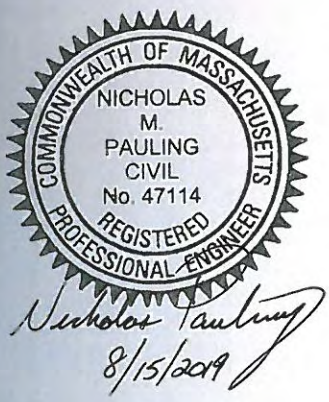
Stormwater Management Report

Healy Corner
195 Tahattawan Road
Littleton, MA

August 2019



Submitted to:
Town of Littleton Planning Board
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Room 303
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Submitted by:
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Project No:
171088

GPR Engineering Solutions for Land & Structures

Table of Contents

Attachments

"Definitive Subdivision Plan - Open Space Development - Healy Corner - Littleton, MA" prepared for Glavey Family Trust, Dated August 2019.

Long-Term Pollution Prevention Plan & Stormwater System Operation and Maintenance Plan, Dated August 2019.

Section 1

Introduction and Methodology

Introduction and Methodology

This Stormwater Management Report is intended to accompany plans for the proposed residential open space subdivision referred to as Healy Corner located at 195 Tahattawan Road in Littleton, MA. Included in this report are calculations that support a final engineering design as required by the state's Wetlands Protection Act Regulations and the Town of Littleton's bylaws and regulations. Site specific information is presented under two scenarios, "pre-development" and "post-development" conditions, so that potential impacts due to the project can be identified, quantified and, as necessary, mitigated.

The final design intent seeks to meet the following interrelated goals:

1. Limit stormwater runoff rates and volumes for the 2-, 10-, 25-, 50-, and 100-year storm events to existing (pre-development) levels;

2. Evaluate potential on- and off-site flooding during the 100-year storm event due to proposed development;

3. Maintain or increase the volume of stormwater recharged per storm event to those of existing (pre-development) levels;

4. Prevent appreciable sediment and other suspended solids and contaminants transport by trapping them on site via Best Management Practices;

5. Provide adequate drainage for new surfaces;

6. Maintain existing drainage patterns while providing a cost-effective engineering solution that addresses regulatory as well as real-world constraints.

Site Description

The proposed residential open space subdivision, Healy Corner, is located at 195 Tahattawan Road in south-central Littleton. The project area consists of one parcel containing a total of 44± acres, approximately 1 ¾ of a mile from Littleton Common. Primary site access is off Tahattawan Road, with parts of the parcel along Harwood Avenue. the property consists of wooded area, unmaintained meadow, wetlands, and an existing single-family dwelling with surrounding lawn area located along Tahattawan Road. The area around the existing dwelling is the general high point of the property at elevation 307± and then moderate to steep slopes towards the southwest to a wetland area with elevations ranging from 255± to 265±. The wetland resource area is located within the southwestern portion of the property, generally receiving surface runoff. Within the wetland resource area is a flagged intermittent stream channel along the southeast edge of the property. Located outside the parcel's limits to the northwest is a stream and associated river front area. A flagged potential vernal pool is located at the southern portion of the abutting property owned by Two Hundred Seventy-One Harwood Avenue Nom. Realty Trust which is outside the

limits of the watersheds being analyzed.

Soils present on the project site, as available from the NRCS Soil Survey, show a mix of 11 different soil types including varying types of the Whitman, Freetown Muck, Ridgebury, Charlton-Hollis-Rock, Paxton, Woodbridge, and Canton soils groups. Of the 11 Soil types located on site, 7 are present within the watershed being reviewed (listed on attached Watershed Maps). While these mapped soil units are mixed, the predominant hydraulic soil groups (HSG) are type C and type B. Onsite soil evaluations conducted within proposed stormwater management areas and throughout property showed typically loamy sand and sandy loam generally consistent with the available mapping. For calculation purposes, the underlying hydraulic soil groups were used.

Under the pre-development scenario, the project site has been divided into a total of four subcatchments. As shown on the plan entitled "WATERSHED MAP PRE-DEVELOPMENT & SOILS OVERLAY", included within the attached Appendix, the four subcatchments area used to quantify peak flows and volumes to two Analysis Points. Subcatchment SC-1, SC-2, and SC-3 describes runoff flowing to the wetland resource area along the wetlands south-western edge, southern edge, and south-eastern edge, respectively, designated as Analysis Point AP-1. Subcatchment SC-2 describes runoff that flows into Tahattawan Road, designated as Analysis Point AP-2.

Project Description

The development consists of a 17 residential lot subdivision with 12 proposed dwellings along the proposed Dennis Circle roadway, 2 proposed dwellings at the end of proposed Alfred Trail private roadway/shared driveway, and 2 proposed dwellings and 1 existing dwelling having access off Tahattawan Road. The proposed roadway, Dennis Circle, will provide access to the entire development, continuing 665± linear feet to a "q" shaped cul-de-sac turnaround. Located off of Dennis Circle is the proposed Alfred Trail private roadway/shared driveway, extending 660± linear feet from its intersection Dennis Circle, providing access to the 2 proposed dwellings. To collect and treat stormwater runoff from Dennis Circle a closed drainage system is proposed. A series of catch basin inlets will allow the runoff within the right of way and abutting contributing areas to enter the system prior to being conveyed to Best Management Practices located on site. The catch basins are provided to treat first flush runoff before conveying runoff to the sediment forebay, which continues into an infiltration basin. To collect and treat stormwater runoff from Alfred Trail an open drainage system is proposed. A trench drain will allow the runoff within the private roadway/shared driveway and abutting contributing areas to enter the system prior to being conveyed to Best Management Practices located on site. The trench drain is provided to treat first flush runoff before conveying runoff to the sand filter. The proposed BMP's have been designed in accordance with the Massachusetts Stormwater Standards to attenuate peak flows and volumes, treat runoff from impervious surfaces and maintain groundwater recharge to those of pre-development conditions.

Under the post-development scenario, the project has been divided into a total of 19 subcatchment areas, shown on the plan entitled "WATERSHED MAP POST-DEVELOPMENT", and included in the attached Appendix, outlining runoff to the developments two Analysis Points. Subcatchment SC-10 outlines runoff flowing directly into Tahattawan Road designated by AP-2.

Subcatchment Roof1 and Roof2 both discharge into Stormtech infiltration chambers that are designed to hold and infiltrate the 100-yr storm, therefore, no discharge is modeled.

Subcatchment SC-1, SC-6, and SC-7 outline runoff from the flows directly into the wetland, designated as AP-1. The proposed development involves crossing the wetland and said crossing will block the natural movement of water at the crossing, acting as a dam. Proposed is a 36" wetland culvert that will allow water to flow under the wetland crossing, and in greater intensity storms, be utilized as a control feature. Subcatchment SC-3 outlines runoff flowing into the proposed wetland culvert that discharges into AP-1. Subcatchment SC-2 outlines run-off flowing over grassed areas into AP-1.

Subcatchments SC-4 and SC-5 describes runoff to the Alfred Trail trench drain, which discharges into the sand filter. The sand filter discharges the runoff into AP-1.

Subcatchments SC8.1 – SC8.8 describes runoff flowing into the multiple catch basins within Dennis Circle roadway. From the catch basins the runoff enters a system of drain manholes which discharge into a sediment forebay. The forebay discharges into an infiltration basin. Subcatchment SC-9 describes runoff that flows directly into the infiltration basin. The infiltration basin then discharges from a four inch culvert and overflow and the runoff goes through the proposed wetland culvert, before being discharged into AP-2.

Hydrologic and Hydraulic Computation Methodology

Runoff rates were computed using the Soil Conservation Service TR-20 Method entitled "Urban Hydrology for Small Watersheds". The following 24-hour rainfall events were analyzed:

Frequency (years): 2, 10, 25, 50 and 100
The climatology of very large precipitation events is a crucial component of engineering design and regulations for such structures and facilities that must withstand or protect against such events. On a national level, since 1960 the rainfall events have not been updated. Recent analysis shows that the rainfall events have in fact changed both in intensity and frequency throughout New England, therefore the amount of water to fall within a 24-hour storm has increased, and we account for that increase. For each storm event the following NRCC Rain Fall amounts for a 24-hour storm are used:
2-Year: 3.09 in.
10-Year: 4.65 in.
25-Year: 5.87 in.
50-Year: 7.00 in.
100-Year: 8.36 in.

As outlined above, runoff from the site has been analyzed at two points under the pre-development and post-development conditions. As a standard for comparison, AP-1 and AP-2 are represented in both the pre and the post development cases.

Summary of Results

Peak discharge rates and volumes of the calculated runoff for both conditions analyzed are displayed in the HYDROLOGY SUMMARY that follows. As shown within the summary, the peak discharge rates and volumes at both analysis points for all analyzed storm events are less than or equal to those under pre-development conditions.

The provided catch basins, overland grass flow, a sediment forebay, a trench drain, an infiltration basin, and a sand filter will provide greater than or equal to the required 80% Total Suspended Solids (TSS) removal required for each discharge point.

The proposed infiltration basin retains and infiltrates a total of 7,443 cubic feet of runoff prior to discharging. Which is well in excess of the minimum required 4,953 cubic feet displaced by the proposed development to met calculated annual recharge.

The proposed development meets the MADEP Stormwater Management Standards through the use of Best Management Practices that address groundwater recharge, water quality (first flush) retention, and suspended solids removal within sustainable BMP's. See Appendix for computed solids quantities / removal process trains, and water quality runoff volumes.

Section 2

Hydrology Summary for 24-hour Storm

HYDROLOGY SUMMARY FOR 24-HOUR STORM

Healy Corner
Littleton, MA
Project No. 171088

PEAK DISCHARGE RATE

Pre-Development (cfs)

Analysis Point	2-YR	10-YR	25-YR	50-YR	100-YR
AP-1	7.6	19.6	30.3	41.1	54.3
AP-2	0.9	2.0	3.0	3.9	5.1

Development (cfs)

Analysis Point	2-YR	10-YR	25-YR	50-YR	100-YR
AP-1	4.8	12.1	25.4	34.6	44.8
AP-2	0.8	1.8	2.6	3.4	4.4

Pre-Development vs. Developed (cfs)

Analysis Point	2-YR	10-YR	25-YR	50-YR	100-YR
AP-1	**-2.7**	**-7.4**	**-4.9**	**-6.4**	**-9.4**
AP-2	**0.0**	**-0.2**	**-0.4**	**-0.5**	**-0.7**

PEAK DISCHARGE VOLUME

Pre-Development (Cubic feet)

Analysis Point	2-YR	10-YR	25-YR	50-YR	100-YR
AP-1	35,951	84,471	128,664	172,668	228,323
AP-2	4,013	8,840	13,120	17,324	22,589

Development (Cubic feet)

Analysis Point	2-YR	10-YR	25-YR	50-YR	100-YR
AP-1	31,459	80,984	126,360	170,909	227,955
AP-2	3,995	8,502	12,440	16,280	21,065

Pre-Development vs. Developed (Cubic feet)

Analysis Point	2-YR	10-YR	25-YR	50-YR	100-YR
AP-1	**-4,492**	**-3,487**	**-2,304**	**-1,759**	**-368**
AP-2	**-18**	**-338**	**-680**	**-1,044**	**-1,524**

Section 3

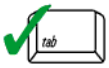
Mass DEP Stormwater Management Report Checklist

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

[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.

B. Stormwater Checklist and Certification

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

Checklist for Stormwater Report

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.

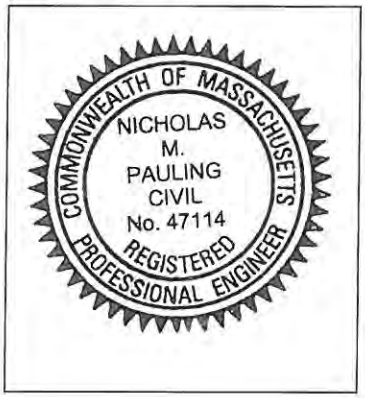
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



Nicholas Pauling 8/15/2019
Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (continued)

Checklist for Stormwater Report

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

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

Standard 1: No New Untreated Discharges

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

Checklist (continued)

Checklist for Stormwater Report

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist (continued)

Checklist for Stormwater Report

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist (continued)

Checklist for Stormwater Report

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 (continued)

Checklist for Stormwater Report

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 (continued)

Checklist for Stormwater Report

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

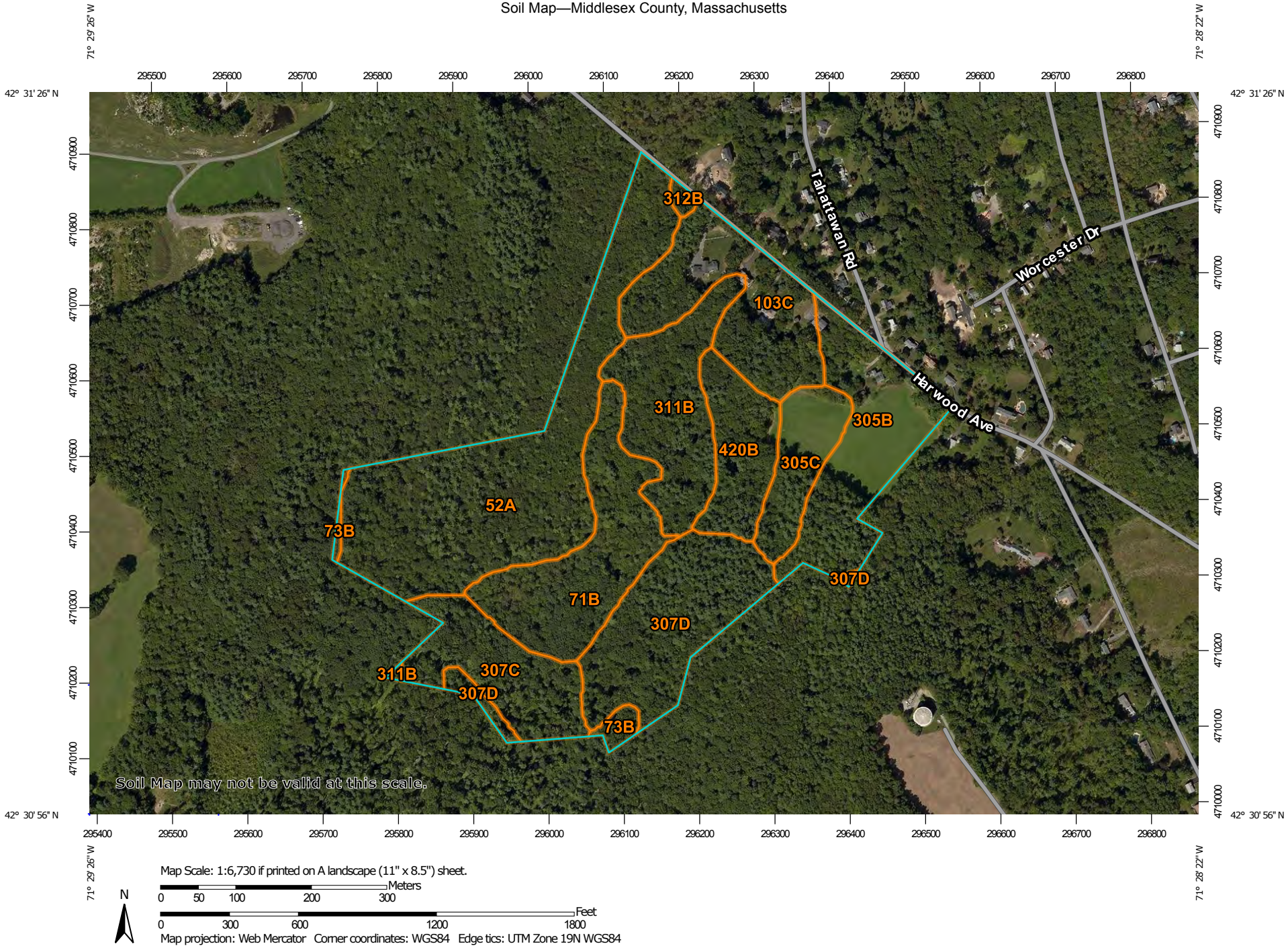
☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ 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.

Section 4

Appendix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42° 30' 56" N
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4710200
4710100
4710000
Tahattawan Rd
Worcester Dr
Harwood Ave
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103C
311B
305B
420B
305C
52A
73B
71B
307D
307C
Soil Map may not be valid at this scale.
Map Scale: 1:6,730 if printed on A landscape (11" x 8.5") sheet.
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0 50 100 200 300
Feet
0 300 600 1200 1800
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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
52A	Freetown muck, 0 to 1 percent slopes	19.3	24.5%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	9.2	11.7%
73B	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	0.7	0.9%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	8.7	11.0%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	8.7	11.1%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	3.8	4.8%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	6.0	7.7%
307D	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	9.8	12.5%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	7.6	9.7%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	0.3	0.4%
420B	Canton fine sandy loam, 3 to 8 percent slopes	4.5	5.8%
Totals for Area of Interest		**78.6**	**100.0%**

FORM 11 - SOIL EVALUATOR FORM

No. 171088 Date: 8/8/18

Commonwealth of Massachusetts
Littleton Massachusetts

Soil Suitability Assessment for On-Site Sewage Disposal

Performed by: Jude Gauvin, GPR Inc Date: 7/11-12/18 7/18-19/18
Witnessed by: Jim Garreffi, NABH

Location Address:	Owner's Name: Glavey Family Trust
or Lot No. 195 Tahattawan Rd Littleton, MA 01460	Address: 195 Tahattawan Road Littleton, MA 01460
	Telephone No.

New Construction ☑ Upgrade ☐ Repair ☐

Office Review

Published Soil Survey Available: No ☑ Yes ☐

Year Published Internet Publication Scale na Soil Map Unit 305B,420B,311B
Soil Name Paxton fine sandy loam Soil Limitations Depth to restrictive features
Soil Name Woodbridge fine sandy loam Soil Limitations Very stony, Depth to restictive features
Soil Name Canton fine sandy loam Soil Limitations Depth to restrictive features

Surficial Geologic Report Available: No ☑ Yes ☐

Year Published MASS GIS Publication Scale
Geologic Material(Map Unit) Glacial Till
Landform Ground Morraine

Flood Insurance Rate Map: 25017C0238F

Above 500 Year Flood Boundary	No ☐	Yes ☑
Within 500 Year Flood Boundary	No ☑	Yes ☐
Within 100 Year Flood Boundary	No ☑	Yes ☐
Within Velocity Zone	No ☑	Yes ☐

Wetland Area:

National Wetlands Inventory Map (map unit) N/A
Wetlands Conservancy Program Map (map unit) N/A

Current Water Resource Conditions (USGS): Month August

Range: Above Normal ☐ Normal ☑ Below Normal ☐
Other Reference Reviewed USGS

Site Info.

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-1 Date: 07/11/18 Time: 12:30 PM Weather: Sunny 80°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-1 NB 30/34 Suface El. 310.1

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		loose, cr
7-18	B	SL	10YR 5/4		vfr, roots
18-92	C	fsl	2.5 Y 6/4	@20"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >92"
Depth to Groundwater: Standing Water in the Hole 92" Weeping from Pit Face: 78"
Estimated Seasonal High Groundwater in the Hole 20"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-2 Date: 07/11/18 Time: 12:45 PM Weather: Sunny 80°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-2 NB 30/34 Suface El. 309.9

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		loose, cr
7-23	B	SL	10YR 5/4		vfr, roots
23-106	C	fsl	2.5 Y 6/4	@23"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >106"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: 80"
Estimated Seasonal High Groundwater in the Hole 23"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-3 Date: 07/11/18 Time: 1:00 PM Weather: Sunny 80°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-3 NB 30/34 Suface El. 309.4

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		loose, cr
7-21	B	SL	10YR 5/4		vfr, roots
23-108	C	fsl	2.5 Y 6/4	@23"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >108"
Depth to Groundwater: Standing Water in the Hole 108" Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 23"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-4 Date: 07/11/18 Time: 1:15 PM Weather: Sunny 80°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-4 NB 30/37 Suface El. 309.3

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		loose, cr
7-21	B	SL	10YR 5/4		vfr, roots
23-110	C	fsl	2.5 Y 6/4	@25"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >110"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 25"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-5 Date: 07/11/18 Time: 1:30 PM Weather: Sunny 80°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-5 NB 30/37 Suface El. 308.1

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-20	B	SL	10YR 5/4		vfr, roots
20-112	C	fsl	2.5 Y 6/4	@29"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >112"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 29"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-6 Date: 07/11/18 Time: 1:45 PM Weather: Sunny 80°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-6 NB 30/37 Suface El. 308.9

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-30	B	SL	10YR 5/4		vfr, roots
30-104	C	fsl	2.5 Y 6/4	@25"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >104"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 25"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-7 Date: 07/12/18 Time: 10:00 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-7 NB 30/38 Suface El. 308.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-24	B	SL	10YR 5/4		vfr, roots
24-102	C	fsl	2.5 Y 6/4	@24"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >102"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-8 Date: 07/12/18 Time: 10:15 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-8 NB 30/38 Suface El. 306.9

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-24	B	SL	10YR 5/4		vfr, roots
24-96	C	fsl	2.5 Y 6/4	@24"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >96"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-9 Date: 07/12/18 Time: 10:30 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line >20' feet
Other: feet

Deep Observation Hole Log

Hole # 718-9 NB 30/38 Suface El. 295.4

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-22	B	SL	10YR 5/4		vfr, roots
22-100	C	fsl	2.5 Y 6/4	@20"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >100"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 20"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-10 Date: 07/12/18 Time: 10:45 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-10 NB 30/38 Suface El. 297.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-26	B	SL	10YR 5/4		vfr, roots
26-96	C	fsl	2.5 Y 6/4	@26"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >96"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 26"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-11 Date: 07/12/18 Time: 11:00 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-11 NB 30/39 Suface El. 295.1

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-30	B	SL	10YR 5/4		vfr, roots
30-99	C	fsl	2.5 Y 6/4	@24"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >99"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-12 Date: 07/12/18 Time: 11:15 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-12 NB 30/39 Suface El. 293.5

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-20	B	SL	10YR 5/4		vfr, roots
20-96	C	fsl	2.5 Y 6/4	@24"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >96"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718.13 Date: 07/12/18 Time: 11:30 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718.13 NB 30/39 Suface El. 303.4

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		loose, cr
7-26	B	SL	10YR 5/4		vfr, roots
26-88	C	fsl	2.5 Y 6/4	@20"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >88"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 20"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-14 Date: 07/12/18 Time: 11:45 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line >20' feet
Other: feet

Deep Observation Hole Log

Hole # 718-14 NB 30/39 Suface El. 306.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-26	B	SL	10YR 5/4		vfr, roots
26-90	C	fsl	2.5 Y 6/4	@28"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >90"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 28"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-15 Date: 07/12/18 Time: 12:00 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-15 NB 30/40 Suface El. 306.1

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-26	B	SL	10YR 5/4		vfr, roots
26-92	C	fsl	2.5 Y 6/4	@25"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >92"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 25"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-16 Date: 07/12/18 Time: 12:45 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-16 NB 30/40 Suface El. 303.3

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-28	B	SL	10YR 5/4		vfr, roots
28-106	C	fsl	2.5 Y 6/4	@25"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >106"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 25"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-17 Date: 07/12/18 Time: 1:00 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	feet

Deep Observation Hole Log

Hole # 718-17 NB 30/40 Suface El. 306.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-29	B	SL	10YR 5/4		vfr, roots
29-109	C	fsl	2.5 Y 6/4	@24"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >109"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-18 Date: 07/12/18 Time: 1:15 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-18 NB 30/41 Suface El. 307.3

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		loose, cr
8-26	B	SL	10YR 5/4		vfr, roots
26-100	C	fsl	2.5 Y 6/4	@23"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >100"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 23"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-19 Date: 07/12/18 Time: 1:30 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-19 NB 30/41 Suface El. 306.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-18	B	SL	10YR 5/4		vfr, roots
18-101	C	fsl	2.5 Y 6/4	@23"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >101"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 23"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-20 Date: 07/12/18 Time: 1:45 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-20 NB 30/41 Suface El. 305.7

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	SL	10YR3/2		loose, cr
9-24	B	SL	10YR 5/4		vfr, roots
24-98	C	fsl	2.5 Y 6/4	@26"	abk,vfr, 5% cob, 10%gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >98"
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole 26"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-21 Date: 07/18/18 Time: 12:00 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line >20' feet
Other: feet

Deep Observation Hole Log

Hole # 718-21 NB 30/45 Suface El. 305.4

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		roots, cr, vfr
8-22	B	SL	10YR 5/4		vfr, roots
22-98	C	LS	2.5 Y 6/4	@30"	firm, 10% gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >98
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 26
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-22 Date: 07/18/18 Time: 12:15 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-22 NB 30/45 Suface El. 304.8

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		roots, cr, vfr
8-22	B	SL	10YR 5/4		vfr, roots
22-88	C	LS	2.5 Y 6/4	@36"	firm, 10% gr

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >88
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 36
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-23 Date: 07/18/18 Time: 12:30 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line >20' feet
Other: feet

Deep Observation Hole Log

Hole # 718-23 NB 30/45 Suface El. 292.5

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		roots, cr, vfr
7-24	B	SL	10YR 5/6		vfr, roots
24-92	C	fls	2.5 Y 6/3	@30"	firm, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >92
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 30
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-24 Date: 07/18/18 Time: 1:15 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-24 NB 30/45 Suface El. 294.0

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		roots, cr, vfr
7-30	B	SL	10YR 5/6		vfr, roots
30-100	C	fls	2.5 Y 6/3	@30"	firm, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >100
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 30
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-25 Date: 07/18/18 Time: 1:30 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-25 NB 30/46 Suface El. 291.2

