STORMWATER MANAGEMENT REPORT

for

COUNCIL ON AGING COMMUNITY CENTER
8 ANDREW AVENUE
WAYLAND, MASSACHUSETTS

Prepared for:

Town of Wayland
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Stormwater Management Standards

Project Narrative:

The former Raytheon facility in Wayland occupied approximately 83 acres of land at 430 Boston Post Road from circa 1955 through 1996. It was developed into the 'Wayland Town Center' between 2012 and 2015. The subject property is located at 8 Andrew Avenue and is located within the "Wayland Town Center'. The subject property includes four (4) individual parcels with a combined total area of approximately 4.16 acres The project site previously contained two buildings used for radar equipment testing. The buildings were demolished in 1999 and the current 10,472 sf building was constructed in 2000. The intention was to use this building as a daycare center for the tenants of Raytheon's former main building but the building was never completed or occupied. The unoccupied building is connected to sanitary sewer, domestic and fire water services, natural gas, electric, telephone and data service connections.

The project site also includes several easements for existing sanitary sewer and stormwater drainage utilities. The western portion of the project site is adjacent to the Sudbury River and the one hundred (100) foot and two hundred (200) foot riverfront Riparian Zones extend onto the site. There are bordering vegetated wetlands downhill of the project site adjacent to the Sudbury River and there is a small area of bordering vegetated wetlands between the building and the Boston Post Road. A portion of the project site contains priority habitats of rare species as mapped by Natural Heritage and is partially located within the one hundred (100) year flood plain. Per the Town of Wayland Zoning Map, the project site is located within the Limited Commercial District Zoning District and the Aquifer Protection District (Zone IIs Wellhead Protection Area).

The topography on the eastern and northern portions of the project site gradually slopes towards the Sudbury River while the topography west of the building slopes more steeply towards the Sudbury River. The area surrounding the building and to the west towards the Sudbury River contains woods. The area on the eastern and northern portions of the project site is covered by grass. There is an existing drainage basin between the project site and the Boston Post Road that collects the stormwater runoff flowing from the Boston Post Road.

The Town of Wayland is proposing renovations and additions to the existing unoccupied building and other improvements including parking areas, sidewalks that connect to Andrew Avenue and Lillian Way, patio, stormwater management system, site grading, utility connections, stone dust trails and two overlooks to the Sudbury River, landscaping, hardscaping and lighting.

The project site utilizes several different stormwater management techniques. There are proposed deep sump hooded catch basins, proprietary filter media unit and subsurface infiltration facility that will be used for the treatment, recharge and mitigation of the stormwater runoff.

The following are the DEP Stormwater Standards as outlined in the Wetlands Regulations:

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

There are no new untreated stormwater discharges for the proposed project. There are no new untreated stormwater discharges for the proposed project. The stormwater runoff from the existing building rooftop is considered clean stormwater runoff and does not need to be treated. The stormwater runoff from the building rooftop will be collected with gutters and discharged to a level spreader.

The Town of Wayland stormwater regulations require removing 50% total phosphorous and 80% TSS for redevelopment projects. The stormwater runoff from the parking areas, patio and some walkways will be collected with deep sump catchbasins and then flow through a storm drain system to a proprietary filter media unit that shall remove 50% minimum total phosphorous and 44% minimum TSS and then flow to a subsurface infiltration facility and then discharge to a level spreader.

Standard 2: Peak Rate Attenuation - 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.

One design point has been utilized for the purpose of analyzing pre and post development stormwater peak rates and volumes of stormwater runoff. The design point in the existing conditions is the same design point in the proposed conditions. Comparison values for pre and post development stormwater peak rates and volumes have been calculated for the design point.

The storm events that were used to calculate peak stormwater runoff rates for pre and post construction conditions have been taken from Northeast Regional Climate Center "Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada". Full details of peak rate and volume attenuation along with supplemental stormwater calculations utilizing HydroCAD as well as pre and post development drainage plans can be found in the Stormwater Analysis and Calculations. The details of this report show that the peak rates and volumes of stormwater runoff for the 1 Inch, 2, 10, 25 and 100 year events have been matched or reduced from pre to post conditions. The tables below illustrates the calculated stormwater runoff flows at the design point for the existing and proposed storm events.

Peak Flow Rates Design Point #1

Storm Event	Existing Conditions (Pre) Peak Flow (CFS)	Proposed Conditions (Post) Peak Flow (CFS)
1 Inch	0.0	0.0
2-Year (3.14 in/hr)	0.9	1.0*
10-Year (4.70 in/hr)	3.7	3.2

25-Year (5.91 in/hr)		
100-Year (8.39 in/hr)	6.4 13.0	5.1 10.5
*Decrease in Volume		

Peak Volumes Design Point #1

Storm Event	**Existing Conditions (Pre) Peak Volume (Acre-feet)**	**Proposed Conditions (Post) Peak Volume (Acre-feet)**
1 Inch	0.0	0.0
2-Year (3.14 in/hr)	0.13	0.10
10-Year (4.70 in/hr)	0.37	0.25
25-Year (5.91 in/hr)	0.60	0.41
100-Year (8.39 in/hr)	1.15	0.90

The peak stormwater runoff rates and volumes have been matched or reduced for the design point. We therefore anticipate no adverse impacts or downstream flooding with the completion of this project.

Standard 3: Recharge - Loss of annual recharge to groundwater shall be eliminated or minimized…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 in accordance with the Mass Stormwater Handbook.

The stormwater runoff from the parking areas, patio and some walkways are recharged with the proposed subsurface infiltration facility.

Based on soil maps provided by the Natural Resources Conservation Service the project site is mostly urban land with a small portion of saco mucky silt loam. Urban land doesn't have a hydrologic soil group rating but soil testing found that the soil is similar to a hydrologic soil group rating of B. Saco mucky silt loam has a hydrologic soil group rating of B. Refer to the hydrologic soil group report in the appendix.

Utilizing the Stormwater Handbook the proposed project will meet standard 3 as supported by the calculations below:

Recharge Volume for Subsurface Infiltration Facility:

Rv = Fx
Rv = Required Recharge Volume
F = Target Depth Factor associated with hydrologic soil groups located in table 2.3.2 in Volume 3 of the Stormwater Management Handbook
x = Total impervious area proposed

Impervious area directed to the subsurface infiltration facility: xx sf

F for hydrologic group B soils: 0.35 inches
Therefore Rv = (52,841 sf)(0.35 inches/12 inches per foot)
Rv = 1,542 cubic feet (cf)

The Town of Wayland stormwater regulations require retaining 0.8 inches of stormwater runoff for redevelopment projects which is larger than the recharge requirement from the Stormwater Handbook. The project site also meets this requirement as shown below.

Recharge = (52,841 sf)(0.8 inches/12 inches per foot)
Recharge = 3,523 cubic feet (cf)

The proposed subsurface infiltration facility provides a total recharge storage volume of 7,649 cf below the outlet pipe inverts.

The Stormwater Handbook also requires recharge facilities to be constructed in soils capable of absorbing the recharge volume with the ability to drain within 72 hours. The formula for drawdown is as follows:

General Formula:

$$T_{DR} = \frac{requiredstoragevolume^{*}}{(RawlsRate)(BottomSurfaceAreaofSystem)}$$

(*Required storage volume is equal to the larger of the calculated required recharge or water quality treatment volumes. In this case, the water quality treatment volume is larger.)

Subsurface Infiltration Facility:

Volume to Recharge = 4,404 *cf*

$T_{DR} = (4{,}404\ cf)/((8.27\ in/hr/12\ in/ft)(5{,}592\ sf)) = 1.2\ hrs$

1.2 *hrs* < 72 *hrs*

In accordance with the Stormwater Handbook, a capture area adjustment calculation is required when stormwater runoff from only a portion of the proposed impervious area on a site is directed to one or more infiltration BMPs. The following are steps of the capture area adjustment calculation to demonstrate the required minimum 65% of the impervious area onsite is being directed to an infiltration BMP. The calculation also determines the increase in storage capacity of the infiltration BMPs to ensure they are able to capture sufficient stormwater runoff from the impervious surfaces within the contributing drainage area to infiltrate the required recharge volume.

1. Calculate Rv for the project:
   From above Rv = 3,523 cf

2. Calculate the impervious area draining to the subsurface infiltration facility:
   Area = 52,841 sf

3. Divide total proposed impervious area by the impervious area draining to the subsurface infiltration facility:
   Total proposed impervious area = 63,868 sf
   63,868 sf/52,841 sf = 1.21

4. Multiply quotient from step 3 by the original Rv to determine the adjusted minimum storage volume needed to meet the recharge requirement:
   1.21 x 3,523 = 4,263 cf
   Subsurface infiltration facility provide 7,649 cf of storage.

5. Insure minimum of 65% of the site impervious area is being directed to the subsurface infiltration facility:
   52,841 sf/63,868 sf = 82.7%

In summary, the subsurface infiltration facility provides a total recharge storage volume of 7,649 cf which is greater than the adjusted minimum storage volume calculated by the capture area adjustment. The project also directs a minimum 65% of the proposed impervious area into the subsurface infiltration facility which will provide sufficient stormwater runoff to infiltrate the required recharge volume. This ensures the post development annual recharge rate will approximate the annual rate from pre development conditions.

Standard 4: Water Quality – Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). The standard is met with pollution prevention plans, stormwater BMP's sized to capture required water quality volume, and pretreatment measures.

There are no new untreated stormwater discharges for the proposed project. The stormwater runoff from the existing building rooftop is considered clean stormwater runoff and does not need to be treated. The stormwater runoff from the building rooftop will be collected with gutters and discharged to a level spreader.

The Town of Wayland stormwater regulations require removing 50% total phosphorous and 80% TSS for redevelopment projects. The stormwater runoff from the parking areas, patio and some walkways will be collected with deep sump catchbasins and then flow through a storm drain system to a proprietary filter media unit that shall remove 50% minimum total phosphorous and 44% minimum TSS and then flow to a subsurface infiltration facility and then discharge to a level spreader.

The proposed stormwater management system has been designed to remove a minimum of 80% of the average annual post-construction load of Total Suspended Solids (TSS). TSS Removal Calculation Worksheet is included in the calculation appendix of this report.

The Stormwater Management Handbook assigns TSS removal percentages to each treatment BMP. Each treatment BMP is sized to capture the required water quality volume as calculated in accordance with the Handbook in order to achieve the assigned TSS removal rates.

The following are water quality treatment calculations:

General Equation from Stormwater Management Handbook

Vwq = (Dwq)(A)
Vwq = required water quality volume
Dwq = water quality depth (1" for critical areas, 0.5" for non-critical areas)
A = impervious area

A water quality depth of 1 inch has been used in the calculations because the soils have a rapid infiltration rate greater than 2.4 in/hr and the project site is within the Aquifer Protection District (Zone IIs Wellhead Protection Area).

The following are treatment sizing calculations for the proposed subsurface infiltration facility:

Impervious area directed to Subsurface Infiltration Facility:

Vwq = (52,841)(1"/12) = 4,404 cf

The proposed subsurface infiltration facility provides a total water quality storage volume of 7,649 cf under the outlet pipe inverts.

A separate document entitled "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan and Long Term Operation and Maintenance Plan" is included in this report. Suitable practices for source control and long term pollution prevention have been identified and shall be implemented as discussed.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs) – Source control and pollution prevention shall be implemented in accordance with the Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

Stormwater Standard 5 is not applicable to this project. The proposed development will not be subject to the higher potential pollutant loads as defined in the Massachusetts Department of Environmental Protection Wetlands and Water Quality Regulations.

LUHPPLs are identified in 310 CMR 22.20B(2) and C(2)(a)-(k) and (m) and CMR 22.21(2)(a)(1)-(8) and (b)(1)-(6), areas within a site that are the location of activities that are subject to an individual National Pollutant Discharge Elimination System (NPDES) permit or the NPDES Multi-Sector General Permit; auto fueling facilities, exterior fleet storage areas, exterior vehicle service and equipment cleaning areas; marinas and boatyards; parking lots with high-intensity-use; confined disposal facilities and disposal sites.

Standard 6: Critical Areas – Stormwater discharges to critical areas require the use of specific source control and pollution prevention measures and specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas.

Stormwater Standard 6 is applicable to this project. Critical areas being Outstanding Resource Waters and Special Resource Waters as designated in 314 CMR 4.0, recharge areas for public water supplies as defined in 310 CMR 22.02, bathing beaches as defined in 105 CMR 445.000, cold-water fisheries and shellfish growing areas as defined in 314 CMR 9.02 and 310 CMR 10.04.

The project site is located within the Aquifer Protection District (Zone IIs Wellhead Protection Area). The project site is meeting this standard by providing recharge utilizing a subsurface infiltration facility, treating the 1" water quality volume and providing 44% TSS removal prior to discharging to the subsurface infiltration facility.

Standard 7: Redevelopments – A redevelopment project is required to meet Standards 1-6 only to the maximum extent practicable. Remaining standards shall be met as well as the project shall improve the existing conditions.

Stormwater Standard 7 is applicable to this project. Within the Stormwater Handbook (volume 1 chapter 1 page 20), the definition of a redevelopment project includes, "development, rehabilitation, expansion and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area". The project site is meeting all of the stormwater standards.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan shall be implemented.

