Stormwater Report

Conservation Commission
Wayland, Massachusetts

Wayland High School Athletic Facilities Improvements

Notice of Intent
Massachusetts Wetland Protection Act
M.G.L. c. 131 § 40

July 11, 2018
Revised September 10, 2018

JOB NO: 2180076

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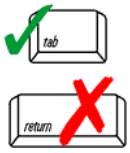
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

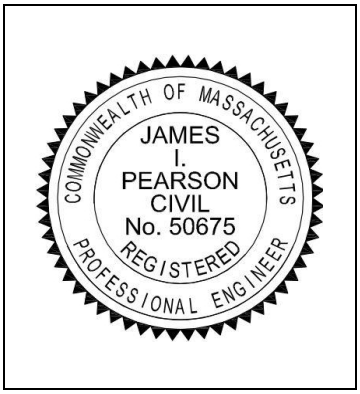
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



9/10/2018

Signature and Date

Checklist

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

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☐ No new untreated discharges

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ 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.

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☒ An Illicit Discharge Compliance Statement is attached;

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

Stormwater Report

Revised September 10, 2018

To Be Submitted with the Notice of Intent

Applicant/Project Name:	Town of Wayland – High School Athletic Facilities Improvements
Project Address:	264 Old Connecticut Path, Wayland MA 01778

Application Prepared by:

Firm:	Weston & Sampson, Inc.
Registered PE:	James Pearson

Below is an explanation concerning Standards 1-10 as they apply to the Town of Wayland High School Athletic Facilities Improvement project, located on Old Connecticut Path:

General:

Due to need for updated athletic facilities, the proponent (Wayland High School) is proposing the replacement of their current turf field, and their existing tennis courts. They are also proposing the addition of a girls softball field and basketball courts. These major renovations will be accompanied by more minor additions such as bleachers, parking areas, a ticket booth, and additional bathroom facilities.

The goal of this project is to both improve the existing athletic facilities as well as install new facilities at Wayland High School. The existing track and synthetic turf field is located on the northwest portion of the property. The track will be moved slightly closer to the high school and replaced. The renovation of the athletic field will include the addition of 400-person visitor bleachers, 1,000-person grand stand bleachers, ticket booth/concession stand, and new bathroom facilities. Abutting the field currently are two tennis courts. These will be relocated to the south campus, taking the place of the existing softball field. Included with the tennis courts will be a new parking lot, as well as basketball courts. The existing softball field will then be moved to the north campus, next to the track and synthetic turf field.

Standard 1: No New Untreated Discharges

The proposed project will create no new untreated discharges. Total impervious area post-development will increase in comparison with existing conditions at the new parking lot and tennis court areas, but will remain unchanged at the track and turf field.

Standard 2: Peak Rate Attenuation

For the west side of the high school, there will be a decrease in impervious area due to the redevelopment of the track removal of existing tennis courts. Under existing conditions, there are approximately 3.2 acres of impervious surface in this area, and proposed conditions will result in approximately 2.3 acres of impervious area. Consequently, it can be concluded without further analysis that the proposed work will not increase peak discharge rates in this area of the campus.

For the southeast area of the high school, an analysis was performed for the proposed tennis court and parking lot areas to the southeast of the site. For the latter areas, both existing and proposed conditions were modeled using HydroCAD computer software.

Table 1: Total Peak Runoff Rate

Point of Interest	Storm Frequency	Storm Depth (in)	Peak Flow (cfs) Existing Conditions	Peak Flow (cfs) Post-Development
P1	0.5" Event	0.5	0.00	0
	1" Event	1	0.00	0
	2 Year	3.31	0.00	0
	10 Year	5.19	0.29	0
	25 Year	6.36	1.21	0.28
	100 Year	8.17	5.27	3.88

The proposed design is such that peak runoff rates do not exceed rates of runoff under existing conditions even in the 100-year storm scenario. For regulatory purposes the existing site condition serves as the benchmark for peak discharges that must not be exceeded under the re-developed condition. Peak discharges are mitigated by using the proposed underground chambers to provide stormwater detention benefit. Please refer to existing and proposed conditions in HydroCAD model printouts included in Attachment D for additional details.

To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures will include compost filter tubes, catch basin protection, and a stabilized construction entrance.

Standard 3: Recharge

The proposed improvements will result in an increase to the impervious areas of the site. Runoff from all impervious areas is directed to an underground stormwater chamber

system that will provide the required recharge volume (Attachment E). Test pits (Attachment C) indicate gravelly substratum which will allow for favorable infiltration characteristics.

Standard 4: Water Quality

All of the stormwater from impervious areas on the site will undergo treatment to bring TSS levels within regulated limits (>80% removal). Treatment will occur via deep sump hooded catch basins and an underground stormwater chamber system with built-in pretreatment. Pretreatment of 44% TSS removal will occur prior to groundwater recharge in the underground chamber system (See TSS removal worksheet, Appendix E). During the project, appropriate BMPs will be used to minimize sedimentation and soil erosion.

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

The proposed improvements will not constitute a land use with higher potential pollutant load.

Standard 6: Critical Areas

The site is located within a Zone II water resource protection district. Specific requirements for stormwater management in such areas include the removal of at least 44% of total suspended solids from stormwater prior to discharge to an infiltration structure. The current design meets this requirement, as discussed under Standard 4. It is also noted under this standard that "site specific" conditions should be considered. The proposed use is relatively passive from a potential pollutant load standpoint. The proposed impervious surfaces consist of sport courts and a short-term parking lot for passenger vehicles.

Standard 7: Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

The project is a mix of new development and redevelopment, however the standards have been fully met.

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

A detailed Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Attachment G. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures will include compost filter tubes, silt fence, catch basin protection, and a stabilized construction entrance.

Standard 9: Operation and Maintenance Plan

An operations and maintenance plan is included in Attachment H.

Standard 10: Prohibition of Illicit Discharges

An illicit discharge compliance statement has been included in Attachment I.

Registered Professional Engineer's Certification

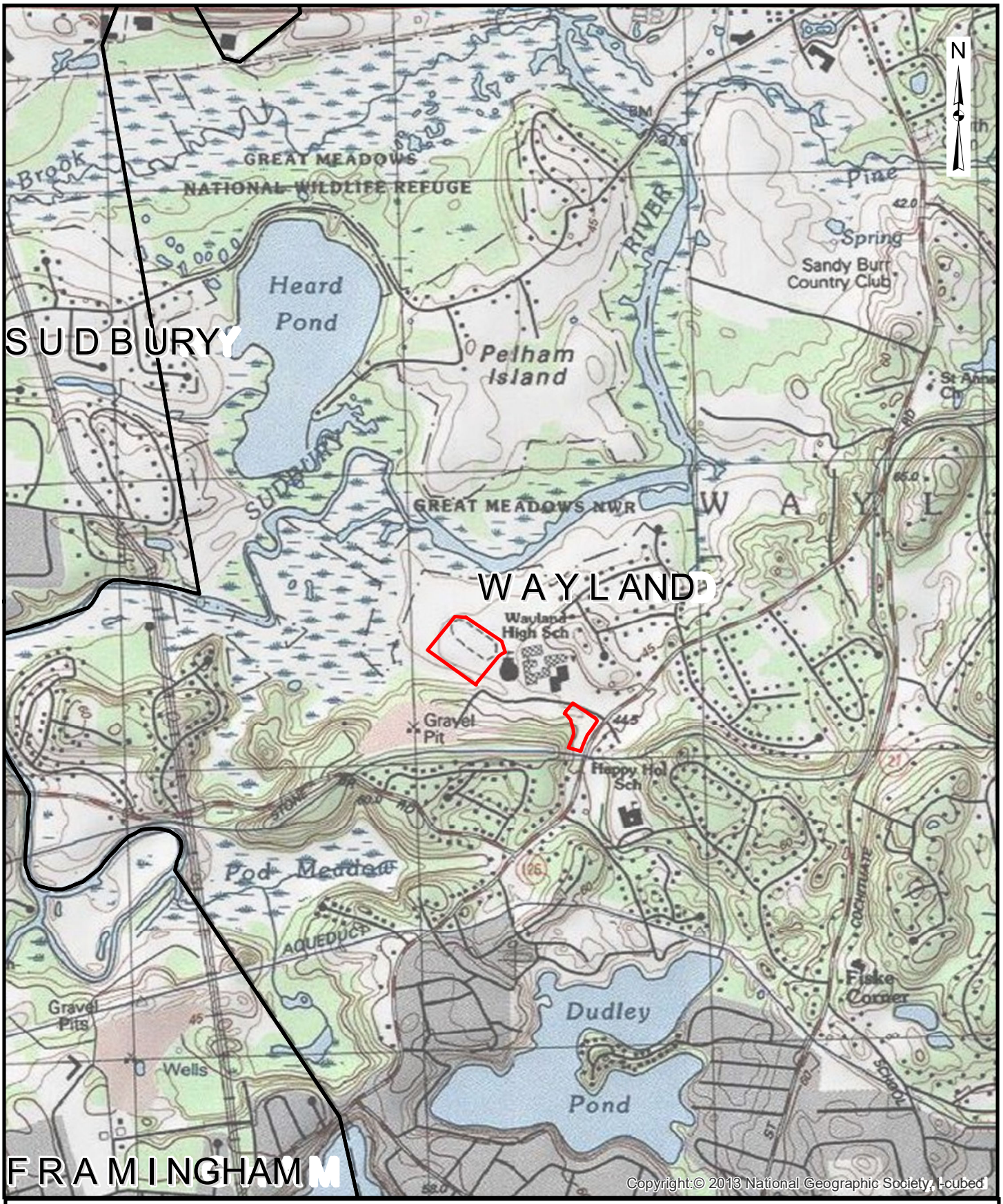
I have reviewed the Stormwater Report, including any relevant soil evaluations, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan, the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement 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

9/10/2018

Signature and Date

Attachment A - Locus Map



Attachment A

Wayland Highschool Athletic Facilities
Wayland, Massachusetts

Locus Map

Work Area

1,200 0 1,200

Scale In Feet

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\GIS\Wayland HS Athletic Facilities\Figure 1- Locus.mxd User: GasparA Saved: 7/5/2018 2:58:02 PM Opened: 7/5/2018 2:58:17 PM

Attachment B - NRCS Soils Map, Soils Report, and HSG Classifications

Map Scale: 1:5,780 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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 17, Oct 6, 2017

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

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

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
36A	Saco mucky silt loam, 0 to 1 percent slopes	B/D	1.4	2.5%
251B	Haven silt loam, 3 to 8 percent slopes	A	5.1	8.9%
253E	Hinckley loamy sand, 25 to 35 percent slopes	A	0.6	1.1%
256A	Deerfield loamy sand, 0 to 3 percent slopes	B	0.5	0.8%
256B	Deerfield loamy sand, 3 to 8 percent slopes	B	1.3	2.3%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	2.1	3.7%
653	Udorthents, sandy		0.2	0.4%
655	Udorthents, wet substratum		28.2	49.3%
656	Udorthents-Urban land complex		17.8	31.1%
Totals for Area of Interest			**57.2**	**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.

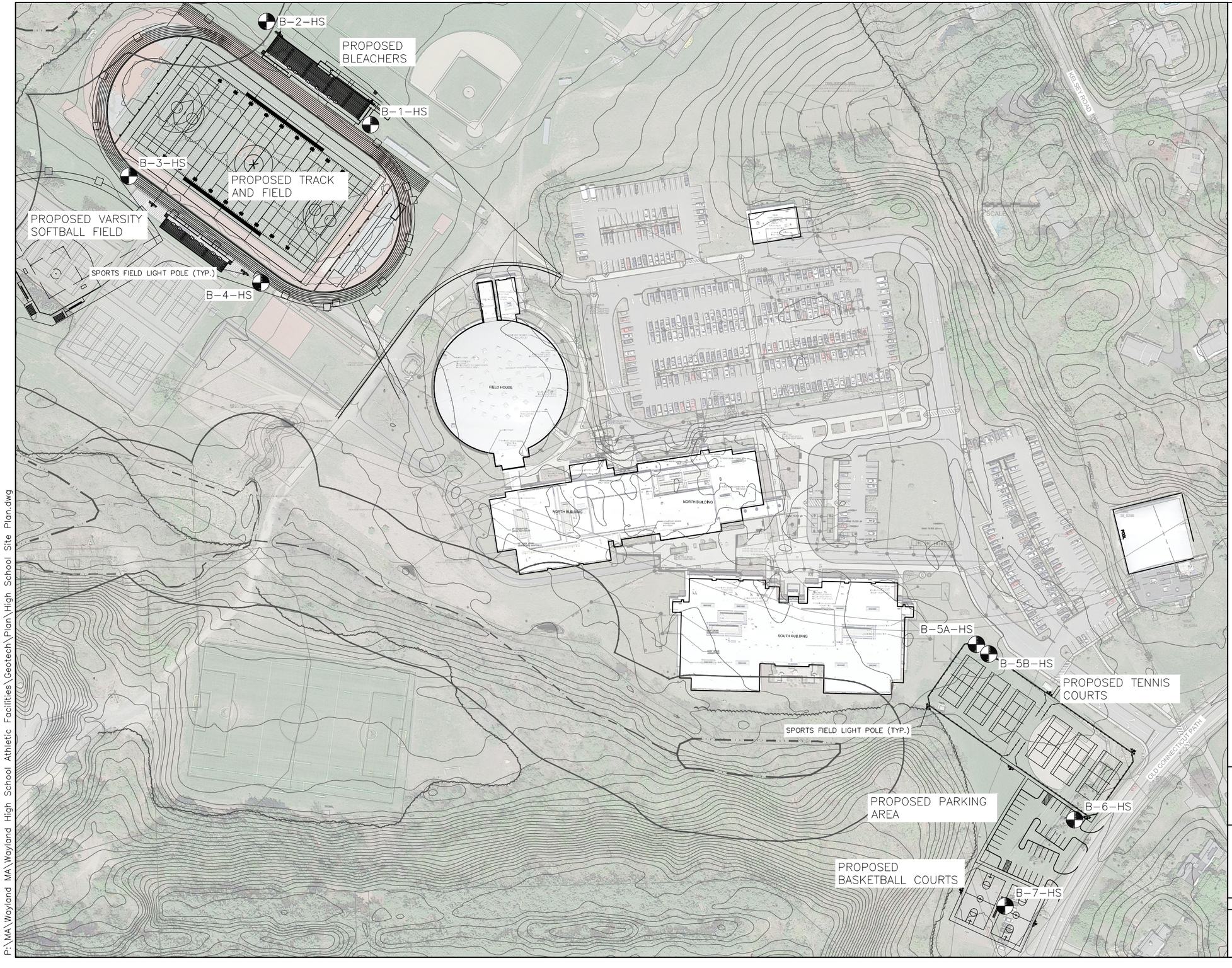
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment C - Test Pit Summary and Logs



NOTES:

1. THIS FIGURE IS BASED ON AN EXISTING AND PROPOSED CONDITIONS PLAN PREPARED BY WESTON & SAMPSON ENGINEERS, INC. DATED MARCH 2018.
2. ELEVATIONS REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. BORINGS WERE COMPLETED BY TECHNICAL DRILLING SERVICES, INC. OF STERLING, MA AND OBSERVED BY WESTON & SAMPSON ENGINEERS, INC. ON MARCH 14 AND 22, 2018.
4. BORING LOCATIONS SHOWN ARE APPROXIMATE AND WERE LOCATED IN THE FIELD BY WESTON & SAMPSON ENGINEERS, INC. USING TIE-OFFS TO EXISTING SITE FEATURES.

LEGEND:

B-1-HS
BORING DESIGNATION AND APPROXIMATE LOCATION.

150 75 0 150 300

SCALE: 1"=150'

FIGURE 2
HIGH SCHOOL SITE PLAN

WAYLAND HIGH SCHOOL ATHLETIC FACILITIES
WAYLAND, MA

DESIGNED BY: MJZ	CHECKED BY:	DATE: APRIL 2018

Weston & Sampson

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Weston & Sampson

BORING NUMBER: **B-1-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/14/2018 **END DATE:** 3/14/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/14/2018	1.2 ft. +/-	Observed in hand excavation.

DEPTH (ft.) / Elevation	TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0										8" Topsoil	Hand excavate to 2 ft. due to possible electric lines.
	S-1	0.7	/						SAND & GRAVEL	Medium dense, light brown, fine to coarse SAND, some fine gravel, trace silt; wet. ▼	
	S-2	2.0	18/24	6 7 8 9	15					Top 8" - Light brown, fine to coarse SAND, some fine gravel, trace silt; wet.	
										Bottom 10" - Medium dense, light brown, fine to medium SAND, little silt; wet.	
	S-3	4.0	7/24	3 6 7 6	13					Medium dense, brown, sandy SILT; wet.	
5											
10	S-4	10.0	16/24	3 5 5 7	10				SILT & SAND	Stiff, brown, sandy SILT; wet. - Bottom 2" is gray	
15	S-5	15.0	14/24	3 3 4 5	7					Loose, gray, silty fine SAND; wet.	
	S-6	19.0	21/24	5 6 7 7	13					Stiff, gray, SILT, some fine sand; wet.	
20										End of boring at 21 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil
GRAVEL, SAND, SILT, CLAY: >50%
gravelly, sandy, silty, clayey: 35-50%
some: 20-35%
little: 10-20%
trace: 0-10%

Organic Soil
PEAT: 50-100%
organic (soil): 15-50%
with some organics: 5-15%

SAMPLE		GRANULAR SOILS		COHESIVE SOILS		GENERAL NOTES:
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY	1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
S	Split spoon	0-4	Very Loose	< 2	Very Soft	
ST	Shelby tube	4-10	Loose	2-4	Soft	
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff	2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.
NX	Rock core	30-50	Dense	8-15	Stiff	
GP	Direct push	> 50	Very Dense	15-30	Very Stiff	
				> 30	Hard	

Weston & Sampson

BORING NUMBER: **B-2-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/14/2018 **END DATE:** 3/14/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/14/2018	2 ft. +/-	Observed in hand excavation.

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	/							12" Topsoil	Hand excavate to 2 ft. due to possible electric lines.
									FILL	Dark brown, SILT, little fine to coarse sand, trace fine gravel, trace roots; moist. [FILL] ▼	
	S-2	2.0	10/24	9 12 14 18	26				SAND & GRAVEL	Medium dense, light brown, gravelly fine to coarse SAND, trace silt; wet.	
5	S-3	4.0	12/24	9 15 21 20	36					Top 5" - Light brown, gravelly fine to coarse SAND, trace silt; wet. Bottom 7" - Dense, orange-brown, sandy fine to coarse GRAVEL, trace silt; wet. - Iron oxide staining	
10	S-4	10.0	10/24	5 7 7 6	14					Top 5" - Medium dense, light brown, fine to coarse SAND, little fine gravel, trace silt; wet.	
									SILT & SAND	Bottom 5" - Stiff, gray-brown, SILT, some fine to medium sand, trace fine gravel; wet.	
15	S-5	15.0	13/24	9 7 9 11	16					Very stiff, gray, SILT, little fine sand; wet.	
20	S-6	19.0	17/24	6 7 8 7	15					Very stiff, gray, sandy SILT; wet.	
										End of boring at 21 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil
GRAVEL, SAND, SILT, CLAY: >50%
gravelly, sandy, silty, clayey: 35-50%
some: 20-35%
little: 10-20%
trace: 0-10%

Organic Soil
PEAT: 50-100%
organic (soil): 15-50%
with some organics: 5-15%

SAMPLE		GRANULAR SOILS		COHESIVE SOILS		GENERAL NOTES:
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY	1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
S	Split spoon	0-4	Very Loose	< 2	Very Soft	
ST	Shelby tube	4-10	Loose	2-4	Soft	
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff	2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.
NX	Rock core	30-50	Dense	8-15	Stiff	
GP	Direct push	> 50	Very Dense	15-30	Very Stiff	
				> 30	Hard	

Weston & Sampson

BORING NUMBER: **B-3-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/14/2018 **END DATE:** 3/14/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/14/2018	2 ft. +/-	Observed in hand excavation.

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	/							7" Topsoil	Hand excavate to 2 ft. due to possible electric lines.
									SAND & GRAVEL	Brown, fine to coarse SAND, little fine to coarse gravel, little silt; moist. ▼	
	S-2	2.0	16/24	9 10 10 11	20					Medium dense, brown, gravelly fine to coarse SAND, trace silt; wet.	
5	S-3	4.0	14/24	17 18 17 16	35					Dense, brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt; wet.	
10	S-4	10.0	15/24	7 6 7 9	13				SILT & SAND	Stiff, brown, SILT, some fine sand; wet. - varves of silt and fine sand	
15	S-5	15.0	13/24	3 3 5 5	8					Stiff, gray, SILT, some fine sand; wet.	
20	S-6	19.0	23/24	3 4 4 4	8					Medium stiff, gray, SILT, some fine sand; wet.	
										End of boring at 21 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil
GRAVEL, SAND, SILT, CLAY: >50%
gravelly, sandy, silty, clayey: 35-50%
some: 20-35%
little: 10-20%
trace: 0-10%

Organic Soil
PEAT: 50-100%
organic (soil): 15-50%
with some organics: 5-15%

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

Weston & Sampson

BORING NUMBER: **B-4-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/22/2018 **END DATE:** 3/22/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/22/2018	4 ft. +/-	Based on wet samples.

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	/							10" Topsoil	Hand excavate to 2 ft. due to possible electric lines.
									FILL	Dark brown, SILT, some fine to coarse sand, trace fine gravel, trace roots; moist. [FILL]	
	S-2	2.0	15/24	10 11 14 18	25				SAND & GRAVEL	Medium dense, brown, fine to coarse SAND, some fine to coarse gravel, trace silt; moist.	
5	S-3	4.0	7/24	4 9 16 17	25					Medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt; wet. - coarse gravel fragment in tip of spoon.	
10									SILT & SAND		
	S-4	10.0	14/24	3 5 5 6	10					Stiff, gray, SILT, some fine sand; wet.	
15	S-5	15.0	19/24	3 4 5 6	9					Stiff, gray, SILT, some fine sand; wet.	
20	S-6	19.0	17/24	6 7 7 8	14					Stiff, gray, SILT, some fine sand; wet.	
										End of boring at 22 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil
GRAVEL, SAND, SILT, CLAY: >50%
gravelly, sandy, silty, clayey: 35-50%
some: 20-35%
little: 10-20%
trace: 0-10%

Organic Soil
PEAT: 50-100%
organic (soil): 15-50%
with some organics: 5-15%

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

Weston & Sampson

BORING NUMBER: **B-5A-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/22/2018 **END DATE:** 3/22/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/22/2018	Not observed	

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	16/24	5 6 6 7	12					10" Topsoil	
									FILL	Medium dense, brown, fine to coarse SAND, little fine gravel, little silt; moist. [FILL]	
	S-2	2.0	14/24	12 18 24 12	42					Dense, brown, fine to coarse SAND, some fine gravel, trace silt; moist. [FILL]	

(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

Approximately 4 in. diameter plastic gas line encountered at 4 ft. End of boring at 4 ft.
Offset boring approximately 24 ft. south to B-5B-HS.

