ENVIRONMENTAL SERVICES

CMG EST. 2002

ENGINEERING SERVICES

STORMWATER REPORT

LAWRENCE WASTE SERVICES CORP.
PROPOSED COMMERCIAL BUILDING
#39 ALDER STREET
MEDWAY, MA

REVISE DATE: 9/16/24

PREPARED FOR:

EAST HILL ASSOCIATES LLC
49 ALDER STREET
MEDWAY, MA 02053

PREPARED BY:

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Stormwater Report
Lawrence Waste Services Corp.
Proposed Commercial Building
#39 Alder Street, Medway, MA
Revise Date: September 16, 2024

Project Description:

The project Applicant*, East Hill Associates LLC (Formerly: ETS Properties, LLC)* retained *CMG Engineering* to prepare this engineering analysis of pre- and post-development drainage runoff conditions for a proposed 7,400 +/- s.f. Commercial Building. The proposed site improvements are located on assessor's parcel 63-004 with a total area of 7.42 Acres, identified as #39 Alder Street (Site).

The site is currently undeveloped meadow and woodlands with bordering vegetated wetlands and riverfront area associated with Stall Brook located in the rear portion of the site. The property is located within the West Industrial (WI) zoning district and is within close proximity to municipal water and sewer located within the Alder Street right-of-way. The property also lies within the Town of Medway's Groundwater Protection District, associated with the Zone II Wellhead Protection Area.

The current site topography contains a higher upland area located within the central portion of the site which pitches towards the northeastern and southern areas of the site to the jurisdictional resource areas. An existing stormwater basin is located along the front of the site which is associated with the town owned drainage system located within the Alder Street right-of-way. No other stormwater BMPs are located on site. The rear portion of the site contains bordering vegetated wetlands and riverfront area and will require a Notice of Intent filing with the Medway Conservation Commission.

Please note there is a change of the project Applicant to *Lawrence Waste Services* and the proposed use to construct a new one-story 7,400 SF building to be used exclusively by Lawrence Waste Services, a waste disposal and recycling company. The building will be similar to their existing building located at their adjacent 49 Alder Street property with 2,400 SF of office space and 5,000 SF for garage space. The site is not to be used for the storage of waste, only for the storage of empty waste dumpsters / containers / compactors. The paved storage area is not considered a Land Use with Higher Potential Pollutant Load (LUHPPL). Customer parking will be located in front of the proposed building. As previously stated, the existing parcel is currently undeveloped woodlands, therefore, the project is considered new development.

A copy of the "MA-DEP Checklist for Stormwater Report" is included as **Appendix A**.

Hydrologic Calculation Methodology:

Hydrology

Computer Model: HydroCAD 10.0 © 2015 Applied Microcomputer Systems, drainage modeling software;

Hydrologic Methodology: TR-55 Methodology is used for analysis of peak flow and drywell sizing.

Surface Runoff Conditions

Rainfall Intensity: NOAA Atlas 14 – Rainfall Data
2-Year Storm = 3.39 in.
10-Year Storm = 5.26 in
25-Year Storm = 6.43 in.
100-Year Storm = 8.23 in.

Watershed Areas: Watershed areas are calculated using AutoCAD software based on the subcatchment areas delineated on topographic mapping included as "Pre-Development Drainage" and "Post-Development Drainage". The areas shown, times of concentration and runoff coefficients are all consistent with the TR-55 drainage calculation method.

Flood Plain:

FEMA Flood Mapping: Site is not in the 100-year flood plain based on Flood Insurance Rate Map (FIRM) Town of Medway, Norfolk County Massachusetts (All Jurisdictions) Map Number 25021C0138E, Effective Date July 17, 2012 (see **Appendix B).**

Soils & Topography:

The Site soils are mapped as and appear to be consistent with Scarboro and Birdsall soils (10) with 0 ~ 3% slopes & Merrimac Fine Sandy Loam (254B) with 3 ~ 8% slopes classified as Hydrologic Soil Group "C/D" & "A" respectively.

A copy of the *National Resources Conservation Service* (NRCS) Soils Map, listed area soil types are included as **Appendix C.**

On-Site Soil Testing:

May 13, 2022 Soil Testing – O'Driscoll Land Surveying, Inc. (Daniel O'Driscoll, PLS, LSE)

On November 30, 2022 O'Driscoll Land Surveying, Inc. completed four (4) on-site soil test pits within the proposed project area. The purpose of these test pits was to verify the ESHGW and soil conditions within the proposed stormwater management areas.

Depth to Groundwater:

Estimated seasonal high groundwater (ESHGW) elevations based on soil mottling are as follows:

TP - 1	**TP - 2**	**TP - 3**	**TP – 4**
ESHGW = 52"	**ESHGW=38"**	**ESHGW = 84"**	**ESHGW = 64"**

Soil Conditions:

Test pit TP – 1 was excavated in the vicinity of the proposed metal building to approximately 12 ft. below ground surface (b.g.s.). Soil testing results are consistent with the NRCS mapping for loamy sand with an ESHGW located approximately 4.3 ft. b.g.s.

Test pit TP - 2 was excavated within the limits of the proposed paved storage yard to approximately 10 ft. b.g.s. Soil testing results were also consistent with the NRCS mapping for loamy sand with an ESHGW located approximately 3.1' b.g.s. Groundwater seepage was encountered at 6 ft. b.g.s.

Test pit TP – 3 was excavated in the vicinity of the proposed underground infiltration chambers to approximately 9.3' below ground surface. Soils were consistent with NRCS mapping for loamy sand with ESHGW at 7'b.g.s. Groundwater seepage was encountered at 9.3' b.g.s.

Test pit TP – 4 was excavated in the vicinity of the proposed stormwater basin to approximately 10' b.g.s. Soils were consistent with the rest of the site with loamy sand with ESHGW at 5.3' b.g.s.

Copies of Site Soil Investigation Data are shown on Grading & Drainage Plan, Sheet C-2.0.

Soil Permeability (k):
Based upon on-site classification by a State of Massachusetts Licensed Soil Evaluator Daniel O'Driscoll, PLS, Site subsurface soils within the development area are classified as a "loamy sand". Loamy sands correlate to a "A" type soil classification within the Rawls Rate soil permeability table; therefore, the drainage design permeability has been identified as follows:

Design permeability (k) values of Type "A" Soils:
***k* = 2.41 in / hr** (Rawls Rate: Type "A" Soils) Loamy Sand

Existing Conditions:

The existing site currently consists of one industrial zoned property located at #39 Alder Street with an area of 7.42 Acres. The parcel consists of undeveloped meadow and woodland with bordering vegetated wetlands riverfront area located around the site. The central portion of the site appears to be the highpoint, which pitches due northeast and southwest to the wetland resource areas. There is one stormwater outfall location for the site:

Outfall 1S – South Wetland Approximately 91,474 s.f. of undeveloped meadow and woodland discharges stormwater runoff, via overland flow, to the bordering vegetated wetlands located along the rear of the Site. No existing stormwater BMP's are present on-site to treat and convey existing stormwater flows. The wetlands appear to be associated with the Stall Brook tributary, which is located in the southeastern portion of the site.

Outfall 2S – North Wetland Approximately 36,748 s.f. of undeveloped meadow and woodland discharges stormwater runoff, via overland flow, to the bordering vegetated wetlands located off-site to the Northern abutting property. No existing stormwater BMP's are present on-site to treat and convey existing stormwater flows. This wetland is part of the same wetlands associated with the Stall Brook tributary located in the southeastern portion of the site.

Proposed Conditions:

The project Applicant is proposing to construct a 7,400 s.f. metal building. A paved parking area will be located along the front of the proposed building and a paved storage yard will be located in the rear of the proposed building. The proposed storage yard will be used to store empty waste dumpsters / containers / compactors. The proposed use is not considered a Land Use with Higher Potential Pollutant Load (LUHPPL).

CMG is proposing the following Stormwater Management System for the Site in order to meet the MA-DEP Stormwater Management Standards for a new development project.

Outfall 1S – South Wetland Subcatchment 1A consists of the proposed building, paved parking area, and paved storage area. Per the Massachusetts Stormwater Handbook, the paved storage areas will need to achieve 44% TSS removal prior to infiltration. The paved parking and storage area will utilize a combination of deep-sump hooded catch basins and Cultec Separator Row Filtration System to capture and pretreat stormwater runoff prior to discharge to a subsurface infiltration system.

The subsurface infiltration system consists of Cultec 280 HD Rechargers. Two (2) - 8" overflow pipes will then convey stormwater to the rear of the property to riprap aprons. Once discharged, the stormwater flows will be conveyed via overland flow to the bordering vegetated flows. In accordance with the Massachusetts Stormwater Handbook, the building will be constructed with a non-metal (rubber) roof due

to its locations within the Zone II Wellhead Protection Area. Roof runoff will be piped directly to the underground infiltration system.

Subcatchment 1B consists of the proposed landscape areas and undeveloped woodlands located around the perimeter of the proposed paved areas and metal building. Please note, the site contains jurisdictional resource areas with associated buffers, including a 25' "no disturb" buffer, which are located in this subcatchment. The majority of subcatchment 1B remains undisturbed and will contain no structural stormwater BMP's. All stormwater runoff will discharge to the bordering vegetated wetlands via overland flow.

Outfall 2S – North Wetland Subcatchment 2A consists of the remaining portion of wooded area at the rear of the Site and a small portion of grass / landscaping along the property line. This area will be reduced from its pre-development condition resulting in a decrease in post-development off-site flow.

Proposed Stormwater Management System:

Proposed "Lawrence Waste Services" #39 Alder Street Facility:

- Deep sump hooded catch basins collect runoff for site's impervious and landscaped areas.
- Cultec Separator Row Filtration System to provide additional treatment for the proposed paved parking and storage areas to achieve 44% TSS removal prior to infiltration.
- Proposed building will have a rubber "non-metal" roof as the Site's within the Zone II Wellhead Protection Area.
- A proposed underground infiltration system is proposed under the proposed paved storage area to enhance groundwater recharge on-site.
- Site Long-term Operation and Maintenance plan is provided for the Site.

MA-DEP Stormwater Management Standards:

STANDARD 1: (Untreated discharges):
No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Proposed Full Compliance:

- **Combination of on-site stormwater BMPs including deep sump catch basins with hoods and water quality units provide treatment for on-site stormwater prior to discharge to Outfall 1S.**

STANDARD 2: (Peak rate control and flood prevention):
Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

Proposed Full Compliance:

- **No proposed increase to post-development Site peak runoff and Site is not in the 100-year flood plain.**

STANDARD 3: (Recharge to Groundwater):

Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development conditions based on soil type. This Standard is met when the storm water management system is design to infiltrate the required recharge volume as determined in accordance with the Massachusetts Storm water Handbook.

Proposed Full Compliance:

- **The site will be utilizing infiltration chambers to meet the required recharge.**
- **Site specific BMPs are utilized to pretreat stormwater runoff prior to discharging to infiltration practices.**
- **44% Pre-Treatment is provided by a combination of deep sump hooded catch basins (25% TSS removal) and Cultec Separator Row (25% TSS removal) prior to entering the underground recharge chambers.**

STANDARD 4: (TSS Removal):

Stormwater management systems must be designed to remove 80% of the average annual post construction load of Total Suspended Solids (TSS).

Proposed Full Compliance:

- **Outfall 1S & 2S –will achieve minimum 85% TSS removal through a combination of deep sump hooded catch basins, Cultec Separator Row Filtration System, and an underground infiltration system.**
- **A "Long Term Operation and Maintenance Plan" is being provided as Appendix H.**

STANDARD 5: (Higher Potential Pollutant Loads (LUHPPL)):

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Storm water Handbook to eliminate or reduce the discharge of storm water runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, or storm water runoff, the proponent shall use the specific storm water BMP's determined by the Department to be suitable for such use as provided in the Massachusetts Storm water Handbook.

N/A – Site is not considered a LUHPPL

STANDARD 6: (Critical Areas)

Storm water discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and storm water discharges near or any other critical area require the use of the specific storm water best management practices determined by the Department to be suitable for managing discharges to such area as provided in the Massachusetts Storm water Handbook.

Proposed Full Compliance:

- **The site is within a Zone II Aquifer Protection District. As a result, the on-site stormwater management system was designed to treat the 1" water quality volume and pre-treatment requirements have been met.**

STANDARD 7: (Redevelopment)

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

Proposed Full Compliance:

N/A Site is considered new development and will meet all applicable Stormwater Management Standards

STANDARD 8: (Erosion, Sediment Control):
A plan to control construction related impacts including erosion sedimentation and other pollution prevention sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) must be implemented.

Proposed Full Compliance:

- **The "Erosion and Sedimentation Control Plan" Sheet C-4.0 and "Erosion and Sediment Control Details" Sheet C-4.1 are incorporated into the Plan Set.**
- **Project will disturb > 1 Acre, therefore an EPA–NPDES Stormwater General Permit is required prior to construction and will be accompanied with a comprehensive SWPP Plan.**

STANDARD 9: (Operation and Maintenance):
A long-term operation and maintenance plan must be developed and implemented to ensure that storm water management systems function as designed.

Proposed Full Compliance:

- **Long Term Operation and Maintenance Plan is included in Stormwater Management Report, Appendix H.**

STANDARD 10: (Illicit Discharges):
All illicit discharges to the stormwater management system are prohibited.

Proposed Full Compliance:

- **A signed "illicit discharge compliance statement" will be provided as part of the final "Storm water Management System Long-Term Operation & Maintenance Plan".**

A copy of the "MA-DEP Checklist for Stormwater Report" is included as **Appendix A**.

Table No. 1 provides a summary of off-site Pre- and Post-Development peak runoff flow rates and volumes**.**

Table No. 2 provides a summary of the subcatchment drainage area calculations.

Appendix D & E includes the complete Pre-Development and Post-Development *HydroCAD* drainage calculation reports and **Figures D-1 and D-2 "Pre- "and "Post-Development Drainage Areas" plans**.

Appendix F provides additional stormwater calculations.

Appendix G provides the Manufacturer's Design Report for the Cultec Separator Row.

Appendix H provides a DRAFT "Long Term Stormwater Operation & Maintenance Plan"

The complete Site Plans for the **"Lawrence Waste Services Corp. Proposed Commercial Building #39 Alder Street, Medway, MA" prepared by CMG Engineering, Revision #4 date 9/4/2024** (or latest version) provide details of the complete storm water management system design**.**

TABLE NO. 1

9/16/2024

STORMWATER RUNOFF PEAK FLOW SUMMARY
LAWRENCE WASTE SERVICES
#39 ALDER STREET
MEDWAY, MA

Pre-Existing Site Development (Fig D1) Conditions					
		2-Year	10-Year	25-Year	100-Year
1S - SOUTH WETLAND	*Peak Flow (cfs)*	*0.00*	*0.03*	*0.15*	*0.71*
2S - NORTH WETLAND	*Peak Flow (cfs)*	*0.00*	*0.02*	*0.14*	*0.54*

Proposed - Site Development (Fig D2) Conditions					
1S - SOUTH WETLAND	*Peak Flow (cfs)*	*0.00*	*0.01*	*0.03*	*0.56*
2S - NORTH WETLAND	*Peak Flow (cfs)*	*0.00*	*0.00*	*0.01*	*0.40*

TABLE NO. 2
DRAINAGE AREA CALCULATIONS
LAWRENCE WASTE SERVICES
#39 ALDER STREET
MEDWAY, MA

PRE-DEVELOPMENT DRAINAGE AREAS (s.f.)

On-Site	Soil Type A						Watershed
Area	Pavement	Roof	Grass/Woods	Woods			Total
1	238		32,250	58,986			91,474
2			20,371	16,377			36,748
							0
							Total
	238	0	52,621	75,363			**128,222 s.f.**
				Total Site Area=	128,222	s.f.	**2.94** Ac
Total Impervious=		**238 s.f.**			2.94	Ac	
Total Open Space =		**127,984 s.f.**					

POST-DEVELOPMENT DRAINAGE AREAS (s.f.)

On-Site	Soil Type A						Watershed
Area	Pavement	Roof	Grass/Ldscp	Woods			Total
1A	57,371		2,609				59,980
1B			10,540	36,164			46,704
ROOF		7,400					7,400
2A			4,911	9,227			14,138
							0
							0
							0
							Total
	57,371	7,400	18,060	45,391			***128,222 s.f.***
				Total Site Area=	128,222	s.f.	**2.94** Ac
Total Impervious=		**64,771 s.f.**			2.94	Ac	
Total Open Space =		**63,451 s.f.**					

Note:

[1] All Drainage Areas are calculated using CAD Software based on Pre- & Post Development Drainage Plans prepared by CMG date 9/04/2024

Appendix A

MA-DEP Stormwater Checklist

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

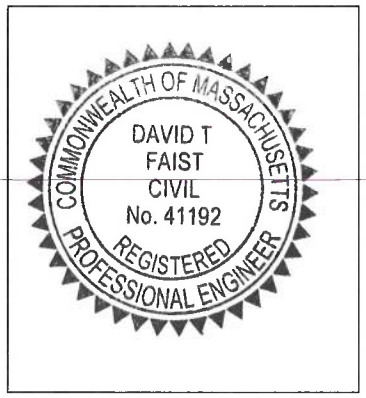
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



9-16-24

Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

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

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

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

☐ Use of “country drainage” versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

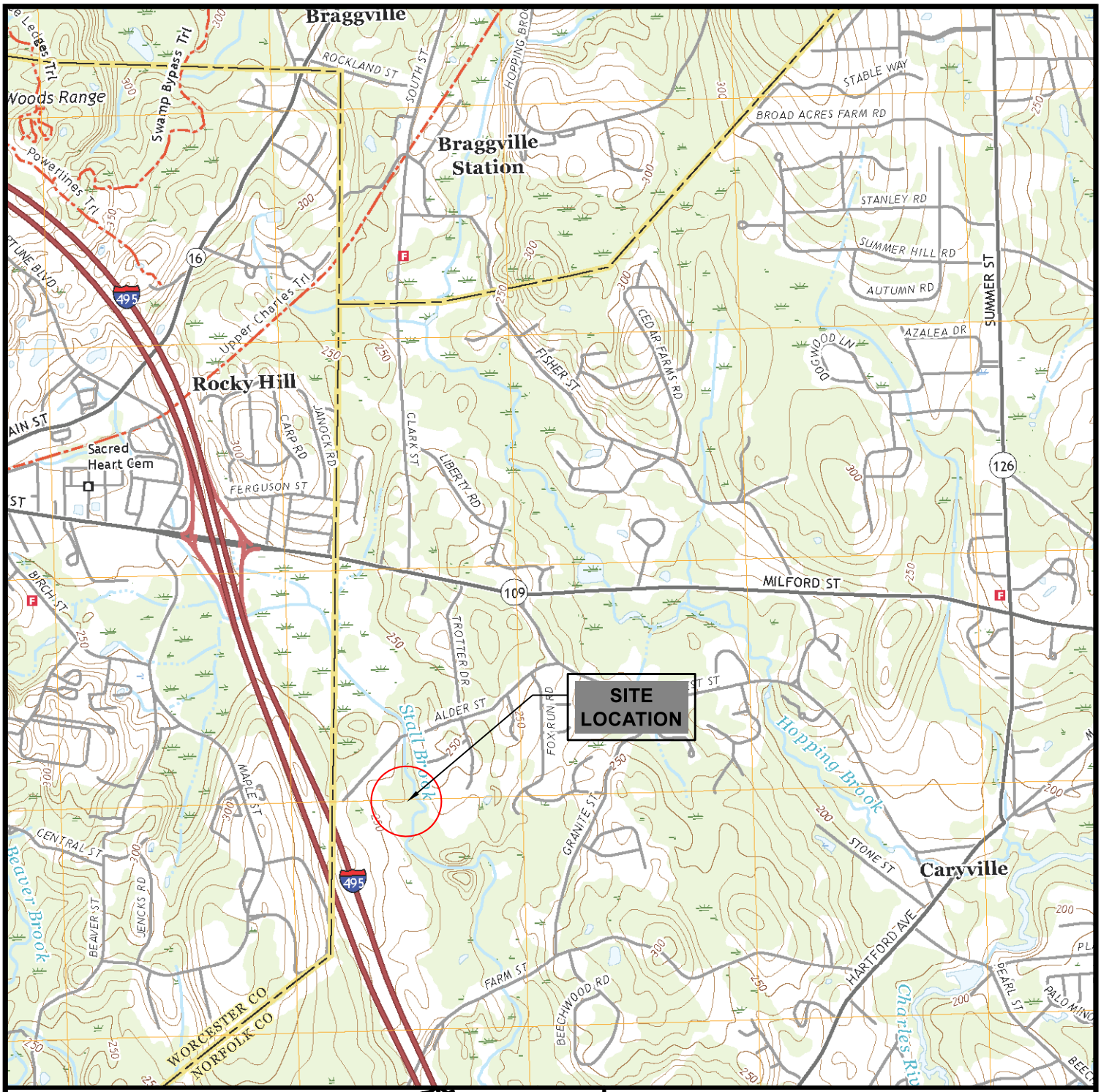
☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

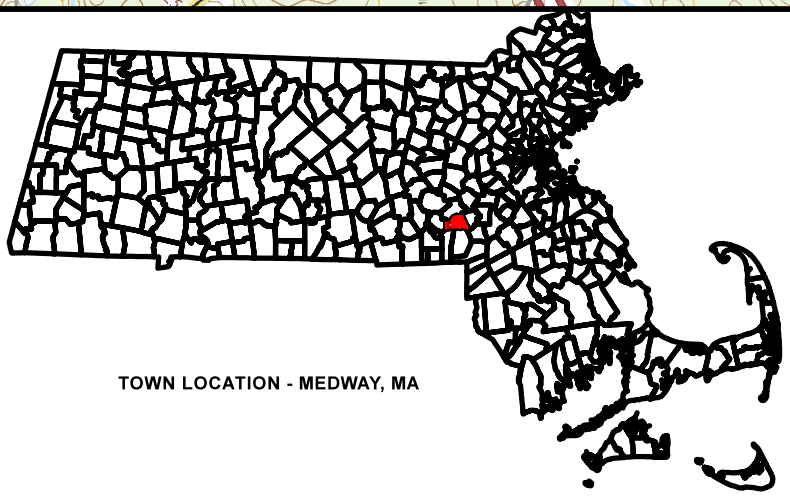
☒ An Illicit Discharge Compliance Statement is attached;

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

Appendix B

USGS FIGURE
FEMA Flood Plain Mapping
NOAA Atlas 14 Precipitation Data





TOWN LOCATION - MEDWAY, MA

FIGURE 1: SITE LOCATION

39 ALDER STREET
MEDWAY, MA 02053
CMG ID 2020-149

SCALE 1:24,000

2000 FT 0 2000 FT

ENVIRONMENTAL SERVICES

CMG EST. 2002

ENGINEERING SERVICES

67 HALL ROAD. STURBRIDGE MA 01566

National Flood Hazard Layer FIRMette

71°28'49"W 42°8'28"N

0 250 500 1,000 1,500 2,000 Feet 1:6,000

71°28'11"W 42°8'1"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/20/2022 at 1:40 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOAA Atlas 14, Volume 10, Version 3
Location name: Medway, Massachusetts, USA*
Latitude: 42.1389°, Longitude: -71.476°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.333** (0.259-0.426)	**0.401** (0.311-0.513)	**0.511** (0.395-0.656)	**0.602** (0.463-0.777)	**0.728** (0.542-0.984)	**0.824** (0.601-1.14)	**0.923** (0.654-1.32)	**1.03** (0.695-1.52)	**1.19** (0.770-1.81)	**1.31** (0.832-2.05)
10-min	**0.472** (0.367-0.603)	**0.568** (0.440-0.726)	**0.724** (0.560-0.930)	**0.854** (0.656-1.10)	**1.03** (0.768-1.39)	**1.17** (0.851-1.61)	**1.31** (0.926-1.87)	**1.46** (0.984-2.15)	**1.68** (1.09-2.56)	**1.86** (1.18-2.90)
15-min	**0.555** (0.431-0.710)	**0.668** (0.518-0.855)	**0.852** (0.658-1.09)	**1.00** (0.772-1.30)	**1.21** (0.904-1.64)	**1.37** (1.00-1.89)	**1.54** (1.09-2.20)	**1.72** (1.16-2.53)	**1.98** (1.28-3.02)	**2.19** (1.39-3.41)
30-min	**0.758** (0.589-0.969)	**0.913** (0.709-1.17)	**1.17** (0.902-1.50)	**1.38** (1.06-1.78)	**1.67** (1.24-2.25)	**1.89** (1.38-2.61)	**2.12** (1.50-3.03)	**2.37** (1.59-3.48)	**2.73** (1.77-4.15)	**3.01** (1.91-4.69)
60-min	**0.961** (0.746-1.23)	**1.16** (0.899-1.48)	**1.48** (1.15-1.91)	**1.75** (1.35-2.26)	**2.12** (1.58-2.87)	**2.40** (1.75-3.32)	**2.69** (1.91-3.86)	**3.01** (2.03-4.43)	**3.47** (2.25-5.28)	**3.84** (2.43-5.97)
2-hr	**1.23** (0.956-1.56)	**1.49** (1.16-1.89)	**1.92** (1.50-2.46)	**2.28** (1.77-2.93)	**2.78** (2.08-3.74)	**3.15** (2.31-4.33)	**3.54** (2.53-5.07)	**4.00** (2.70-5.84)	**4.66** (3.03-7.06)	**5.22** (3.31-8.06)
3-hr	**1.41** (1.11-1.79)	**1.72** (1.35-2.18)	**2.23** (1.74-2.84)	**2.65** (2.06-3.39)	**3.23** (2.43-4.34)	**3.66** (2.70-5.03)	**4.13** (2.97-5.91)	**4.67** (3.16-6.80)	**5.48** (3.57-8.27)	**6.17** (3.92-9.49)
6-hr	**1.81** (1.43-2.28)	**2.21** (1.74-2.78)	**2.86** (2.24-3.61)	**3.40** (2.65-4.32)	**4.14** (3.14-5.53)	**4.69** (3.48-6.42)	**5.29** (3.83-7.54)	**6.00** (4.07-8.68)	**7.08** (4.62-10.6)	**8.00** (5.11-12.2)
12-hr	**2.30** (1.82-2.87)	**2.80** (2.22-3.50)	**3.62** (2.85-4.54)	**4.29** (3.37-5.42)	**5.22** (3.98-6.93)	**5.91** (4.41-8.03)	**6.66** (4.85-9.44)	**7.56** (5.15-10.9)	**8.94** (5.85-13.3)	**10.1** (6.47-15.3)
24-hr	**2.77** (2.21-3.43)	**3.39** (2.70-4.21)	**4.41** (3.50-5.50)	**5.26** (4.15-6.60)	**6.43** (4.92-8.49)	**7.29** (5.48-9.86)	**8.23** (6.03-11.6)	**9.39** (6.42-13.4)	**11.2** (7.35-16.5)	**12.7** (8.18-19.2)
2-day	**3.15** (2.52-3.88)	**3.92** (3.14-4.83)	**5.18** (4.13-6.41)	**6.22** (4.93-7.75)	**7.66** (5.90-10.1)	**8.71** (6.59-11.7)	**9.87** (7.30-13.9)	**11.3** (7.78-16.1)	**13.7** (9.01-20.1)	**15.7** (10.1-23.5)
3-day	**3.44** (2.76-4.22)	**4.27** (3.43-5.24)	**5.62** (4.50-6.94)	**6.75** (5.37-8.37)	**8.30** (6.41-10.9)	**9.43** (7.16-12.7)	**10.7** (7.93-15.0)	**12.3** (8.44-17.3)	**14.8** (9.77-21.6)	**17.0** (11.0-25.3)
4-day	**3.70** (2.98-4.53)	**4.57** (3.68-5.59)	**5.98** (4.79-7.35)	**7.15** (5.70-8.84)	**8.76** (6.78-11.4)	**9.94** (7.55-13.3)	**11.2** (8.34-15.7)	**12.9** (8.87-18.1)	**15.5** (10.2-22.5)	**17.7** (11.5-26.3)
7-day	**4.44** (3.60-5.41)	**5.36** (4.33-6.53)	**6.85** (5.52-8.38)	**8.09** (6.48-9.96)	**9.80** (7.61-12.7)	**11.1** (8.42-14.7)	**12.4** (9.21-17.2)	**14.1** (9.76-19.7)	**16.7** (11.1-24.2)	**18.9** (12.2-27.9)
10-day	**5.15** (4.18-6.25)	**6.09** (4.94-7.40)	**7.64** (6.17-9.31)	**8.92** (7.16-10.9)	**10.7** (8.30-13.7)	**12.0** (9.13-15.8)	**13.4** (9.91-18.3)	**15.1** (10.4-21.0)	**17.6** (11.7-25.3)	**19.7** (12.8-29.0)
20-day	**7.25** (5.93-8.74)	**8.26** (6.74-9.96)	**9.89** (8.04-12.0)	**11.2** (9.09-13.7)	**13.1** (10.2-16.6)	**14.5** (11.1-18.8)	**16.0** (11.8-21.5)	**17.6** (12.3-24.3)	**19.9** (13.3-28.4)	**21.7** (14.1-31.6)
30-day	**8.99** (7.38-10.8)	**10.0** (8.22-12.1)	**11.7** (9.57-14.1)	**13.1** (10.6-15.9)	**15.1** (11.8-19.0)	**16.6** (12.6-21.2)	**18.0** (13.2-23.9)	**19.6** (13.7-26.9)	**21.6** (14.5-30.8)	**23.2** (15.1-33.7)
45-day	**11.1** (9.17-13.3)	**12.2** (10.0-14.6)	**14.0** (11.5-16.8)	**15.4** (12.6-18.7)	**17.5** (13.7-21.8)	**19.0** (14.5-24.2)	**20.6** (15.1-26.9)	**22.0** (15.5-30.0)	**23.8** (16.0-33.7)	**25.1** (16.4-36.3)
60-day	**12.9** (10.7-15.4)	**14.1** (11.6-16.8)	**15.9** (13.0-19.0)	**17.4** (14.2-20.9)	**19.5** (15.2-24.2)	**21.1** (16.1-26.7)	**22.7** (16.6-29.4)	**24.0** (16.9-32.6)	**25.6** (17.3-36.1)	**26.7** (17.4-38.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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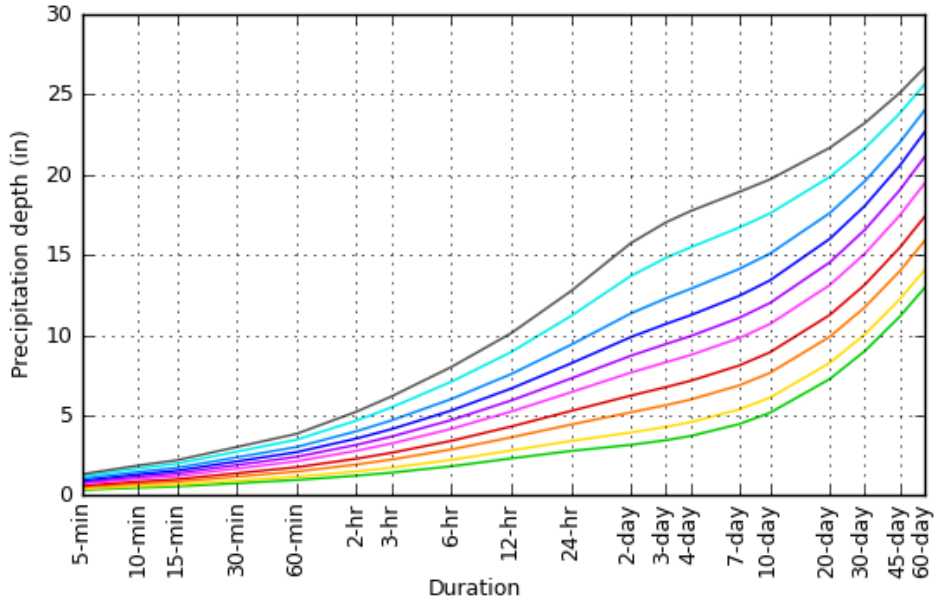
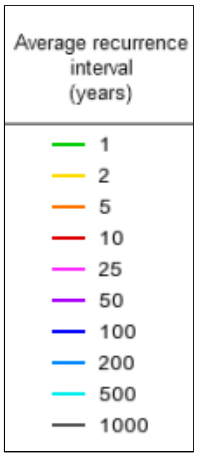
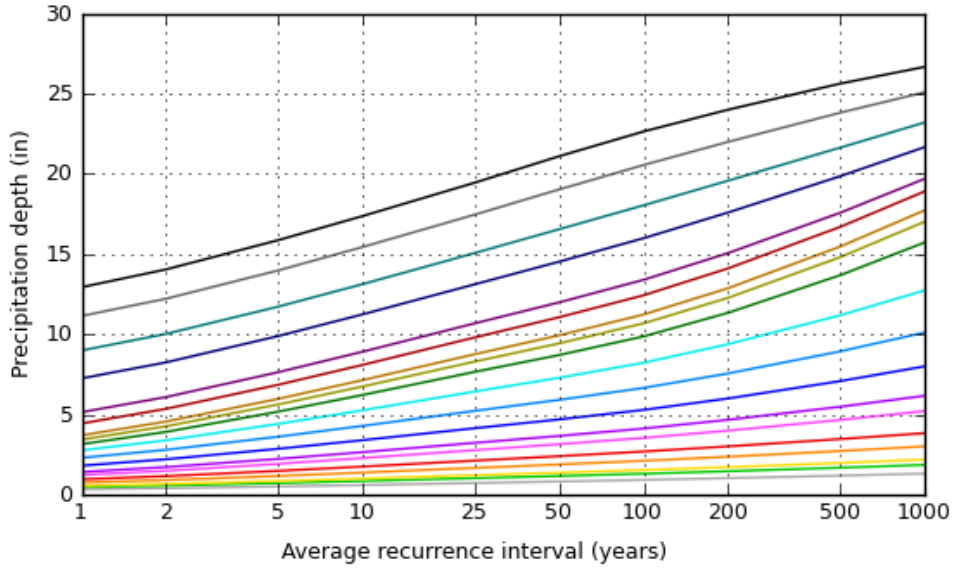
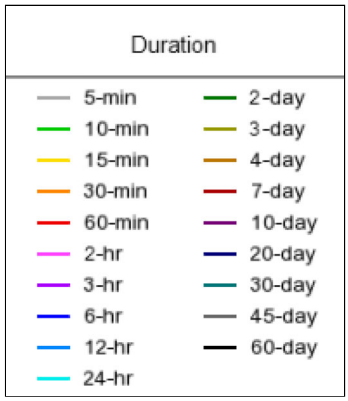
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 42.1389°, Longitude: -71.4760°









NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Thu Apr 13 16:01:02 2023

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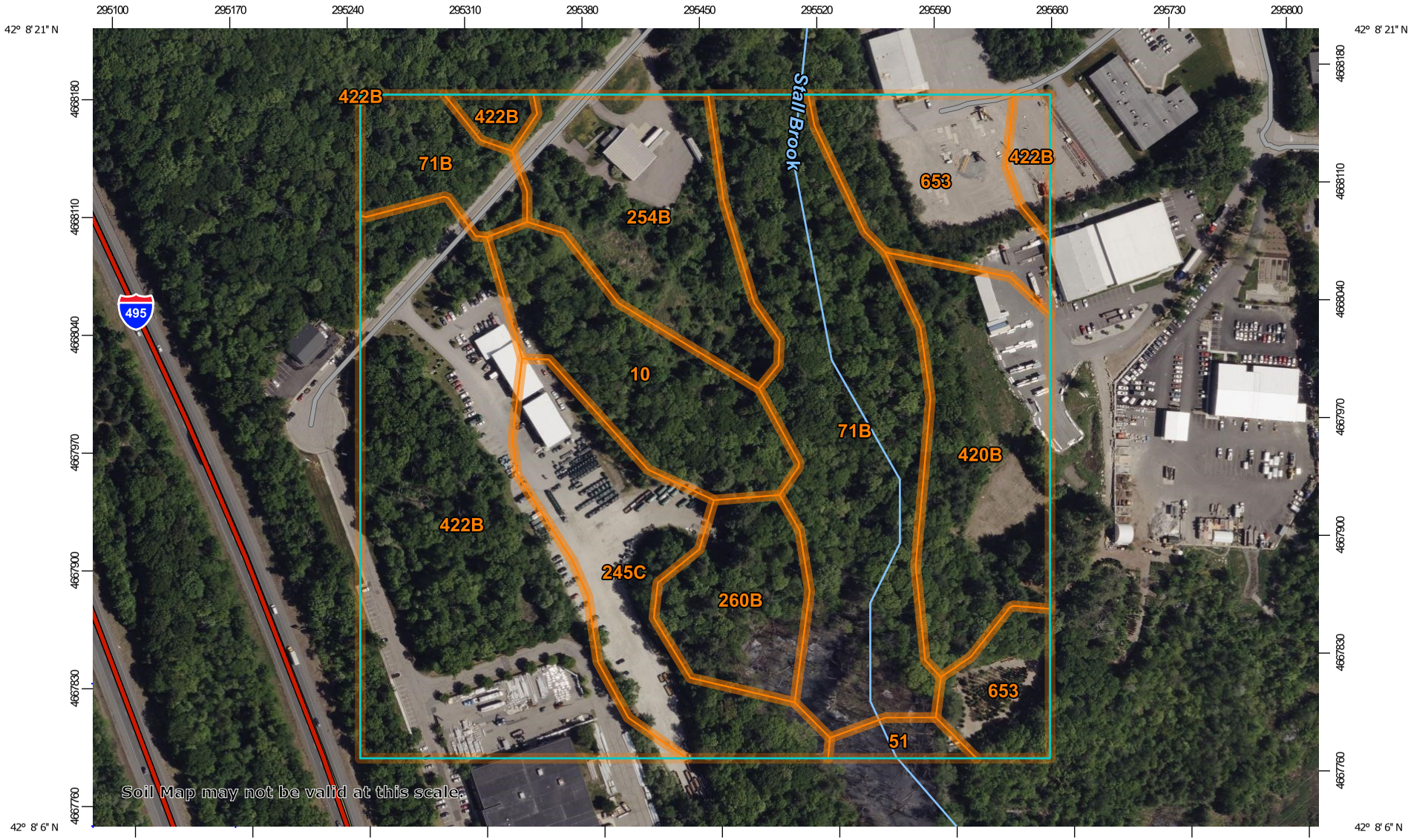
Maps & aerials

Small scale terrain

Appendix C

NCRS Soil Mapping

Soil Map—Norfolk and Suffolk Counties, Massachusetts



Map Scale: 1:3,340 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

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

MAP LEGEND

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

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

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	3.3	8.1%
51	Swansea muck, 0 to 1 percent slopes	0.4	1.0%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	8.7	21.7%
245C	Hinckley loamy sand, 8 to 15 percent slopes	3.9	9.8%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	3.9	9.7%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	2.0	5.1%
420B	Canton fine sandy loam, 3 to 8 percent slopes	4.2	10.3%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	9.9	24.5%
653	Udorthents, sandy	4.0	9.8%
Totals for Area of Interest		**40.3**	**100.0%**

Norfolk and Suffolk Counties, Massachusetts

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Outwash plains, outwash terraces, dunes, deltas
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

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

Norfolk and Suffolk Counties, Massachusetts

10—Scarboro and Birdsall soils, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vkxw
Elevation: 0 to 2,100 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 65 percent
Birdsall and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 9 inches: mucky fine sandy loam
H2 - 9 to 60 inches: stratified loamy fine sand to gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Description of Birdsall

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Soft coarse-silty glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 16 inches: very fine sandy loam
H3 - 16 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 12.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 5 percent
Landform: Bogs
Hydric soil rating: Yes

Raynham

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Walpole

Percent of map unit: 2 percent
Landform: Terraces

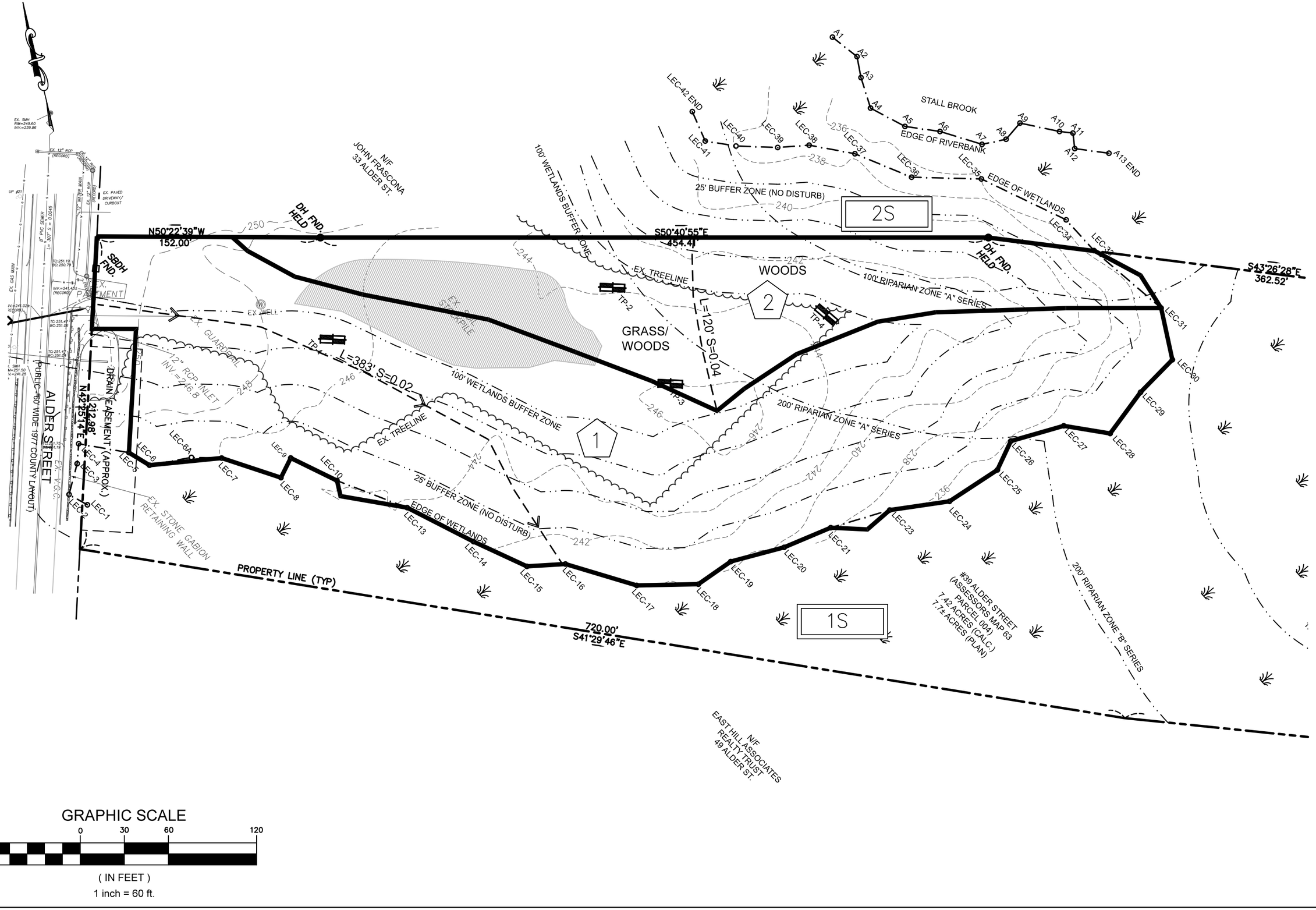
Hydric soil rating: Yes

Data Source Information

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

Appendix D

Pre-Development Drainage Calculations



GRAPHIC SCALE

60 0 30 60 120

(IN FEET)

1 inch = 60 ft.

NO.	DATE	DESCRIPTION	BY	CKD
1.	3/4/2024	CLIENT CHANGE OF USE / BUILDING	RL	DTF
2.	9/4/2024	APPLICANT CHANGE & BUILDING MODIFICATION	MM	DTF

PROFESSIONAL SEAL

PROJECT:

PROPOSED COMMERCIAL BUILDING
#39 ALDER STREET
MEDWAY, MA 02053

PREPARED FOR:

EAST HILL ASSOCIATES LLC
#49 ALDER STREET
MEDWAY, MA 02053

ENGINEERING SERVICES
ENVIRONMENTAL SERVICES

67 Hall Road
Sturbridge, MA 01566
Phone: 774-241-0901
fax: 774-241-0906

CMG EST. 2002

ISSUE DATE: 2/16/2024

DRAWN BY: RL | CHECKED BY: DTF

SCALE: 1" = 60'

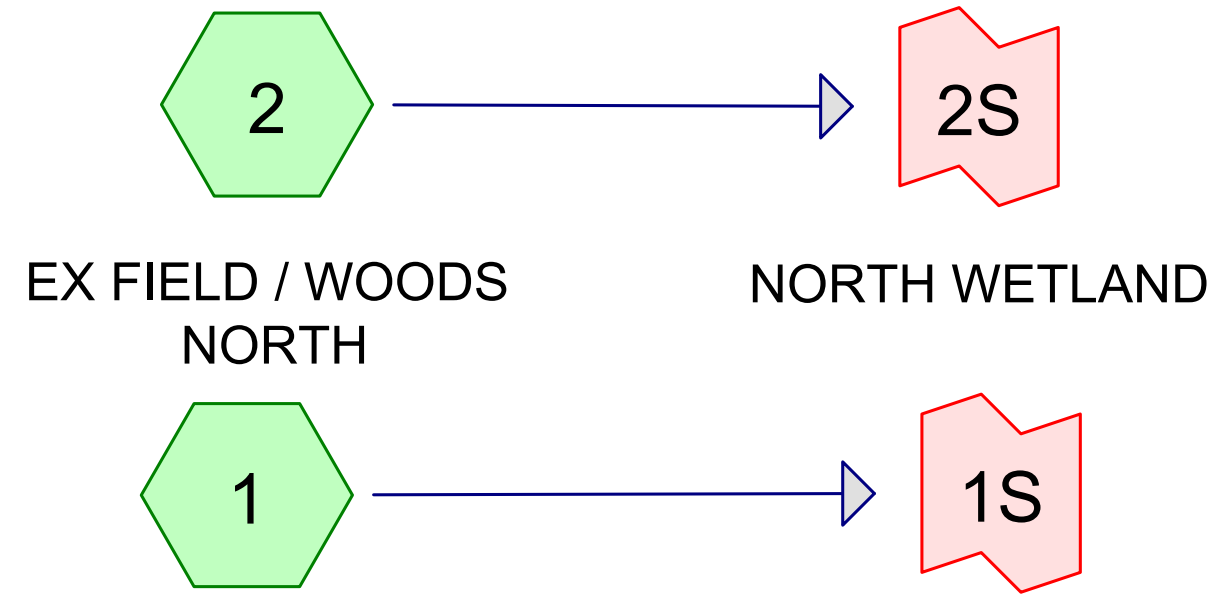
PROJECT NO.: 2024-128

SHEET NAME:

PRE-DEVELOPMENT DRAINAGE MAP

SHEET NO.:

D - 1.0



Subcat Reach Pond Link

Routing Diagram for 2024-128-PRE_DEV_REV4
Prepared by {enter your company name here}, Printed 9/3/2024

Time span=3.00-30.00 hrs, dt=0.03 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EX FIELD / WOODS Runoff Area=91,474 sf 0.26% Impervious Runoff Depth=0.00"
Flow Length=383' Slope=0.0260 '/' Tc=30.5 min CN=35 Runoff=0.00 cfs 0.000 af

Subcatchment 2: EX FIELD / WOODS Runoff Area=36,748 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=120' Slope=0.0400 '/' Tc=9.2 min CN=37 Runoff=0.00 cfs 0.000 af

Link 1S: SOUTH WETLAND Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 2S: NORTH WETLAND Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
99.81% Pervious = 2.938 ac 0.19% Impervious = 0.005 ac

Summary for Subcatchment 1: EX FIELD / WOODS SOUTH

[45] Hint: Runoff=Zero

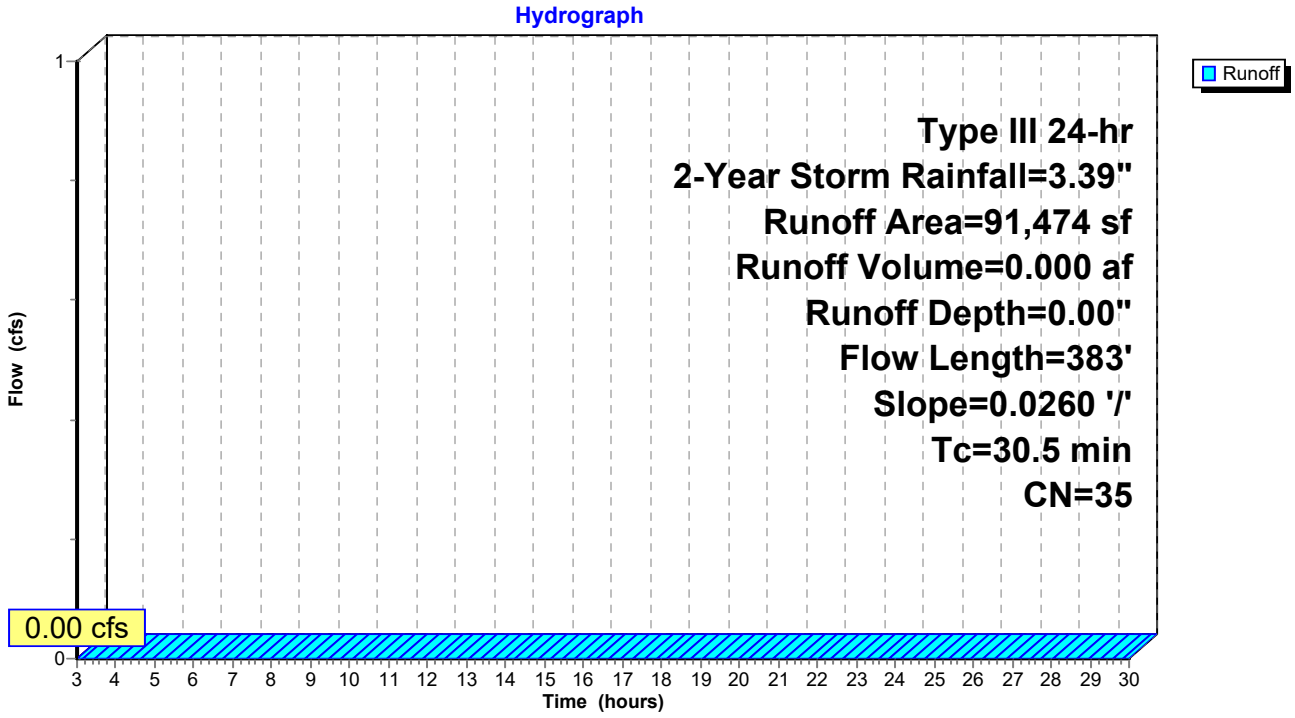
Runoff = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Storm Rainfall=3.39"

Area (sf)	CN	Description
58,986	30	Woods, Good, HSG A
238	98	Paved parking, HSG A
32,250	43	Woods/grass comb., Fair, HSG A
91,474	35	Weighted Average
91,236		99.74% Pervious Area
238		0.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	383	0.0260	0.21		**Lag/CN Method, CN/LAG METHOD**

Subcatchment 1: EX FIELD / WOODS SOUTH



Summary for Subcatchment 2: EX FIELD / WOODS NORTH

[45] Hint: Runoff=Zero

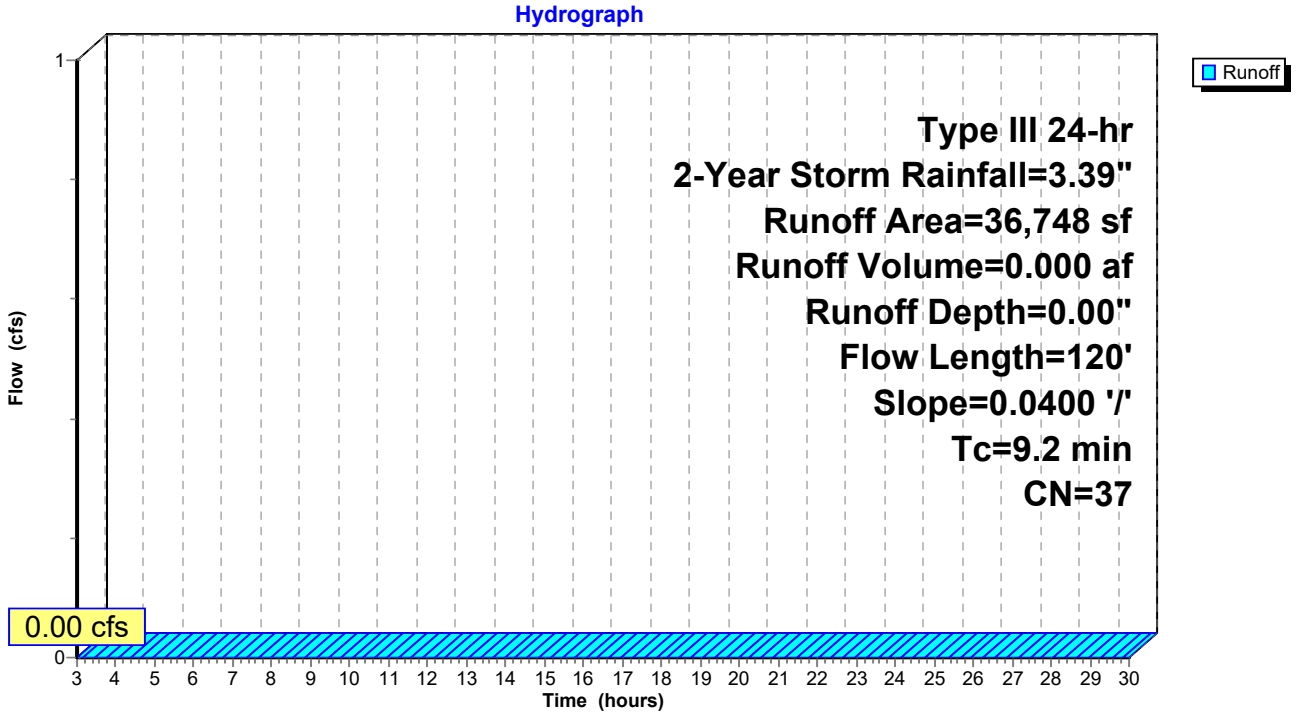
Runoff = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Storm Rainfall=3.39"

Area (sf)	CN	Description
20,371	43	Woods/grass comb., Fair, HSG A
16,377	30	Woods, Good, HSG A
36,748	37	Weighted Average
36,748		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	120	0.0400	0.22		**Lag/CN Method,**

Subcatchment 2: EX FIELD / WOODS NORTH

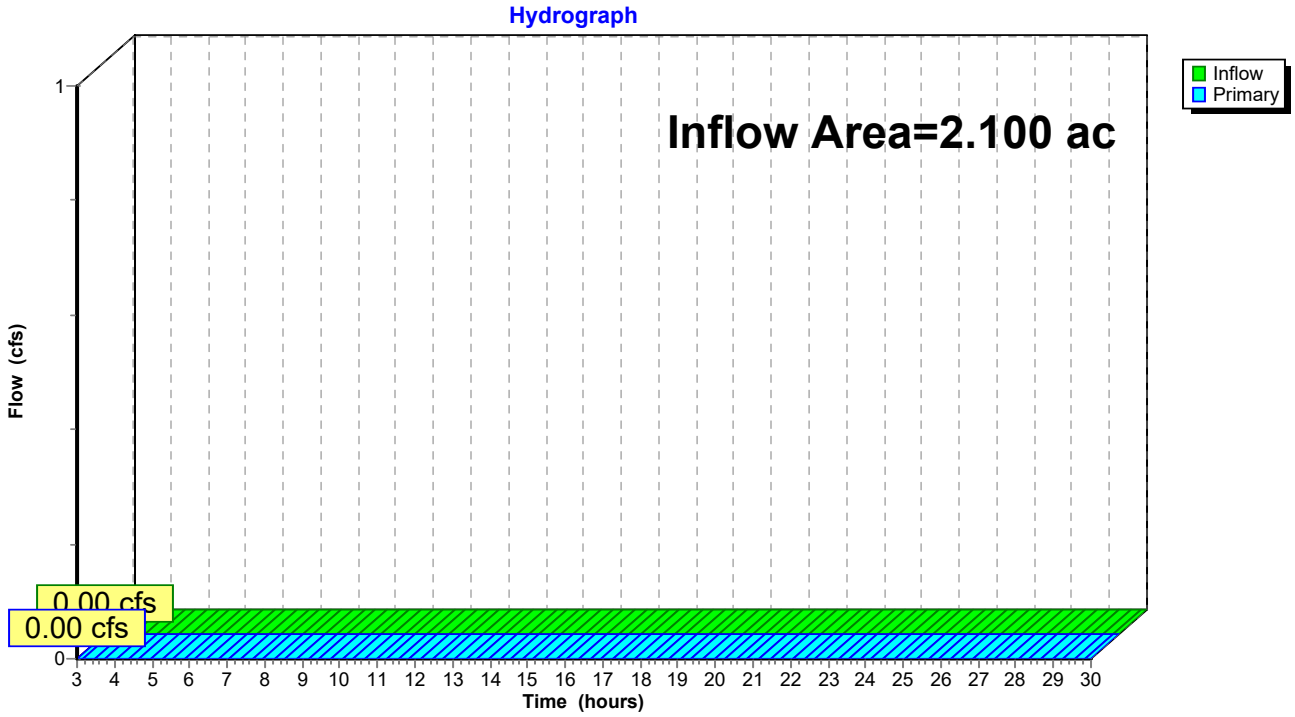


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.100 ac, 0.26% Impervious, Inflow Depth = 0.00" for 2-Year Storm event
Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

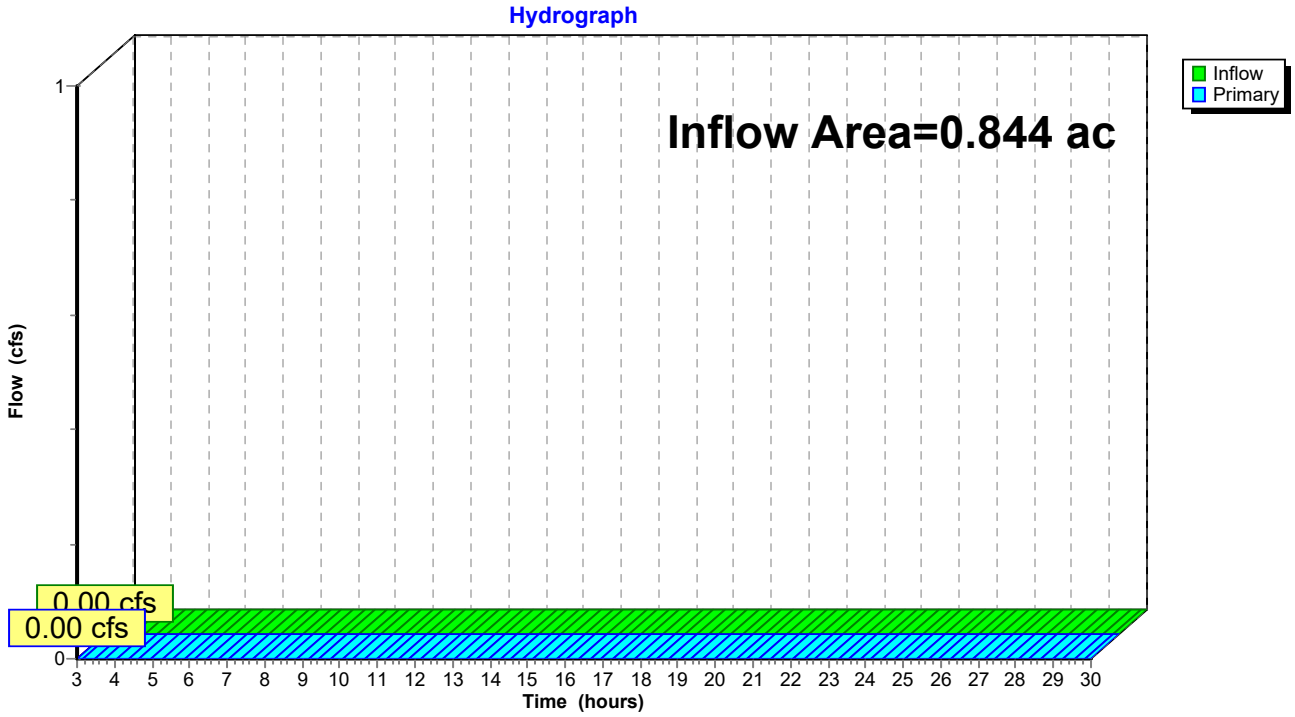


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.844 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year Storm event
Inflow = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 3.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Time span=3.00-30.00 hrs, dt=0.03 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EX FIELD / WOODS Runoff Area=91,474 sf 0.26% Impervious Runoff Depth=0.12"
Flow Length=383' Slope=0.0260 '/' Tc=30.5 min CN=35 Runoff=0.03 cfs 0.021 af

Subcatchment 2: EX FIELD / WOODS Runoff Area=36,748 sf 0.00% Impervious Runoff Depth=0.18"
Flow Length=120' Slope=0.0400 '/' Tc=9.2 min CN=37 Runoff=0.02 cfs 0.013 af

Link 1S: SOUTH WETLAND Inflow=0.03 cfs 0.021 af
Primary=0.03 cfs 0.021 af

Link 2S: NORTH WETLAND Inflow=0.02 cfs 0.013 af
Primary=0.02 cfs 0.013 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.034 af Average Runoff Depth = 0.14"
99.81% Pervious = 2.938 ac 0.19% Impervious = 0.005 ac

Summary for Subcatchment 1: EX FIELD / WOODS SOUTH

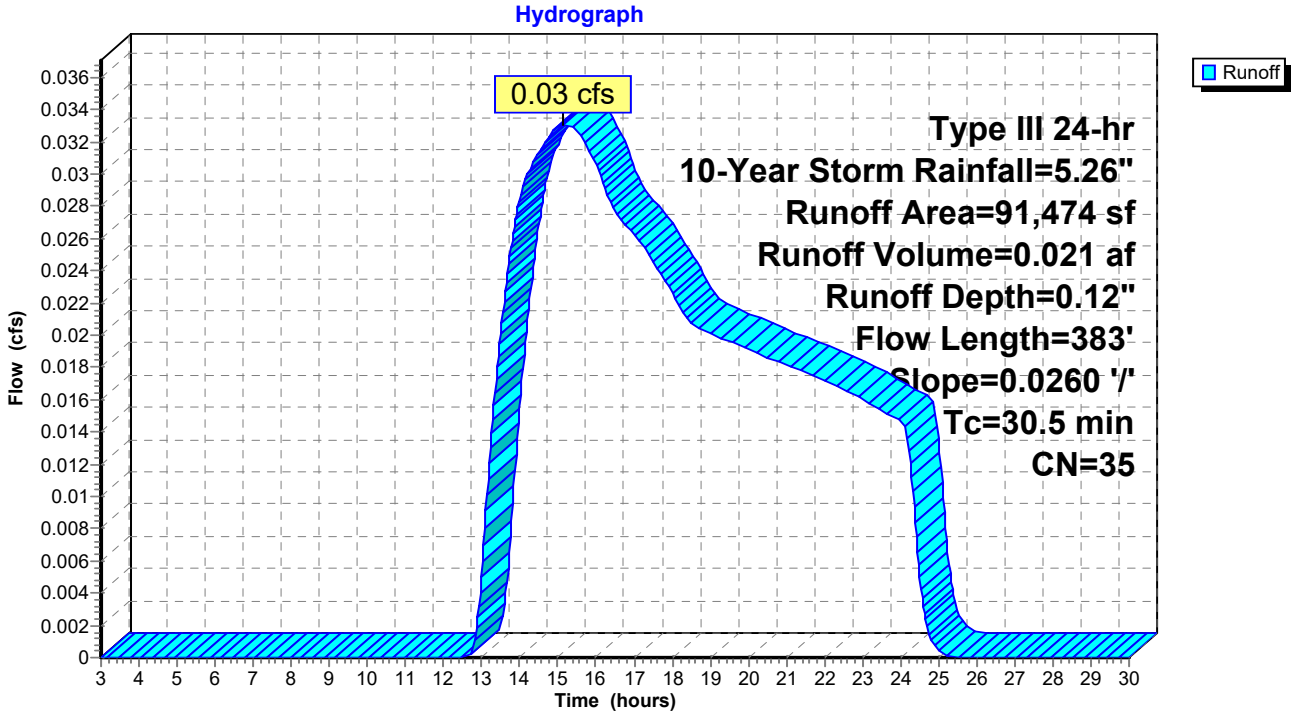
Runoff = 0.03 cfs @ 15.15 hrs, Volume= 0.021 af, Depth= 0.12"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Storm Rainfall=5.26"

Area (sf)	CN	Description
58,986	30	Woods, Good, HSG A
238	98	Paved parking, HSG A
32,250	43	Woods/grass comb., Fair, HSG A
91,474	35	Weighted Average
91,236		99.74% Pervious Area
238		0.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	383	0.0260	0.21		**Lag/CN Method, CN/LAG METHOD**

Subcatchment 1: EX FIELD / WOODS SOUTH



Summary for Subcatchment 2: EX FIELD / WOODS NORTH

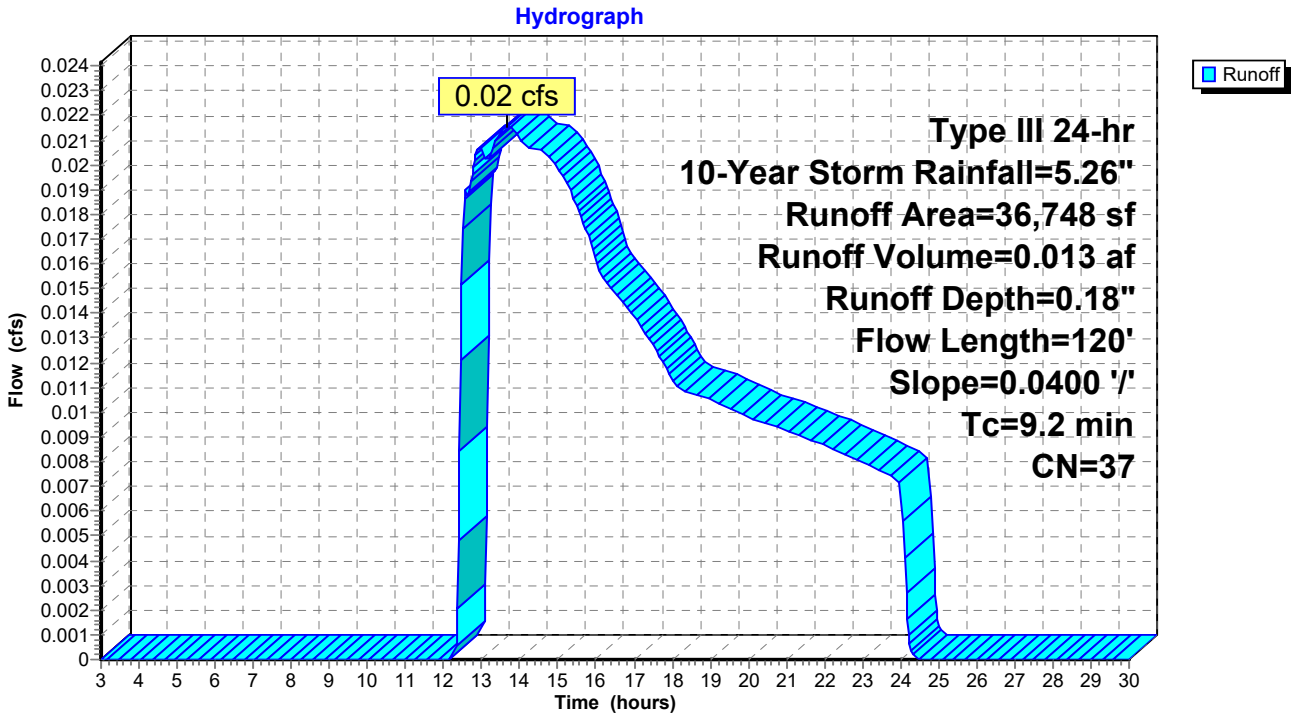
Runoff = 0.02 cfs @ 13.69 hrs, Volume= 0.013 af, Depth= 0.18"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Storm Rainfall=5.26"

Area (sf)	CN	Description
20,371	43	Woods/grass comb., Fair, HSG A
16,377	30	Woods, Good, HSG A
36,748	37	Weighted Average
36,748		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	120	0.0400	0.22		**Lag/CN Method,**

Subcatchment 2: EX FIELD / WOODS NORTH

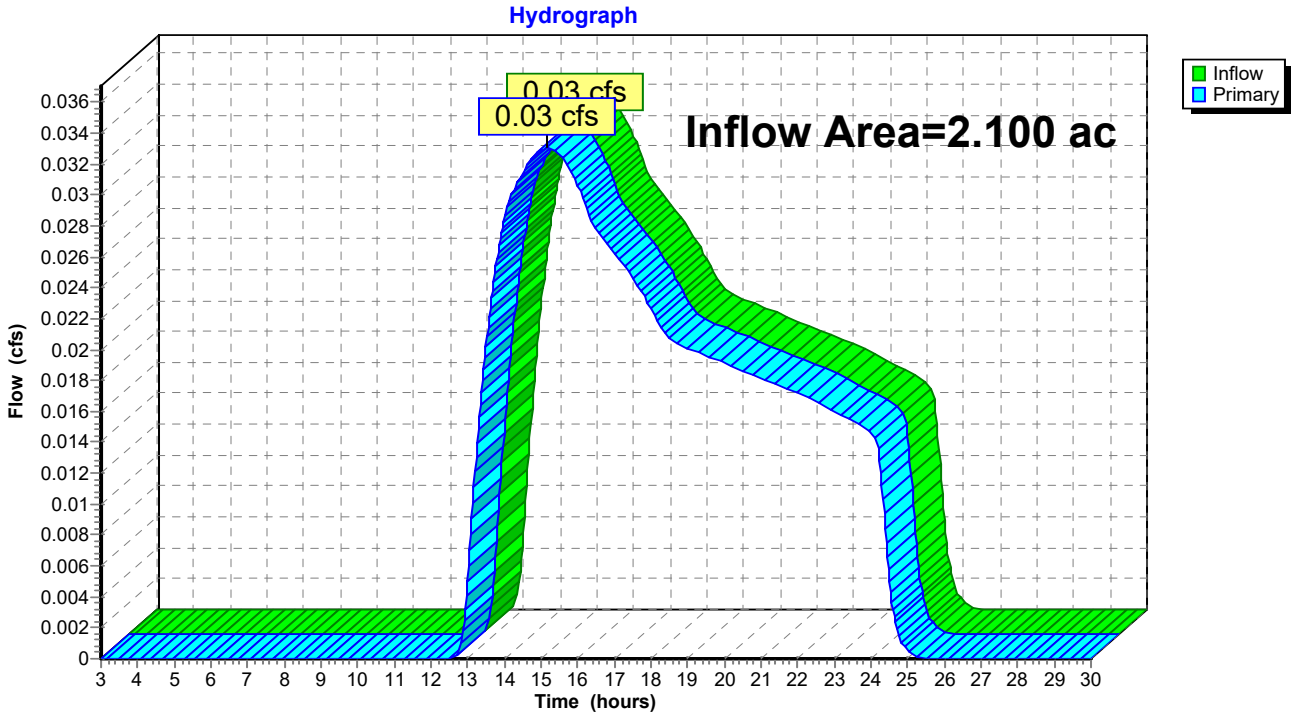


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.100 ac, 0.26% Impervious, Inflow Depth = 0.12" for 10-Year Storm event
Inflow = 0.03 cfs @ 15.15 hrs, Volume= 0.021 af
Primary = 0.03 cfs @ 15.15 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