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		roots, cr, vfr
7-22	B	SL	10YR 5/6		vfr, roots
22-96	C	fls	2.5 Y 6/3	@30"	firm, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >96
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 30
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-26 Date: 07/18/18 Time: 1:45 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-26 NB 30/46 Suface El. 292.5

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		roots, cr, vfr
8-26	B	SL	10YR 5/4		vfr, roots
22-96	C	fls	2.5 Y 6/4	@30"	firm, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >96
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 30
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-27 Date: 07/18/18 Time: 2:00 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-27 NB 30/46 Suface El. 289.5

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		roots, cr, vfr
7-22	B	SL	10YR 5/6		vfr, roots
22-102	C	LS	2.5 Y 6/3	@32"	firm, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >102
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 32
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-28 Date: 07/18/18 Time: 2:15 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-28 NB 30/46 Suface El. 286.8

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		roots, cr, vfr
7-24	B	SL	10YR 5/6		vfr, roots
24-98	C	LS	2.5 Y 6/3	@36"	firm, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >98
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 36
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-29 Date: 07/19/18 Time: 11:00 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-29 NB 30/48 Suface El. 258.7

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		roots, cr, vfr
8-30	B	SL	10YR 5/6		vfr, roots
30-94	C	LS	10YR 5/4	@36"	cobbles, lrg bldrs, firm

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >94
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 36
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-30 Date: 07/19/18 Time: 11:15 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-30 NB 30/48 Suface El. 258.8

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		roots, cr, vfr
8-30	B	SL	10YR 5/6		vfr, roots
30-94	C	LS	10YR 5/4	@28"	cobbles, lrg bldrs, firm

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >94
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 28
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-31 Date: 07/19/18 Time: 11:30 AM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-31 NB 30/49 Suface El. 261.1

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	SL	10YR3/2		roots, cr, vfr
7-28	B	SL	10YR 5/6		vfr, roots
28-84	C	LS	10YR 5/4	@36"	cobbles, lrg bldrs, firm

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >84
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 36
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 718-32 Date: 07/19/18 Time: 12:00 PM Weather: Sunny 85°
Location (identify on site plan) See Attached Sketch
Land Use Grass/ Field Slope (%) 2% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation grass
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 718-32 NB 30/49 Suface El. 259.5

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	SL	10YR3/2		roots, cr, vfr
8-38	B	SL	10YR 5/6		vfr, roots
38-88	C	LS	10YR 5/4	@36"	cobbles, lrg bldrs, firm

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock (in): >88
Depth to Groundwater: Standing Water in the Hole N/A Weeping from Pit Face: N/A
Estimated Seasonal High Groundwater in the Hole (in) 36
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot#: 195 Tahattawan Rd
Littleton, MA 01460

Determination for Seasonal High Water Table

Method Used:

- ☐ Depth observed standing in observation hole ------ inches ----------
- ☐ Depth weeping from side of observation hole ------ inches ----------
- ☑ Depth to soil mottles * inches See individual Reports
- ☐ Ground water adjustment ------ feet ----------

Index Well Number ---------- Reading Date ---------- Index Well Level ----------

Adjustment Factor ---------- Adjusted Ground Water Level ----------

Depth of Naturally Occuring Pervious Material

Does at least four feet of naturally occuring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes

If not, what is the depth of naturally occuring pervious material? _____ Feet

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated, on the attached soil evaluation form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature _____ Date 8/8/18

Notes: _____

Signature

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/11/18 Date / 1:07 PM Time	7/11/18 Date / 1:11 PM Time
Observation Hole #	718-A	718-B
Depth of Perc	45"	45"
Start Pre-Soak	1:07 PM	1:11 PM
End Pre-Soak	1:22 PM	1:28 PM
Time @ 12"		1:28 PM
Time @ 9"	11"@2:36 PM	1:55 PM
Time @ 6"		2:46 PM
Time (9"-6")		51
Rate (Min./Inch)		17
	Test Passed: ☐ Test Failed: ☑	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/11/18 Date / 1:08 PM Time	7/11/18 Date / 1:12 PM Time
Observation Hole #	718-C	718-D
Depth of Perc	58"	46"
Start Pre-Soak	1:08 PM	1:12 PM
End Pre-Soak	1:23 PM	1:29 PM
Time @ 12"	1:23 PM	1:29 PM
Time @ 9"	2:41 PM	2:19 PM
Time @ 6"	3:49 PM	3:24 PM
Time (9"-6")	68	65
Rate (Min./Inch)	23	22
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/12/18 Date / 11:25 AM Time	7/12/18 Date / 11:26 AM Time
Observation Hole #	718-E	718-F
Depth of Perc	62"	68"
Start Pre-Soak	11:25 AM	11:26 AM
End Pre-Soak	11:40 AM	11:41 AM
Time @ 12"	11:40 AM	11:41 AM
Time @ 9"	12:12 PM	8"@ 1:24
Time @ 6"	12:47 PM	2:31 PM
Time (9"-6")	35	67
Rate (Min./Inch)	12	23
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/12/18 Date / 11:23 AM Time	7/12/18 Date / 11:28 AM Time
Observation Hole #	718-G	718-H
Depth of Perc	56"	42"
Start Pre-Soak	11:23 AM	11:28 AM
End Pre-Soak	11:38 AM	11:43 AM
Time @ 12"	11:38 AM	11:43 AM
Time @ 9"	11:56 AM	12:05 PM
Time @ 6"	12:26 PM	1:09 PM
Time (9"-6")	30	64
Rate (Min./Inch)	10	22
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address:	Owner's Name: Glavey Family Trust
or Lot # 195 Tahattawan Rd Littleton, MA 01460	Address: 195 Tahattawan Road Littleton, MA 01460
	Telephone No.

	7/12/18 Date	11:58 AM Time	7/12/18 Date	11:53 AM Time
Observation Hole #	718-I		718-J	
Depth of Perc	52"		48"	
Start Pre-Soak	11:58 AM		11:53 AM	
End Pre-Soak	12:13 PM		12:08 PM	
Time @ 12"	12:13 PM		12:08 PM	
Time @ 9"	1:03 PM		1:06 PM	
Time @ 6"	2:28 PM		2:24 PM	
Time (9"-6")	85		78	
Rate (Min./Inch)	29		26	
	Test Passed: ☑		Test Passed: ☑	
	Test Failed: ☐		Test Failed: ☐	

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/12/18 Date / 11:57 AM Time	7/12/18 Date / 11:50 AM Time
Observation Hole #	718-K	718-L
Depth of Perc	58"	44"
Start Pre-Soak	11:57 AM	11:50 AM
End Pre-Soak	12:12 PM	12:05 PM
Time @ 12"	12:12 PM	12:05 PM
Time @ 9"	12:43 PM	12:44 PM
Time @ 6"	1:42 PM	1:47 PM
Time (9"-6")	59	63
Rate (Min./Inch)	20	21
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/18/18 Date / 1:02 PM Time	7/18/18 Date / 1:03 PM Time
Observation Hole #	718-M	718-N
Depth of Perc	54"	48"
Start Pre-Soak	1:02 PM	1:03 PM
End Pre-Soak	1:17 PM	1:18 PM
Time @ 12"	1:17 PM	1:18 PM
Time @ 9"	1:50 PM	2:03 PM
Time @ 6"	2:25 PM	3:10 PM
Time (9"-6")	35	67
Rate (Min./Inch)	12	23
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/18/18 Date / 1:04 PM Time	7/18/18 Date / 1:05 PM Time
Observation Hole #	718-O	718-P
Depth of Perc	50"	48"
Start Pre-Soak	1:04 PM	1:05 PM
End Pre-Soak	1:19 PM	1:20 PM
Time @ 12"	1:19 PM	1:20 PM
Time @ 9"	2:00 PM	1:28 PM
Time @ 6"	2:50 PM	1:40 PM
Time (9"-6")	50	12
Rate (Min./Inch)	17	4
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

		7/18/18 Date	1:07 PM Time	7/18/18 Date	1:08 AM Time
Observation Hole #		718-Q		718-R	
Depth of Perc		50"		48"	
Start Pre-Soak		1:07 PM		1:08 PM	
End Pre-Soak		1:22 PM		1:23 PM	
Time @ 12"		1:22 PM		1:23 PM	
Time @ 9"	8.5"@	1:43 PM		1:54 PM	
Time @ 6"		2:05 PM		2:42 PM	
Time (9"-6")		22		48	
Rate (Min./Inch)		9		16	
		Test Passed: ☑		Test Passed: ☑	
		Test Failed: ☐		Test Failed: ☐	

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/18/18 Date / 1:00 PM Time	7/18/18 Date / 1:10 PM Time
Observation Hole #	718-S	718-T
Depth of Perc	50"	46"
Start Pre-Soak	1:00 PM	1:10 PM
End Pre-Soak	1:24 PM	1:24 AM
Time @ 12"	1:24 PM	1:24 AM
Time @ 9"		1:55 PM
Time @ 6"		2:53 PM
Time (9"-6")	0	58
Rate (Min./Inch)	2	20
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

* over 24 gallons applied unable to soak

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/18/18 Date / 1:44 PM Time	7/18/18 Date / 1:47 PM Time
Observation Hole #	718-U	718-V
Depth of Perc	50"	48"
Start Pre-Soak	1:44 PM	1:47 PM
End Pre-Soak	1:52 PM	1:53 PM
Time @ 12"	1:52 PM	1:53 PM
Time @ 9"	2:18 PM	2:01 PM
Time @ 6"	3:10 PM	2:17 PM
Time (9"-6")	52	16
Rate (Min./Inch)	18	6
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/18/18 Date	1:59 PM Time	7/18/18 Date	1:59 PM Time
Observation Hole #	718-W		718-X	
Depth of Perc	56"		54"	
Start Pre-Soak	1:56 PM		1:59 PM	
End Pre-Soak	2:11 PM		2:14 PM	
Time @ 12"	2:11 PM		2:14 PM	
Time @ 9"	2:19 PM		2:24 PM	
Time @ 6"	2:31 PM		2:42 PM	
Time (9"-6")	12		18	
Rate (Min./Inch)	4		6	
	Test Passed: ☑		Test Passed: ☑	
	Test Failed: ☐		Test Failed: ☐	

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/18/18 Date	2:01 PM Time	7/18/18 Date	2:02 PM Time
Observation Hole #	718-Y		718-Z	
Depth of Perc	53"		54"	
Start Pre-Soak	2:01 PM		2:02 PM	
End Pre-Soak	2:16 PM		2:18 AM	
Time @ 12"	2:16 PM		2:18 AM	
Time @ 9"	2:26 PM		2:28 PM	
Time @ 6"	2:43 PM		2:45 PM	
Time (9"-6")	17		17	
Rate (Min./Inch)	6		6	
	Test Passed: ☑		Test Passed: ☐	
	Test Failed: ☐		Test Failed: ☐	

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

#REF!

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/19/18 Date / 10:57 AM Time	7/19/18 Date / 11:01 AM Time
Observation Hole #	718-AA	718-BB
Depth of Perc	42"	56"
Start Pre-Soak	10:57 AM	11:01 AM
End Pre-Soak	11:13 AM	11:16 AM
Time @ 12"	11:13 AM	11:16 AM
Time @ 9"	11:20 AM	11:27 AM
Time @ 6"	11:30 AM	11:48 AM
Time (9"-6")	10	21
Rate (Min./Inch)	4	7
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	7/19/18 Date / 11:09 AM Time	7/19/18 Date / 11:10 AM Time
Observation Hole #	718-CC	718-DD
Depth of Perc	50"	48"
Start Pre-Soak	11:09 AM	11:10 AM
End Pre-Soak	11:24 AM	11:25 AM
Time @ 12"	11:24 AM	11:25 AM
Time @ 9"	11:31 AM	11:29 AM
Time @ 6"	11:46 AM	11:37 AM
Time (9"-6")	15	8
Rate (Min./Inch)	5	3
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 11 - SOIL EVALUATOR FORM

No. 171088 Date: 8/29/18

Commonwealth of Massachusetts
Littleton, Massachusetts

Soil Suitability Assessment for On-Site Sewage Disposal

Performed by: Bruce Ringwall, GPR Inc. Date: 8/29/18
Witnessed by: James Garreffi, BOH

Location Address:	Owner's Name: Glavey Family Trust
or Lot No. 195 Tahattawan Road Littleton, MA 01460	Address: 195 Tahattawan Road Littleton, MA 01460
	Telephone No.

New Construction ☑ Upgrade ☐ Repair ☐

Office Review

Published Soil Survey Available: No ☑ Yes ☐

Year Published Internet Publication Scale na Soil Map Unit 420B, 311B
Soil Name Woodbridge fine sandy loam Soil Limitations Very stony, Depth to restictive features
Soil Name Canton fine sandy loam Soil Limitations Depth to restictive features
Soil Name Soil Limitations

Surficial Geologic Report Available: No ☑ Yes ☐

Year Published Publication Scale
Geologic Material(Map Unit) Glacial Till
Landform Ground Morraine

Flood Insurance Rate Map: 25017C0238F

Above 500 Year Flood Boundary	No ☐	Yes ☑
Within 500 Year Flood Boundary	No ☑	Yes ☐
Within 100 Year Flood Boundary	No ☑	Yes ☐
Within Velocity Zone	No ☑	Yes ☐

Wetland Area:

National Wetlands Inventory Map (map unit) N/A
Wetlands Conservancy Program Map (map unit) N/A

Current Water Resource Conditions (USGS): Month August

Range: Above Normal ☐ Normal ☑ Below Normal ☐

Other Reference Reviewed USGS

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-1 Date: 08/29/18 Time: 9:30 AM Weather: Sunny 78°
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line >100 feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 818-1 NB 29/51 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-13	A	fsl	10YR3/3		
13-26	B	fsl	10YR 5/6		
26-98	C	ls	2.5Y 6/4	@34", 10YR5/8 2.5YR6/2	15% cobbles, 25% gravel

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 98"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 34"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-2 Date: 08/29/18 Time: 10:00 AM Weather: Sunny 78°
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line 100± feet
Other: feet

Deep Observation Hole Log

Hole # 818-2 NB 29/51 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-13	A	fsl	10YR3/3		
13-26	B	fsl	10YR 5/6		
26-106	C	ls	2.5Y 6/4	@ 38", 10YR5/8 2.5YR6/2	25% gravel

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 106"
Depth to Groundwater: Standing Water in the Hole 104" Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 38"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-3 Date: 08/29/18 Time: 10:15 AM Weather: Sunny 78°
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line 100± feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 818-3 NB 29/51 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-13	A	fsl	10YR3/3		
13-28	B	fsl	10YR 5/6		
28-96	C	ls	2.5Y 6/4	@ 40", 10YR5/8 2.5YR6/2	25% gravel

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 96"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 40"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-4 Date: 08/29/18 Time: 10:30 AM Weather: Sunny 80's
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line 100± feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 818-4 NB 29/52 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-13	A	fsl	10YR3/3		
13-28	B	fsl	10YR 5/6		
28-110	C	ls	2.5Y 6/4	@ 32", 10YR5/8 2.5YR6/2	25% gravel

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: >110"
Depth to Groundwater: Standing Water in the Hole 103" Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 32"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-5 Date: 08/29/18 Time: 10:45 AM Weather: Sunny 80's
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line 100± feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 818-5 NB 29/53 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-10	A	fsl	10YR3/3		
10-22	B	fsl	10YR 5/6		
22-72	C	ls	2.5Y 6/4	@ 36", 10YR5/8 2.5YR6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 72"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 36"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-6 Date: 08/29/18 Time: 11:00 AM Weather: Sunny 80's
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line 100± feet
Other: feet

Deep Observation Hole Log

Hole # 818-6 NB 29/53 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-10	A	fsl	10YR3/3		
10-32	B	fsl	10YR 5/6	@ 32", 10YR5/8	
32-88	C	ls	2.5Y 6/4	2.5YR6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 88"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 32"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-7 Date: 08/29/18 Time: 11:15 AM Weather: Sunny 80's
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc…)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line 100± feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 818-7 NB 29/53 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-11	A	fsl	10YR3/3		
11-24	B	fsl	10YR 5/6		
24-80	C	ls	2.5Y 6/4	@ 33", 10YR5/8 2.5YR6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 80"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 33"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-8 Date: 08/29/18 Time: 11:30 AM Weather: Sunny 80's
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line 100± feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 818-8 NB 29/53 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-7	A	fsl	10YR3/3		
7-22	B	fsl	10YR 5/6		
22-80	C	ls	2.5Y 6/4	@ 29", 10YR5/8 2.5YR6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 80"
Depth to Groundwater: Standing Water in the Hole None Weeping from Pit Face: None
Estimated Seasonal High Groundwater in the Hole 29"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Road
Littleton, MA 01460

On-Site Review

Deep Hole #: 818-9 Date: 08/29/18 Time: 11:45 AM Weather: Sunny 80's
Location (identify on site plan) See Attached Sketch
Land Use Woodland Slope (%) 4% Surfaces Stones few
(eg woodland, agricultural field, vacant lot etc...)
Vegatation mixed hardwoods and pines
Landform Drumlin
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line 100± feet
Other: feet

Deep Observation Hole Log

Hole # 818-9 NB 29/55 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-14	A	fsl	10YR3/2		
14-21	B	fsl	2.5YR 5/4		
21-138	C	ls	2.5Y 5/3	@ 24", 10YR5/8 2.5YR6/2	

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Compact Till Depth to Bedrock: 132"
Depth to Groundwater: Standing Water in the Hole 128" Weeping from Pit Face: 96"
Estimated Seasonal High Groundwater in the Hole 24"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot#: 195 Tahattawan Road
Littleton, MA 01460

Determination for Seasonal High Water Table

Method Used:

- ☐ Depth observed standing in observation hole _____ inches _____
- ☐ Depth weeping from side of observation hole _____ inches _____
- ☑ Depth to soil mottles * inches See individual Reports
- ☐ Ground water adjustment _____ feet _____

Index Well Number _____ Reading Date _____ Index Well Level _____

Adjustment Factor _____ Adjusted Ground Water Level _____

Depth of Naturally Occuring Pervious Material

Does at least four feet of naturally occuring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes

If not, what is the depth of naturally occuring pervious material? _____ Feet

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated, on the attached soil evaluation form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature _____ Date 10/4/18

Notes: _____

FORM 12 - PERCOLATION TEST

Location Address:	Owner's Name: Glavey Family Trust
or Lot # 195 Tahattawan Road Littleton, MA 01460	Address: 195 Tahattawan Road Littleton, MA 01460
	Telephone No.

	8/29/18 Date / 1:17 PM Time	8/29/18 Date / 1:14 PM Time
Observation Hole #	818-A	818-B
Depth of Perc	56"	54"
Start Pre-Soak	1:17 PM	1:14 PM
End Pre-Soak	1:32 PM	1:30 PM
Time @ 12"	1:32 PM	1:30 PM
Time @ 9"	1:37 PM	1:37 PM
Time @ 6"	1:52 PM	1:56 PM
Time (9"-6")	15	19
Rate (Min./Inch)	5	7
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Bruce Ringwall, GPR Inc.

Witnessed By: James Garreffi, BOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Road Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	8/29/18 (Date) / 1:06 PM (Time)	8/29/18 (Date) / 1:08 PM (Time)
Observation Hole #	818-C	818-D
Depth of Perc	56"	56"
Start Pre-Soak	1:06 PM	1:08 PM
End Pre-Soak	1:21 PM	1:23 PM
Time @ 12"	1:21 PM	1:23 PM
Time @ 9"	1:28 PM	1:32 PM
Time @ 6"	1:37 PM	1:45 PM
Time (9"-6")	9	13
Rate (Min./Inch)	3	5
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Bruce Ringwall, GPR Inc.

Witnessed By: James Garreffi, BOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Road Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	8/29/18 (Date) / 1:09 PM (Time)	8/29/18 (Date) / 1:11 AM (Time)
Observation Hole #	818-E	818-F
Depth of Perc	60"	62"
Start Pre-Soak	1:09 PM	1:11 AM
End Pre-Soak	1:24 PM	1:26 PM
Time @ 12"	1:24 PM	1:26 PM
Time @ 9"	1:33 PM	1:35 PM
Time @ 6"	1:46 PM	1:55 PM
Time (9"-6")	13	20
Rate (Min./Inch)	5	7
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☑ Test Failed: ☐

Test performed By: Bruce Ringwall, GPR Inc.

Witnessed By: James Garreffi, BOH

Comments:

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Road Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	8/29/18 (Date) / 2:32 PM (Time)	8/30/18 (Date) / 11:09 PM (Time)
Observation Hole #	818-G	818-H
Depth of Perc	52"	46"
Start Pre-Soak	2:32 PM	11:09 AM
End Pre-Soak	2:47 PM	11:26 AM
Time @ 12"	2:47 PM	11:26 AM
Time @ 9"		12:25 PM
Time @ 6"		1:55 PM
Time (9"-6")		90
Rate (Min./Inch)	*	30
	Test Passed: ☑ Test Failed: ☐	Test Passed: ☐ Test Failed: ☐

Test performed By: Bruce Ringwall, GPR Inc.

Witnessed By: James Garreffi, BOH

Comments:

* Discontinued due to wet soil below bottom of hole

FORM 11 - SOIL EVALUATOR FORM

No. 171088 Date: 5/8/19

Commonwealth of Massachusetts
Littleton Massachusetts

Soil Suitability Assessment for On-Site Sewage Disposal

Performed by: Jude Gauvin, GPR Inc Date: 5/2/19
Witnessed by: Jim Garreffi, NABH

Location Address: or Lot No. 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

New Construction ☑ Upgrade ☐ Repair ☐

Office Review

Published Soil Survey Available: No ☑ Yes ☐

Year Published Internet Publication Scale na Soil Map Unit 305B,420B,311B
Soil Name Paxton fine sandy loam Soil Limitations Depth to restrictive features
Soil Name Woodbridge fine sandy loam Soil Limitations Very stony, Depth to restictive features
Soil Name Canton fine sandy loam Soil Limitations Depth to restrictive features

Surficial Geologic Report Available: No ☑ Yes ☐

Year Published MASS GIS Publication Scale
Geologic Material(Map Unit) Glacial Till
Landform Ground Morraine

Flood Insurance Rate Map: 25017C0238F

Above 500 Year Flood Boundary	No ☐	Yes ☑
Within 500 Year Flood Boundary	No ☑	Yes ☐
Within 100 Year Flood Boundary	No ☑	Yes ☐
Within Velocity Zone	No ☑	Yes ☐

Wetland Area:

National Wetlands Inventory Map (map unit) N/A
Wetlands Conservancy Program Map (map unit) N/A

Current Water Resource Conditions (USGS): Month May

Range: Above Normal ☑ Normal ☐ Below Normal ☐
Other Reference Reviewed USGS

Site Info.

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-1 Date: 05/02/19 Time: 9:00 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc…)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 519-1 NB 30/98 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-10	A	sl	10YR3/2		roots, cr, vfr
10-39	B	sl	10YR 5/6		vfr, roots
39-96	C	ls	2.5 Y 6/4	@40"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >96"
Depth to Groundwater: Standing Water in the Hole 86" Weeping from Pit Face: 74"
Estimated Seasonal High Groundwater in the Hole 40"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-2 Date: 05/02/19 Time: 9:20 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc…)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 519-2 NB 30/98 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	sl	10YR3/2		roots, cr, vfr
9-22	B	sl	10YR 5/6		vfr, roots
22-104	C	ls	2.5 Y 6/4	@26"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >104"
Depth to Groundwater: Standing Water in the Hole 80" Weeping from Pit Face: 80"
Estimated Seasonal High Groundwater in the Hole 26"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-3 Date: 05/02/19 Time: 9:40 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc…)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line >20' feet
Other:
feet

Deep Observation Hole Log

Hole # 519-3 NB 30/98 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-8	A	sl	10YR3/2		roots, cr, vfr
8-30	B	sl	10YR 5/6		vfr, roots
30-108	C	ls	2.5 Y 6/4	@30"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >108"
Depth to Groundwater: Standing Water in the Hole 90" Weeping from Pit Face: 90"
Estimated Seasonal High Groundwater in the Hole 30"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-4 Date: 05/02/19 Time: 10:00 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc…)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 519-4 NB 30/100 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	sl	10YR3/2		roots, cr, vfr
9-26	B	sl	10YR 5/6		vfr, roots
26-108	C	ls	2.5 Y 6/4	@28"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >108"
Depth to Groundwater: Standing Water in the Hole 76" Weeping from Pit Face: 34"
Estimated Seasonal High Groundwater in the Hole 28"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-5 Date: 05/02/19 Time: 10:20 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc...)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet
Possible Wet Area >100 feet
Drinking Water Well >100 feet
Drainage Way >100 feet
Property Line >20' feet
Other: feet

Deep Observation Hole Log

Hole # 519-5 NB 30/100 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-10	A	sl	10YR3/2		roots, cr, vfr
10-28	B	sl	10YR 5/6		vfr, roots
28-104	C	ls	2.5 Y 6/4	@40"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >104"
Depth to Groundwater: Standing Water in the Hole 98" Weeping from Pit Face: 98"
Estimated Seasonal High Groundwater in the Hole 40"
Additional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-6 Date: 05/02/19 Time: 10:40 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc…)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 519-6 NB 30/100 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-10	A	sl	10YR3/2		roots, cr, vfr
10-26	B	sl	10YR 5/6		vfr, roots
26-100	C	ls	2.5 Y 6/4	@32"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >100"
Depth to Groundwater: Standing Water in the Hole 90" Weeping from Pit Face: 50"
Estimated Seasonal High Groundwater in the Hole 32"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-7 Date: 05/02/19 Time: 11:00 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc...)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body >100 feet Drainage Way >100 feet
Possible Wet Area >100 feet Property Line >20' feet
Drinking Water Well >100 feet Other:
feet

Deep Observation Hole Log

Hole # 519-7 NB 30/100 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-9	A	sl	10YR3/2		roots, cr, vfr
9-22	B	sl	10YR 5/6		vfr, roots
22-85	C	ls	2.5 Y 6/4	@30"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >85"
Depth to Groundwater: Standing Water in the Hole 74" Weeping from Pit Face: 30"
Estimated Seasonal High Groundwater in the Hole 30"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot #: 195 Tahattawan Rd
Littleton, MA 01460

On-Site Review

Deep Hole #: 519-7 Date: 05/02/19 Time: 11:00 AM Weather: Cloudy 50°
Location (identify on site plan) See Attached Sketch
Land Use Woods Slope (%) 2% Surfaces Stones none
(eg woodland, agricultural field, vacant lot etc…)
Vegatation Trees and shrubs
Landform Ground Morraine
Position on landscape See attached Sketch
Distances from:

Open Water Body	>100 feet	Drainage Way	>100 feet
Possible Wet Area	>100 feet	Property Line	>20' feet
Drinking Water Well	>100 feet	Other:	
			feet

Deep Observation Hole Log

Hole # 519-7 NB 30/101 Suface El.