SAMPLE	
SYMBOL	TYPE
S	Split spoon
ST	Shelby tube
AG	Auger grab
NX	Rock core
GP	Direct push

GRANULAR SOILS	
N-Value	Density
0-4	Very Loose
4-10	Loose
10-30	Med. Dense
30-50	Dense
> 50	Very Dense

COHESIVE SOILS	
N-VALUE	CONSISTENCY
< 2	Very Soft
2-4	Soft
4-8	Med. Stiff
8-15	Stiff
15-30	Very Stiff
> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

Weston & Sampson

BORING NUMBER: **B-5B-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/22/2018 **END DATE:** 3/22/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/22/2018	9 ft. +/-	Measured in borehole.

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0										See log for B-5A-HS for upper 4 ft. descriptions.	- B-5B is offset approximately 24 ft. south of B-5A-HS.
5	S-3	4.0	12/24	14 15 21 18	36				SAND & GRAVEL	Dense, brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt; moist.	- Auger grinding and rig chatter from approximately 5 - 15 ft. Coarse gravel and cobbles in auger spoils.
10	S-4	10.0	18/24	53 117 54 40	171					Very dense, gray, sandy fine to coarse GRAVEL, trace silt; wet.	
15	S-5	15.0	18/24	6 10 15 36	25					Medium dense, brown, fine GRAVEL, some medium to coarse sand, trace silt; wet.	- Blow-in observed in augers after sampling 15 - 17 ft. Unable to continue boring.
										End of boring at 17 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS		GENERAL NOTES:
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY	1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
S	Split spoon	0-4	Very Loose	< 2	Very Soft	
ST	Shelby tube	4-10	Loose	2-4	Soft	
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff	2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.
NX	Rock core	30-50	Dense	8-15	Stiff	
GP	Direct push	> 50	Very Dense	15-30	Very Stiff	
				> 30	Hard	

Weston & Sampson

BORING NUMBER: **B-6-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/22/2018 **END DATE:** 3/22/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/22/2018	15 ft. +/-	Measured in borehole.

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	20/24	2 2 8 14	10					11" Topsoil	
									FILL	Medium dense, gray-brown, silty SAND, little fine gravel; moist. [FILL]	
	S-2	2.0	12/24	5 7 13 22	20					Medium dense, brown, fine to coarse SAND, little fine gravel, little silt; moist. [FILL]	
5	S-3	4.0	15/24	14 23 35 22	58				SAND & GRAVEL	Top 6" - Brown, fine to coarse SAND, some silt, little fine gravel; moist. Bottom 9" - Very dense, gray-brown, fine to coarse GRAVEL, little fine to coarse sand, trace silt; moist.	- Auger grinding at approximately 5 ft.
10	S-4	10.0	3/24	19 15 16 16	31					Dense, brown, fine to coarse GRAVEL, little fine to coarse sand, little silt; moist.	- Coarse gravel fragment stuck in tip of spoon.
15	S-5	15.0	10/24	9 9 7 6	16					▼ Medium dense, brown, fine to coarse SAND, trace fine gravel, trace silt; wet.	
20	S-6	20.0	18/24	11 10 12 20	22					Medium dense, tan, fine to coarse GRAVEL, little medium to coarse sand, trace silt; wet.	
										End of boring at 22 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

Weston & Sampson

BORING NUMBER: **B-7-HS**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/14/2018 **END DATE:** 3/22/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/22/2018	15 ft. +/-	Based on wet samples.

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	14/24	3 5 6 5	11					Stiff, dark brown, SILT, little fine to coarse gravel, little fine to coarse sand; moist. [TOPSOIL]	
	S-2	2.0	12/24	11 17 12 25	29				SAND & GRAVEL	Medium dense, brown, fine to coarse GRAVEL, some fine to coarse sand, trace silt; moist.	
5	S-3	4.0	14/24	50 35 40 53	75					Very dense, brown, sandy fine to coarse GRAVEL, trace silt; moist.	
10	S-4	10.0	14/24	13 11 11 10	22				SAND	Medium dense, brown, fine to coarse SAND, little fine to coarse gravel, trace silt; moist.	
15	S-5	15.0	12/24	9 8 8 8	16					Medium dense, brown, fine to medium SAND, trace silt; wet. ▼	
20	S-6	20.0	24/24	5 7 7 8	14					Medium dense, brown, fine to medium SAND, little silt; wet.	
										End of boring at 22 ft.	

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

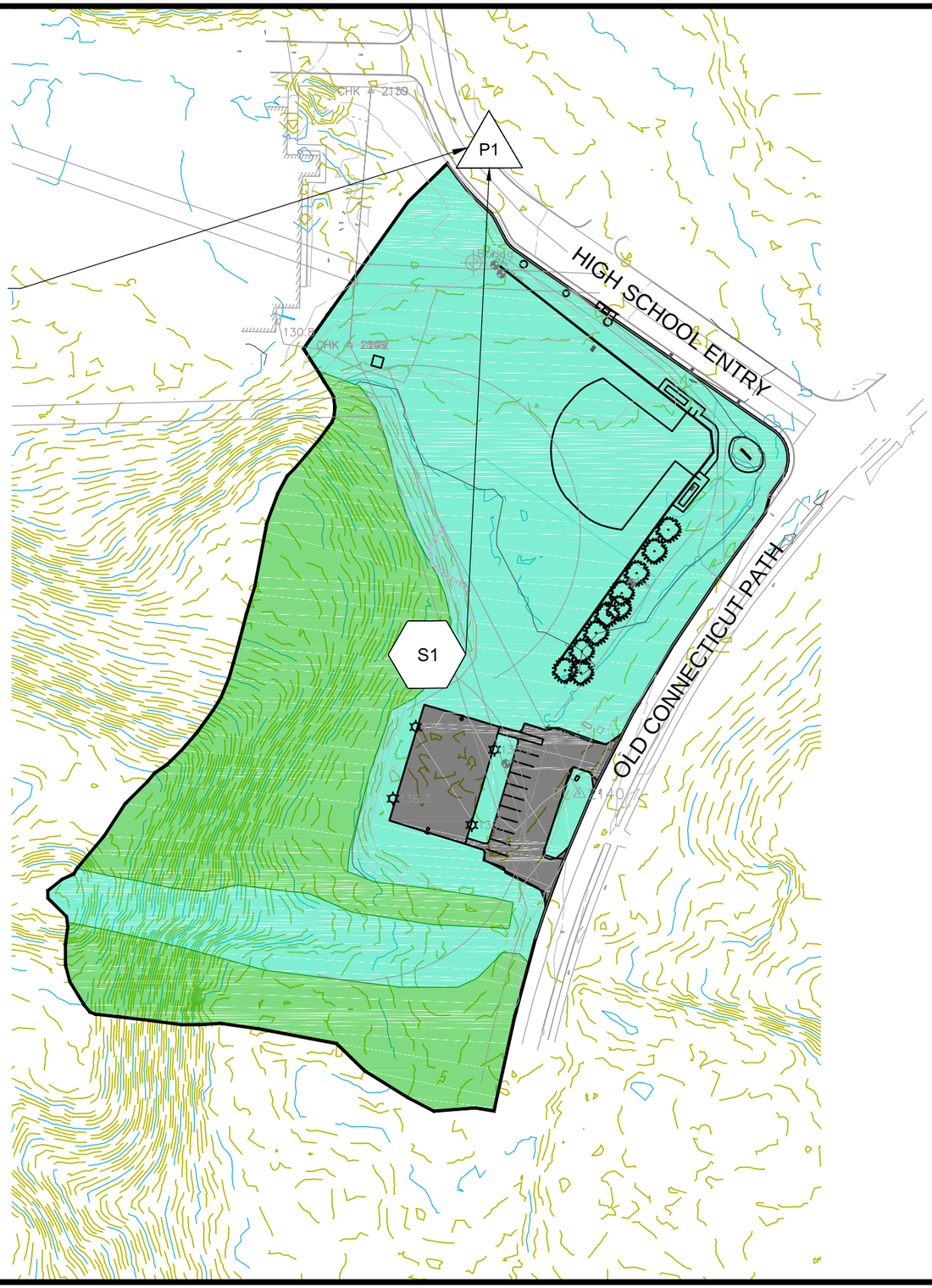
2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

Attachment D - Stormwater Modeling

LEGEND

- IMPERVIOUS
- WOODLAND
- GRASSED/LANDSCAPE AREAS

ANALYSIS POINT OF INTEREST (TYP.)



N

PLAN
SCALE: 1" = 100'

FIGURE 1

TOWN OF WAYLAND, MA
HIGH SCHOOL ATHLETIC FACILITIES

HYDROLOGY MAP
PROPOSED CONDITIONS

DESIGNED BY: JIP	CHECKED BY: JIP	DATE: JULY 13, 2018

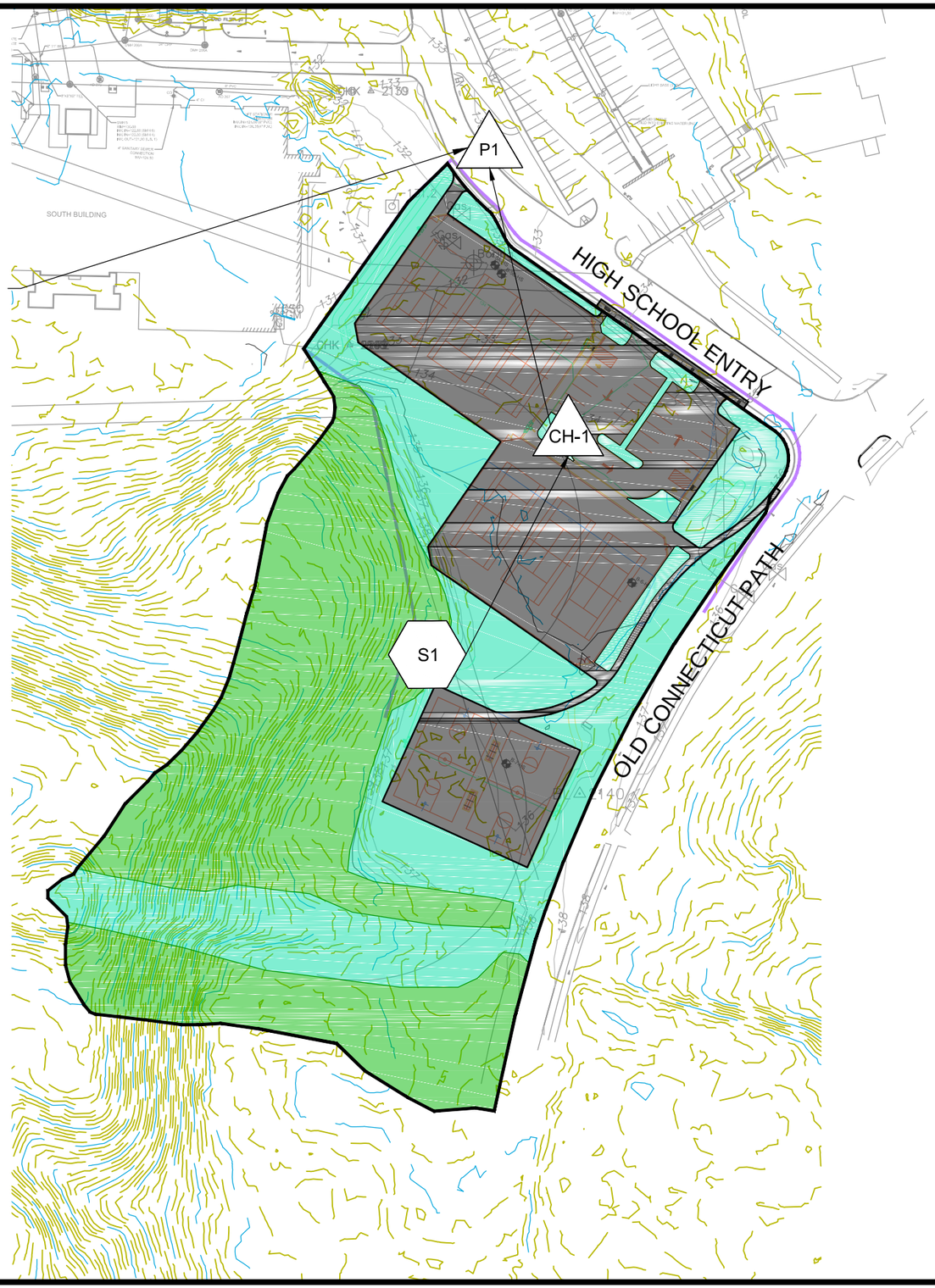
Weston & Sampson

\\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\CAD\0_Current_HIGH SCHOOL\Figures\Hydro-EX.dwg

LEGEND

- IMPERVIOUS
- WOODLAND
- GRASSED/LANDSCAPE AREAS

ANALYSIS POINT OF INTEREST (TYP.)



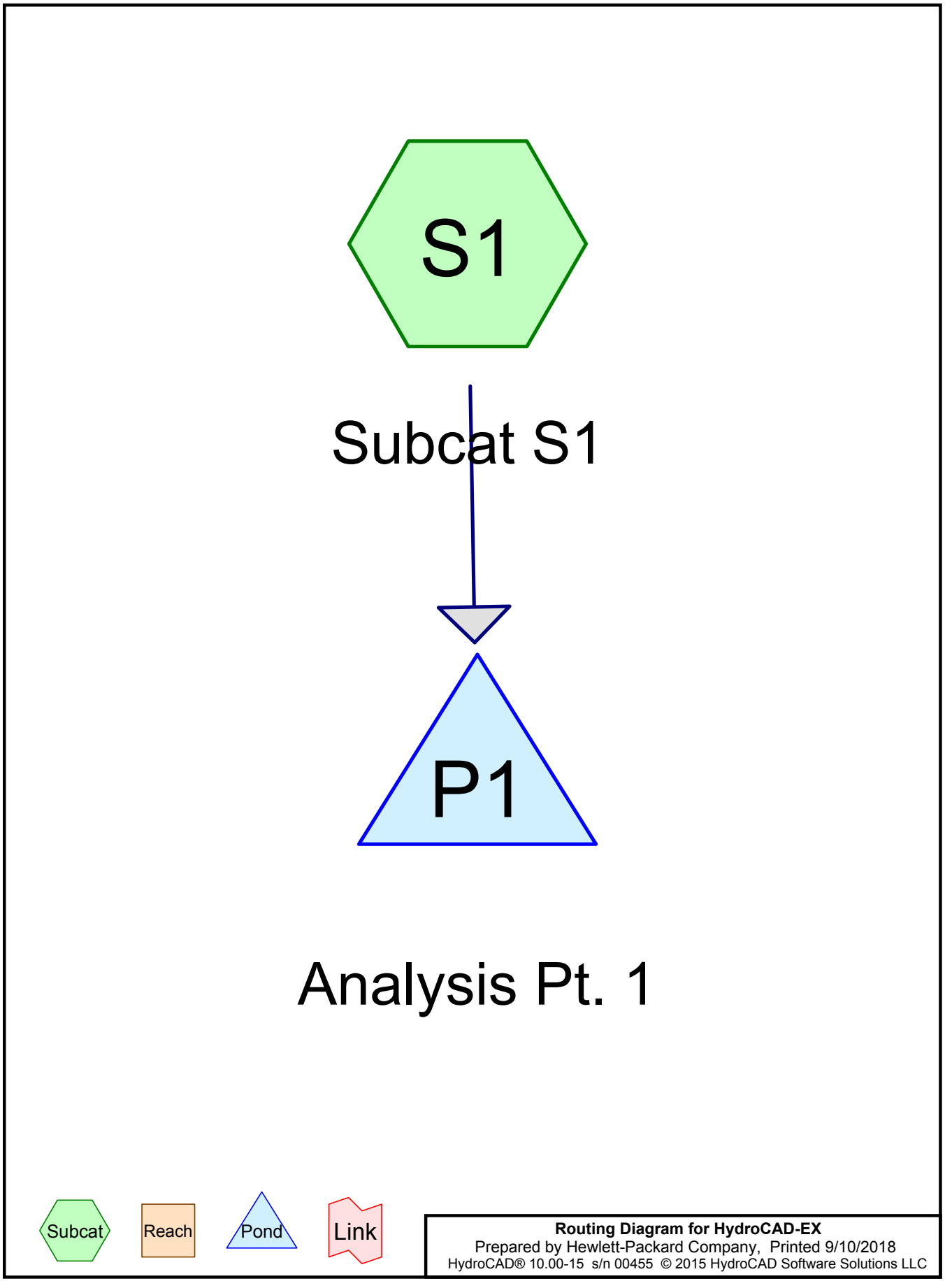
PLAN
SCALE: 1" = 100'

FIGURE 2
TOWN OF WAYLAND, MA
HIGH SCHOOL ATHLETIC FACILITIES
HYDROLOGY MAP
PROPOSED CONDITIONS

DESIGNED BY: JIP	CHECKED BY: JIP	DATE: JULY 13, 2018

Weston & Sampson℠

\\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\CAD\0_Current_HIGH SCHOOL\Figures\Hydro-PR.dwg



Routing Diagram for HydroCAD-EX
Prepared by Hewlett-Packard Company, Printed 9/10/2018

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
118,483	39	Pasture/grassland/range, Good, HSG A (S1)
12,377	98	Paved parking, HSG A (S1)
80,197	30	Woods, Good, HSG A (S1)
211,057	**39**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
211,057	HSG A	S1
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
211,057		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
118,483	0	0	0	0	118,483	Pasture/grassland/range, Good
12,377	0	0	0	0	12,377	Paved parking
80,197	0	0	0	0	80,197	Woods, Good
211,057	**0**	**0**	**0**	**0**	**211,057**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 5.86% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=39 Runoff=0.00 cfs 0 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 211,057 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
94.14% Pervious = 198,680 sf 5.86% Impervious = 12,377 sf

Summary for Subcatchment S1: Subcat S1

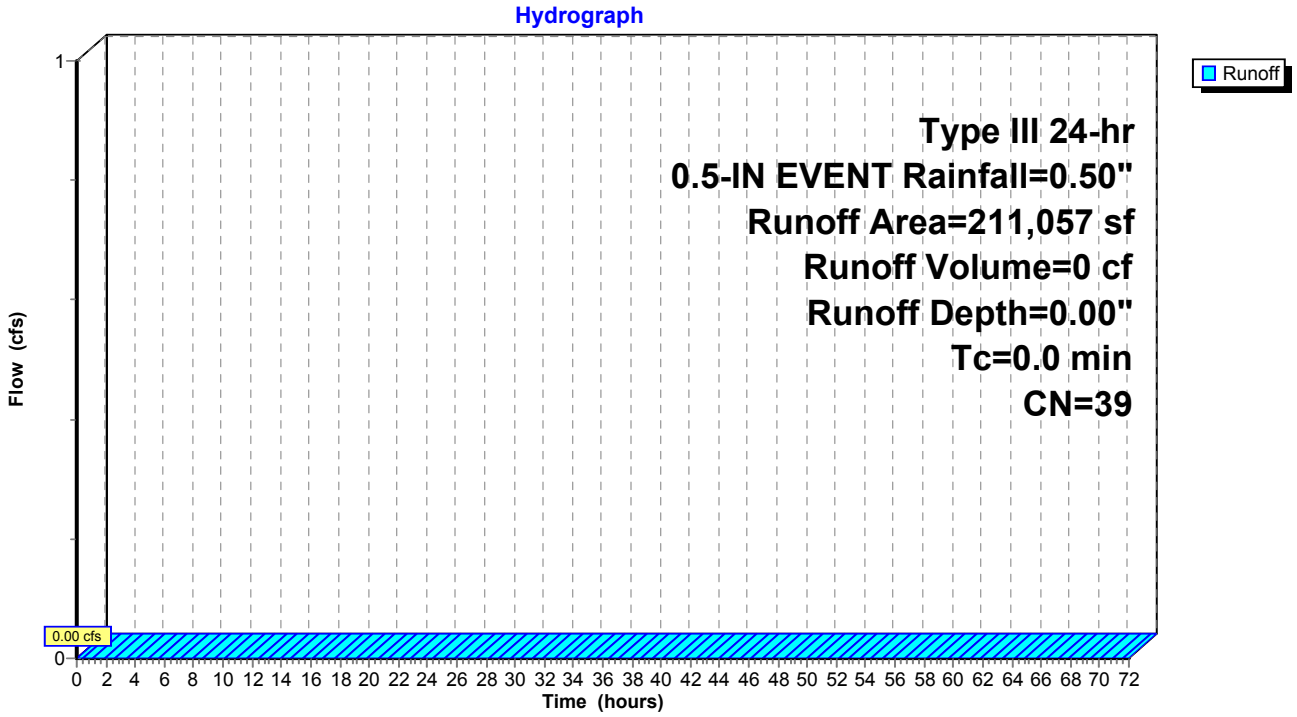
[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 0.5-IN EVENT Rainfall=0.50"

Area (sf)	CN	Description
1,446	39	Pasture/grassland/range, Good, HSG A
12,377	98	Paved parking, HSG A
1,358	39	Pasture/grassland/range, Good, HSG A
100,451	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
9,134	39	Pasture/grassland/range, Good, HSG A
4,620	39	Pasture/grassland/range, Good, HSG A
211,057	39	Weighted Average
198,680		94.14% Pervious Area
12,377		5.86% Impervious Area