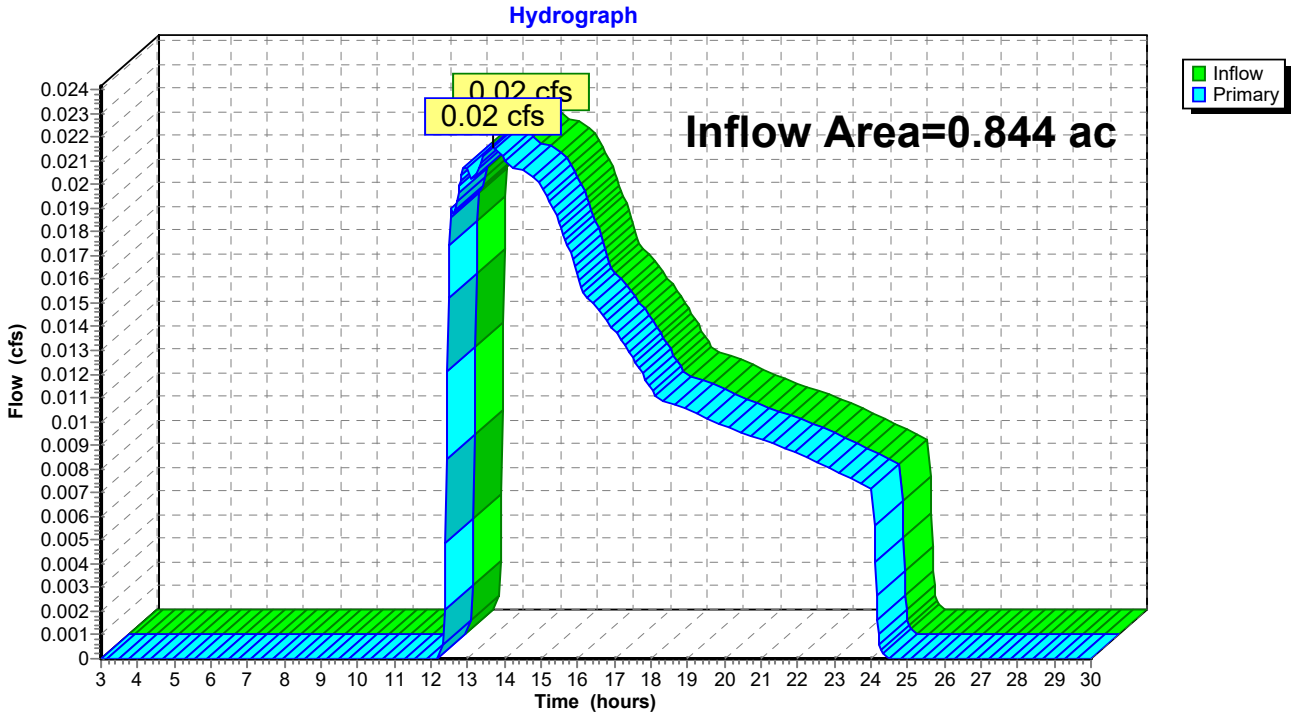


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.844 ac, 0.00% Impervious, Inflow Depth = 0.18" for 10-Year Storm event
Inflow = 0.02 cfs @ 13.69 hrs, Volume= 0.013 af
Primary = 0.02 cfs @ 13.69 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Time span=3.00-30.00 hrs, dt=0.03 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EX FIELD / WOODS Runoff Area=91,474 sf 0.26% Impervious Runoff Depth=0.35"
Flow Length=383' Slope=0.0260 '/' Tc=30.5 min CN=35 Runoff=0.15 cfs 0.061 af

Subcatchment 2: EX FIELD / WOODS Runoff Area=36,748 sf 0.00% Impervious Runoff Depth=0.46"
Flow Length=120' Slope=0.0400 '/' Tc=9.2 min CN=37 Runoff=0.14 cfs 0.032 af

Link 1S: SOUTH WETLAND Inflow=0.15 cfs 0.061 af
Primary=0.15 cfs 0.061 af

Link 2S: NORTH WETLAND Inflow=0.14 cfs 0.032 af
Primary=0.14 cfs 0.032 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.093 af Average Runoff Depth = 0.38"
99.81% Pervious = 2.938 ac 0.19% Impervious = 0.005 ac

Summary for Subcatchment 1: EX FIELD / WOODS SOUTH

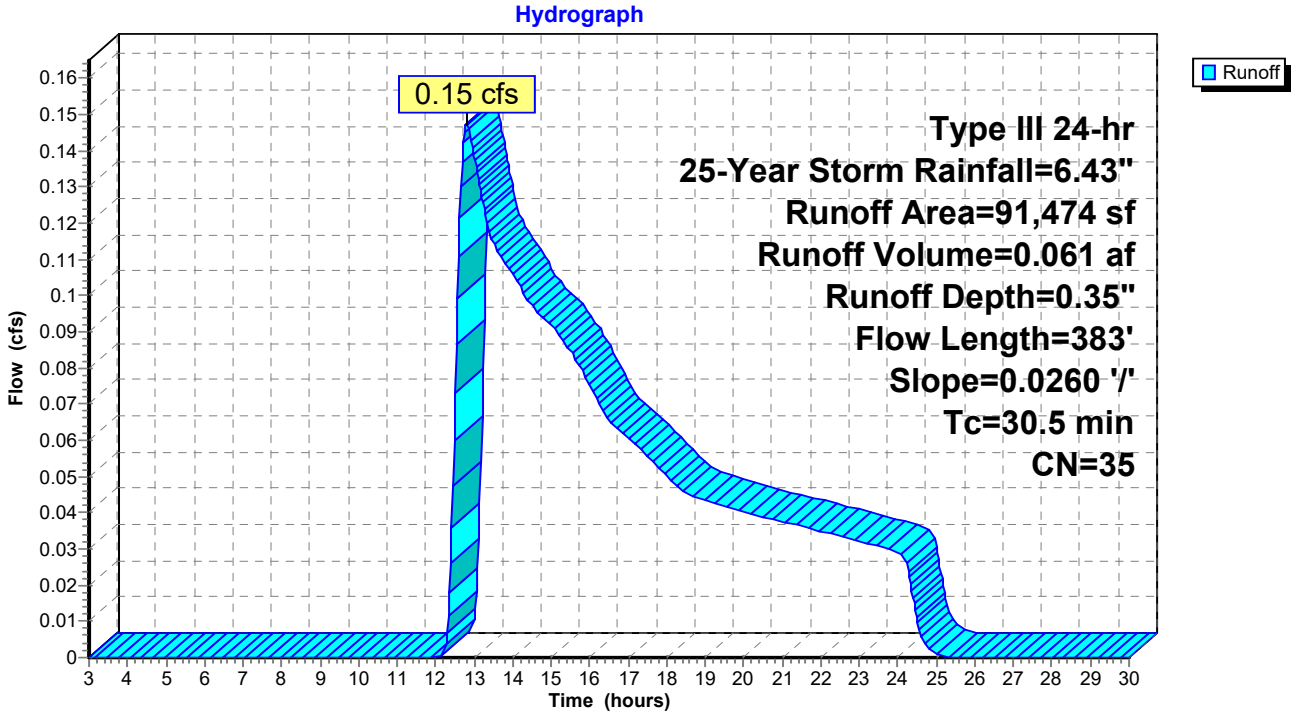
Runoff = 0.15 cfs @ 12.81 hrs, Volume= 0.061 af, Depth= 0.35"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Storm Rainfall=6.43"

Area (sf)	CN	Description
58,986	30	Woods, Good, HSG A
238	98	Paved parking, HSG A
32,250	43	Woods/grass comb., Fair, HSG A
91,474	35	Weighted Average
91,236		99.74% Pervious Area
238		0.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	383	0.0260	0.21		**Lag/CN Method, CN/LAG METHOD**

Subcatchment 1: EX FIELD / WOODS SOUTH



Summary for Subcatchment 2: EX FIELD / WOODS NORTH

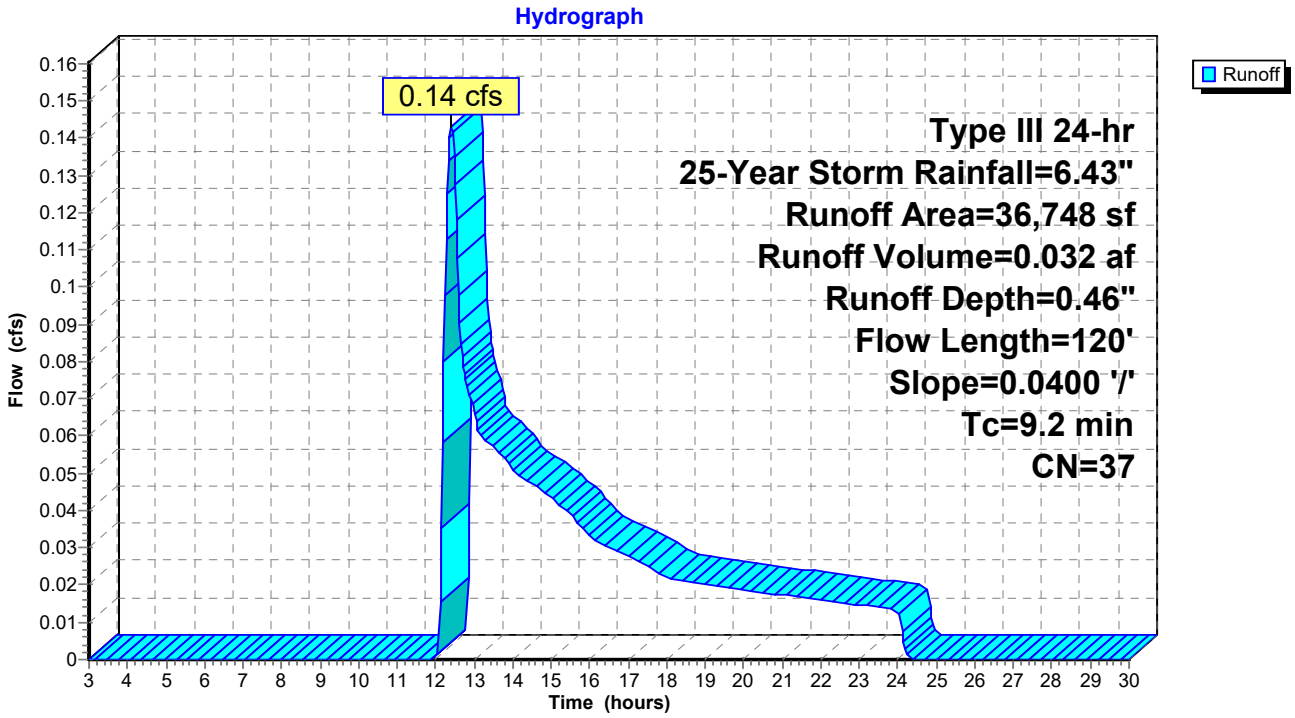
Runoff = 0.14 cfs @ 12.40 hrs, Volume= 0.032 af, Depth= 0.46"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Storm Rainfall=6.43"

Area (sf)	CN	Description
20,371	43	Woods/grass comb., Fair, HSG A
16,377	30	Woods, Good, HSG A
36,748	37	Weighted Average
36,748		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	120	0.0400	0.22		**Lag/CN Method,**

Subcatchment 2: EX FIELD / WOODS NORTH

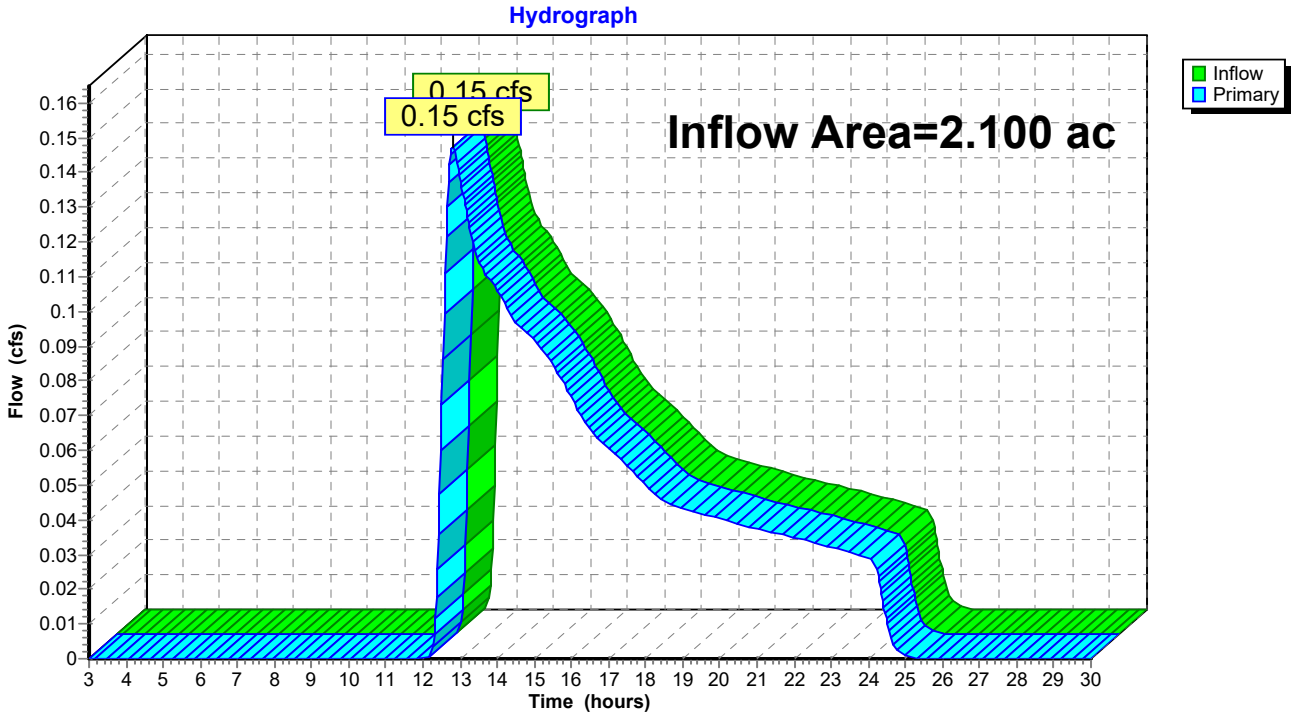


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.100 ac, 0.26% Impervious, Inflow Depth = 0.35" for 25-Year Storm event
Inflow = 0.15 cfs @ 12.81 hrs, Volume= 0.061 af
Primary = 0.15 cfs @ 12.81 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

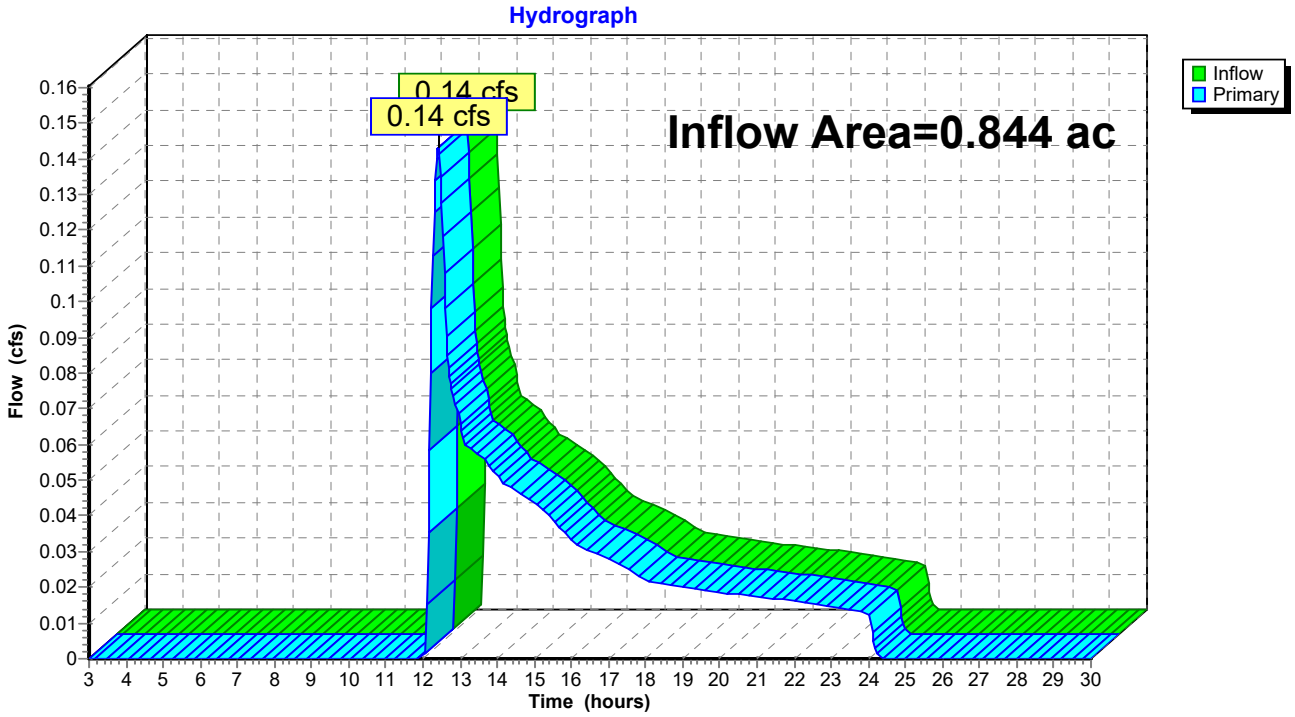


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.844 ac, 0.00% Impervious, Inflow Depth = 0.46" for 25-Year Storm event
Inflow = 0.14 cfs @ 12.40 hrs, Volume= 0.032 af
Primary = 0.14 cfs @ 12.40 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Time span=3.00-30.00 hrs, dt=0.03 hrs, 901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EX FIELD / WOODS Runoff Area=91,474 sf 0.26% Impervious Runoff Depth=0.88"
Flow Length=383' Slope=0.0260 '/' Tc=30.5 min CN=35 Runoff=0.71 cfs 0.155 af

Subcatchment 2: EX FIELD / WOODS Runoff Area=36,748 sf 0.00% Impervious Runoff Depth=1.07"
Flow Length=120' Slope=0.0400 '/' Tc=9.2 min CN=37 Runoff=0.54 cfs 0.075 af

Link 1S: SOUTH WETLAND Inflow=0.71 cfs 0.155 af
Primary=0.71 cfs 0.155 af

Link 2S: NORTH WETLAND Inflow=0.54 cfs 0.075 af
Primary=0.54 cfs 0.075 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.229 af Average Runoff Depth = 0.94"
99.81% Pervious = 2.938 ac 0.19% Impervious = 0.005 ac

Summary for Subcatchment 1: EX FIELD / WOODS SOUTH

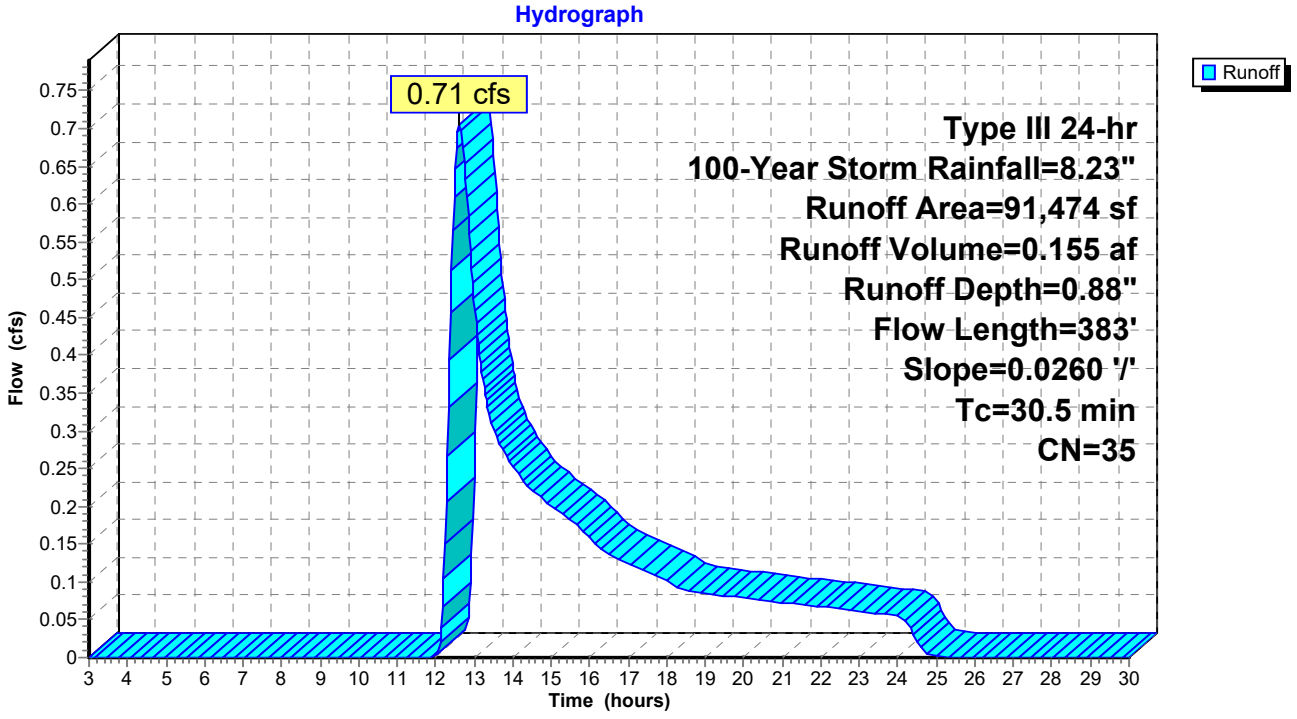
Runoff = 0.71 cfs @ 12.62 hrs, Volume= 0.155 af, Depth= 0.88"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Storm Rainfall=8.23"

Area (sf)	CN	Description
58,986	30	Woods, Good, HSG A
238	98	Paved parking, HSG A
32,250	43	Woods/grass comb., Fair, HSG A
91,474	35	Weighted Average
91,236		99.74% Pervious Area
238		0.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.5	383	0.0260	0.21		**Lag/CN Method, CN/LAG METHOD**

Subcatchment 1: EX FIELD / WOODS SOUTH



Summary for Subcatchment 2: EX FIELD / WOODS NORTH

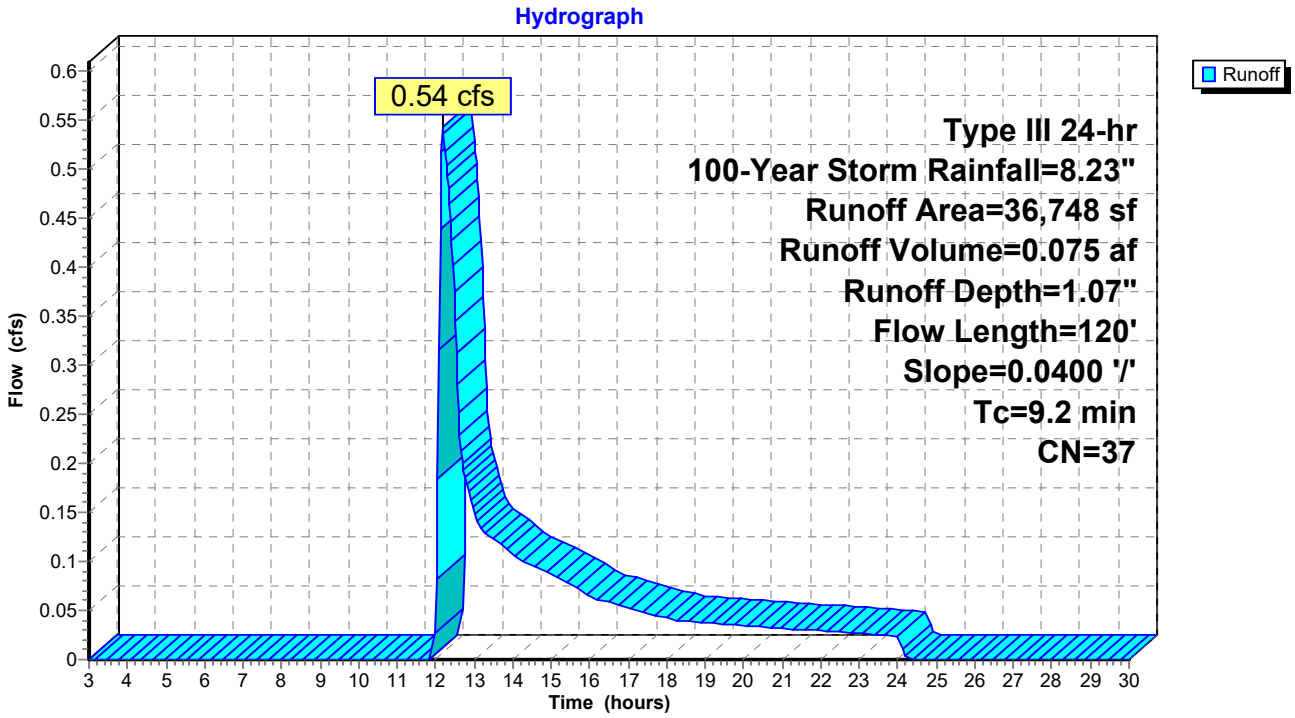
Runoff = 0.54 cfs @ 12.19 hrs, Volume= 0.075 af, Depth= 1.07"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Storm Rainfall=8.23"

Area (sf)	CN	Description
20,371	43	Woods/grass comb., Fair, HSG A
16,377	30	Woods, Good, HSG A
36,748	37	Weighted Average
36,748		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	120	0.0400	0.22		**Lag/CN Method,**

Subcatchment 2: EX FIELD / WOODS NORTH

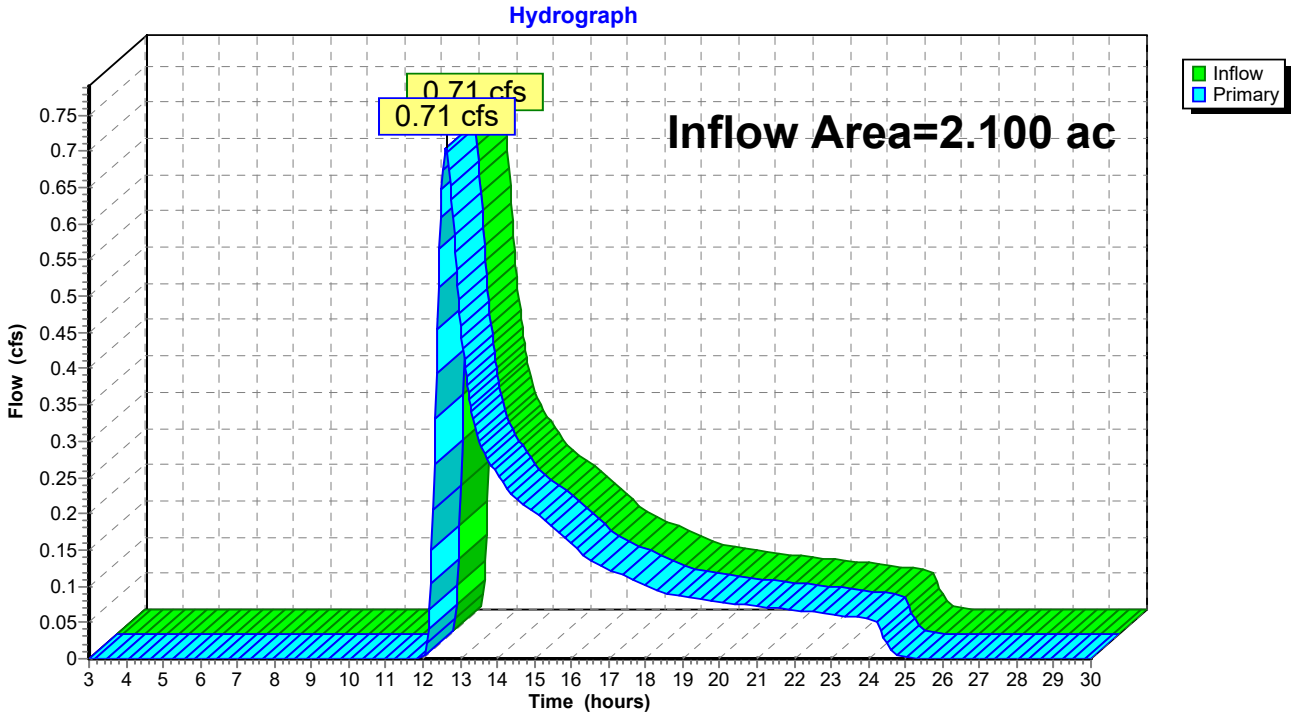


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.100 ac, 0.26% Impervious, Inflow Depth = 0.88" for 100-Year Storm event
Inflow = 0.71 cfs @ 12.62 hrs, Volume= 0.155 af
Primary = 0.71 cfs @ 12.62 hrs, Volume= 0.155 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

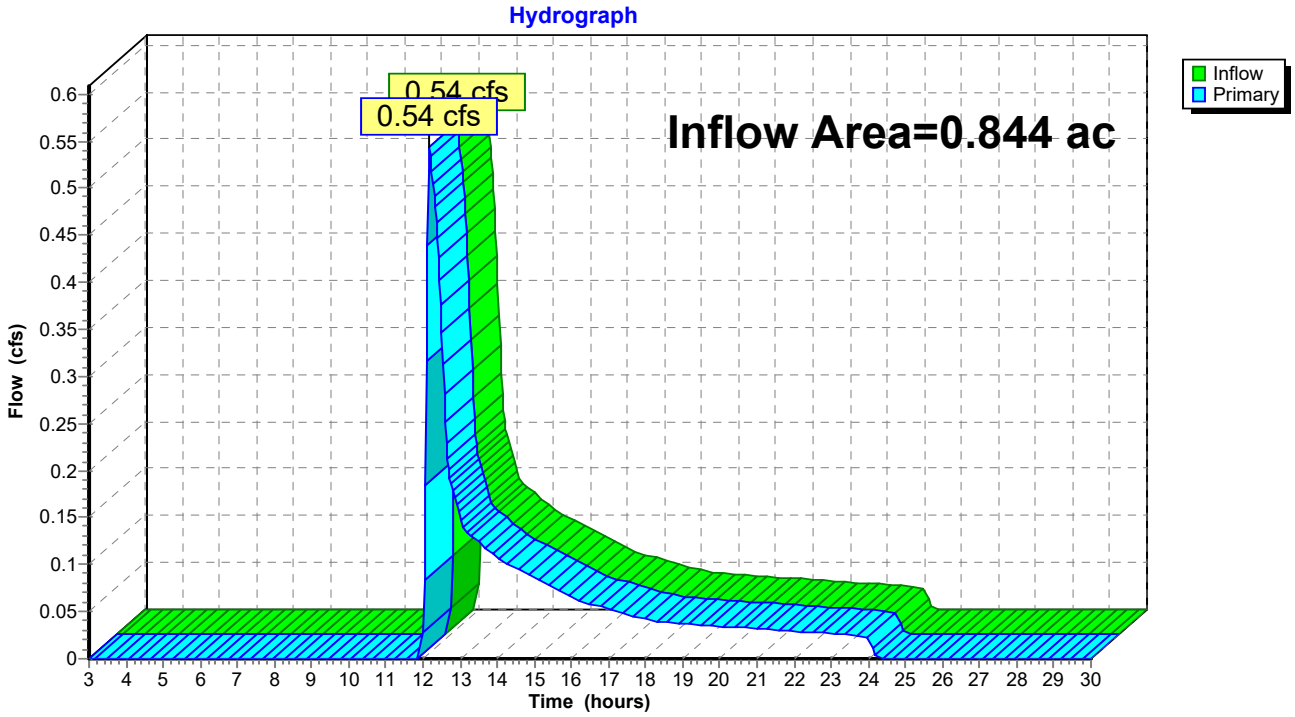


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.844 ac, 0.00% Impervious, Inflow Depth = 1.07" for 100-Year Storm event
Inflow = 0.54 cfs @ 12.19 hrs, Volume= 0.075 af
Primary = 0.54 cfs @ 12.19 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