A *Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan and Long Term Operation and Maintenance Plan* is included with this report. The erosion and sediment control section of the program details the construction period operation and maintenance plan and sequencing for pollution prevention measures and erosion and sedimentation controls. Locations of erosion control measures for the project are depicted on the site plan set accompanying this report.

Standard 9: A long term Operation and Maintenance Plan shall be implemented.

A *Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan and Long Term Operation and Maintenance Plan* is included with this report. The long term operation and maintenance section of the program provides details and the schedule for routine and non-routine maintenance tasks to be implemented at the completion of the project.

Standard 10: Prohibition of Illicit Discharges – Illicit discharges to the stormwater management system are prohibited.

Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Discharges to the stormwater management system from the following activities or facilities are permissible: Firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents. All other illicit discharges are prohibited.

There are no known illicit discharges anticipated through the completion of this project. During construction and post construction procedures are provided to dissipate the potential for illicit discharges to the drainage system. Post construction preventions of illicit discharges are described in the Inspection and Maintenance Plan under the Good Housekeeping Practices section of the report. An illicit discharge compliance statement has been included in the appendix.

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APPENDIX

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

TSS Removal Calculation Worksheet

Location: Council on Aging Community Center, 8 Andrew Avenue, Wayland, MA

Train 1: Proposed parking areas

A BMP	B TSS Removal Rate	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Catchbasin	25%	1.00	0.25	0.75
Filter Media Unit	44%	0.75	0.33	0.42
Subsurface Infiltration Facility	80%	0.42	0.34	0.08

Total TSS Removal = 91.6%

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

Project: 6452

Prepared By: Meridian Associates, Inc.

Date: 12/7/2022

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

** See portion of STEP Fact Sheet for removal rate

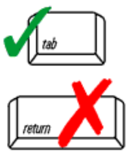
Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

January 5, 2023

Signature and Date

Checklist

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

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (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 (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist (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 (continued)

Standard 4: Water Quality (continued)

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

** ☒ The ½” or 1” Water Quality Volume or

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

** The calculations utilize the half-inch rule for BMP’s (as noted in the treatment calculations provided).

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.

MERIDIAN ASSOCIATES
100% employee owned

ILLICIT 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 the USEPA).

Owner's Name:	Town of Wayland
Address:	41 Cochituate Road
	Wayland, MA 01778
Telephone Number:	
Project Address:	8 Andrew Avenue, Wayland, MA 01778

Owner's Signature: ______________________________

Engineer's As-built Compliance Statement

To the best of my knowledge, the project referenced above meets 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.

Included with this statement is a plan entitled: "Utility Plan", drawn to scale, that identifies the locations 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 on the site and show that there are no connections between the stormwater and wastewater systems. All documents and attachments were prepared under my direction and qualified personnel properly gathered and evaluated the information submitted, to the best of my knowledge.

The responsible parties for implementing the Long Term Pollution Prevention Plan are accountable to ensure no illicit discharges take place.

Signature: ______________________________
David S. Kelley, PE for Meridian Associates, Inc.

P:\6452_10 Andrew Ave, Wayland, Ma\ADMIN\Reports\Stormwater\6452 Illicit Discharge Compliance Stmt.doc

CONSTRUCTION PERIOD POLLUTION PREVENTION PLAN AND EROSION SEDIMENTATION CONTROL PLAN AND LONG TERM OPERATION AND MAINTENANCE PLAN

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION SEDIMENTATION CONTROL PLAN
and
LONG TERM OPERATION AND MAINTENANCE PLAN
located at
COUNCIL OF AGING COMMUNITY CENTER
8 ANDREW AVENUE
WAYLAND, MASSACHUSETTS

Prepared for:

Town of Wayland
41 Cochituate Road
Wayland, Massachusetts 01778

Prepared by:

Meridian Associates, Inc.
500 Cummings Center, Suite 5950
Beverly, Massachusetts 01915
(978) 299-0447

December 7, 2022

Project Name: Council on Aging Community Center
8 Andrew Avenue
Wayland, MA 01778

Applicant Name: Town of Wayland
41 Cochituate Road
Wayland, MA 01778

Party Responsible for Maintenance: Town of Wayland
41 Cochituate Road
Wayland, MA 01778

Project Description:

The former Raytheon facility in Wayland occupied approximately 83 acres of land at 430 Boston Post Road from circa 1955 through 1996. It was developed into the 'Wayland Town Center' between 2012 and 2015. The subject property is located at 8 Andrew Avenue and is located within the "Wayland Town Center'. The subject property includes four (4) individual parcels with a combined total area of approximately 4.16 acres The project site previously contained two buildings used for radar equipment testing. The buildings were demolished in 1999 and the current 12,759 sf building was constructed in 2000. The intention was to use this building as a daycare center for the tenants of Raytheon's former main building but the building was never completed or occupied. The unoccupied building is connected to sanitary sewer, domestic and fire water services, natural gas, electric, telephone and data service connections.

The project site also includes several easements for existing sanitary sewer and stormwater drainage utilities. The western portion of the project site is adjacent to the Sudbury River and the one hundred (100) foot and two hundred (200) foot riverfront Riparian Zones extend onto the site. There are bordering vegetated wetlands downhill of the project site adjacent to the Sudbury River and there is a small area of bordering vegetated wetlands between the building and the Boston Post Road. A portion of the project site contains priority habitats of rare species as mapped by Natural Heritage and is partially located within the one hundred (100) year flood plain. Per the Town of Wayland Zoning Map, the project site is located within the Limited Commercial District Zoning District and the Aquifer Protection District (Zone IIs Wellhead Protection Area).

The topography on the eastern and northern portions of the project site gradually slopes towards the Sudbury River while the topography west of the building slopes more steeply towards the Sudbury River. The area surrounding the building and to the west towards the Sudbury River contains woods. The area on the eastern and northern portions of the project site is covered by grass. There is an existing drainage basin between the project site and the Boston Post Road that collects the stormwater runoff flowing from the Boston Post Road.

The Town of Wayland is proposing renovations and additions to the existing unoccupied building and other improvements including parking areas, sidewalks that connect to Andrew Avenue and Lillian Way, patio, stormwater management system, site grading, utility connections, stone dust trails and two overlooks to the Sudbury River, landscaping, hardscaping and lighting.

Construction Sequence

A. Contact Digsafe (888-344-7233) and obtain clearance at least 72 hours before initiating an excavation.
B. Coordinate an onsite pre-construction conference at least 5 business days prior to initial site work which shall be held with the applicant, applicant's contractor, consulting engineer, and representatives of the city departments having an interest in the plan.
C. Install the erosion control sock and catch basin filters and construction entrance.
D. Excavate for the building additions foundations.
E. Begin constructing the building additions.
F. Install the subsurface infiltration facility and install the drain lines, catch basins and drain manholes, filter media unit and level spreader.
G. Install the water services and fire hydrant.
H. Install the transformer and electric duct bank.
I. Replace the existing sewer line.
J. Pave the parking area with the binder course.
K. Install the granite curbing.
L. Install the concrete walkways and patio.
M. Install the stone dust trails, boardwalks and overlooks to Sudbury River.
N. Install the guardrail and lighting.
O. Apply loam and seed to all the disturbed areas and plant the trees and shrubs.
P. Pave the parking area with the wearing course.

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION SEDIMENTATION CONTROL PLAN:

Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and siltation. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

a. Temporary Seeding
b. Temporary Mulching
c. Permanent Seeding
d. Placement of Sod
e. Hydroseeding
f. Placement of Hay
g. Placement of Jute Netting

Catch Basin Filter

A temporary storm drain inlet protection filter will be placed in all catch basin units. The purpose of the filter is to prevent the inflow of sediments into the storm drain system. The filter shall remain in place until a permanent vegetative cover is established and the transport of sediment is no longer visibly apparent. The filter shall be inspected and maintained on a weekly basis and after every storm of 0.25 inches or more of rainfall/precipitation.

Erosion Control Sock

Erosion control sock are proposed to be installed, as shown on the site plan and in accordance with the detail. The barriers are burlap fabric mitts filled with compost blends and shall be installed prior to the commencement of any work on-site and in accordance with the design plans. An additional supply of mitts shall be on-site to replace and/or repair erosion control socks that have been disturbed. The lines of mitts shall be inspected and maintained on a weekly basis during construction. Deposited sediments shall be removed when the level of deposition reaches approximately one-third the height of the erosion control sock.

Construction Entrance

Install the construction entrance as shown on the site plan and in accordance with the detail. The entrance should be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic topdressing with additional stone. Inspect entrance/exit pad and sediment disposal area weekly and after heavy rains or heavy use. Remove mud and sediment tracked or washed onto public roads immediately. Mud and soil particles will eventually clog the voids in the gravel and the effectiveness of the gravel pad will not be satisfactory. When this occurs, the pad should be topdressed with new stone. Complete replacement of the pad may be necessary when the pad becomes completely clogged. If washing facilities are used, the sediment traps should be cleaned out as often as necessary to assure that adequate trapping efficiency and storage volume is available. Vegetative filter strips should be maintained to insure a vigorous stand of vegetation at all times. Reshape pad as needed for drainage and runoff control. Repair any broken road pavement immediately.

Subsurface Infiltration Facility

The performance of the subsurface infiltration facility shall be checked weekly and after every major storm event during construction. No construction period runoff should be directed into the subsurface infiltration facility.

Level Spreader

Inspect rip rap outlet structures weekly and after heavy rains for erosion at sides and ends of structures and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet structure. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade.

Stockpile

All unused debris, soil, and other material shall be stockpiled in locations of relatively flat grades, away from any trees identified to be saved and upgradient of the erosion control sock. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by erosion control sock, and shall be placed outside the 100-foot buffer to any bordering vegetated wetland. Surrounding erosion control sock shall be inspected and maintained on a daily basis.

Dust Control

Provide dust control as needed.

LONG TERM OPERATION AND MAINTENANCE PLAN:

Erosion Control

Eroded sediments can adversely affect the performance of the stormwater management system. Eroding or barren areas should be immediately re-vegetated.

Debris and Litter Removal

All debris and litter shall be removed when necessary, and after each storm event.

Deep Sump Hooded Catch Basins

The catch basins shall be inspected two (2) times per year, and if necessary, any maintenance shall be performed so that it functions as designed. The catch basins shall be cleaned twice per year, or when sediment in the bottom of the sump reaches 24 inches below the bottom of the outlet. Inlet and outlet pipes should be checked for clogging. At a minimum, inspection of the catch basins shall be performed during the last week of April and the first week of October each year.

Filter Media Unit

In the event of any hazardous material spill maintenance should be performed immediately. Maintenance should be performed by a licensed liquid waste hauler. The appropriate regulatory agencies should also be notified.

Typically, maintenance is performed by the Vacuum Service Industry, a well-established sector of the service industry that cleans underground tanks, sewers, and catch basins. Costs to clean the treatment unit will vary based on the size of the unit and transportation distances.

The requirements for the disposal of material from a treatment unit are similar to that of any other Best Management Practices (BMPs). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as a hazardous waste. In some areas, mixing the water with the sediment will create slurry that can be discharged into a trunk sanitary sewer. In all disposal options, approval from the disposal facility agency is required. Petroleum waste products collected in the treatment unit (oil/chemical/fuel spills) should be removed by a licensed waste management company.

Subsurface Infiltration Facility

The infiltration facility should be inspected after the first several rainfall events or first few months after construction, after all major storms (1.5" and greater), and on regular bi-annual scheduled dates. The infiltration facility shall be inspected through the inspection ports and the upstream and downstream structures. If the depth of sediment is greater than 3 inches the facility shall be cleaned with high pressure water through a culvert cleaning nozzle. The sediment shall then be vacuumed from the upstream and downstream structures.

Level Spreader

Inspect rip rap outlet structures twice per year for erosion at sides and ends of outlet structures and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet structure. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade.

<u>Good Housekeeping Practices</u> (in accordance with Standard 10 of the Stormwater Management Handbook to prevent illicit discharges)

Provisions for storing paints, cleaners, automotive waste and other potentially hazardous household waste products inside or under cover

- All materials on site will be stored inside in a neat, orderly, manner in their appropriate containers with the original manufacturer's label.
- Only store enough material necessary. Whenever possible, all of a product shall be used up before disposing of container.
- Manufacturer, local, and State recommendations for proper use and disposal shall be followed.

Vehicle washing controls

- A commercial car wash shall be used when possible. Car washes treat and/or recycle water.
- Cars shall be washed on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Use biodegradable soaps.
- A water hose with a nozzle that automatically turns off when left unattended.

Spill prevention and response plans

- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Construction requirements

- Contractor shall follow the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Provisions for maintenance of lawns, gardens, and other landscaped areas

- Grass shall not be cut shorter than 2 to 3 inches and mulch clipping should be left on lawn as a natural fertilizer.
- Use low volume water approaches such as drip-type or sprinkler systems. Water plants only when needed to enhance root growth and avoid runoff problems.
- The use of mulch shall be utilized where possible. Mulch helps retain water and prevents erosion.