Subcatchment S1: Subcat S1



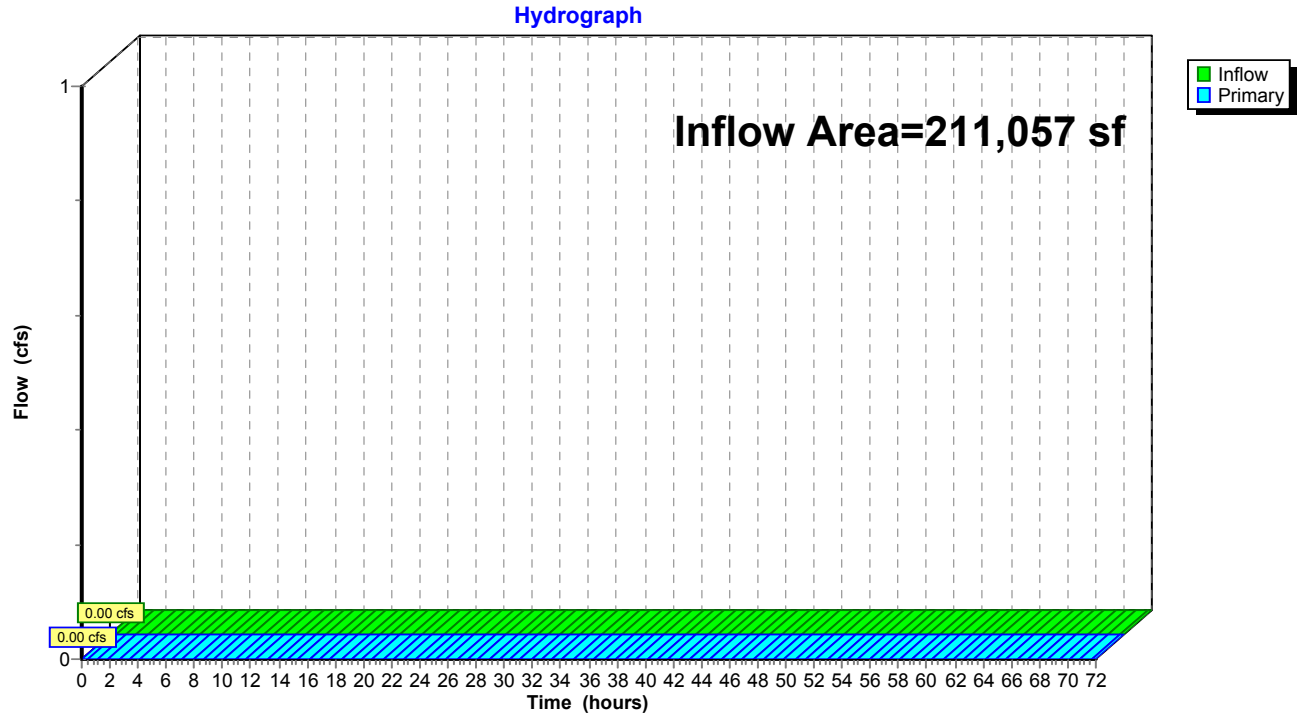
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 5.86% Impervious, Inflow Depth = 0.00" for 0.5-IN EVENT event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

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

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 5.86% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=39 Runoff=0.00 cfs 0 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 211,057 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
94.14% Pervious = 198,680 sf 5.86% Impervious = 12,377 sf

Summary for Subcatchment S1: Subcat S1

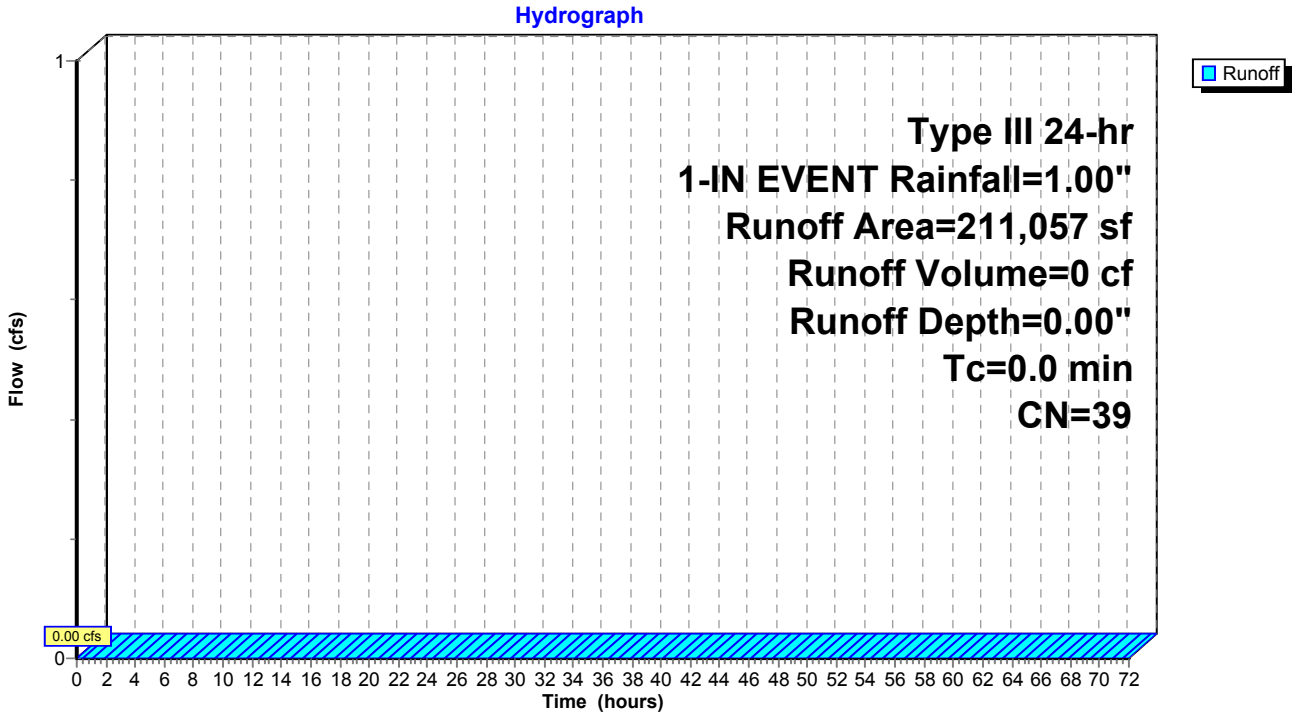
[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

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

Area (sf)	CN	Description
1,446	39	Pasture/grassland/range, Good, HSG A
12,377	98	Paved parking, HSG A
1,358	39	Pasture/grassland/range, Good, HSG A
100,451	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
9,134	39	Pasture/grassland/range, Good, HSG A
4,620	39	Pasture/grassland/range, Good, HSG A
211,057	39	Weighted Average
198,680		94.14% Pervious Area
12,377		5.86% Impervious Area

Subcatchment S1: Subcat S1



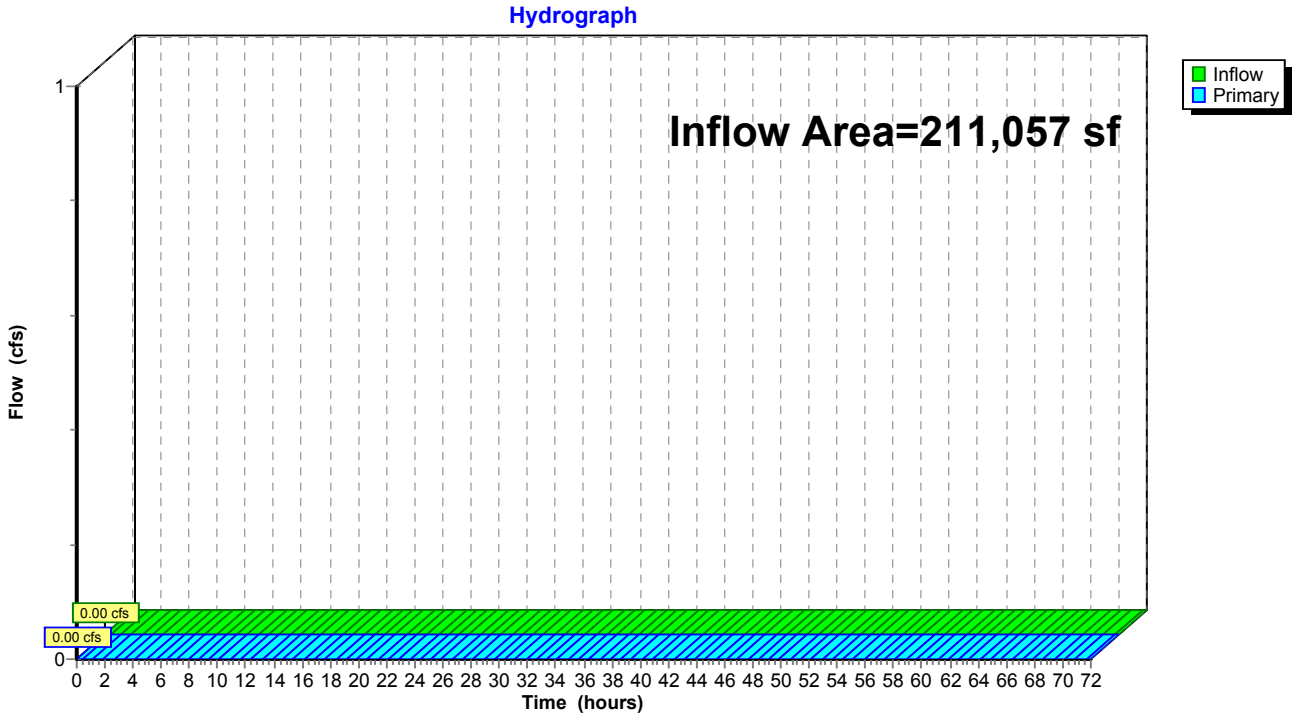
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 5.86% Impervious, Inflow Depth = 0.00" for 1-IN EVENT event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

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

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 5.86% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=39 Runoff=0.00 cfs 37 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 37 cf
Primary=0.00 cfs 37 cf

Total Runoff Area = 211,057 sf Runoff Volume = 37 cf Average Runoff Depth = 0.00"
94.14% Pervious = 198,680 sf 5.86% Impervious = 12,377 sf

Summary for Subcatchment S1: Subcat S1

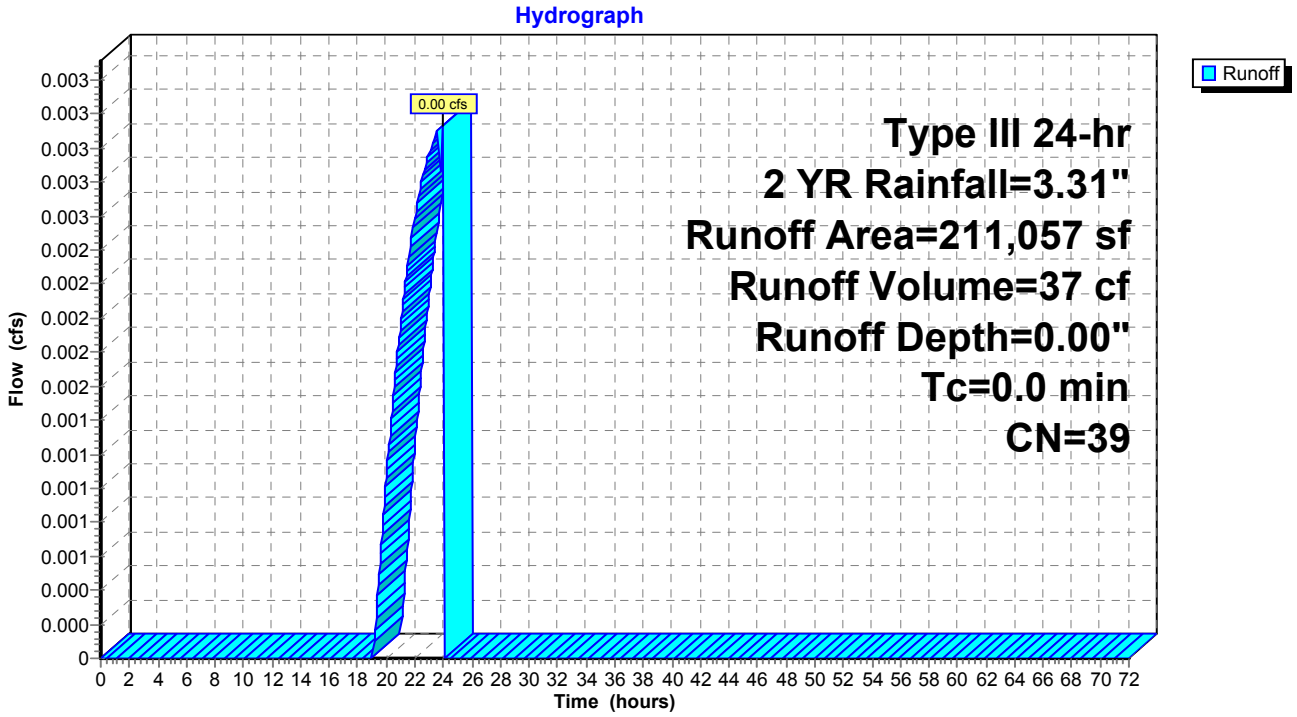
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.00 cfs @ 23.95 hrs, Volume= 37 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (sf)	CN	Description
1,446	39	Pasture/grassland/range, Good, HSG A
12,377	98	Paved parking, HSG A
1,358	39	Pasture/grassland/range, Good, HSG A
100,451	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
9,134	39	Pasture/grassland/range, Good, HSG A
4,620	39	Pasture/grassland/range, Good, HSG A
211,057	39	Weighted Average
198,680		94.14% Pervious Area
12,377		5.86% Impervious Area

Subcatchment S1: Subcat S1



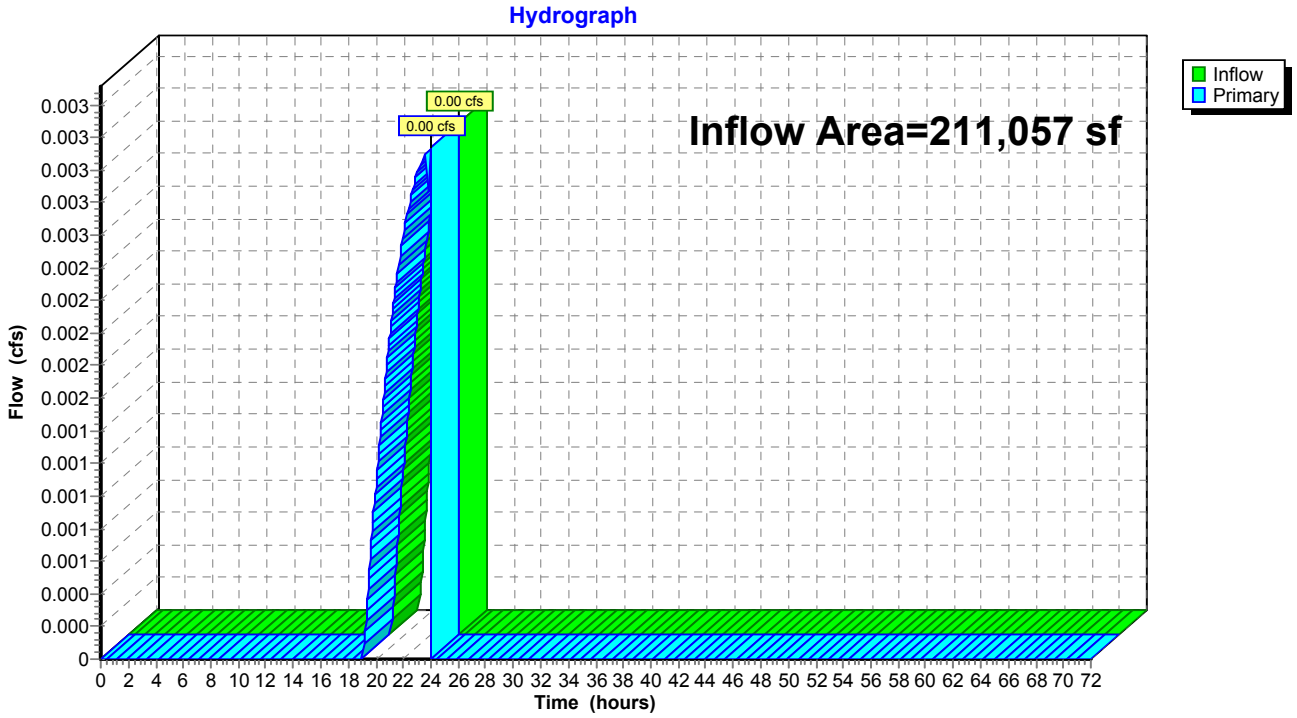
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 5.86% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 23.95 hrs, Volume= 37 cf
Primary = 0.00 cfs @ 23.95 hrs, Volume= 37 cf, Atten= 0%, Lag= 0.0 min

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

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 5.86% Impervious Runoff Depth=0.24"
Tc=0.0 min CN=39 Runoff=0.29 cfs 4,223 cf

Pond P1: Analysis Pt. 1 Inflow=0.29 cfs 4,223 cf
Primary=0.29 cfs 4,223 cf

Total Runoff Area = 211,057 sf Runoff Volume = 4,223 cf Average Runoff Depth = 0.24"
94.14% Pervious = 198,680 sf 5.86% Impervious = 12,377 sf

Summary for Subcatchment S1: Subcat S1

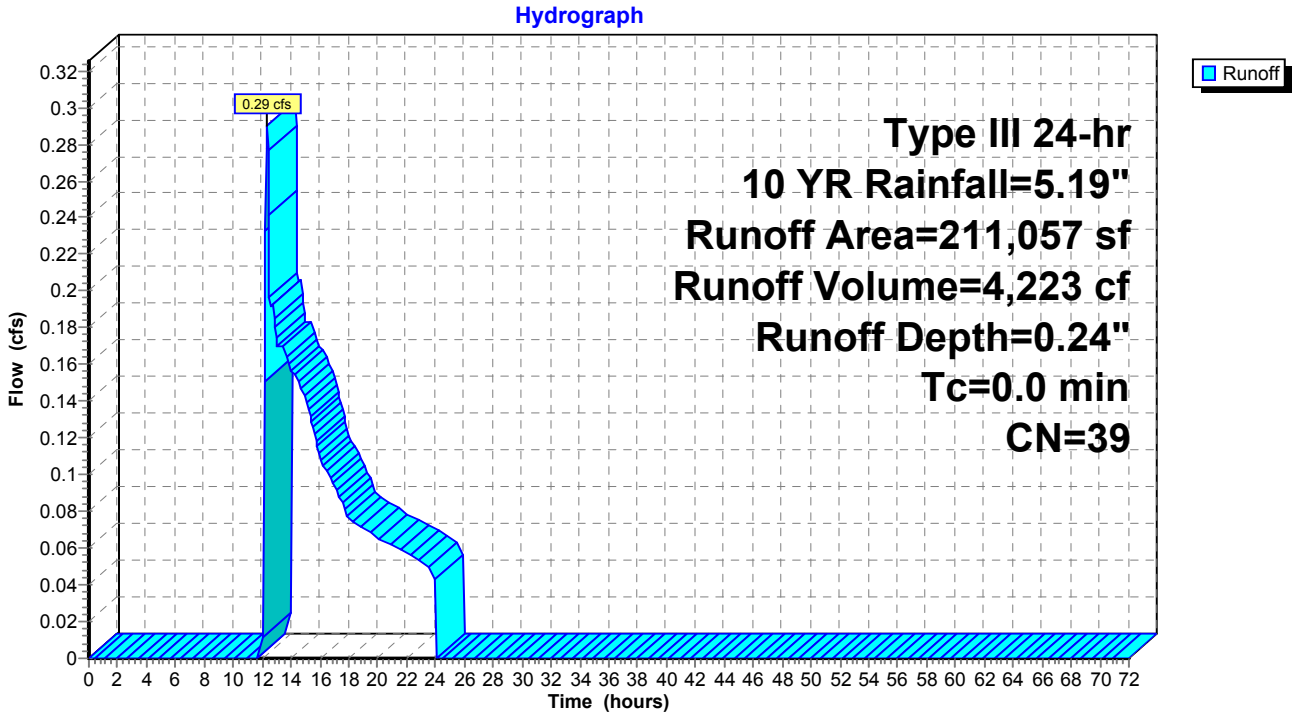
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.29 cfs @ 12.35 hrs, Volume= 4,223 cf, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (sf)	CN	Description
1,446	39	Pasture/grassland/range, Good, HSG A
12,377	98	Paved parking, HSG A
1,358	39	Pasture/grassland/range, Good, HSG A
100,451	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
9,134	39	Pasture/grassland/range, Good, HSG A
4,620	39	Pasture/grassland/range, Good, HSG A
211,057	39	Weighted Average
198,680		94.14% Pervious Area
12,377		5.86% Impervious Area

Subcatchment S1: Subcat S1



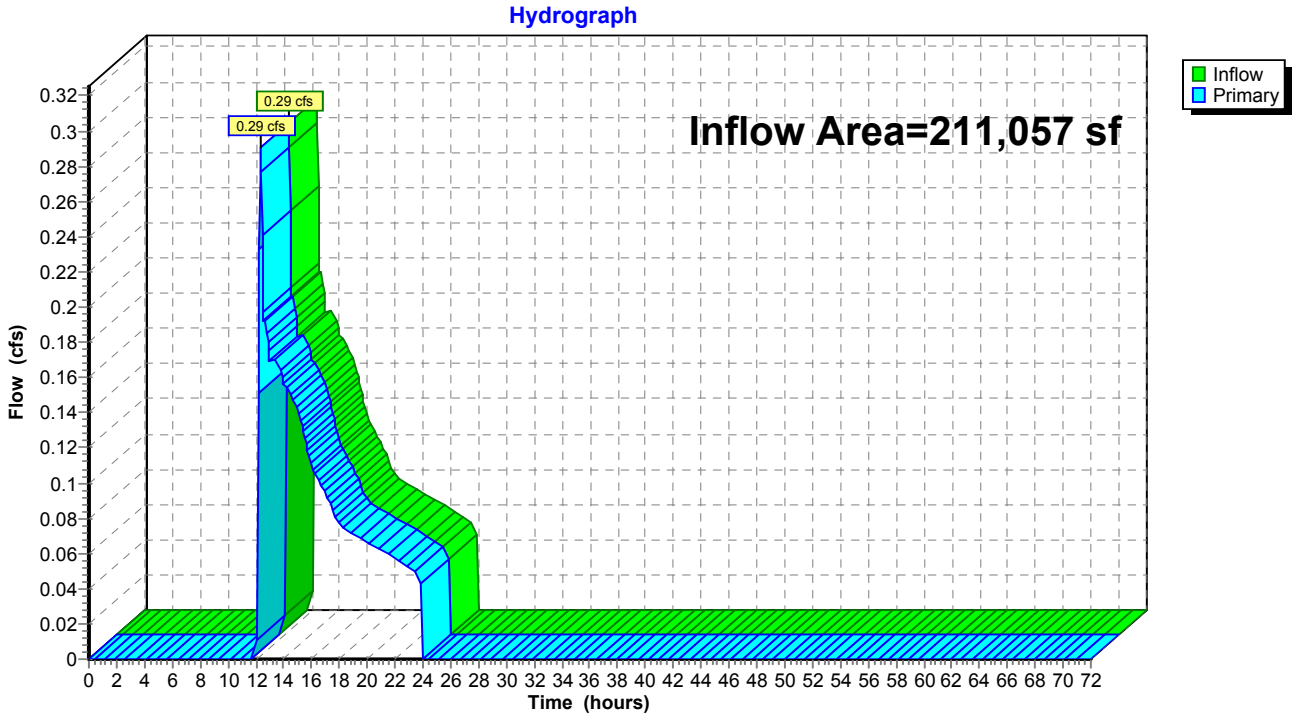
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 5.86% Impervious, Inflow Depth = 0.24" for 10 YR event
Inflow = 0.29 cfs @ 12.35 hrs, Volume= 4,223 cf
Primary = 0.29 cfs @ 12.35 hrs, Volume= 4,223 cf, Atten= 0%, Lag= 0.0 min