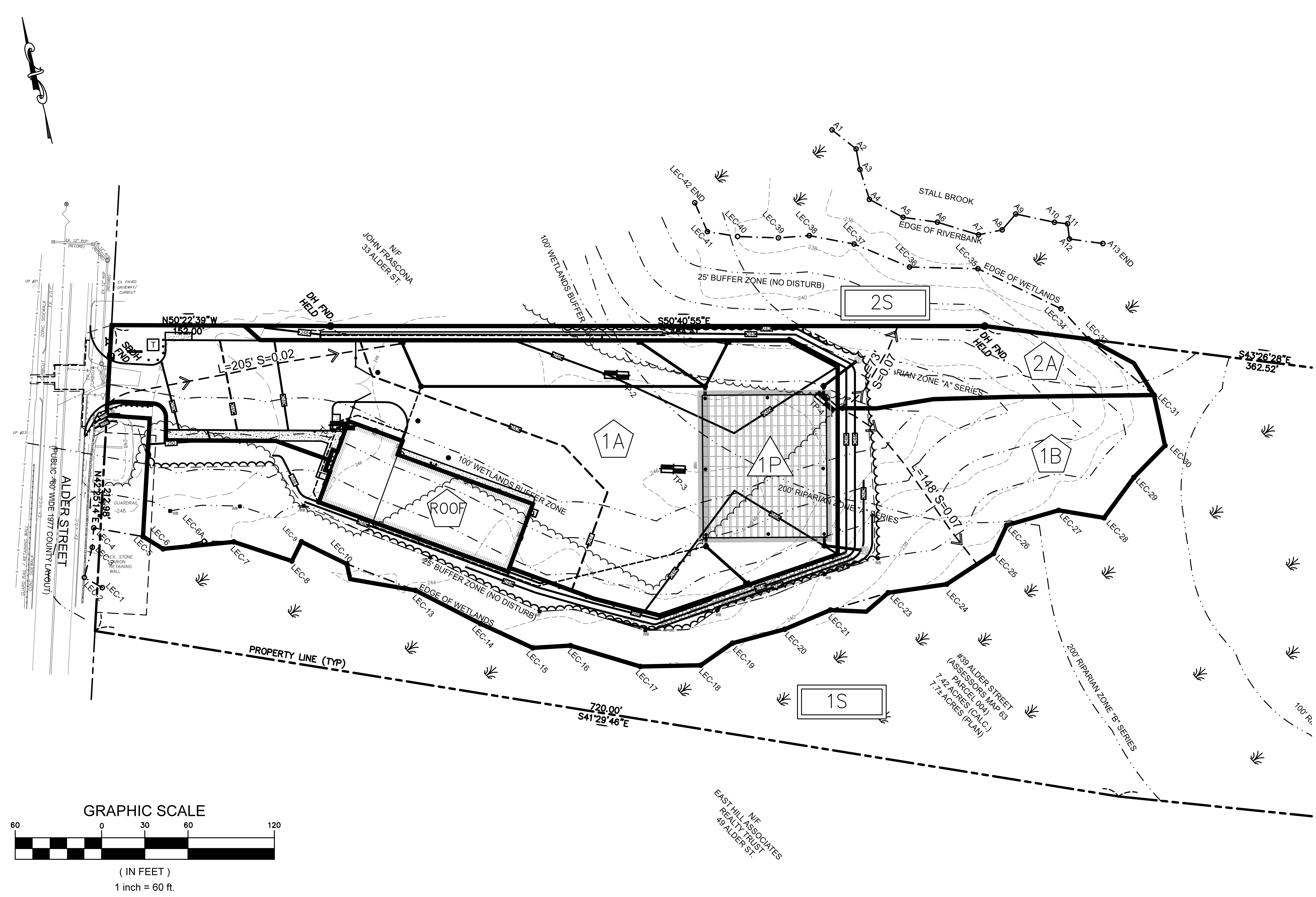
Primary outflow = Inflow, Time Span= 3.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Appendix E

Post-Development Drainage Calculations



REVISIONS

NO.	DATE	DESCRIPTION	BY	CK'D
1.	3/4/2024	CLIENT CHANGE OF USE / BUILDING	RL	DTF
2.	9/4/2024	APPLICANT CHANGE & BUILDING MODIFICATION	MM	DTF

PROFESSIONAL SEAL

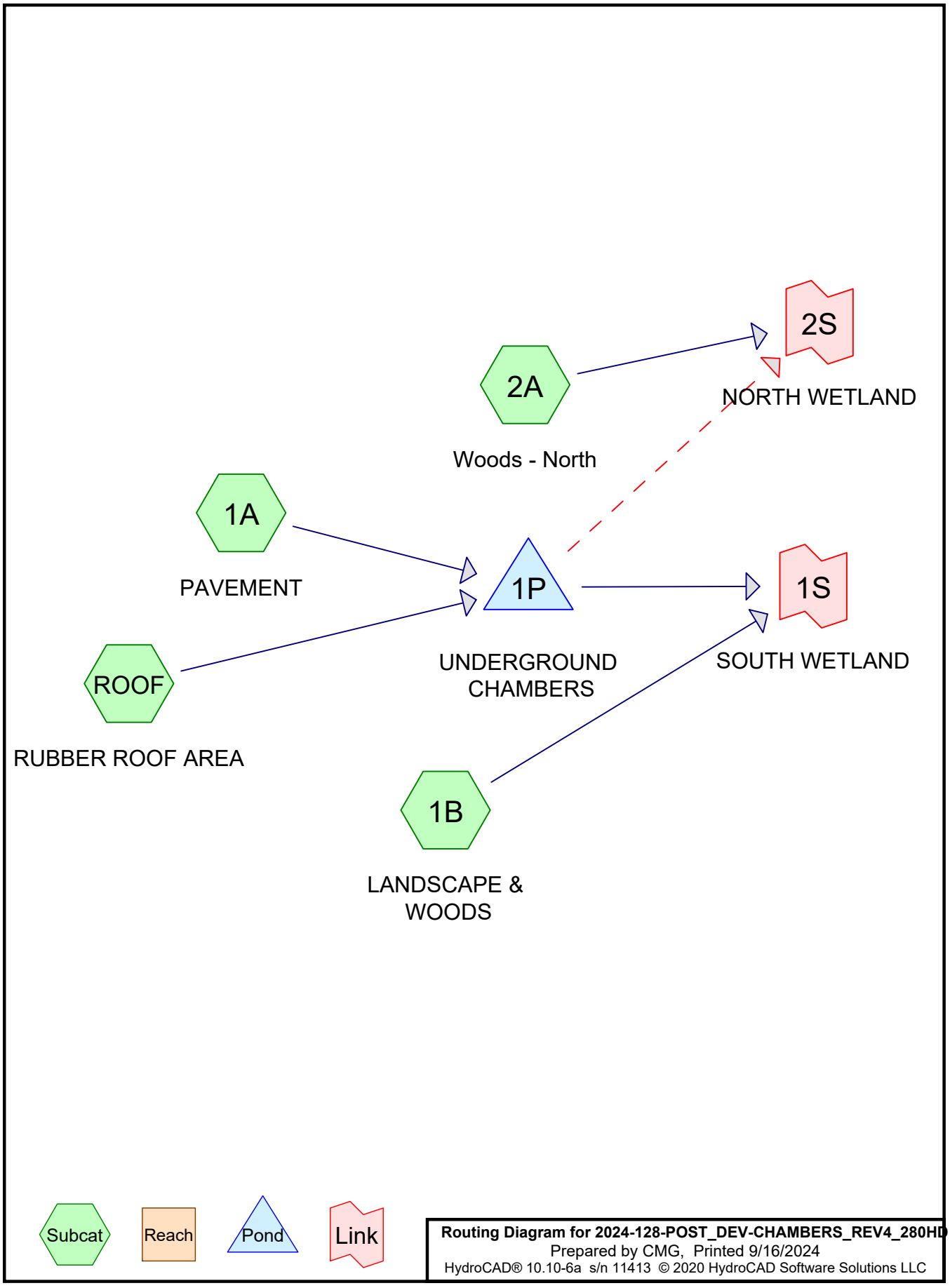
PROJECT:
PROPOSED COMMERCIAL BUILDING
#39 ALDER STREET
MEDWAY, MA 02053

PREPARED FOR:
EAST HILL ASSOCIATES LLC
#49 ALDER STREET
MEDWAY, MA 02053

ENGINEERING SERVICES
ENVIRONMENTAL SERVICES
67 Hall Road
Sturbridge, MA 01566
Phone: 774-241-0901
fax: 774-241-0906

CMG EST. 2002

ISSUE DATE: 2/16/2024
DRAWN BY: RL CHECKED BY: DTF
SCALE: 1" = 60'
PROJECT NO.: 2024-128
SHEET NAME:
POST-DEVELOPMENT DRAINAGE MAP
SHEET NO.:
D - 2.0



Routing Diagram for 2024-128-POST_DEV-CHAMBERS_REV4_280HD
Prepared by CMG, Printed 9/16/2024

Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: PAVEMENT Runoff Area=59,980 sf 95.65% Impervious Runoff Depth=2.83"
Tc=5.0 min CN=95 Runoff=4.43 cfs 0.325 af

Subcatchment 1B: LANDSCAPE & WOODS Runoff Area=46,704 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=148' Slope=0.0700 '/' Tc=9.5 min CN=32 Runoff=0.00 cfs 0.000 af

Subcatchment 2A: Woods - North Runoff Area=14,138 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=73' Slope=0.0700 '/' Tc=5.2 min CN=33 Runoff=0.00 cfs 0.000 af

Subcatchment ROOF: RUBBER ROOF Runoff Area=7,400 sf 100.00% Impervious Runoff Depth=3.16"
Tc=5.0 min CN=98 Runoff=0.58 cfs 0.045 af

Pond 1P: UNDERGROUND CHAMBERS Peak Elev=242.21' Storage=4,862 cf Inflow=5.01 cfs 0.370 af
Discarded=0.80 cfs 0.370 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.80 cfs 0.370 af

Link 1S: SOUTH WETLAND Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 2S: NORTH WETLAND Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.370 af Average Runoff Depth = 1.51"
49.49% Pervious = 1.457 ac 50.51% Impervious = 1.487 ac

Summary for Subcatchment 1A: PAVEMENT

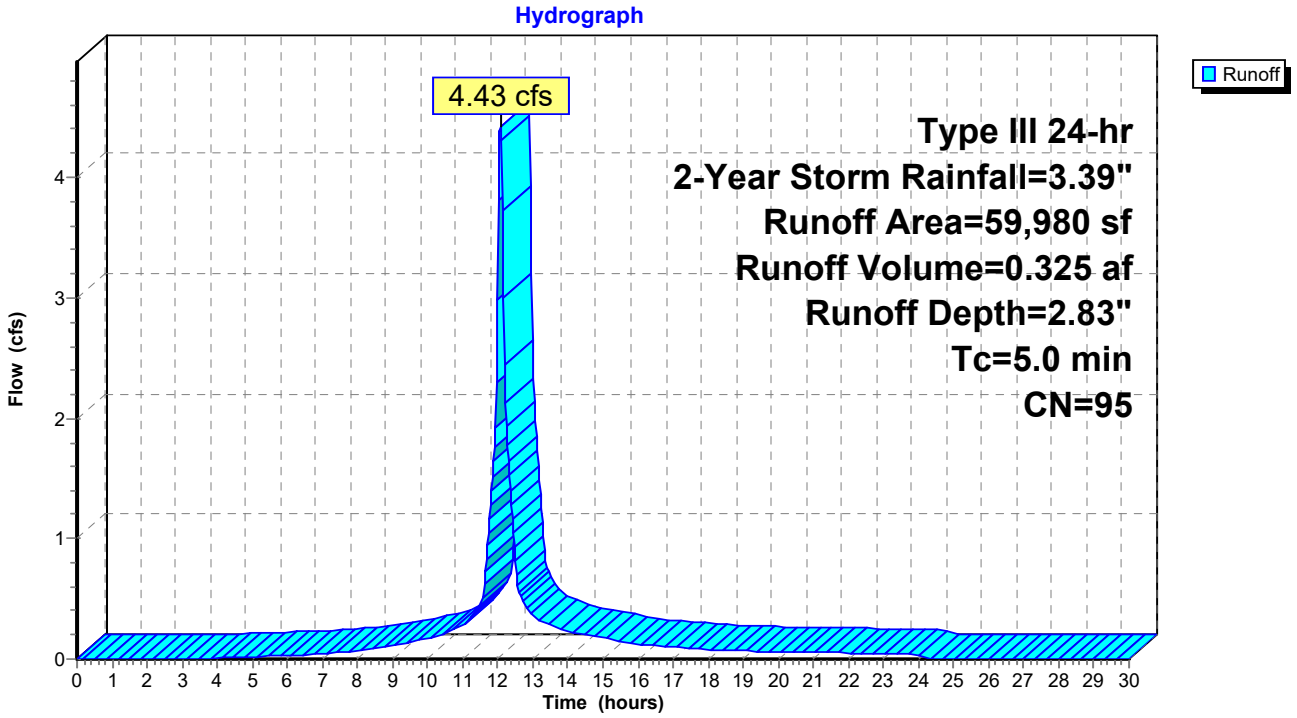
Runoff = 4.43 cfs @ 12.07 hrs, Volume= 0.325 af, Depth= 2.83"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Storm Rainfall=3.39"

Area (sf)	CN	Description
57,371	98	Paved parking, HSG A
2,609	39	>75% Grass cover, Good, HSG A
59,980	95	Weighted Average
2,609		4.35% Pervious Area
57,371		95.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Tc minimum = 5 min**

Subcatchment 1A: PAVEMENT



Summary for Subcatchment 1B: LANDSCAPE & WOODS

[45] Hint: Runoff=Zero

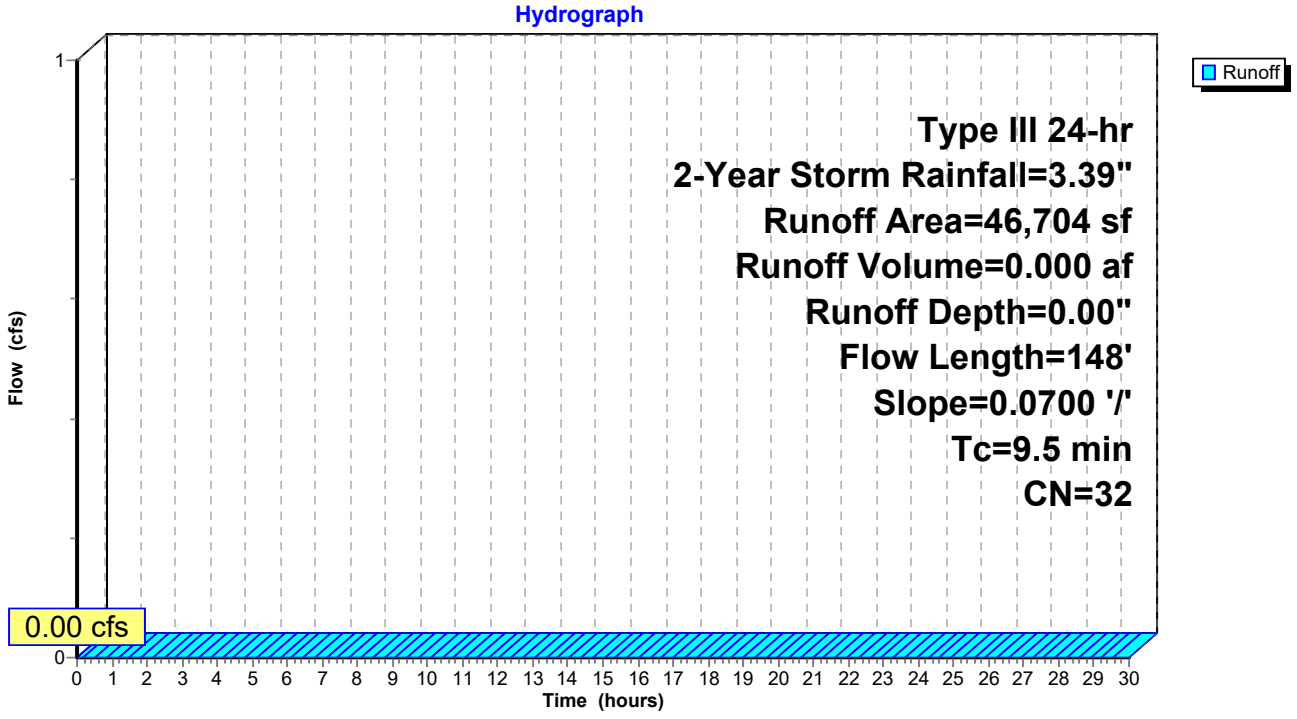
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Storm Rainfall=3.39"

Area (sf)	CN	Description
10,540	39	>75% Grass cover, Good, HSG A
36,164	30	Woods, Good, HSG A
46,704	32	Weighted Average
46,704		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	148	0.0700	0.26		**Lag/CN Method,**

Subcatchment 1B: LANDSCAPE & WOODS



Summary for Subcatchment 2A: Woods - North

[45] Hint: Runoff=Zero

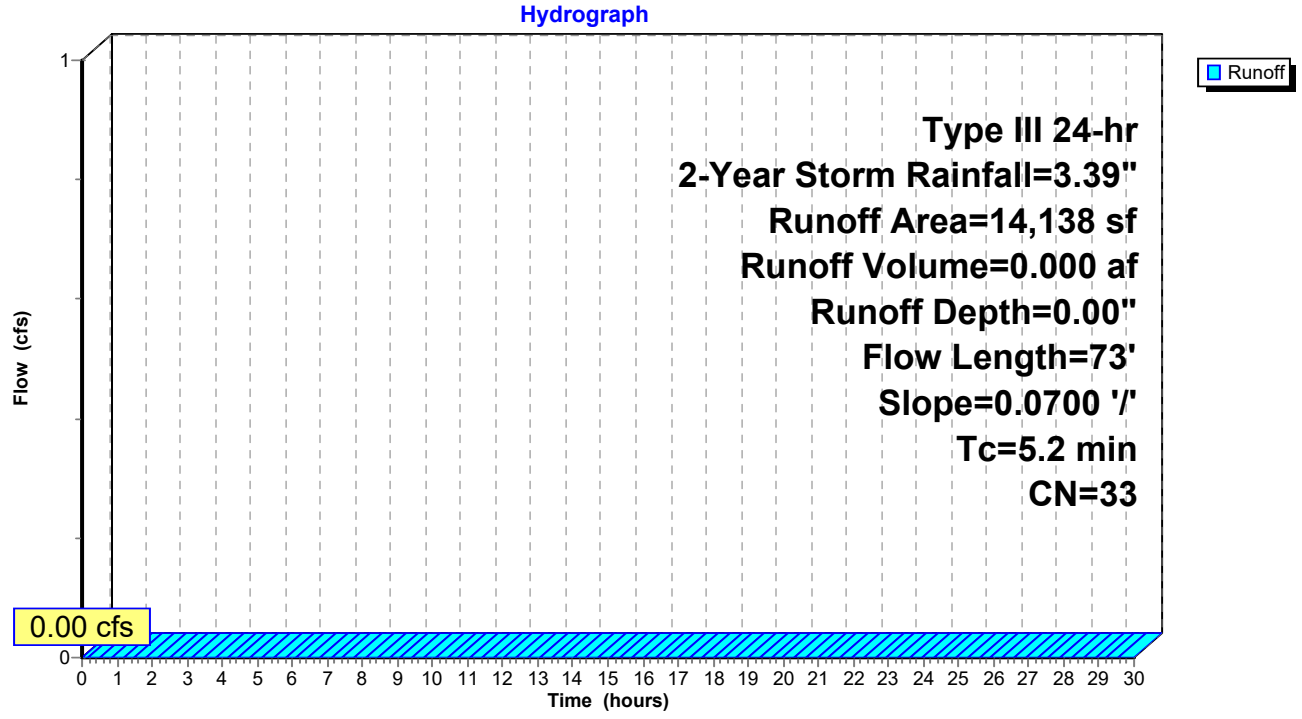
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Storm Rainfall=3.39"

Area (sf)	CN	Description
4,911	39	>75% Grass cover, Good, HSG A
9,227	30	Woods, Good, HSG A
14,138	33	Weighted Average
14,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	73	0.0700	0.23		**Lag/CN Method,**

Subcatchment 2A: Woods - North



Summary for Subcatchment ROOF: RUBBER ROOF AREA

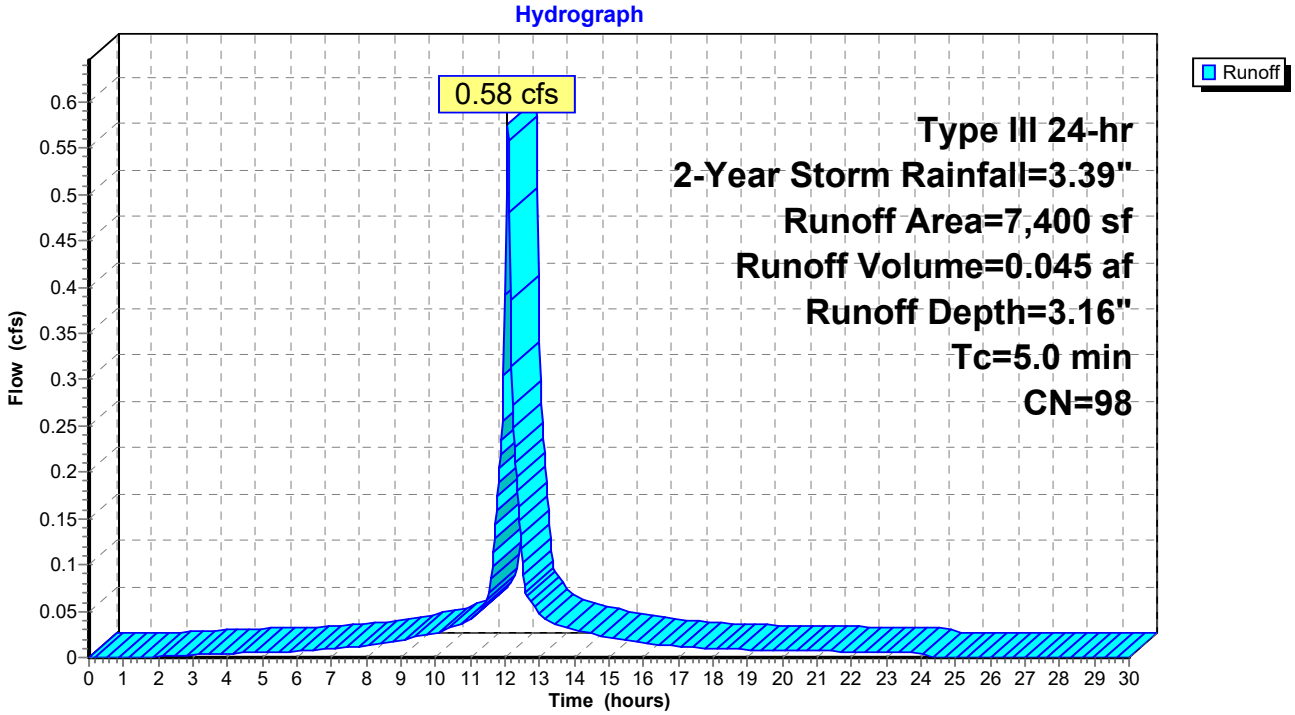
Runoff = 0.58 cfs @ 12.07 hrs, Volume= 0.045 af, Depth= 3.16"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Storm Rainfall=3.39"

Area (sf)	CN	Description
7,400	98	Roofs, HSG A
7,400		100.00% Impervious Area

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

Subcatchment ROOF: RUBBER ROOF AREA



Summary for Pond 1P: UNDERGROUND CHAMBERS

Inflow Area = 1.547 ac, 96.13% Impervious, Inflow Depth = 2.87" for 2-Year Storm event
Inflow = 5.01 cfs @ 12.07 hrs, Volume= 0.370 af
Outflow = 0.80 cfs @ 12.54 hrs, Volume= 0.370 af, Atten= 84%, Lag= 28.0 min
Discarded = 0.80 cfs @ 12.54 hrs, Volume= 0.370 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1S : SOUTH WETLAND
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 2S : NORTH WETLAND

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 242.21' @ 12.54 hrs Surf.Area= 9,660 sf Storage= 4,862 cf

Plug-Flow detention time= 41.6 min calculated for 0.369 af (100% of inflow)
Center-of-Mass det. time= 41.6 min (817.0 - 775.4)

Volume	Invert	Avail.Storage	Storage Description
#1	241.25'	9,198 cf	**92.00'W x 105.00'L x 3.50'H Stone Surround** 33,810 cf Overall - 10,814 cf Embedded = 22,996 cf x 40.0% Voids
#2	241.92'	10,814 cf	**Cultec R-280HD** x 252 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 17 rows
		20,012 cf	Total Available Storage

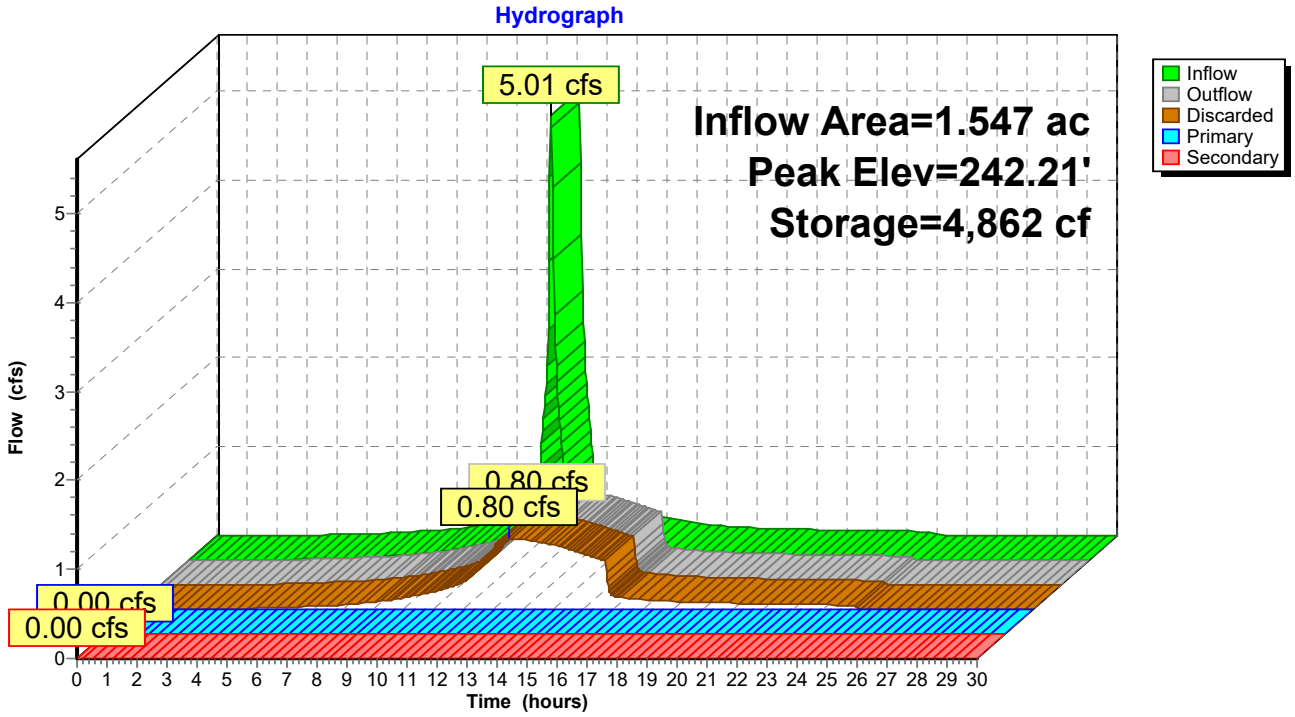
Device	Routing	Invert	Outlet Devices
#1	Discarded	241.25'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 239.25'
#2	Primary	243.45'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.10' S= 0.0540 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Secondary	243.45'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.82' S= 0.0225 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.80 cfs @ 12.54 hrs HW=242.21' (Free Discharge)
└**1=Exfiltration** (Controls 0.80 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=241.25' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=241.25' (Free Discharge)
└**3=Culvert** (Controls 0.00 cfs)

Pond 1P: UNDERGROUND CHAMBERS

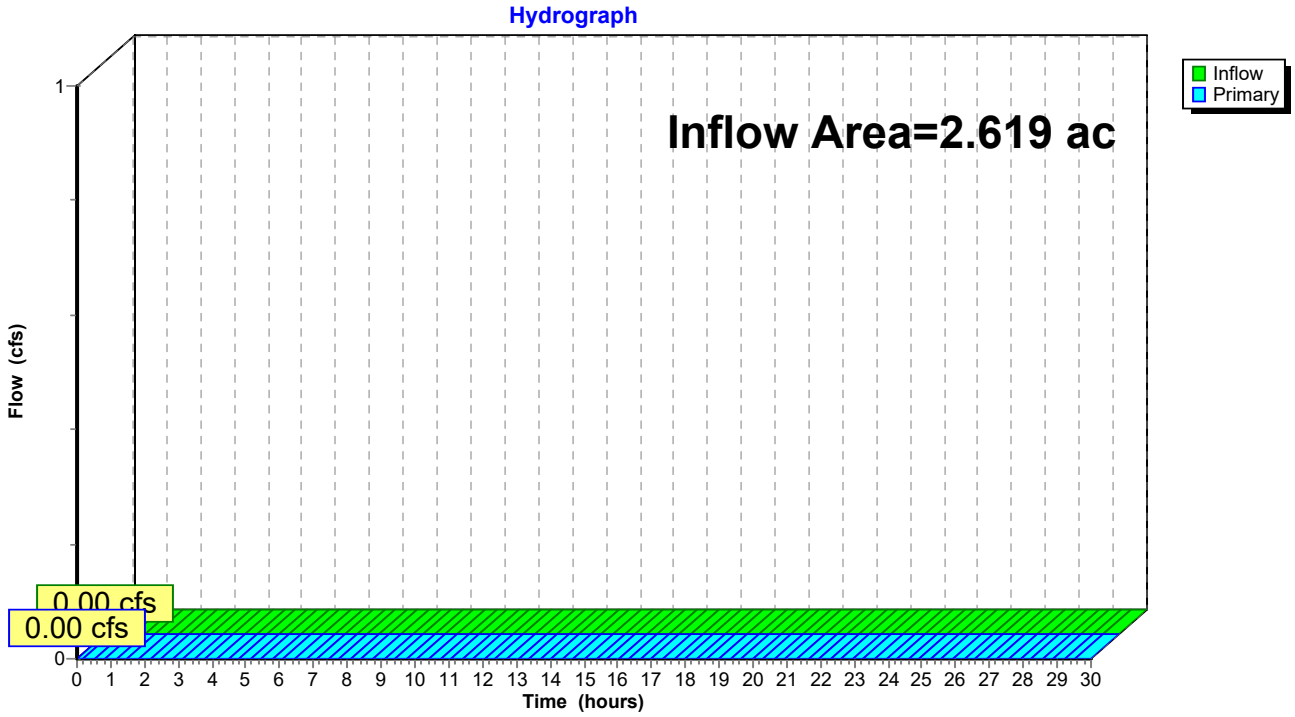


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.619 ac, 56.77% Impervious, Inflow Depth = 0.00" for 2-Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

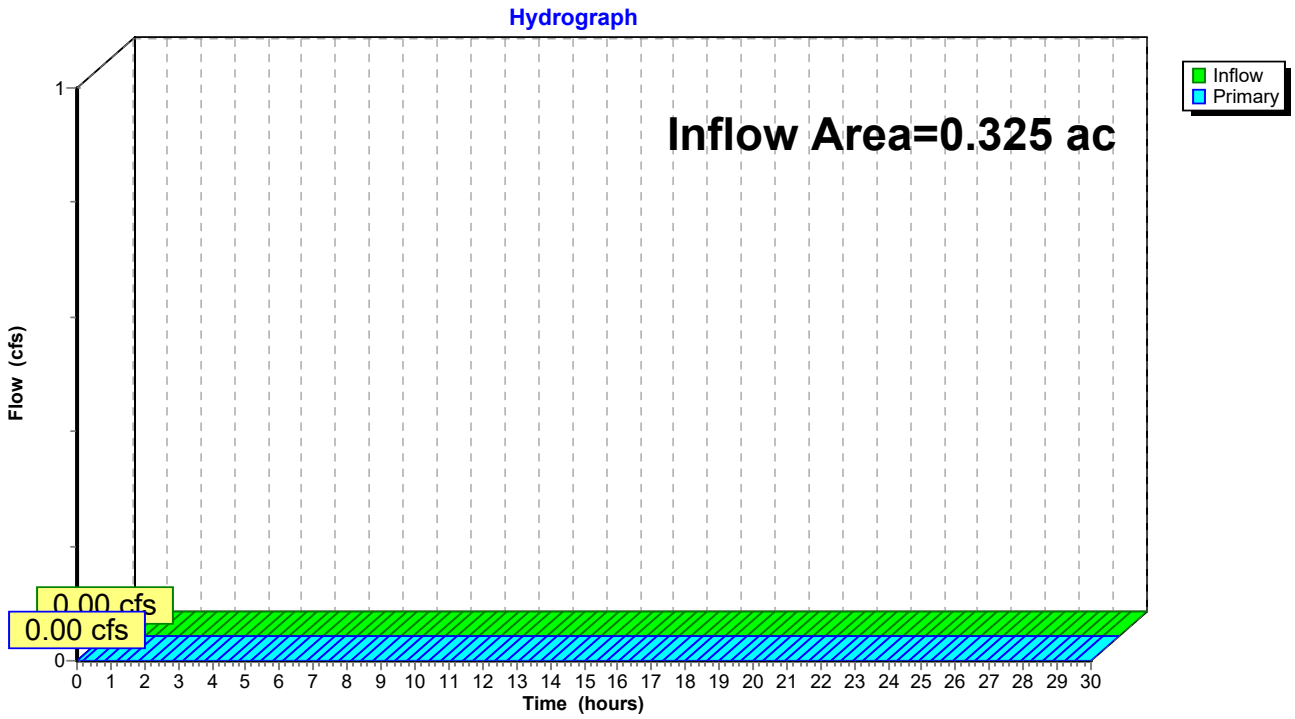


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.325 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-Year Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: PAVEMENT Runoff Area=59,980 sf 95.65% Impervious Runoff Depth=4.68"
Tc=5.0 min CN=95 Runoff=7.11 cfs 0.537 af

Subcatchment 1B: LANDSCAPE & WOODS Runoff Area=46,704 sf 0.00% Impervious Runoff Depth=0.05"
Flow Length=148' Slope=0.0700 '/' Tc=9.5 min CN=32 Runoff=0.01 cfs 0.004 af

Subcatchment 2A: Woods - North Runoff Area=14,138 sf 0.00% Impervious Runoff Depth=0.07"
Flow Length=73' Slope=0.0700 '/' Tc=5.2 min CN=33 Runoff=0.00 cfs 0.002 af

Subcatchment ROOF: RUBBER ROOF Runoff Area=7,400 sf 100.00% Impervious Runoff Depth=5.02"
Tc=5.0 min CN=98 Runoff=0.90 cfs 0.071 af

Pond 1P: UNDERGROUND CHAMBERS Peak Elev=242.77' Storage=9,186 cf Inflow=8.01 cfs 0.608 af
Discarded=0.95 cfs 0.608 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.95 cfs 0.608 af

Link 1S: SOUTH WETLAND Inflow=0.01 cfs 0.004 af
Primary=0.01 cfs 0.004 af

Link 2S: NORTH WETLAND Inflow=0.00 cfs 0.002 af
Primary=0.00 cfs 0.002 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.614 af Average Runoff Depth = 2.50"
49.49% Pervious = 1.457 ac 50.51% Impervious = 1.487 ac