Requirements for storage and use of fertilizers, herbicides and pesticides

- Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
- Do not fertilize before a rainstorm.
- Consider using organic fertilizers. They release nutrients more slowly.
- Pesticides shall be applied on lawns and gardens only when necessary and applied only in the minimum amounts recommended by the manufacturer.

Pet waste management

- Scoop up and seal pet wastes in a plastic bag. Dispose of properly, in the garbage.

Provisions for operation and management of septic systems

- Not applicable.

Provisions for solid waste management

- All solid waste shall be disposed of or recycled in accordance with local town regulations.

Snow disposal and plowing plans relative to Wetland Resource Area

- Snow shall be plowed and stored on gravel, grass, or other permeable surfaces to allow filtration to occur.
- Once snow melts all sand salt and debris shall be extracted from surface and properly disposed of.
- Snow shall not be disposed of in any wetland resource area or waterbody.

Winter drive salt use and storage restrictions

- Salt storage piles shall be covered at all times.
- The amount of drive salt applied should be minimized to prevent over salting of driveways and increasing runoff concentrations.

Driveway sweeping and cleaning routine maintenance schedule

- Vacuum sweeping and power washing shall be conducted as needed but at a frequency of not less than once per year.
- Removal of any accumulated sand, grit, and debris from driveway shall be completed shortly after snow melts for the season.

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

- Spill Control Practices shall be in conformance with the guidelines set forth in the National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP)

Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan

T.B.D.
Town of Wayland
41 Cochituate Road
Wayland, MA 01778

List of Emergency contacts for implementing Long-Term Pollution Prevention Plan

T.B.D.
Town of Wayland
41 Cochituate Road
Wayland, MA 01778

P:\6452_10 Andrew Ave, Wayland, Ma\ADMIN\Reports\Stormwater\6452 Inspection Maintenance.doc

STORMWATER MANAGEMENT
CONSTRUCTION PHASE

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 8 Andrew Avenue, Wayland, Massachusetts

Inspection Date	Inspector	Area Inspected	Best Management Practice (yes/no)	Required Inspection Frequency if BMP	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Erosion Control Sock	Yes	Weekly and After Major Storm Events			
		Subsurface Infiltration Facility	Yes	Weekly and After Major Storm Events			
		Stockpile	Yes	Weekly and After Major Storm Events			
		Construction Entrance	Yes	Weekly and After Major Storm Events			
		Catch Basin Filter	Yes	Weekly and After Major Storm Events			
		Level Spreader	Yes	Weekly and After Major Storm Events			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(2) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.

Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Stormwater Control Manager: ____

<u>STORMWATER MANAGEMENT POST CONSTRUCTION PHASE</u>
INSPECTION SCHEDULE AND EVALUATION CHECKLIST

PROJECT LOCATION: 8 Andrew Avenue, Wayland, Massachusetts

Inspection Date	Inspector	Area Inspected	Best Management Practice (yes/no)	Required Inspection Frequency if BMP	Comments	Recommendation	Follow-up Inspection Required (yes/no)
		Subsurface Infiltration Facility	Yes	Twice per year			
		Driveway Sweeping	Yes	Once per year			
		Debris and Litter Removal	No	As necessary and after each storm event			
		Erosion Control	No	As necessary			
		Filter Media Unit	Yes	Twice per year			
		Level Spreader	Yes	Twice per year			
		PDCB1	Yes	Twice per year			
		PCB2	Yes	Twice per year			
		PCB3	Yes	Twice per year			
		PCB4	Yes	Twice per year			
		PCB5	Yes	Twice per year			
		PDMH1	No	Twice per year			
		PDMH2	No	Twice per year			
		PDMH3	No	Twice per year			
		PDMH4	No	Twice per year			
		PDMH5	No	Twice per year			
		PDMH6	No	Twice per year			

(1) Refer to the Massachusetts Stormwater Handbook, Volume Two: Stormwater Technical Handbook (February 2008) for recommendations regarding frequency for inspection and maintenance of specific BMP's.

(2) Inspections to be conducted by a qualified professional such as an environmental scientist or civil engineer.
Limited or no use of sodium chloride salts, fertilizers or pesticides recommended.

Stormwater Control Manager: ____

STORMWATER ANALYSIS AND CALCULATIONS

STORMWATER ANALYSIS & CALCULATIONS

for

COUNCIL ON AGING COMMUNITY CENTER
8 ANDREW AVENUE
WAYLAND, MASSACHUSETTS

Prepared for:

Town of Wayland
41 Cochituate Road
Wayland, Massachusetts 01778

Prepared by:

Meridian Associates, Inc.
500 Cummings Center, Suite 5950
Beverly, Massachusetts 01915
(978) 299-0447

December 7, 2022
Revised: January 5, 2023

MERIDIAN ASSOCIATES

TABLE OF CONTENTS

CALCULATION METHODS

- TR 20 SCS Unit Hydrograph Procedure
- Runoff Curve Numbers
- Time of Concentration by TR55 Methodology
- Pond Rating by the Storage-Indication Method
- Manning Equation

SOURCE OF DATA

- Technical Report No. 20
- Technical Report No. 55
- Field Survey and Soil Testing by Meridian Associates
- Northeast Regional Climate Center
- Massachusetts Stormwater Management Handbook, February 2008

REPORT SUMMARY:

Calculation Objectives

The objective of these calculations is to document that the proposed project described in the Stormwater Management Report does not result in flooding down gradient of the site. The analysis is separated into existing and proposed conditions. Drainage plans have been incorporated into this report to depict pre and post development drainage conditions.

Selection of Storm Events

The storm events have been taken from Northeast Regional Climate Center "Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada". Rainfall frequency data has been provided as follows:

Frequency (Years)	Rainfall [24-Hour Event (inches)]
2	3.14
10	4.70
25	5.91
100	8.39

Classification of Soils

Based on soil maps provided by the Natural Resources Conservation Service the project site is mostly urban land with a small portion of saco mucky silt loam. Urban land doesn't have a hydrologic soil group rating but soil testing found that the soil is similar to a hydrologic soil group rating of B. Saco mucky silt loam has a hydrologic soil group rating of B. Refer to the hydrologic soil group report in the appendix.

Hydrologic soil groups are assigned to each soil type by the NRCS based on their potential rate of water infiltration when soils are not protected by vegetation, are thoroughly wet and receive precipitation from long duration storms.

Existing Conditions Overview

The former Raytheon facility in Wayland occupied approximately 83 acres of land at 430 Boston Post Road from circa 1955 through 1996. It was developed into the 'Wayland Town Center' between 2012 and 2015. The subject property is located at 8 Andrew Avenue and is located within the "Wayland Town Center'. The subject property includes four (4) individual parcels with a combined total area of approximately 4.16 acres The project site previously contained two buildings used for radar equipment testing. The buildings were demolished in 1999 and the current 12,759 sf building was constructed in 2000. The intention was to use this building as a daycare center for the tenants of Raytheon's former main building but the building was never completed or occupied. The unoccupied building is connected to sanitary sewer, domestic and fire water services, natural gas, electric, telephone and data service connections.

The project site also includes several easements for existing sanitary sewer and stormwater drainage utilities. The western portion of the project site is adjacent to the Sudbury River and the one hundred (100) foot and two hundred (200) foot riverfront Riparian Zones extend onto the site. There are bordering vegetated wetlands downhill of the project site adjacent to the Sudbury River and there is a small area of bordering vegetated wetlands between the building and the Boston Post Road. A portion of the project site contains priority habitats of rare species as mapped by Natural Heritage and is partially located within the one hundred (100) year flood plain. Per the Town of Wayland Zoning Map, the project site is located within the Limited Commercial District Zoning District and the Aquifer Protection District (Zone IIs Wellhead Protection Area).

The topography on the eastern and northern portions of the project site gradually slopes towards the Sudbury River while the topography west of the building slopes more steeply towards the Sudbury River. The area surrounding the building and to the west towards the Sudbury River contains woods. The area on the eastern and northern portions of the project site is covered by grass. There is an existing drainage basin between the project site and the Boston Post Road that collects the stormwater runoff flowing from the Boston Post Road.

For the purpose of analyzing existing and proposed stormwater runoff, one design point has been designated for comparison.

Existing Design Points and Subcatchment Areas

Design Point #1 is located in the northwest portion of the property adjacent to the bordering vegetated wetlands and the Sudbury River. The subcatchment area includes the majority of the property and the uphill areas adjacent to Andrew Avenue and Lillian Way.

Proposed Conditions Overview

The Town of Wayland is proposing renovations and additions to the existing unoccupied building and other improvements including parking areas, sidewalks that connect to Andrew Avenue and Lillian Way, patio, stormwater management system, site grading, utility connections, stone dust trails and two overlooks to the Sudbury River, landscaping, hardscaping and lighting.

The project site utilizes several different stormwater management techniques. There are proposed deep sump hooded catch basins, proprietary filter media unit and subsurface infiltration facility that will be used for the treatment, recharge and mitigation of the stormwater runoff.

Subsurface Infiltration Facility:

A subsurface infiltration facility has been incorporated into this design to provide mitigation and recharge of the stormwater runoff from the proposed building addition rooftop and a portion of the existing building rooftop. The facility consists of plastic chambers with open bottoms placed on a bed of stone. The chambers are constructed to store the stormwater runoff temporarily to allow it to infiltrate into the underlying soil. During the larger storm events stormwater runoff does discharge from the facility. A TSS removal rate of 80% is achieved by this BMP.

Deep Sump Hooded Catchbasin:

Similar to an ordinary catchbasin but fitted with an outlet hood to separate floatables such as oil, grease, trash and debris. They also have four(4) foot deep sumps that promote settling of suspended solids. The catchbasins are pretreating the stormwater runoff from the paved impervious areas. A TSS removal rate of 25% is achieved by this BMP.

Filter Media Unit:

Media units are typically two-chambered underground concrete vaults designed to reduce both TSS and other pollutants. The first chamber is usually a pretreatment settling basin. The second chamber is a filler bed containing either sand or other filtering media or an array of media-containing cartridge filters. After larger particles settle out in the first chamber, stormwater flows through the specific filter media in the second chamber, and a portion of the target pollutants are sorbed to the filter media. The media unit needs to be designed to remove 50% minimum total phosphorous and 44% minimum TSS from the stormwater runoff.

Proposed Design Points and Subcatchment Areas

Design Point #1 is located in the northwest portion of the property adjacent to the bordering vegetated wetlands and the Sudbury River. The subcatchment areas include the majority of the property and the uphill areas adjacent to Andrew Avenue and Lillian Way.

Storm Drain Line Analysis

The storm drain lines have been analyzed in HydroCAD and are sized and designed for the 100 year storm event.

Summary of Flows at Design Point #1

A detailed analysis of the existing and proposed subcatchment areas reaches and ponds are included in the HydroCAD analysis section of this report.

Peak Flow Rates Design Point #1

Storm Event	Existing Conditions (Pre) Peak Flow (CFS)	Proposed Conditions (Post) Peak Flow (CFS)
1 Inch	0.0	0.0
2-Year (3.14 in/hr)	0.9	1.0*
10-Year (4.70 in/hr)	3.7	3.2
25-Year (5.91 in/hr)	6.4	5.1
100-Year (8.39 in/hr)	13.0	10.5