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (MUNSELL)	Soil Mottling	Other (Stucture, Stones, Boulders, Consistency, % Gravel)
0-10	A	sl	10YR3/2		roots, cr, vfr
10-24	B	sl	10YR 5/6		vfr, roots
24-86	C	ls	2.5 Y 6/4	@30"	vfr, fine sand

*MINIMUM OF 2 HOLES REQUIRED AT EVERY PROPOSED DISPOSAL AREA

Parent Material (geologic) Glacial Till Depth to Bedrock: >86"
Depth to Groundwater: Standing Water in the Hole 56" Weeping from Pit Face: 36"
Estimated Seasonal High Groundwater in the Hole 30"
Aditional Notes

FORM 11 - SOIL EVALUATOR FORM

Location Address or Lot#: 195 Tahattawan Rd
Littleton, MA 01460

Determination for Seasonal High Water Table

Method Used:

- ☐ Depth observed standing in observation hole ..... inches .....
- ☐ Depth weeping from side of observation hole ..... inches .....
- ☑ Depth to soil mottles ..... * inches See individual Reports .....
- ☐ Ground water adjustment ..... feet .....

Index Well Number ..... Reading Date ..... Index Well Level .....

Adjustment Factor ..... Adjusted Ground Water Level .....

Depth of Naturally Occuring Pervious Material

Does at least four feet of naturally occuring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes

If not, what is the depth of naturally occuring pervious material? _____ Feet

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated, on the attached soil evaluation form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature _____ Date 5/9/19

Notes: _____

Signature

FORM 12 - PERCOLATION TEST

Location Address: or Lot # 195 Tahattawan Rd Littleton, MA 01460	Owner's Name: Glavey Family Trust Address: 195 Tahattawan Road Littleton, MA 01460 Telephone No.

	5/2/19 Date / 11:44 AM Time	5/2/19 Date / 11:47 AM Time
Observation Hole #	519-A	519-B
Depth of Perc	58"	58"
Start Pre-Soak	11:44 AM	11:47 AM
End Pre-Soak	11:59 AM	12:02 PM
Time @ 12"	11:59 AM	12:02 PM
Time @ 9"	12:09 PM	12:08 PM
Time @ 6"	12:32 PM	12:30 PM
Time (9"-6")	23	22
Rate (Min./Inch)	8	8
	Test Passed: ☐ Test Failed: ☑	Test Passed: ☑ Test Failed: ☐

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:

FORM 12 - PERCOLATION TEST

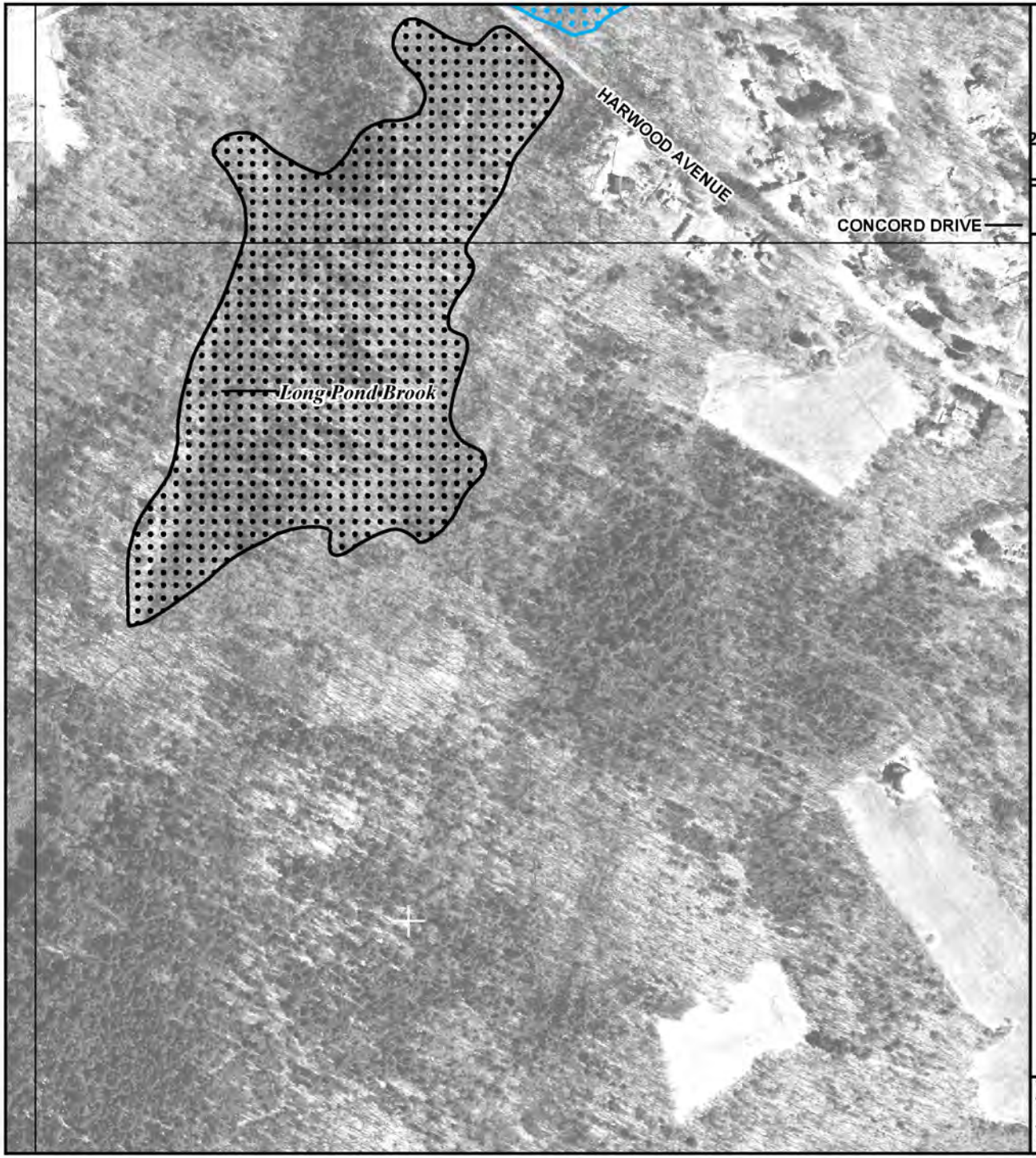
Location Address:	Owner's Name: Glavey Family Trust
or Lot # 195 Tahattawan Rd Littleton, MA 01460	Address: 195 Tahattawan Road Littleton, MA 01460
	Telephone No.

	5/2/19 Date	11:49 AM Time	 Date	 Time
Observation Hole #	519-C			
Depth of Perc	58"			
Start Pre-Soak	11:49 AM			
End Pre-Soak	12:04 PM			
Time @ 12"	12:04 PM			
Time @ 9"	12:45 PM			
Time @ 6"	1:50 PM			
Time (9"-6")	65			
Rate (Min./Inch)	22			
	Test Passed: ☑ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Test performed By: Jude Gauvin , GPR Inc.

Witnessed By: Jim Garreffi, NBOH

Comments:



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0238F

FIRM

FLOOD INSURANCE RATE MAP

MIDDLESEX COUNTY, MASSACHUSETTS

(ALL JURISDICTIONS)

PANEL 238 OF 656

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ACTON, TOWN OF	250176	0238	F
BOXBOROUGH, TOWN OF	250184	0238	F
LITTLETON, TOWN OF	250200	0238	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25017C0238F

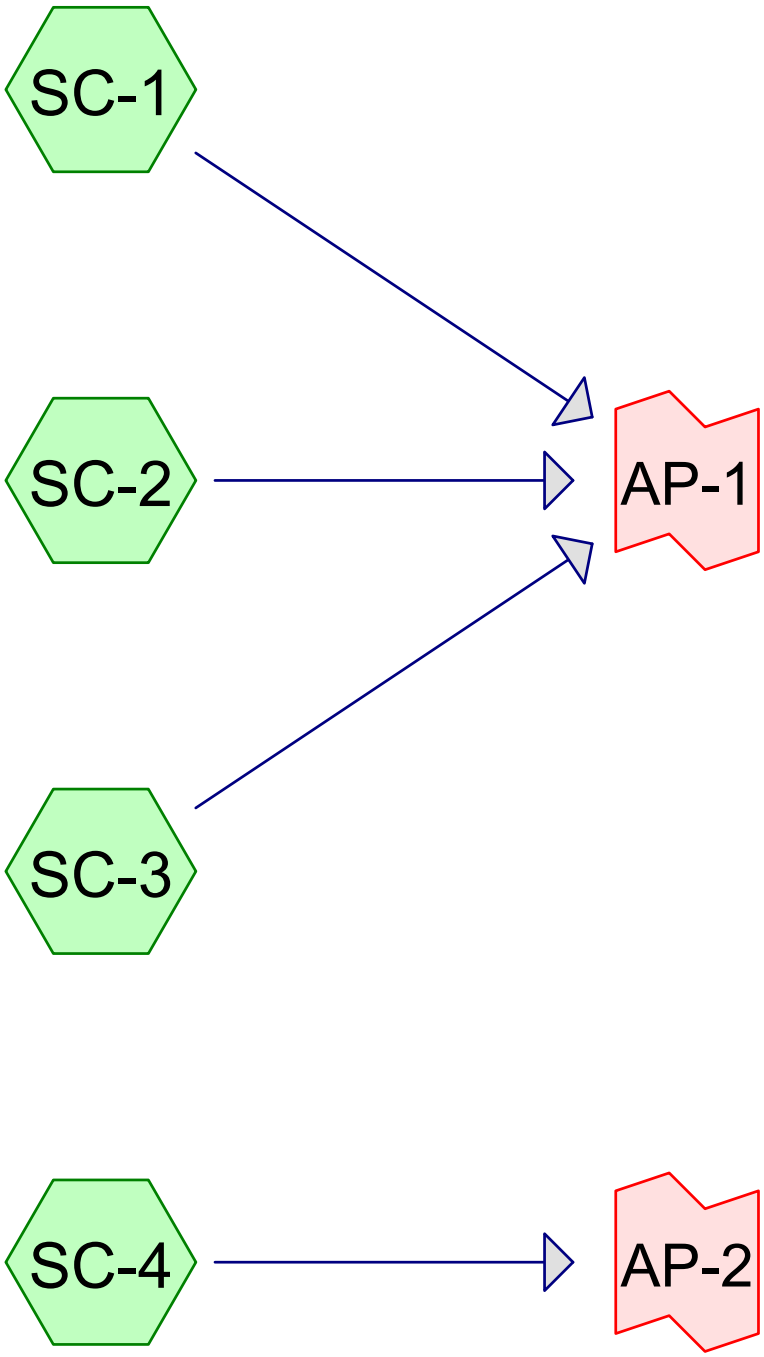
MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

See Attached

“Watershed Map Pre-Development & Soils Overlay”

(24” x36”)



Subcat Reach Pond Link

Routing Diagram for Pre-Development
Prepared by Goldsmith, Prest & Ringwall, Inc., Printed 8/15/2019

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
8,124	61	>75% Grass cover, Good, HSG B (SC-2, SC-3)
208,869	74	>75% Grass cover, Good, HSG C (SC-2, SC-3, SC-4)
1,986	98	Paved parking, HSG C (SC-2, SC-4)
2,382	98	Roofs, HSG C (SC-2, SC-4)
33,235	98	Water Surface, HSG B (SC-2)
7,526	98	Water Surface, HSG C (SC-2)
140,936	55	Woods, Good, HSG B (SC-2, SC-3)
231,344	70	Woods, Good, HSG C (SC-1, SC-2, SC-3, SC-4)
715	77	Woods, Good, HSG D (SC-1)
635,117	**70**	**TOTAL AREA**

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 0.53 cfs @ 12.53 hrs, Volume= 4,099 cf, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
64,727	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
65,442	70	Weighted Average
65,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	255	0.0510	1.13		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
35.3	305	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 5.22 cfs @ 12.19 hrs, Volume= 22,787 cf, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,771	98	Roofs, HSG C
686	98	Paved parking, HSG C
83,306	74	>75% Grass cover, Good, HSG C
126,691	70	Woods, Good, HSG C
5,004	61	>75% Grass cover, Good, HSG B
124,017	55	Woods, Good, HSG B
7,526	98	Water Surface, HSG C
33,235	98	Water Surface, HSG B
382,236	69	Weighted Average
339,018		88.69% Pervious Area
43,218		11.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0420	0.13		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.9	448	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.7	101	0.0410	1.01		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.8	599	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 2.16 cfs @ 12.18 hrs, Volume= 9,065 cf, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
92,652	74	>75% Grass cover, Good, HSG C
21,690	70	Woods, Good, HSG C
3,120	61	>75% Grass cover, Good, HSG B
16,919	55	Woods, Good, HSG B
134,381	71	Weighted Average
134,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0260	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.7	429	0.0770	4.16		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.5	31	0.0360	0.95		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.7	510	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 0.85 cfs @ 12.24 hrs, Volume= 4,013 cf, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
611	98	Roofs, HSG C
1,300	98	Paved parking, HSG C
32,911	74	>75% Grass cover, Good, HSG C
18,236	70	Woods, Good, HSG C
53,058	73	Weighted Average
51,147		96.40% Pervious Area
1,911		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
2.4	305	0.0200	2.12		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	39	0.0180	0.67		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.4	394	Total			

Summary for Link AP-1:

Inflow Area = 582,059 sf, 7.43% Impervious, Inflow Depth > 0.74" for 2-Year event
Inflow = 7.56 cfs @ 12.19 hrs, Volume= 35,951 cf
Primary = 7.56 cfs @ 12.19 hrs, Volume= 35,951 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 53,058 sf, 3.60% Impervious, Inflow Depth > 0.91" for 2-Year event
Inflow = 0.85 cfs @ 12.24 hrs, Volume= 4,013 cf
Primary = 0.85 cfs @ 12.24 hrs, Volume= 4,013 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 1.36 cfs @ 12.51 hrs, Volume= 9,575 cf, Depth> 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
64,727	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
65,442	70	Weighted Average
65,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	255	0.0510	1.13		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
35.3	305	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 13.71 cfs @ 12.18 hrs, Volume= 54,185 cf, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,771	98	Roofs, HSG C
686	98	Paved parking, HSG C
83,306	74	>75% Grass cover, Good, HSG C
126,691	70	Woods, Good, HSG C
5,004	61	>75% Grass cover, Good, HSG B
124,017	55	Woods, Good, HSG B
7,526	98	Water Surface, HSG C
33,235	98	Water Surface, HSG B
382,236	69	Weighted Average
339,018		88.69% Pervious Area
43,218		11.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0420	0.13		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.9	448	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.7	101	0.0410	1.01		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.8	599	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 5.32 cfs @ 12.17 hrs, Volume= 20,712 cf, Depth> 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
92,652	74	>75% Grass cover, Good, HSG C
21,690	70	Woods, Good, HSG C
3,120	61	>75% Grass cover, Good, HSG B
16,919	55	Woods, Good, HSG B
134,381	71	Weighted Average
134,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0260	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.7	429	0.0770	4.16		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.5	31	0.0360	0.95		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.7	510	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 1.97 cfs @ 12.23 hrs, Volume= 8,840 cf, Depth> 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
611	98	Roofs, HSG C
1,300	98	Paved parking, HSG C
32,911	74	>75% Grass cover, Good, HSG C
18,236	70	Woods, Good, HSG C
53,058	73	Weighted Average
51,147		96.40% Pervious Area
1,911		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
2.4	305	0.0200	2.12		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	39	0.0180	0.67		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.4	394	Total			

Summary for Link AP-1:

Inflow Area = 582,059 sf, 7.43% Impervious, Inflow Depth > 1.74" for 10-Year event
Inflow = 19.58 cfs @ 12.18 hrs, Volume= 84,471 cf
Primary = 19.58 cfs @ 12.18 hrs, Volume= 84,471 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 53,058 sf, 3.60% Impervious, Inflow Depth > 2.00" for 10-Year event
Inflow = 1.97 cfs @ 12.23 hrs, Volume= 8,840 cf
Primary = 1.97 cfs @ 12.23 hrs, Volume= 8,840 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 2.11 cfs @ 12.50 hrs, Volume= 14,549 cf, Depth> 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
64,727	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
65,442	70	Weighted Average
65,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	255	0.0510	1.13		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
35.3	305	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 21.41 cfs @ 12.17 hrs, Volume= 82,918 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,771	98	Roofs, HSG C
686	98	Paved parking, HSG C
83,306	74	>75% Grass cover, Good, HSG C
126,691	70	Woods, Good, HSG C
5,004	61	>75% Grass cover, Good, HSG B
124,017	55	Woods, Good, HSG B
7,526	98	Water Surface, HSG C
33,235	98	Water Surface, HSG B
382,236	69	Weighted Average
339,018		88.69% Pervious Area
43,218		11.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0420	0.13		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.9	448	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.7	101	0.0410	1.01		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.8	599	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 8.10 cfs @ 12.17 hrs, Volume= 31,198 cf, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
92,652	74	>75% Grass cover, Good, HSG C
21,690	70	Woods, Good, HSG C
3,120	61	>75% Grass cover, Good, HSG B
16,919	55	Woods, Good, HSG B
134,381	71	Weighted Average
134,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0260	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.7	429	0.0770	4.16		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.5	31	0.0360	0.95		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.7	510	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 2.95 cfs @ 12.23 hrs, Volume= 13,120 cf, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
611	98	Roofs, HSG C
1,300	98	Paved parking, HSG C
32,911	74	>75% Grass cover, Good, HSG C
18,236	70	Woods, Good, HSG C
53,058	73	Weighted Average
51,147		96.40% Pervious Area
1,911		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
2.4	305	0.0200	2.12		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	39	0.0180	0.67		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.4	394	Total			

Summary for Link AP-1:

Inflow Area = 582,059 sf, 7.43% Impervious, Inflow Depth > 2.65" for 25-Year event
Inflow = 30.33 cfs @ 12.18 hrs, Volume= 128,664 cf
Primary = 30.33 cfs @ 12.18 hrs, Volume= 128,664 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 53,058 sf, 3.60% Impervious, Inflow Depth > 2.97" for 25-Year event
Inflow = 2.95 cfs @ 12.23 hrs, Volume= 13,120 cf
Primary = 2.95 cfs @ 12.23 hrs, Volume= 13,120 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 2.85 cfs @ 12.49 hrs, Volume= 19,495 cf, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
64,727	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
65,442	70	Weighted Average
65,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	255	0.0510	1.13		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
35.3	305	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 28.93 cfs @ 12.17 hrs, Volume= 111,596 cf, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,771	98	Roofs, HSG C
686	98	Paved parking, HSG C
83,306	74	>75% Grass cover, Good, HSG C
126,691	70	Woods, Good, HSG C
5,004	61	>75% Grass cover, Good, HSG B
124,017	55	Woods, Good, HSG B
7,526	98	Water Surface, HSG C
33,235	98	Water Surface, HSG B
382,236	69	Weighted Average
339,018		88.69% Pervious Area
43,218		11.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0420	0.13		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.9	448	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.7	101	0.0410	1.01		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.8	599	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 10.81 cfs @ 12.17 hrs, Volume= 41,577 cf, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
92,652	74	>75% Grass cover, Good, HSG C
21,690	70	Woods, Good, HSG C
3,120	61	>75% Grass cover, Good, HSG B
16,919	55	Woods, Good, HSG B
134,381	71	Weighted Average
134,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0260	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.7	429	0.0770	4.16		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.5	31	0.0360	0.95		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.7	510	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 3.91 cfs @ 12.22 hrs, Volume= 17,324 cf, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
611	98	Roofs, HSG C
1,300	98	Paved parking, HSG C
32,911	74	>75% Grass cover, Good, HSG C
18,236	70	Woods, Good, HSG C
53,058	73	Weighted Average
51,147		96.40% Pervious Area
1,911		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
2.4	305	0.0200	2.12		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	39	0.0180	0.67		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.4	394	Total			

Summary for Link AP-1:

Inflow Area = 582,059 sf, 7.43% Impervious, Inflow Depth > 3.56" for 50-Year event
Inflow = 41.05 cfs @ 12.17 hrs, Volume= 172,668 cf
Primary = 41.05 cfs @ 12.17 hrs, Volume= 172,668 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 53,058 sf, 3.60% Impervious, Inflow Depth > 3.92" for 50-Year event
Inflow = 3.91 cfs @ 12.22 hrs, Volume= 17,324 cf
Primary = 3.91 cfs @ 12.22 hrs, Volume= 17,324 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 3.77 cfs @ 12.49 hrs, Volume= 25,745 cf, Depth> 4.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
64,727	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
65,442	70	Weighted Average
65,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	255	0.0510	1.13		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
35.3	305	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 38.32 cfs @ 12.17 hrs, Volume= 147,928 cf, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,771	98	Roofs, HSG C
686	98	Paved parking, HSG C
83,306	74	>75% Grass cover, Good, HSG C
126,691	70	Woods, Good, HSG C
5,004	61	>75% Grass cover, Good, HSG B
124,017	55	Woods, Good, HSG B
7,526	98	Water Surface, HSG C
33,235	98	Water Surface, HSG B
382,236	69	Weighted Average
339,018		88.69% Pervious Area
43,218		11.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.0420	0.13		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.9	448	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.7	101	0.0410	1.01		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.8	599	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 14.17 cfs @ 12.17 hrs, Volume= 54,650 cf, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
92,652	74	>75% Grass cover, Good, HSG C
21,690	70	Woods, Good, HSG C
3,120	61	>75% Grass cover, Good, HSG B
16,919	55	Woods, Good, HSG B
134,381	71	Weighted Average
134,381		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0260	0.11		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
1.7	429	0.0770	4.16		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.5	31	0.0360	0.95		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
9.7	510	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 5.08 cfs @ 12.22 hrs, Volume= 22,589 cf, Depth> 5.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
611	98	Roofs, HSG C
1,300	98	Paved parking, HSG C
32,911	74	>75% Grass cover, Good, HSG C
18,236	70	Woods, Good, HSG C
53,058	73	Weighted Average
51,147		96.40% Pervious Area
1,911		3.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.09"
2.4	305	0.0200	2.12		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	39	0.0180	0.67		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
14.4	394	Total			

Summary for Link AP-1:

Inflow Area = 582,059 sf, 7.43% Impervious, Inflow Depth > 4.71" for 100-Year event
Inflow = 54.26 cfs @ 12.17 hrs, Volume= 228,323 cf
Primary = 54.26 cfs @ 12.17 hrs, Volume= 228,323 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