Summary for Subcatchment 1A: PAVEMENT

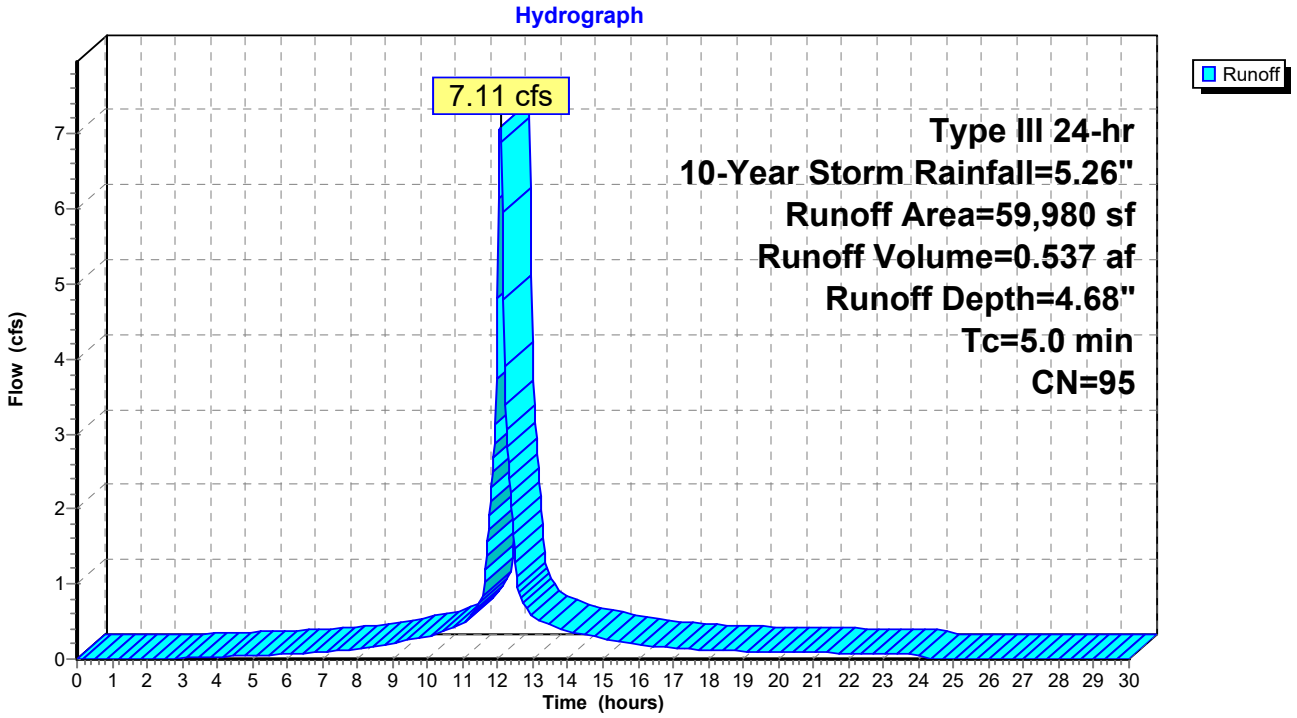
Runoff = 7.11 cfs @ 12.07 hrs, Volume= 0.537 af, Depth= 4.68"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Storm Rainfall=5.26"

Area (sf)	CN	Description
57,371	98	Paved parking, HSG A
2,609	39	>75% Grass cover, Good, HSG A
59,980	95	Weighted Average
2,609		4.35% Pervious Area
57,371		95.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Tc minimum = 5 min**

Subcatchment 1A: PAVEMENT



Summary for Subcatchment 1B: LANDSCAPE & WOODS

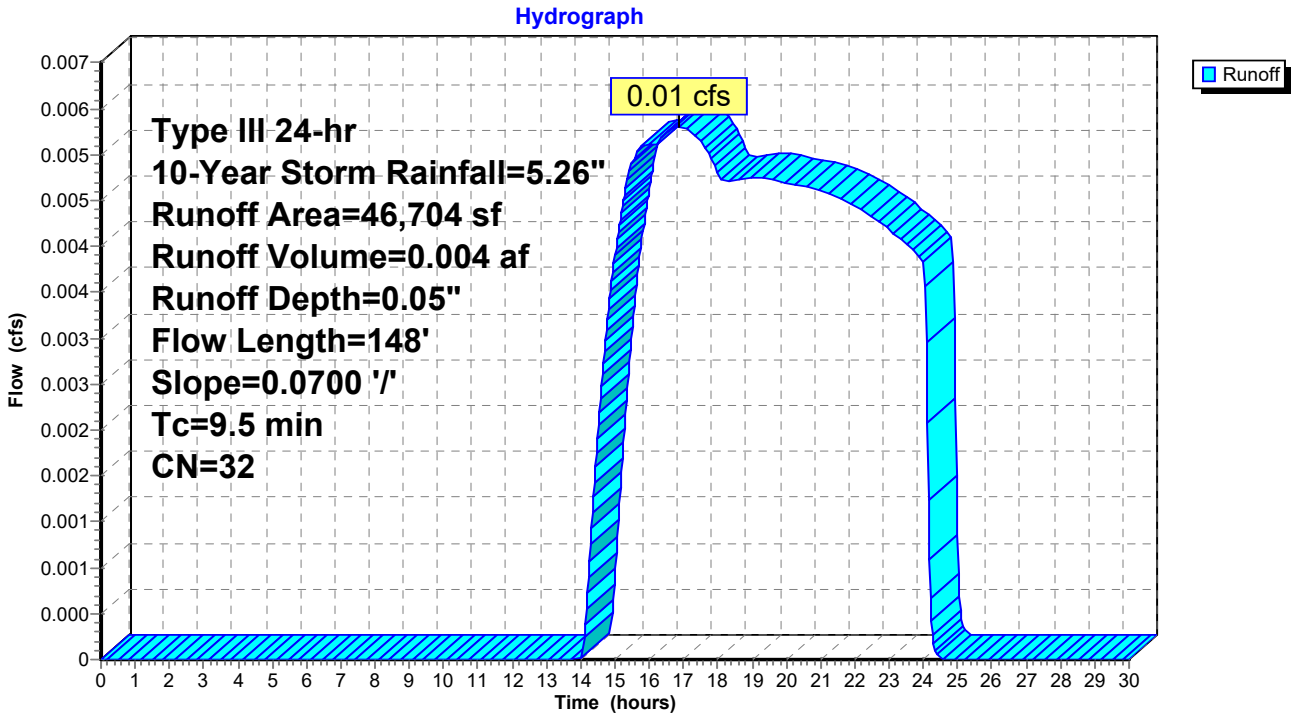
Runoff = 0.01 cfs @ 16.89 hrs, Volume= 0.004 af, Depth= 0.05"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Storm Rainfall=5.26"

Area (sf)	CN	Description
10,540	39	>75% Grass cover, Good, HSG A
36,164	30	Woods, Good, HSG A
46,704	32	Weighted Average
46,704		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	148	0.0700	0.26		**Lag/CN Method,**

Subcatchment 1B: LANDSCAPE & WOODS



Summary for Subcatchment 2A: Woods - North

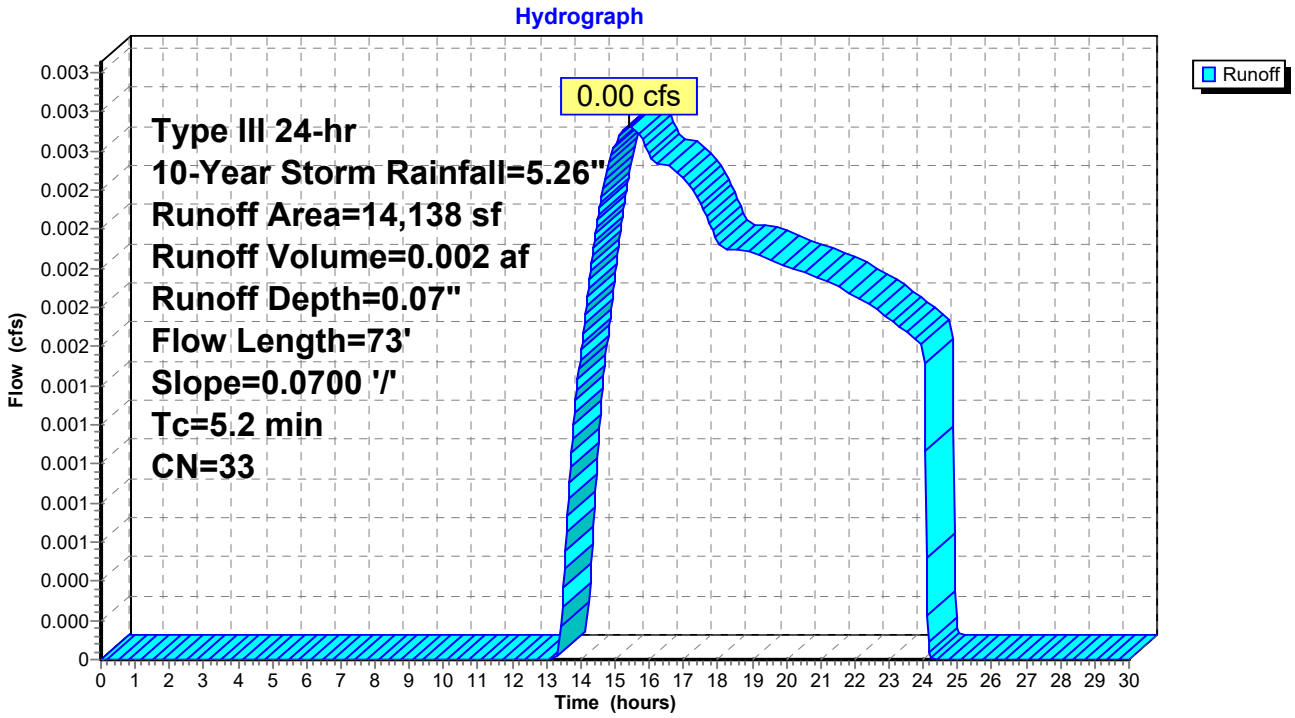
Runoff = 0.00 cfs @ 15.42 hrs, Volume= 0.002 af, Depth= 0.07"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Storm Rainfall=5.26"

Area (sf)	CN	Description
4,911	39	>75% Grass cover, Good, HSG A
9,227	30	Woods, Good, HSG A
14,138	33	Weighted Average
14,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	73	0.0700	0.23		**Lag/CN Method,**

Subcatchment 2A: Woods - North



Summary for Subcatchment ROOF: RUBBER ROOF AREA

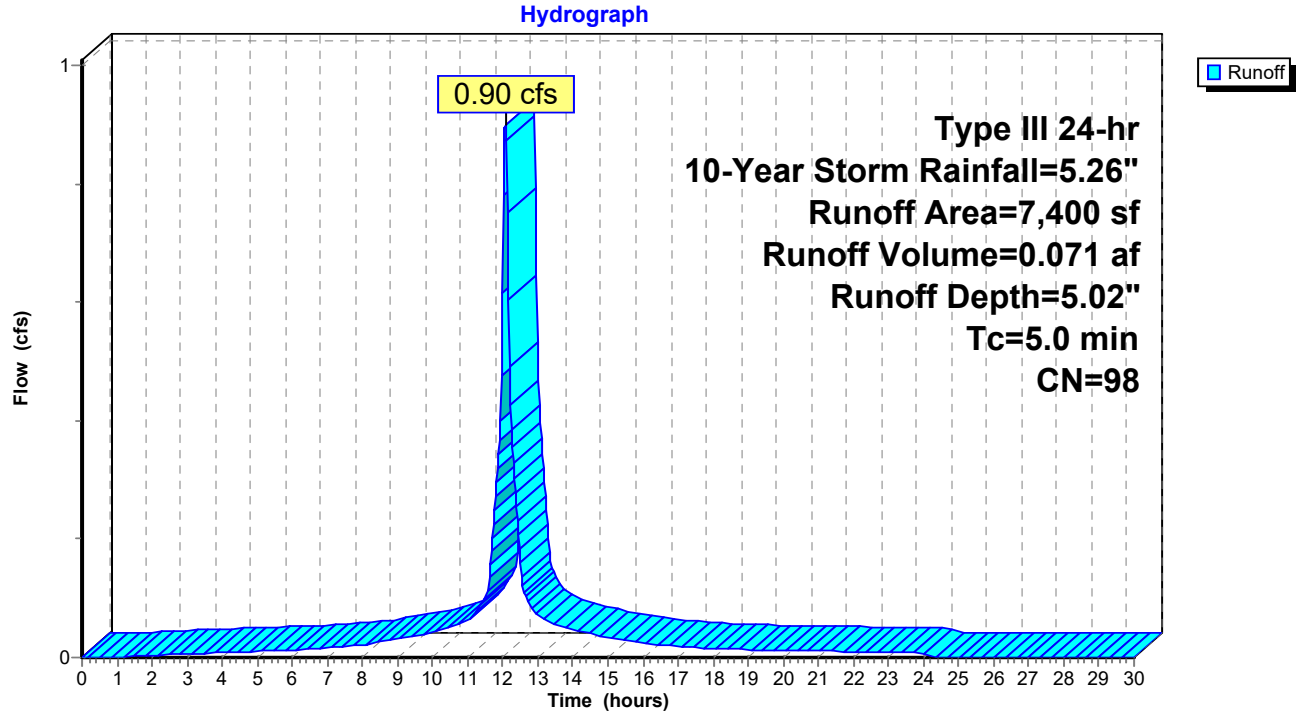
Runoff = 0.90 cfs @ 12.07 hrs, Volume= 0.071 af, Depth= 5.02"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Storm Rainfall=5.26"

Area (sf)	CN	Description
7,400	98	Roofs, HSG A
7,400		100.00% Impervious Area

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

Subcatchment ROOF: RUBBER ROOF AREA



Summary for Pond 1P: UNDERGROUND CHAMBERS

Inflow Area = 1.547 ac, 96.13% Impervious, Inflow Depth = 4.72" for 10-Year Storm event
Inflow = 8.01 cfs @ 12.07 hrs, Volume= 0.608 af
Outflow = 0.95 cfs @ 12.63 hrs, Volume= 0.608 af, Atten= 88%, Lag= 33.4 min
Discarded = 0.95 cfs @ 12.63 hrs, Volume= 0.608 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1S : SOUTH WETLAND
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 2S : NORTH WETLAND

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 242.77' @ 12.63 hrs Surf.Area= 9,660 sf Storage= 9,186 cf

Plug-Flow detention time= 74.8 min calculated for 0.607 af (100% of inflow)
Center-of-Mass det. time= 74.7 min (838.4 - 763.7)

Volume	Invert	Avail.Storage	Storage Description
#1	241.25'	9,198 cf	**92.00'W x 105.00'L x 3.50'H Stone Surround** 33,810 cf Overall - 10,814 cf Embedded = 22,996 cf x 40.0% Voids
#2	241.92'	10,814 cf	**Cultec R-280HD** x 252 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 17 rows
		20,012 cf	Total Available Storage

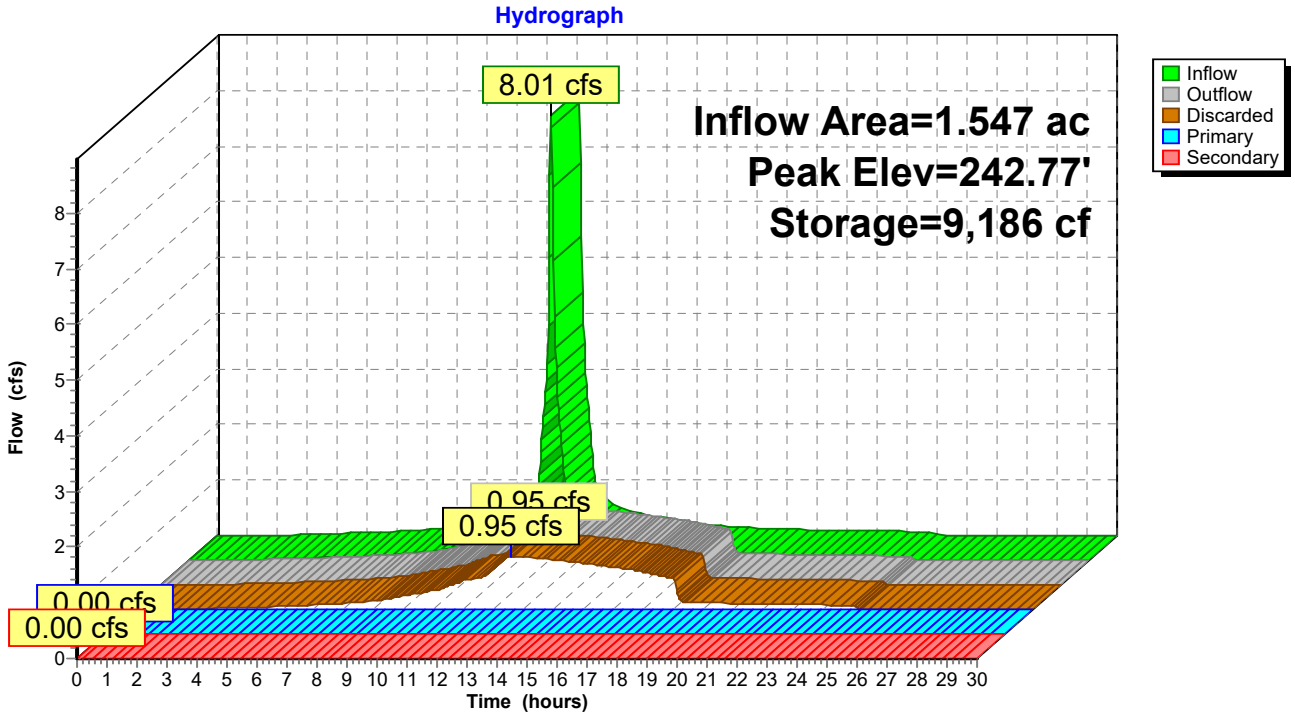
Device	Routing	Invert	Outlet Devices
#1	Discarded	241.25'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 239.25'
#2	Primary	243.45'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.10' S= 0.0540 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Secondary	243.45'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.82' S= 0.0225 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.95 cfs @ 12.63 hrs HW=242.77' (Free Discharge)
↑—**1=Exfiltration** (Controls 0.95 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=241.25' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=241.25' (Free Discharge)
↑—**3=Culvert** (Controls 0.00 cfs)

Pond 1P: UNDERGROUND CHAMBERS

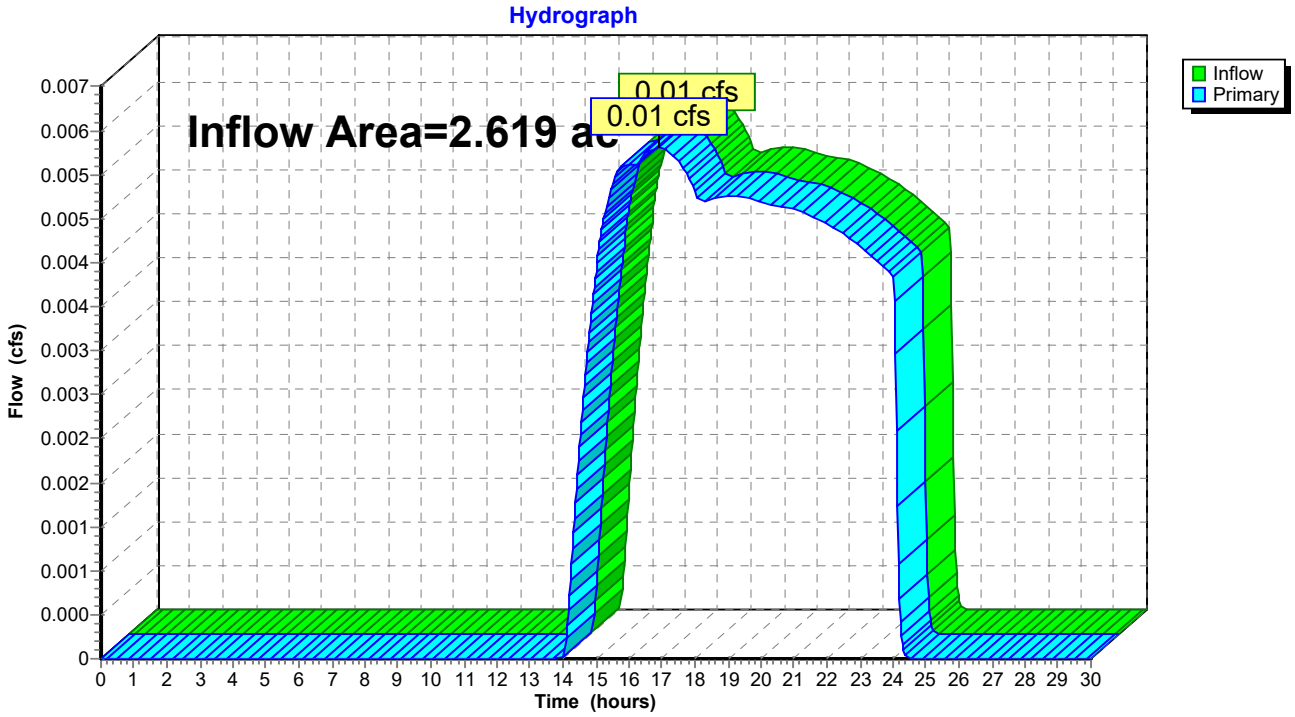


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.619 ac, 56.77% Impervious, Inflow Depth = 0.02" for 10-Year Storm event
Inflow = 0.01 cfs @ 16.89 hrs, Volume= 0.004 af
Primary = 0.01 cfs @ 16.89 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

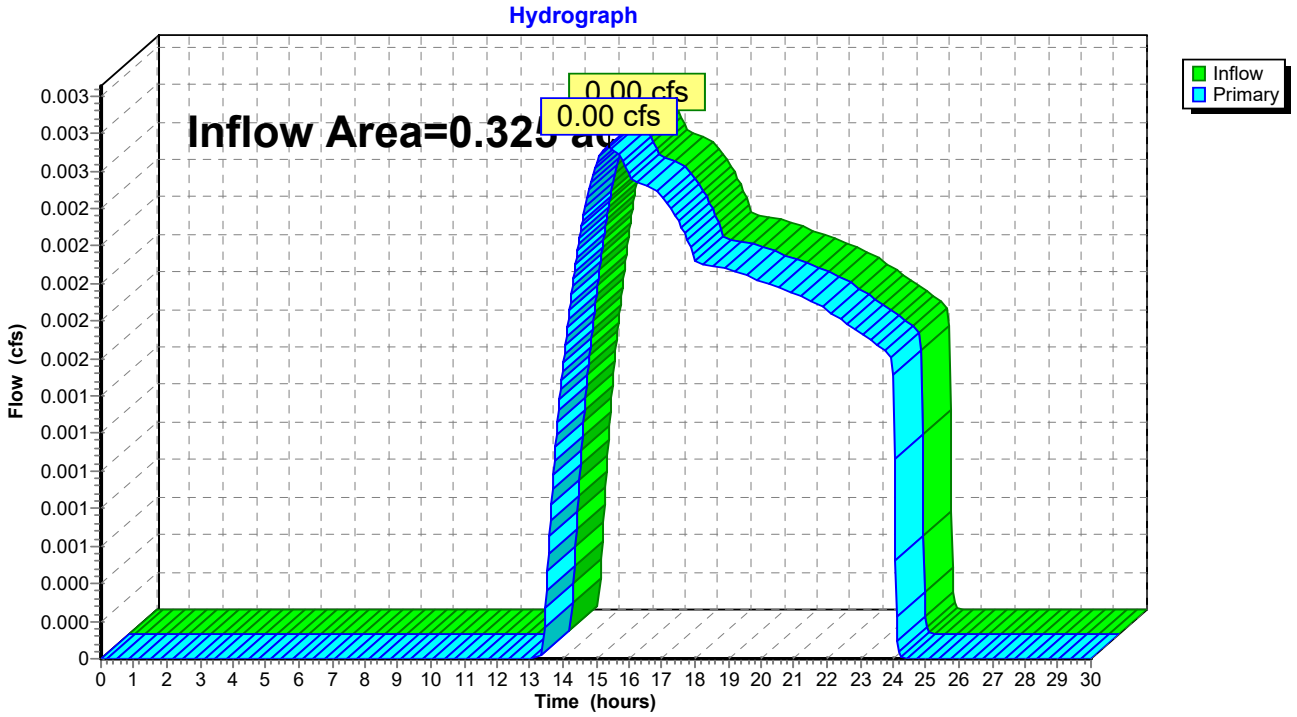


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.325 ac, 0.00% Impervious, Inflow Depth = 0.07" for 10-Year Storm event
Inflow = 0.00 cfs @ 15.42 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 15.42 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: PAVEMENT Runoff Area=59,980 sf 95.65% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=95 Runoff=8.78 cfs 0.670 af

Subcatchment 1B: LANDSCAPE & WOODS Runoff Area=46,704 sf 0.00% Impervious Runoff Depth=0.20"
Flow Length=148' Slope=0.0700 '/' Tc=9.5 min CN=32 Runoff=0.03 cfs 0.018 af

Subcatchment 2A: Woods - North Runoff Area=14,138 sf 0.00% Impervious Runoff Depth=0.25"
Flow Length=73' Slope=0.0700 '/' Tc=5.2 min CN=33 Runoff=0.01 cfs 0.007 af

Subcatchment ROOF: RUBBER ROOF Runoff Area=7,400 sf 100.00% Impervious Runoff Depth=6.19"
Tc=5.0 min CN=98 Runoff=1.10 cfs 0.088 af

Pond 1P: UNDERGROUND CHAMBERS Peak Elev=243.18' Storage=12,106 cf Inflow=9.88 cfs 0.758 af
Discarded=1.06 cfs 0.758 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=1.06 cfs 0.758 af

Link 1S: SOUTH WETLAND Inflow=0.03 cfs 0.018 af
Primary=0.03 cfs 0.018 af

Link 2S: NORTH WETLAND Inflow=0.01 cfs 0.007 af
Primary=0.01 cfs 0.007 af

Total Runoff Area = 2.944 ac Runoff Volume = 0.782 af Average Runoff Depth = 3.19"
49.49% Pervious = 1.457 ac 50.51% Impervious = 1.487 ac

Summary for Subcatchment 1A: PAVEMENT

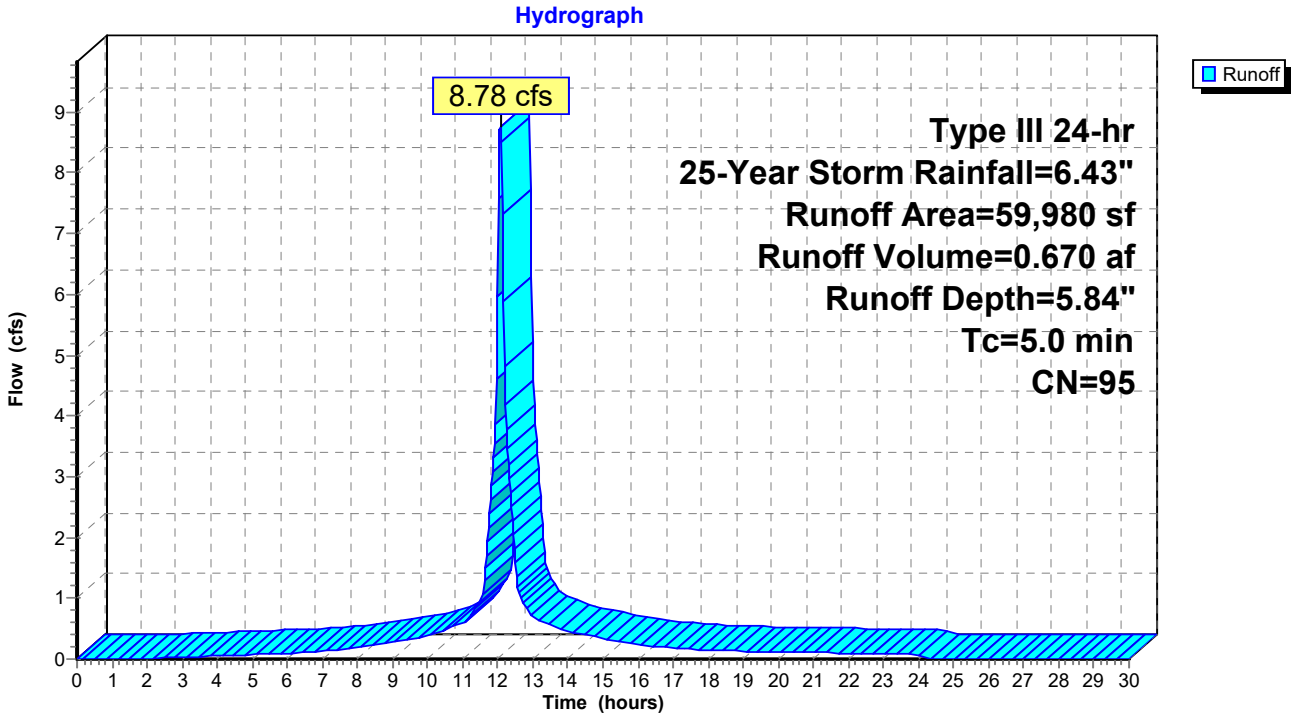
Runoff = 8.78 cfs @ 12.07 hrs, Volume= 0.670 af, Depth= 5.84"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Storm Rainfall=6.43"

Area (sf)	CN	Description
57,371	98	Paved parking, HSG A
2,609	39	>75% Grass cover, Good, HSG A
59,980	95	Weighted Average
2,609		4.35% Pervious Area
57,371		95.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Tc minimum = 5 min**

Subcatchment 1A: PAVEMENT



Summary for Subcatchment 1B: LANDSCAPE & WOODS

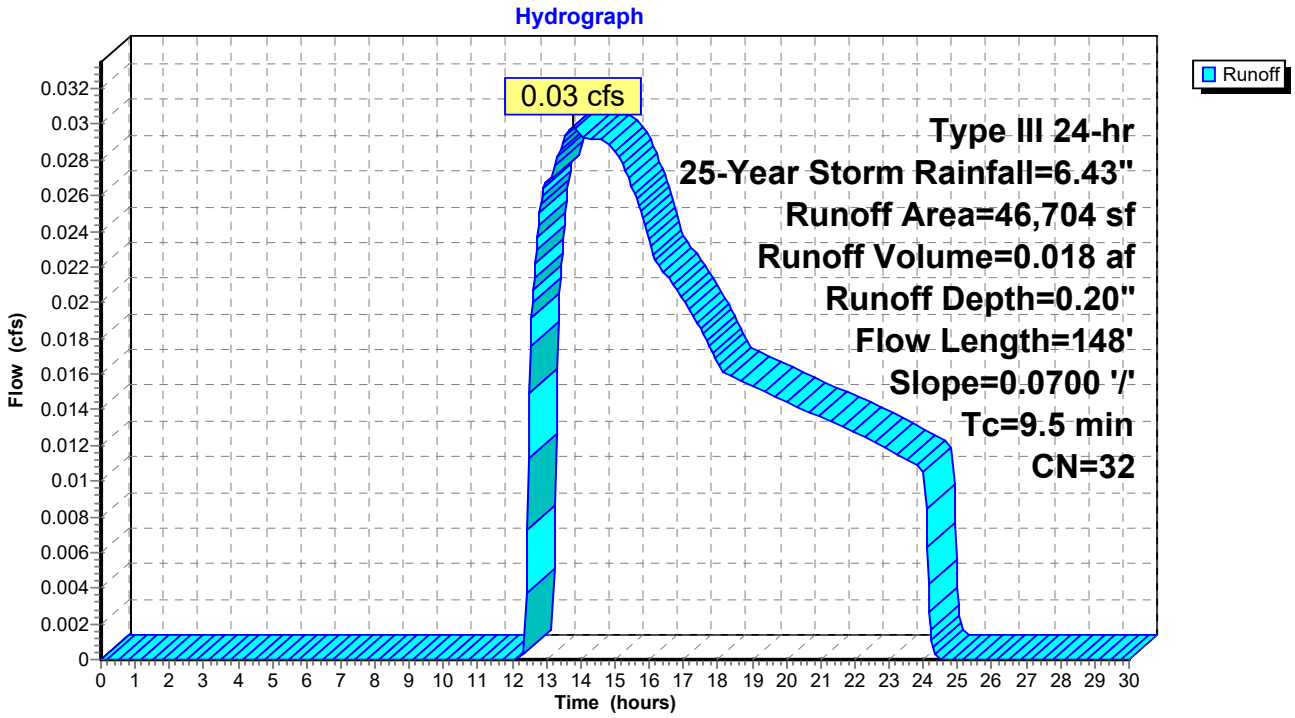
Runoff = 0.03 cfs @ 13.78 hrs, Volume= 0.018 af, Depth= 0.20"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Storm Rainfall=6.43"

Area (sf)	CN	Description
10,540	39	>75% Grass cover, Good, HSG A
36,164	30	Woods, Good, HSG A
46,704	32	Weighted Average
46,704		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	148	0.0700	0.26		**Lag/CN Method,**

Subcatchment 1B: LANDSCAPE & WOODS



Summary for Subcatchment 2A: Woods - North

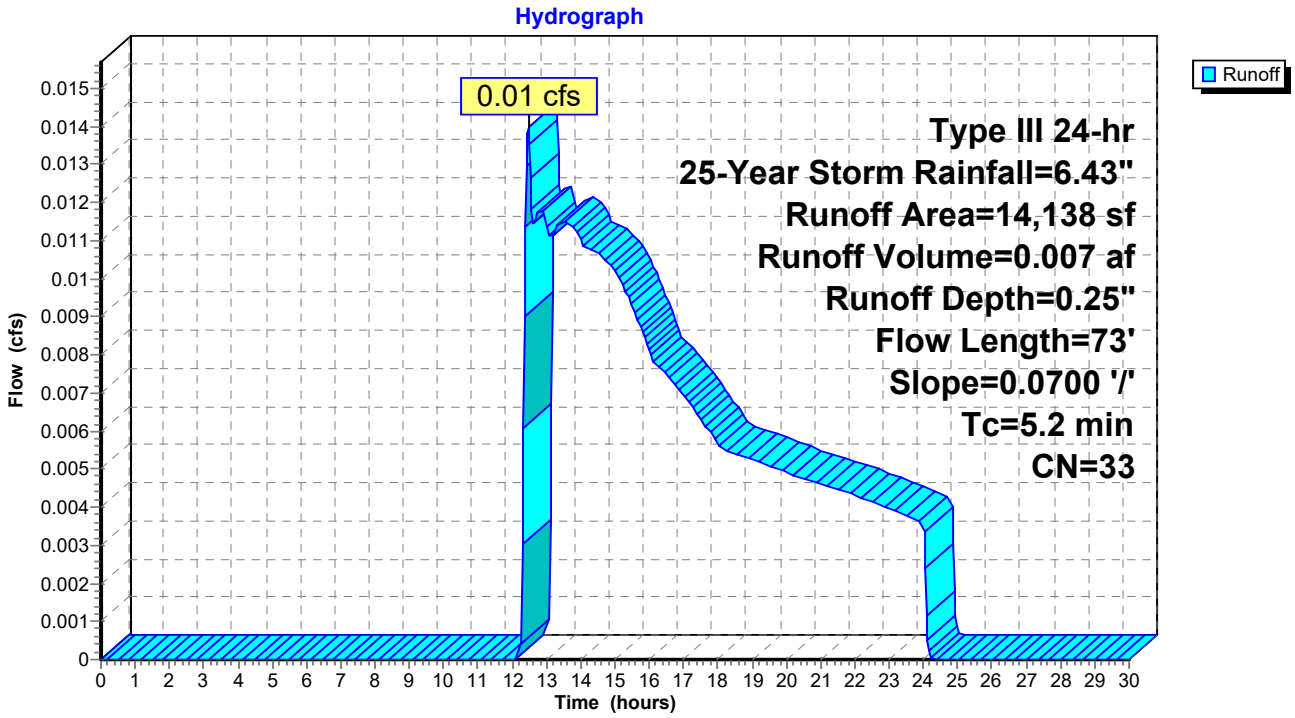
Runoff = 0.01 cfs @ 12.47 hrs, Volume= 0.007 af, Depth= 0.25"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Storm Rainfall=6.43"

Area (sf)	CN	Description
4,911	39	>75% Grass cover, Good, HSG A
9,227	30	Woods, Good, HSG A
14,138	33	Weighted Average
14,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	73	0.0700	0.23		**Lag/CN Method,**