*Decrease in Volume

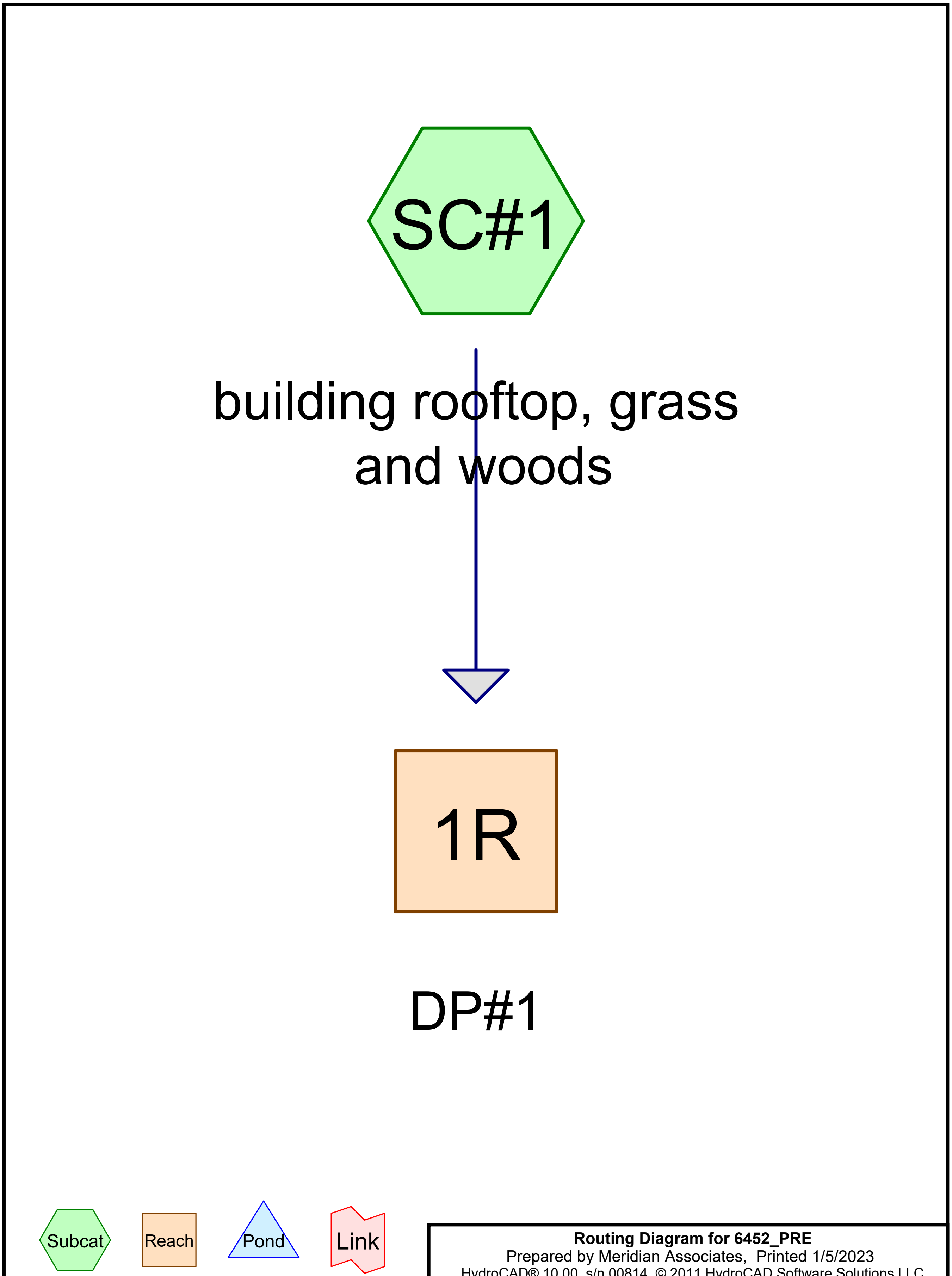
Peak Volumes Design Point #1

Storm Event	Existing Conditions (Pre) Peak Volume (Acre-feet)	Proposed Conditions (Post) Peak Volume (Acre-feet)
1 Inch	0.0	0.0
2-Year (3.14 in/hr)	0.13	0.10
10-Year (4.70 in/hr)	0.37	0.25
25-Year (5.91 in/hr)	0.60	0.41
100-Year (8.39 in/hr)	1.15	0.90

Conclusion

The peak stormwater runoff rates and volumes are matched or reduced for the design point. We can therefore anticipate no adverse impacts or downstream flooding with the completion of this project.

EXISTING CONDITIONS
WATERSHED ROUTING DIAGRAM



Routing Diagram for 6452_PRE
Prepared by Meridian Associates, Printed 1/5/2023
HydroCAD® 10.00 s/n 00814 © 2011 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.391	55	Woods, Good, HSG B (SC#1)
2.053	61	>75% Grass cover, Good, HSG B (SC#1)
0.006	98	Concrete walkways & pads, HSG B (SC#1)
0.245	98	Roofs, HSG B (SC#1)
3.696	**61**	**TOTAL AREA**

EXISTING CONDITIONS
1 INCH STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
	161,016	61	Weighted Average
	150,055		93.19% Pervious Area
	10,961		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 6.81% Impervious, Inflow Depth = 0.00" for 1 inch storm event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
2-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 0.9 cfs @ 12.26 hrs, Volume= 0.13 af, Depth= 0.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
	161,016	61	Weighted Average
	150,055		93.19% Pervious Area
	10,961		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 6.81% Impervious, Inflow Depth = 0.42" for 2 year storm event
Inflow = 0.9 cfs @ 12.26 hrs, Volume= 0.13 af
Outflow = 0.9 cfs @ 12.26 hrs, Volume= 0.13 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
10-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 3.7 cfs @ 12.19 hrs, Volume= 0.37 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
	161,016	61	Weighted Average
	150,055		93.19% Pervious Area
	10,961		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 6.81% Impervious, Inflow Depth = 1.19" for 10 year storm event
Inflow = 3.7 cfs @ 12.19 hrs, Volume= 0.37 af
Outflow = 3.7 cfs @ 12.19 hrs, Volume= 0.37 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
25-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 6.4 cfs @ 12.18 hrs, Volume= 0.60 af, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
	161,016	61	Weighted Average
	150,055		93.19% Pervious Area
	10,961		6.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 6.81% Impervious, Inflow Depth = 1.95" for 25 year storm event
Inflow = 6.4 cfs @ 12.18 hrs, Volume= 0.60 af
Outflow = 6.4 cfs @ 12.18 hrs, Volume= 0.60 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

EXISTING CONDITIONS
100-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass and woods

Runoff = 13.0 cfs @ 12.17 hrs, Volume= 1.15 af, Depth= 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	10,683	98	Roofs, HSG B
*	278	98	Concrete walkways & pads, HSG B
	89,447	61	>75% Grass cover, Good, HSG B
	60,608	55	Woods, Good, HSG B
	161,016	61	Weighted Average
	150,055		93.19% Pervious Area
	10,961		6.81% Impervious Area

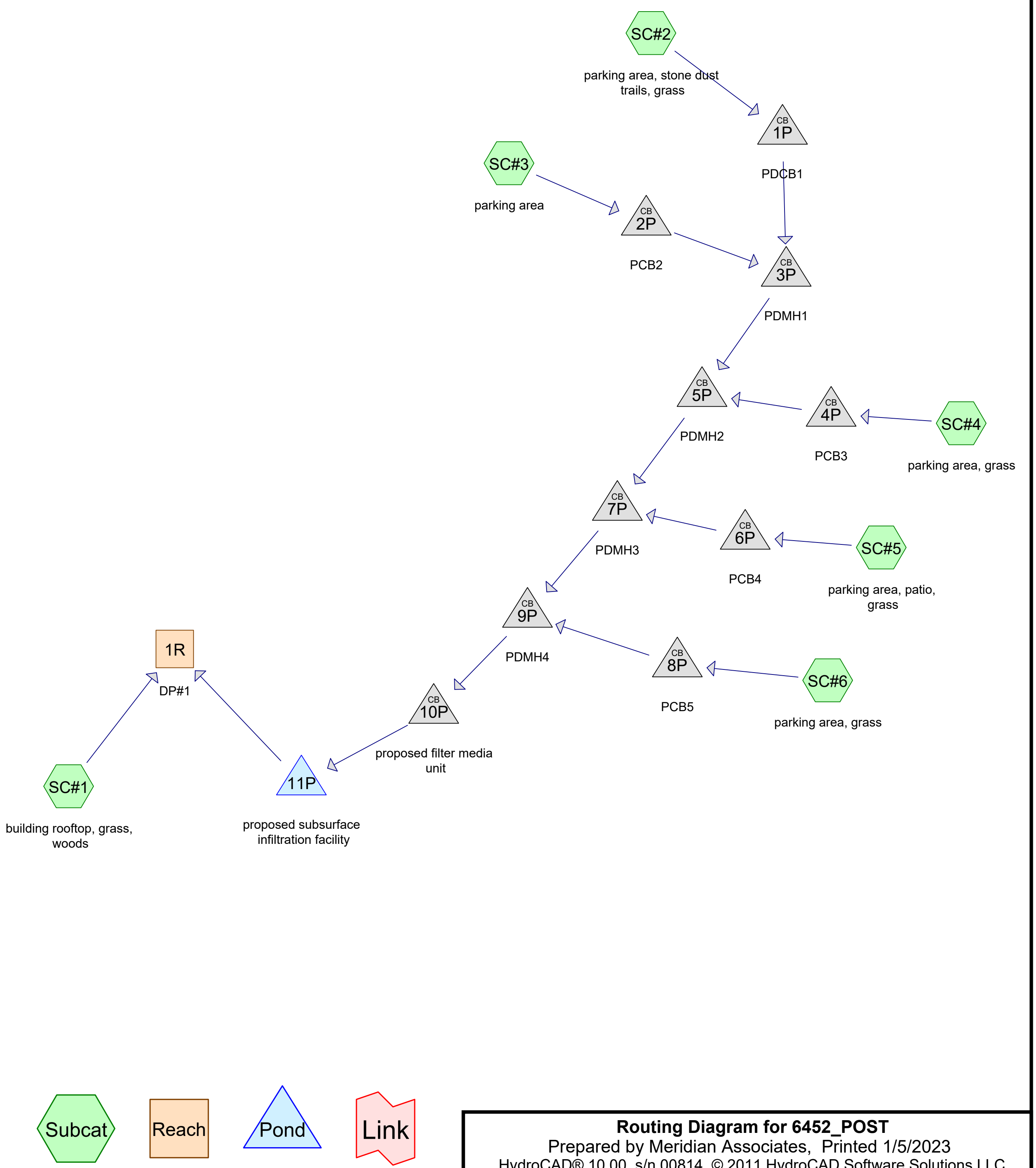
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.9	50	0.0050	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.1	69	0.0050	1.1		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
1.2	100	0.0810	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
12.2	219	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 6.81% Impervious, Inflow Depth = 3.74" for 100 year storm event
Inflow = 13.0 cfs @ 12.17 hrs, Volume= 1.15 af
Outflow = 13.0 cfs @ 12.17 hrs, Volume= 1.15 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

PROPOSED CONDITIONS
WATERSHED ROUTING DIAGRAM



Routing Diagram for 6452_POST
Prepared by Meridian Associates, Printed 1/5/2023
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.856	55	Woods, Good, HSG B (SC#1)
1.185	61	>75% Grass cover, Good, HSG B (SC#1, SC#2, SC#3, SC#4, SC#5, SC#6)
0.018	86	Bare soil under boardwalk, HSG B (SC#1)
0.144	96	Stone dust trails, HSG B (SC#1, SC#2, SC#4)
0.003	98	Concrete walkways, HSG B (SC#1)
0.021	98	Future Outdoor Classroom (SC#5)
1.187	98	Paved parking, HSG B (SC#2, SC#3, SC#4, SC#5, SC#6)
0.284	98	Roofs, HSG B (SC#1, SC#4, SC#5, SC#6)
3.696	**76**	**TOTAL AREA**

PROPOSED CONDITIONS
1 INCH STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	10,914	98	Roofs, HSG B
*	113	98	Concrete walkways, HSG B
*	4,460	96	Stone dust trails, HSG B
*	769	86	Bare soil under boardwalk, HSG B
	32,067	61	>75% Grass cover, Good, HSG B
	37,285	55	Woods, Good, HSG B
*	800	98	Roofs, HSG B
	86,408	66	Weighted Average
	74,581		86.31% Pervious Area
	11,827		13.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods**
					Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, stone dust trails, grass

Runoff = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	20,588	98	Paved parking, HSG B
*	1,634	96	Stone dust trails, HSG B
	10,445	61	>75% Grass cover, Good, HSG B
	32,667	86	Weighted Average
	12,079		36.98% Pervious Area
	20,588		63.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.3	206	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	256	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	7,154	98	Paved parking, HSG B
	248	61	>75% Grass cover, Good, HSG B
	7,402	97	Weighted Average
	248		3.35% Pervious Area
	7,154		96.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, grass

Runoff = 0.1 cfs @ 12.12 hrs, Volume= 0.01 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	11,025	98	Paved parking, HSG B
	264	98	Roofs, HSG B
*	163	96	Stone dust trails, HSG B
	7,259	61	>75% Grass cover, Good, HSG B
	18,711	84	Weighted Average
	7,422		39.67% Pervious Area
	11,289		60.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, patio, grass

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

	Area (sf)	CN	Description
	5,597	98	Paved parking, HSG B
	264	98	Roofs, HSG B
	683	61	>75% Grass cover, Good, HSG B
*	900	98	Future Outdoor Classroom
	7,444	95	Weighted Average
	683		9.18% Pervious Area
	6,761		90.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 inch storm Rainfall=1.00"

Area (sf)	CN	Description
7,345	98	Paved parking, HSG B
142	98	Roofs, HSG B
898	61	>75% Grass cover, Good, HSG B
8,385	94	Weighted Average
898		10.71% Pervious Area
7,487		89.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 40.43% Impervious, Inflow Depth = 0.00" for 1 inch storm event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 0.750 ac, 63.02% Impervious, Inflow Depth = 0.20" for 1 inch storm event
Inflow = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.39' @ 12.11 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.20'	**15.0" Round drain line** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.20' / 121.90' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.1 cfs @ 12.11 hrs HW=122.39' TW=122.05' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 0.1 cfs @ 1.7 fps)

Summary for Pond 2P: PCB2

Inflow Area = 0.170 ac, 96.65% Impervious, Inflow Depth = 0.71" for 1 inch storm event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.19' @ 12.09 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.09 hrs HW=122.18' TW=122.05' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 0.1 cfs @ 2.0 fps)

Summary for Pond 3P: PDMH1

Inflow Area = 0.920 ac, 69.24% Impervious, Inflow Depth = 0.29" for 1 inch storm event
Inflow = 0.3 cfs @ 12.10 hrs, Volume= 0.02 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.02 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 0.02 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.05' @ 12.10 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 127.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.3 cfs @ 12.10 hrs HW=122.05' TW=121.27' (Dynamic Tailwater)
↑—**1=drain line** (Barrel Controls 0.3 cfs @ 2.1 fps)