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

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 5.86% Impervious Runoff Depth=0.55"
Tc=0.0 min CN=39 Runoff=1.21 cfs 9,734 cf

Pond P1: Analysis Pt. 1 Inflow=1.21 cfs 9,734 cf
Primary=1.21 cfs 9,734 cf

Total Runoff Area = 211,057 sf Runoff Volume = 9,734 cf Average Runoff Depth = 0.55"
94.14% Pervious = 198,680 sf 5.86% Impervious = 12,377 sf

Summary for Subcatchment S1: Subcat S1

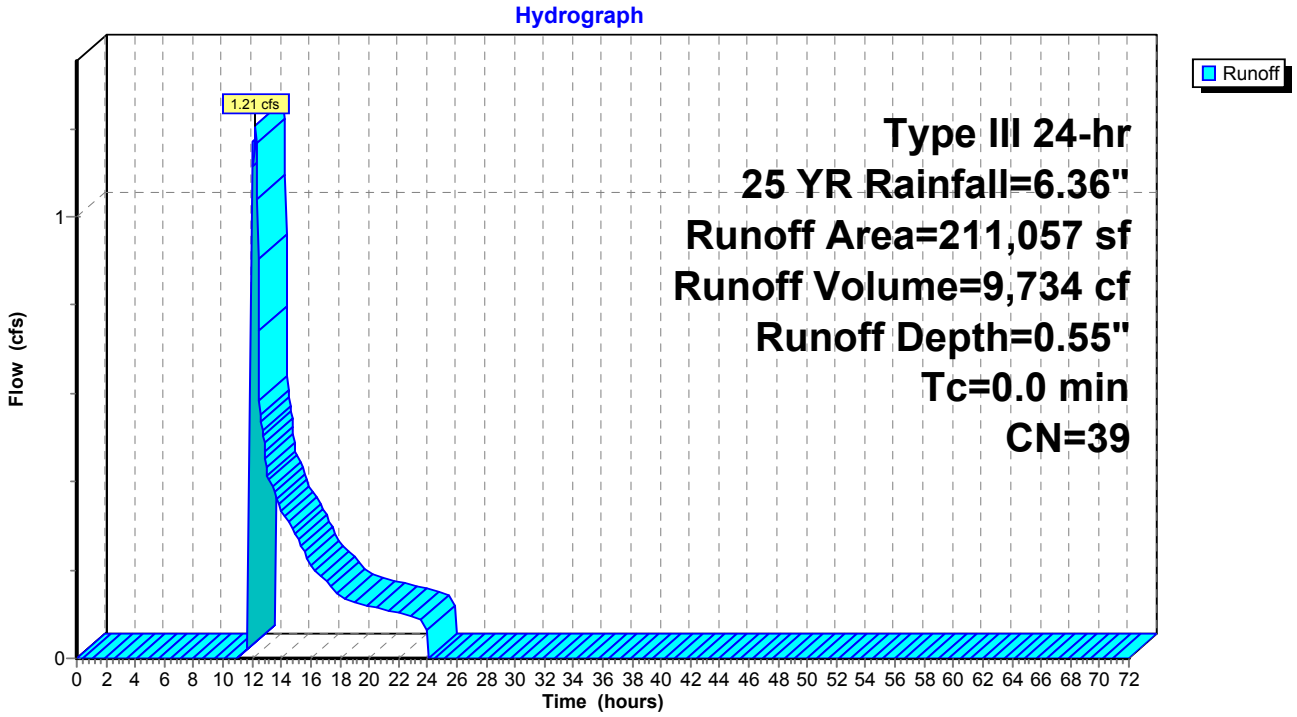
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.21 cfs @ 12.22 hrs, Volume= 9,734 cf, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (sf)	CN	Description
1,446	39	Pasture/grassland/range, Good, HSG A
12,377	98	Paved parking, HSG A
1,358	39	Pasture/grassland/range, Good, HSG A
100,451	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
9,134	39	Pasture/grassland/range, Good, HSG A
4,620	39	Pasture/grassland/range, Good, HSG A
211,057	39	Weighted Average
198,680		94.14% Pervious Area
12,377		5.86% Impervious Area

Subcatchment S1: Subcat S1



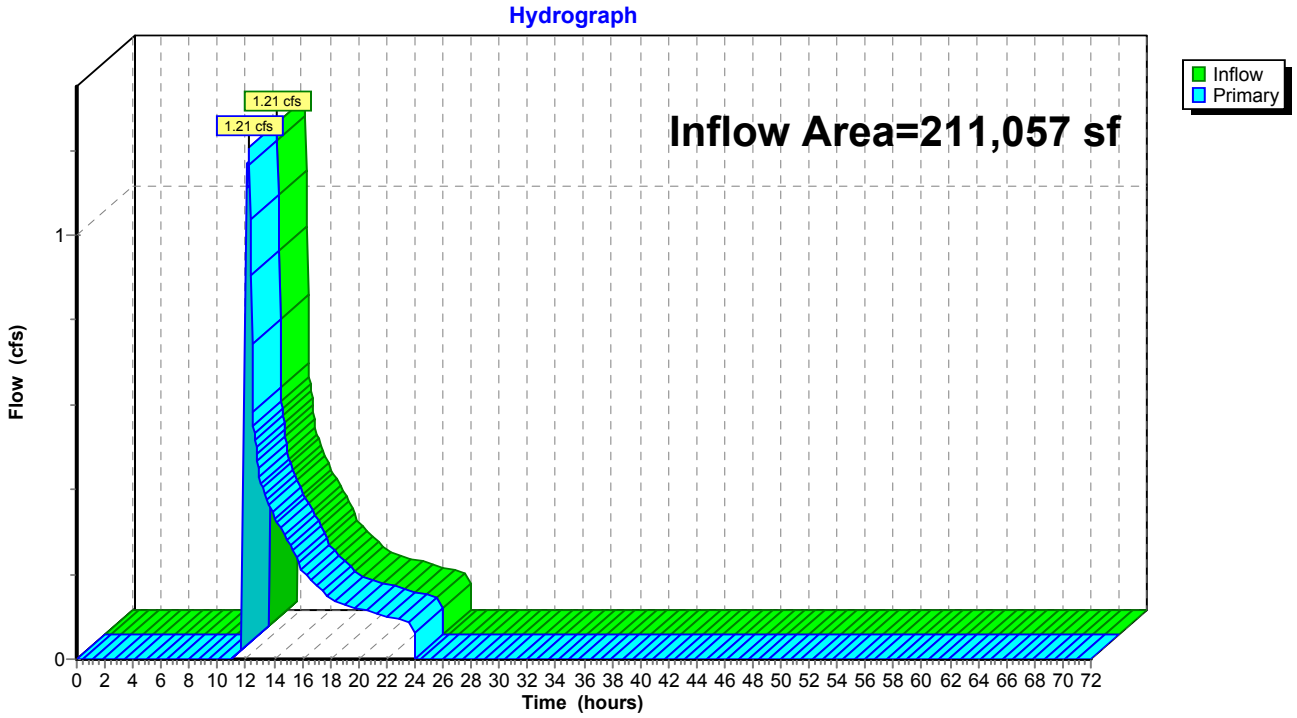
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 5.86% Impervious, Inflow Depth = 0.55" for 25 YR event
Inflow = 1.21 cfs @ 12.22 hrs, Volume= 9,734 cf
Primary = 1.21 cfs @ 12.22 hrs, Volume= 9,734 cf, Atten= 0%, Lag= 0.0 min

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

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 5.86% Impervious Runoff Depth=1.23"
Tc=0.0 min CN=39 Runoff=5.27 cfs 21,616 cf

Pond P1: Analysis Pt. 1 Inflow=5.27 cfs 21,616 cf
Primary=5.27 cfs 21,616 cf

Total Runoff Area = 211,057 sf Runoff Volume = 21,616 cf Average Runoff Depth = 1.23"
94.14% Pervious = 198,680 sf 5.86% Impervious = 12,377 sf

Summary for Subcatchment S1: Subcat S1

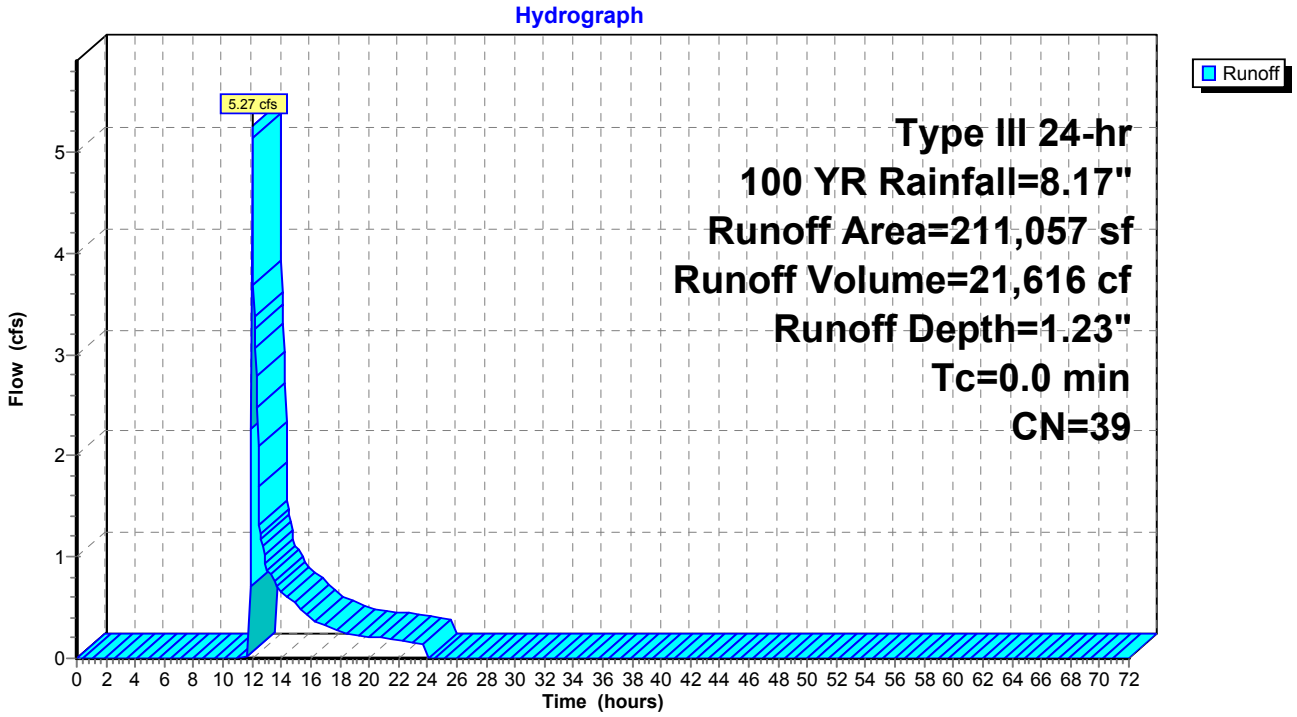
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.27 cfs @ 12.03 hrs, Volume= 21,616 cf, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (sf)	CN	Description
1,446	39	Pasture/grassland/range, Good, HSG A
12,377	98	Paved parking, HSG A
1,358	39	Pasture/grassland/range, Good, HSG A
100,451	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
9,134	39	Pasture/grassland/range, Good, HSG A
4,620	39	Pasture/grassland/range, Good, HSG A
211,057	39	Weighted Average
198,680		94.14% Pervious Area
12,377		5.86% Impervious Area

Subcatchment S1: Subcat S1



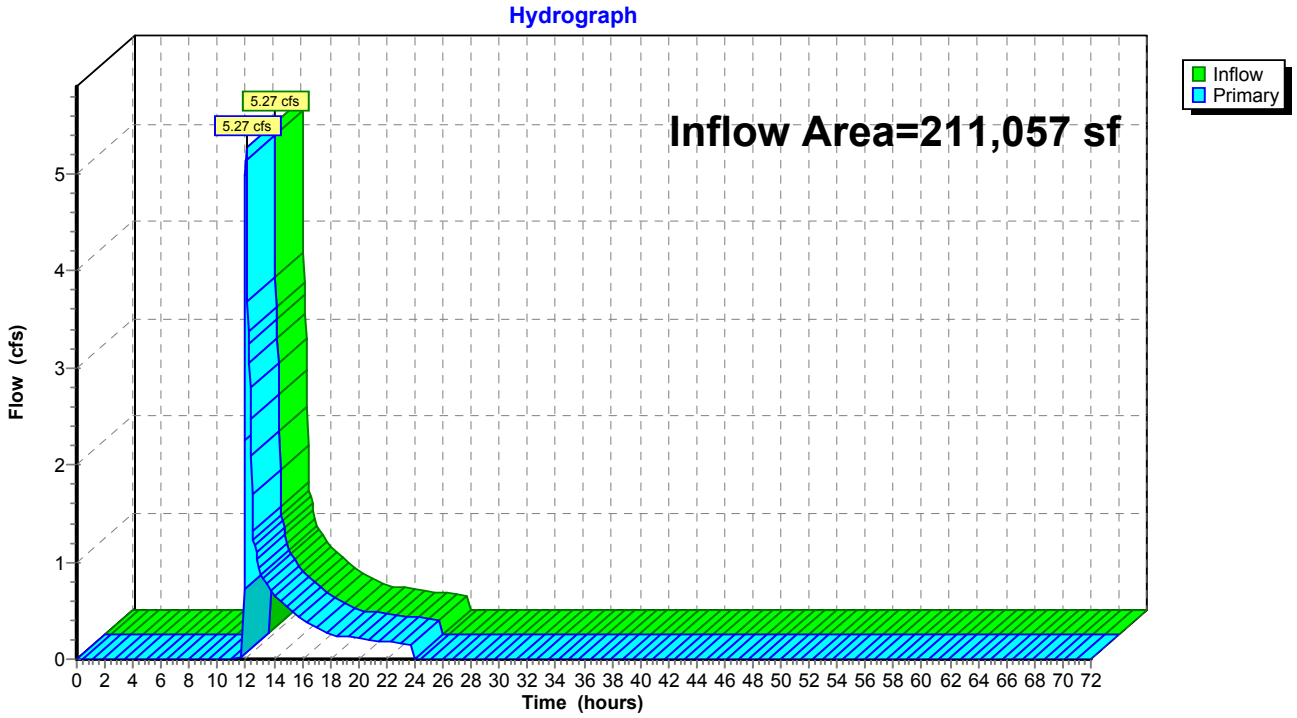
Summary for Pond P1: Analysis Pt. 1

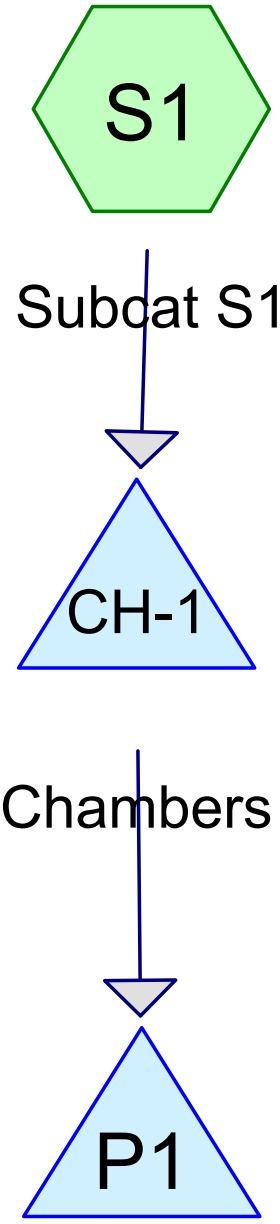
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 5.86% Impervious, Inflow Depth = 1.23" for 100 YR event
Inflow = 5.27 cfs @ 12.03 hrs, Volume= 21,616 cf
Primary = 5.27 cfs @ 12.03 hrs, Volume= 21,616 cf, Atten= 0%, Lag= 0.0 min

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

Pond P1: Analysis Pt. 1





Analysis Pt. 1

Subcat Reach Pond Link

Routing Diagram for HydroCAD-PR
Prepared by Hewlett-Packard Company, Printed 9/10/2018

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
65,197	39	Pasture/grassland/range, Good, HSG A (S1)
65,663	98	Paved parking, HSG A (S1)
80,197	30	Woods, Good, HSG A (S1)
211,057	**54**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
211,057	HSG A	S1
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
211,057		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
65,197	0	0	0	0	65,197	Pasture/grassland/range, Good
65,663	0	0	0	0	65,663	Paved parking
80,197	0	0	0	0	80,197	Woods, Good
211,057	**0**	**0**	**0**	**0**	**211,057**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	CH-1	128.50	127.60	220.0	0.0041	0.012	12.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 31.11% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=54 Runoff=0.00 cfs 0 cf

Pond CH-1: Chambers Peak Elev=128.00' Storage=0 cf Inflow=0.00 cfs 0 cf
Discarded=0.00 cfs 0 cf Primary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 211,057 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
68.89% Pervious = 145,394 sf 31.11% Impervious = 65,663 sf

Summary for Subcatchment S1: Subcat S1

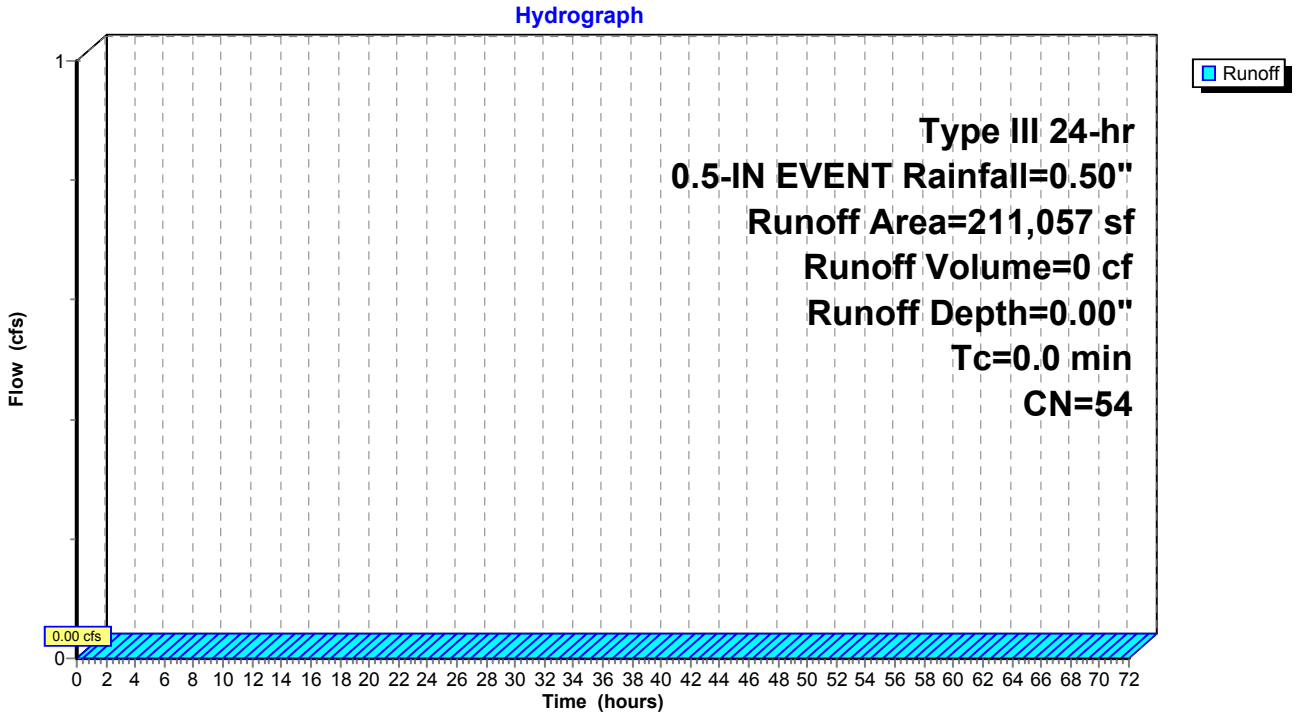
[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 0.5-IN EVENT Rainfall=0.50"

Area (sf)	CN	Description
1,259	39	Pasture/grassland/range, Good, HSG A
1,202	39	Pasture/grassland/range, Good, HSG A
530	39	Pasture/grassland/range, Good, HSG A
531	39	Pasture/grassland/range, Good, HSG A
336	39	Pasture/grassland/range, Good, HSG A
63,478	98	Paved parking, HSG A
4,885	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
1	39	Pasture/grassland/range, Good, HSG A
443	39	Pasture/grassland/range, Good, HSG A
10,285	39	Pasture/grassland/range, Good, HSG A
32,682	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
449	39	Pasture/grassland/range, Good, HSG A
8,685	39	Pasture/grassland/range, Good, HSG A
2,185	98	Paved parking, HSG A
1,103	39	Pasture/grassland/range, Good, HSG A
1,331	39	Pasture/grassland/range, Good, HSG A
211,057	54	Weighted Average
145,394		68.89% Pervious Area
65,663		31.11% Impervious Area

Subcatchment S1: Subcat S1



Summary for Pond CH-1: Chambers

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.00" for 0.5-IN EVENT event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 128.00' @ 0.00 hrs Surf.Area= 6,820 sf Storage= 0 cf
Flood Elev= 134.00' Surf.Area= 6,820 sf Storage= 14,913 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.00'	5,988 cf	**58.50'W x 116.36'L x 3.50'H Field A** 23,825 cf Overall - 8,855 cf Embedded = 14,970 cf x 40.0% Voids
#2A	128.50'	8,855 cf	**ADS_StormTech SC-740** x 192 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
#3	128.00'	70 cf	**4.00'D x 5.60'H Vertical Cone/Cylinder**
		14,913 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**12.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.60' S= 0.0041 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	129.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	131.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	128.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.00' (Free Discharge)
└**4=Exfiltration** (Passes 0.00 cfs of 1.31 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CH-1: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

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

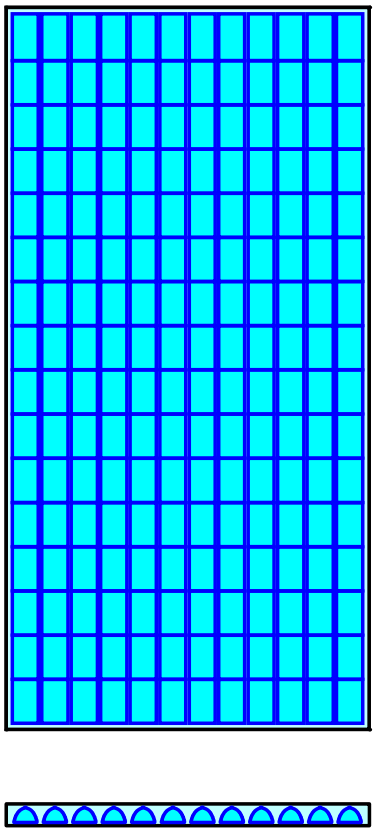
16 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 114.36' Row Length +12.0" End Stone x 2 = 116.36' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

