
			9				
			10				
			11				
			12				
13							
14							
15							
16							
17							
18							
19							
20							

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 253.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		10.0 ft		Water Level - First		N/A ▽		Water Level - Completion		6.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS	
				Number	Type		
	+253.0	POORLY GRADED SAND WITH GRAVEL (SP) [FILL] dark gray, loose, moist, medium sand, trace silt	0	G-1	GRAB	G-1 at 0 ft.	
			1				
			2				
	+248.0	SILTY SAND (SM) [FILL] dark brown, medium dense, moist, medium to coarse sand, trace gravel	3	G-2	GRAB	G-2 at 3 ft.	
			4				
			5				
	+243.0	SILTY SAND WITH GRAVEL (SM) dark gray, medium dense, moist, medium to coarse sand, cobbles	6	G-3	GRAB	G-3 at 5 ft.	
			7				
			8				
		End of Test Pit at 10.0ft.	10			End of TP at 10 ft. Sidewall sloughing observed. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.	
			11				
			12				
			13				
			14				
			15				
			16				
			17				
			18				
			19				
			20				

Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 245.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		7.0 ft		Water Level - First		N/A ∇		Water Level - Completion		5.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+245.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown, loose, moist, medium to coarse sand, brick, metal	0	G-1	GRAB	G-1 at 0 ft.
	1					
	2					
	3					
	+241.0	SANDY SILT (ML) reddish brown-black, stiff, moist, medium plasticity silt	4	G-2	GRAB	G-2 at 4 ft.
	5					
	+239.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium sand, cobbles	6	G-3	GRAB	G-3 at 6 ft.
	+238.0		7			
		End of Test Pit at 7.0ft.	8			End of TP at 7 ft. Vertical sidewalls were maintained. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
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Project		Public Safety and Townhall Complex		Project No.		151072201		Date		4/24/2026													
Location				120 Mainstreet, Medway, MA				Elevation and Datum				Approx. el. 246.0 (NAVD 88)											
Excavation Company				Northern Drill Service				Depth		7.0 ft		Water Level - First		N/A ▽		Water Level - Completion		6.0 ▼					
Excavation Equipment				Hitachi ZX85USB-7				Excavation Foreman				Matt Denis				Field Engineer				Sushant Timalisina			

SYMBOL	Elev. (ft)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+246.0	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) [FILL] dark brown-black, loose, medium sand, brick, cobbles	0	G-1	GRAB	G-1 at 0 ft.
	+243.0	SANDY SILT (ML) reddish brown-black, stiff, medium plasticity silt	3			G-2 at 3 ft.
	+241.0	SILTY SAND WITH GRAVEL (SM) dark gray, dense, moist, medium to coarse sand	5			G-3 at 5 ft.
	+239.0	End of Test Pit at 7.0ft.	7			End of TP at 7 ft. Vertical sidewalls were maintained. TP backfilled with excavated material in about 1-foot thick lift to grade, compacted with excavator bucket.
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