Subcatchment 2A: Woods - North



Summary for Subcatchment ROOF: RUBBER ROOF AREA

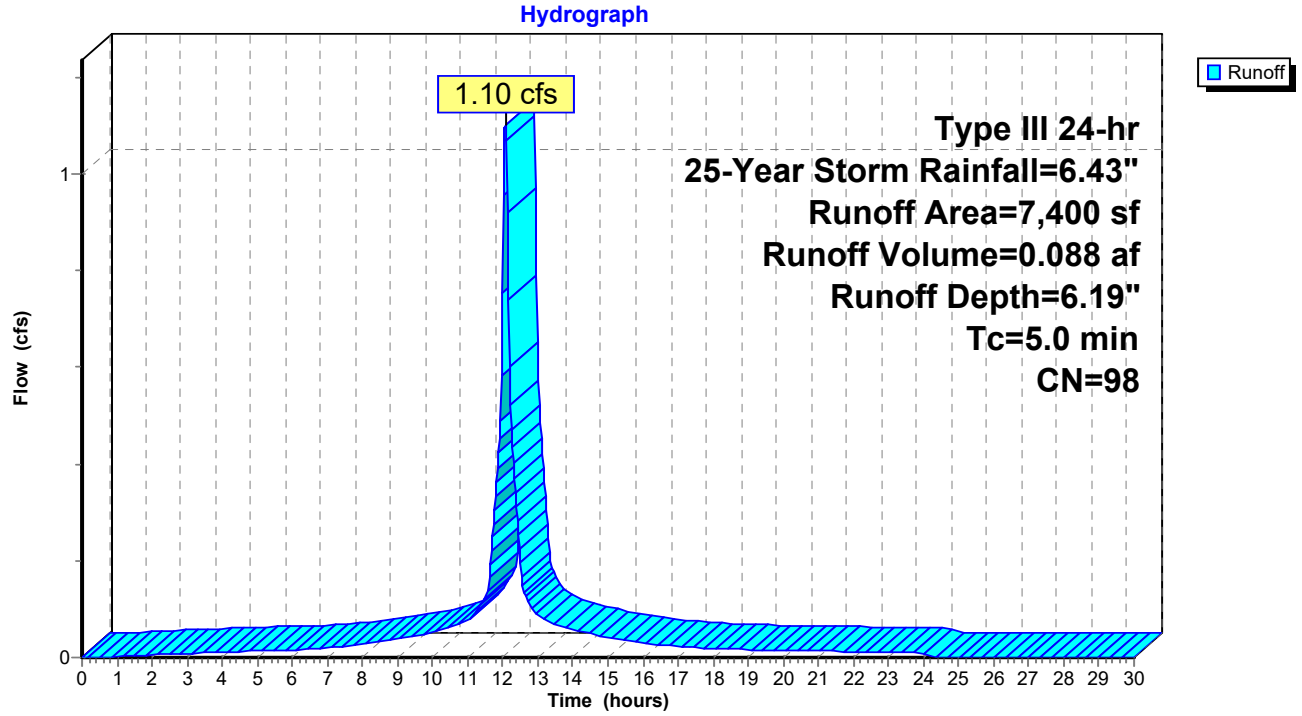
Runoff = 1.10 cfs @ 12.07 hrs, Volume= 0.088 af, Depth= 6.19"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Storm Rainfall=6.43"

Area (sf)	CN	Description
7,400	98	Roofs, HSG A
7,400		100.00% Impervious Area

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

Subcatchment ROOF: RUBBER ROOF AREA



Summary for Pond 1P: UNDERGROUND CHAMBERS

Inflow Area = 1.547 ac, 96.13% Impervious, Inflow Depth = 5.88" for 25-Year Storm event
Inflow = 9.88 cfs @ 12.07 hrs, Volume= 0.758 af
Outflow = 1.06 cfs @ 12.71 hrs, Volume= 0.758 af, Atten= 89%, Lag= 38.6 min
Discarded = 1.06 cfs @ 12.71 hrs, Volume= 0.758 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 1S : SOUTH WETLAND
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link 2S : NORTH WETLAND

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 243.18' @ 12.71 hrs Surf.Area= 9,660 sf Storage= 12,106 cf

Plug-Flow detention time= 94.3 min calculated for 0.757 af (100% of inflow)
Center-of-Mass det. time= 94.2 min (853.2 - 759.0)

Volume	Invert	Avail.Storage	Storage Description
#1	241.25'	9,198 cf	**92.00'W x 105.00'L x 3.50'H Stone Surround** 33,810 cf Overall - 10,814 cf Embedded = 22,996 cf x 40.0% Voids
#2	241.92'	10,814 cf	**Cultec R-280HD** x 252 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 17 rows
		20,012 cf	Total Available Storage

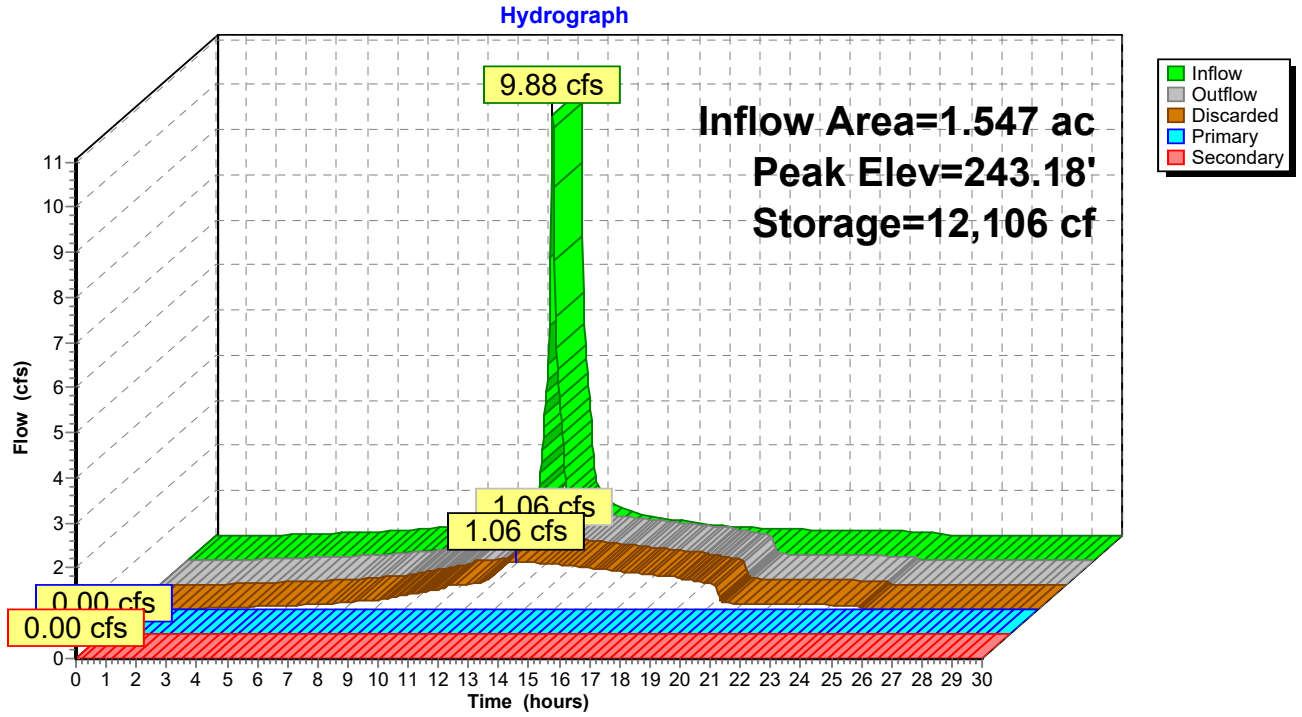
Device	Routing	Invert	Outlet Devices
#1	Discarded	241.25'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 239.25'
#2	Primary	243.45'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.10' S= 0.0540 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Secondary	243.45'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.82' S= 0.0225 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=1.06 cfs @ 12.71 hrs HW=243.18' (Free Discharge)
↑**1=Exfiltration** (Controls 1.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=241.25' (Free Discharge)
↑**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=241.25' (Free Discharge)
↑**3=Culvert** (Controls 0.00 cfs)

Pond 1P: UNDERGROUND CHAMBERS

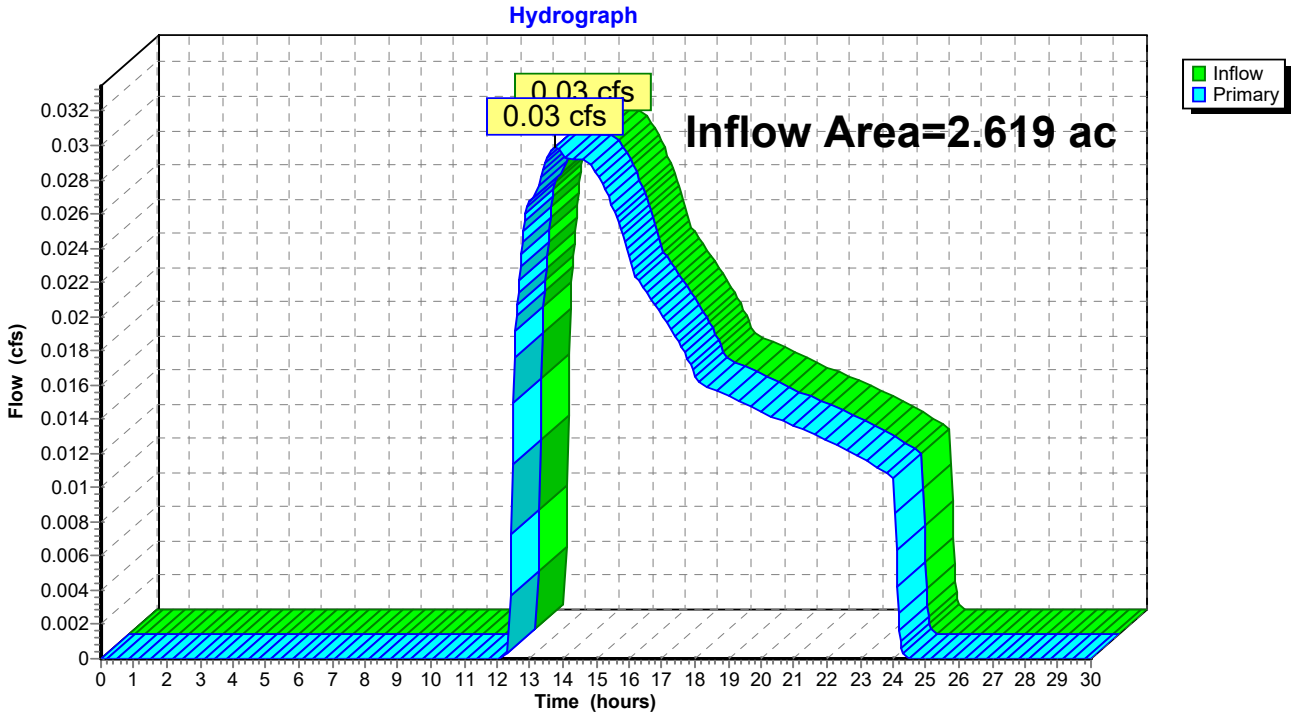


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.619 ac, 56.77% Impervious, Inflow Depth = 0.08" for 25-Year Storm event
Inflow = 0.03 cfs @ 13.78 hrs, Volume= 0.018 af
Primary = 0.03 cfs @ 13.78 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

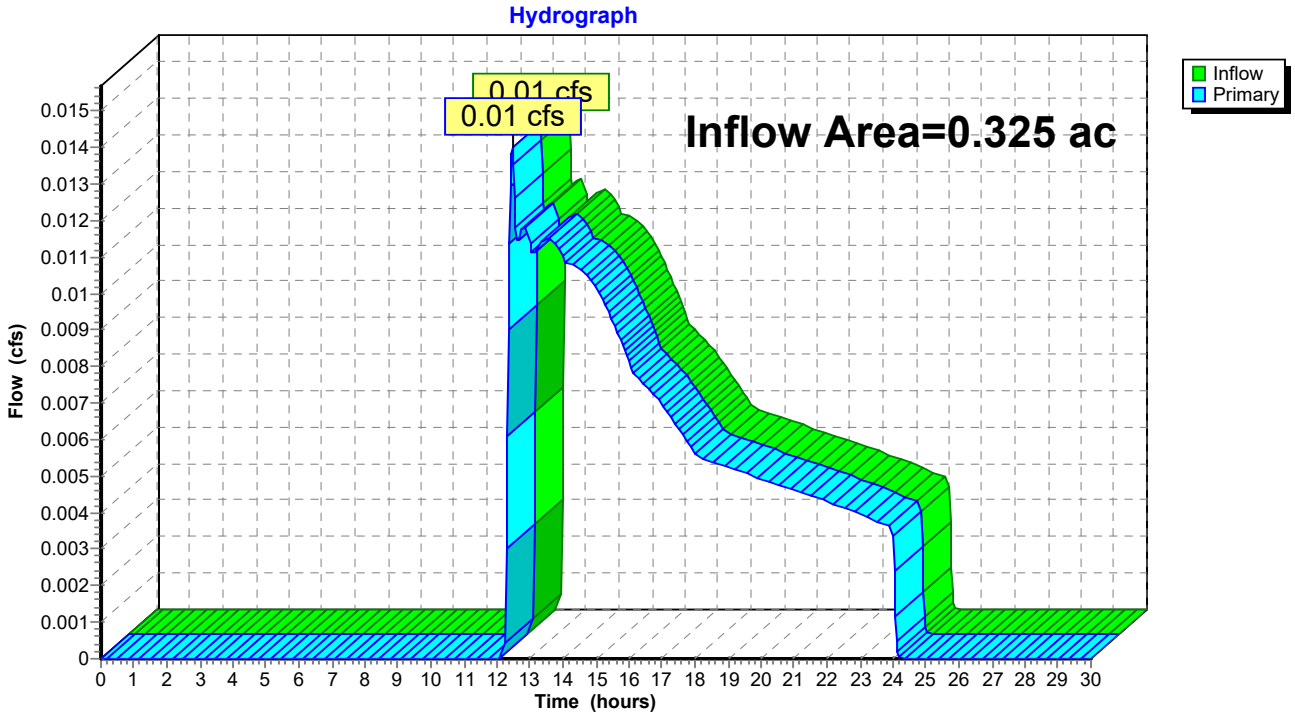


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.325 ac, 0.00% Impervious, Inflow Depth = 0.25" for 25-Year Storm event
Inflow = 0.01 cfs @ 12.47 hrs, Volume= 0.007 af
Primary = 0.01 cfs @ 12.47 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Time span=0.00-30.00 hrs, dt=0.03 hrs, 1001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: PAVEMENT Runoff Area=59,980 sf 95.65% Impervious Runoff Depth=7.63"
Tc=5.0 min CN=95 Runoff=11.32 cfs 0.876 af

Subcatchment 1B: LANDSCAPE & WOODS Runoff Area=46,704 sf 0.00% Impervious Runoff Depth=0.63"
Flow Length=148' Slope=0.0700 '/' Tc=9.5 min CN=32 Runoff=0.26 cfs 0.056 af

Subcatchment 2A: Woods - North Runoff Area=14,138 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=73' Slope=0.0700 '/' Tc=5.2 min CN=33 Runoff=0.10 cfs 0.019 af

Subcatchment ROOF: RUBBER ROOF Runoff Area=7,400 sf 100.00% Impervious Runoff Depth=7.99"
Tc=5.0 min CN=98 Runoff=1.41 cfs 0.113 af

Pond 1P: UNDERGROUND CHAMBERS Peak Elev=243.82' Storage=16,240 cf Inflow=12.73 cfs 0.989 af
Discarded=1.23 cfs 0.951 af Primary=0.33 cfs 0.019 af Secondary=0.33 cfs 0.019 af Outflow=1.90 cfs 0.989 af

Link 1S: SOUTH WETLAND Inflow=0.56 cfs 0.075 af
Primary=0.56 cfs 0.075 af

Link 2S: NORTH WETLAND Inflow=0.40 cfs 0.038 af
Primary=0.40 cfs 0.038 af

Total Runoff Area = 2.944 ac Runoff Volume = 1.064 af Average Runoff Depth = 4.34"
49.49% Pervious = 1.457 ac 50.51% Impervious = 1.487 ac

Summary for Subcatchment 1A: PAVEMENT

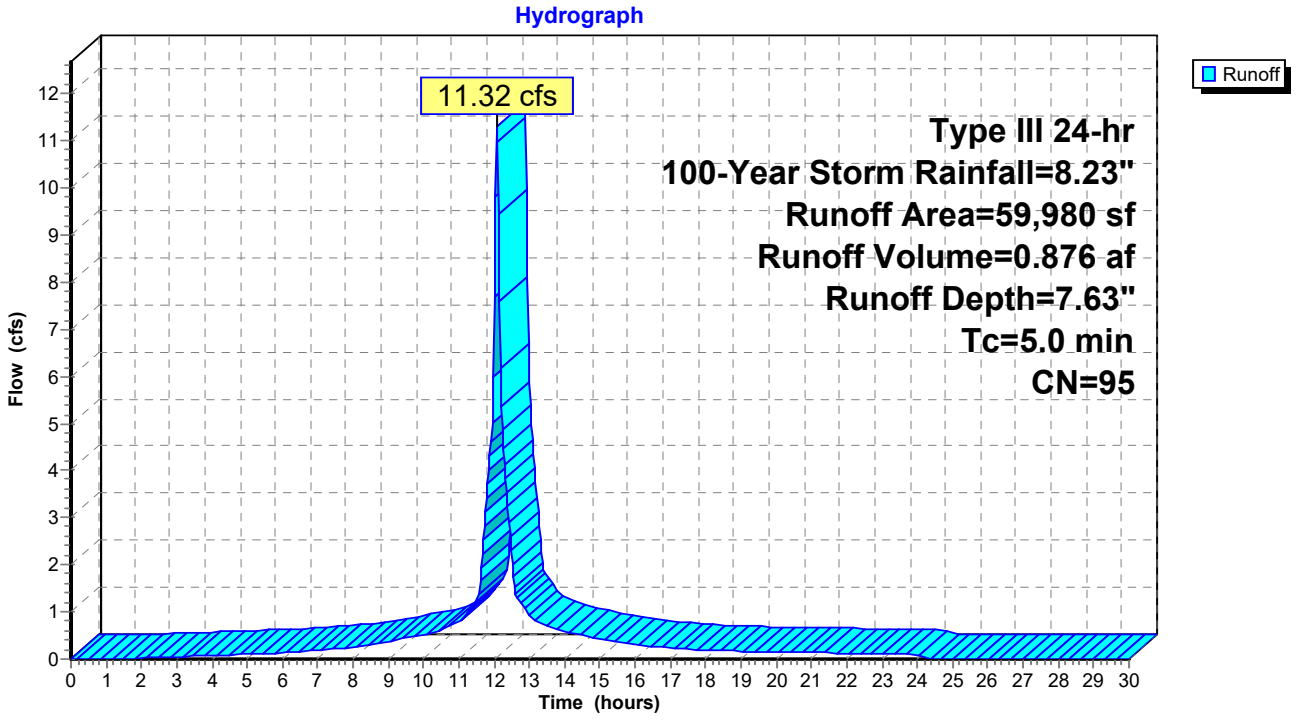
Runoff = 11.32 cfs @ 12.07 hrs, Volume= 0.876 af, Depth= 7.63"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Storm Rainfall=8.23"

Area (sf)	CN	Description
57,371	98	Paved parking, HSG A
2,609	39	>75% Grass cover, Good, HSG A
59,980	95	Weighted Average
2,609		4.35% Pervious Area
57,371		95.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Tc minimum = 5 min**

Subcatchment 1A: PAVEMENT



Summary for Subcatchment 1B: LANDSCAPE & WOODS

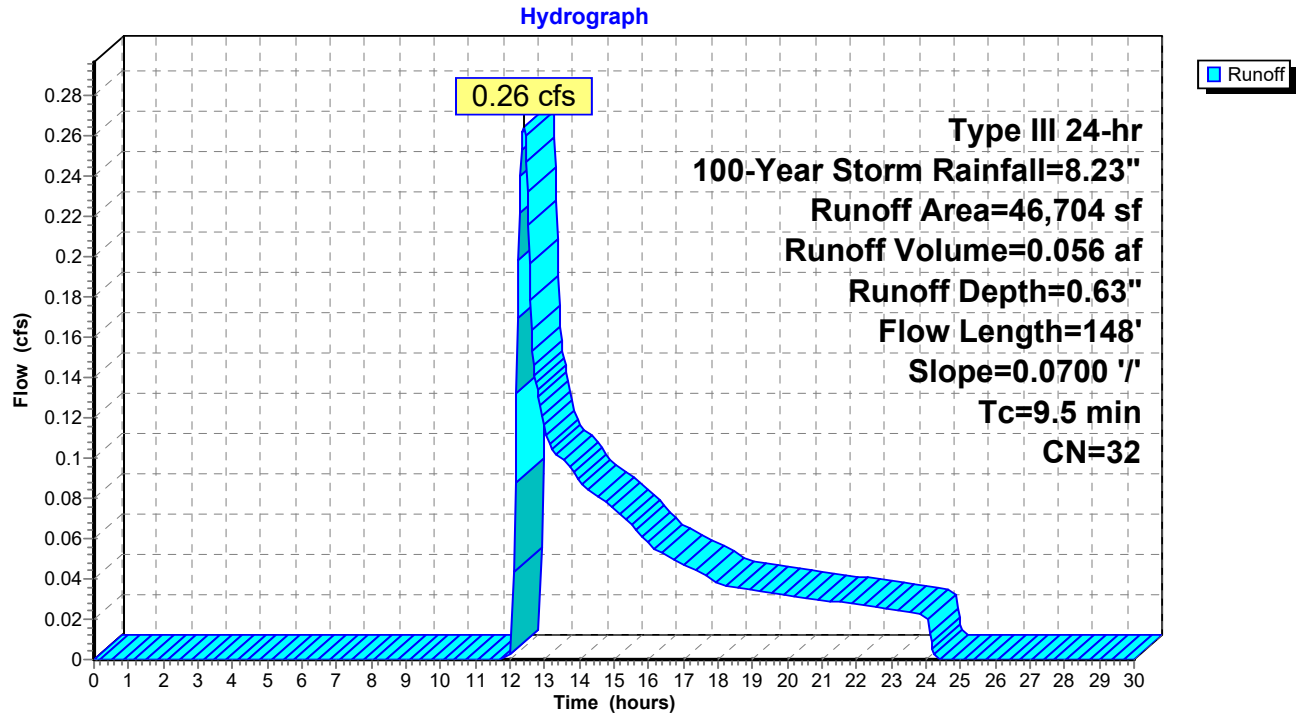
Runoff = 0.26 cfs @ 12.39 hrs, Volume= 0.056 af, Depth= 0.63"
Routed to Link 1S : SOUTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Storm Rainfall=8.23"

Area (sf)	CN	Description
10,540	39	>75% Grass cover, Good, HSG A
36,164	30	Woods, Good, HSG A
46,704	32	Weighted Average
46,704		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	148	0.0700	0.26		**Lag/CN Method,**

Subcatchment 1B: LANDSCAPE & WOODS



Summary for Subcatchment 2A: Woods - North

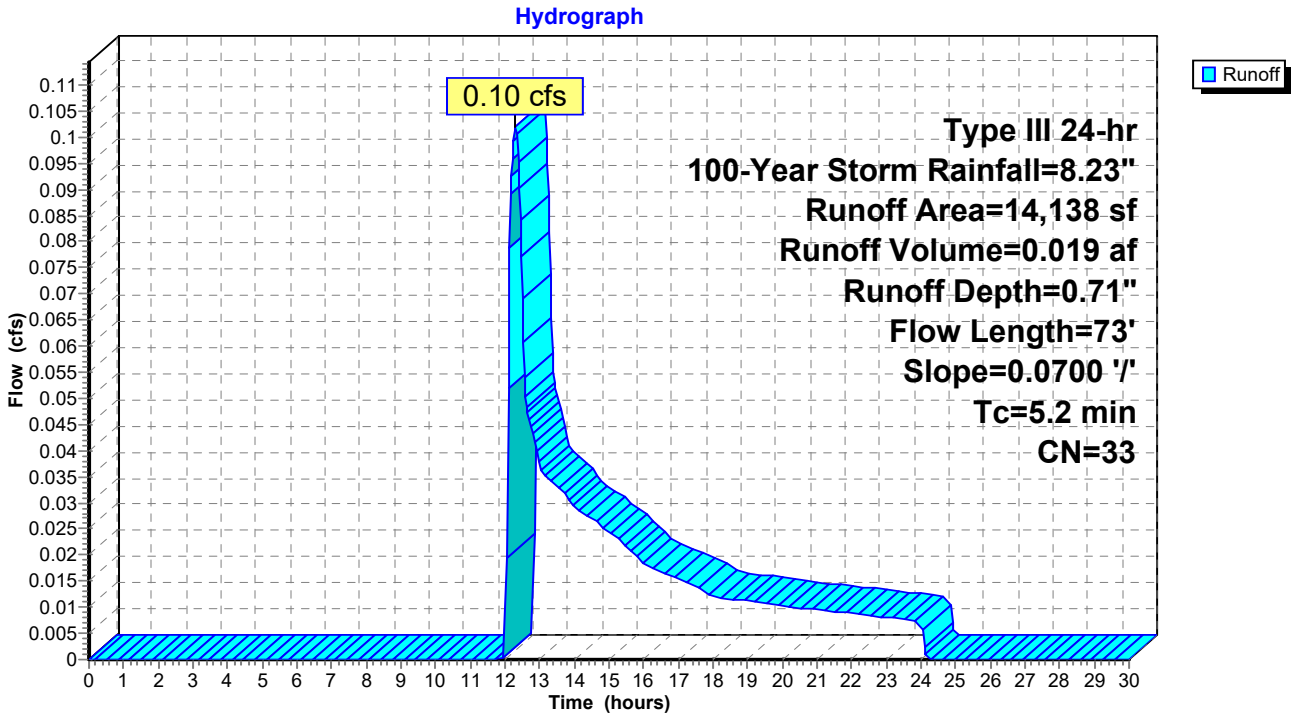
Runoff = 0.10 cfs @ 12.30 hrs, Volume= 0.019 af, Depth= 0.71"
Routed to Link 2S : NORTH WETLAND

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Storm Rainfall=8.23"

Area (sf)	CN	Description
4,911	39	>75% Grass cover, Good, HSG A
9,227	30	Woods, Good, HSG A
14,138	33	Weighted Average
14,138		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	73	0.0700	0.23		**Lag/CN Method,**

Subcatchment 2A: Woods - North



Summary for Subcatchment ROOF: RUBBER ROOF AREA

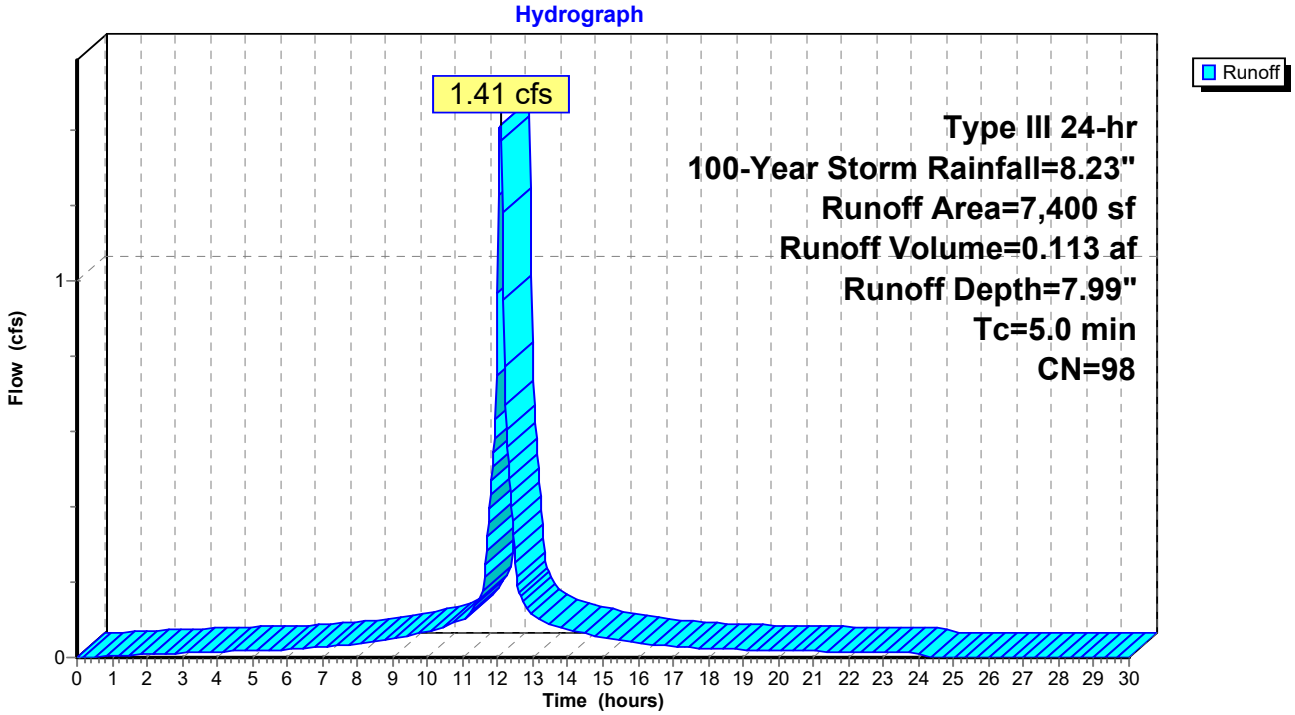
Runoff = 1.41 cfs @ 12.07 hrs, Volume= 0.113 af, Depth= 7.99"
Routed to Pond 1P : UNDERGROUND CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Storm Rainfall=8.23"

Area (sf)	CN	Description
7,400	98	Roofs, HSG A
7,400		100.00% Impervious Area

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

Subcatchment ROOF: RUBBER ROOF AREA



Summary for Pond 1P: UNDERGROUND CHAMBERS

Inflow Area = 1.547 ac, 96.13% Impervious, Inflow Depth = 7.67" for 100-Year Storm event
Inflow = 12.73 cfs @ 12.07 hrs, Volume= 0.989 af
Outflow = 1.90 cfs @ 12.55 hrs, Volume= 0.989 af, Atten= 85%, Lag= 28.7 min
Discarded = 1.23 cfs @ 12.55 hrs, Volume= 0.951 af
Primary = 0.33 cfs @ 12.55 hrs, Volume= 0.019 af
Routed to Link 1S : SOUTH WETLAND
Secondary = 0.33 cfs @ 12.55 hrs, Volume= 0.019 af
Routed to Link 2S : NORTH WETLAND

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Peak Elev= 243.82' @ 12.55 hrs Surf.Area= 9,660 sf Storage= 16,240 cf

Plug-Flow detention time= 109.8 min calculated for 0.989 af (100% of inflow)
Center-of-Mass det. time= 109.8 min (863.5 - 753.7)

Volume	Invert	Avail.Storage	Storage Description
#1	241.25'	9,198 cf	**92.00'W x 105.00'L x 3.50'H Stone Surround** 33,810 cf Overall - 10,814 cf Embedded = 22,996 cf x 40.0% Voids
#2	241.92'	10,814 cf	**Cultec R-280HD** x 252 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 17 rows
		20,012 cf	Total Available Storage

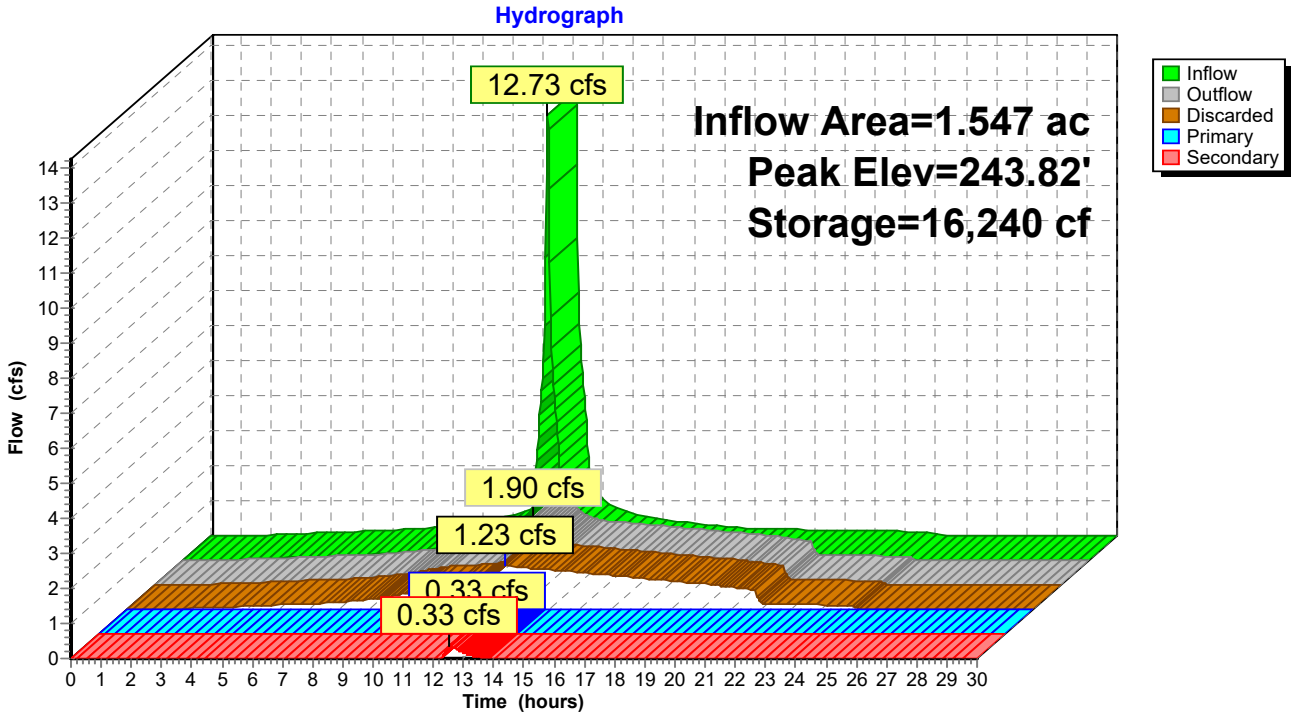
Device	Routing	Invert	Outlet Devices
#1	Discarded	241.25'	**2.410 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 239.25'
#2	Primary	243.45'	**8.0" Round Culvert** L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.10' S= 0.0540 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Secondary	243.45'	**8.0" Round Culvert** L= 28.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 243.45' / 242.82' S= 0.0225 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=1.23 cfs @ 12.55 hrs HW=243.82' (Free Discharge)
1=Exfiltration (Controls 1.23 cfs)

Primary OutFlow Max=0.33 cfs @ 12.55 hrs HW=243.82' (Free Discharge)
2=Culvert (Inlet Controls 0.33 cfs @ 1.64 fps)

Secondary OutFlow Max=0.33 cfs @ 12.55 hrs HW=243.82' (Free Discharge)
3=Culvert (Inlet Controls 0.33 cfs @ 1.64 fps)