192 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 8,854.6 cf Chamber Storage

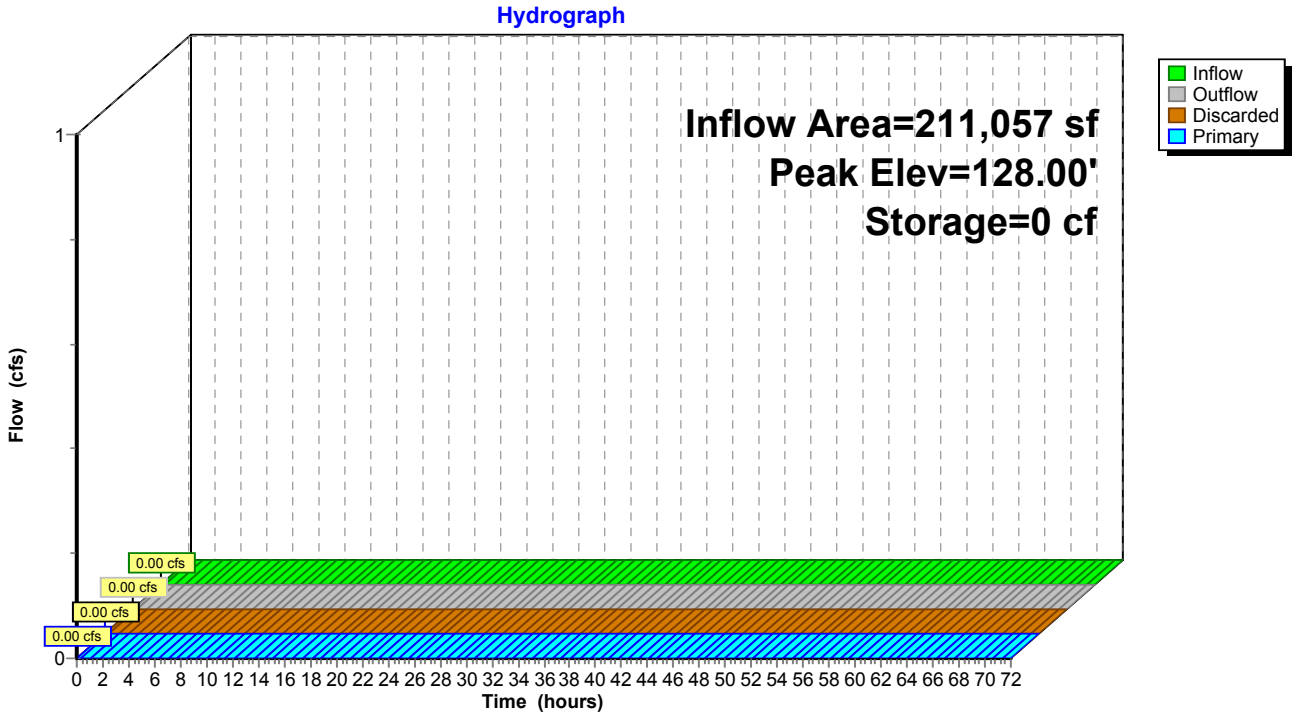
23,824.7 cf Field - 8,854.6 cf Chambers = 14,970.2 cf Stone x 40.0% Voids = 5,988.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,842.6 cf = 0.341 af
Overall Storage Efficiency = 62.3%

192 Chambers
882.4 cy Field
554.5 cy Stone



Pond CH-1: Chambers



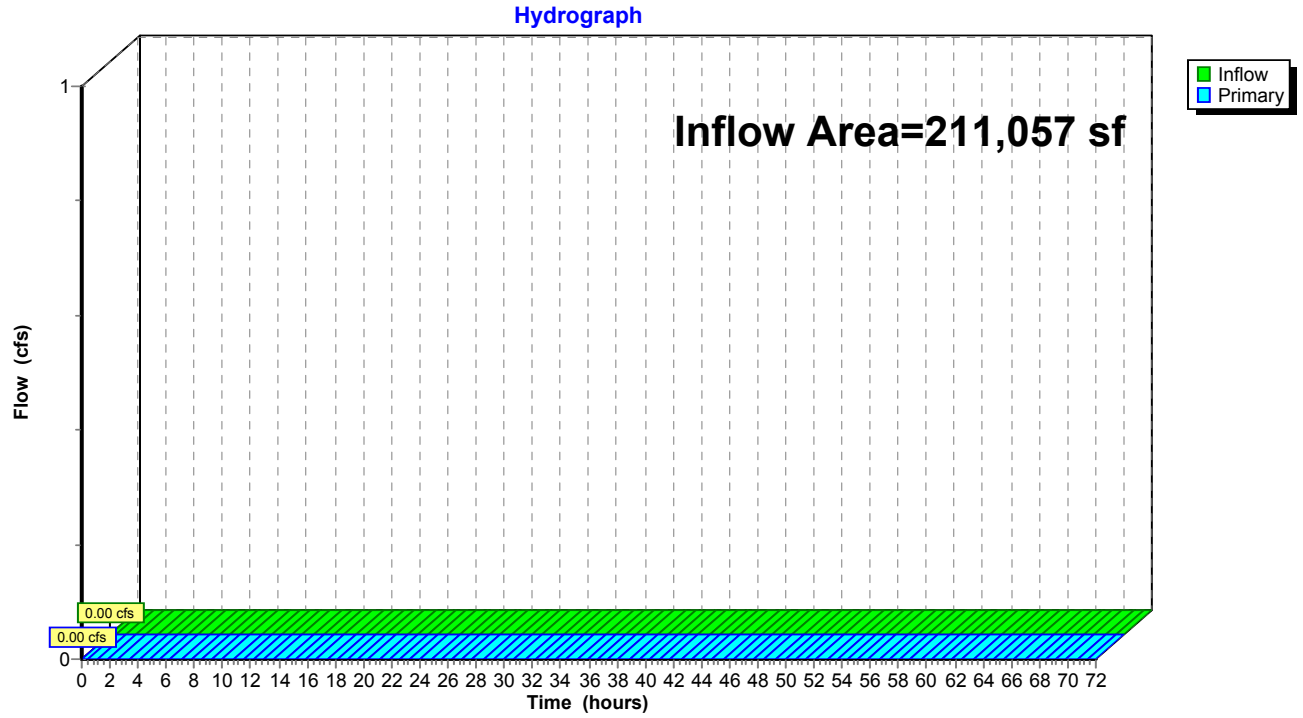
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.00" for 0.5-IN EVENT event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 31.11% Impervious Runoff Depth=0.00"
Tc=0.0 min CN=54 Runoff=0.00 cfs 0 cf

Pond CH-1: Chambers Peak Elev=128.00' Storage=0 cf Inflow=0.00 cfs 0 cf
Discarded=0.00 cfs 0 cf Primary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 211,057 sf Runoff Volume = 0 cf Average Runoff Depth = 0.00"
68.89% Pervious = 145,394 sf 31.11% Impervious = 65,663 sf

Summary for Subcatchment S1: Subcat S1

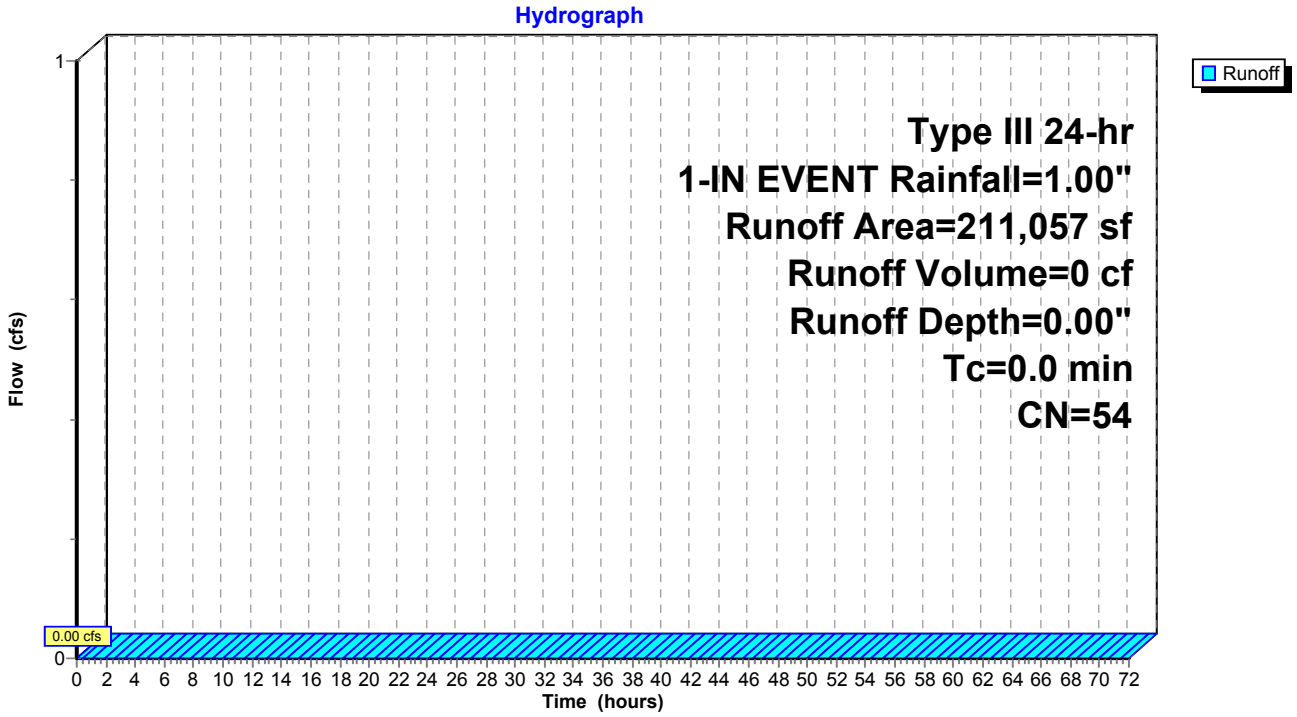
[46] Hint: Tc=0 (Instant runoff peak depends on dt)
[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 1-IN EVENT Rainfall=1.00"

Area (sf)	CN	Description
1,259	39	Pasture/grassland/range, Good, HSG A
1,202	39	Pasture/grassland/range, Good, HSG A
530	39	Pasture/grassland/range, Good, HSG A
531	39	Pasture/grassland/range, Good, HSG A
336	39	Pasture/grassland/range, Good, HSG A
63,478	98	Paved parking, HSG A
4,885	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
1	39	Pasture/grassland/range, Good, HSG A
443	39	Pasture/grassland/range, Good, HSG A
10,285	39	Pasture/grassland/range, Good, HSG A
32,682	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
449	39	Pasture/grassland/range, Good, HSG A
8,685	39	Pasture/grassland/range, Good, HSG A
2,185	98	Paved parking, HSG A
1,103	39	Pasture/grassland/range, Good, HSG A
1,331	39	Pasture/grassland/range, Good, HSG A
211,057	54	Weighted Average
145,394		68.89% Pervious Area
65,663		31.11% Impervious Area

Subcatchment S1: Subcat S1



Summary for Pond CH-1: Chambers

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.00" for 1-IN EVENT event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 128.00' @ 0.00 hrs Surf.Area= 6,820 sf Storage= 0 cf
Flood Elev= 134.00' Surf.Area= 6,820 sf Storage= 14,913 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.00'	5,988 cf	**58.50'W x 116.36'L x 3.50'H Field A** 23,825 cf Overall - 8,855 cf Embedded = 14,970 cf x 40.0% Voids
#2A	128.50'	8,855 cf	**ADS_StormTech SC-740** x 192 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
#3	128.00'	70 cf	**4.00'D x 5.60'H Vertical Cone/Cylinder**
		14,913 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**12.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.60' S= 0.0041 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	129.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	131.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	128.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.00' (Free Discharge)
└**4=Exfiltration** (Passes 0.00 cfs of 1.31 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CH-1: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

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

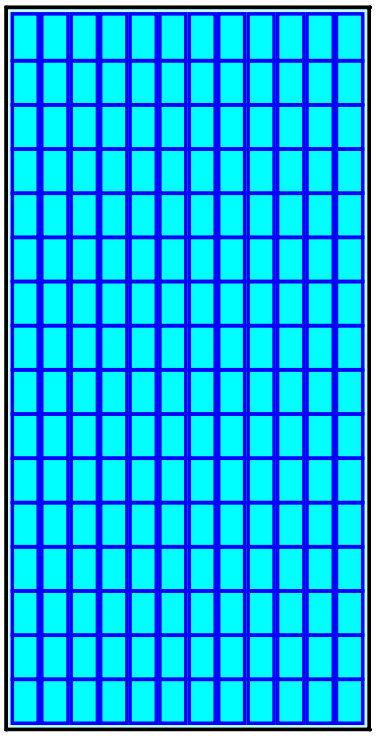
16 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 114.36' Row Length +12.0" End Stone x 2 = 116.36' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

192 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 8,854.6 cf Chamber Storage

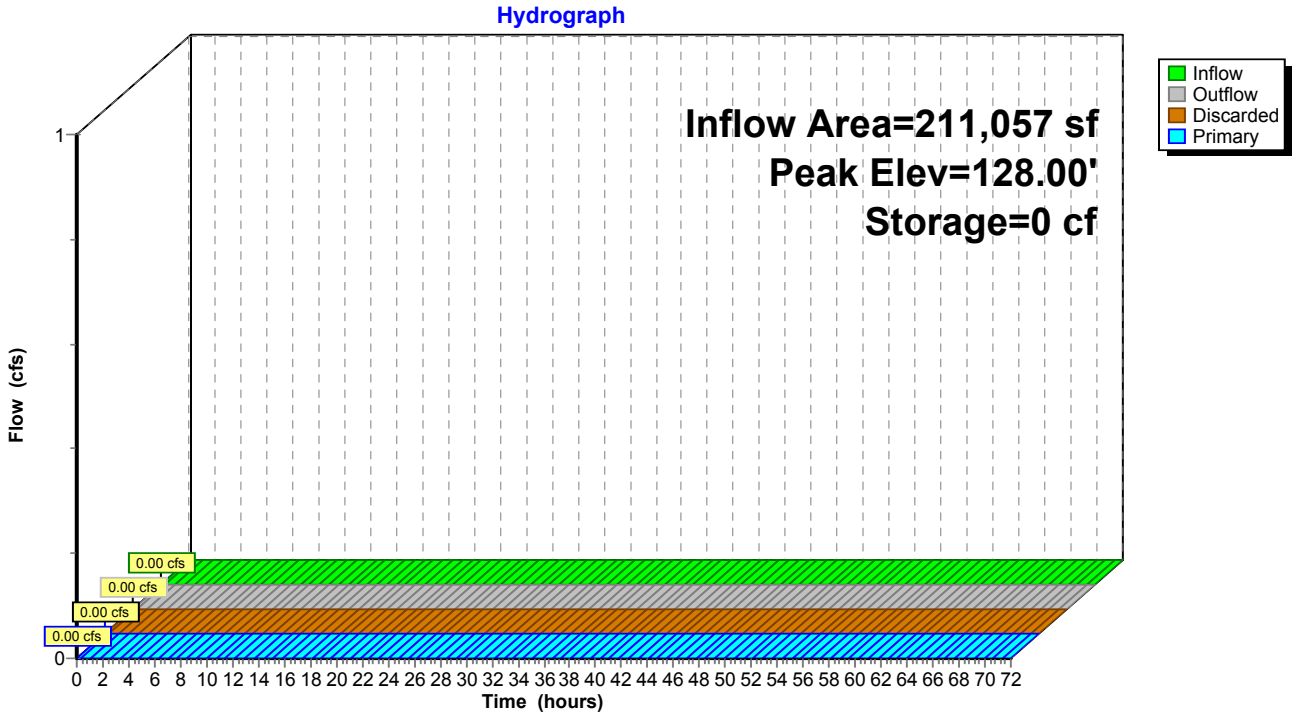
23,824.7 cf Field - 8,854.6 cf Chambers = 14,970.2 cf Stone x 40.0% Voids = 5,988.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,842.6 cf = 0.341 af
Overall Storage Efficiency = 62.3%

192 Chambers
882.4 cy Field
554.5 cy Stone



Pond CH-1: Chambers



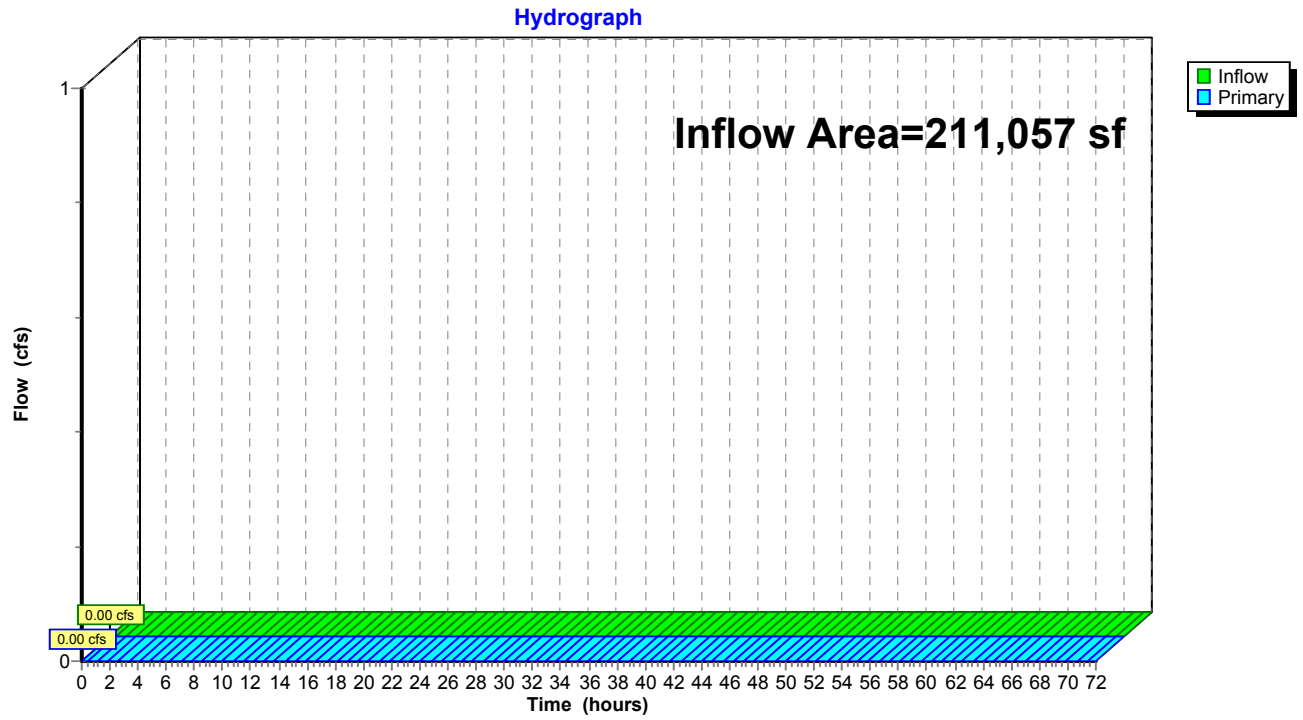
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.00" for 1-IN EVENT event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 31.11% Impervious Runoff Depth=0.25"
Tc=0.0 min CN=54 Runoff=0.51 cfs 4,482 cf

Pond CH-1: Chambers Peak Elev=128.02' Storage=64 cf Inflow=0.51 cfs 4,482 cf
Discarded=0.51 cfs 4,482 cf Primary=0.00 cfs 0 cf Outflow=0.51 cfs 4,482 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 211,057 sf Runoff Volume = 4,482 cf Average Runoff Depth = 0.25"
68.89% Pervious = 145,394 sf 31.11% Impervious = 65,663 sf

Summary for Subcatchment S1: Subcat S1

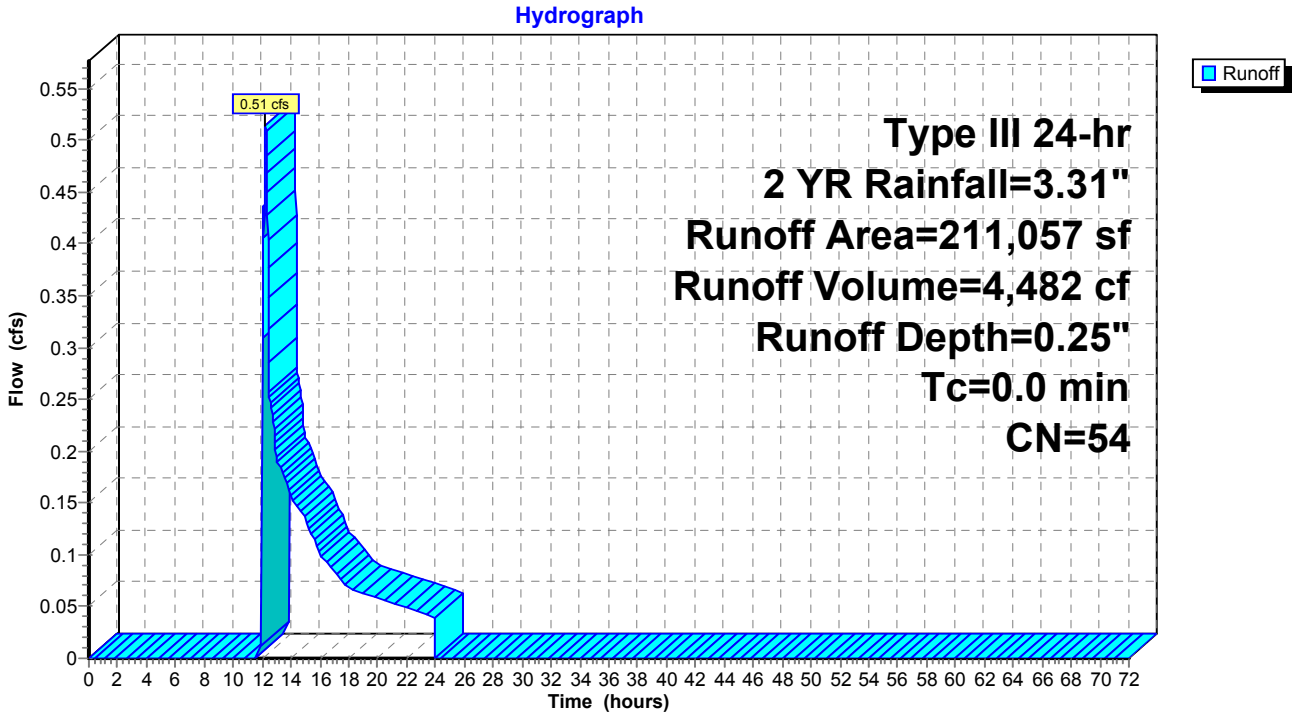
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.51 cfs @ 12.24 hrs, Volume= 4,482 cf, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (sf)	CN	Description
1,259	39	Pasture/grassland/range, Good, HSG A
1,202	39	Pasture/grassland/range, Good, HSG A
530	39	Pasture/grassland/range, Good, HSG A
531	39	Pasture/grassland/range, Good, HSG A
336	39	Pasture/grassland/range, Good, HSG A
63,478	98	Paved parking, HSG A
4,885	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
1	39	Pasture/grassland/range, Good, HSG A
443	39	Pasture/grassland/range, Good, HSG A
10,285	39	Pasture/grassland/range, Good, HSG A
32,682	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
449	39	Pasture/grassland/range, Good, HSG A
8,685	39	Pasture/grassland/range, Good, HSG A
2,185	98	Paved parking, HSG A
1,103	39	Pasture/grassland/range, Good, HSG A
1,331	39	Pasture/grassland/range, Good, HSG A
211,057	54	Weighted Average
145,394		68.89% Pervious Area
65,663		31.11% Impervious Area