Summary for Pond 4P: PCB3

Inflow Area = 0.430 ac, 60.33% Impervious, Inflow Depth = 0.15" for 1 inch storm event
Inflow = 0.1 cfs @ 12.12 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.12 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.12 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.33' @ 12.14 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.12 hrs HW=121.33' TW=121.26' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 0.0 cfs @ 1.2 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 1.349 ac, 66.40% Impervious, Inflow Depth = 0.25" for 1 inch storm event
Inflow = 0.3 cfs @ 12.10 hrs, Volume= 0.03 af
Outflow = 0.3 cfs @ 12.10 hrs, Volume= 0.03 af, Atten= 0%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.10 hrs, Volume= 0.03 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.27' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.00'	**18.0" Round drain line** L= 166.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.00' / 120.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=0.3 cfs @ 12.10 hrs HW=121.27' TW=120.31' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 0.3 cfs @ 2.2 fps)

Summary for Pond 6P: PCB4

Inflow Area = 0.171 ac, 90.82% Impervious, Inflow Depth = 0.56" for 1 inch storm event
Inflow = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.0 min
Primary = 0.1 cfs @ 12.09 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.38' @ 12.12 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.09 hrs HW=120.38' TW=120.30' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 0.1 cfs @ 1.5 fps)

Summary for Pond 7P: PDMH3

Inflow Area = 1.520 ac, 69.15% Impervious, Inflow Depth = 0.28" for 1 inch storm event
Inflow = 0.4 cfs @ 12.10 hrs, Volume= 0.04 af
Outflow = 0.4 cfs @ 12.10 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Primary = 0.4 cfs @ 12.10 hrs, Volume= 0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.31' @ 12.11 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.4 cfs @ 12.10 hrs HW=120.31' TW=120.12' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 0.4 cfs @ 2.0 fps)

Summary for Pond 8P: PCB5

Inflow Area =	0.192 ac,	89.29% Impervious,	Inflow Depth = 0.50"	for 1 inch storm event
Inflow =	0.1 cfs @	12.09 hrs, Volume=	0.01 af	
Outflow =	0.1 cfs @	12.09 hrs, Volume=	0.01 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.1 cfs @	12.09 hrs, Volume=	0.01 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.30' @ 12.11 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.09 hrs HW=120.29' TW=120.12' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 0.1 cfs @ 1.4 fps)

Summary for Pond 9P: PDMH4

Inflow Area =	1.713 ac,	71.41% Impervious,	Inflow Depth = 0.31"	for 1 inch storm event
Inflow =	0.5 cfs @	12.10 hrs, Volume=	0.04 af	
Outflow =	0.5 cfs @	12.10 hrs, Volume=	0.04 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.5 cfs @	12.10 hrs, Volume=	0.04 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.12' @ 12.10 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=120.12' TW=119.99' (Dynamic Tailwater)
└─**1=drain line** (Barrel Controls 0.5 cfs @ 2.1 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 0.31" for 1 inch storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 119.99' @ 12.10 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=0.5 cfs @ 12.10 hrs HW=119.99' TW=119.00' (Dynamic Tailwater)
└─**1=drain line** (Barrel Controls 0.5 cfs @ 2.1 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 0.31" for 1 inch storm event
Inflow = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af
Outflow = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.5 cfs @ 12.10 hrs, Volume= 0.04 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 119.00' @ 12.10 hrs Surf.Area= 5,592 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (850.4 - 850.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0078 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 12.10 hrs HW=119.00' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)
  └─**2=Orifice** (Controls 0.0 cfs)

PROPOSED CONDITIONS
2-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 1.0 cfs @ 12.13 hrs, Volume= 0.10 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	10,914	98	Roofs, HSG B
*	113	98	Concrete walkways, HSG B
*	4,460	96	Stone dust trails, HSG B
*	769	86	Bare soil under boardwalk, HSG B
	32,067	61	>75% Grass cover, Good, HSG B
	37,285	55	Woods, Good, HSG B
*	800	98	Roofs, HSG B
	86,408	66	Weighted Average
	74,581		86.31% Pervious Area
	11,827		13.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, stone dust trails, grass

Runoff = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	20,588	98	Paved parking, HSG B
*	1,634	96	Stone dust trails, HSG B
	10,445	61	>75% Grass cover, Good, HSG B
	32,667	86	Weighted Average
	12,079		36.98% Pervious Area
	20,588		63.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.3	206	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	256	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af, Depth= 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

Area (sf)	CN	Description
7,154	98	Paved parking, HSG B
248	61	>75% Grass cover, Good, HSG B
7,402	97	Weighted Average
248		3.35% Pervious Area
7,154		96.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, grass

Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	11,025	98	Paved parking, HSG B
	264	98	Roofs, HSG B
*	163	96	Stone dust trails, HSG B
	7,259	61	>75% Grass cover, Good, HSG B
	18,711	84	Weighted Average
	7,422		39.67% Pervious Area
	11,289		60.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, patio, grass

Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af, Depth= 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

	Area (sf)	CN	Description
	5,597	98	Paved parking, HSG B
	264	98	Roofs, HSG B
	683	61	>75% Grass cover, Good, HSG B
*	900	98	Future Outdoor Classroom
	7,444	95	Weighted Average
	683		9.18% Pervious Area
	6,761		90.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af, Depth= 2.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 year storm Rainfall=3.14"

Area (sf)	CN	Description
7,345	98	Paved parking, HSG B
142	98	Roofs, HSG B
898	61	>75% Grass cover, Good, HSG B
8,385	94	Weighted Average
898		10.71% Pervious Area
7,487		89.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 40.43% Impervious, Inflow Depth = 0.33" for 2 year storm event
Inflow = 1.0 cfs @ 12.13 hrs, Volume= 0.10 af
Outflow = 1.0 cfs @ 12.13 hrs, Volume= 0.10 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 0.750 ac, 63.02% Impervious, Inflow Depth = 1.78" for 2 year storm event
Inflow = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af
Outflow = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.91' @ 12.11 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.20'	**15.0" Round drain line** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.20' / 121.90' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.4 cfs @ 12.09 hrs HW=122.90' TW=122.53' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 1.4 cfs @ 2.8 fps)

Summary for Pond 2P: PCB2

Inflow Area = 0.170 ac, 96.65% Impervious, Inflow Depth = 2.80" for 2 year storm event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.58' @ 12.14 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=122.52' TW=122.52' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 0.920 ac, 69.24% Impervious, Inflow Depth = 1.97" for 2 year storm event
Inflow = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af
Outflow = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af, Atten= 0%, Lag= 0.0 min
Primary = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.54' @ 12.10 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 127.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=1.9 cfs @ 12.09 hrs HW=122.53' TW=121.86' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 1.9 cfs @ 3.2 fps)

Summary for Pond 4P: PCB3

Inflow Area = 0.430 ac, 60.33% Impervious, Inflow Depth = 1.63" for 2 year storm event
Inflow = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af
Outflow = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.93' @ 12.14 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.3 cfs @ 12.09 hrs HW=121.88' TW=121.86' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 0.3 cfs @ 0.8 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 1.349 ac, 66.40% Impervious, Inflow Depth = 1.86" for 2 year storm event
Inflow = 2.8 cfs @ 12.09 hrs, Volume= 0.21 af
Outflow = 2.8 cfs @ 12.09 hrs, Volume= 0.21 af, Atten= 0%, Lag= 0.0 min
Primary = 2.8 cfs @ 12.09 hrs, Volume= 0.21 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.87' @ 12.10 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.00'	**18.0" Round drain line** L= 166.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.00' / 120.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=2.6 cfs @ 12.09 hrs HW=121.86' TW=120.99' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 2.6 cfs @ 3.6 fps)

Summary for Pond 6P: PCB4

Inflow Area = 0.171 ac, 90.82% Impervious, Inflow Depth = 2.59" for 2 year storm event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.03' @ 12.18 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=120.87' TW=120.98' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 1.520 ac, 69.15% Impervious, Inflow Depth = 1.94" for 2 year storm event
Inflow = 3.3 cfs @ 12.09 hrs, Volume= 0.25 af
Outflow = 3.3 cfs @ 12.09 hrs, Volume= 0.25 af, Atten= 0%, Lag= 0.0 min
Primary = 3.3 cfs @ 12.09 hrs, Volume= 0.25 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.02' @ 12.13 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=2.4 cfs @ 12.09 hrs HW=120.98' TW=120.83' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 2.4 cfs @ 2.3 fps)

Summary for Pond 8P: PCB5

Inflow Area = 0.192 ac, 89.29% Impervious, Inflow Depth = 2.49" for 2 year storm event
Inflow = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af
Outflow = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af, Atten= 0%, Lag= 0.0 min
Primary = 0.5 cfs @ 12.09 hrs, Volume= 0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.88' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=120.76' TW=120.82' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 2.00" for 2 year storm event
Inflow = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af
Outflow = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.86' @ 12.12 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.2 cfs @ 12.09 hrs HW=120.83' TW=120.65' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 3.2 cfs @ 2.7 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 2.00" for 2 year storm event
Inflow = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af
Outflow = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af, Atten= 0%, Lag= 0.0 min
Primary = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.66' @ 12.09 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.8 cfs @ 12.09 hrs HW=120.65' TW=119.45' (Dynamic Tailwater)
└─**1=drain line** (Barrel Controls 3.8 cfs @ 3.4 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 2.00" for 2 year storm event
Inflow = 3.8 cfs @ 12.09 hrs, Volume= 0.29 af
Outflow = 1.1 cfs @ 11.95 hrs, Volume= 0.29 af, Atten= 72%, Lag= 0.0 min
Discarded = 1.1 cfs @ 11.95 hrs, Volume= 0.29 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 119.74' @ 12.45 hrs Surf.Area= 5,592 sf Storage= 2,300 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.2 min (816.8 - 806.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0078 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 11.95 hrs HW=119.06' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)
  └─**2=Orifice** (Controls 0.0 cfs)

PROPOSED CONDITIONS
10-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 3.2 cfs @ 12.12 hrs, Volume= 0.25 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	10,914	98	Roofs, HSG B
*	113	98	Concrete walkways, HSG B
*	4,460	96	Stone dust trails, HSG B
*	769	86	Bare soil under boardwalk, HSG B
	32,067	61	>75% Grass cover, Good, HSG B
	37,285	55	Woods, Good, HSG B
*	800	98	Roofs, HSG B
	86,408	66	Weighted Average
	74,581		86.31% Pervious Area
	11,827		13.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, stone dust trails, grass

Runoff = 2.7 cfs @ 12.09 hrs, Volume= 0.20 af, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	20,588	98	Paved parking, HSG B
*	1,634	96	Stone dust trails, HSG B
	10,445	61	>75% Grass cover, Good, HSG B
	32,667	86	Weighted Average
	12,079		36.98% Pervious Area
	20,588		63.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.3	206	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	256	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af, Depth= 4.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	7,154	98	Paved parking, HSG B
	248	61	>75% Grass cover, Good, HSG B
	7,402	97	Weighted Average
	248		3.35% Pervious Area
	7,154		96.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, grass

Runoff = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	11,025	98	Paved parking, HSG B
	264	98	Roofs, HSG B
*	163	96	Stone dust trails, HSG B
	7,259	61	>75% Grass cover, Good, HSG B
	18,711	84	Weighted Average
	7,422		39.67% Pervious Area
	11,289		60.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, patio, grass

Runoff = 0.7 cfs @ 12.09 hrs, Volume= 0.06 af, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

	Area (sf)	CN	Description
	5,597	98	Paved parking, HSG B
	264	98	Roofs, HSG B
	683	61	>75% Grass cover, Good, HSG B
*	900	98	Future Outdoor Classroom
	7,444	95	Weighted Average
	683		9.18% Pervious Area
	6,761		90.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 year storm Rainfall=4.70"

Area (sf)	CN	Description
7,345	98	Paved parking, HSG B
142	98	Roofs, HSG B
898	61	>75% Grass cover, Good, HSG B
8,385	94	Weighted Average
898		10.71% Pervious Area
7,487		89.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 40.43% Impervious, Inflow Depth = 0.82" for 10 year storm event
Inflow = 3.2 cfs @ 12.12 hrs, Volume= 0.25 af
Outflow = 3.2 cfs @ 12.12 hrs, Volume= 0.25 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 0.750 ac, 63.02% Impervious, Inflow Depth = 3.19" for 10 year storm event
Inflow = 2.7 cfs @ 12.09 hrs, Volume= 0.20 af
Outflow = 2.7 cfs @ 12.09 hrs, Volume= 0.20 af, Atten= 0%, Lag= 0.0 min
Primary = 2.7 cfs @ 12.09 hrs, Volume= 0.20 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.22' @ 12.11 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.20'	**15.0" Round drain line** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.20' / 121.90' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.3 cfs @ 12.09 hrs HW=123.19' TW=122.83' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 2.3 cfs @ 3.0 fps)