Pond 1P: UNDERGROUND CHAMBERS

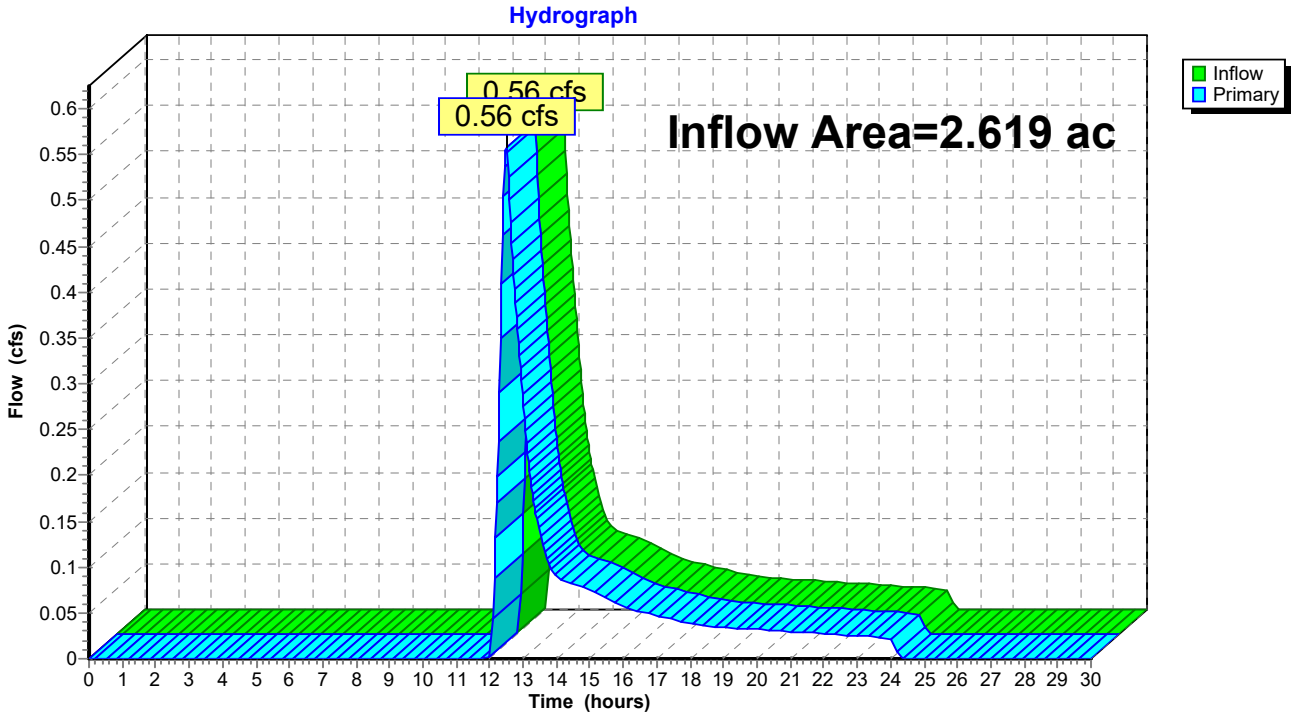


Summary for Link 1S: SOUTH WETLAND

Inflow Area = 2.619 ac, 56.77% Impervious, Inflow Depth = 0.34" for 100-Year Storm event
Inflow = 0.56 cfs @ 12.50 hrs, Volume= 0.075 af
Primary = 0.56 cfs @ 12.50 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 1S: SOUTH WETLAND

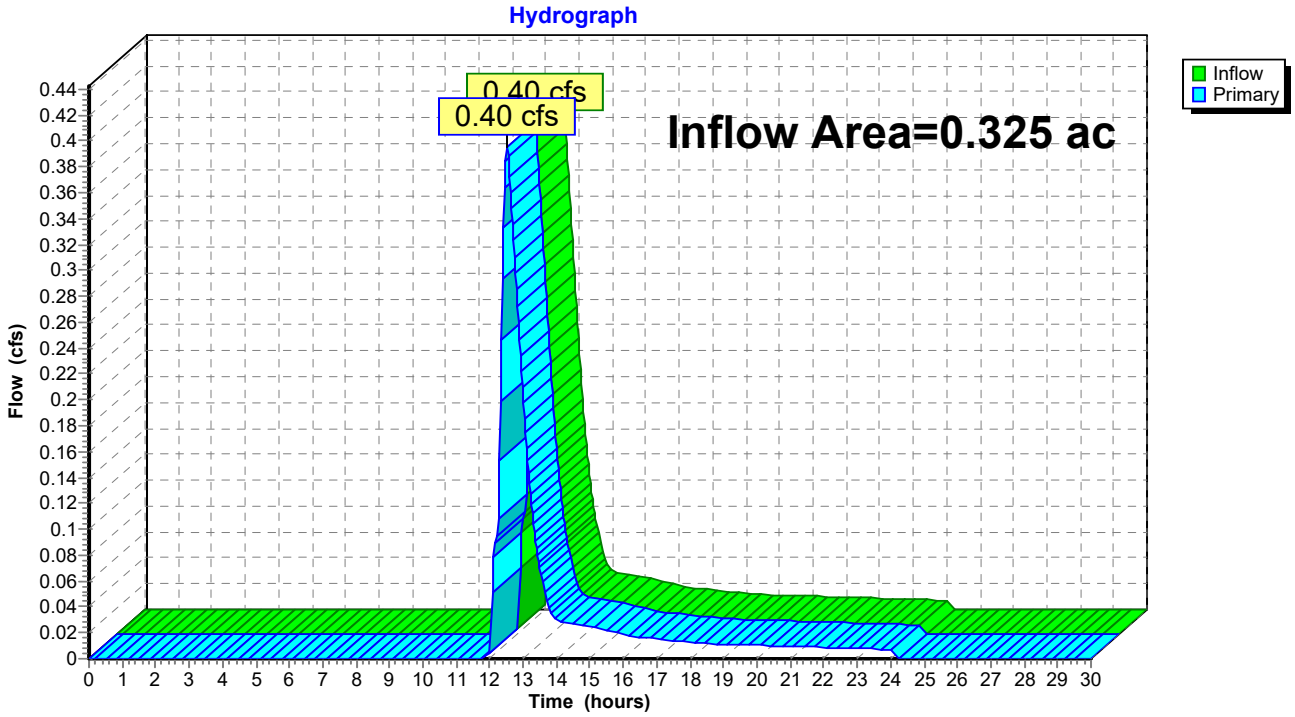


Summary for Link 2S: NORTH WETLAND

Inflow Area = 0.325 ac, 0.00% Impervious, Inflow Depth = 1.40" for 100-Year Storm event
Inflow = 0.40 cfs @ 12.52 hrs, Volume= 0.038 af
Primary = 0.40 cfs @ 12.52 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 2S: NORTH WETLAND



Appendix F

Additional Stormwater Design
Drainage Calculations

TABLE NO. 3
STORMWATER MANAGEMENT CALCULATIONS
LAWRENCE WASTE SERVICES
#39 ALDER STREET
MEDWAY, MA

STANDARD 3 - RECHARGE
REQUIRED RECHARGE VOLUME
RECHARGE VOLUME (Rv)

Existing Impervious Area =	238	s.f.
Proposed Impervious Area =	**64,771**	**s.f.**

Impervious Area (s.f.)	**Rv (cf)**	**Soil Type - Type A = 0.60 inches**
Impervious Area s.f. x (0.60") x (1'/12")	**3,239**	c.f.

Proposed Underground Infiltration Chambers (Pond 1P)

Storage Volume =	13,963	c.f.	(Elev. 243.45 = 2-8" Diam. Outlet Pipes)

STANDARD 4 - WATER QUALITY

Impervious Area (s.f.)	**WQv (cf)**	**Zone II = 1" Runoff**
Impervious Area s.f. x (1") x (1'/12")	**5,398**	**c.f.**
Proposed Storage in Chambers =	**13,963**	**c.f.**

SUBCATCHMENT 1A - Building & Paved Storage/ Parking Areas

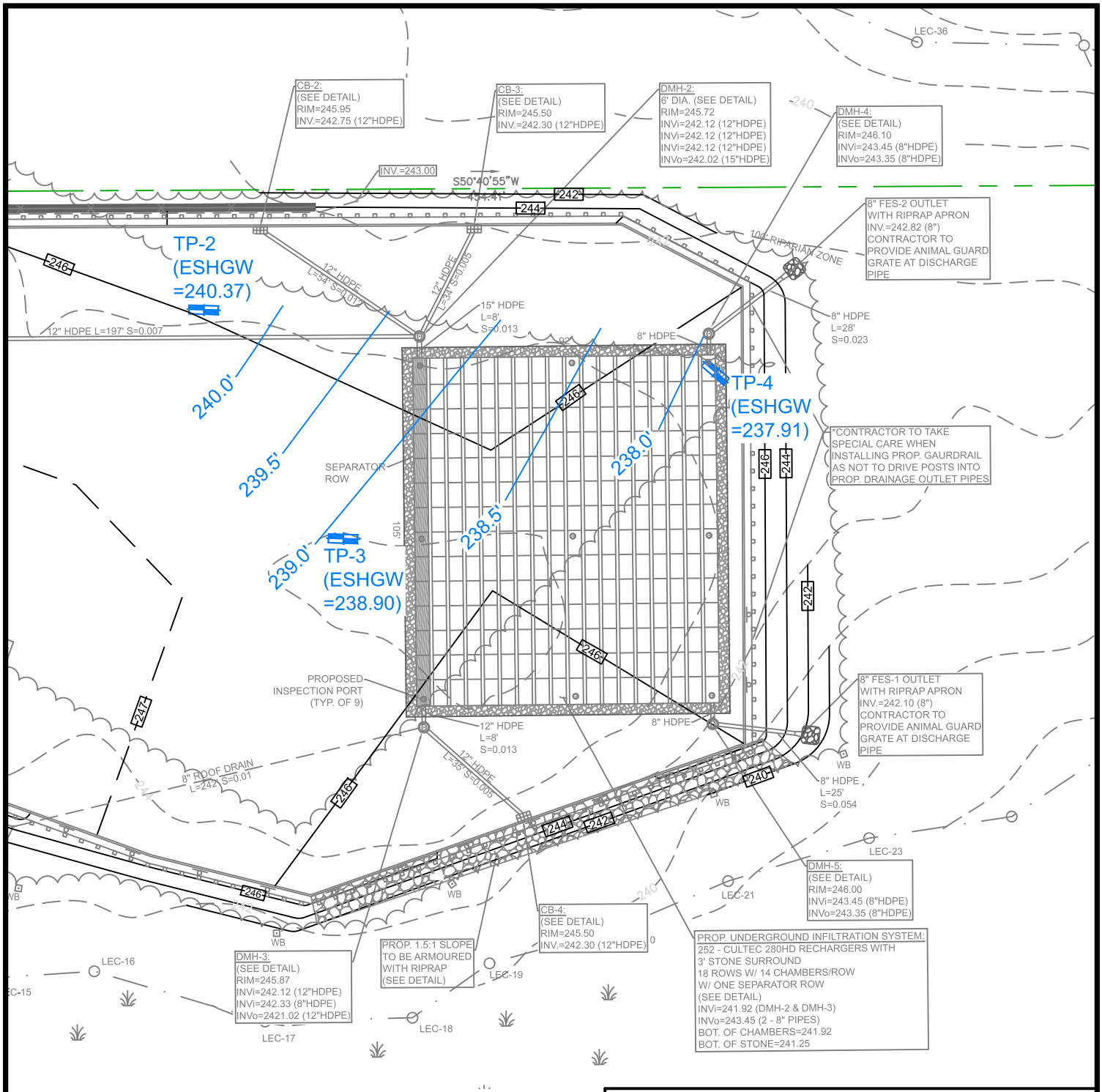
TSS Removal Calculation (39 Alder Street)		**TSS Removal**	**TSS Remaining**
1. Catch Basin	25%	0.25	**0.75**
2. Cultec Separator Row (65% TSS Removal)	25%	0.25	**0.56**
3. Underground Infiltration System	80%	0.80	**0.11**
		TSS Removal Efficiency =	**0.89**

Drawdown (Td) = Rv / k A	**2.78**	**hours**	< 72 Hours OK
Recharge Volume (Rv) =	5,398	c.f.	
Permeability (k) =	2.41	in/hr	
Bottom Area (A) =	9,660	s.f.	

Stage-Area-Storage for Pond 1P: UNDERGROUND CHAMBERS

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
241.25	**9,660**	0
241.30	9,660	193
241.35	9,660	386
241.40	9,660	580
241.45	9,660	773
241.50	9,660	966
241.55	9,660	1,159
241.60	9,660	1,352
241.65	9,660	1,546
241.70	9,660	1,739
241.75	9,660	1,932
241.80	9,660	2,125
241.85	9,660	2,318
241.90	9,660	2,512
241.95	9,660	2,830
242.00	9,660	3,229
242.05	9,660	3,625
242.10	9,660	4,019
242.15	9,660	4,411
242.20	9,660	4,802
242.25	9,660	5,193
242.30	9,660	5,582
242.35	9,660	5,971
242.40	9,660	6,359
242.45	9,660	6,744
242.50	9,660	7,126
242.55	9,660	7,507
242.60	9,660	7,886
242.65	9,660	8,263
242.70	9,660	8,637
242.75	9,660	9,009
242.80	9,660	9,379
242.85	9,660	9,748
242.90	9,660	10,115
242.95	9,660	10,480
243.00	9,660	10,844
243.05	9,660	11,206
243.10	9,660	11,564
243.15	9,660	11,918
243.20	9,660	12,268
243.25	9,660	12,615
243.30	9,660	12,958
243.35	9,660	13,297
243.40	9,660	13,633
243.45	9,660	13,963
243.50	9,660	14,289
243.55	9,660	14,609
243.60	9,660	14,923
243.65	9,660	15,231
243.70	9,660	15,532
243.75	9,660	15,824
243.80	9,660	16,106
243.85	9,660	16,376
243.90	9,660	16,632
243.95	9,660	16,871
244.00	9,660	17,094
244.05	9,660	17,303
244.10	9,660	17,501
244.15	9,660	17,694
244.20	9,660	17,887
244.25	9,660	18,080
244.30	9,660	18,273
244.35	9,660	18,467
244.40	9,660	18,660
244.45	9,660	18,853
244.50	9,660	19,046
244.55	9,660	19,239
244.60	9,660	19,433
244.65	9,660	19,626
244.70	9,660	19,819
244.75	9,660	**20,012**

Two (2) 8" OUTLET PIPES



LEGEND:

PROPERTY LINE

EDGE OF PAVEMENT

TEST PIT LOCATION TP-3

GROUNDWATER CONTOUR

40 20 10 0 40

1"= 40'

FIGURE 1: GROUNDWATER ELEVATIONS

PROPOSED COMMERCIAL BUILDING
39 ADLER STREET
MEDWAY, MA
CMG ID 2024-128

ENVIRONMENTAL SERVICES CMG EST. 2002 ENGINEERING SERVICES
67 HALL ROAD. STURBRIDGE MA 01566

CB1
11,810 S.F.

CB2
13,330 S.F.

CB3
15,990 S.F.

CB4
16,241 S.F.

TP-1
TP-2
TP-3
TP-4

DH FND. HELD

N50°22'39"W
152.00'

S50°40'55"E
362.52'

S43°26'28"E
362.52'

N42°25'14"E
212.98'

720.00'
S41°29'46"E

PROPERTY LINE (TYP)

ALDER STREET
(PUBLIC - 60' WIDE 1977 COUNTY LAYOUT)

N/F
JOHN FRASCONA
33 ALDER ST.

N/F
EAST HILL ASSOCIATES REALTY TRUST
49 ALDER ST.

STALL BROOK

EDGE OF RIVERBANK

EDGE OF WETLANDS

100' WETLANDS BUFFER ZONE

25' BUFFER ZONE (NO DISTURB)

100' RIPARIAN ZONE "A" SERIES

200' RIPARIAN ZONE "B" SERIES

LEC-1 LEC-2 LEC-3 LEC-4 LEC-5 LEC-6 LEC-6A LEC-7 LEC-8 LEC-9 LEC-10 LEC-11 LEC-12 LEC-13 LEC-14 LEC-15 LEC-16 LEC-17 LEC-18 LEC-19 LEC-20 LEC-21 LEC-22 LEC-23 LEC-24 LEC-25 LEC-26 LEC-27 LEC-28 LEC-29 LEC-30 LEC-31 LEC-32 LEC-34 LEC-35 LEC-36 LEC-37 LEC-38 LEC-39 LEC-40 LEC-41 LEC-42 END

A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 END

EX. 12" RCP (RECORD)
EX. 15" RCP (RECORD)
EX. 12" RCP (RECORD)
EX. PAVED DRIVEWAY/ CURBCUT
EX. V.C.C.
CONC. SIDEWALK
CURBCUT
UP #21
UP #23
GUARDRAIL
EX. STONE MASONRY RETAINING WALL
GUARD RAIL
RETAINING WALL
CONC. SIDEWALK

#39 ALDER STREET
(ASSESSORS MAP 63
PARCEL 004)
7.42 ACRES (CALC.)
7.7± ACRES (PLAN)

GRAPHIC SCALE
60 0 30 60 120
(IN FEET)
1 inch = 60 ft.

REVISIONS

NO.	DATE	DESCRIPTION	BY	CKD
1.	3/4/2024	CLIENT CHANGE OF USE / BUILDING	RL	DTF
2.	9/4/2024	APPLICANT CHANGE & BUILDING MODIFICATION	MM	DTF

PROFESSIONAL SEAL

PROJECT:
PROPOSED COMMERCIAL BUILDING
#39 ALDER STREET
MEDWAY, MA 02053

PREPARED FOR:
EAST HILL ASSOCIATES LLC
#49 ALDER STREET
MEDWAY, MA 02053

ENGINEERING SERVICES
ENVIRONMENTAL SERVICES
67 Hall Road
Sturbridge, MA 01566
Phone: 774-241-0901
fax: 774-241-0906

CMG Est. 2002

ISSUE DATE: 2/16/2024
DRAWN BY: RL | CHECKED BY: DTF
SCALE: 1" = 60'
PROJECT NO.: 2024-128
SHEET NAME:
RATIONAL METHOD DRAINAGE MAP
SHEET NO.:
D - 3.0

RATIONAL METHOD PIPE DESIGN WORKSHEET

Lawrence Waste Services Corp.
Proposed Commercial Building
#39 Alder Street
Medway, MA

LOCATION	PIPE SEGMENT From	To	INCREMENTAL AREA DESIGNATION	A (Acres)	Total A	C	C*A	Sum (C*A)	FLOW TIME (min.) To Inlet	In Chan.	Tot.	25-Yr I (in/hr)	25-Yr Q (cfs)	DESIGN CONDITIONS Pipe Diam (in.)	Length (ft)	Slope (%)	Q-full (cfs)	V-Full (fps)	Design (25-Yr) Depth Peak (in.)	V-Peak (fps)	Inverts Up	Down	Remarks
CB-1, CB-2, & CB-3 to Underground Chambers																							
dbl grate	CB-1	DMH-1		0.271		0.90	**0.24**		5		5	6.42	**1.57**	12	33	0.010	**3.87**	4.93	4.9	2.00	243.52	243.19	CB-1 Rim =246.72
	Front Roof	DMH-1		0.055		0.90	**0.05**		5		5	6.42	**0.32**	8	38	0.029	**2.23**	6.40	1.1	0.91	244.62	243.52	DMH-1 Rim = 246.90
	DMH-1	DMH-2			0.326			**0.29**	5		5	6.42	**1.88**	12	197	0.006	**3.04**	3.88	7.4	2.40	243.09	241.87	
dbl grate	CB-2	DMH-2		0.306		0.90	**0.28**					6.42	**1.77**	12	54	0.012	**4.18**	5.32	5.1	2.25	242.75	242.12	CB-2 Rim =245.95
dbl grate	CB-3	DMH-2		0.367		0.90	**0.33**		5		5	6.42	**2.12**	12	34	0.005	**2.81**	3.59	9.0	2.70	242.30	242.12	CB-3 Rim=245.50
	DMH-2	Chambers			0.693			**0.90**	5		5	6.42	**5.77**	15	8	0.013	**7.84**	6.39	11.0	4.71	242.02	241.92	DMH-2 Rim = 245.72
CB-4 to Underground Chambers																							
dbl grate	CB-4	DMH-3		0.373		0.90	**0.34**		5		5	6.42	**2.15**	12	35	0.005	**2.77**	3.53	9.3	2.74	242.3	242.12	CB-4 Rim = 245.50
	Rear Roof	DMH-3		0.115		0.90	**0.10**		5		5	6.42	**0.66**	8	242	0.009	**1.24**	3.56	4.3	1.90	244.5	242.33	DMH-3 Rim = 245.87
	DMH-3	Chambers			0.115			**0.44**	5		5	6.42	**2.82**	15	8	0.013	**7.84**	6.39	5.4	2.30	242.02	241.92	

Notes:
1) Runoff Coefficient C-Values used; Impervious(Pavement) C=0.90 Grass/OpenSpace C=0.20, Residential Suburban C=.25~.40, Mannings "n" HDPE n=0.012, RCP n=0.013
2) Rainfall Intensity I (in/hr) values taken from Figure 10-4 Intensity-Duration-Frequency Curve for Boston, Massachusetts, Mass Highway Design Manual.
3) Five (5) minute minimum flow time used for minimum time of concentration (Tc) to CB inlet to system
4) Massachusetts Cascade Grate Inlet Capacity = 1.26 cfs @ 100% efficiency, Standard Grate = 0.95 cfs est.
5) Blue Highlight denotes calculated peak flow (cfs) to CB Inlet

Drainage Structure	Contributing Area Impervious	Grass/Lawn	Total s.f.	Ac.	Runoff Coefficient C
CB-1	11,810	-	11,810	0.271	0.90
CB-2	13,330	-	13,330	0.306	0.90
CB-3	15,990	-	15,990	0.367	0.90
CB-4	16,241	-	16,241	0.373	0.90
Front Roof	2,400	-	2,400	0.055	0.90
Rear Roof	5,000	-	5,000	0.115	0.90
Total	64,771				

Appendix G

Cultec Separator Row
Verification Statement

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Cultec Separator Row™ Filtration System

Developed by Cultec, Inc.
Brookfield, Connecticut, USA

In accordance with

ISO 14034:2016

Environmental management —
Environmental technology verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

March 15, 2018
Vancouver, BC, Canada

GLOBE PERFORMANCE SOLUTIONS

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

Cultec Recharger and Contactor chambers are used for infiltration, detention and/or retention of stormwater underground. The system is comprised of thermoplastic arch-shaped chambers surrounded by clear crushed stone. Water enters the system through a Separator row and then flows through the stone and into a Chamber row prior to exiting. The Cultec stormwater system is sized based on the volume of stormwater which is stored in the voids created by the chamber and the voids in the clear stone surround, with a void ratio of 40%. The entire system is wrapped in a non-woven geotextile and/or impermeable geomembrane. In order to minimize fine particles and silts from blinding the voids in the clear stone surround, a single chamber row is wrapped in non-woven geotextile and placed on a woven geotextile. This row is connected to the inlet pipe of the Cultec system providing a filtration function as the surface stormwater run-off passes through the geotextile wrapped inlet row. Sediment is trapped within the Cultec Separator Row™ and may be removed through back flushing of this row. A typical system installation is illustrated in Figure 1 and Figure 2 below.

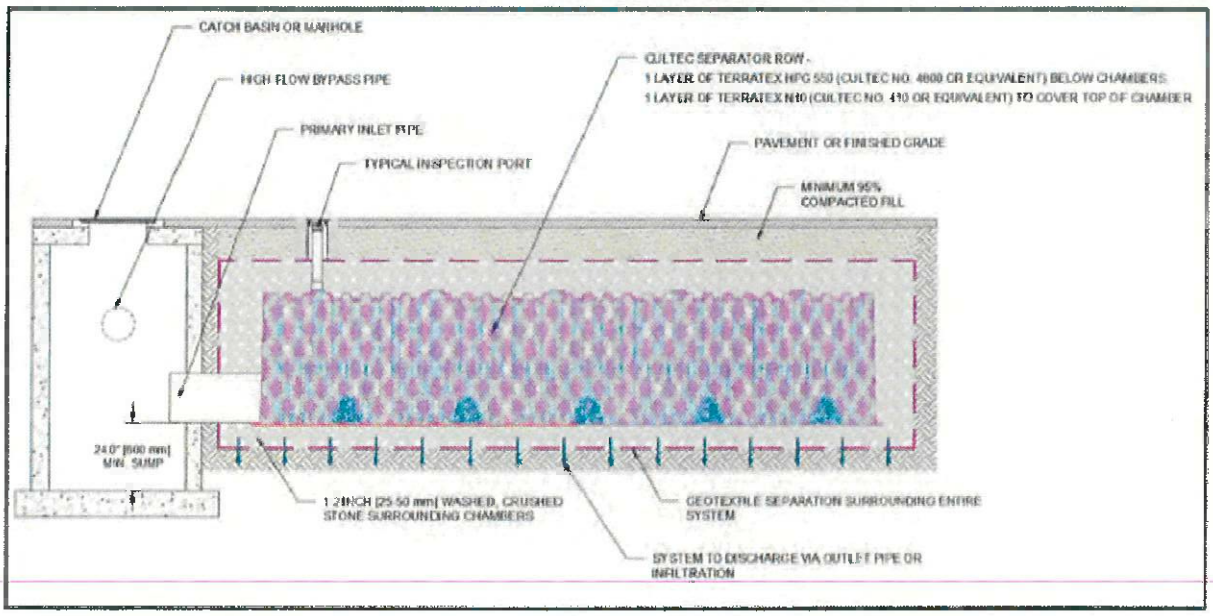


Figure 1: Cultec Separator Row™ Filtration System – Cross-Sectional View

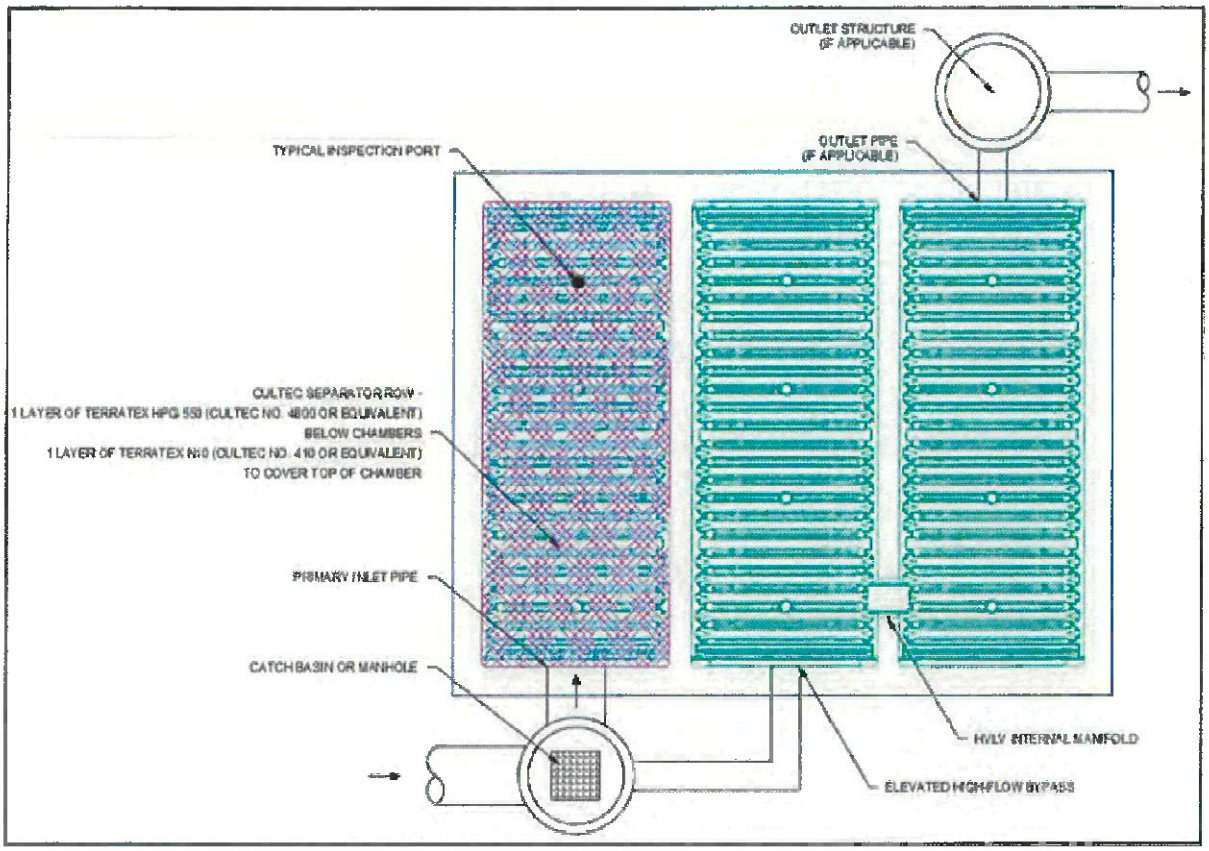


Figure 2: Cultec Separator Row™ Filtration System – Plan View

Performance conditions

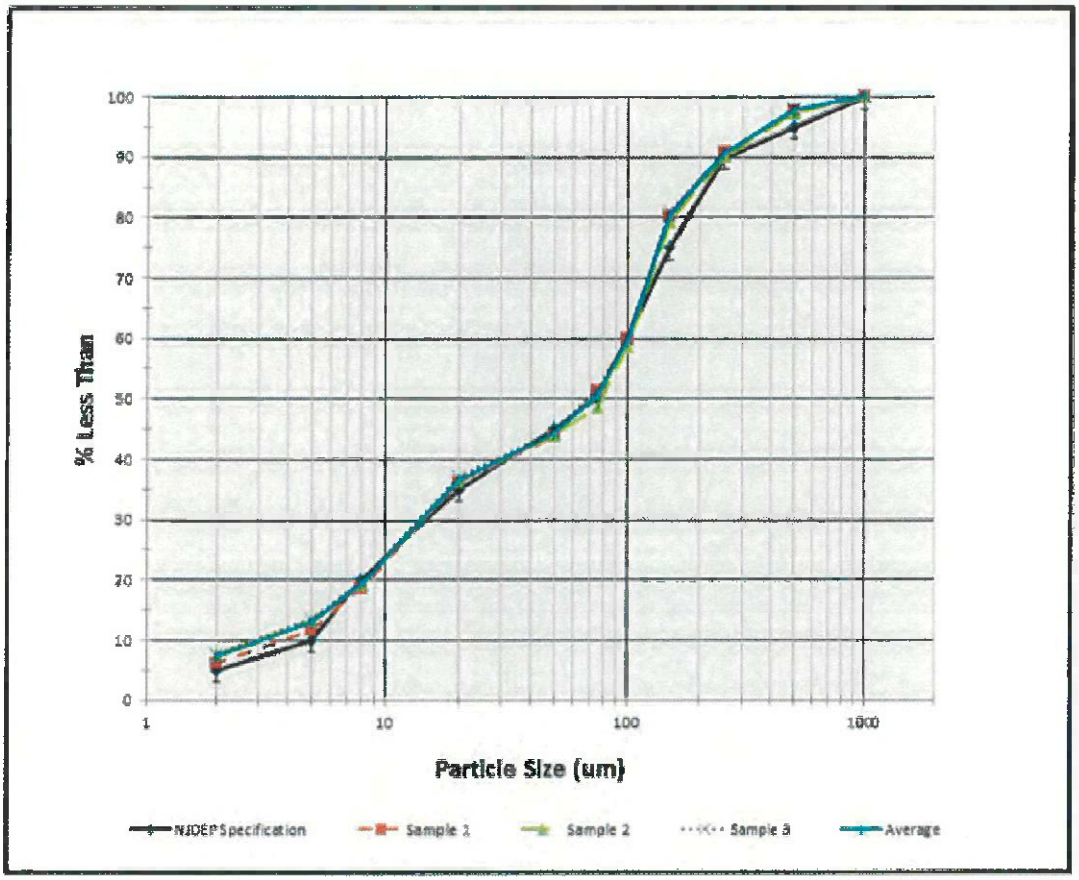
The data and results published in this Verification Statement were obtained from the testing program conducted on the Cultec Separator Row™ in accordance with a technology specific test plan (TSTP) developed and approved by the client and test lab (Good Harbour Laboratories, Mississauga, Ontario), and reviewed by Verification Expert and Verifying Organization, in compliance with ISO/IEC 14034. A copy of the testing procedures contained in the TSTP may be accessed at the following website: https://www.goodharbourlabs.com.

Performance claims

When installed with Terratex HPG 550 and Terratex N10 geotextiles, and tested with silica sediment having a particle size distribution conforming to the *Canadian Environmental Technology Verification Program Procedure for Laboratory Testing of Oil-Grit Separators*, the Cultec Recharger® 150XLHD Separator Row™ will remove at least the following fractions of suspended sediment at the corresponding flow rates: 80% at 24 gpm, 77% at 49 gpm, 73% at 73 gpm, 70% at 97 gpm, and 65% at 121 gpm. These performance claims are verified statistically at a 95% level of confidence.

Performance results

TEST SEDIMENT PARTICLE SIZE DISTRIBUTION IN RELATION TO SPECIFIED PSD



SUSPENDED SEDIMENT REMOVAL EFFICIENCY AT A FLOW RATE OF 24 GPM

	Suspended Sediment Concentration (mg/L)														
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Effluent	39.6	38.7	39.2	39.8	39.1	39.5	41.7	41.9	41.1	42.4	43.2	41.6	40.8	41.1	41.6
Background	2		2		2		2		2		2		2		2
Adjusted Effluent	37.6	36.7	37.2	37.8	37.1	37.5	39.7	39.9	39.1	40.4	41.2	39.6	38.8	39.1	39.6
Average Adjusted Effluent Concentration					38.8 mg/L			Removal Efficiency					80.2%		

SUSPENDED SEDIMENT REMOVAL EFFICIENCY AT A FLOW RATE OF 48 GPM

	Suspended Sediment Concentration (mg/L)														
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Effluent	47.1	47.0	47.1	46.8	47.3	47.3	49.0	50.1	49.5	50.4	49.1	50.2	52.2	49.7	51.8
Background	2		2		2		2		2		2		2		2
Adjusted Effluent	45.1	45.0	45.1	44.8	45.3	45.3	47.0	48.1	47.5	48.4	47.1	48.2	50.2	47.7	49.8
Average Adjusted Effluent Concentration					47.0 mg/L			Removal Efficiency					76.9%		

SUSPENDED SEDIMENT REMOVAL EFFICIENCY AT A FLOW RATE OF 73 GPM

	Suspended Sediment Concentration (mg/L)														
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Effluent	54.3	55.2	53.3	53.8	55.8	55.8	55.3	54.5	53.5	56.2	56.4	56.5	58.4	56.8	57.7
Background	2		2		2		2		2		2		2		2
Adjusted Effluent	52.3	53.2	51.3	51.8	53.8	53.8	53.3	52.5	51.5	54.2	54.4	54.5	56.4	54.8	55.7
Average Adjusted Effluent Concentration					53.6 mg/L			Removal Efficiency					73.3%		

SUSPENDED SEDIMENT REMOVAL EFFICIENCY AT A FLOW RATE OF 97 GPM

	Suspended Sediment Concentration (mg/L)														
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Effluent	58.4	59.4	59.0	61.2	61.6	61.1	58.9	60.4	59.9	63.9	63.3	62.5	61.9	61.0	61.0
Background	2		2		2		2		2		2		2		2
Adjusted Effluent	56.4	57.4	57.0	59.2	59.6	59.1	56.9	58.4	57.9	61.9	61.3	60.5	59.9	59.0	59.0
Average Adjusted Effluent Concentration					58.9 mg/L			Removal Efficiency					70.0 %		

SUSPENDED SEDIMENT REMOVAL EFFICIENCY AT A FLOW RATE OF 121 GPM

	Suspended Sediment Concentration (mg/L)														
Sample #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Effluent	72.0	72.8	71.7	72.1	70.1	72.1	69.3	72.3	77.2	71.0	70.7	72.7	71.1	70.4	73.0
Background	2		2		2		2		2		2		2		2
Adjusted Effluent	70.0	70.8	69.7	70.1	68.1	70.1	67.3	70.3	75.2*	69.0	68.7	70.7	69.1	68.4	71.0
Average Adjusted Effluent Concentration					69.9 mg/L			Removal Efficiency					65.3%		

*Note: This data point was considered to be a significant outlier and was therefore omitted as part of the overall statistical calculations to verify performance at a 95% level of confidence.