Subcatchment S1: Subcat S1



Summary for Pond CH-1: Chambers

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.25" for 2 YR event
Inflow = 0.51 cfs @ 12.24 hrs, Volume= 4,482 cf
Outflow = 0.51 cfs @ 12.28 hrs, Volume= 4,482 cf, Atten= 1%, Lag= 2.2 min
Discarded = 0.51 cfs @ 12.28 hrs, Volume= 4,482 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 128.02' @ 12.28 hrs Surf.Area= 6,820 sf Storage= 64 cf
Flood Elev= 134.00' Surf.Area= 6,820 sf Storage= 14,913 cf

Plug-Flow detention time= 2.1 min calculated for 4,481 cf (100% of inflow)
Center-of-Mass det. time= 2.1 min (953.3 - 951.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.00'	5,988 cf	**58.50'W x 116.36'L x 3.50'H Field A** 23,825 cf Overall - 8,855 cf Embedded = 14,970 cf x 40.0% Voids
#2A	128.50'	8,855 cf	**ADS_StormTech SC-740** x 192 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
#3	128.00'	70 cf	**4.00'D x 5.60'H Vertical Cone/Cylinder**
		14,913 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**12.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.60' S= 0.0041 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	129.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	131.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	128.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.31 cfs @ 12.28 hrs HW=128.02' (Free Discharge)
└**4=Exfiltration** (Controls 1.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CH-1: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

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

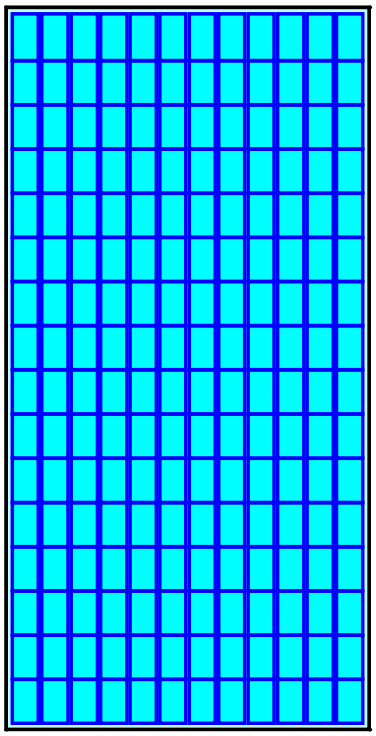
16 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 114.36' Row Length +12.0" End Stone x 2 = 116.36' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

192 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 8,854.6 cf Chamber Storage

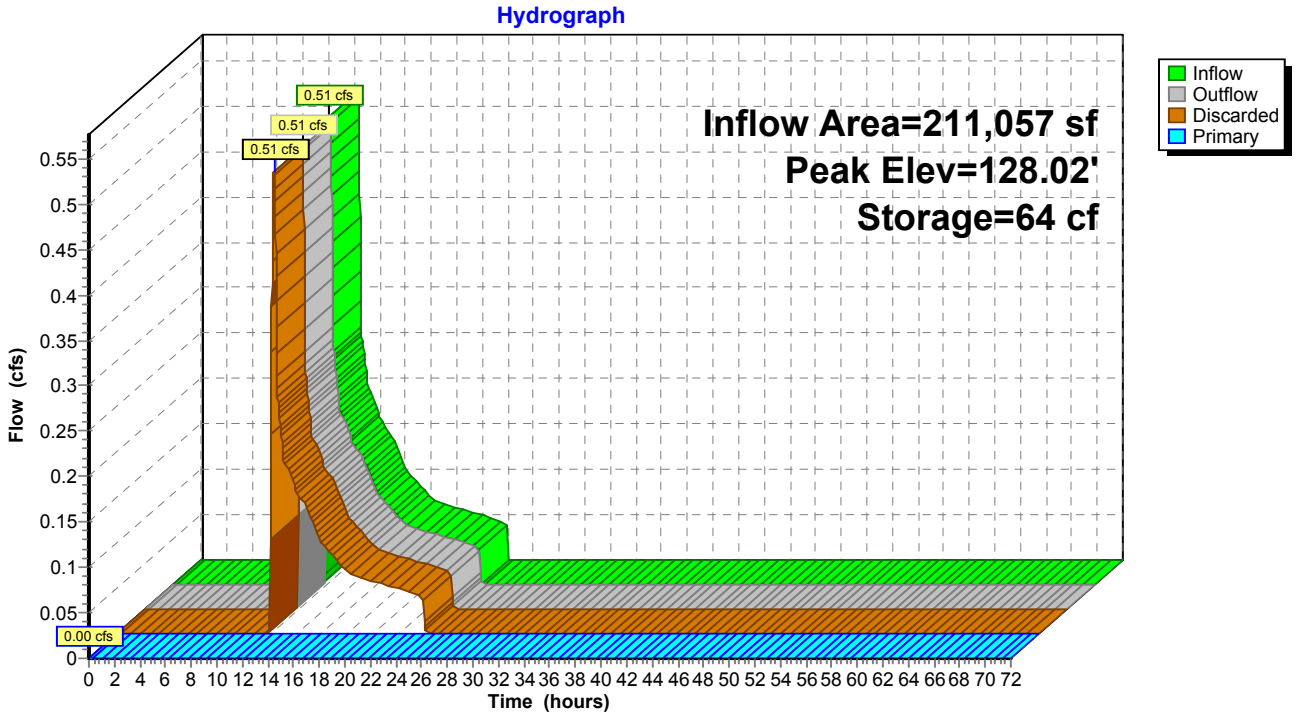
23,824.7 cf Field - 8,854.6 cf Chambers = 14,970.2 cf Stone x 40.0% Voids = 5,988.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,842.6 cf = 0.341 af
Overall Storage Efficiency = 62.3%

192 Chambers
882.4 cy Field
554.5 cy Stone



Pond CH-1: Chambers



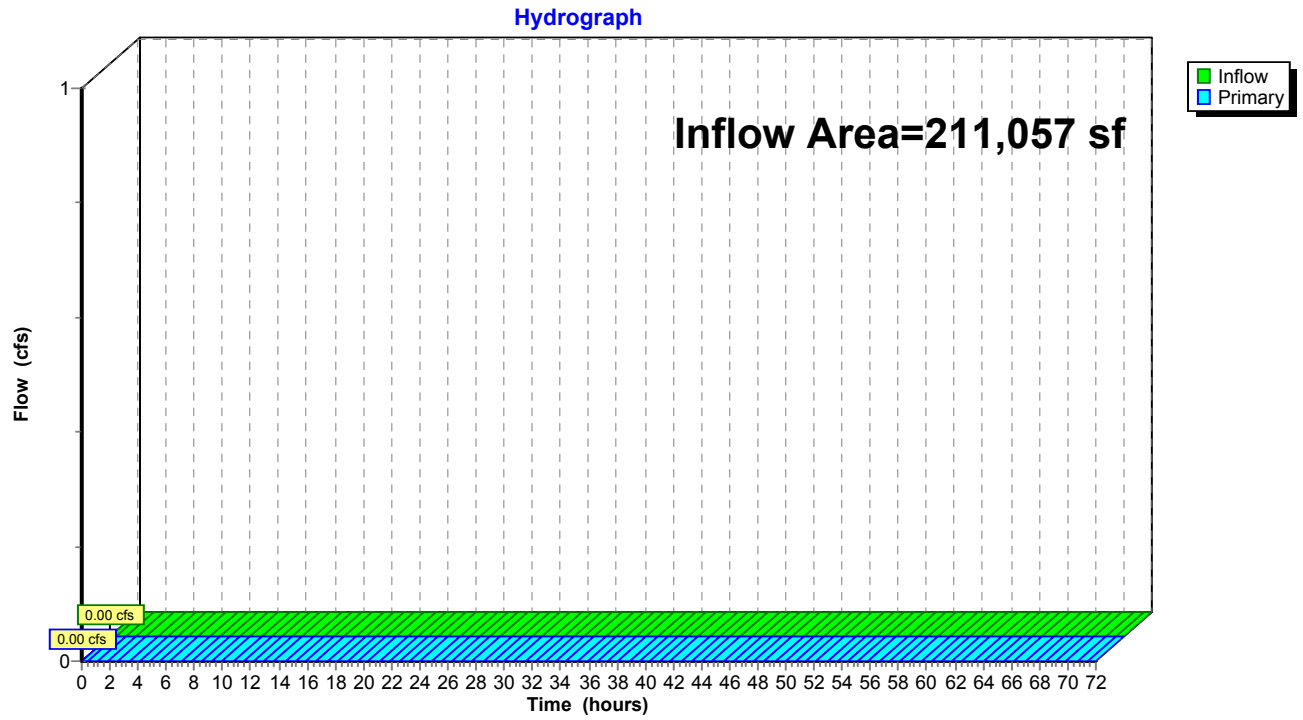
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 31.11% Impervious Runoff Depth=1.01"
Tc=0.0 min CN=54 Runoff=5.43 cfs 17,807 cf

Pond CH-1: Chambers Peak Elev=128.83' Storage=3,246 cf Inflow=5.43 cfs 17,807 cf
Discarded=1.31 cfs 17,807 cf Primary=0.00 cfs 0 cf Outflow=1.31 cfs 17,807 cf

Pond P1: Analysis Pt. 1 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 211,057 sf Runoff Volume = 17,807 cf Average Runoff Depth = 1.01"
68.89% Pervious = 145,394 sf 31.11% Impervious = 65,663 sf

Summary for Subcatchment S1: Subcat S1

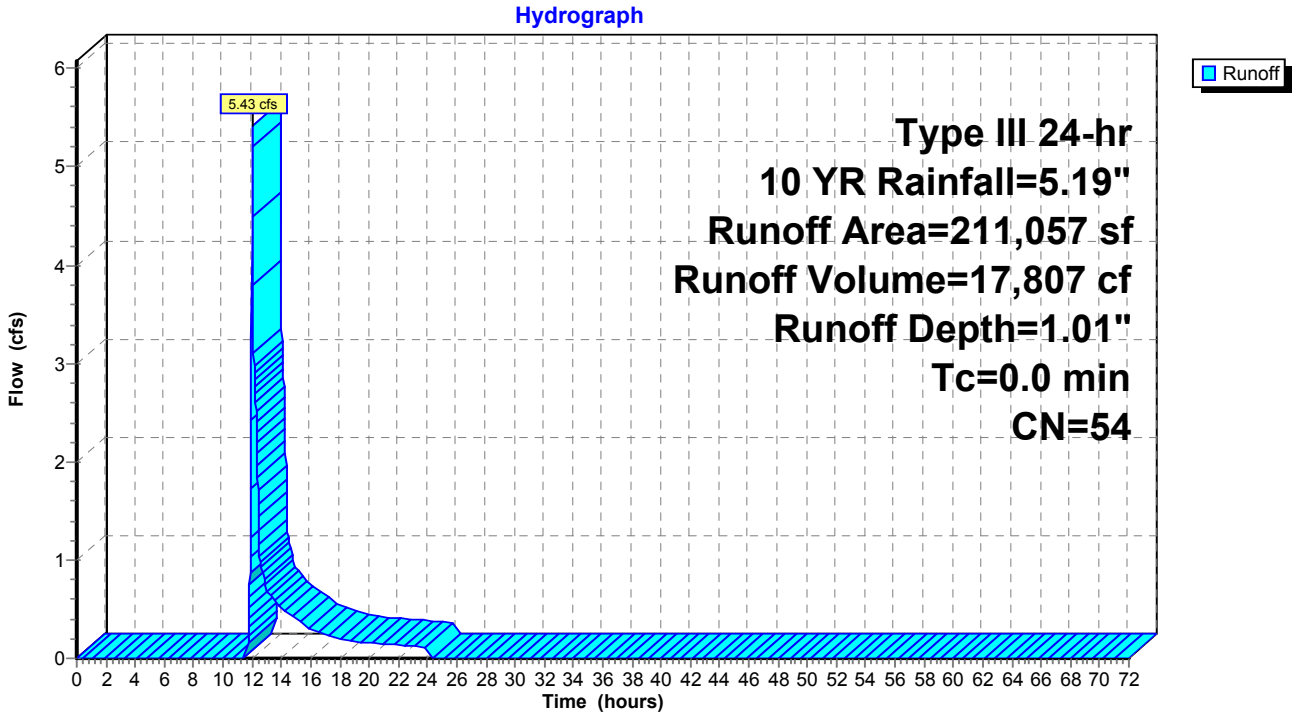
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.43 cfs @ 12.01 hrs, Volume= 17,807 cf, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (sf)	CN	Description
1,259	39	Pasture/grassland/range, Good, HSG A
1,202	39	Pasture/grassland/range, Good, HSG A
530	39	Pasture/grassland/range, Good, HSG A
531	39	Pasture/grassland/range, Good, HSG A
336	39	Pasture/grassland/range, Good, HSG A
63,478	98	Paved parking, HSG A
4,885	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
1	39	Pasture/grassland/range, Good, HSG A
443	39	Pasture/grassland/range, Good, HSG A
10,285	39	Pasture/grassland/range, Good, HSG A
32,682	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
449	39	Pasture/grassland/range, Good, HSG A
8,685	39	Pasture/grassland/range, Good, HSG A
2,185	98	Paved parking, HSG A
1,103	39	Pasture/grassland/range, Good, HSG A
1,331	39	Pasture/grassland/range, Good, HSG A
211,057	54	Weighted Average
145,394		68.89% Pervious Area
65,663		31.11% Impervious Area

Subcatchment S1: Subcat S1



Summary for Pond CH-1: Chambers

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 1.01" for 10 YR event
Inflow = 5.43 cfs @ 12.01 hrs, Volume= 17,807 cf
Outflow = 1.31 cfs @ 12.46 hrs, Volume= 17,807 cf, Atten= 76%, Lag= 26.8 min
Discarded = 1.31 cfs @ 12.46 hrs, Volume= 17,807 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 128.83' @ 12.46 hrs Surf.Area= 6,820 sf Storage= 3,246 cf
Flood Elev= 134.00' Surf.Area= 6,820 sf Storage= 14,913 cf

Plug-Flow detention time= 14.2 min calculated for 17,802 cf (100% of inflow)
Center-of-Mass det. time= 14.2 min (901.5 - 887.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.00'	5,988 cf	**58.50'W x 116.36'L x 3.50'H Field A** 23,825 cf Overall - 8,855 cf Embedded = 14,970 cf x 40.0% Voids
#2A	128.50'	8,855 cf	**ADS_StormTech SC-740** x 192 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
#3	128.00'	70 cf	**4.00'D x 5.60'H Vertical Cone/Cylinder**
		14,913 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**12.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.60' S= 0.0041 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	129.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	131.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	128.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.31 cfs @ 12.46 hrs HW=128.83' (Free Discharge)
└**4=Exfiltration** (Controls 1.31 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CH-1: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

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

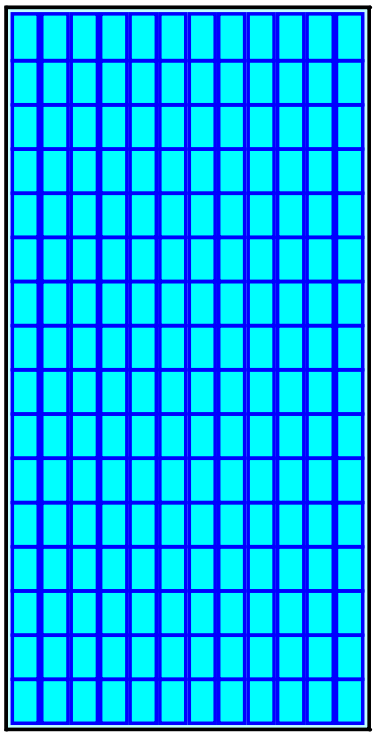
16 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 114.36' Row Length +12.0" End Stone x 2 = 116.36' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

192 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 8,854.6 cf Chamber Storage

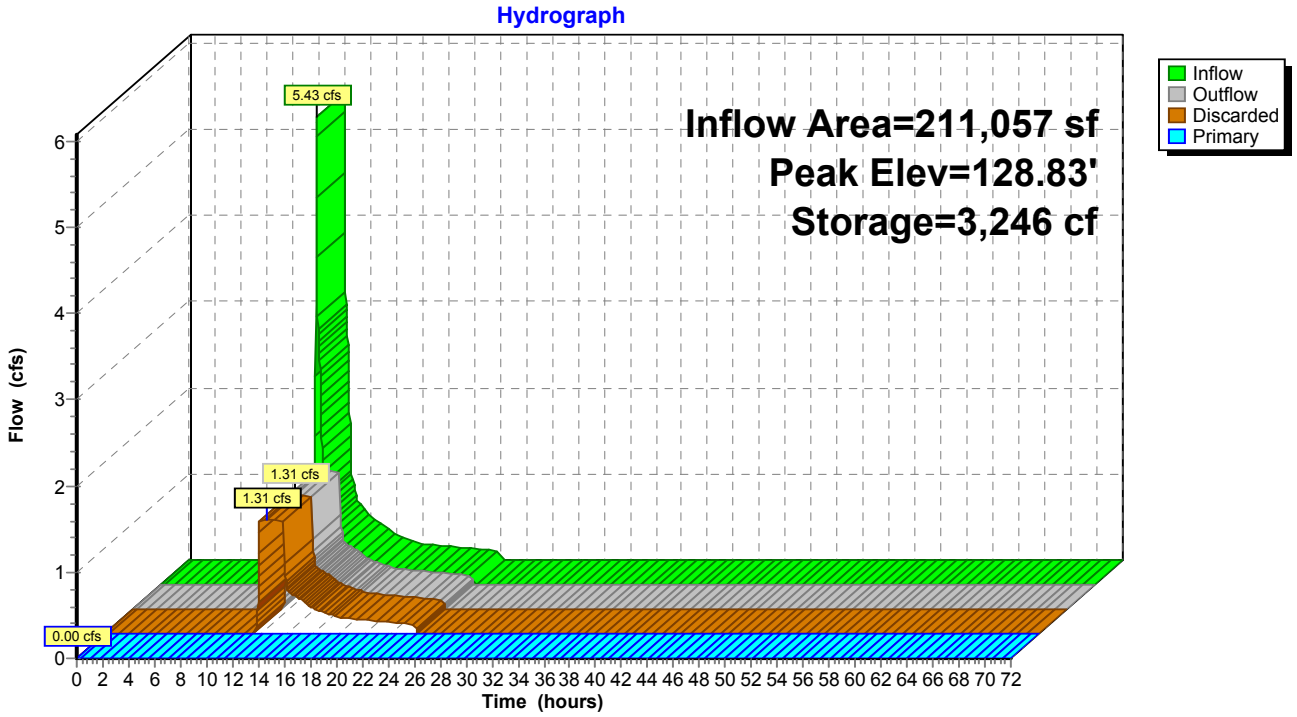
23,824.7 cf Field - 8,854.6 cf Chambers = 14,970.2 cf Stone x 40.0% Voids = 5,988.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,842.6 cf = 0.341 af
Overall Storage Efficiency = 62.3%

192 Chambers
882.4 cy Field
554.5 cy Stone



Pond CH-1: Chambers



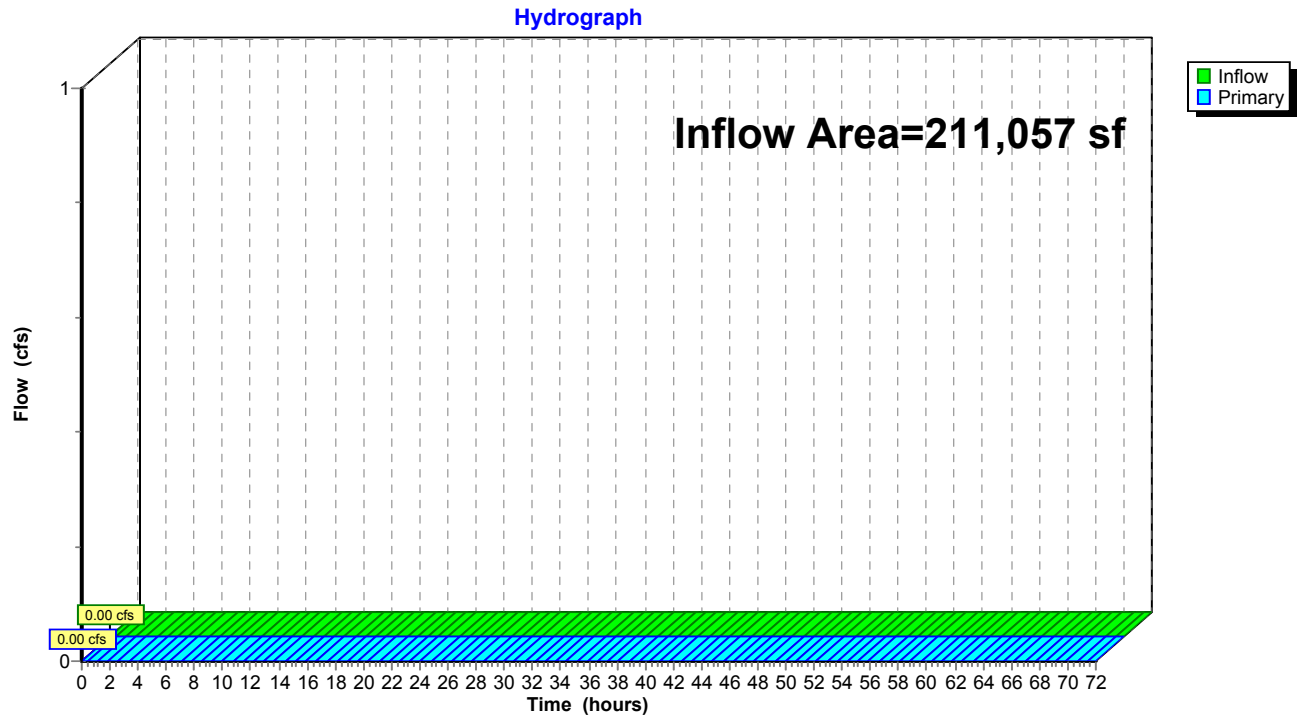
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 31.11% Impervious Runoff Depth=1.65"
Tc=0.0 min CN=54 Runoff=10.08 cfs 28,944 cf