Summary for Pond 2P: PCB2

Inflow Area = 0.170 ac, 96.65% Impervious, Inflow Depth = 4.35" for 10 year storm event
Inflow = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af
Outflow = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.88' @ 12.15 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=122.76' TW=122.82' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 0.920 ac, 69.24% Impervious, Inflow Depth = 3.40" for 10 year storm event
Inflow = 3.5 cfs @ 12.09 hrs, Volume= 0.26 af
Outflow = 3.5 cfs @ 12.09 hrs, Volume= 0.26 af, Atten= 0%, Lag= 0.0 min
Primary = 3.5 cfs @ 12.09 hrs, Volume= 0.26 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.85' @ 12.11 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 127.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.1 cfs @ 12.09 hrs HW=122.82' TW=122.22' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 3.1 cfs @ 3.4 fps)

Summary for Pond 4P: PCB3

Inflow Area = 0.430 ac, 60.33% Impervious, Inflow Depth = 3.00" for 10 year storm event
Inflow = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af
Outflow = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.09 hrs, Volume= 0.11 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.35' @ 12.14 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.5 cfs @ 12.09 hrs HW=122.24' TW=122.23' (Dynamic Tailwater)
└─**1=drain line** (Inlet Controls 0.5 cfs @ 0.6 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 1.349 ac, 66.40% Impervious, Inflow Depth = 3.27" for 10 year storm event
Inflow = 4.9 cfs @ 12.09 hrs, Volume= 0.37 af
Outflow = 4.9 cfs @ 12.09 hrs, Volume= 0.37 af, Atten= 0%, Lag= 0.0 min
Primary = 4.9 cfs @ 12.09 hrs, Volume= 0.37 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.25' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.00'	**18.0" Round drain line** L= 166.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.00' / 120.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=4.4 cfs @ 12.09 hrs HW=122.22' TW=121.36' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 4.4 cfs @ 3.9 fps)

Summary for Pond 6P: PCB4

Inflow Area = 0.171 ac, 90.82% Impervious, Inflow Depth = 4.12" for 10 year storm event
Inflow = 0.7 cfs @ 12.09 hrs, Volume= 0.06 af
Outflow = 0.7 cfs @ 12.09 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min
Primary = 0.7 cfs @ 12.09 hrs, Volume= 0.06 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.46' @ 12.19 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.20' TW=121.35' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 1.520 ac, 69.15% Impervious, Inflow Depth = 3.37" for 10 year storm event
Inflow = 5.7 cfs @ 12.09 hrs, Volume= 0.43 af
Outflow = 5.7 cfs @ 12.09 hrs, Volume= 0.43 af, Atten= 0%, Lag= 0.0 min
Primary = 5.7 cfs @ 12.09 hrs, Volume= 0.43 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.44' @ 12.14 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.6 cfs @ 12.09 hrs HW=121.36' TW=121.21' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 3.6 cfs @ 2.3 fps)

Summary for Pond 8P: PCB5

Inflow Area = 0.192 ac, 89.29% Impervious, Inflow Depth = 4.01" for 10 year storm event
Inflow = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af
Outflow = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af, Atten= 0%, Lag= 0.0 min
Primary = 0.8 cfs @ 12.09 hrs, Volume= 0.06 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.29' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.08' TW=121.21' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 3.44" for 10 year storm event
Inflow = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af
Outflow = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af, Atten= 0%, Lag= 0.0 min
Primary = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.26' @ 12.12 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=5.3 cfs @ 12.09 hrs HW=121.21' TW=121.00' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 5.3 cfs @ 3.0 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 3.44" for 10 year storm event
Inflow = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af
Outflow = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af, Atten= 0%, Lag= 0.0 min
Primary = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.01' @ 12.09 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.4 cfs @ 12.09 hrs HW=121.00' TW=119.83' (Dynamic Tailwater)
↑—**1=drain line** (Barrel Controls 6.4 cfs @ 3.9 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 3.44" for 10 year storm event
Inflow = 6.5 cfs @ 12.09 hrs, Volume= 0.49 af
Outflow = 1.1 cfs @ 11.75 hrs, Volume= 0.49 af, Atten= 84%, Lag= 0.0 min
Discarded = 1.1 cfs @ 11.75 hrs, Volume= 0.49 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 120.52' @ 12.57 hrs Surf.Area= 5,592 sf Storage= 5,967 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.5 min (826.9 - 793.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0078 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 11.75 hrs HW=119.04' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)
  └─**2=Orifice** (Controls 0.0 cfs)

PROPOSED CONDITIONS
25-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 5.1 cfs @ 12.11 hrs, Volume= 0.39 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	10,914	98	Roofs, HSG B
*	113	98	Concrete walkways, HSG B
*	4,460	96	Stone dust trails, HSG B
*	769	86	Bare soil under boardwalk, HSG B
	32,067	61	>75% Grass cover, Good, HSG B
	37,285	55	Woods, Good, HSG B
*	800	98	Roofs, HSG B
	86,408	66	Weighted Average
	74,581		86.31% Pervious Area
	11,827		13.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, stone dust trails, grass

Runoff = 3.6 cfs @ 12.09 hrs, Volume= 0.27 af, Depth= 4.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	20,588	98	Paved parking, HSG B
*	1,634	96	Stone dust trails, HSG B
	10,445	61	>75% Grass cover, Good, HSG B
	32,667	86	Weighted Average
	12,079		36.98% Pervious Area
	20,588		63.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.3	206	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	256	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 1.0 cfs @ 12.09 hrs, Volume= 0.08 af, Depth= 5.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

Area (sf)	CN	Description
7,154	98	Paved parking, HSG B
248	61	>75% Grass cover, Good, HSG B
7,402	97	Weighted Average
248		3.35% Pervious Area
7,154		96.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, grass

Runoff = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	11,025	98	Paved parking, HSG B
	264	98	Roofs, HSG B
*	163	96	Stone dust trails, HSG B
	7,259	61	>75% Grass cover, Good, HSG B
	18,711	84	Weighted Average
	7,422		39.67% Pervious Area
	11,289		60.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, patio, grass

Runoff = 0.9 cfs @ 12.09 hrs, Volume= 0.08 af, Depth= 5.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

	Area (sf)	CN	Description
	5,597	98	Paved parking, HSG B
	264	98	Roofs, HSG B
	683	61	>75% Grass cover, Good, HSG B
*	900	98	Future Outdoor Classroom
	7,444	95	Weighted Average
	683		9.18% Pervious Area
	6,761		90.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 1.1 cfs @ 12.09 hrs, Volume= 0.08 af, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 year storm Rainfall=5.91"

Area (sf)	CN	Description
7,345	98	Paved parking, HSG B
142	98	Roofs, HSG B
898	61	>75% Grass cover, Good, HSG B
8,385	94	Weighted Average
898		10.71% Pervious Area
7,487		89.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 40.43% Impervious, Inflow Depth = 1.34" for 25 year storm event
Inflow = 5.1 cfs @ 12.11 hrs, Volume= 0.41 af
Outflow = 5.1 cfs @ 12.11 hrs, Volume= 0.41 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 0.750 ac, 63.02% Impervious, Inflow Depth = 4.32" for 25 year storm event
Inflow = 3.6 cfs @ 12.09 hrs, Volume= 0.27 af
Outflow = 3.6 cfs @ 12.09 hrs, Volume= 0.27 af, Atten= 0%, Lag= 0.0 min
Primary = 3.6 cfs @ 12.09 hrs, Volume= 0.27 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.46' @ 12.12 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.20'	**15.0" Round drain line** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.20' / 121.90' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=3.0 cfs @ 12.09 hrs HW=123.41' TW=123.05' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 3.0 cfs @ 3.1 fps)

Summary for Pond 2P: PCB2

Inflow Area = 0.170 ac, 96.65% Impervious, Inflow Depth = 5.55" for 25 year storm event
Inflow = 1.0 cfs @ 12.09 hrs, Volume= 0.08 af
Outflow = 1.0 cfs @ 12.09 hrs, Volume= 0.08 af, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 12.09 hrs, Volume= 0.08 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.13' @ 12.16 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=122.94' TW=123.04' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 0.920 ac, 69.24% Impervious, Inflow Depth = 4.55" for 25 year storm event
Inflow = 4.6 cfs @ 12.09 hrs, Volume= 0.35 af
Outflow = 4.6 cfs @ 12.09 hrs, Volume= 0.35 af, Atten= 0%, Lag= 0.0 min
Primary = 4.6 cfs @ 12.09 hrs, Volume= 0.35 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.09' @ 12.11 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 127.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.9 cfs @ 12.09 hrs HW=123.05' TW=122.50' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 3.9 cfs @ 3.3 fps)

Summary for Pond 4P: PCB3

Inflow Area = 0.430 ac, 60.33% Impervious, Inflow Depth = 4.11" for 25 year storm event
Inflow = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af
Outflow = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af, Atten= 0%, Lag= 0.0 min
Primary = 2.0 cfs @ 12.09 hrs, Volume= 0.15 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.72' @ 12.14 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.1 cfs @ 12.09 hrs HW=122.59' TW=122.51' (Dynamic Tailwater)
↑—**1=drain line** (Inlet Controls 1.1 cfs @ 1.4 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 1.349 ac, 66.40% Impervious, Inflow Depth = 4.41" for 25 year storm event
Inflow = 6.6 cfs @ 12.09 hrs, Volume= 0.50 af
Outflow = 6.6 cfs @ 12.09 hrs, Volume= 0.50 af, Atten= 0%, Lag= 0.0 min
Primary = 6.6 cfs @ 12.09 hrs, Volume= 0.50 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.54' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.00'	**18.0" Round drain line** L= 166.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.00' / 120.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=5.7 cfs @ 12.09 hrs HW=122.50' TW=121.62' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 5.7 cfs @ 4.0 fps)

Summary for Pond 6P: PCB4

Inflow Area = 0.171 ac, 90.82% Impervious, Inflow Depth = 5.32" for 25 year storm event
Inflow = 0.9 cfs @ 12.09 hrs, Volume= 0.08 af
Outflow = 0.9 cfs @ 12.09 hrs, Volume= 0.08 af, Atten= 0%, Lag= 0.0 min
Primary = 0.9 cfs @ 12.09 hrs, Volume= 0.08 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.77' @ 12.19 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.44' TW=121.61' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 1.520 ac, 69.15% Impervious, Inflow Depth = 4.51" for 25 year storm event
Inflow = 7.5 cfs @ 12.09 hrs, Volume= 0.57 af
Outflow = 7.5 cfs @ 12.09 hrs, Volume= 0.57 af, Atten= 0%, Lag= 0.0 min
Primary = 7.5 cfs @ 12.09 hrs, Volume= 0.57 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.74' @ 12.14 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=4.3 cfs @ 12.09 hrs HW=121.62' TW=121.49' (Dynamic Tailwater)
↑—**1=drain line** (Outlet Controls 4.3 cfs @ 2.2 fps)

Summary for Pond 8P: PCB5

Inflow Area = 0.192 ac, 89.29% Impervious, Inflow Depth = 5.21" for 25 year storm event
Inflow = 1.1 cfs @ 12.09 hrs, Volume= 0.08 af
Outflow = 1.1 cfs @ 12.09 hrs, Volume= 0.08 af, Atten= 0%, Lag= 0.0 min
Primary = 1.1 cfs @ 12.09 hrs, Volume= 0.08 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.59' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.31' TW=121.48' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 4.59" for 25 year storm event
Inflow = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af
Outflow = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af, Atten= 0%, Lag= 0.0 min
Primary = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.55' @ 12.12 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=6.9 cfs @ 12.09 hrs HW=121.49' TW=121.24' (Dynamic Tailwater)
↑—**1=drain line** (Inlet Controls 6.9 cfs @ 2.4 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 4.59" for 25 year storm event
Inflow = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af
Outflow = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af, Atten= 0%, Lag= 0.0 min
Primary = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.26' @ 12.09 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=8.4 cfs @ 12.09 hrs HW=121.24' TW=120.14' (Dynamic Tailwater)
↑—**1=drain line** (Barrel Controls 8.4 cfs @ 4.2 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 4.59" for 25 year storm event
Inflow = 8.6 cfs @ 12.09 hrs, Volume= 0.66 af
Outflow = 1.6 cfs @ 12.54 hrs, Volume= 0.66 af, Atten= 81%, Lag= 26.9 min
Discarded = 1.1 cfs @ 11.70 hrs, Volume= 0.64 af
Primary = 0.6 cfs @ 12.54 hrs, Volume= 0.02 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 121.16' @ 12.54 hrs Surf.Area= 5,592 sf Storage= 8,700 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 49.2 min (835.6 - 786.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0078 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 11.70 hrs HW=119.05' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.5 cfs @ 12.54 hrs HW=121.16' TW=0.00' (Dynamic Tailwater)
└─**1=drain line** (Barrel Controls 0.5 cfs @ 2.8 fps)
  └─**2=Orifice** (Passes 0.5 cfs of 0.9 cfs potential flow)

PROPOSED CONDITIONS
100-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment SC#1: building rooftop, grass, woods

Runoff = 9.5 cfs @ 12.11 hrs, Volume= 0.72 af, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	10,914	98	Roofs, HSG B
*	113	98	Concrete walkways, HSG B
*	4,460	96	Stone dust trails, HSG B
*	769	86	Bare soil under boardwalk, HSG B
	32,067	61	>75% Grass cover, Good, HSG B
	37,285	55	Woods, Good, HSG B
*	800	98	Roofs, HSG B
	86,408	66	Weighted Average
	74,581		86.31% Pervious Area
	11,827		13.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0160	0.1		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.2	102	0.0840	1.4		**Shallow Concentrated Flow, woods** Woodland Kv= 5.0 fps
7.4	152	Total			