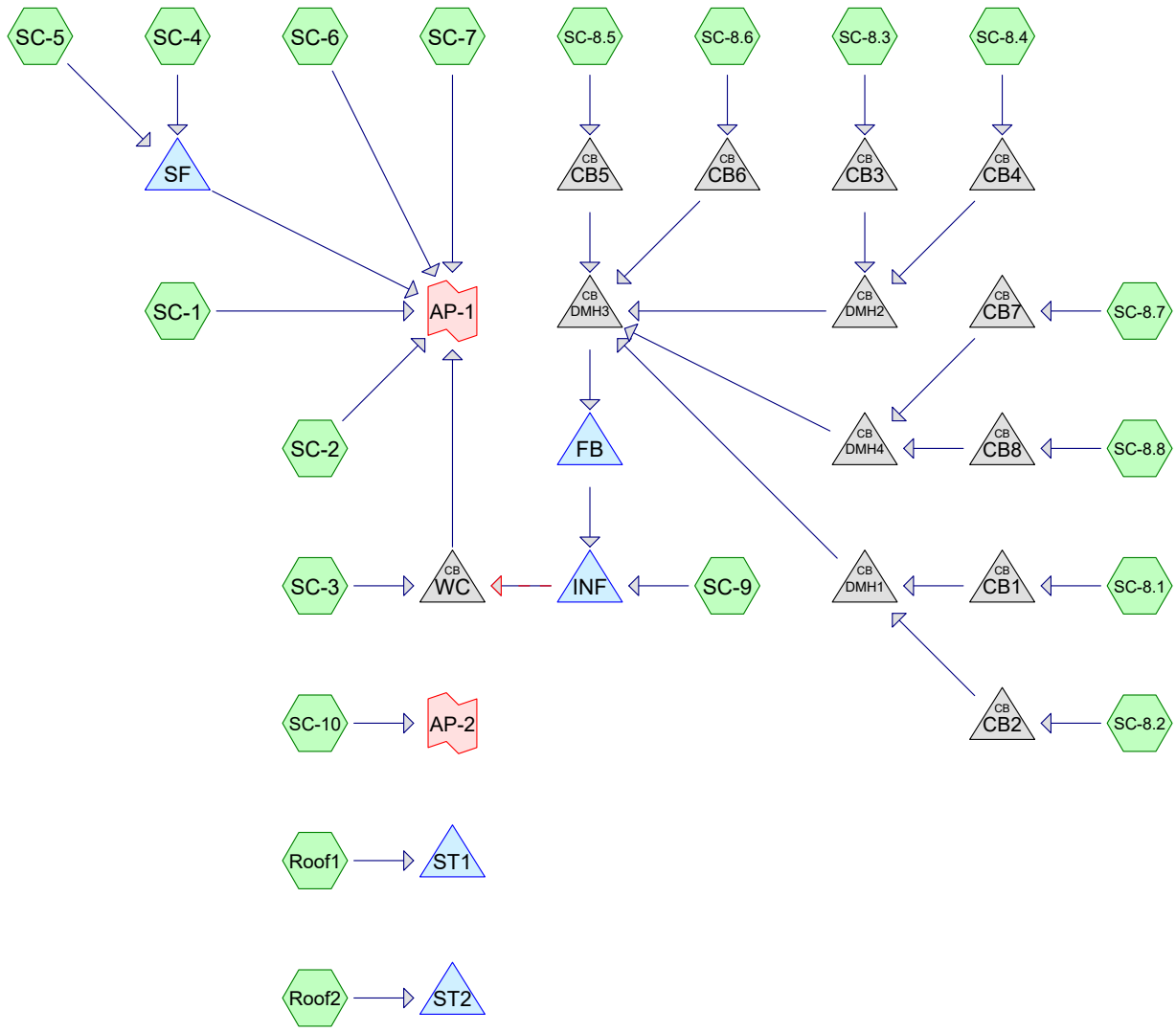
Inflow Area = 53,058 sf, 3.60% Impervious, Inflow Depth > 5.11" for 100-Year event
Inflow = 5.08 cfs @ 12.22 hrs, Volume= 22,589 cf
Primary = 5.08 cfs @ 12.22 hrs, Volume= 22,589 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

See Attached

“Watershed Map Post-Development”

(24” x36”)



Subcat Reach Pond Link

Routing Diagram for Post-Development

Prepared by Goldsmith, Prest & Ringwall, Inc., Printed 8/15/2019

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
56,162	61	>75% Grass cover, Good, HSG B (SC-3, SC-5, SC-6, SC-7, SC-8.6, SC-8.7, SC-8.8)
221,771	74	>75% Grass cover, Good, HSG C (SC-1, SC-10, SC-2, SC-3, SC-4, SC-5, SC-6, SC-7, SC-8.1, SC-8.2, SC-8.3, SC-8.4, SC-8.6, SC-8.7, SC-8.8, SC-9)
3,667	98	Paved parking, HSG B (SC-5)
53,591	98	Paved parking, HSG C (SC-10, SC-2, SC-3, SC-4, SC-5, SC-7, SC-8.1, SC-8.2, SC-8.3, SC-8.4, SC-8.5, SC-8.6, SC-8.7, SC-8.8)
25,258	98	Roofs, HSG C (Roof1, Roof2, SC-1, SC-10, SC-2, SC-3, SC-7, SC-8.1, SC-8.4, SC-8.6, SC-8.7, SC-8.8)
33,233	98	Water Surface, HSG B (SC-3)
6,394	98	Water Surface, HSG C (SC-3)
89,233	55	Woods, Good, HSG B (SC-3, SC-6, SC-7)
145,093	70	Woods, Good, HSG C (SC-1, SC-10, SC-3, SC-6, SC-7, SC-8.2)
715	77	Woods, Good, HSG D (SC-1)
635,117	**74**	**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	CB1	299.43	299.25	9.1	0.0198	0.015	12.0	0.0	0.0
2	CB2	299.57	299.25	15.9	0.0201	0.015	12.0	0.0	0.0
3	CB3	292.40	292.32	4.0	0.0200	0.015	12.0	0.0	0.0
4	CB4	292.50	292.32	8.8	0.0205	0.015	12.0	0.0	0.0
5	CB5	290.68	290.57	5.4	0.0204	0.015	12.0	0.0	0.0
6	CB6	290.75	290.57	8.8	0.0205	0.015	12.0	0.0	0.0
7	CB7	296.29	295.80	24.7	0.0198	0.015	12.0	0.0	0.0
8	CB8	296.45	295.80	32.5	0.0200	0.015	12.0	0.0	0.0
9	DMH1	299.00	293.38	281.0	0.0200	0.015	12.0	0.0	0.0
10	DMH2	291.82	290.57	62.3	0.0201	0.015	12.0	0.0	0.0
11	DMH3	290.06	289.33	73.0	0.0100	0.015	24.0	0.0	0.0
12	DMH4	295.30	290.57	157.7	0.0300	0.015	12.0	0.0	0.0
13	INF	292.20	292.00	30.0	0.0067	0.020	4.0	0.0	0.0
14	SF	265.00	265.00	51.0	0.0000	0.012	6.0	0.0	0.0
15	WC	264.50	264.30	28.0	0.0071	0.020	36.0	0.0	0.0

Summary for Subcatchment Roof1:

Lot 1's Roof

Runoff = 0.11 cfs @ 12.11 hrs, Volume= 394 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,656	98	Roofs, HSG C
1,656		100.00% Impervious Area

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

Summary for Subcatchment Roof2:

Lot 2's Roof

Runoff = 0.08 cfs @ 12.11 hrs, Volume= 313 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,315	98	Roofs, HSG C
1,315		100.00% Impervious Area

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

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 0.67 cfs @ 12.31 hrs, Volume= 3,711 cf, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
595	98	Roofs, HSG C
5,140	74	>75% Grass cover, Good, HSG C
48,831	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
55,281	71	Weighted Average
54,686		98.92% Pervious Area
595		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	50	0.0480	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	241	0.0436	1.04		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
19.2	291	Total			

Summary for Subcatchment SC-10:

Subcatchment SC-10

Runoff = 0.80 cfs @ 12.27 hrs, Volume= 3,995 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
13,170	70	Woods, Good, HSG C
30,063	74	>75% Grass cover, Good, HSG C
3,281	98	Paved parking, HSG C
810	98	Roofs, HSG C
47,324	75	Weighted Average
43,233		91.36% Pervious Area
4,091		8.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.09"
1.1	60	0.0350	0.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
3.5	160	0.0230	0.76		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
17.2	270	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 0.60 cfs @ 12.54 hrs, Volume= 4,332 cf, Depth> 1.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
2,235	98	Roofs, HSG C
6,865	98	Paved parking, HSG C
32,960	74	>75% Grass cover, Good, HSG C
42,060	79	Weighted Average
32,960		78.36% Pervious Area
9,100		21.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
4.6	203	0.0220	0.74		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	21	0.0140	2.40		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
2.0	119	0.0390	0.99		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
38.2	393	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 2.13 cfs @ 12.30 hrs, Volume= 12,182 cf, Depth> 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
631	98	Paved parking, HSG C
1,858	98	Roofs, HSG C
50,102	70	Woods, Good, HSG C
3,842	74	>75% Grass cover, Good, HSG C
66,484	55	Woods, Good, HSG B
42,744	61	>75% Grass cover, Good, HSG B
6,394	98	Water Surface, HSG C
33,233	98	Water Surface, HSG B
205,288	69	Weighted Average
163,172		79.48% Pervious Area
42,116		20.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0500	0.06		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
0.9	154	0.0340	2.77		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.5	122	0.0740	1.36		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	29	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	104	0.1220	1.75		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
18.6	459	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 0.13 cfs @ 12.11 hrs, Volume= 458 cf, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,824	98	Paved parking, HSG C
525	74	>75% Grass cover, Good, HSG C
2,349	93	Weighted Average
525		22.36% Pervious Area
1,824		77.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.55		**Sheet Flow, sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.3	100	0.0950	6.26		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
0.8	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-5:

Subcatchment SC-5

Runoff = 0.39 cfs @ 12.12 hrs, Volume= 1,262 cf, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
502	74	>75% Grass cover, Good, HSG C
2,003	98	Paved parking, HSG C
3,667	98	Paved parking, HSG B
4,283	61	>75% Grass cover, Good, HSG B
10,455	82	Weighted Average
4,785		45.77% Pervious Area
5,670		54.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.1000	2.24		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.8	233	0.0570	4.85		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.2	283	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-6:

Subcatchment SC-6

Runoff = 0.20 cfs @ 12.18 hrs, Volume= 977 cf, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,529	74	>75% Grass cover, Good, HSG C
11,891	70	Woods, Good, HSG C
2,237	61	>75% Grass cover, Good, HSG B
5,828	55	Woods, Good, HSG B
21,485	65	Weighted Average
21,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.22		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
5.0	291	0.0370	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
8.8	341	Total			

Summary for Subcatchment SC-7:

Subcatchment SC-7

Runoff = 1.37 cfs @ 12.35 hrs, Volume= 7,999 cf, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
6,792	98	Paved parking, HSG C
8,663	98	Roofs, HSG C
49,414	74	>75% Grass cover, Good, HSG C
20,905	70	Woods, Good, HSG C
16,921	55	Woods, Good, HSG B
3,467	61	>75% Grass cover, Good, HSG B
106,162	73	Weighted Average
90,707		85.44% Pervious Area
15,455		14.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	50	0.0440	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
2.8	151	0.0330	0.91		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
4.0	354	0.0880	1.48		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
22.7	555	Total			

Summary for Subcatchment SC-8.1:

Subcatchment SC-8.1

Runoff = 0.30 cfs @ 12.12 hrs, Volume= 975 cf, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
2,899	98	Paved parking, HSG C
279	98	Roofs, HSG C
3,860	74	>75% Grass cover, Good, HSG C
7,038	85	Weighted Average
3,860		54.85% Pervious Area
3,178		45.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.9	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.2:

Subcatchment SC-8.2

Runoff = 0.14 cfs @ 12.12 hrs, Volume= 449 cf, Depth> 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,291	98	Paved parking, HSG C
194	70	Woods, Good, HSG C
2,064	74	>75% Grass cover, Good, HSG C
3,549	83	Weighted Average
2,258		63.62% Pervious Area
1,291		36.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.4	54	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.3	104	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.3:

Subcatchment SC-8.3

Runoff = 0.17 cfs @ 12.11 hrs, Volume= 578 cf, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,283	74	>75% Grass cover, Good, HSG C
2,220	98	Paved parking, HSG C
3,503	89	Weighted Average
1,283		36.63% Pervious Area
2,220		63.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	235	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.4	285	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.4:

Subcatchment SC-8.4

Runoff = 0.56 cfs @ 12.12 hrs, Volume= 1,867 cf, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
14,429	74	>75% Grass cover, Good, HSG C
1,313	98	Roofs, HSG C
2,137	98	Paved parking, HSG C
17,879	79	Weighted Average
14,429		80.70% Pervious Area
3,450		19.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	73	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.4	102	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
5.1	225	Total			

Summary for Subcatchment SC-8.5:

Subcatchment SC-8.5

Runoff = 0.23 cfs @ 12.11 hrs, Volume= 862 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
3,621	98	Paved parking, HSG C
3,621		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.6	140	0.0400	4.06		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.1	190	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.6:

Subcatchment SC-8.6

Runoff = 1.59 cfs @ 12.13 hrs, Volume= 5,399 cf, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
42,795	74	>75% Grass cover, Good, HSG C
4,291	98	Roofs, HSG C
6,223	98	Paved parking, HSG C
1,084	61	>75% Grass cover, Good, HSG B
54,393	78	Weighted Average
43,879		80.67% Pervious Area
10,514		19.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
1.5	259	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.2	31	0.0150	2.49		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
6.0	340	Total			

Summary for Subcatchment SC-8.7:

Subcatchment SC-8.7

Runoff = 0.81 cfs @ 12.12 hrs, Volume= 2,667 cf, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
1,692	98	Roofs, HSG C
8,872	74	>75% Grass cover, Good, HSG C
7,520	98	Paved parking, HSG C
1,174	61	>75% Grass cover, Good, HSG B
19,258	85	Weighted Average
10,046		52.17% Pervious Area
9,212		47.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.3	210	0.0300	2.60		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.0	260	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.8:

Subcatchment SC-8.8

Runoff = 0.64 cfs @ 12.12 hrs, Volume= 2,084 cf, Depth> 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
551	98	Roofs, HSG C
8,476	74	>75% Grass cover, Good, HSG C
6,284	98	Paved parking, HSG C
1,173	61	>75% Grass cover, Good, HSG B
16,484	83	Weighted Average
9,649		58.54% Pervious Area
6,835		41.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	185	0.0300	3.52		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.6	235	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-9:

Subcatchment SC-9

Runoff = 0.38 cfs @ 12.12 hrs, Volume= 1,287 cf, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.09"

Area (sf)	CN	Description
16,017	74	>75% Grass cover, Good, HSG C
16,017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.0870	0.26		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	100	0.0870	4.42		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
3.6	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond CB1:

Catch Basin #1

Inflow Area = 7,038 sf, 45.15% Impervious, Inflow Depth > 1.66" for 2-Year event
Inflow = 0.30 cfs @ 12.12 hrs, Volume= 975 cf
Outflow = 0.30 cfs @ 12.12 hrs, Volume= 975 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 12.12 hrs, Volume= 975 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.71' @ 12.12 hrs
Flood Elev= 305.52'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.43'	**12.0" Round Culvert** L= 9.1' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.43' / 299.25' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 12.12 hrs HW=299.70' TW=299.32' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.29 cfs @ 2.53 fps)

Summary for Pond CB2:

Catch Basin #2

Inflow Area = 3,549 sf, 36.38% Impervious, Inflow Depth > 1.52" for 2-Year event
Inflow = 0.14 cfs @ 12.12 hrs, Volume= 449 cf
Outflow = 0.14 cfs @ 12.12 hrs, Volume= 449 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.12 hrs, Volume= 449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.75' @ 12.12 hrs
Flood Elev= 305.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.57'	**12.0" Round Culvert** L= 15.9' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.57' / 299.25' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.13 cfs @ 12.12 hrs HW=299.75' TW=299.32' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.13 cfs @ 1.43 fps)

Summary for Pond CB3:

Catch Basin #3

Inflow Area = 3,503 sf, 63.37% Impervious, Inflow Depth > 1.98" for 2-Year event
Inflow = 0.17 cfs @ 12.11 hrs, Volume= 578 cf
Outflow = 0.17 cfs @ 12.11 hrs, Volume= 578 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 12.11 hrs, Volume= 578 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.62' @ 12.11 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.40'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.40' / 292.32' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.17 cfs @ 12.11 hrs HW=292.62' TW=292.25' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.17 cfs @ 2.04 fps)

Summary for Pond CB4:

Catch Basin #4

Inflow Area = 17,879 sf, 19.30% Impervious, Inflow Depth > 1.25" for 2-Year event
Inflow = 0.56 cfs @ 12.12 hrs, Volume= 1,867 cf
Outflow = 0.56 cfs @ 12.12 hrs, Volume= 1,867 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.12 hrs, Volume= 1,867 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.89' @ 12.12 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.50'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.50' / 292.32' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.54 cfs @ 12.12 hrs HW=292.88' TW=292.25' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.54 cfs @ 2.88 fps)

Summary for Pond CB5:

Catch Basin #5

Inflow Area = 3,621 sf,100.00% Impervious, Inflow Depth > 2.86" for 2-Year event
Inflow = 0.23 cfs @ 12.11 hrs, Volume= 862 cf
Outflow = 0.23 cfs @ 12.11 hrs, Volume= 862 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 12.11 hrs, Volume= 862 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.39' @ 16.50 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.68'	**12.0" Round Culvert** L= 5.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.68' / 290.57' S= 0.0204 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=291.27' TW=291.41' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB6:

Catch Basin #6

Inflow Area = 54,393 sf, 19.33% Impervious, Inflow Depth > 1.19" for 2-Year event
Inflow = 1.59 cfs @ 12.13 hrs, Volume= 5,399 cf
Outflow = 1.59 cfs @ 12.13 hrs, Volume= 5,399 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 12.13 hrs, Volume= 5,399 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.39' @ 16.55 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.75'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.75' / 290.57' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.12 cfs @ 12.13 hrs HW=291.59' TW=291.45' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.12 cfs @ 2.17 fps)

Summary for Pond CB7:

Catch Basin #7

Inflow Area = 19,258 sf, 47.83% Impervious, Inflow Depth > 1.66" for 2-Year event
Inflow = 0.81 cfs @ 12.12 hrs, Volume= 2,667 cf
Outflow = 0.81 cfs @ 12.12 hrs, Volume= 2,667 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.81 cfs @ 12.12 hrs, Volume= 2,667 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 296.75' @ 12.12 hrs
Flood Elev= 302.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.29'	**12.0" Round Culvert** L= 24.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.29' / 295.80' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.78 cfs @ 12.12 hrs HW=296.74' TW=295.93' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.78 cfs @ 2.28 fps)

Summary for Pond CB8:

Catch Basin #8

Inflow Area = 16,484 sf, 41.46% Impervious, Inflow Depth > 1.52" for 2-Year event
Inflow = 0.64 cfs @ 12.12 hrs, Volume= 2,084 cf
Outflow = 0.64 cfs @ 12.12 hrs, Volume= 2,084 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.64 cfs @ 12.12 hrs, Volume= 2,084 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 296.85' @ 12.12 hrs
Flood Elev= 303.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.45'	**12.0" Round Culvert** L= 32.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.45' / 295.80' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.61 cfs @ 12.12 hrs HW=296.84' TW=295.93' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.61 cfs @ 2.14 fps)

Summary for Pond DMH1:

Drain Manhole #1

Inflow Area = 10,587 sf, 42.21% Impervious, Inflow Depth > 1.61" for 2-Year event
Inflow = 0.43 cfs @ 12.12 hrs, Volume= 1,424 cf
Outflow = 0.43 cfs @ 12.12 hrs, Volume= 1,424 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.12 hrs, Volume= 1,424 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.33' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**12.0" Round Culvert** L= 281.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 293.38' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.42 cfs @ 12.12 hrs HW=299.32' TW=291.42' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.42 cfs @ 1.93 fps)

Summary for Pond DMH2:

Drain Manhole #2

Inflow Area = 21,382 sf, 26.52% Impervious, Inflow Depth > 1.37" for 2-Year event
Inflow = 0.74 cfs @ 12.12 hrs, Volume= 2,444 cf
Outflow = 0.74 cfs @ 12.12 hrs, Volume= 2,444 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.74 cfs @ 12.12 hrs, Volume= 2,444 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.39' @ 16.54 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	291.82'	**12.0" Round Culvert** L= 62.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 291.82' / 290.57' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.68 cfs @ 12.12 hrs HW=292.25' TW=291.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.68 cfs @ 3.10 fps)

Summary for Pond DMH3:

Drain Manhole #3

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 1.42" for 2-Year event
Inflow = 4.39 cfs @ 12.12 hrs, Volume= 14,881 cf
Outflow = 4.39 cfs @ 12.12 hrs, Volume= 14,881 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.39 cfs @ 12.12 hrs, Volume= 14,881 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.39' @ 16.50 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	290.06'	**24.0" Round Culvert** L= 73.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.06' / 289.33' S= 0.0100 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 3.14 sf

Primary OutFlow Max=2.81 cfs @ 12.12 hrs HW=291.43' TW=291.31' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.81 cfs @ 1.72 fps)

Summary for Pond DMH4:

Drain Manhole #4

Inflow Area = 35,742 sf, 44.90% Impervious, Inflow Depth > 1.60" for 2-Year event
Inflow = 1.45 cfs @ 12.12 hrs, Volume= 4,752 cf
Outflow = 1.45 cfs @ 12.12 hrs, Volume= 4,752 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.45 cfs @ 12.12 hrs, Volume= 4,752 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 295.94' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Culvert** L= 157.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 290.57' S= 0.0300 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.40 cfs @ 12.12 hrs HW=295.93' TW=291.42' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.40 cfs @ 2.70 fps)

Summary for Pond FB:

Sediment Forebay

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 1.42" for 2-Year event
Inflow = 4.39 cfs @ 12.12 hrs, Volume= 14,881 cf
Outflow = 4.41 cfs @ 12.12 hrs, Volume= 14,289 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.50 hrs, Volume= 663 cf
Primary = 4.40 cfs @ 12.12 hrs, Volume= 13,625 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.39' @ 16.45 hrs Surf.Area= 489 sf Storage= 433 cf

Plug-Flow detention time= 31.6 min calculated for 14,289 cf (96% of inflow)
Center-of-Mass det. time= 9.5 min (868.9 - 859.4)

Volume	Invert	Avail.Storage	Storage Description
#1	288.00'	433 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
288.00	34	24.1	0	0	34
289.00	211	55.7	110	110	239
289.50	302	66.4	128	237	347
290.00	489	86.0	196	433	588

Device	Routing	Invert	Outlet Devices
#1	Primary	290.30'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Discarded	288.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.50 hrs HW=290.31' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.12 hrs HW=291.30' TW=291.48' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond INF:

Infiltration Basin

Inflow Area = 141,742 sf, 28.45% Impervious, Inflow Depth > 1.26" for 2-Year event
Inflow = 4.78 cfs @ 12.12 hrs, Volume= 14,912 cf
Outflow = 0.19 cfs @ 16.44 hrs, Volume= 7,301 cf, Atten= 96%, Lag= 259.1 min
Discarded = 0.15 cfs @ 16.44 hrs, Volume= 6,469 cf
Primary = 0.04 cfs @ 16.44 hrs, Volume= 832 cf
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 292.39' @ 16.44 hrs Surf.Area= 6,246 sf Storage= 8,635 cf

Plug-Flow detention time= 345.2 min calculated for 7,286 cf (49% of inflow)
Center-of-Mass det. time= 200.2 min (1,067.8 - 867.7)

Volume	Invert	Avail.Storage	Storage Description
#1	290.00'	20,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
290.00	886	167.9	0	0	886
291.00	3,050	255.4	1,860	1,860	3,841
292.00	5,881	307.0	4,389	6,249	6,167
293.00	6,830	326.0	6,350	12,598	7,175
294.00	8,106	348.8	7,459	20,057	8,445

Device	Routing	Invert	Outlet Devices
#1	Secondary	293.00'	**20.0' long x 24.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	290.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	292.20'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 292.20' / 292.00' S= 0.0067 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.15 cfs @ 16.44 hrs HW=292.39' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.04 cfs @ 16.44 hrs HW=292.39' TW=264.73' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.04 cfs @ 1.12 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=290.00' TW=264.50' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond SF:

Sand Filter

Inflow Area = 12,804 sf, 58.53% Impervious, Inflow Depth > 1.61" for 2-Year event
Inflow = 0.52 cfs @ 12.12 hrs, Volume= 1,720 cf
Outflow = 0.51 cfs @ 12.13 hrs, Volume= 1,716 cf, Atten= 2%, Lag= 1.1 min
Discarded = 0.01 cfs @ 9.45 hrs, Volume= 335 cf
Primary = 0.50 cfs @ 12.13 hrs, Volume= 1,380 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 266.04' @ 12.13 hrs Surf.Area= 100 sf Storage= 36 cf

Plug-Flow detention time= 3.2 min calculated for 1,716 cf (100% of inflow)
Center-of-Mass det. time= 1.9 min (849.5 - 847.6)

Volume	Invert	Avail.Storage	Storage Description
#1	265.00'	637 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.00	100	50.0	0.0	0	0	100
265.50	100	50.0	40.0	20	20	125
267.00	100	50.0	30.0	45	65	200
268.00	278	68.8	100.0	182	247	387
268.50	389	78.3	100.0	166	413	505
269.00	513	87.7	100.0	225	637	635

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	268.50'	**2.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#3 Primary 265.00' **6.0" Round Culvert**
L= 51.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 265.00' / 265.00' S= 0.0000 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 9.45 hrs HW=265.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.48 cfs @ 12.13 hrs HW=266.00' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Barrel Controls 0.48 cfs @ 2.46 fps)

Summary for Pond ST1:

Stormtech Infiltration Chambers #1

Inflow Area = 1,656 sf,100.00% Impervious, Inflow Depth > 2.86" for 2-Year event
Inflow = 0.11 cfs @ 12.11 hrs, Volume= 394 cf
Outflow = 0.01 cfs @ 11.40 hrs, Volume= 394 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.40 hrs, Volume= 394 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 305.41' @ 13.45 hrs Surf.Area= 312 sf Storage= 131 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 125.4 min (885.2 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.60'	326 cf	**12.00'W x 25.98'L x 3.50'H Field A** 1,091 cf Overall - 276 cf Embedded = 815 cf x 40.0% Voids
#2A	305.10'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		602 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.60'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.40 hrs HW=304.64' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond ST2:

Stormtech Infiltration Chambers #2

Inflow Area = 1,315 sf,100.00% Impervious, Inflow Depth > 2.86" for 2-Year event
Inflow = 0.08 cfs @ 12.11 hrs, Volume= 313 cf
Outflow = 0.01 cfs @ 11.50 hrs, Volume= 313 cf, Atten= 92%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.50 hrs, Volume= 313 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 305.21' @ 13.31 hrs Surf.Area= 275 sf Storage= 98 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 100.8 min (860.6 - 759.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.50'	274 cf	**11.00'W x 24.98'L x 3.50'H Field A** 962 cf Overall - 276 cf Embedded = 686 cf x 40.0% Voids
#2A	305.00'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		550 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.50 hrs HW=304.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond WC:

36" HDPE Wetland Culvert

Inflow Area = 347,030 sf, 23.76% Impervious, Inflow Depth > 0.45" for 2-Year event
Inflow = 2.13 cfs @ 12.30 hrs, Volume= 13,014 cf
Outflow = 2.13 cfs @ 12.30 hrs, Volume= 13,014 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.13 cfs @ 12.30 hrs, Volume= 13,014 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 265.19' @ 12.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.50'	**36.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 264.50' / 264.30' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 7.07 sf

Primary OutFlow Max=2.13 cfs @ 12.30 hrs HW=265.19' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 2.13 cfs @ 2.64 fps)

Summary for Link AP-1:

Inflow Area = 584,822 sf, 19.68% Impervious, Inflow Depth > 0.64" for 2-Year event
Inflow = 4.83 cfs @ 12.32 hrs, Volume= 31,413 cf
Primary = 4.83 cfs @ 12.32 hrs, Volume= 31,413 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 47,324 sf, 8.64% Impervious, Inflow Depth > 1.01" for 2-Year event
Inflow = 0.80 cfs @ 12.27 hrs, Volume= 3,995 cf
Primary = 0.80 cfs @ 12.27 hrs, Volume= 3,995 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment Roof1:

Lot 1's Roof

Runoff = 0.16 cfs @ 12.11 hrs, Volume= 609 cf, Depth> 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,656	98	Roofs, HSG C
1,656		100.00% Impervious Area

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

Summary for Subcatchment Roof2:

Lot 2's Roof

Runoff = 0.13 cfs @ 12.11 hrs, Volume= 483 cf, Depth> 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,315	98	Roofs, HSG C
1,315		100.00% Impervious Area

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

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 1.65 cfs @ 12.29 hrs, Volume= 8,487 cf, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
595	98	Roofs, HSG C
5,140	74	>75% Grass cover, Good, HSG C
48,831	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
55,281	71	Weighted Average
54,686		98.92% Pervious Area
595		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	50	0.0480	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	241	0.0436	1.04		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
19.2	291	Total			

Summary for Subcatchment SC-10:

Subcatchment SC-10

Runoff = 1.77 cfs @ 12.26 hrs, Volume= 8,502 cf, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
13,170	70	Woods, Good, HSG C
30,063	74	>75% Grass cover, Good, HSG C
3,281	98	Paved parking, HSG C
810	98	Roofs, HSG C
47,324	75	Weighted Average
43,233		91.36% Pervious Area
4,091		8.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.09"
1.1	60	0.0350	0.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
3.5	160	0.0230	0.76		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
17.2	270	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 1.21 cfs @ 12.53 hrs, Volume= 8,660 cf, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
2,235	98	Roofs, HSG C
6,865	98	Paved parking, HSG C
32,960	74	>75% Grass cover, Good, HSG C
42,060	79	Weighted Average
32,960		78.36% Pervious Area
9,100		21.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
4.6	203	0.0220	0.74		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	21	0.0140	2.40		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
2.0	119	0.0390	0.99		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
38.2	393	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 5.67 cfs @ 12.29 hrs, Volume= 28,993 cf, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
631	98	Paved parking, HSG C
1,858	98	Roofs, HSG C
50,102	70	Woods, Good, HSG C
3,842	74	>75% Grass cover, Good, HSG C
66,484	55	Woods, Good, HSG B
42,744	61	>75% Grass cover, Good, HSG B
6,394	98	Water Surface, HSG C
33,233	98	Water Surface, HSG B
205,288	69	Weighted Average
163,172		79.48% Pervious Area
42,116		20.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0500	0.06		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
0.9	154	0.0340	2.77		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.5	122	0.0740	1.36		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	29	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	104	0.1220	1.75		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
18.6	459	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 0.21 cfs @ 12.11 hrs, Volume= 754 cf, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,824	98	Paved parking, HSG C
525	74	>75% Grass cover, Good, HSG C
2,349	93	Weighted Average
525		22.36% Pervious Area
1,824		77.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.55		**Sheet Flow, sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.3	100	0.0950	6.26		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
0.8	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-5:

Subcatchment SC-5

Runoff = 0.73 cfs @ 12.11 hrs, Volume= 2,409 cf, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
502	74	>75% Grass cover, Good, HSG C
2,003	98	Paved parking, HSG C
3,667	98	Paved parking, HSG B
4,283	61	>75% Grass cover, Good, HSG B
10,455	82	Weighted Average
4,785		45.77% Pervious Area
5,670		54.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.1000	2.24		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.8	233	0.0570	4.85		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.2	283	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-6:

Subcatchment SC-6

Runoff = 0.65 cfs @ 12.17 hrs, Volume= 2,543 cf, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,529	74	>75% Grass cover, Good, HSG C
11,891	70	Woods, Good, HSG C
2,237	61	>75% Grass cover, Good, HSG B
5,828	55	Woods, Good, HSG B
21,485	65	Weighted Average
21,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.22		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
5.0	291	0.0370	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
8.8	341	Total			

Summary for Subcatchment SC-7:

Subcatchment SC-7

Runoff = 3.20 cfs @ 12.33 hrs, Volume= 17,631 cf, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
6,792	98	Paved parking, HSG C
8,663	98	Roofs, HSG C
49,414	74	>75% Grass cover, Good, HSG C
20,905	70	Woods, Good, HSG C
16,921	55	Woods, Good, HSG B
3,467	61	>75% Grass cover, Good, HSG B
106,162	73	Weighted Average
90,707		85.44% Pervious Area
15,455		14.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	50	0.0440	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
2.8	151	0.0330	0.91		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
4.0	354	0.0880	1.48		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
22.7	555	Total			

Summary for Subcatchment SC-8.1:

Subcatchment SC-8.1

Runoff = 0.54 cfs @ 12.11 hrs, Volume= 1,785 cf, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
2,899	98	Paved parking, HSG C
279	98	Roofs, HSG C
3,860	74	>75% Grass cover, Good, HSG C
7,038	85	Weighted Average
3,860		54.85% Pervious Area
3,178		45.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.9	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.2:

Subcatchment SC-8.2

Runoff = 0.26 cfs @ 12.11 hrs, Volume= 845 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,291	98	Paved parking, HSG C
194	70	Woods, Good, HSG C
2,064	74	>75% Grass cover, Good, HSG C
3,549	83	Weighted Average
2,258		63.62% Pervious Area
1,291		36.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.4	54	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.3	104	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.3:

Subcatchment SC-8.3

Runoff = 0.29 cfs @ 12.11 hrs, Volume= 1,003 cf, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,283	74	>75% Grass cover, Good, HSG C
2,220	98	Paved parking, HSG C
3,503	89	Weighted Average
1,283		36.63% Pervious Area
2,220		63.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	235	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.4	285	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.4:

Subcatchment SC-8.4

Runoff = 1.13 cfs @ 12.12 hrs, Volume= 3,724 cf, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
14,429	74	>75% Grass cover, Good, HSG C
1,313	98	Roofs, HSG C
2,137	98	Paved parking, HSG C
17,879	79	Weighted Average
14,429		80.70% Pervious Area
3,450		19.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	73	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.4	102	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
5.1	225	Total			

Summary for Subcatchment SC-8.5:

Subcatchment SC-8.5

Runoff = 0.35 cfs @ 12.11 hrs, Volume= 1,331 cf, Depth> 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
3,621	98	Paved parking, HSG C
3,621		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.6	140	0.0400	4.06		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.1	190	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.6:

Subcatchment SC-8.6

Runoff = 3.25 cfs @ 12.13 hrs, Volume= 10,940 cf, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
42,795	74	>75% Grass cover, Good, HSG C
4,291	98	Roofs, HSG C
6,223	98	Paved parking, HSG C
1,084	61	>75% Grass cover, Good, HSG B
54,393	78	Weighted Average
43,879		80.67% Pervious Area
10,514		19.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
1.5	259	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.2	31	0.0150	2.49		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
6.0	340	Total			

Summary for Subcatchment SC-8.7:

Subcatchment SC-8.7

Runoff = 1.47 cfs @ 12.11 hrs, Volume= 4,883 cf, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
1,692	98	Roofs, HSG C
8,872	74	>75% Grass cover, Good, HSG C
7,520	98	Paved parking, HSG C
1,174	61	>75% Grass cover, Good, HSG B
19,258	85	Weighted Average
10,046		52.17% Pervious Area
9,212		47.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.3	210	0.0300	2.60		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.0	260	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.8:

Subcatchment SC-8.8

Runoff = 1.19 cfs @ 12.11 hrs, Volume= 3,923 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
551	98	Roofs, HSG C
8,476	74	>75% Grass cover, Good, HSG C
6,284	98	Paved parking, HSG C
1,173	61	>75% Grass cover, Good, HSG B
16,484	83	Weighted Average
9,649		58.54% Pervious Area
6,835		41.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	185	0.0300	3.52		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.6	235	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-9:

Subcatchment SC-9

Runoff = 0.85 cfs @ 12.12 hrs, Volume= 2,784 cf, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-Year Rainfall=4.65"

Area (sf)	CN	Description
16,017	74	>75% Grass cover, Good, HSG C
16,017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.0870	0.26		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	100	0.0870	4.42		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
3.6	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond CB1:

Catch Basin #1

Inflow Area = 7,038 sf, 45.15% Impervious, Inflow Depth > 3.04" for 10-Year event
Inflow = 0.54 cfs @ 12.11 hrs, Volume= 1,785 cf
Outflow = 0.54 cfs @ 12.11 hrs, Volume= 1,785 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.54 cfs @ 12.11 hrs, Volume= 1,785 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.81' @ 12.11 hrs
Flood Elev= 305.52'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.43'	**12.0" Round Culvert** L= 9.1' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.43' / 299.25' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.11 hrs HW=299.81' TW=299.44' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.52 cfs @ 2.85 fps)

Summary for Pond CB2:

Catch Basin #2

Inflow Area = 3,549 sf, 36.38% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 0.26 cfs @ 12.11 hrs, Volume= 845 cf
Outflow = 0.26 cfs @ 12.11 hrs, Volume= 845 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 12.11 hrs, Volume= 845 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.82' @ 12.11 hrs
Flood Elev= 305.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.57'	**12.0" Round Culvert** L= 15.9' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.57' / 299.25' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 12.11 hrs HW=299.81' TW=299.44' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.25 cfs @ 1.68 fps)

Summary for Pond CB3:

Catch Basin #3

Inflow Area = 3,503 sf, 63.37% Impervious, Inflow Depth > 3.43" for 10-Year event
Inflow = 0.29 cfs @ 12.11 hrs, Volume= 1,003 cf
Outflow = 0.29 cfs @ 12.11 hrs, Volume= 1,003 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.11 hrs, Volume= 1,003 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.10' @ 12.70 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.40'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.40' / 292.32' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.24 cfs @ 12.11 hrs HW=292.69' TW=292.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.24 cfs @ 1.83 fps)

Summary for Pond CB4:

Catch Basin #4

Inflow Area = 17,879 sf, 19.30% Impervious, Inflow Depth > 2.50" for 10-Year event
Inflow = 1.13 cfs @ 12.12 hrs, Volume= 3,724 cf
Outflow = 1.13 cfs @ 12.12 hrs, Volume= 3,724 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.12 hrs, Volume= 3,724 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.10' @ 12.70 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.50'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.50' / 292.32' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.09 cfs @ 12.12 hrs HW=293.08' TW=292.60' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.09 cfs @ 3.31 fps)

Summary for Pond CB5:

Catch Basin #5

Inflow Area = 3,621 sf,100.00% Impervious, Inflow Depth > 4.41" for 10-Year event
Inflow = 0.35 cfs @ 12.11 hrs, Volume= 1,331 cf
Outflow = 0.35 cfs @ 12.11 hrs, Volume= 1,330 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.35 cfs @ 12.11 hrs, Volume= 1,330 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.09' @ 12.65 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.68'	**12.0" Round Culvert** L= 5.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.68' / 290.57' S= 0.0204 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=292.09' TW=292.30' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB6:

Catch Basin #6

Inflow Area = 54,393 sf, 19.33% Impervious, Inflow Depth > 2.41" for 10-Year event
Inflow = 3.25 cfs @ 12.13 hrs, Volume= 10,940 cf
Outflow = 3.25 cfs @ 12.13 hrs, Volume= 10,940 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.25 cfs @ 12.13 hrs, Volume= 10,940 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.11' @ 12.64 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.75'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.75' / 290.57' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=2.70 cfs @ 12.13 hrs HW=292.86' TW=292.35' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.70 cfs @ 3.44 fps)

Summary for Pond CB7:

Catch Basin #7

Inflow Area = 19,258 sf, 47.83% Impervious, Inflow Depth > 3.04" for 10-Year event
Inflow = 1.47 cfs @ 12.11 hrs, Volume= 4,883 cf
Outflow = 1.47 cfs @ 12.11 hrs, Volume= 4,883 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.47 cfs @ 12.11 hrs, Volume= 4,883 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 296.94' @ 12.11 hrs
Flood Elev= 302.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.29'	**12.0" Round Culvert** L= 24.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.29' / 295.80' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.42 cfs @ 12.11 hrs HW=296.92' TW=296.25' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.42 cfs @ 2.71 fps)

Summary for Pond CB8:

Catch Basin #8

Inflow Area = 16,484 sf, 41.46% Impervious, Inflow Depth > 2.86" for 10-Year event
Inflow = 1.19 cfs @ 12.11 hrs, Volume= 3,923 cf
Outflow = 1.19 cfs @ 12.11 hrs, Volume= 3,923 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.19 cfs @ 12.11 hrs, Volume= 3,923 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 297.02' @ 12.11 hrs
Flood Elev= 303.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.45'	**12.0" Round Culvert** L= 32.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.45' / 295.80' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.15 cfs @ 12.11 hrs HW=297.01' TW=296.25' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 1.15 cfs @ 2.54 fps)

Summary for Pond DMH1:

Drain Manhole #1

Inflow Area = 10,587 sf, 42.21% Impervious, Inflow Depth > 2.98" for 10-Year event
Inflow = 0.79 cfs @ 12.11 hrs, Volume= 2,629 cf
Outflow = 0.79 cfs @ 12.11 hrs, Volume= 2,629 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.79 cfs @ 12.11 hrs, Volume= 2,629 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.45' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**12.0" Round Culvert** L= 281.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 293.38' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.11 hrs HW=299.44' TW=292.30' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.76 cfs @ 2.27 fps)

Summary for Pond DMH2:

Drain Manhole #2

Inflow Area = 21,382 sf, 26.52% Impervious, Inflow Depth > 2.65" for 10-Year event
Inflow = 1.42 cfs @ 12.12 hrs, Volume= 4,727 cf
Outflow = 1.42 cfs @ 12.12 hrs, Volume= 4,727 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.42 cfs @ 12.12 hrs, Volume= 4,727 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.10' @ 12.65 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	291.82'	**12.0" Round Culvert** L= 62.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 291.82' / 290.57' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.06 cfs @ 12.12 hrs HW=292.60' TW=292.31' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.06 cfs @ 2.22 fps)

Summary for Pond DMH3:

Drain Manhole #3

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 2.71" for 10-Year event
Inflow = 8.38 cfs @ 12.12 hrs, Volume= 28,433 cf
Outflow = 8.38 cfs @ 12.12 hrs, Volume= 28,433 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.38 cfs @ 12.12 hrs, Volume= 28,433 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.09' @ 12.60 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	290.06'	**24.0" Round Culvert** L= 73.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.06' / 289.33' S= 0.0100 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 3.14 sf

Primary OutFlow Max=5.00 cfs @ 12.12 hrs HW=292.32' TW=292.20' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 5.00 cfs @ 1.76 fps)

Summary for Pond DMH4:

Drain Manhole #4

Inflow Area = 35,742 sf, 44.90% Impervious, Inflow Depth > 2.96" for 10-Year event
Inflow = 2.66 cfs @ 12.11 hrs, Volume= 8,807 cf
Outflow = 2.66 cfs @ 12.11 hrs, Volume= 8,807 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.66 cfs @ 12.11 hrs, Volume= 8,807 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 296.28' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Culvert** L= 157.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 290.57' S= 0.0300 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=2.57 cfs @ 12.11 hrs HW=296.25' TW=292.30' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 2.57 cfs @ 3.32 fps)

Summary for Pond FB:

Sediment Forebay

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 2.71" for 10-Year event
Inflow = 8.38 cfs @ 12.12 hrs, Volume= 28,433 cf
Outflow = 8.71 cfs @ 12.13 hrs, Volume= 27,752 cf, Atten= 0%, Lag= 0.8 min
Discarded = 0.01 cfs @ 8.40 hrs, Volume= 746 cf
Primary = 8.70 cfs @ 12.13 hrs, Volume= 27,006 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.08' @ 12.55 hrs Surf.Area= 489 sf Storage= 433 cf

Plug-Flow detention time= 20.9 min calculated for 27,694 cf (97% of inflow)
Center-of-Mass det. time= 7.1 min (844.6 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	288.00'	433 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
288.00	34	24.1	0	0	34
289.00	211	55.7	110	110	239
289.50	302	66.4	128	237	347
290.00	489	86.0	196	433	588

Device	Routing	Invert	Outlet Devices
#1	Primary	290.30'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Discarded	288.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.40 hrs HW=290.31' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=292.26' TW=292.50' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond INF:

Infiltration Basin

Inflow Area = 141,742 sf, 28.45% Impervious, Inflow Depth > 2.52" for 10-Year event
Inflow = 9.53 cfs @ 12.13 hrs, Volume= 29,790 cf
Outflow = 1.67 cfs @ 12.49 hrs, Volume= 19,354 cf, Atten= 82%, Lag= 21.7 min
Discarded = 0.16 cfs @ 12.49 hrs, Volume= 7,595 cf
Primary = 0.18 cfs @ 12.49 hrs, Volume= 6,750 cf
Secondary = 1.33 cfs @ 12.49 hrs, Volume= 5,009 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.08' @ 12.49 hrs Surf.Area= 6,934 sf Storage= 13,183 cf

Plug-Flow detention time= 263.8 min calculated for 19,354 cf (65% of inflow)
Center-of-Mass det. time= 140.9 min (986.3 - 845.4)

Volume	Invert	Avail.Storage	Storage Description
#1	290.00'	20,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
290.00	886	167.9	0	0	886
291.00	3,050	255.4	1,860	1,860	3,841
292.00	5,881	307.0	4,389	6,249	6,167
293.00	6,830	326.0	6,350	12,598	7,175
294.00	8,106	348.8	7,459	20,057	8,445

Device	Routing	Invert	Outlet Devices
#1	Secondary	293.00'	**20.0' long x 24.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	290.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	292.20'	**4.0" Round Culvert**
			L= 30.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 292.20' / 292.00' S= 0.0067 '/' Cc= 0.900
			n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.16 cfs @ 12.49 hrs HW=293.08' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.18 cfs @ 12.49 hrs HW=293.08' TW=265.56' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.18 cfs @ 2.05 fps)

Secondary OutFlow Max=1.31 cfs @ 12.49 hrs HW=293.08' TW=265.56' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.31 cfs @ 0.78 fps)

Summary for Pond SF:

Sand Filter

Inflow Area = 12,804 sf, 58.53% Impervious, Inflow Depth > 2.96" for 10-Year event
Inflow = 0.94 cfs @ 12.11 hrs, Volume= 3,163 cf
Outflow = 0.87 cfs @ 12.14 hrs, Volume= 3,158 cf, Atten= 8%, Lag= 1.6 min
Discarded = 0.01 cfs @ 12.15 hrs, Volume= 378 cf
Primary = 0.86 cfs @ 12.14 hrs, Volume= 2,779 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 267.08' @ 12.14 hrs Surf.Area= 111 sf Storage= 74 cf

Plug-Flow detention time= 2.7 min calculated for 3,151 cf (100% of inflow)
Center-of-Mass det. time= 1.6 min (828.5 - 826.8)

Volume	Invert	Avail.Storage	Storage Description
#1	265.00'	637 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.00	100	50.0	0.0	0	0	100
265.50	100	50.0	40.0	20	20	125
267.00	100	50.0	30.0	45	65	200
268.00	278	68.8	100.0	182	247	387
268.50	389	78.3	100.0	166	413	505
269.00	513	87.7	100.0	225	637	635

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	268.50'	**2.0' long x 14.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#3 Primary 265.00' **6.0" Round Culvert**
L= 51.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 265.00' / 265.00' S= 0.0000 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=267.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.84 cfs @ 12.14 hrs HW=267.03' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Barrel Controls 0.84 cfs @ 4.30 fps)

Summary for Pond ST1:

Stormtech Infiltration Chambers #1

Inflow Area = 1,656 sf,100.00% Impervious, Inflow Depth > 4.41" for 10-Year event
Inflow = 0.16 cfs @ 12.11 hrs, Volume= 609 cf
Outflow = 0.01 cfs @ 10.70 hrs, Volume= 484 cf, Atten= 95%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.70 hrs, Volume= 484 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 305.95' @ 14.53 hrs Surf.Area= 312 sf Storage= 246 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 127.0 min (877.5 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.60'	326 cf	**12.00'W x 25.98'L x 3.50'H Field A** 1,091 cf Overall - 276 cf Embedded = 815 cf x 40.0% Voids
#2A	305.10'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		602 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.60'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.70 hrs HW=304.64' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond ST2:

Stormtech Infiltration Chambers #2

Inflow Area = 1,315 sf,100.00% Impervious, Inflow Depth > 4.41" for 10-Year event
Inflow = 0.13 cfs @ 12.11 hrs, Volume= 483 cf
Outflow = 0.01 cfs @ 10.90 hrs, Volume= 417 cf, Atten= 95%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.90 hrs, Volume= 417 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 305.64' @ 14.20 hrs Surf.Area= 275 sf Storage= 185 cf

Plug-Flow detention time= 210.8 min calculated for 417 cf (86% of inflow)
Center-of-Mass det. time= 138.0 min (888.5 - 750.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.50'	274 cf	**11.00'W x 24.98'L x 3.50'H Field A** 962 cf Overall - 276 cf Embedded = 686 cf x 40.0% Voids
#2A	305.00'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		550 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.90 hrs HW=304.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Summary for Pond WC:

36" HDPE Wetland Culvert

Inflow Area = 347,030 sf, 23.76% Impervious, Inflow Depth > 1.41" for 10-Year event
Inflow = 5.81 cfs @ 12.30 hrs, Volume= 40,751 cf
Outflow = 5.81 cfs @ 12.30 hrs, Volume= 40,751 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.81 cfs @ 12.30 hrs, Volume= 40,751 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 265.66' @ 12.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.50'	**36.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 264.50' / 264.30' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 7.07 sf

Primary OutFlow Max=5.81 cfs @ 12.30 hrs HW=265.66' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 5.81 cfs @ 3.40 fps)

Summary for Link AP-1:

Inflow Area = 584,822 sf, 19.68% Impervious, Inflow Depth > 1.66" for 10-Year event
Inflow = 12.13 cfs @ 12.31 hrs, Volume= 80,852 cf
Primary = 12.13 cfs @ 12.31 hrs, Volume= 80,852 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 47,324 sf, 8.64% Impervious, Inflow Depth > 2.16" for 10-Year event
Inflow = 1.77 cfs @ 12.26 hrs, Volume= 8,502 cf
Primary = 1.77 cfs @ 12.26 hrs, Volume= 8,502 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment Roof1:

Lot 1's Roof

Runoff = 0.20 cfs @ 12.11 hrs, Volume= 777 cf, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,656	98	Roofs, HSG C
1,656		100.00% Impervious Area

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

Summary for Subcatchment Roof2:

Lot 2's Roof

Runoff = 0.16 cfs @ 12.11 hrs, Volume= 617 cf, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,315	98	Roofs, HSG C
1,315		100.00% Impervious Area

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

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 2.53 cfs @ 12.29 hrs, Volume= 12,789 cf, Depth> 2.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
595	98	Roofs, HSG C
5,140	74	>75% Grass cover, Good, HSG C
48,831	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
55,281	71	Weighted Average
54,686		98.92% Pervious Area
595		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	50	0.0480	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	241	0.0436	1.04		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
19.2	291	Total			

Summary for Subcatchment SC-10:

Subcatchment SC-10

Runoff = 2.60 cfs @ 12.26 hrs, Volume= 12,440 cf, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
13,170	70	Woods, Good, HSG C
30,063	74	>75% Grass cover, Good, HSG C
3,281	98	Paved parking, HSG C
810	98	Roofs, HSG C
47,324	75	Weighted Average
43,233		91.36% Pervious Area
4,091		8.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.09"
1.1	60	0.0350	0.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
3.5	160	0.0230	0.76		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
17.2	270	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 1.73 cfs @ 12.52 hrs, Volume= 12,342 cf, Depth> 3.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
2,235	98	Roofs, HSG C
6,865	98	Paved parking, HSG C
32,960	74	>75% Grass cover, Good, HSG C
42,060	79	Weighted Average
32,960		78.36% Pervious Area
9,100		21.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
4.6	203	0.0220	0.74		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	21	0.0140	2.40		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
2.0	119	0.0390	0.99		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
38.2	393	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 8.86 cfs @ 12.28 hrs, Volume= 44,382 cf, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
631	98	Paved parking, HSG C
1,858	98	Roofs, HSG C
50,102	70	Woods, Good, HSG C
3,842	74	>75% Grass cover, Good, HSG C
66,484	55	Woods, Good, HSG B
42,744	61	>75% Grass cover, Good, HSG B
6,394	98	Water Surface, HSG C
33,233	98	Water Surface, HSG B
205,288	69	Weighted Average
163,172		79.48% Pervious Area
42,116		20.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0500	0.06		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
0.9	154	0.0340	2.77		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.5	122	0.0740	1.36		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	29	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	104	0.1220	1.75		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
18.6	459	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 0.28 cfs @ 12.11 hrs, Volume= 989 cf, Depth> 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,824	98	Paved parking, HSG C
525	74	>75% Grass cover, Good, HSG C
2,349	93	Weighted Average
525		22.36% Pervious Area
1,824		77.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.55		**Sheet Flow, sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.3	100	0.0950	6.26		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
0.8	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-5:

Subcatchment SC-5

Runoff = 1.01 cfs @ 12.11 hrs, Volume= 3,366 cf, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
502	74	>75% Grass cover, Good, HSG C
2,003	98	Paved parking, HSG C
3,667	98	Paved parking, HSG B
4,283	61	>75% Grass cover, Good, HSG B
10,455	82	Weighted Average
4,785		45.77% Pervious Area
5,670		54.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.1000	2.24		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.8	233	0.0570	4.85		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.2	283	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-6:

Subcatchment SC-6

Runoff = 1.07 cfs @ 12.16 hrs, Volume= 4,029 cf, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,529	74	>75% Grass cover, Good, HSG C
11,891	70	Woods, Good, HSG C
2,237	61	>75% Grass cover, Good, HSG B
5,828	55	Woods, Good, HSG B
21,485	65	Weighted Average
21,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.22		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
5.0	291	0.0370	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
8.8	341	Total			

Summary for Subcatchment SC-7:

Subcatchment SC-7

Runoff = 4.80 cfs @ 12.33 hrs, Volume= 26,173 cf, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
6,792	98	Paved parking, HSG C
8,663	98	Roofs, HSG C
49,414	74	>75% Grass cover, Good, HSG C
20,905	70	Woods, Good, HSG C
16,921	55	Woods, Good, HSG B
3,467	61	>75% Grass cover, Good, HSG B
106,162	73	Weighted Average
90,707		85.44% Pervious Area
15,455		14.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	50	0.0440	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
2.8	151	0.0330	0.91		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
4.0	354	0.0880	1.48		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
22.7	555	Total			

Summary for Subcatchment SC-8.1:

Subcatchment SC-8.1

Runoff = 0.73 cfs @ 12.11 hrs, Volume= 2,449 cf, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
2,899	98	Paved parking, HSG C
279	98	Roofs, HSG C
3,860	74	>75% Grass cover, Good, HSG C
7,038	85	Weighted Average
3,860		54.85% Pervious Area
3,178		45.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.9	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.2:

Subcatchment SC-8.2

Runoff = 0.35 cfs @ 12.11 hrs, Volume= 1,173 cf, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,291	98	Paved parking, HSG C
194	70	Woods, Good, HSG C
2,064	74	>75% Grass cover, Good, HSG C
3,549	83	Weighted Average
2,258		63.62% Pervious Area
1,291		36.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.4	54	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.3	104	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.3:

Subcatchment SC-8.3

Runoff = 0.39 cfs @ 12.11 hrs, Volume= 1,344 cf, Depth> 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,283	74	>75% Grass cover, Good, HSG C
2,220	98	Paved parking, HSG C
3,503	89	Weighted Average
1,283		36.63% Pervious Area
2,220		63.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	235	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.4	285	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.4:

Subcatchment SC-8.4

Runoff = 1.60 cfs @ 12.12 hrs, Volume= 5,304 cf, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
14,429	74	>75% Grass cover, Good, HSG C
1,313	98	Roofs, HSG C
2,137	98	Paved parking, HSG C
17,879	79	Weighted Average
14,429		80.70% Pervious Area
3,450		19.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	73	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.4	102	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
5.1	225	Total			

Summary for Subcatchment SC-8.5:

Subcatchment SC-8.5

Runoff = 0.44 cfs @ 12.11 hrs, Volume= 1,698 cf, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
3,621	98	Paved parking, HSG C
3,621		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.6	140	0.0400	4.06		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.1	190	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.6:

Subcatchment SC-8.6

Runoff = 4.63 cfs @ 12.13 hrs, Volume= 15,680 cf, Depth> 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
42,795	74	>75% Grass cover, Good, HSG C
4,291	98	Roofs, HSG C
6,223	98	Paved parking, HSG C
1,084	61	>75% Grass cover, Good, HSG B
54,393	78	Weighted Average
43,879		80.67% Pervious Area
10,514		19.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
1.5	259	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.2	31	0.0150	2.49		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
6.0	340	Total			

Summary for Subcatchment SC-8.7:

Subcatchment SC-8.7

Runoff = 1.99 cfs @ 12.11 hrs, Volume= 6,701 cf, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
1,692	98	Roofs, HSG C
8,872	74	>75% Grass cover, Good, HSG C
7,520	98	Paved parking, HSG C
1,174	61	>75% Grass cover, Good, HSG B
19,258	85	Weighted Average
10,046		52.17% Pervious Area
9,212		47.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.3	210	0.0300	2.60		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.0	260	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.8:

Subcatchment SC-8.8

Runoff = 1.63 cfs @ 12.11 hrs, Volume= 5,449 cf, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
551	98	Roofs, HSG C
8,476	74	>75% Grass cover, Good, HSG C
6,284	98	Paved parking, HSG C
1,173	61	>75% Grass cover, Good, HSG B
16,484	83	Weighted Average
9,649		58.54% Pervious Area
6,835		41.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	185	0.0300	3.52		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.6	235	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-9:

Subcatchment SC-9

Runoff = 1.25 cfs @ 12.12 hrs, Volume= 4,101 cf, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-Year Rainfall=5.87"

Area (sf)	CN	Description
16,017	74	>75% Grass cover, Good, HSG C
16,017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.0870	0.26		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	100	0.0870	4.42		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
3.6	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond CB1:

Catch Basin #1

Inflow Area = 7,038 sf, 45.15% Impervious, Inflow Depth > 4.18" for 25-Year event
Inflow = 0.73 cfs @ 12.11 hrs, Volume= 2,449 cf
Outflow = 0.73 cfs @ 12.11 hrs, Volume= 2,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.73 cfs @ 12.11 hrs, Volume= 2,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.89' @ 12.11 hrs
Flood Elev= 305.52'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.43'	**12.0" Round Culvert** L= 9.1' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.43' / 299.25' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.70 cfs @ 12.11 hrs HW=299.88' TW=299.53' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.70 cfs @ 3.02 fps)

Summary for Pond CB2:

Catch Basin #2

Inflow Area = 3,549 sf, 36.38% Impervious, Inflow Depth > 3.97" for 25-Year event
Inflow = 0.35 cfs @ 12.11 hrs, Volume= 1,173 cf
Outflow = 0.35 cfs @ 12.11 hrs, Volume= 1,173 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.35 cfs @ 12.11 hrs, Volume= 1,173 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.86' @ 12.12 hrs
Flood Elev= 305.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.57'	**12.0" Round Culvert** L= 15.9' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.57' / 299.25' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 12.11 hrs HW=299.86' TW=299.53' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.33 cfs @ 2.62 fps)

Summary for Pond CB3:

Catch Basin #3

Inflow Area = 3,503 sf, 63.37% Impervious, Inflow Depth > 4.61" for 25-Year event
Inflow = 0.39 cfs @ 12.11 hrs, Volume= 1,344 cf
Outflow = 0.39 cfs @ 12.11 hrs, Volume= 1,345 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.11 hrs, Volume= 1,345 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.49' @ 12.22 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.40'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.40' / 292.32' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=292.89' TW=293.15' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB4:

Catch Basin #4

Inflow Area = 17,879 sf, 19.30% Impervious, Inflow Depth > 3.56" for 25-Year event
Inflow = 1.60 cfs @ 12.12 hrs, Volume= 5,304 cf
Outflow = 1.60 cfs @ 12.12 hrs, Volume= 5,304 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.60 cfs @ 12.12 hrs, Volume= 5,304 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.51' @ 12.21 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.50'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.50' / 292.32' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.12 hrs HW=293.25' TW=293.18' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.76 cfs @ 1.65 fps)

Summary for Pond CB5:

Catch Basin #5

Inflow Area = 3,621 sf,100.00% Impervious, Inflow Depth > 5.63" for 25-Year event
Inflow = 0.44 cfs @ 12.11 hrs, Volume= 1,698 cf
Outflow = 0.44 cfs @ 12.11 hrs, Volume= 1,697 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.11 hrs, Volume= 1,697 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.36' @ 12.33 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.68'	**12.0" Round Culvert** L= 5.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.68' / 290.57' S= 0.0204 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=292.78' TW=293.14' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB6:

Catch Basin #6

Inflow Area = 54,393 sf, 19.33% Impervious, Inflow Depth > 3.46" for 25-Year event
Inflow = 4.63 cfs @ 12.13 hrs, Volume= 15,680 cf
Outflow = 4.63 cfs @ 12.13 hrs, Volume= 15,680 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.63 cfs @ 12.13 hrs, Volume= 15,680 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.52' @ 12.15 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.75'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.75' / 290.57' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=3.96 cfs @ 12.13 hrs HW=294.31' TW=293.21' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.96 cfs @ 5.05 fps)

Summary for Pond CB7:

Catch Basin #7

Inflow Area = 19,258 sf, 47.83% Impervious, Inflow Depth > 4.18" for 25-Year event
Inflow = 1.99 cfs @ 12.11 hrs, Volume= 6,701 cf
Outflow = 1.99 cfs @ 12.11 hrs, Volume= 6,701 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.99 cfs @ 12.11 hrs, Volume= 6,701 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 297.14' @ 12.14 hrs
Flood Elev= 302.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.29'	**12.0" Round Culvert** L= 24.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.29' / 295.80' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.65 cfs @ 12.11 hrs HW=297.08' TW=296.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.65 cfs @ 3.39 fps)

Summary for Pond CB8:

Catch Basin #8

Inflow Area = 16,484 sf, 41.46% Impervious, Inflow Depth > 3.97" for 25-Year event
Inflow = 1.63 cfs @ 12.11 hrs, Volume= 5,449 cf
Outflow = 1.63 cfs @ 12.11 hrs, Volume= 5,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.63 cfs @ 12.11 hrs, Volume= 5,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 297.19' @ 12.13 hrs
Flood Elev= 303.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.45'	**12.0" Round Culvert** L= 32.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.45' / 295.80' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.39 cfs @ 12.11 hrs HW=297.15' TW=296.65' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.39 cfs @ 3.36 fps)

Summary for Pond DMH1:

Drain Manhole #1

Inflow Area = 10,587 sf, 42.21% Impervious, Inflow Depth > 4.11" for 25-Year event
Inflow = 1.08 cfs @ 12.11 hrs, Volume= 3,622 cf
Outflow = 1.08 cfs @ 12.11 hrs, Volume= 3,622 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.08 cfs @ 12.11 hrs, Volume= 3,622 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.54' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**12.0" Round Culvert** L= 281.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 293.38' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 12.11 hrs HW=299.53' TW=293.15' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.04 cfs @ 2.47 fps)

Summary for Pond DMH2:

Drain Manhole #2

Inflow Area = 21,382 sf, 26.52% Impervious, Inflow Depth > 3.73" for 25-Year event
Inflow = 1.99 cfs @ 12.12 hrs, Volume= 6,649 cf
Outflow = 1.99 cfs @ 12.12 hrs, Volume= 6,649 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.99 cfs @ 12.12 hrs, Volume= 6,649 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.49' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	291.82'	**12.0" Round Culvert** L= 62.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 291.82' / 290.57' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.31 cfs @ 12.12 hrs HW=293.17' TW=293.16' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.31 cfs @ 0.40 fps)

Summary for Pond DMH3:

Drain Manhole #3

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 3.80" for 25-Year event
Inflow = 11.63 cfs @ 12.12 hrs, Volume= 39,798 cf
Outflow = 11.63 cfs @ 12.12 hrs, Volume= 39,798 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.63 cfs @ 12.12 hrs, Volume= 39,798 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.36' @ 12.28 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	290.06'	**24.0" Round Culvert** L= 73.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.06' / 289.33' S= 0.0100 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 3.14 sf

Primary OutFlow Max=8.44 cfs @ 12.12 hrs HW=293.17' TW=292.86' (Dynamic Tailwater)
1=Culvert (Inlet Controls 8.44 cfs @ 2.69 fps)

Summary for Pond DMH4:

Drain Manhole #4

Inflow Area = 35,742 sf, 44.90% Impervious, Inflow Depth > 4.08" for 25-Year event
Inflow = 3.62 cfs @ 12.11 hrs, Volume= 12,150 cf
Outflow = 3.62 cfs @ 12.11 hrs, Volume= 12,150 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.62 cfs @ 12.11 hrs, Volume= 12,150 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 296.71' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Culvert** L= 157.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 290.57' S= 0.0300 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=3.49 cfs @ 12.11 hrs HW=296.65' TW=293.15' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.49 cfs @ 4.45 fps)

Summary for Pond FB:

Sediment Forebay

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 3.80" for 25-Year event
Inflow = 11.63 cfs @ 12.12 hrs, Volume= 39,798 cf
Outflow = 12.25 cfs @ 12.11 hrs, Volume= 39,163 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 7.20 hrs, Volume= 789 cf
Primary = 12.24 cfs @ 12.11 hrs, Volume= 38,374 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.30' @ 12.25 hrs Surf.Area= 489 sf Storage= 433 cf

Plug-Flow detention time= 15.0 min calculated for 39,163 cf (98% of inflow)
Center-of-Mass det. time= 5.5 min (831.4 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	288.00'	433 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
288.00	34	24.1	0	0	34
289.00	211	55.7	110	110	239
289.50	302	66.4	128	237	347
290.00	489	86.0	196	433	588

Device	Routing	Invert	Outlet Devices
#1	Primary	290.30'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Discarded	288.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 7.20 hrs HW=290.31' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=292.81' TW=293.08' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond INF:

Infiltration Basin

Inflow Area = 141,742 sf, 28.45% Impervious, Inflow Depth > 3.60" for 25-Year event
Inflow = 13.49 cfs @ 12.11 hrs, Volume= 42,474 cf
Outflow = 9.01 cfs @ 12.20 hrs, Volume= 30,733 cf, Atten= 33%, Lag= 5.4 min
Discarded = 0.17 cfs @ 12.20 hrs, Volume= 8,124 cf
Primary = 0.20 cfs @ 12.20 hrs, Volume= 7,299 cf
Secondary = 8.64 cfs @ 12.20 hrs, Volume= 15,309 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.30' @ 12.20 hrs Surf.Area= 7,196 sf Storage= 14,670 cf

Plug-Flow detention time= 189.2 min calculated for 30,669 cf (72% of inflow)
Center-of-Mass det. time= 81.7 min (914.4 - 832.8)

Volume	Invert	Avail.Storage	Storage Description
#1	290.00'	20,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
290.00	886	167.9	0	0	886
291.00	3,050	255.4	1,860	1,860	3,841
292.00	5,881	307.0	4,389	6,249	6,167
293.00	6,830	326.0	6,350	12,598	7,175
294.00	8,106	348.8	7,459	20,057	8,445

Device	Routing	Invert	Outlet Devices
#1	Secondary	293.00'	**20.0' long x 24.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	290.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	292.20'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 292.20' / 292.00' S= 0.0067 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.17 cfs @ 12.20 hrs HW=293.29' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.20 cfs @ 12.20 hrs HW=293.29' TW=266.58' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.20 cfs @ 2.32 fps)

Secondary OutFlow Max=8.60 cfs @ 12.20 hrs HW=293.29' TW=266.58' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 8.60 cfs @ 1.46 fps)

Summary for Pond SF:

Sand Filter

Inflow Area = 12,804 sf, 58.53% Impervious, Inflow Depth > 4.08" for 25-Year event
Inflow = 1.29 cfs @ 12.11 hrs, Volume= 4,355 cf
Outflow = 1.00 cfs @ 12.17 hrs, Volume= 4,349 cf, Atten= 22%, Lag= 3.2 min
Discarded = 0.01 cfs @ 12.17 hrs, Volume= 404 cf
Primary = 0.99 cfs @ 12.17 hrs, Volume= 3,945 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 267.60' @ 12.17 hrs Surf.Area= 197 sf Storage= 153 cf

Plug-Flow detention time= 2.5 min calculated for 4,340 cf (100% of inflow)
Center-of-Mass det. time= 1.6 min (817.5 - 815.9)

Volume	Invert	Avail.Storage	Storage Description
#1	265.00'	637 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.00	100	50.0	0.0	0	0	100
265.50	100	50.0	40.0	20	20	125
267.00	100	50.0	30.0	45	65	200
268.00	278	68.8	100.0	182	247	387
268.50	389	78.3	100.0	166	413	505
269.00	513	87.7	100.0	225	637	635

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	268.50'	**2.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#3 Primary 265.00' **6.0" Round Culvert**
L= 51.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 265.00' / 265.00' S= 0.0000 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.01 cfs @ 12.17 hrs HW=267.57' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.98 cfs @ 12.17 hrs HW=267.57' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Barrel Controls 0.98 cfs @ 4.99 fps)

Summary for Pond ST1:

Stormtech Infiltration Chambers #1

Inflow Area = 1,656 sf,100.00% Impervious, Inflow Depth > 5.63" for 25-Year event
Inflow = 0.20 cfs @ 12.11 hrs, Volume= 777 cf
Outflow = 0.01 cfs @ 9.95 hrs, Volume= 516 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.95 hrs, Volume= 516 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 306.47' @ 15.19 hrs Surf.Area= 312 sf Storage= 350 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 98.7 min (844.7 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.60'	326 cf	**12.00'W x 25.98'L x 3.50'H Field A** 1,091 cf Overall - 276 cf Embedded = 815 cf x 40.0% Voids
#2A	305.10'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		602 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.60'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 9.95 hrs HW=304.64' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond ST2:

Stormtech Infiltration Chambers #2

Inflow Area = 1,315 sf,100.00% Impervious, Inflow Depth > 5.63" for 25-Year event
Inflow = 0.16 cfs @ 12.11 hrs, Volume= 617 cf
Outflow = 0.01 cfs @ 10.25 hrs, Volume= 444 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.25 hrs, Volume= 444 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 306.05' @ 14.88 hrs Surf.Area= 275 sf Storage= 265 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 110.4 min (856.5 - 746.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.50'	274 cf	**11.00'W x 24.98'L x 3.50'H Field A** 962 cf Overall - 276 cf Embedded = 686 cf x 40.0% Voids
#2A	305.00'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		550 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.25 hrs HW=304.54' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond WC:

36" HDPE Wetland Culvert

Inflow Area = 347,030 sf, 23.76% Impervious, Inflow Depth > 2.32" for 25-Year event
Inflow = 16.73 cfs @ 12.22 hrs, Volume= 66,990 cf
Outflow = 16.73 cfs @ 12.22 hrs, Volume= 66,990 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.73 cfs @ 12.22 hrs, Volume= 66,990 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 266.60' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.50'	**36.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 264.50' / 264.30' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 7.07 sf

Primary OutFlow Max=16.25 cfs @ 12.22 hrs HW=266.57' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 16.25 cfs @ 4.41 fps)

Summary for Link AP-1:

Inflow Area = 584,822 sf, 19.68% Impervious, Inflow Depth > 2.59" for 25-Year event
Inflow = 25.38 cfs @ 12.23 hrs, Volume= 126,268 cf
Primary = 25.38 cfs @ 12.23 hrs, Volume= 126,268 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 47,324 sf, 8.64% Impervious, Inflow Depth > 3.15" for 25-Year event
Inflow = 2.60 cfs @ 12.26 hrs, Volume= 12,440 cf
Primary = 2.60 cfs @ 12.26 hrs, Volume= 12,440 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment Roof1:

Lot 1's Roof

Runoff = 0.24 cfs @ 12.11 hrs, Volume= 932 cf, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,656	98	Roofs, HSG C
1,656		100.00% Impervious Area

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

Summary for Subcatchment Roof2:

Lot 2's Roof

Runoff = 0.19 cfs @ 12.11 hrs, Volume= 740 cf, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,315	98	Roofs, HSG C
1,315		100.00% Impervious Area

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

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 3.38 cfs @ 12.29 hrs, Volume= 17,047 cf, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
595	98	Roofs, HSG C
5,140	74	>75% Grass cover, Good, HSG C
48,831	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
55,281	71	Weighted Average
54,686		98.92% Pervious Area
595		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	50	0.0480	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	241	0.0436	1.04		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
19.2	291	Total			

Summary for Subcatchment SC-10:

Subcatchment SC-10

Runoff = 3.39 cfs @ 12.26 hrs, Volume= 16,280 cf, Depth> 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
13,170	70	Woods, Good, HSG C
30,063	74	>75% Grass cover, Good, HSG C
3,281	98	Paved parking, HSG C
810	98	Roofs, HSG C
47,324	75	Weighted Average
43,233		91.36% Pervious Area
4,091		8.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.09"
1.1	60	0.0350	0.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
3.5	160	0.0230	0.76		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
17.2	270	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 2.22 cfs @ 12.52 hrs, Volume= 15,885 cf, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
2,235	98	Roofs, HSG C
6,865	98	Paved parking, HSG C
32,960	74	>75% Grass cover, Good, HSG C
42,060	79	Weighted Average
32,960		78.36% Pervious Area
9,100		21.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
4.6	203	0.0220	0.74		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	21	0.0140	2.40		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
2.0	119	0.0390	0.99		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
38.2	393	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 12.01 cfs @ 12.28 hrs, Volume= 59,744 cf, Depth> 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
631	98	Paved parking, HSG C
1,858	98	Roofs, HSG C
50,102	70	Woods, Good, HSG C
3,842	74	>75% Grass cover, Good, HSG C
66,484	55	Woods, Good, HSG B
42,744	61	>75% Grass cover, Good, HSG B
6,394	98	Water Surface, HSG C
33,233	98	Water Surface, HSG B
205,288	69	Weighted Average
163,172		79.48% Pervious Area
42,116		20.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0500	0.06		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
0.9	154	0.0340	2.77		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.5	122	0.0740	1.36		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	29	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	104	0.1220	1.75		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
18.6	459	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 0.33 cfs @ 12.11 hrs, Volume= 1,207 cf, Depth> 6.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,824	98	Paved parking, HSG C
525	74	>75% Grass cover, Good, HSG C
2,349	93	Weighted Average
525		22.36% Pervious Area
1,824		77.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.55		**Sheet Flow, sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.3	100	0.0950	6.26		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
0.8	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-5:

Subcatchment SC-5

Runoff = 1.27 cfs @ 12.11 hrs, Volume= 4,279 cf, Depth> 4.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
502	74	>75% Grass cover, Good, HSG C
2,003	98	Paved parking, HSG C
3,667	98	Paved parking, HSG B
4,283	61	>75% Grass cover, Good, HSG B
10,455	82	Weighted Average
4,785		45.77% Pervious Area
5,670		54.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.1000	2.24		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.8	233	0.0570	4.85		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.2	283	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-6:

Subcatchment SC-6

Runoff = 1.49 cfs @ 12.16 hrs, Volume= 5,539 cf, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,529	74	>75% Grass cover, Good, HSG C
11,891	70	Woods, Good, HSG C
2,237	61	>75% Grass cover, Good, HSG B
5,828	55	Woods, Good, HSG B
21,485	65	Weighted Average
21,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.22		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
5.0	291	0.0370	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
8.8	341	Total			

Summary for Subcatchment SC-7:

Subcatchment SC-7

Runoff = 6.35 cfs @ 12.33 hrs, Volume= 34,565 cf, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
6,792	98	Paved parking, HSG C
8,663	98	Roofs, HSG C
49,414	74	>75% Grass cover, Good, HSG C
20,905	70	Woods, Good, HSG C
16,921	55	Woods, Good, HSG B
3,467	61	>75% Grass cover, Good, HSG B
106,162	73	Weighted Average
90,707		85.44% Pervious Area
15,455		14.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	50	0.0440	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
2.8	151	0.0330	0.91		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
4.0	354	0.0880	1.48		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
22.7	555	Total			

Summary for Subcatchment SC-8.1:

Subcatchment SC-8.1

Runoff = 0.90 cfs @ 12.11 hrs, Volume= 3,078 cf, Depth> 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
2,899	98	Paved parking, HSG C
279	98	Roofs, HSG C
3,860	74	>75% Grass cover, Good, HSG C
7,038	85	Weighted Average
3,860		54.85% Pervious Area
3,178		45.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.9	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.2:

Subcatchment SC-8.2

Runoff = 0.44 cfs @ 12.11 hrs, Volume= 1,485 cf, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,291	98	Paved parking, HSG C
194	70	Woods, Good, HSG C
2,064	74	>75% Grass cover, Good, HSG C
3,549	83	Weighted Average
2,258		63.62% Pervious Area
1,291		36.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.4	54	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.3	104	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.3:

Subcatchment SC-8.3

Runoff = 0.47 cfs @ 12.11 hrs, Volume= 1,665 cf, Depth> 5.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,283	74	>75% Grass cover, Good, HSG C
2,220	98	Paved parking, HSG C
3,503	89	Weighted Average
1,283		36.63% Pervious Area
2,220		63.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	235	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.4	285	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.4:

Subcatchment SC-8.4

Runoff = 2.04 cfs @ 12.12 hrs, Volume= 6,823 cf, Depth> 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
14,429	74	>75% Grass cover, Good, HSG C
1,313	98	Roofs, HSG C
2,137	98	Paved parking, HSG C
17,879	79	Weighted Average
14,429		80.70% Pervious Area
3,450		19.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	73	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.4	102	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
5.1	225	Total			

Summary for Subcatchment SC-8.5:

Subcatchment SC-8.5

Runoff = 0.53 cfs @ 12.11 hrs, Volume= 2,038 cf, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
3,621	98	Paved parking, HSG C
3,621		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.6	140	0.0400	4.06		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.1	190	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.6:

Subcatchment SC-8.6

Runoff = 5.93 cfs @ 12.13 hrs, Volume= 20,255 cf, Depth> 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
42,795	74	>75% Grass cover, Good, HSG C
4,291	98	Roofs, HSG C
6,223	98	Paved parking, HSG C
1,084	61	>75% Grass cover, Good, HSG B
54,393	78	Weighted Average
43,879		80.67% Pervious Area
10,514		19.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
1.5	259	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.2	31	0.0150	2.49		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
6.0	340	Total			

Summary for Subcatchment SC-8.7:

Subcatchment SC-8.7

Runoff = 2.47 cfs @ 12.11 hrs, Volume= 8,421 cf, Depth> 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
1,692	98	Roofs, HSG C
8,872	74	>75% Grass cover, Good, HSG C
7,520	98	Paved parking, HSG C
1,174	61	>75% Grass cover, Good, HSG B
19,258	85	Weighted Average
10,046		52.17% Pervious Area
9,212		47.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.3	210	0.0300	2.60		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.0	260	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.8:

Subcatchment SC-8.8

Runoff = 2.04 cfs @ 12.11 hrs, Volume= 6,900 cf, Depth> 5.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
551	98	Roofs, HSG C
8,476	74	>75% Grass cover, Good, HSG C
6,284	98	Paved parking, HSG C
1,173	61	>75% Grass cover, Good, HSG B
16,484	83	Weighted Average
9,649		58.54% Pervious Area
6,835		41.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	185	0.0300	3.52		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.6	235	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-9:

Subcatchment SC-9

Runoff = 1.64 cfs @ 12.12 hrs, Volume= 5,389 cf, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 50-Year Rainfall=7.00"

Area (sf)	CN	Description
16,017	74	>75% Grass cover, Good, HSG C
16,017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.0870	0.26		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	100	0.0870	4.42		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
3.6	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond CB1:

Catch Basin #1

Inflow Area = 7,038 sf, 45.15% Impervious, Inflow Depth > 5.25" for 50-Year event
Inflow = 0.90 cfs @ 12.11 hrs, Volume= 3,078 cf
Outflow = 0.90 cfs @ 12.11 hrs, Volume= 3,078 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 12.11 hrs, Volume= 3,078 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.95' @ 12.11 hrs
Flood Elev= 305.52'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.43'	**12.0" Round Culvert** L= 9.1' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.43' / 299.25' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.87 cfs @ 12.11 hrs HW=299.94' TW=299.60' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.87 cfs @ 3.15 fps)

Summary for Pond CB2:

Catch Basin #2

Inflow Area = 3,549 sf, 36.38% Impervious, Inflow Depth > 5.02" for 50-Year event
Inflow = 0.44 cfs @ 12.11 hrs, Volume= 1,485 cf
Outflow = 0.44 cfs @ 12.11 hrs, Volume= 1,485 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.44 cfs @ 12.11 hrs, Volume= 1,485 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.91' @ 12.13 hrs
Flood Elev= 305.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.57'	**12.0" Round Culvert** L= 15.9' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.57' / 299.25' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 12.11 hrs HW=299.90' TW=299.60' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.39 cfs @ 2.59 fps)

Summary for Pond CB3:

Catch Basin #3

Inflow Area = 3,503 sf, 63.37% Impervious, Inflow Depth > 5.70" for 50-Year event
Inflow = 0.47 cfs @ 12.11 hrs, Volume= 1,665 cf
Outflow = 0.47 cfs @ 12.11 hrs, Volume= 1,663 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.47 cfs @ 12.11 hrs, Volume= 1,663 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.54' @ 12.21 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.40'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.40' / 292.32' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=293.54' TW=294.14' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB4:

Catch Basin #4

Inflow Area = 17,879 sf, 19.30% Impervious, Inflow Depth > 4.58" for 50-Year event
Inflow = 2.04 cfs @ 12.12 hrs, Volume= 6,823 cf
Outflow = 2.04 cfs @ 12.12 hrs, Volume= 6,823 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.12 hrs, Volume= 6,823 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.62' @ 12.20 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.50'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.50' / 292.32' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.12 hrs HW=293.84' TW=294.17' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB5:

Catch Basin #5

Inflow Area = 3,621 sf,100.00% Impervious, Inflow Depth > 6.76" for 50-Year event
Inflow = 0.53 cfs @ 12.11 hrs, Volume= 2,038 cf
Outflow = 0.53 cfs @ 12.11 hrs, Volume= 2,038 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.11 hrs, Volume= 2,038 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.10' @ 12.18 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.68'	**12.0" Round Culvert** L= 5.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.68' / 290.57' S= 0.0204 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=293.53' TW=294.00' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB6:

Catch Basin #6

Inflow Area = 54,393 sf, 19.33% Impervious, Inflow Depth > 4.47" for 50-Year event
Inflow = 5.93 cfs @ 12.13 hrs, Volume= 20,255 cf
Outflow = 5.93 cfs @ 12.13 hrs, Volume= 20,255 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.93 cfs @ 12.13 hrs, Volume= 20,255 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 296.31' @ 12.14 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.75'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.75' / 290.57' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=5.29 cfs @ 12.13 hrs HW=295.99' TW=294.03' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.29 cfs @ 6.74 fps)

Summary for Pond CB7:

Catch Basin #7

Inflow Area = 19,258 sf, 47.83% Impervious, Inflow Depth > 5.25" for 50-Year event
Inflow = 2.47 cfs @ 12.11 hrs, Volume= 8,421 cf
Outflow = 2.47 cfs @ 12.11 hrs, Volume= 8,421 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.47 cfs @ 12.11 hrs, Volume= 8,421 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 297.78' @ 12.16 hrs
Flood Elev= 302.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.29'	**12.0" Round Culvert** L= 24.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.29' / 295.80' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=297.35' TW=297.40' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB8:

Catch Basin #8

Inflow Area = 16,484 sf, 41.46% Impervious, Inflow Depth > 5.02" for 50-Year event
Inflow = 2.04 cfs @ 12.11 hrs, Volume= 6,900 cf
Outflow = 2.04 cfs @ 12.11 hrs, Volume= 6,900 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.04 cfs @ 12.11 hrs, Volume= 6,900 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 297.67' @ 12.16 hrs
Flood Elev= 303.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.45'	**12.0" Round Culvert** L= 32.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.45' / 295.80' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=297.36' TW=297.40' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond DMH1:

Drain Manhole #1

Inflow Area = 10,587 sf, 42.21% Impervious, Inflow Depth > 5.17" for 50-Year event
Inflow = 1.34 cfs @ 12.11 hrs, Volume= 4,563 cf
Outflow = 1.34 cfs @ 12.11 hrs, Volume= 4,563 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 12.11 hrs, Volume= 4,563 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.61' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**12.0" Round Culvert** L= 281.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 293.38' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.30 cfs @ 12.11 hrs HW=299.60' TW=294.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.30 cfs @ 2.64 fps)

Summary for Pond DMH2:

Drain Manhole #2

Inflow Area = 21,382 sf, 26.52% Impervious, Inflow Depth > 4.76" for 50-Year event
Inflow = 2.51 cfs @ 12.11 hrs, Volume= 8,486 cf
Outflow = 2.51 cfs @ 12.11 hrs, Volume= 8,486 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.51 cfs @ 12.11 hrs, Volume= 8,486 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.54' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	291.82'	**12.0" Round Culvert** L= 62.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 291.82' / 290.57' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.23 cfs @ 12.11 hrs HW=294.16' TW=294.01' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.23 cfs @ 1.56 fps)

Summary for Pond DMH3:

Drain Manhole #3

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 4.84" for 50-Year event
Inflow = 14.67 cfs @ 12.12 hrs, Volume= 50,663 cf
Outflow = 14.67 cfs @ 12.12 hrs, Volume= 50,663 cf, Atten= 0%, Lag= 0.0 min
Primary = 14.67 cfs @ 12.12 hrs, Volume= 50,663 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.09' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	290.06'	**24.0" Round Culvert** L= 73.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.06' / 289.33' S= 0.0100 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 3.14 sf

Primary OutFlow Max=12.95 cfs @ 12.12 hrs HW=294.01' TW=293.28' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 12.95 cfs @ 4.12 fps)

Summary for Pond DMH4:

Drain Manhole #4

Inflow Area = 35,742 sf, 44.90% Impervious, Inflow Depth > 5.14" for 50-Year event
Inflow = 4.51 cfs @ 12.11 hrs, Volume= 15,321 cf
Outflow = 4.51 cfs @ 12.11 hrs, Volume= 15,321 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.51 cfs @ 12.11 hrs, Volume= 15,321 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 297.51' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Culvert** L= 157.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 290.57' S= 0.0300 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=4.09 cfs @ 12.11 hrs HW=297.40' TW=294.00' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 4.09 cfs @ 5.20 fps)

Summary for Pond FB:

Sediment Forebay

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 4.84" for 50-Year event
Inflow = 14.67 cfs @ 12.12 hrs, Volume= 50,663 cf
Outflow = 14.74 cfs @ 12.12 hrs, Volume= 50,104 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 6.25 hrs, Volume= 819 cf
Primary = 14.72 cfs @ 12.12 hrs, Volume= 49,285 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.41' @ 12.21 hrs Surf.Area= 489 sf Storage= 433 cf

Plug-Flow detention time= 10.9 min calculated for 49,999 cf (99% of inflow)
Center-of-Mass det. time= 4.3 min (821.9 - 817.6)

Volume	Invert	Avail.Storage	Storage Description
#1	288.00'	433 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
288.00	34	24.1	0	0	34
289.00	211	55.7	110	110	239
289.50	302	66.4	128	237	347
290.00	489	86.0	196	433	588

Device	Routing	Invert	Outlet Devices
#1	Primary	290.30'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Discarded	288.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 6.25 hrs HW=290.30' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.12 hrs HW=293.28' TW=293.37' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond INF:

Infiltration Basin

Inflow Area = 141,742 sf, 28.45% Impervious, Inflow Depth > 4.63" for 50-Year event
Inflow = 16.36 cfs @ 12.12 hrs, Volume= 54,674 cf
Outflow = 14.75 cfs @ 12.16 hrs, Volume= 42,236 cf, Atten= 10%, Lag= 2.4 min
Discarded = 0.17 cfs @ 12.16 hrs, Volume= 8,571 cf
Primary = 0.21 cfs @ 12.16 hrs, Volume= 7,596 cf
Secondary = 14.36 cfs @ 12.16 hrs, Volume= 26,069 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.41' @ 12.16 hrs Surf.Area= 7,345 sf Storage= 15,529 cf

Plug-Flow detention time= 154.4 min calculated for 42,148 cf (77% of inflow)
Center-of-Mass det. time= 58.7 min (882.2 - 823.5)

Volume	Invert	Avail.Storage	Storage Description
#1	290.00'	20,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
290.00	886	167.9	0	0	886
291.00	3,050	255.4	1,860	1,860	3,841
292.00	5,881	307.0	4,389	6,249	6,167
293.00	6,830	326.0	6,350	12,598	7,175
294.00	8,106	348.8	7,459	20,057	8,445

Device	Routing	Invert	Outlet Devices
#1	Secondary	293.00'	**20.0' long x 24.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	290.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	292.20'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 292.20' / 292.00' S= 0.0067 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.17 cfs @ 12.16 hrs HW=293.41' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.21 cfs @ 12.16 hrs HW=293.41' TW=267.04' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.21 cfs @ 2.45 fps)

Secondary OutFlow Max=14.08 cfs @ 12.16 hrs HW=293.41' TW=267.04' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 14.08 cfs @ 1.73 fps)

Summary for Pond SF:

Sand Filter

Inflow Area = 12,804 sf, 58.53% Impervious, Inflow Depth > 5.14" for 50-Year event
Inflow = 1.60 cfs @ 12.11 hrs, Volume= 5,486 cf
Outflow = 1.11 cfs @ 12.18 hrs, Volume= 5,479 cf, Atten= 31%, Lag= 4.1 min
Discarded = 0.02 cfs @ 12.18 hrs, Volume= 423 cf
Primary = 1.09 cfs @ 12.18 hrs, Volume= 5,056 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 268.06' @ 12.18 hrs Surf.Area= 290 sf Storage= 264 cf

Plug-Flow detention time= 2.6 min calculated for 5,468 cf (100% of inflow)
Center-of-Mass det. time= 1.8 min (809.8 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	265.00'	637 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.00	100	50.0	0.0	0	0	100
265.50	100	50.0	40.0	20	20	125
267.00	100	50.0	30.0	45	65	200
268.00	278	68.8	100.0	182	247	387
268.50	389	78.3	100.0	166	413	505
269.00	513	87.7	100.0	225	637	635

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	268.50'	**2.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#3 Primary 265.00' **6.0" Round Culvert**
L= 51.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 265.00' / 265.00' S= 0.0000 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.02 cfs @ 12.18 hrs HW=268.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.08 cfs @ 12.18 hrs HW=268.03' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Culvert** (Barrel Controls 1.08 cfs @ 5.52 fps)

Summary for Pond ST1:

Stormtech Infiltration Chambers #1

Inflow Area = 1,656 sf,100.00% Impervious, Inflow Depth > 6.76" for 50-Year event
Inflow = 0.24 cfs @ 12.11 hrs, Volume= 932 cf
Outflow = 0.01 cfs @ 9.30 hrs, Volume= 541 cf, Atten= 97%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.30 hrs, Volume= 541 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 307.04' @ 16.44 hrs Surf.Area= 312 sf Storage= 456 cf

Plug-Flow detention time= 222.7 min calculated for 539 cf (58% of inflow)
Center-of-Mass det. time= 76.6 min (819.8 - 743.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.60'	326 cf	**12.00'W x 25.98'L x 3.50'H Field A** 1,091 cf Overall - 276 cf Embedded = 815 cf x 40.0% Voids
#2A	305.10'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		602 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.60'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 9.30 hrs HW=304.64' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond ST2:

Stormtech Infiltration Chambers #2

Inflow Area = 1,315 sf,100.00% Impervious, Inflow Depth > 6.76" for 50-Year event
Inflow = 0.19 cfs @ 12.11 hrs, Volume= 740 cf
Outflow = 0.01 cfs @ 9.75 hrs, Volume= 466 cf, Atten= 97%, Lag= 0.0 min
Discarded = 0.01 cfs @ 9.75 hrs, Volume= 466 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 306.49' @ 15.73 hrs Surf.Area= 275 sf Storage= 344 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 88.2 min (831.4 - 743.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.50'	274 cf	**11.00'W x 24.98'L x 3.50'H Field A** 962 cf Overall - 276 cf Embedded = 686 cf x 40.0% Voids
#2A	305.00'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		550 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 9.75 hrs HW=304.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond WC:

36" HDPE Wetland Culvert

Inflow Area = 347,030 sf, 23.76% Impervious, Inflow Depth > 3.23" for 50-Year event
Inflow = 23.41 cfs @ 12.18 hrs, Volume= 93,409 cf
Outflow = 23.41 cfs @ 12.18 hrs, Volume= 93,409 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.41 cfs @ 12.18 hrs, Volume= 93,409 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 267.08' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.50'	**36.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 264.50' / 264.30' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 7.07 sf

Primary OutFlow Max=23.11 cfs @ 12.18 hrs HW=267.06' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 23.11 cfs @ 4.85 fps)

Summary for Link AP-1:

Inflow Area = 584,822 sf, 19.68% Impervious, Inflow Depth > 3.52" for 50-Year event
Inflow = 34.64 cfs @ 12.21 hrs, Volume= 171,501 cf
Primary = 34.64 cfs @ 12.21 hrs, Volume= 171,501 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 47,324 sf, 8.64% Impervious, Inflow Depth > 4.13" for 50-Year event
Inflow = 3.39 cfs @ 12.26 hrs, Volume= 16,280 cf
Primary = 3.39 cfs @ 12.26 hrs, Volume= 16,280 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment Roof1:

Lot 1's Roof

Runoff = 0.29 cfs @ 12.11 hrs, Volume= 1,120 cf, Depth> 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,656	98	Roofs, HSG C
1,656		100.00% Impervious Area

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

Summary for Subcatchment Roof2:

Lot 2's Roof

Runoff = 0.23 cfs @ 12.11 hrs, Volume= 889 cf, Depth> 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,315	98	Roofs, HSG C
1,315		100.00% Impervious Area

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

Summary for Subcatchment SC-1:

Subcatchment SC-1

Runoff = 4.44 cfs @ 12.28 hrs, Volume= 22,411 cf, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
595	98	Roofs, HSG C
5,140	74	>75% Grass cover, Good, HSG C
48,831	70	Woods, Good, HSG C
715	77	Woods, Good, HSG D
55,281	71	Weighted Average
54,686		98.92% Pervious Area
595		1.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	50	0.0480	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
3.8	241	0.0436	1.04		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
19.2	291	Total			

Summary for Subcatchment SC-10:

Subcatchment SC-10

Runoff = 4.37 cfs @ 12.26 hrs, Volume= 21,065 cf, Depth> 5.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
13,170	70	Woods, Good, HSG C
30,063	74	>75% Grass cover, Good, HSG C
3,281	98	Paved parking, HSG C
810	98	Roofs, HSG C
47,324	75	Weighted Average
43,233		91.36% Pervious Area
4,091		8.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.09"
1.1	60	0.0350	0.94		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
3.5	160	0.0230	0.76		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
17.2	270	Total			

Summary for Subcatchment SC-2:

Subcatchment SC-2

Runoff = 2.81 cfs @ 12.52 hrs, Volume= 20,259 cf, Depth> 5.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
2,235	98	Roofs, HSG C
6,865	98	Paved parking, HSG C
32,960	74	>75% Grass cover, Good, HSG C
42,060	79	Weighted Average
32,960		78.36% Pervious Area
9,100		21.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.5	50	0.0080	0.03		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
4.6	203	0.0220	0.74		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	21	0.0140	2.40		**Shallow Concentrated Flow, shallow** Paved Kv= 20.3 fps
2.0	119	0.0390	0.99		**Shallow Concentrated Flow, shallow** Woodland Kv= 5.0 fps
38.2	393	Total			

Summary for Subcatchment SC-3:

Subcatchment SC-3

Runoff = 15.93 cfs @ 12.28 hrs, Volume= 79,210 cf, Depth> 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
631	98	Paved parking, HSG C
1,858	98	Roofs, HSG C
50,102	70	Woods, Good, HSG C
3,842	74	>75% Grass cover, Good, HSG C
66,484	55	Woods, Good, HSG B
42,744	61	>75% Grass cover, Good, HSG B
6,394	98	Water Surface, HSG C
33,233	98	Water Surface, HSG B
205,288	69	Weighted Average
163,172		79.48% Pervious Area
42,116		20.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.1	50	0.0500	0.06		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
0.9	154	0.0340	2.77		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.5	122	0.0740	1.36		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.1	29	0.0690	3.94		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
1.0	104	0.1220	1.75		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
18.6	459	Total			

Summary for Subcatchment SC-4:

Subcatchment SC-4

Runoff = 0.40 cfs @ 12.11 hrs, Volume= 1,471 cf, Depth> 7.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,824	98	Paved parking, HSG C
525	74	>75% Grass cover, Good, HSG C
2,349	93	Weighted Average
525		22.36% Pervious Area
1,824		77.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.55		**Sheet Flow, sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.3	100	0.0950	6.26		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
0.8	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-5:

Subcatchment SC-5

Runoff = 1.58 cfs @ 12.11 hrs, Volume= 5,398 cf, Depth> 6.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
502	74	>75% Grass cover, Good, HSG C
2,003	98	Paved parking, HSG C
3,667	98	Paved parking, HSG B
4,283	61	>75% Grass cover, Good, HSG B
10,455	82	Weighted Average
4,785		45.77% Pervious Area
5,670		54.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	50	0.1000	2.24		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.8	233	0.0570	4.85		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.2	283	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-6:

Subcatchment SC-6

Runoff = 2.02 cfs @ 12.16 hrs, Volume= 7,477 cf, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,529	74	>75% Grass cover, Good, HSG C
11,891	70	Woods, Good, HSG C
2,237	61	>75% Grass cover, Good, HSG B
5,828	55	Woods, Good, HSG B
21,485	65	Weighted Average
21,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	50	0.0540	0.22		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
5.0	291	0.0370	0.96		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
8.8	341	Total			

Summary for Subcatchment SC-7:

Subcatchment SC-7

Runoff = 8.28 cfs @ 12.32 hrs, Volume= 45,077 cf, Depth> 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
6,792	98	Paved parking, HSG C
8,663	98	Roofs, HSG C
49,414	74	>75% Grass cover, Good, HSG C
20,905	70	Woods, Good, HSG C
16,921	55	Woods, Good, HSG B
3,467	61	>75% Grass cover, Good, HSG B
106,162	73	Weighted Average
90,707		85.44% Pervious Area
15,455		14.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	50	0.0440	0.05		**Sheet Flow, Sheet** Woods: Dense underbrush n= 0.800 P2= 3.09"
2.8	151	0.0330	0.91		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
4.0	354	0.0880	1.48		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
22.7	555	Total			

Summary for Subcatchment SC-8.1:

Subcatchment SC-8.1

Runoff = 1.11 cfs @ 12.11 hrs, Volume= 3,844 cf, Depth> 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
2,899	98	Paved parking, HSG C
279	98	Roofs, HSG C
3,860	74	>75% Grass cover, Good, HSG C
7,038	85	Weighted Average
3,860		54.85% Pervious Area
3,178		45.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.0	125	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.9	175	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.2:

Subcatchment SC-8.2

Runoff = 0.55 cfs @ 12.11 hrs, Volume= 1,868 cf, Depth> 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,291	98	Paved parking, HSG C
194	70	Woods, Good, HSG C
2,064	74	>75% Grass cover, Good, HSG C
3,549	83	Weighted Average
2,258		63.62% Pervious Area
1,291		36.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.4	54	0.0100	2.03		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.3	104	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.3:

Subcatchment SC-8.3

Runoff = 0.58 cfs @ 12.11 hrs, Volume= 2,053 cf, Depth> 7.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,283	74	>75% Grass cover, Good, HSG C
2,220	98	Paved parking, HSG C
3,503	89	Weighted Average
1,283		36.63% Pervious Area
2,220		63.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	235	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.4	285	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.4:

Subcatchment SC-8.4

Runoff = 2.57 cfs @ 12.11 hrs, Volume= 8,698 cf, Depth> 5.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
14,429	74	>75% Grass cover, Good, HSG C
1,313	98	Roofs, HSG C
2,137	98	Paved parking, HSG C
17,879	79	Weighted Average
14,429		80.70% Pervious Area
3,450		19.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	73	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.4	102	0.0500	4.54		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
5.1	225	Total			

Summary for Subcatchment SC-8.5:

Subcatchment SC-8.5

Runoff = 0.63 cfs @ 12.11 hrs, Volume= 2,448 cf, Depth> 8.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
3,621	98	Paved parking, HSG C
3,621		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0500	1.70		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.6	140	0.0400	4.06		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.1	190	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.6:

Subcatchment SC-8.6

Runoff = 7.51 cfs @ 12.13 hrs, Volume= 25,914 cf, Depth> 5.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
42,795	74	>75% Grass cover, Good, HSG C
4,291	98	Roofs, HSG C
6,223	98	Paved parking, HSG C
1,084	61	>75% Grass cover, Good, HSG B
54,393	78	Weighted Average
43,879		80.67% Pervious Area
10,514		19.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.0400	0.19		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
1.5	259	0.0350	2.81		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
0.2	31	0.0150	2.49		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
6.0	340	Total			

Summary for Subcatchment SC-8.7:

Subcatchment SC-8.7

Runoff = 3.04 cfs @ 12.11 hrs, Volume= 10,519 cf, Depth> 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
1,692	98	Roofs, HSG C
8,872	74	>75% Grass cover, Good, HSG C
7,520	98	Paved parking, HSG C
1,174	61	>75% Grass cover, Good, HSG B
19,258	85	Weighted Average
10,046		52.17% Pervious Area
9,212		47.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
1.3	210	0.0300	2.60		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
2.0	260	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-8.8:

Subcatchment SC-8.8

Runoff = 2.53 cfs @ 12.11 hrs, Volume= 8,676 cf, Depth> 6.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
551	98	Roofs, HSG C
8,476	74	>75% Grass cover, Good, HSG C
6,284	98	Paved parking, HSG C
1,173	61	>75% Grass cover, Good, HSG B
16,484	83	Weighted Average
9,649		58.54% Pervious Area
6,835		41.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.18		**Sheet Flow, Sheet** Smooth surfaces n= 0.011 P2= 3.09"
0.9	185	0.0300	3.52		**Shallow Concentrated Flow, Shallow** Paved Kv= 20.3 fps
1.6	235	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment SC-9:

Subcatchment SC-9

Runoff = 2.11 cfs @ 12.11 hrs, Volume= 6,998 cf, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-Year Rainfall=8.36"

Area (sf)	CN	Description
16,017	74	>75% Grass cover, Good, HSG C
16,017		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	50	0.0870	0.26		**Sheet Flow, Sheet** Grass: Short n= 0.150 P2= 3.09"
0.4	100	0.0870	4.42		**Shallow Concentrated Flow, Shallow** Grassed Waterway Kv= 15.0 fps
3.6	150	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond CB1:

Catch Basin #1

Inflow Area = 7,038 sf, 45.15% Impervious, Inflow Depth > 6.55" for 100-Year event
Inflow = 1.11 cfs @ 12.11 hrs, Volume= 3,844 cf
Outflow = 1.11 cfs @ 12.11 hrs, Volume= 3,844 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.11 cfs @ 12.11 hrs, Volume= 3,844 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 300.02' @ 12.12 hrs
Flood Elev= 305.52'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.43'	**12.0" Round Culvert** L= 9.1' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.43' / 299.25' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.08 cfs @ 12.11 hrs HW=300.01' TW=299.68' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.08 cfs @ 3.29 fps)