Pond CH-1: Chambers Peak Elev=129.64' Storage=7,718 cf Inflow=10.08 cfs 28,944 cf
Discarded=1.32 cfs 28,143 cf Primary=0.28 cfs 801 cf Outflow=1.60 cfs 28,944 cf

Pond P1: Analysis Pt. 1 Inflow=0.28 cfs 801 cf
Primary=0.28 cfs 801 cf

Total Runoff Area = 211,057 sf Runoff Volume = 28,944 cf Average Runoff Depth = 1.65"
68.89% Pervious = 145,394 sf 31.11% Impervious = 65,663 sf

Summary for Subcatchment S1: Subcat S1

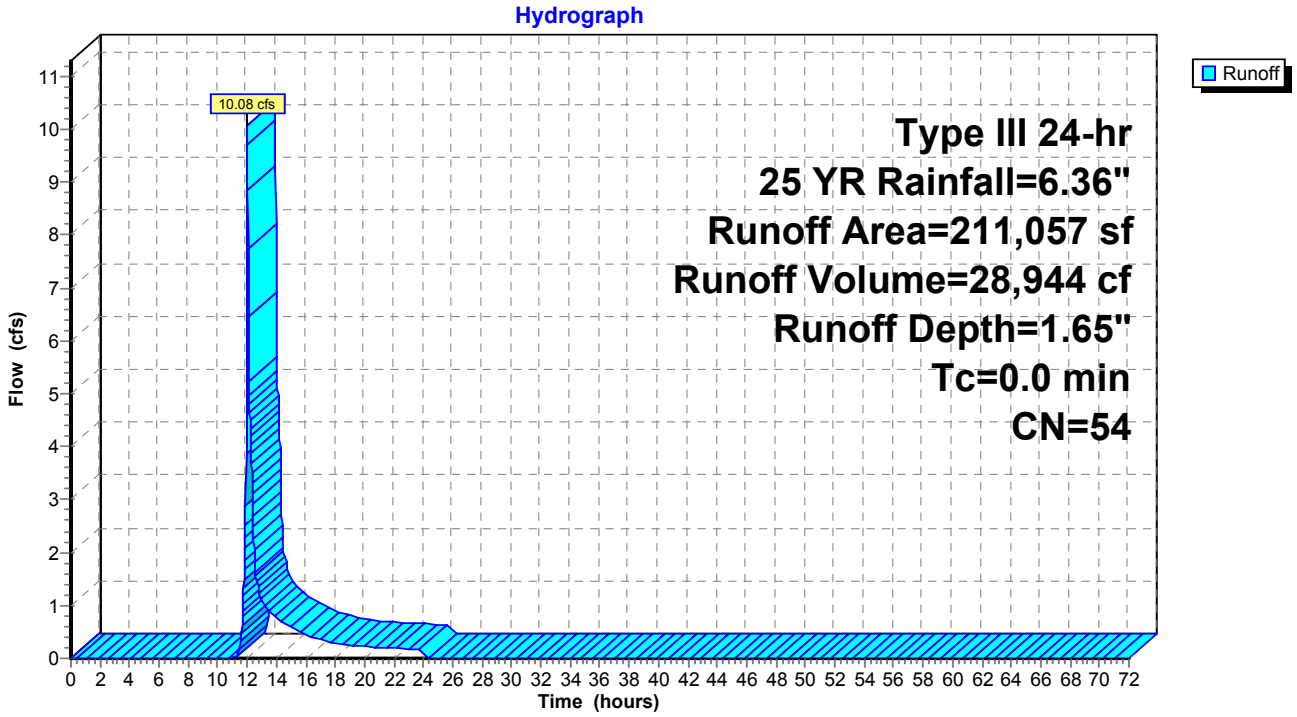
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 10.08 cfs @ 12.01 hrs, Volume= 28,944 cf, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (sf)	CN	Description
1,259	39	Pasture/grassland/range, Good, HSG A
1,202	39	Pasture/grassland/range, Good, HSG A
530	39	Pasture/grassland/range, Good, HSG A
531	39	Pasture/grassland/range, Good, HSG A
336	39	Pasture/grassland/range, Good, HSG A
63,478	98	Paved parking, HSG A
4,885	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
1	39	Pasture/grassland/range, Good, HSG A
443	39	Pasture/grassland/range, Good, HSG A
10,285	39	Pasture/grassland/range, Good, HSG A
32,682	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
449	39	Pasture/grassland/range, Good, HSG A
8,685	39	Pasture/grassland/range, Good, HSG A
2,185	98	Paved parking, HSG A
1,103	39	Pasture/grassland/range, Good, HSG A
1,331	39	Pasture/grassland/range, Good, HSG A
211,057	54	Weighted Average
145,394		68.89% Pervious Area
65,663		31.11% Impervious Area

Subcatchment S1: Subcat S1



Summary for Pond CH-1: Chambers

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 1.65" for 25 YR event
Inflow = 10.08 cfs @ 12.01 hrs, Volume= 28,944 cf
Outflow = 1.60 cfs @ 12.51 hrs, Volume= 28,944 cf, Atten= 84%, Lag= 30.1 min
Discarded = 1.32 cfs @ 12.51 hrs, Volume= 28,143 cf
Primary = 0.28 cfs @ 12.51 hrs, Volume= 801 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 129.64' @ 12.51 hrs Surf.Area= 6,820 sf Storage= 7,718 cf
Flood Elev= 134.00' Surf.Area= 6,820 sf Storage= 14,913 cf

Plug-Flow detention time= 41.7 min calculated for 28,944 cf (100% of inflow)
Center-of-Mass det. time= 41.7 min (911.9 - 870.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.00'	5,988 cf	**58.50'W x 116.36'L x 3.50'H Field A** 23,825 cf Overall - 8,855 cf Embedded = 14,970 cf x 40.0% Voids
#2A	128.50'	8,855 cf	**ADS_StormTech SC-740** x 192 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
#3	128.00'	70 cf	**4.00'D x 5.60'H Vertical Cone/Cylinder**
		14,913 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**12.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.60' S= 0.0041 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	129.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	131.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	128.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.32 cfs @ 12.51 hrs HW=129.64' (Free Discharge)
└**4=Exfiltration** (Controls 1.32 cfs)

Primary OutFlow Max=0.28 cfs @ 12.51 hrs HW=129.64' (Free Discharge)
└**1=Culvert** (Passes 0.28 cfs of 2.54 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 1.98 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CH-1: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

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

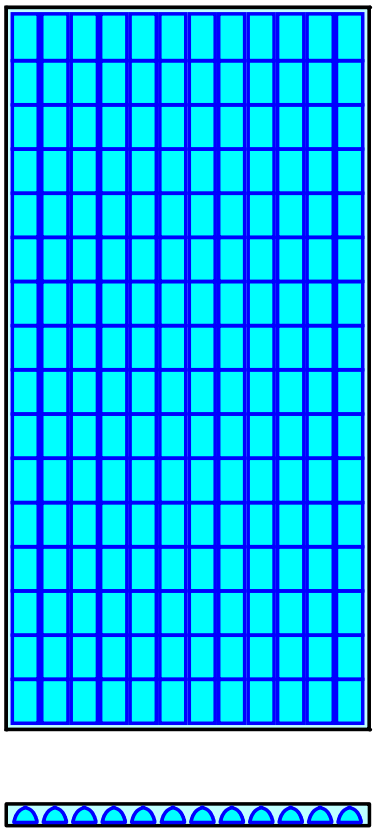
16 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 114.36' Row Length +12.0" End Stone x 2 = 116.36' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

192 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 8,854.6 cf Chamber Storage

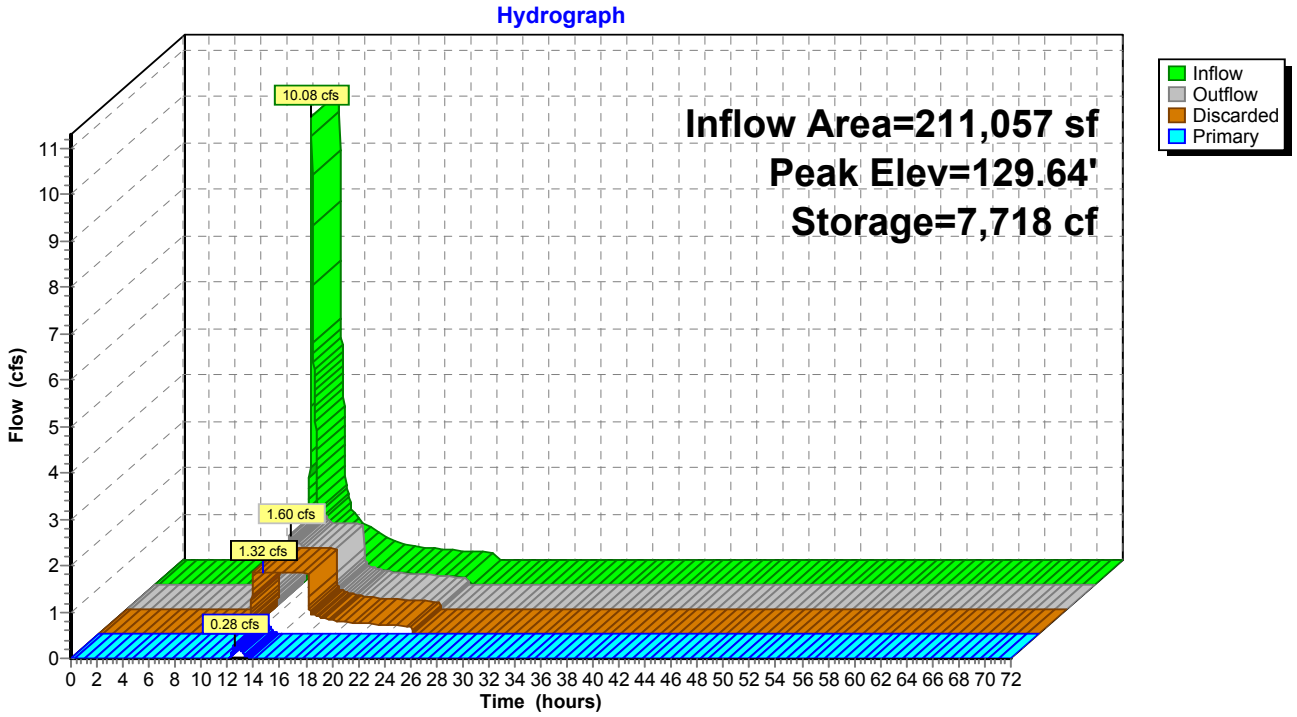
23,824.7 cf Field - 8,854.6 cf Chambers = 14,970.2 cf Stone x 40.0% Voids = 5,988.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,842.6 cf = 0.341 af
Overall Storage Efficiency = 62.3%

192 Chambers
882.4 cy Field
554.5 cy Stone



Pond CH-1: Chambers



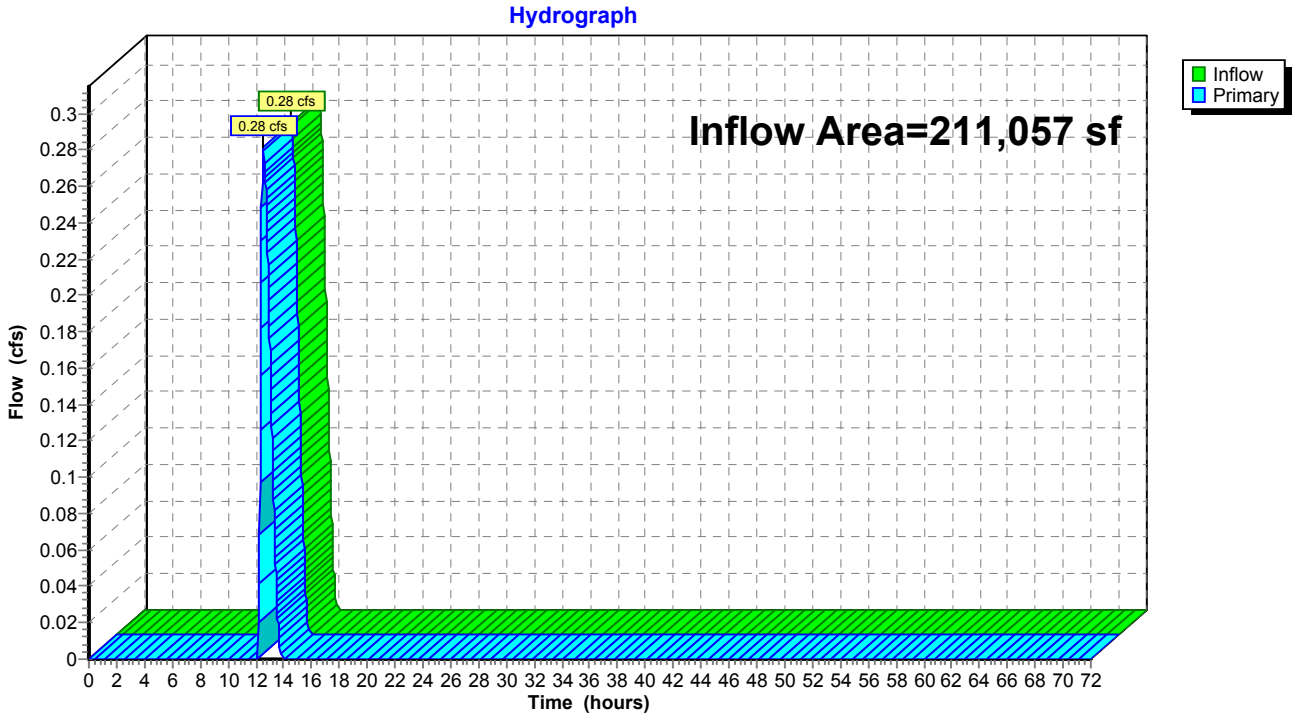
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.05" for 25 YR event
Inflow = 0.28 cfs @ 12.51 hrs, Volume= 801 cf
Primary = 0.28 cfs @ 12.51 hrs, Volume= 801 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Pond P1: Analysis Pt. 1



Time span=0.00-72.00 hrs, dt=0.02 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment S1: Subcat S1 Runoff Area=211,057 sf 31.11% Impervious Runoff Depth=2.79"
Tc=0.0 min CN=54 Runoff=18.31 cfs 49,077 cf

Pond CH-1: Chambers Peak Elev=131.84' Storage=14,891 cf Inflow=18.31 cfs 49,077 cf
Discarded=1.34 cfs 38,535 cf Primary=3.88 cfs 10,542 cf Outflow=5.22 cfs 49,077 cf

Pond P1: Analysis Pt. 1 Inflow=3.88 cfs 10,542 cf
Primary=3.88 cfs 10,542 cf

Total Runoff Area = 211,057 sf Runoff Volume = 49,077 cf Average Runoff Depth = 2.79"
68.89% Pervious = 145,394 sf 31.11% Impervious = 65,663 sf

Summary for Subcatchment S1: Subcat S1

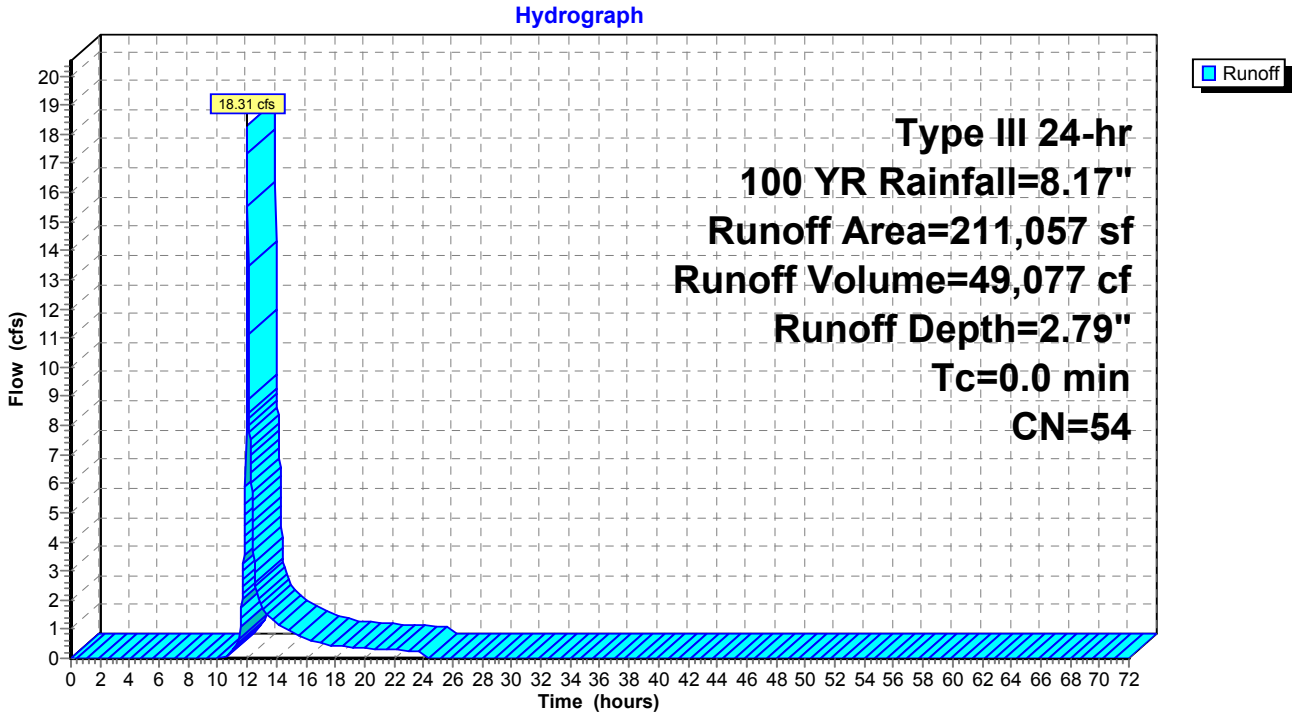
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 18.31 cfs @ 12.00 hrs, Volume= 49,077 cf, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (sf)	CN	Description
1,259	39	Pasture/grassland/range, Good, HSG A
1,202	39	Pasture/grassland/range, Good, HSG A
530	39	Pasture/grassland/range, Good, HSG A
531	39	Pasture/grassland/range, Good, HSG A
336	39	Pasture/grassland/range, Good, HSG A
63,478	98	Paved parking, HSG A
4,885	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
1	39	Pasture/grassland/range, Good, HSG A
443	39	Pasture/grassland/range, Good, HSG A
10,285	39	Pasture/grassland/range, Good, HSG A
32,682	39	Pasture/grassland/range, Good, HSG A
2,033	30	Woods, Good, HSG A
8,196	30	Woods, Good, HSG A
12,995	30	Woods, Good, HSG A
1,474	39	Pasture/grassland/range, Good, HSG A
148	30	Woods, Good, HSG A
1,392	30	Woods, Good, HSG A
9,331	30	Woods, Good, HSG A
46,101	30	Woods, Good, HSG A
449	39	Pasture/grassland/range, Good, HSG A
8,685	39	Pasture/grassland/range, Good, HSG A
2,185	98	Paved parking, HSG A
1,103	39	Pasture/grassland/range, Good, HSG A
1,331	39	Pasture/grassland/range, Good, HSG A
211,057	54	Weighted Average
145,394		68.89% Pervious Area
65,663		31.11% Impervious Area

Subcatchment S1: Subcat S1



Summary for Pond CH-1: Chambers

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 2.79" for 100 YR event
Inflow = 18.31 cfs @ 12.00 hrs, Volume= 49,077 cf
Outflow = 5.22 cfs @ 12.38 hrs, Volume= 49,077 cf, Atten= 71%, Lag= 22.7 min
Discarded = 1.34 cfs @ 12.39 hrs, Volume= 38,535 cf
Primary = 3.88 cfs @ 12.38 hrs, Volume= 10,542 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs
Peak Elev= 131.84' @ 12.39 hrs Surf.Area= 6,820 sf Storage= 14,891 cf
Flood Elev= 134.00' Surf.Area= 6,820 sf Storage= 14,913 cf

Plug-Flow detention time= 59.2 min calculated for 49,063 cf (100% of inflow)
Center-of-Mass det. time= 59.2 min (912.5 - 853.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.00'	5,988 cf	**58.50'W x 116.36'L x 3.50'H Field A** 23,825 cf Overall - 8,855 cf Embedded = 14,970 cf x 40.0% Voids
#2A	128.50'	8,855 cf	**ADS_StormTech SC-740** x 192 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 12 rows
#3	128.00'	70 cf	**4.00'D x 5.60'H Vertical Cone/Cylinder**
		14,913 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	128.50'	**12.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 128.50' / 127.60' S= 0.0041 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	129.30'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	131.50'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Discarded	128.00'	**8.270 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'

Discarded OutFlow Max=1.34 cfs @ 12.39 hrs HW=131.80' (Free Discharge)
└**4=Exfiltration** (Controls 1.34 cfs)

Primary OutFlow Max=3.58 cfs @ 12.38 hrs HW=131.80' (Free Discharge)
└**1=Culvert** (Passes 3.58 cfs of 4.15 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.42 cfs @ 7.23 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.16 cfs @ 1.80 fps)

Pond CH-1: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 12 rows

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

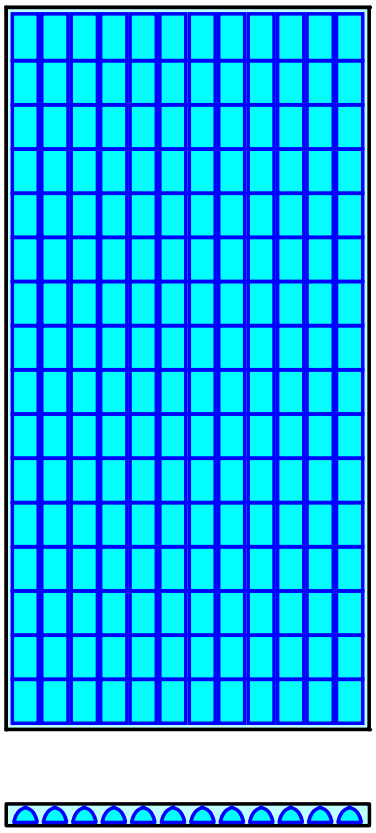
16 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 114.36' Row Length +12.0" End Stone x 2 = 116.36' Base Length
12 Rows x 51.0" Wide + 6.0" Spacing x 11 + 12.0" Side Stone x 2 = 58.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