Summary for Subcatchment SC#2: parking area, stone dust trails, grass

Runoff = 5.5 cfs @ 12.09 hrs, Volume= 0.42 af, Depth= 6.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	20,588	98	Paved parking, HSG B
*	1,634	96	Stone dust trails, HSG B
	10,445	61	>75% Grass cover, Good, HSG B
	32,667	86	Weighted Average
	12,079		36.98% Pervious Area
	20,588		63.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	50	0.0600	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
1.3	206	0.0180	2.7		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.0					**Direct Entry, min. tc adjustment**
6.0	256	Total			

Summary for Subcatchment SC#3: parking area

Runoff = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af, Depth= 8.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

Area (sf)	CN	Description
7,154	98	Paved parking, HSG B
248	61	>75% Grass cover, Good, HSG B
7,402	97	Weighted Average
248		3.35% Pervious Area
7,154		96.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.4		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	102	0.0300	3.5		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.9					**Direct Entry, min. tc adjustment**
6.0	152	Total			

Summary for Subcatchment SC#4: parking area, grass

Runoff = 3.1 cfs @ 12.09 hrs, Volume= 0.23 af, Depth= 6.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	11,025	98	Paved parking, HSG B
	264	98	Roofs, HSG B
*	163	96	Stone dust trails, HSG B
	7,259	61	>75% Grass cover, Good, HSG B
	18,711	84	Weighted Average
	7,422		39.67% Pervious Area
	11,289		60.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.2		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.14"
0.8	68	0.0100	1.5		**Shallow Concentrated Flow, grass** Grassed Waterway Kv= 15.0 fps
0.3	57	0.0190	2.8		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
1.1					**Direct Entry, min. tc adjustment**
6.0	175	Total			

Summary for Subcatchment SC#5: parking area, patio, grass

Runoff = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af, Depth= 7.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

	Area (sf)	CN	Description
	5,597	98	Paved parking, HSG B
	264	98	Roofs, HSG B
	683	61	>75% Grass cover, Good, HSG B
*	900	98	Future Outdoor Classroom
	7,444	95	Weighted Average
	683		9.18% Pervious Area
	6,761		90.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0150	1.1		**Sheet Flow, parking area** Smooth surfaces n= 0.011 P2= 3.14"
0.5	71	0.0160	2.6		**Shallow Concentrated Flow, parking area** Paved Kv= 20.3 fps
4.7					**Direct Entry, min. tc adjustment**
6.0	121	Total			

Summary for Subcatchment SC#6: parking area, grass

Runoff = 1.5 cfs @ 12.09 hrs, Volume= 0.12 af, Depth= 7.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year storm Rainfall=8.39"

Area (sf)	CN	Description
7,345	98	Paved parking, HSG B
142	98	Roofs, HSG B
898	61	>75% Grass cover, Good, HSG B
8,385	94	Weighted Average
898		10.71% Pervious Area
7,487		89.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0160	1.1		**Sheet Flow, turn around** Smooth surfaces n= 0.011 P2= 3.14"
0.6	88	0.0160	2.6		**Shallow Concentrated Flow, turn around** Paved Kv= 20.3 fps
4.6					**Direct Entry, min. tc adjustment**
6.0	138	Total			

Summary for Reach 1R: DP#1

Inflow Area = 3.696 ac, 40.43% Impervious, Inflow Depth = 2.93" for 100 year storm event
Inflow = 10.5 cfs @ 12.17 hrs, Volume= 0.90 af
Outflow = 10.5 cfs @ 12.17 hrs, Volume= 0.90 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond 1P: PDCB1

Inflow Area = 0.750 ac, 63.02% Impervious, Inflow Depth = 6.71" for 100 year storm event
Inflow = 5.5 cfs @ 12.09 hrs, Volume= 0.42 af
Outflow = 5.5 cfs @ 12.09 hrs, Volume= 0.42 af, Atten= 0%, Lag= 0.0 min
Primary = 5.5 cfs @ 12.09 hrs, Volume= 0.42 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.73' @ 12.18 hrs
Flood Elev= 125.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.20'	**15.0" Round drain line** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.20' / 121.90' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.5 cfs @ 12.09 hrs HW=124.10' TW=123.93' (Dynamic Tailwater)
└─**1=drain line** (Inlet Controls 2.5 cfs @ 2.0 fps)

Summary for Pond 2P: PCB2

Inflow Area = 0.170 ac, 96.65% Impervious, Inflow Depth = 8.03" for 100 year storm event
Inflow = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af
Outflow = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.42' @ 12.19 hrs
Flood Elev= 126.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	122.00'	**12.0" Round drain line** L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 122.00' / 121.90' S= 0.0143 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=123.37' TW=123.90' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 3P: PDMH1

Inflow Area = 0.920 ac, 69.24% Impervious, Inflow Depth = 6.95" for 100 year storm event
Inflow = 6.9 cfs @ 12.09 hrs, Volume= 0.53 af
Outflow = 6.9 cfs @ 12.09 hrs, Volume= 0.53 af, Atten= 0%, Lag= 0.0 min
Primary = 6.9 cfs @ 12.09 hrs, Volume= 0.53 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.37' @ 12.14 hrs
Flood Elev= 126.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.80'	**18.0" Round drain line** L= 127.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.80' / 121.10' S= 0.0055 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.4 cfs @ 12.09 hrs HW=123.92' TW=123.72' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 3.4 cfs @ 1.9 fps)

Summary for Pond 4P: PCB3

Inflow Area = 0.430 ac, 60.33% Impervious, Inflow Depth = 6.47" for 100 year storm event
Inflow = 3.1 cfs @ 12.09 hrs, Volume= 0.23 af
Outflow = 3.1 cfs @ 12.09 hrs, Volume= 0.23 af, Atten= 0%, Lag= 0.0 min
Primary = 3.1 cfs @ 12.09 hrs, Volume= 0.23 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 124.27' @ 12.15 hrs
Flood Elev= 123.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.20' / 121.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.4 cfs @ 12.09 hrs HW=123.74' TW=123.73' (Dynamic Tailwater)
└─**1=drain line** (Inlet Controls 0.4 cfs @ 0.5 fps)

Summary for Pond 5P: PDMH2

Inflow Area = 1.349 ac, 66.40% Impervious, Inflow Depth = 6.80" for 100 year storm event
Inflow = 10.0 cfs @ 12.09 hrs, Volume= 0.76 af
Outflow = 10.0 cfs @ 12.09 hrs, Volume= 0.76 af, Atten= 0%, Lag= 0.0 min
Primary = 10.0 cfs @ 12.09 hrs, Volume= 0.76 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 123.88' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	121.00'	**18.0" Round drain line** L= 166.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 121.00' / 120.10' S= 0.0054 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=8.5 cfs @ 12.09 hrs HW=123.73' TW=122.26' (Dynamic Tailwater)
└─**1=drain line** (Outlet Controls 8.5 cfs @ 4.8 fps)

Summary for Pond 6P: PCB4

Inflow Area = 0.171 ac, 90.82% Impervious, Inflow Depth = 7.79" for 100 year storm event
Inflow = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af
Outflow = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.09 hrs, Volume= 0.11 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.72' @ 12.20 hrs
Flood Elev= 123.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.20'	**12.0" Round drain line** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.20' / 120.10' S= 0.0167 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.91' TW=122.24' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)

Summary for Pond 7P: PDMH3

Inflow Area = 1.520 ac, 69.15% Impervious, Inflow Depth = 6.91" for 100 year storm event
Inflow = 11.3 cfs @ 12.09 hrs, Volume= 0.88 af
Outflow = 11.3 cfs @ 12.09 hrs, Volume= 0.88 af, Atten= 0%, Lag= 0.0 min
Primary = 11.3 cfs @ 12.09 hrs, Volume= 0.88 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.68' @ 12.15 hrs
Flood Elev= 123.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	**24.0" Round drain line** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.00' / 119.86' S= 0.0050 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=3.3 cfs @ 12.09 hrs HW=122.26' TW=122.21' (Dynamic Tailwater)
↑—**1=drain line** (Inlet Controls 3.3 cfs @ 1.1 fps)

Summary for Pond 8P: PCB5

Inflow Area = 0.192 ac, 89.29% Impervious, Inflow Depth = 7.67" for 100 year storm event
Inflow = 1.5 cfs @ 12.09 hrs, Volume= 0.12 af
Outflow = 1.5 cfs @ 12.09 hrs, Volume= 0.12 af, Atten= 0%, Lag= 0.0 min
Primary = 1.5 cfs @ 12.09 hrs, Volume= 0.12 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.44' @ 12.16 hrs
Flood Elev= 123.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	120.10'	**12.0" Round drain line** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.10' / 119.86' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 12.09 hrs HW=121.86' TW=122.20' (Dynamic Tailwater)
↑—**1=drain line** (Controls 0.0 cfs)

Summary for Pond 9P: PDMH4

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 7.00" for 100 year storm event
Inflow = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af
Outflow = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af, Atten= 0%, Lag= 0.0 min
Primary = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.35' @ 12.11 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.76'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.76' / 119.73' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=10.8 cfs @ 12.09 hrs HW=122.21' TW=121.70' (Dynamic Tailwater)
↑—**1=drain line** (Inlet Controls 10.8 cfs @ 3.4 fps)

Summary for Pond 10P: proposed filter media unit

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 7.00" for 100 year storm event
Inflow = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af
Outflow = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af, Atten= 0%, Lag= 0.0 min
Primary = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.15' @ 12.32 hrs
Flood Elev= 123.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	119.63'	**24.0" Round drain line** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.63' / 119.60' S= 0.0060 '/' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf

Primary OutFlow Max=12.5 cfs @ 12.09 hrs HW=121.70' TW=120.91' (Dynamic Tailwater)
└─**1=drain line** (Barrel Controls 12.5 cfs @ 4.8 fps)

Summary for Pond 11P: proposed subsurface infiltration facility

Inflow Area = 1.713 ac, 71.41% Impervious, Inflow Depth = 7.00" for 100 year storm event
Inflow = 12.8 cfs @ 12.09 hrs, Volume= 1.00 af
Outflow = 5.4 cfs @ 12.30 hrs, Volume= 1.00 af, Atten= 58%, Lag= 12.5 min
Discarded = 1.1 cfs @ 11.45 hrs, Volume= 0.81 af
Primary = 4.4 cfs @ 12.30 hrs, Volume= 0.19 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 122.04' @ 12.30 hrs Surf.Area= 5,592 sf Storage= 11,121 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 45.0 min (821.4 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.00'	3,322 cf	**54.50'W x 80.00'L x 3.21'H Field A** 13,988 cf Overall - 5,683 cf Embedded = 8,305 cf x 40.0% Voids
#2A	119.50'	5,683 cf	**Cultec R-280** x 132 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 12 rows
#3B	119.00'	969 cf	**32.42'W x 38.00'L x 3.21'H Field B** 3,952 cf Overall - 1,530 cf Embedded = 2,422 cf x 40.0% Voids
#4B	119.50'	1,530 cf	**Cultec R-280** x 35 Inside #3 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 7 rows
		11,504 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.80'	**15.0" Round drain line** L= 51.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.80' / 120.40' S= 0.0078 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	120.90'	**6.0" Vert. Orifice X 5.00** C= 0.600
#3	Discarded	119.00'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.1 cfs @ 11.45 hrs HW=119.04' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