Verification

This verification was completed by the Verification Expert, the Centre for Advancement of Water and Wastewater Technologies ("CAWT"), contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management – Environmental technology verification (ETV)***. Data and information provided by Cultec, Inc. to support the performance claim included the final test report prepared by Good Harbour Laboratories of Mississauga, Ontario and dated November 9, 2017. The test report is based on testing completed in compliance with the requirements of ISO/IEC 17025.

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Cultec Separator Row™ Filtration System please contact:

Cultec, Inc.
878 Federal Road
Brookfield, CT
06804 USA
Tel: 203.775.4416 / Toll Free: 1.800.4.CULTEC
custservice@cultec.com
www.cultec.com

For more information on ISO 14034:2016 / ETV please contact:

GLOBE Performance Solutions
404 – 999 Canada Place
Vancouver, BC
V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com
www.globeperformance.com

Appendix H

Stormwater Management System
Long-Term Operation & Maintenance (O&M) Plan

STORM WATER MANAGEMENT SYSTEM
LONG-TERM OPERATION & MAINTENANCE PLAN

Revise Date: September 16, 2024

Lawrence Waste Services Corp.
Proposed Commercial Building
#39 Alder Street
Medway, MA

Prepared For:
East Hill Associates LLC
#49 Alder Street
Medway, MA 02053

Prepared By:
CMG Environmental, Inc.
67 Hall Road
Sturbridge, MA 01566
Phone: (774) 241-0901

CMG ID 2024-128

TABLE OF CONTENTS

TABLES

ATTACHMENTS

Long Term Operation & Maintenance Plan
Site Stormwater Management System
Proposed Commercial Building – Lawrence Waste Services
#39 Alder Street
MEDWAY, MA

Operation and Maintenance (O&M) Plan

The purpose of this Storm Water Management System Operation and Maintenance Plan is to prevent erosion, sedimentation, pollution or other deterioration of the storm water management system and resource areas located on and adjacent to the site property located at **#39 Alder Street in Medway, MA** (the "Site"). The storm water management system shall be maintained properly to assure its continued performance.

Responsible Party:
East Hill Associates LLC
49 Alder Street
Medway, MA 02053
p. (508) 533-5200

Storm water Management System Owner: **(same as above)**

Site subject to Wetlands Protection Act: **YES DEP File #216-1036**

The "Responsible Party" Shall:

- Prepare and submit an **"Operation and Maintenance (O & M) Compliance Statement" (see Attachment #1)** upon completion of site construction activities.
- Implement the routine and non-routine operation, maintenance, and inspection tasks in accordance with the procedures specified in this document to ensure that all storm water management systems function as designed;
- Maintain a log of all operation and maintenance (O & M) activities for the last five (5) years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and disposal location);
- Make this log available to **Town of Medway** official representatives upon request;
- Agree to notify in writing all "future property owners" of the presence of the storm water management system and the requirement for proper operation and maintenance.
- Responsible Party is required to maintain an adequate annual budget to fund all required stormwater operation and maintenance activities.

"Lawrence Waste Services" maintains a contract with the following companies:

Landscaping & Pavement Maintenance: _____

Snow Removal & Plowing: _____

Storm Water System Maintenance: _____

Table No. 1
Proposed Commercial Building – Lawrence Waste Services
#39 Alder Street, Medway, MA

STORMWATER SYSTEM INSPECTION AND MAINTENANCE SCHEDULE		
Best Management Practice (BMP)	**Inspection Frequency**	**Maintenance Frequency**
STRUCTURAL BMPs		
DEEP-SUMP HOODED CATCH BASIN	Four (4) Times/ Year At end of foliage & snow removal seasons	Remove Sediment if Sediment Depth Reaches 50% of Sump as Min 2 Times per Year (End of Foliage & Snow Removal Season)
CULTEC SEPARATOR ROW	Bi-annual (Early Spring & Late Fall)	Refer to Manufacturer's Recommendations
UNDERGROUND INFILTRATION CHAMBERS	Bi-Annual (Early Spring & Late Fall)	As needed
8" OUTLET PIPES Rip-Rap Apron	Four (4) Times / Year	Remove Sediment Four (4) Times / Year (Including End of Foliage & Snow Removal Seasons)
NON-STRUCTURAL STORMWATER CONTROLS		
Landscaping	Four (4) Times / Year	Seasonally As Needed
Roadway / Driveway Sweeping	Two (2) Times /Year	Seasonally As Needed
Snow Removal	Seasonally As Needed	In Accordance with M.G.L. Title XIV. Public Ways and Works; Chapter 85

STRUCTURAL STORMWATER BMP MAINTENANCE:

Deep Sump Catch Basin(s):

- Inspect or clean catch basin(s) at least four (4) times per year, including the end of the foliage and snow removal seasons.
- Inspection shall occur by probing the structure with a rod to determine the depth of accumulated sediment.
- Sediments must be removed whenever the depth of sediment is greater than or equal to one half of the depth from the bottom of the invert of the lowest pipe in the basin. At a minimum, cleaning shall occur twice a year during the spring and fall.
- The structure will be cleaned of water and sand/debris with the use of a vacuum truck. Material removed from the structure will be disposed of legally off-site by the vendor.
- Unless there is evidence that they have been contaminated by a spill or other means, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste.

Cultec Separator Row

- Inspect Separator Rows bi-annually using the installed inspection ports.
- Utilizing the JetVac process, remove accumulated sediment or pollutants in the separator row. See the attached Cultec Operation and Maintenance Plan (**Attachment #2**) for more details regarding the JetVac process and monitoring procedure.

Underground Infiltration Chambers

- Inspect inlet at least twice a year and remove any debris that may clog the system.

Rip-rap Apron Outlets

- Inspect regularly, especially after large rainfall events;
- Note and repair any erosion & sediment buildup at the Rip-Rap outlet protection.

NON- STRUCTURAL STORM WATER MANAGEMENT CONTROLS:

Non-Structural Control Measures & Stormwater Treatment

Landscape & Pavement Maintenance:

- **No debris, refuse or other materials,** including but not limited to landscaping debris, leaves, shrubs and tree trimmings, logs, bricks, stone or trash shall be deposited within the vegetated wetland.

- The use of pesticides, herbicides, and fertilizers on the site shall be minimized to the extent practicable and shall be applied in accordance with manufacture recommendations by experienced and if applicable, licensed personnel.

- Only allowed slow-release organic in jurisdictional areas such as within 100' from wetland resources.

- Pavement areas will be swept seasonally as necessary to remove accumulated winter sand and salt and fall leaves, and shall be swept as required to remove litter. Collected material will be properly disposed of off-site.

- Storage of fertilizer, pesticides, & herbicides is prohibited within the jurisdictional areas.

- Storage of materials, such as salt or building materials, shall be stored indoors or undercover if located outside.

Trash Removal

- Inspect on-site area for litter and trash as needed. Any accumulated trash, litter, and discarded materials in this area will be removed and will be disposed of at a suitable location on a weekly basis. Solid waste will be collected and stored within the building interior and discarded from the site via the trash removal contractor.

Materials & Waste Storage

- Non-hazardous materials are to be stored within the limits of the secured/ fenced-in "storage yard" as shown on the enclosed Site Plans. Non-hazardous waste will be discarded in the proposed dumpster (location shown on site plans). Any combustibles are to be stored inside the proposed building in fire rated cabinets. No other hazardous materials or waste is to be stored on premise.

HAZARDOUS WASTE / OIL SPILL RESPONSE PROCEDURE

Initial Notification. In the event of a spill of hazardous waste or oil the facility manager or supervisor will be notified immediately by telephone.

Assessment – Initial Containment. The supervisor or manager will assess the incident and initiate control measures. The supervisor will first contact the **Town of Medway Fire Department** and then notify the **Town of Medway Police Department**. The Fire Department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department Telephone: 911 (Emergency); (508) 533-3213 (Non-Emergency)

Police Department Telephone: 911 (Emergency); (508) 533-3212 (Non-Emergency)

Further Notification. Based on the assessment by the Fire Chief, additional notification to a clean up contractor may be made. The Massachusetts Department of Environmental Protection and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of clean up and notification required.

SNOW MANAGEMENT PLAN:

- No snow storage shall be located within or "deposited" within wetland resource areas on or off-site.
- No salt shall be used to treat unpaved areas during snow and ice conditions. The storage of all "de-icing" chemicals and treatment products is to be inside the building.
- If Site snow storage interferes with driveway maneuvers or sight distances (i.e., blocking of travel aisles, sight distance, or parking) the snow pile will be either removed or reduced legally in a legal manner by the snow plow vendor within 24-hours.
- Pavement areas will be swept seasonally as necessary to remove accumulated winter sand and salt and fall leaves, and shall be swept as required to remove litter. Collected material will be properly disposed of off-site.

INSPECTIONS / RECORDKEEPING:

Routine Inspections:
Routine inspections and maintenance to be conducted with the frequency described in this Operation and Maintenance Plan. An example inspection form is provided in **Attachment #3**.

Recordkeeping
Records of all drainage system inspections and maintenance shall be kept on file for a period of at least **three (3) years.**

Annual Report
Annual Report Form (Attachment #3) and copies of quarterly inspection forms must be submitted to the Town of Medway Conservation Commission & Medway Department of Public Works (DPW) by **December 31** of each year per Medway Conservation Agent (see Order of Conditions CE 216-1036).

All repairs and maintenance activities regarding the stormwater management system should be recorded and provided to the Medway Planning Board upon request. An example inspection form is provided in **Attachment #3**.

PUBLIC SAFETY FEATURES:

- All cast iron storm water structure grates and covers shall be kept in good condition and kept closed at all times. Any damaged or broken structures will be replaced immediately upon discovery;

OPERATION & MAINTENANCE BUDGET ESTIMATE:

- **The responsible party, "Lawrence Waste Services",** agrees to maintain an adequate annual budget to provide for the routine maintenance activities detailed in this document including but not limited to:
    - Landscape Maintenance;
    - Storm Water Management System Inspection & Maintenance;
    - Snow Plowing & Removal

STAFF TRAINING:

- Staff training shall be conducted on an annual basis regarding the long-term operation and maintenance of the proposed stormwater management system. A training log is recommended for each annual training and kept for recording purposes for a minimum of three (3) years.

Attachment #1

Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement
Site Storm Water Management System
Lawrence Waste Services Corp - Proposed Commercial Building
#39 Alder Street
MEDWAY, MA

Responsible Party:
East Hill Associates LLC
#49 Alder Street
Medway, MA 02053
p. (508) 533-5200

Storm Water Management System Owner: (same as above)

Site subject to Wetlands Protection Act: YES

The above listed "responsible party" is responsible for implementation of this "Long-Term Operation and Maintenance Plan" and certifies that:

- The site will be inspected for erosion and appropriate steps are to be taken to permanently stabilize any eroded areas;
- All aspects of storm water BMPs will be inspected for damage, wear and malfunction, and appropriate steps will be taken to repair or replace the system or portions of the system so that the storm water at the site may be managed in accordance with:
    - MA-DEP Stormwater Management Standards, revise date January 2, 2008;
- There is no record or knowledge of illicit discharges to the on-site stormwater management system;
- All "future property owners" must be notified of their continuing legal responsibility to operate and maintain the Site Stormwater Management System.
- The "Long-Term Operation and Maintenance Plan" for the storm water BMPs is being implemented.

Signature of Responsible Party:

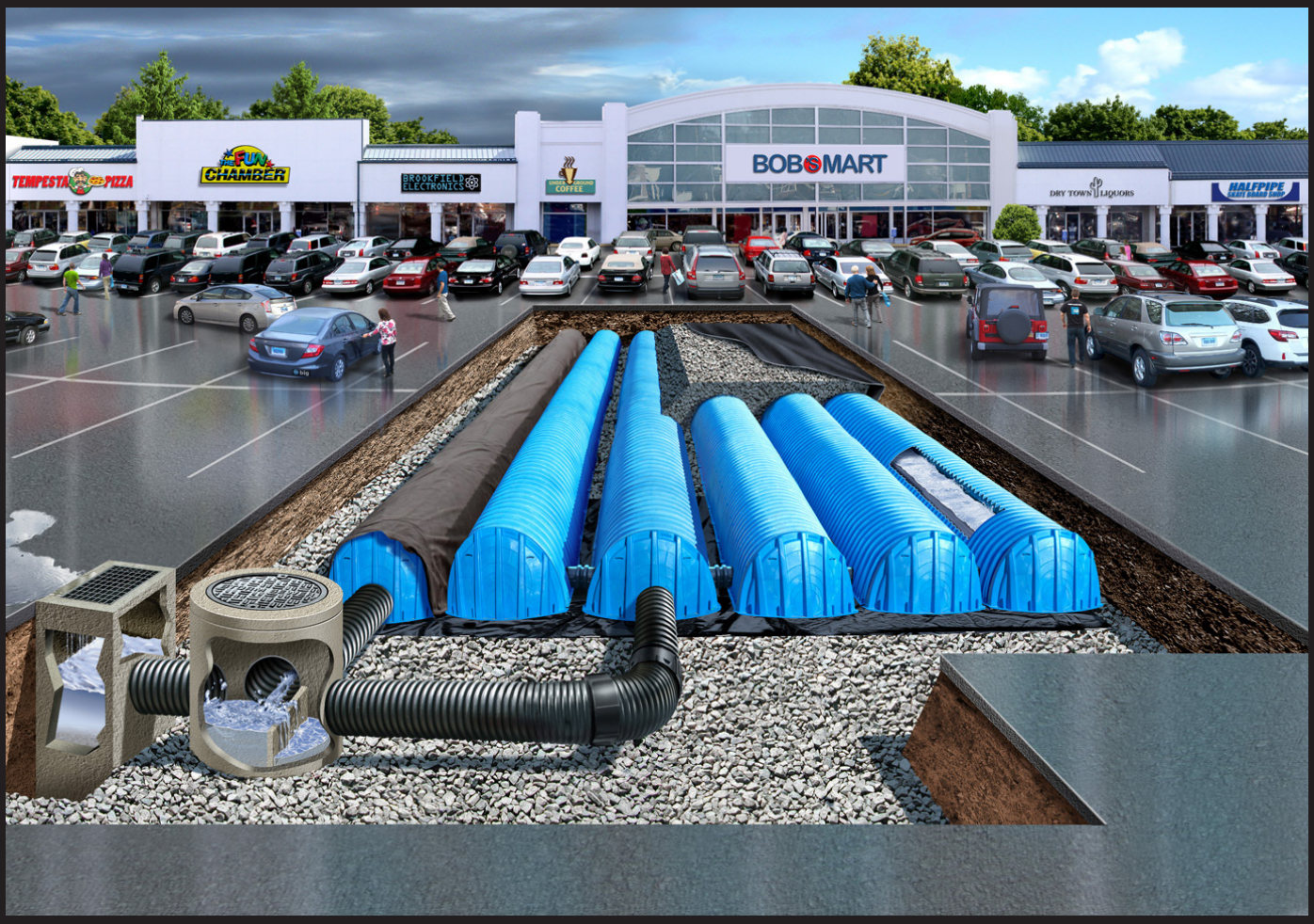
_____ _____
East Hill Associates LLC Date

Attachment #2

Cultec Separator Row Filtration System Operations & Maintenance Manual

CULTEC SEPARATOR™ ROW

WATER QUALITY SYSTEM



OPERATION & MAINTENANCE GUIDE

FOR CULTEC STORMWATER MANAGEMENT SYSTEMS

GLOBE VERIFIED VÉRIFIÉ

STORMWATER MANAGEMENT SOLUTIONS

CULTEC®

Published by
CULTEC, Inc.
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878 Federal Road
Brookfield, Connecticut 06804 USA
www.cultec.com

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Protected by one or more of the following patents:
U.S. Patents 6,129,482; 6,322,288; 6,854,925; 7,226,241; 7,806,627; 8,366,346; 8,425,148; and others; U.S. Designs D613819; D638,095; D668,318 and others; Canadian Patent 2,591,255 and others; Community Designs 1092191; 1745209; and others.

Contact Information:

For general information on our other products and services, please contact our offices within the United States at (800)428-5832, (203)775-4416 ext. 202, or e-mail us at custservice@cultec.com.

For technical support, please call (203)775-4416 ext. 203 or e-mail tech@cultec.com.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

Doc ID: CLT043 02-22
Feb 2022

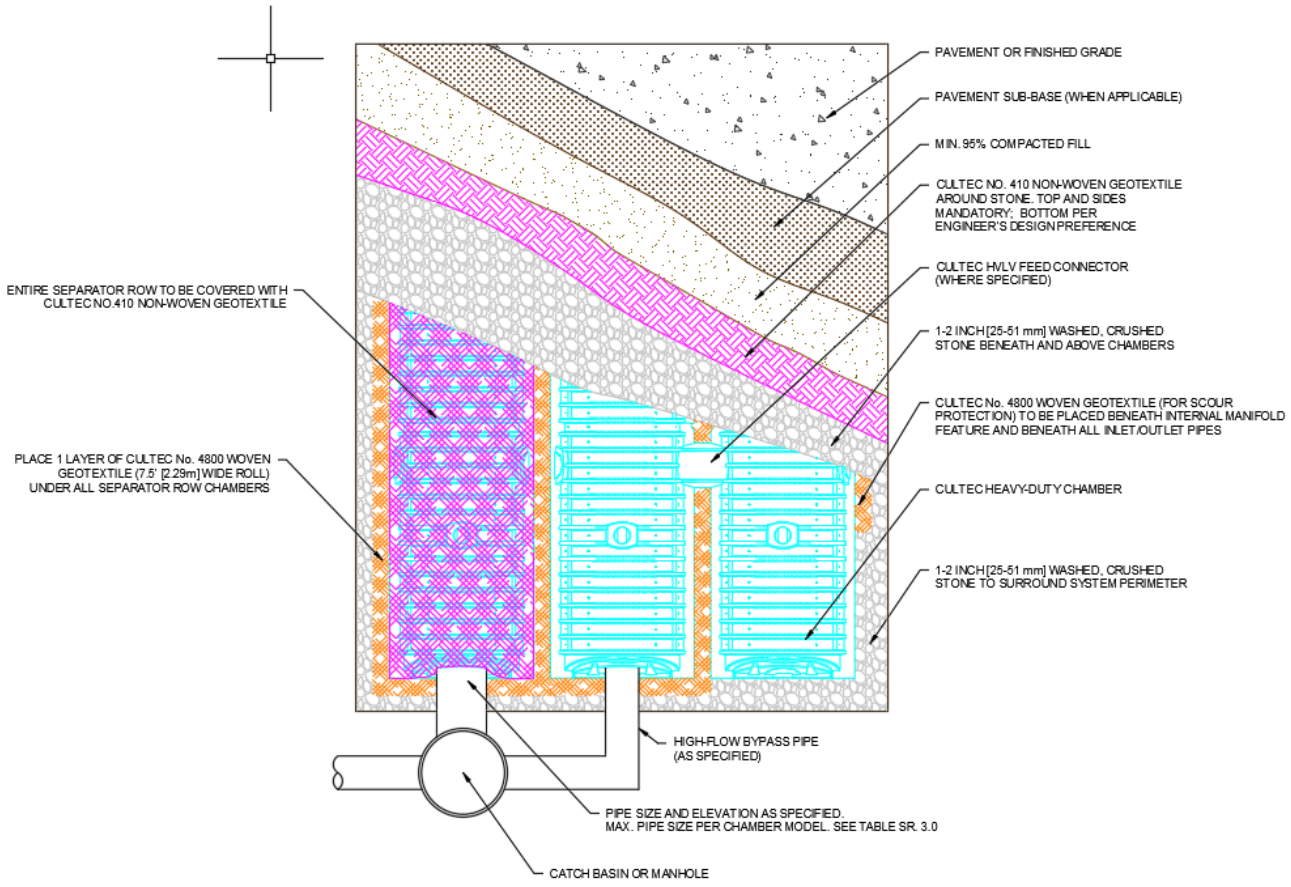
Introduction

CULTEC's Separator™ Row is an inexpensive means of removing Total Suspended Solids from the CULTEC chamber system, as well as providing easier access for inspection and maintenance. The Separator Row is designed to capture the First Flush of a rain event and is typically included as part of the "Treatment Train" for water quality.

The CULTEC Separator Row is a row of CULTEC Contactor or Recharger Chambers that are surrounded on all sides by filter fabric. One layer of CULTEC No. 4800™ Woven Geotextile are placed between the clean foundation stone and the chamber feet. The chambers are then completely wrapped with CULTEC No. 410™ non-woven geotextile. This configuration is designed to trap any sediment and/or debris that may pass through the upstream water-quality structures and into the chamber system.

A manhole is typically located adjacent to the separator row for ease of inspection and maintenance. This manhole is placed upstream of the system and can include a high-flow bypass pipe to pass peak-flows onto adjacent rows of chambers. The upstream manhole is designed with a sump to trap heavier sediment and allow for proper cleaning of the Separator Row. A JetVac process with a high pressure water nozzle is introduced down the Separator Row via the access manhole to clean all sediment and debris from the Separator Row. Captured pollutants are flushed into the sumped access manhole for vacuuming, and the process is repeated until the Separator Row is completely free of sediment and debris.

The Separator Row performance has been tested and verified to the protocols and procedures as defined by Environmental Technology Verification (ETV) Canada to achieve 80% TSS removal.



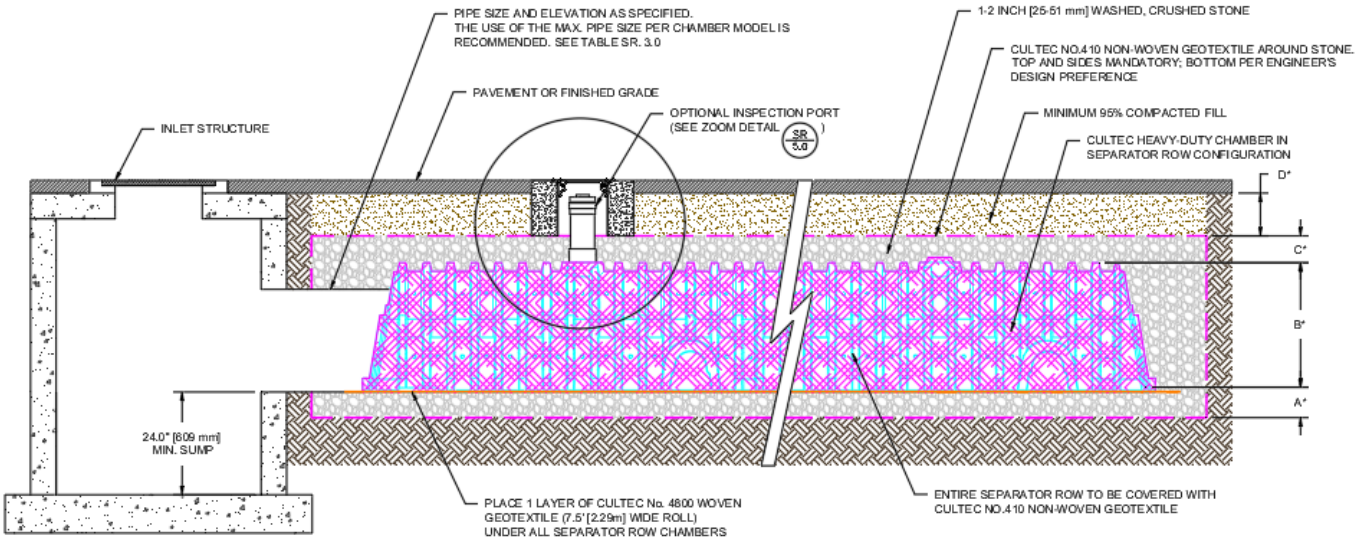
Design

There is no single design to achieve a high level of water quality. The CULTEC Separator Row should be designed as part of an overall best management practices water quality system. Pre-treatment devices such as sump catch basins, inlet baffles and proprietary oil-grit separators and filter systems can all be incorporated upstream of the CULTEC Separator Row. Sumped access/diversion manholes should be installed directly upstream of the Separator Row.

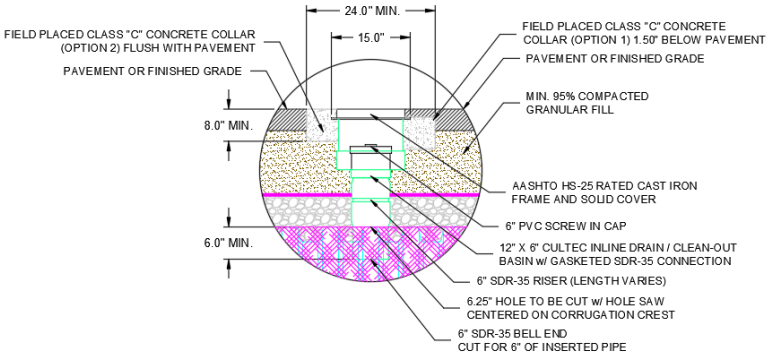
The following is a list of recommended design practices to ensure proper maintenance for the life of the system:

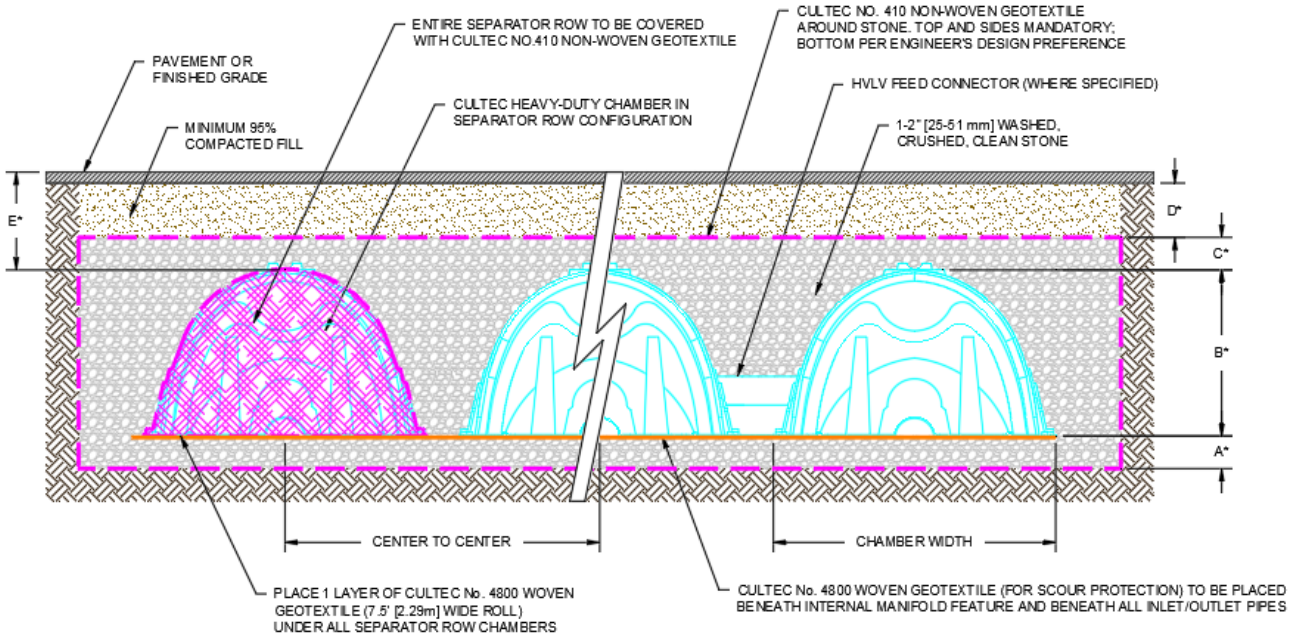
- Install sumped access/diversion manholes, including a minimum 24” (600 mm) sump, directly upstream of the Separator Row.
- Include a high-flow bypass pipe to divert peak flows that exceed the capacity of the Separator Row to adjacent rows.
- Connect the access manhole to the Separator Row with the largest diameter pipe allowable based on the CULTEC chamber model used.
- Maintain a minimum distance between the access manhole and the Separator Row to promote efficient maintenance.
- Include at least one inspection port per Separator Row for periodic inspection.

Note: Typical JetVac maintenance reels have a maximum of 400 feet (121.9 m) of available hose. Consider this when designing the length of the CULTEC Separator Rows.



*SEE SR 3.0 - CROSS SECTION TABLE REFERENCE





*SEE SR 3.0 - CROSS SECTION TABLE REFERENCE

Table SR 3.0

	Description	Contactor 100HD	Recharger 150XLHD	Recharger 280HD	Recharger 330XLHD	Recharger 360HD	Recharger 902HD
A	Min. depth of stone base	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	9″ 229 m
B	Chamber height	12.5″ 318 mm	18.5″ 470 mm	26.5″ 673 mm	30.5″ 775 mm	36″ 914 mm	48″ 1219 mm
C	Min. depth of stone required above units for traffic applications	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	6″ 152 mm	12″ 305 mm
D	Min. depth required of 95% compacted fill for paved traffic application	8″ 203 mm	8″ 203 mm	8″ 203 mm	10″ 254 mm	12″ 305 mm	12″ 305 mm
E	Max. depth of cover allowed above crown of chamber	12′ 3.65 m	12′ 3.65 m	12′ 3.65 m	12′ 3.65 m	12′ 3.65 m	8.5′ 2.59 m
	Max. allowable pipe size into chamber end wall/end cap	10″ 250 mm	12″ 300 mm	18″ 450 mm	24″ 600 mm	24″ 600 mm	24″ 600 mm

Inspection and Maintenance

CULTEC recommends inspection of the Separator Row to be performed every six months for the first year of service. Future inspection frequency can be adjusted based upon previous inspection observations. However annual inspections are recommended. Inspection of the Separator Row can be achieved via an inspection port riser installed during construction. This inspection port riser will connect the top of the Separator Row chambers to finished grade with a removable lid. Alternatively the Separator Row may be inspected via the manhole(s) located at the end(s) of the Separator Row. However this method of inspection requires confined space entry. If entry into the manhole is required, all local and OSHA rules for confined space entries must be strictly followed.

To inspect:

- Remove the inspection port lid from the floor box frame.
- Remove the riser pipe cap.
- With a flashlight and stadia rod, measure the depth of sediment.
- Record results in a maintenance log.
- When depth of sediment exceeds 3” (76 mm), use the JetVac procedure described below.

The JetVac process utilizes a high pressure water nozzle controlled from the surface. The high pressure nozzle is introduced down the Separator Row via the access manhole(s). The high pressure water cleans all sediment and debris from the Separator Row as the nozzle is retrieved. Captured pollutants are flushed into the sumped access manhole for vacuuming. This process is repeated until the Separator Row is completely free of sediment and debris. A small diameter culvert cleaning nozzle is recommended for this procedure.

High pressure water nozzle

Cleaning Separator Row and pipes with high pressure water nozzle

SEPARATOR ROW: Separator Row prior to cleaning

ADJACENT ROW: When the Separator Row is working properly, the adjacent rows will not show signs of sediment.

Inspection and Maintenance Record

Date	Mode of Access	Frequency	Depth of Sediment	Actions	Expenses	Inspector	Notes
Ex.	Inspection Port	Semi-annually	2”	Measure sediment depth with stadia rod. Visually inspect	$100	DPG	Depth of Sediment was measured via Northeast Inspection Port Adjacent to MH-1. Sediment depth was found to be 2”. No further action required at this time.
Ex.	Access Manhole	Annually					

CULTEC, Inc.
878 Federal Road • P.O. Box 280 • Brookfield, CT 06804 USA
P: (203) 775-4416 • Toll Free: 1(800) 4-CULTEC • www.cultec.com

RETENTION • DETENTION • INFILTRATION • WATER QUALITY

Attachment #3

Stormwater Management System
Quarterly Inspection Form
&
Annual Report Form

Inspection Form - Storm Water Management System
Lawrence Waste Services Corp.
Proposed Commercial Building
#39 Alder Street, Medway, Massachusetts

QUARTERLY INSPECTION AND MAINTENANCE REPORT

Jan.-Mar. Apr.-Jun. July-Sep. Oct. – Dec.

Note: This Log should be copied prior to use. Note Additional Comments on back of Form.

Inspector's Name: _____ Date: _____ Time: _____ am/pm

Inspector's Qualifications: _____

Days Since Last Rainfall: _____ Amount of Last Rainfall: _____ inches

Item/Condition to be Checked	Maintenance Required		Corrective Action & Date
	No	Yes	
Four (4) Deep Sump Catch Basins (With Hoods)			Clean Each Unit Twice /Year or After Spill Event
Cultec Separator Row Filtration System			Inspect Bi-Annually using Inspection Ports
Underground Infiltration Chambers			
Two (2) 8" Outlet Pipes with Rip-Rap Aprons			
Parking Lot / Driveway Sweeping			*Sweep Seasonally – As Needed
Landscaping / Trash Removal			
Snow Removal (seasonal)			*All De-icing chemical storage to be inside building

Additional Comments: _____

Annual Report Form
Storm Water Management System
#39 Alder Street Medway, Massachusetts

Note: This Log should be copied prior to use.

**** Submit To Town of Medway Conservation Commission & Department of Public Works Annually by December 31st****
Medway Town Hall, 155 Village Street Medway, MA 02053

Property Owner / Responsible Party: **East Hill Associates LLC**
49 Alder Street
Medway, MA 02053

Storm Water Management System Owner: **(same as above)**

Site subject to Wetlands Protection Act: **DEP FILE No: CE 216-1036 Order of Conditions**

The above listed "responsible party" is responsible for implementation of this "Long-Term Operation and Maintenance Plan" and certifies that:

- The site has been inspected for erosion and appropriate steps have been taken to permanently stabilize any eroded areas;
- All aspects of storm water BMPs have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the storm water at the site may be managed in accordance with:
    - MA-DEP Stormwater Management Standards, revise date January 2, 2008;
- There is no record or knowledge of illicit discharges to the on-site stormwater management system;
- All "future property owners" must be notified of their continuing legal responsibility to operate and maintain the Site Stormwater Management System.
- The "Long-Term Operation and Maintenance Plan" for the storm water BMPs is being implemented.

Signature of Responsible Party:

_____ _____
Keith Lawrence, East Hill Associates LLC Date