192 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 12 Rows = 8,854.6 cf Chamber Storage

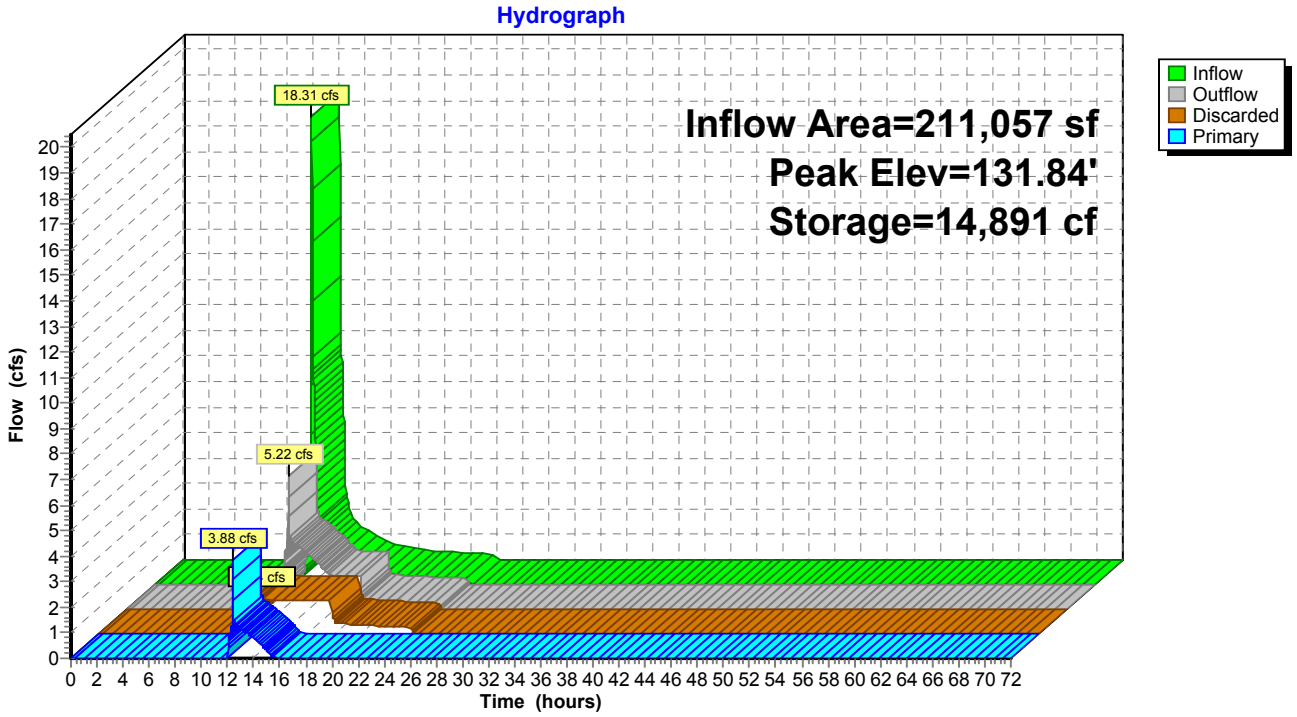
23,824.7 cf Field - 8,854.6 cf Chambers = 14,970.2 cf Stone x 40.0% Voids = 5,988.1 cf Stone Storage

Chamber Storage + Stone Storage = 14,842.6 cf = 0.341 af
Overall Storage Efficiency = 62.3%

192 Chambers
882.4 cy Field
554.5 cy Stone



Pond CH-1: Chambers



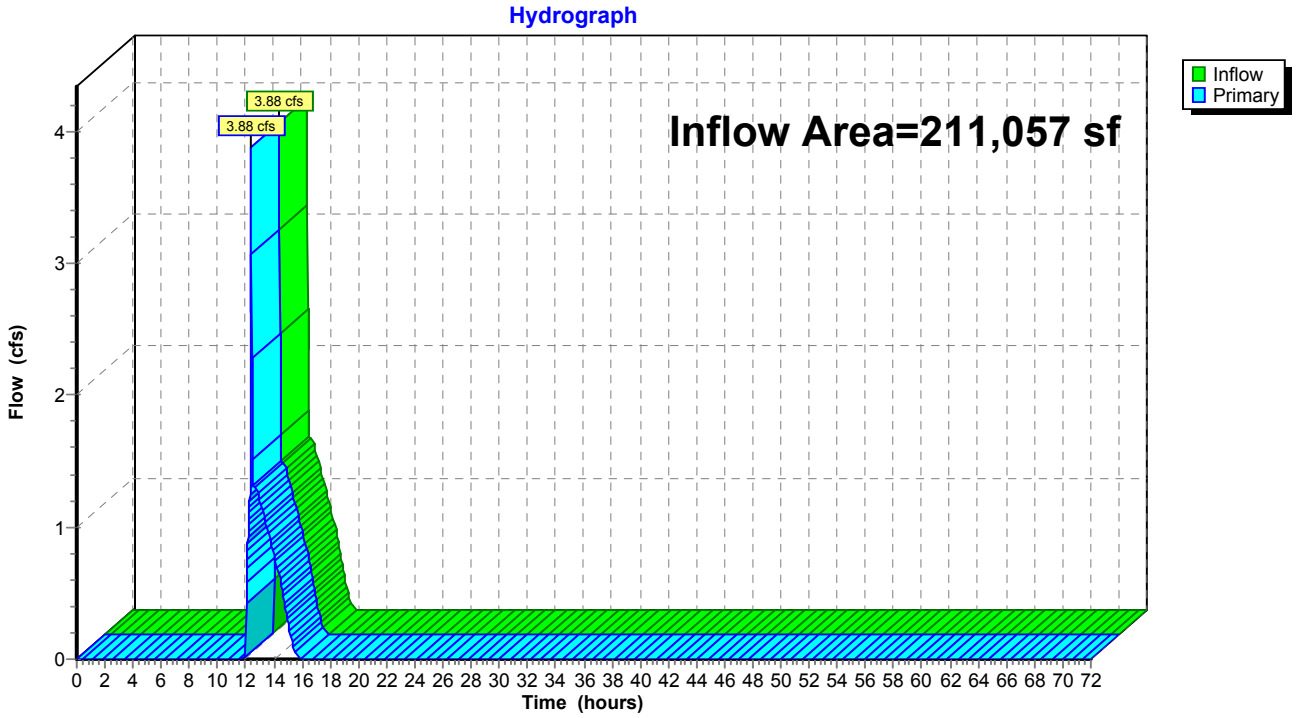
Summary for Pond P1: Analysis Pt. 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 211,057 sf, 31.11% Impervious, Inflow Depth = 0.60" for 100 YR event
Inflow = 3.88 cfs @ 12.38 hrs, Volume= 10,542 cf
Primary = 3.88 cfs @ 12.38 hrs, Volume= 10,542 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.02 hrs

Pond P1: Analysis Pt. 1



Attachment E - Calculations

Wayland - High School Athletic Facilities
Recharge Calculation

Required Recharge

Area Summary	
	Area (SF)*
Existing Impervious	0
Proposed Impervious	65,663
Required Recharge Area *(Proposed - Existing)*	65,663

* Areas calculated in HydroCAD

Note: Site consists of HSG A soils.

Hydrologic Soil Group Summary		
Group	Target Depth Factor (in)	Area (SF)
A	0.6	65,663
B	0.35	0
C	0.25	0
D	0.1	0

Required Recharge (*Rv*) Calculation:

Rv = Target Depth Factor x Δ Impervious Area
Rv = 0.6 x (1/12) x 65,663
Rv = 3,283 CF

Proposed Recharge Summary

Location	Volume (CF)*	Description
Underground Chambers	5,564	Chamber Field
Total	5,564	

Rv = 3,283 CF
Provided recharge = 5,564 CF

Recharge Requirement is met.

*Note: Volume numbers listed above reflect static volume available in recharge systems. Actual volume of recharged water will be much higher due to dynamic action reflected in the HydroCAD analysis.

Wayland-Loker Field
Water Quality Volume Calculation
Jul-18

Required Water Quality Storage
Proposed Paved Area sf x 1" x 1'/12"= Required WQ Storage CF

Location	Proposed Impervious Area (sqft)	Required WQ Storage (cf)	Provided WQ Storage (cf)	Description
Facility Site	65,663	5,472	5,564	Chamber Field (Volume below lowest outlet)

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Wayland High School Athletic Fields - Parking Lot

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Subsurface Infiltration Structure	**0.80**	**0.75**	**0.60**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**

Total TSS Removal = **85%**

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

Project: **Wayland HS Athletic Fields**
Prepared By: **JIP**
Date: **7/11/2018**

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

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

Attachment F - Long Term Pollution Prevention Plan

Long Term Pollution Prevention Plan
Wayland High School Athletic Facilities Improvements
Wayland, MA

To meet the requirements of Standard 4 of the Massachusetts Stormwater Handbook, this Long Term Pollution Prevention Plan is provided to identify the proper procedures of practices for source control and pollution prevention.

Storage and Handling of Oil and other Hazardous Materials

There will be no oil or other hazardous materials stored onsite.

Salt Storage

There will be no salt storage onsite.

Vehicle Storage and Washing

Vehicles will only park on a temporary basis during use of the field. Vehicles will not be stored or washed onsite.

Operation and Maintenance of Stormwater Control Structures

Included in Attachment H of this appendix is the Operation and Maintenance plan for this site, which includes street sweeping of the paved areas and periodic removal of sediment from catch basins and other stormwater structures. The Town will be responsible for implementing the plan.

Landscaping

The landscaped areas will be maintained by the Town. Fertilizers will not be stored onsite.

De-icing & Snow Disposal

The Town intends to utilize salt and sand to treat the paved surfaces of the driveways and main circulation areas during snow and ice events.

Attachment G - Construction Period Pollution and Erosion and Sedimentation Control Plan

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan

SECTION 1: Introduction

The project applicant, Wayland High School is proposing the replacement of their current turf field, and their existing tennis courts. They are also proposing the addition of a girls softball field and basketball courts. These major renovations will be accompanied by more minor additions such as bleachers, parking areas, a ticket booth, and additional bathroom facilities.

As part of this project, this "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan" has been created to insure that no further disturbance to the wetland resource is created during the construction of these improvements.

SECTION 2: Construction Period Pollution Prevention Measures

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter and retain sediment. Both erosion and sedimentation controls and non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the WPA and Stormwater Standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. All recommended control practices will comply with the standards set in the MA DEP Stormwater Policy Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

In order to minimize disturbed areas all work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor shall not disturb native vegetation in the undisturbed wetland area without prior approval from the Engineer. The Contractor will be responsible to make sure that all workers know the proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the project

All construction areas adjacent to wetlands will be lined with compost filter tubes and silt fence. The tubes and silt fence will be inspected daily and accumulated silt will be removed as appropriate. In addition, any storage of material will require a second level of

protection by surrounding the areas with another row of compost filter tubes. A stabilized truck entrance/exit is proposed so that equipment visiting the site can remove any accumulated dirt and mud from vehicles to prevent tracking the mud onto public roads.

2.3 Stabilize Soils

The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, mulching, the use of erosion control mats, or other protective measures shall be provided as specified.

The Contractor shall take account of the conditions of the soil where erosion control seeding will take place to insure that materials used for re-vegetation are adaptive to the sediment control.

2.4 Proper storage and cover of any stockpiles

The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer.

No excavated materials or materials used in backfill operations shall be stored within a minimum distance of fifty (50) feet of any watercourse or any wetlands. Adequate measures for erosion and sediment control such as the placement of compost filter tubes around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

There shall be no storage of equipment or materials in areas designated as wetlands.

The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

2.5 Perimeter Controls and Sediment Barriers

Erosion control lines as described in Section 5 will be utilized to ensure that no sedimentation occurs outside the perimeter of the work area.

2.6 Storm Drain Inlet Protection

Storm Drain inlets (catch basins) will be fitted with a protective insert.

2.7 Retain Sediment On-Site

The Contractor will be responsible to monitor all erosion control measures. Whenever

necessary the Contractor will clear all sediment from the compost filter tubes and silt fence that have been silted up during construction. Daily monitoring should be conducted using the attached Monitoring Form.

The following good housekeeping practices will be followed on-site during the construction project.

2.8 Material Handling and Waste Management

All materials stored on-site will be stored in a neat, orderly manner in appropriate containers. All materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

All waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site daily and disposed of properly. The contractor will be responsible for all waste removal. Manufacturer's recommendations for proper use and disposal will be followed for all materials. Sanitary waste will be collected from the portable units a minimum of once a week, by a licensed sanitary waste management contractor.

2.9 Designated Washout Areas

The Contractor shall use washout facilities at their own facilities, unless otherwise directed by the Engineer.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks on stored equipment do not contaminate the site, oil-absorbing mats will be placed under all equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Repair of equipment or machinery within the 100' water resources area shall not be allowed without the prior approval of the Engineer. Any petroleum products will be stored in tightly sealed containers that are clearly labeled.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site.

SECTION 3: Spill Prevention and Control Plan

The Contractor will be responsible for preventing spills in accordance with the project

specifications and applicable federal, state and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

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

3.2 Notification

All workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification is to the DEP. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

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

3.4 Hazardous Materials Spill Report

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

40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4: Contact Information/Responsible Parties

Owner/Operator:
Town of Wayland
41 Cochituate Road
Wayland, MA 01778

Engineer:
James Pearson, P.E.
Weston & Sampson, Inc.
5 Centennial Drive
Peabody, MA 01960
978-532-1900

Site Inspector:
TBD

Contractor:
TBD

SECTION 5: Erosion and Sedimentation Control

Erosion and Sedimentation Controls are shown on the project plans. In addition a technical specification (***Section 01570 Environmental Protection***) has been included as part of Appendix D, which details all Erosion and Sedimentation controls.

SECTION 6: Site Development Plans

A full set of site development plans are included with this submittal.

SECTION 7: Operation and Maintenance of Erosion Control

The erosion control measures will be installed as detailed in the technical specification ***01570 Environmental Protection***. If there is a failure to the controls the Contractor, under the supervision of the Engineer, will be required to stop work until the failure is repaired.

Periodically throughout the work, whenever the Engineer deems it necessary, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8: Inspection Schedule

During construction the erosion and sedimentation controls will be inspected daily. Once the Contractor is selected, an on site inspector will be selected to work closely with the Engineer to insure that all erosion and sedimentation controls are in place and working properly. An Inspection Form is included.

Inspection Form

Inspected By: _____ Date: _____Time:_____

YES	NO	DOES NOT APPLY	ITEM
			Do any erosion/siltation control measures require repair or clean out to maintain adequate function?
			Is there any evidence that sediment is leaving the site and entering the wetlands?
			Are any temporary soil stockpiles or construction materials located in non-approved areas?
			Are on-site construction traffic routes, parking, and storage of equipment and supplies located in areas not specifically designed for them?

Specific location, current weather conditions, and action to be taken:

_____

_____

_____

_____

_____

Other Comments:

_____

_____

Pending the actions noted above I certify that the site is in compliance with the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan.

Signature: _____ Date: _____

Attachment H - Operations and Maintenance Plan

Attachment H –
Long-Term Operation and Maintenance Plan

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. The Town of Wayland is the owner and operator of the system and is responsible for its upkeep and maintenance.

This work will be funded on an annual basis through the town's operating budget. The estimated budget to maintain these BMPs utilizing the Municipal Services Department workforce and equipment is approximately $2,000 per year. This budget assumes that Town equipment will be utilized and no additional equipment rental is required.

In the event the Town sells the property, it is the Town's responsibility to transfer this plan as well as the past three years of operation and maintenance records to the new property owner.

3.0 BMP Description and Locations

3.1 Street Sweeping

Street sweeping consists of using a street sweeping machine to clean impervious areas of accumulated sediment, debris, and trash at parking areas.

3.2 Deep Sump Catch Basins

Deep sump catch basins will be located throughout the site and used as pre-treatment before entering the stormwater detention/infiltration basin. The deep sump catch basins are designed to remove trash, debris, and coarse sediment from the stormwater runoff.

3.4 Stormwater Infiltration Chambers

There is one underground infiltration chamber field in the facility that will receive stormwater. A stormwater infiltration chamber field will be built beneath the

parking lot area of the site. This structure also significantly mitigates TSS and provides for stormwater detention to mitigate peak discharges from the site.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Street Sweeping

Street sweeping shall be performed on the proposed parking lot areas at least twice per year, primarily in the spring and fall. Street sweeping shall be performed using an appropriate street sweeping machine.

In the event of contamination by a spill or other means, all street sweeping cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, street sweeping cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids. Also see attached operations and maintenance standards (reproduced from the Massachusetts Stormwater Handbook) at the end of this section

4.2 Deep Sump Catch Basins

Inspect and/or clean catch basin at least four times per year and at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. The catch basin and oil-grit separators should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. Catch basins shall be cleaned with clamshell buckets or vacuum trucks.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids. Also see attached operations and maintenance standards (reproduced from the Massachusetts Stormwater Handbook) at the end of this section

4.3 Stormwater Infiltration Chambers

The stormwater infiltration chamber field shall be inspected every six months during the first year, and annually thereafter. All accumulated sediment and debris in the isolation row(s) shall be removed using water jetting and vacuum truck equipment as described in manufacturer literature for the chamber system.

4.4 Inspections and Record Keeping

- An inspection form should be filled out each and every time maintenance work is performed.
- A binder should be kept by the owner that contains all of the completed inspection forms and any other related materials.
- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.
- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site at the owner.
- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

5.0 Public Safety Features

Underground stormwater system measures are protected from access via manhole covers and grates.

6.0 Stormwater Management System Owner/Responsible Party

Town of Wayland
41 Cochituate Road
Wayland, MA 01778

This operation and Maintenance Plan will be recorded with the registry of deeds so that current and future owners are aware of the requirement for proper operation and maintenance of the onsite stormwater system.

Town of Wayland
High School Athletic Facilities
Permanent BMP Inspection Checklist

Street Sweeping

Frequency:	Monthly, primarily in the spring and fall.
Location:	Parking Lots and Driveways
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Sweep parking lot using street sweeping machine. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

Deep Sump Catch Basins

Frequency:	Inspect and clean deep sump catch basins in March, June, September and December.
Structure Number:	_____
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Clean units four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the structure.

Stormwater Detention/Infiltration Chambers

Frequency:	The detention/infiltration chambers should be inspected every six months during the first year and annually thereafter.
Structure No.:	_____
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Inspect isolation rows. If visible sediment deposition has occurred, insert reverse water jet into isolation row via access manhole and jet sediment backward into manhole. Remove sediment with vacuum truck and dispose of sediment as required.

Attachment I - Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

Section I – Purpose/Intent

The purpose of this document is to provide for the health, safety, and general welfare of the citizens of Wayland, Massachusetts through the regulation of non-stormwater discharges into existing outstanding resource areas near the Wayland Public Works Facility to the maximum extent practicable, as required by federal and state law. This document establishes methods for controlling the introduction of pollutants into existing outstanding resource areas to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process.

Section II - Definitions

For the purposes of this statement, the following shall mean:

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The federal Water Pollution Control Act (33 U.S.C § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity: Activities subject to the Massachusetts Erosion and Sedimentation Control Act or NPDES Construction Permits. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Connection: An illegal connection is defined as either of the following:

a. Any pipe, open channel, drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the outstanding resource area including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water, regardless of whether said drain or connection has been previously allowed, permitted, or approved by an authorized enforcement agency; or
b. Any pipe, open channel, drain or conveyance connected to the Town of Wayland storm water treatment system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Illicit Discharge: Any direct or indirect non-stormwater discharge to the Town of Wayland stormwater treatment system, except as exempted in Section II of this ordinance.

Industrial Activity: Activities subject to NPDES Industrial Permits as defined in 40CFR, Section 122.26 (b) (14).

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by MassDEP under authority delegated pursuant to 33 USC § 1342 (b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Town of Wayland Stormwater Treatment System: Any facility, owned or maintained by the town, designed or used for collecting and/or conveying stormwater, including but not limited to roads with drainage systems, Town of Wayland streets, curbs, gutters, inlets, catch basins, piped storm drains, pumping facilities, infiltration, retention and detention basins, natural and man-made or altered drainage channels, reservoirs, and other drainage structures.

Non-Stormwater Discharge: Any discharge to the storm drain system that is not composed entirely of stormwater.

Person: Any individual, association, organization, partnership, firm, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, interstate body, or any other legal entity.

Pollutant: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; petroleum hydrocarbons; automotive fluids; cooking grease; detergents (biodegradable or otherwise); degreasers; cleaning chemicals; non-hazardous liquid and solid wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; liquid and solid wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; concrete and cement; and noxious or offensive matter of any kind.

Pollution: Contamination or other alteration of any water's physical, chemical, or biological properties by addition of any constituent including but not limited to a change in temperature, taste, color, turbidity, or odor of such waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, welfare, or environment, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Wastewater: Any water or other liquid discharged from a facility, that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products.

Section III - Prohibitions

Prohibition of Illicit Discharges:

No person shall throw, drain, or otherwise discharge, cause or allow others under its control to throw, drain, or otherwise discharge into the Town of Wayland stormwater treatment system or watercourses any materials, including but not limited to, any pollutants or waters containing any pollutants, other than stormwater. The commencement, conduct or continuance of any illicit discharge to the storm drain system is prohibited except as described as follows:

1. Water line flushing performed by a government agency, other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, natural riparian habitat or wetland flows, and any other water source not containing pollutants;

2. Discharges or flows from fire fighting, and other discharges specified in writing by the Town of Wayland as being necessary to protect public health and safety;

3. Dye testing is an allowable discharge, but requires a verbal notification to the Town of Wayland prior to the time of the test;

4. Any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for a discharge to the Town of Wayland stormwater treatment system.

Section IV - Industrial or Construction Activity Discharges

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Town of Wayland Department of Public Works prior to allowing discharges to the Wayland stormwater treatment system.

Section V - Notification of Spills and Accidental Discharges

Notwithstanding other requirements of law, as soon as any person responsible for a facility, activity or operation, or responsible for emergency response for a facility, activity or operation has information of any known or suspected release of pollutants or non-stormwater discharges from that facility, activity, or operation which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Londmeadow stormwater treatment system, State Waters, or Waters of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release so as to minimize the effects of the discharge. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Town of Wayland Department Public Works in person or by phone no later than the next business day, including the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice, via certified mail return receipt requested addressed to the Town of Wayland Department of Public Works within three (3) business days of the initial notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

IN WITNESS WHEREOF the parties hereto have executed copies of this Agreement on the _____ day of _____, _____.

_____

Town of Wayland