Summary for Pond CB2:

Catch Basin #2

Inflow Area = 3,549 sf, 36.38% Impervious, Inflow Depth > 6.32" for 100-Year event
Inflow = 0.55 cfs @ 12.11 hrs, Volume= 1,868 cf
Outflow = 0.55 cfs @ 12.11 hrs, Volume= 1,868 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 12.11 hrs, Volume= 1,868 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.97' @ 12.13 hrs
Flood Elev= 305.53'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.57'	**12.0" Round Culvert** L= 15.9' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.57' / 299.25' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.47 cfs @ 12.11 hrs HW=299.95' TW=299.68' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.47 cfs @ 2.54 fps)

Summary for Pond CB3:

Catch Basin #3

Inflow Area = 3,503 sf, 63.37% Impervious, Inflow Depth > 7.03" for 100-Year event
Inflow = 0.58 cfs @ 12.11 hrs, Volume= 2,053 cf
Outflow = 0.58 cfs @ 12.11 hrs, Volume= 2,053 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 12.11 hrs, Volume= 2,053 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 295.55' @ 12.20 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.40'	**12.0" Round Culvert** L= 4.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.40' / 292.32' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=294.37' TW=295.11' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB4:

Catch Basin #4

Inflow Area = 17,879 sf, 19.30% Impervious, Inflow Depth > 5.84" for 100-Year event
Inflow = 2.57 cfs @ 12.11 hrs, Volume= 8,698 cf
Outflow = 2.57 cfs @ 12.11 hrs, Volume= 8,698 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.57 cfs @ 12.11 hrs, Volume= 8,698 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 295.70' @ 12.19 hrs
Flood Elev= 298.71'

Device	Routing	Invert	Outlet Devices
#1	Primary	292.50'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 292.50' / 292.32' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=294.82' TW=295.14' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond CB5:

Catch Basin #5

Inflow Area = 3,621 sf,100.00% Impervious, Inflow Depth > 8.11" for 100-Year event
Inflow = 0.63 cfs @ 12.11 hrs, Volume= 2,448 cf
Outflow = 0.63 cfs @ 12.11 hrs, Volume= 2,445 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.11 hrs, Volume= 2,445 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.79' @ 12.17 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.68'	**12.0" Round Culvert** L= 5.4' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.68' / 290.57' S= 0.0204 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=294.16' TW=294.68' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB6:

Catch Basin #6

Inflow Area = 54,393 sf, 19.33% Impervious, Inflow Depth > 5.72" for 100-Year event
Inflow = 7.51 cfs @ 12.13 hrs, Volume= 25,914 cf
Outflow = 7.51 cfs @ 12.13 hrs, Volume= 25,914 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.51 cfs @ 12.13 hrs, Volume= 25,914 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 298.45' @ 12.14 hrs
Flood Elev= 297.23'

Device	Routing	Invert	Outlet Devices
#1	Primary	290.75'	**12.0" Round Culvert** L= 8.8' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.75' / 290.57' S= 0.0205 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=6.91 cfs @ 12.13 hrs HW=298.01' TW=294.67' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.91 cfs @ 8.80 fps)

Summary for Pond CB7:

Catch Basin #7

Inflow Area = 19,258 sf, 47.83% Impervious, Inflow Depth > 6.55" for 100-Year event
Inflow = 3.04 cfs @ 12.11 hrs, Volume= 10,519 cf
Outflow = 3.04 cfs @ 12.11 hrs, Volume= 10,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.04 cfs @ 12.11 hrs, Volume= 10,519 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 300.89' @ 12.17 hrs
Flood Elev= 302.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.29'	**12.0" Round Culvert** L= 24.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.29' / 295.80' S= 0.0198 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=298.36' TW=300.09' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond CB8:

Catch Basin #8

Inflow Area = 16,484 sf, 41.46% Impervious, Inflow Depth > 6.32" for 100-Year event
Inflow = 2.53 cfs @ 12.11 hrs, Volume= 8,676 cf
Outflow = 2.53 cfs @ 12.11 hrs, Volume= 8,676 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.53 cfs @ 12.11 hrs, Volume= 8,676 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 300.75' @ 12.17 hrs
Flood Elev= 303.08'

Device	Routing	Invert	Outlet Devices
#1	Primary	296.45'	**12.0" Round Culvert** L= 32.5' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 296.45' / 295.80' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=298.28' TW=300.08' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Summary for Pond DMH1:

Drain Manhole #1

Inflow Area = 10,587 sf, 42.21% Impervious, Inflow Depth > 6.47" for 100-Year event
Inflow = 1.66 cfs @ 12.11 hrs, Volume= 5,712 cf
Outflow = 1.66 cfs @ 12.11 hrs, Volume= 5,712 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.66 cfs @ 12.11 hrs, Volume= 5,712 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 299.70' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	299.00'	**12.0" Round Culvert** L= 281.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 299.00' / 293.38' S= 0.0200 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=1.60 cfs @ 12.11 hrs HW=299.68' TW=294.68' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.60 cfs @ 2.81 fps)

Summary for Pond DMH2:

Drain Manhole #2

Inflow Area = 21,382 sf, 26.52% Impervious, Inflow Depth > 6.03" for 100-Year event
Inflow = 3.15 cfs @ 12.11 hrs, Volume= 10,751 cf
Outflow = 3.15 cfs @ 12.11 hrs, Volume= 10,751 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.15 cfs @ 12.11 hrs, Volume= 10,751 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 295.55' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	291.82'	**12.0" Round Culvert** L= 62.3' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 291.82' / 290.57' S= 0.0201 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=2.09 cfs @ 12.11 hrs HW=295.13' TW=294.68' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.09 cfs @ 2.67 fps)

Summary for Pond DMH3:

Drain Manhole #3

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 6.11" for 100-Year event
Inflow = 18.34 cfs @ 12.12 hrs, Volume= 64,018 cf
Outflow = 18.34 cfs @ 12.12 hrs, Volume= 64,018 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.34 cfs @ 12.12 hrs, Volume= 64,018 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 294.77' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	290.06'	**24.0" Round Culvert** L= 73.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 290.06' / 289.33' S= 0.0100 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 3.14 sf

Primary OutFlow Max=17.20 cfs @ 12.12 hrs HW=294.68' TW=293.38' (Dynamic Tailwater)
1=Culvert (Inlet Controls 17.20 cfs @ 5.48 fps)

Summary for Pond DMH4:

Drain Manhole #4

Inflow Area = 35,742 sf, 44.90% Impervious, Inflow Depth > 6.44" for 100-Year event
Inflow = 5.57 cfs @ 12.11 hrs, Volume= 19,195 cf
Outflow = 5.57 cfs @ 12.11 hrs, Volume= 19,195 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.57 cfs @ 12.11 hrs, Volume= 19,195 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 300.46' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	295.30'	**12.0" Round Culvert** L= 157.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 295.30' / 290.57' S= 0.0300 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 0.79 sf

Primary OutFlow Max=5.15 cfs @ 12.11 hrs HW=300.08' TW=294.68' (Dynamic Tailwater)
1=Culvert (Outlet Controls 5.15 cfs @ 6.56 fps)

Summary for Pond FB:

Sediment Forebay

Inflow Area = 125,725 sf, 32.07% Impervious, Inflow Depth > 6.11" for 100-Year event
Inflow = 18.34 cfs @ 12.12 hrs, Volume= 64,018 cf
Outflow = 18.80 cfs @ 12.13 hrs, Volume= 62,904 cf, Atten= 0%, Lag= 0.7 min
Discarded = 0.01 cfs @ 5.40 hrs, Volume= 846 cf
Primary = 18.79 cfs @ 12.13 hrs, Volume= 62,059 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.49' @ 12.20 hrs Surf.Area= 489 sf Storage= 433 cf

Plug-Flow detention time= 14.1 min calculated for 62,774 cf (98% of inflow)
Center-of-Mass det. time= 3.6 min (813.2 - 809.5)

Volume	Invert	Avail.Storage	Storage Description
#1	288.00'	433 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
288.00	34	24.1	0	0	34
289.00	211	55.7	110	110	239
289.50	302	66.4	128	237	347
290.00	489	86.0	196	433	588

Device	Routing	Invert	Outlet Devices
#1	Primary	290.30'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64
#2	Discarded	288.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 5.40 hrs HW=290.32' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=293.40' TW=293.47' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond INF:

Infiltration Basin

Inflow Area = 141,742 sf, 28.45% Impervious, Inflow Depth > 5.85" for 100-Year event
Inflow = 20.85 cfs @ 12.13 hrs, Volume= 69,057 cf
Outflow = 18.89 cfs @ 12.15 hrs, Volume= 56,437 cf, Atten= 9%, Lag= 1.3 min
Discarded = 0.18 cfs @ 12.15 hrs, Volume= 9,045 cf
Primary = 0.22 cfs @ 12.15 hrs, Volume= 7,899 cf
Secondary = 18.49 cfs @ 12.15 hrs, Volume= 39,493 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 293.49' @ 12.15 hrs Surf.Area= 7,441 sf Storage= 16,090 cf

Plug-Flow detention time= 133.3 min calculated for 56,437 cf (82% of inflow)
Center-of-Mass det. time= 49.4 min (864.3 - 815.0)

Volume	Invert	Avail.Storage	Storage Description
#1	290.00'	20,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
290.00	886	167.9	0	0	886
291.00	3,050	255.4	1,860	1,860	3,841
292.00	5,881	307.0	4,389	6,249	6,167
293.00	6,830	326.0	6,350	12,598	7,175
294.00	8,106	348.8	7,459	20,057	8,445

Device	Routing	Invert	Outlet Devices
#1	Secondary	293.00'	**20.0' long x 24.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	290.00'	**1.020 in/hr Exfiltration over Surface area**
#3	Primary	292.20'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 292.20' / 292.00' S= 0.0067 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.09 sf

Discarded OutFlow Max=0.18 cfs @ 12.15 hrs HW=293.49' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.22 cfs @ 12.15 hrs HW=293.49' TW=267.53' (Dynamic Tailwater)
└**3=Culvert** (Barrel Controls 0.22 cfs @ 2.54 fps)

Secondary OutFlow Max=18.45 cfs @ 12.15 hrs HW=293.49' TW=267.53' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 18.45 cfs @ 1.89 fps)

Summary for Pond SF:

Sand Filter

Inflow Area = 12,804 sf, 58.53% Impervious, Inflow Depth > 6.44" for 100-Year event
Inflow = 1.98 cfs @ 12.11 hrs, Volume= 6,869 cf
Outflow = 1.25 cfs @ 12.20 hrs, Volume= 6,862 cf, Atten= 37%, Lag= 5.1 min
Discarded = 0.02 cfs @ 12.19 hrs, Volume= 444 cf
Primary = 1.23 cfs @ 12.20 hrs, Volume= 6,418 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 268.54' @ 12.19 hrs Surf.Area= 398 sf Storage= 428 cf

Plug-Flow detention time= 2.7 min calculated for 6,847 cf (100% of inflow)
Center-of-Mass det. time= 2.0 min (802.5 - 800.5)

Volume	Invert	Avail.Storage	Storage Description
#1	265.00'	637 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
265.00	100	50.0	0.0	0	0	100
265.50	100	50.0	40.0	20	20	125
267.00	100	50.0	30.0	45	65	200
268.00	278	68.8	100.0	182	247	387
268.50	389	78.3	100.0	166	413	505
269.00	513	87.7	100.0	225	637	635

Device	Routing	Invert	Outlet Devices
#1	Discarded	265.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	268.50'	**2.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63
#3 Primary 265.00' **6.0" Round Culvert**
L= 51.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 265.00' / 265.00' S= 0.0000 '/' Cc= 0.900
n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Discarded OutFlow Max=0.02 cfs @ 12.19 hrs HW=268.53' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.22 cfs @ 12.20 hrs HW=268.53' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Weir Controls 0.03 cfs @ 0.49 fps)
└**3=Culvert** (Barrel Controls 1.19 cfs @ 6.05 fps)

Summary for Pond ST1:

Stormtech Infiltration Chambers #1

Inflow Area = 1,656 sf,100.00% Impervious, Inflow Depth > 8.11" for 100-Year event
Inflow = 0.29 cfs @ 12.11 hrs, Volume= 1,120 cf
Outflow = 0.01 cfs @ 8.15 hrs, Volume= 565 cf, Atten= 97%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.15 hrs, Volume= 565 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 308.05' @ 17.50 hrs Surf.Area= 312 sf Storage= 596 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 55.2 min (795.8 - 740.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.60'	326 cf	**12.00'W x 25.98'L x 3.50'H Field A** 1,091 cf Overall - 276 cf Embedded = 815 cf x 40.0% Voids
#2A	305.10'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		602 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.60'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.15 hrs HW=304.64' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Summary for Pond ST2:

Stormtech Infiltration Chambers #2

Inflow Area = 1,315 sf,100.00% Impervious, Inflow Depth > 8.11" for 100-Year event
Inflow = 0.23 cfs @ 12.11 hrs, Volume= 889 cf
Outflow = 0.01 cfs @ 8.80 hrs, Volume= 487 cf, Atten= 97%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.80 hrs, Volume= 487 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 307.13' @ 16.90 hrs Surf.Area= 275 sf Storage= 450 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 66.3 min (806.9 - 740.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	304.50'	274 cf	**11.00'W x 24.98'L x 3.50'H Field A** 962 cf Overall - 276 cf Embedded = 686 cf x 40.0% Voids
#2A	305.00'	276 cf	**ADS_StormTech SC-740 +Cap** x 6 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 6 Chambers in 2 Rows
		550 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	304.50'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.80 hrs HW=304.54' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.01 cfs)

Summary for Pond WC:

36" HDPE Wetland Culvert

Inflow Area = 347,030 sf, 23.76% Impervious, Inflow Depth > 4.38" for 100-Year event
Inflow = 30.37 cfs @ 12.18 hrs, Volume= 126,601 cf
Outflow = 30.37 cfs @ 12.18 hrs, Volume= 126,601 cf, Atten= 0%, Lag= 0.0 min
Primary = 30.37 cfs @ 12.18 hrs, Volume= 126,601 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 267.56' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	264.50'	**36.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 264.50' / 264.30' S= 0.0071 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 7.07 sf

Primary OutFlow Max=29.99 cfs @ 12.18 hrs HW=267.54' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 29.99 cfs @ 5.21 fps)

Summary for Link AP-1:

Inflow Area = 584,822 sf, 19.68% Impervious, Inflow Depth > 4.68" for 100-Year event
Inflow = 44.82 cfs @ 12.21 hrs, Volume= 228,244 cf
Primary = 44.82 cfs @ 12.21 hrs, Volume= 228,244 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP-2:

Inflow Area = 47,324 sf, 8.64% Impervious, Inflow Depth > 5.34" for 100-Year event
Inflow = 4.37 cfs @ 12.26 hrs, Volume= 21,065 cf
Primary = 4.37 cfs @ 12.26 hrs, Volume= 21,065 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Pre-Development Conditions

Healy Corner
Littleton, MA
Project No. 171088

		Area (sf)	Area (Ac)
Total Subcatchment Areas		635,117	14.6
Total Subcatchment Areas On-Site		635,117	14.6
Total Area of Hydrolic Soil Groups On-Site		635,117	14.6
	A	0	0.0
	B	182,295	4.2
	C	452,107	10.4
	D	715	0.0
Surface Type Areas			
Paved		1,986	0.0
	A	0	0.0
	B	0	0.0
	C	1,986	0.0
	D	0	0.0
Roofs		2,382	0.1
	A	0	
	B	0	
	C	2,382	
	D	0	
Grass		216,993	5.0
	A	0	0.0
	B	8,124	0.2
	C	208,869	4.8
	D	0	0.0
Water		40,761	0.9
	A	0	0.0
	B	33,235	0.8
	C	7,526	0.2
	D	0	0.0
Woods		372,995	8.6
	A	0	0.0
	B	140,936	3.2
	C	231,344	5.3
	D	715	0.0
Total Impervious Area		45,129	1.0

Infiltration Volume

Inches of Recharge per Storm Event	A	0.60
	B	0.35
	C	0.25
	D	0.10

Infiltration Volume = ∑ {[(Total Subcatchment Area within HSG) - (Total Impervious Area within HSG)]
x (inches of Recharge Per Storm)}

Infiltration Volume **13,525 CF**

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Post Development Conditions

Healy Corner
Littleton, MA
Project No. 171088

		Area (sf)	Area (Ac)
Total Subcatchment Areas		635,117	14.6
Total Subcatchment Areas On-Site		635,117	14.6
Total Area of Hydrolic Soil Groups On-Site		635,117	14.6
	A	0	0.0
	B	182,295	4.2
	C	452,107	10.4
	D	715	0.0
Surface Type Areas			
Grass Cover		277,933	6.4
	A	0	0.0
	B	56,162	1.3
	C	221,771	5.1
	D	0	0.0
Woods		235,041	5.4
	A	0	0.0
	B	89,233	2.0
	C	145,093	3.3
	D	715	0.0
Water		39,627	0.9
	A	0	0.0
	B	33,233	0.8
	C	6,394	0.1
	D	0	0.0
Pavement		57,258	1.3
	A	0	0.0
	B	3,667	0.1
	C	53,591	1.2
	D	0	0.0
Roofs		25,258	0.6
	A	0	0.0
	B	0	0.0
	C	25,258	0.6
	D	0	0.0
Total Impervious Area		122,143	2.8

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Post Development Conditions

Healy Corner
Littleton, MA
Project No. 171088

Infiltration Volume

Inches of Recharge per Storm Event	A	0.60		
	B	0.35		
	C	0.25		
	D	0.10		

Infiltration Volume = ∑ {[(Total Subcatchment Area within HSG) - (Total Impervious Area within HSG)] x (inches of Recharge Per Storm)}

Natural Infiltration Volume	11,890	CF	
Pre-Development Infiltration Volume	13,525	CF	
Capture area Adjustment	3.03		(Total Imp. Area) / (Imp. Area treated by BMP)
Required Iniltration Volume	**4,953**	**CF**	(Req. Infiltration Vol.)x(Capture Area adj.)

Provided Infiltration Volume

Infiltration Basin	7,443	CF	Volume below 292.20' 4" Culvert
Total Provided Iniltration Volume	**7,443**	**CF**	

Stormwater Management Standard 3
GROUNDWATER RECHARGE

Infiltration Area Requirements

Healy Corner
Littleton, MA
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Drawdown Time

(Per Massachusetts Stormwater regulations, infiltration areas must completely drain within 72 hours)

		Infiltration Basin
Infiltration Area Storage Volume	cf	7,443
Design infiltration Rate	in/hr	1.02
Infiltration Bottom Area	sf	1,375

Drawdown Time = Infiltration Area Storage Volume / [Design Infiltration Rate x Infiltration Area Bottom Area]

Drawdown Time (Hrs)	**63.7**

Mounding Analysis

Per the Massachusetts Stormwater Handbook, mounding analysis is required when ".. The vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four (4) feet and the recharge system is proposed to attenuate the peak discharge from a 10-year or higher 24-hour storm." The mounding analysis "... must show that the REQUIRED RECHARGE VOLUME is fully dewatered within 72

Infiltration Basin		
Hydraulic Conductivity	ft/day	16 Lower Range Standard Value for "Medium Sand" material
Specific Yield		0.28 Standard Value for "Medium Sand" material
Initial Saturated Thickness	ft	15 Depth to bedrock
Design Recharge Rate	ft/day	2.04 infiltration rate
Time	days	3 Minimum 72 hr evaluation period
Bottom Infiltrating Area	sf	1,375
Length of Infiltration Area	ft	85
Width of Infiltration Area	ft	16.2
Time when Infiltration Stops	days	2.65
Maximum Water table rise at 72 hours[1]	**ft** **in**	**1.59** **19 1/8**

- Resulting mound will not interfere with the full draining of the infiltration area in accordance with Mass Stormwater Standards -

[1] - mounding analysis calculated using the Hantush (1967) method. Automated calculator available online from the Aquifer Test Forum sponsored by HydroSOLVE, Inc.

Stormwater Management Standard 4
WATER QUALITY RETENTION VOLUME

Healy Corner
Littleton, MA
Project No. 171088

Parameter	Unit	Quantity	Remarks
Watershed area	sf	635,117	
Predevelopment impervious area	sf	45,129	
Total impervious area added	sf	77,014	
Total impervious area	sf	122,143	
Total impervious area required for retention	sf	77,014	
Runoff depth over impervious area	IN	0.5	
Required Water Quality Volume	**CF**	**3,209**	

Provided Water Quality Volume

Infiltration Basin		7,443	CF	Volume below 292.20' 4" Culvert

DESIGN VOLUME PROVIDED	**CF**	**7,443**

Stormwater Management Standard 4
TSS REMOVAL

Healy Corner
Littleton, MA
Project No. 171088

Process Train No.	BMP Type	TSS Removal Rate	TSS Remaining at Discharge	TSS Removed at Discharge
SC-1*	Grass	100%	0%	**100%**
SC-2*	Grass	100%	0%	**100%**
SC-3*	Grass	100%	0%	**100%**
SC-4 & SC-5	Peastone Diaphragm / Sand Filter	80%	20%	**80%**
SC-7*	Grass	100%	0%	**100%**
SC-8.1 - SC-8.8	Catch Basin	25%	75%	25%
	Forebay / Infiltration Basin	80%	15%	**85%**
SC-10	Grass	100%	0%	**100%**

* - Impervious areas within Subcatchments SC-1, SC-2, SC-3, SC-7, and SC-10 are limited to proposed dwelling roofs and driveways which will not accumulate or produce sediment. Any runoff produced by these areas must flow through long stretches of existing grass and wooded vegetated areas prior to reaching a design analysis point and have been considered as clean runoff for the above calculations.

ABBREVIATIONS:
TSS=total suspended solids; SF=square feet; SC=subcatchment; GC=grassed channel; BMP=best management CB=deep sump hooded catch basin; FB = Sediment Forebay; INF=infiltration basin; WB=wet basin; SP=Silt

Healy Corner - Rim & Invert Schedule

Healy Corner
Littleton, MA
Project No. 171088

FROM			TO																	
Structure	Rim	Invert	Structure	Invert	Pipe Size (in)	Pipe Type	Length (ft)	Slope (ft/ft)	Comments	Slope (%)	Manning's n	Pipe Area (sf)	Hydraulic Radius (ft)	Q_{full} (cfs)	V_{full} (ft/s)	Q_{10}	Q_{10} / Q_{full}	Propotional Flow d/D	V_{10} / V_{full}	V_{10}
CB 1	305.52	299.43	DMH 1	299.25	12	RCP	9.1	0.0198		2.0%	0.015	0.785	0.250	4.4	5.5	0.5	0.12	0.23	0.68	3.8
CB 2	305.53	299.57	DMH 1	299.25	12	RCP	15.9	0.0201		2.0%	0.015	0.785	0.250	4.4	5.6	0.2	0.05	0.15	0.55	3.1
DMH 1	305.72	299.00	DMH 2	293.38	12	RCP	281.0	0.0200		2.0%	0.015	0.785	0.250	4.4	5.6	0.7	0.17	0.27	0.76	4.2
CB3	298.71	292.40	DMH 2	292.32	12	RCP	4.0	0.0199		2.0%	0.015	0.785	0.250	4.4	5.6	0.3	0.07	0.18	0.58	3.2
CB4	298.71	292.50	DMH 2	292.32	12	RCP	8.8	0.0204		2.0%	0.015	0.785	0.250	4.4	5.6	1.0	0.23	0.33	0.83	4.6
DMH2	298.75	291.82	DMH 3	290.57	12	RCP	62.3	0.0201		2.0%	0.015	0.785	0.250	4.4	5.6	8.2	1.86	0.36	0.86	4.8
CB 5	297.23	290.68	DMH 3	290.57	12	RCP	5.4	0.0204		2.0%	0.015	0.785	0.250	4.4	5.6	0.4	0.08	0.21	0.65	3.7
DCB 6	297.23	290.75	DMH 3	290.57	12	RCP	8.8	0.0205		2.0%	0.015	0.785	0.250	4.4	5.6	3.2	0.73	0.65	1.08	6.1
DMH3	297.40	290.06	FB	289.33	24	RCP	73.0	0.0100	Discharge to Sediment Forebay	1.0%	0.015	3.142	0.500	19.7	6.3	8.1	0.41	0.47	0.98	6.1
CB 7	302.80	296.29	DMH 4	295.80	12	RCP	24.7	0.0198		2.0%	0.015	0.785	0.250	4.4	5.5	1.4	0.33	0.38	0.88	4.9
CB 8	303.08	296.45	DMH 4	295.80	12	RCP	32.5	0.0200		2.0%	0.015	0.785	0.250	4.4	5.6	1.2	0.27	0.35	0.85	4.7
DMH4	302.20	295.30	DMH 3	290.57	12	RCP	157.7	0.0300		3.0%	0.015	0.785	0.250	5.4	6.8	2.6	0.49	0.57	1.04	7.1
Wetland Culvert	---	264.50	---	264.30	36	HDPE	28.0	0.007	Culvert under Wetland Crossing	0.7%	0.020	7.069	0.750	36.7	5.2	12.1	0.33	0.38	0.88	4.6

Abbreviations:
CB - Catch Basin; DCB - Double Grate Catch Basin; DMH - Drain Manhole; FES - Flared End Section;

CHART 1
HYDRAULIC ELEMENTS OF CIRCULAR PIPE