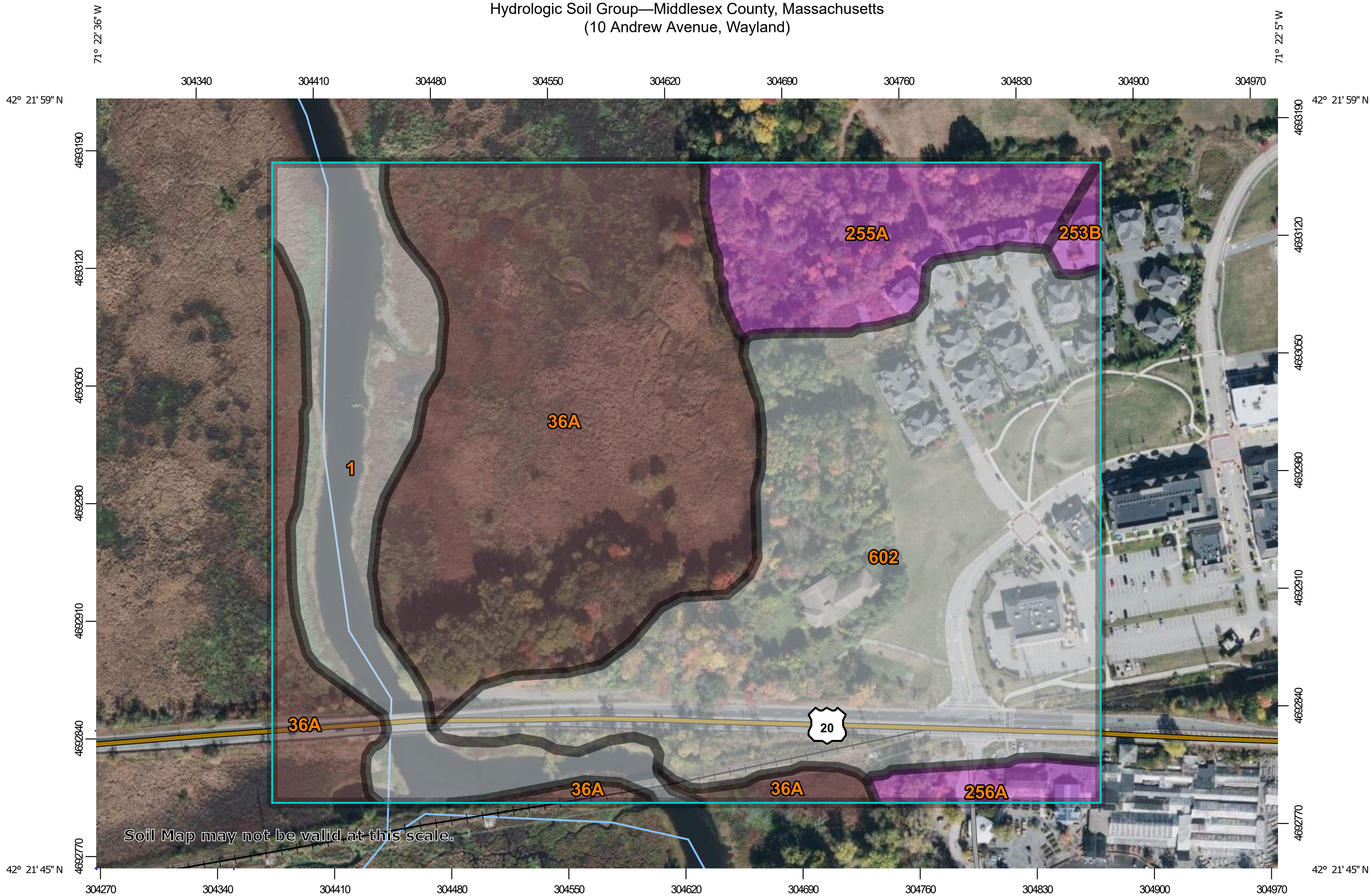
Primary OutFlow Max=4.4 cfs @ 12.30 hrs HW=122.04' TW=0.00' (Dynamic Tailwater)
└─**1=drain line** (Barrel Controls 4.4 cfs @ 4.5 fps)
  └─**2=Orifice** (Passes 4.4 cfs of 4.4 cfs potential flow)

Discarded OutFlow Max=1.1 cfs @ 11.95 hrs HW=119.05' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=119.00' TW=0.00' (Dynamic Tailwater)
└─**1=drain line** (Controls 0.0 cfs)
  └─**2=Orifice** (Controls 0.0 cfs)

APPENDIX

Hydrologic Soil Group—Middlesex County, Massachusetts
(10 Andrew Avenue, Wayland)



Map Scale: 1:3,230 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 45, 90, 180, 270

Feet: 0, 150, 300, 600, 900

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 21, Sep 2, 2021

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

Date(s) aerial images were photographed: Aug 31, 2020—Oct 22, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		6.7	14.2%
36A	Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded	B/D	17.4	37.1%
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	0.3	0.7%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	4.2	9.1%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	A	0.8	1.7%
602	Urban land		17.4	37.3%
Totals for Area of Interest			**46.8**	**100.0%**

Description

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

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

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

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

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

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

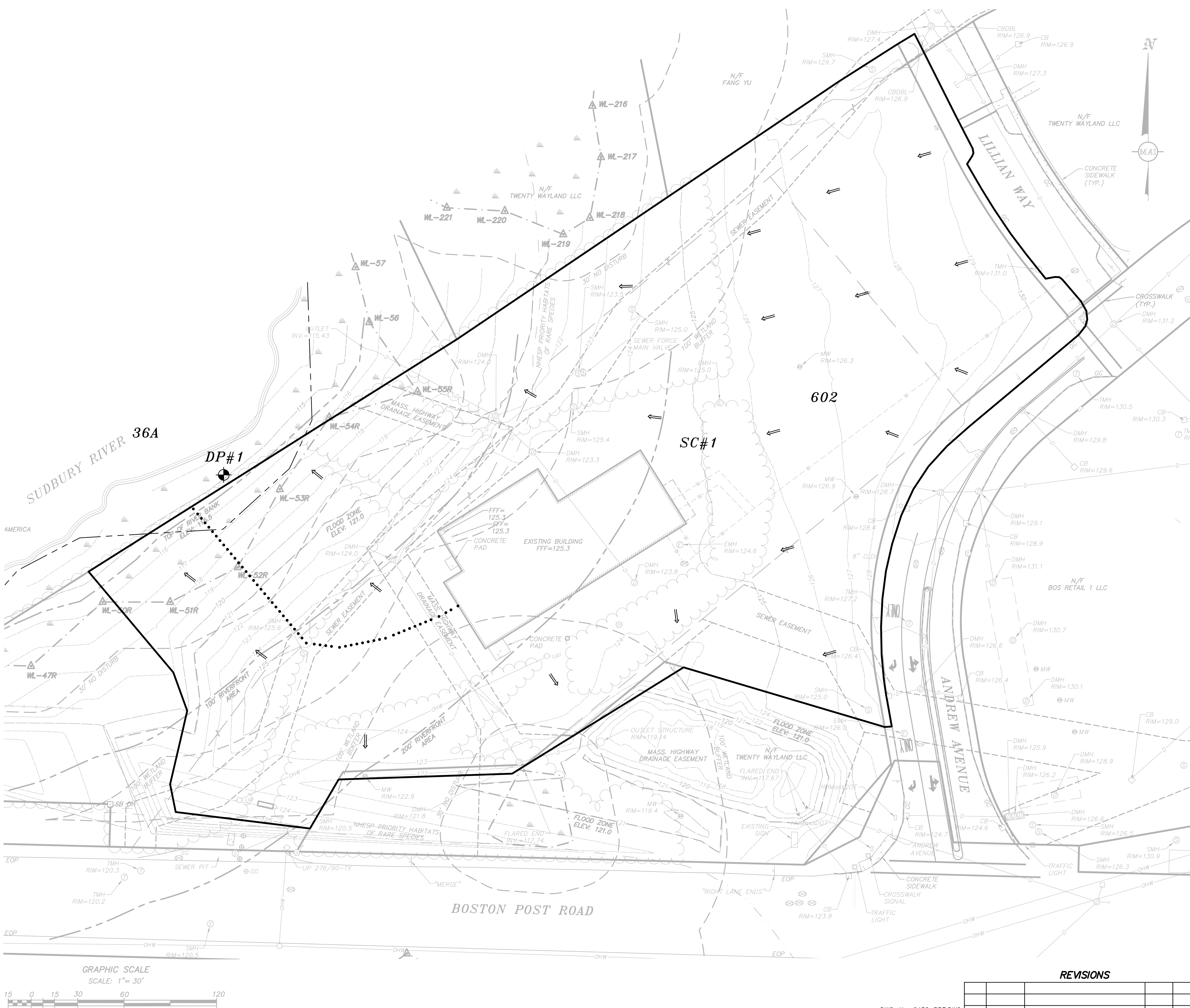
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



LEGEND

SC#1	SUBCATCHMENT AREA
DP#1	DESIGN POINT
•••••••••	OVERLAND FLOW LINE
⇒	OVERLAND FLOW DIRECTION
421D	SOIL TYPE DELINEATION
— — —	LIMIT OF SOIL TYPE

SOIL NOTE

THE SOIL DESIGNATIONS SHOWN WITHIN THE LOCUS PROPERTY SUBCATCHMENT LIMITS HAVE BEEN DELINEATED BY USDA NATURAL RESOURCES CONSERVATION SERVICE. EACH SOIL TYPE HAS A HYDROLOGIC SOIL GROUP RATING (HSG) "A" THRU "D" AS SHOWN ON THE PLAN.

8 ANDREW AVENUE

PRE DEVELOPMENT DRAINAGE PLAN

LOCATED IN

WAYLAND, MASSACHUSETTS

(MIDDLESEX COUNTY)

PREPARED FOR

TOWN OF WAYLAND

SCALE: 1"= 30' DATE: DECEMBER 7, 2022

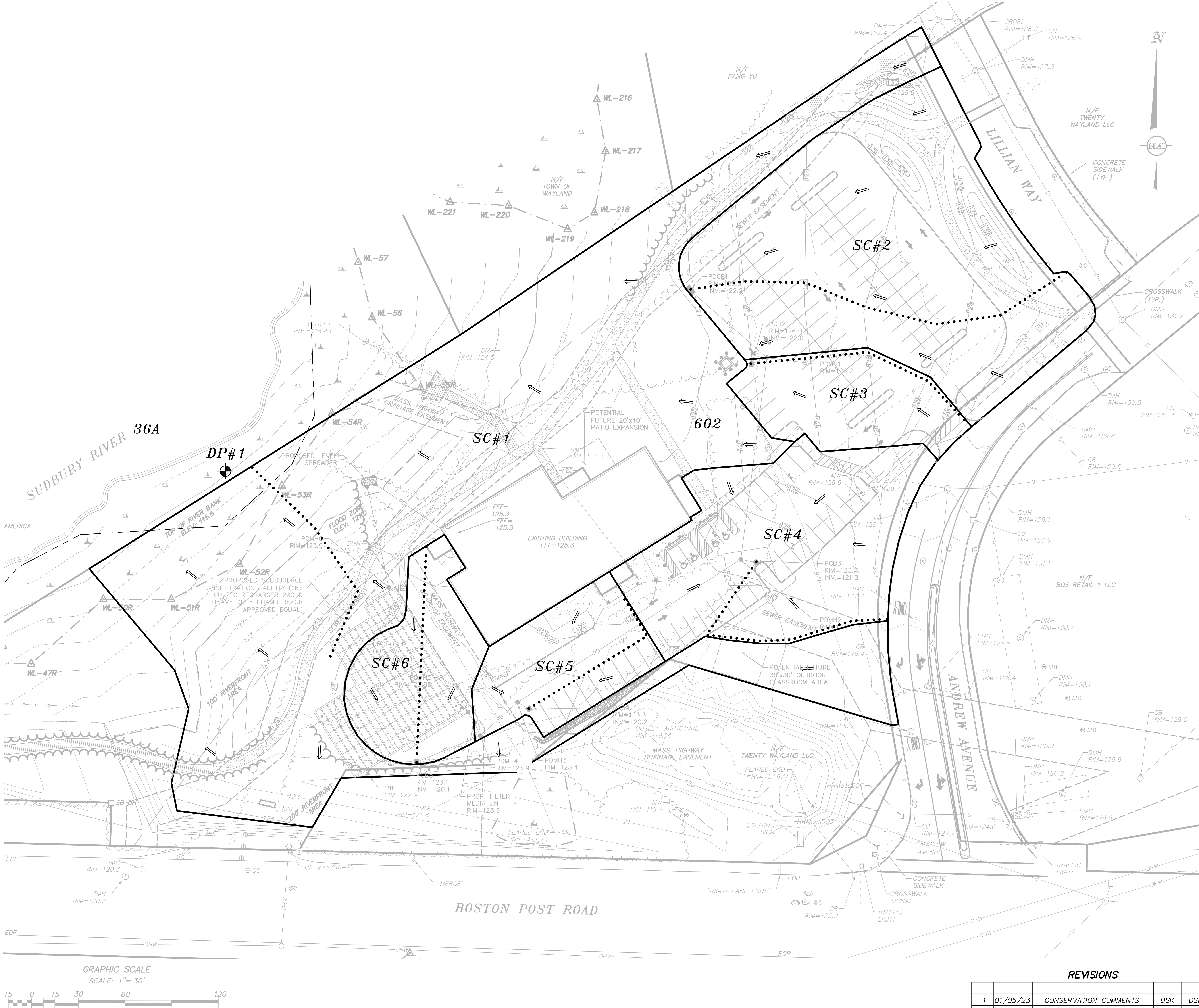
MERIDIAN ASSOCIATES
500 CUMMINGS CENTER, SUITE 5950
BEVERLY, MASSACHUSETTS 01915
TELEPHONE: (978) 299-0447
WWW.MERIDIANASSOC.COM

SHEET No. 1 OF 2 PROJECT No. 6452

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D

DWG. No. 6452_PRE.DWG



LEGEND

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DP#1	DESIGN POINT
	OVERLAND FLOW LINE
	OVERLAND FLOW DIRECTION
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	LIMIT OF SOIL TYPE

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REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D
1	01/05/23	CONSERVATION COMMENTS	DSK	DSK

DWG. No. 6452_POST.DWG

8 ANDREW AVENUE

POST DEVELOPMENT DRAINAGE PLAN

LOCATED IN

WAYLAND, MASSACHUSETTS

(MIDDLESEX COUNTY)

PREPARED FOR

TOWN OF WAYLAND

SCALE: 1"= 30' DATE: DECEMBER 7, 2022

MERIDIAN ASSOCIATES

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SHEET No. 2 OF 2 PROJECT No. 6452