ALTERATION OF TERRAIN PERMIT APPLICATION & DRAINAGE REPORT

PREPARED FOR:
Easter Seals NH, Inc.
Franklin, NH
Merrimack County
Phase 2

August 2025

PREPARED BY:

NORWAY PLAINS ASSOCIATES, INC.

Scott A. Lawler, P.E. N.H. Reg. #10026

2 CONTINENTAL BOULEVARD, P.O. BOX 249, ROCHESTER, NEW HAMPSHIRE 03866-0249 (603) 335-3948

ALTERATION OF TERRAIN PERMIT APPLICATION

Water Division / Alteration of Terrain Bureau
Land Resources Management Program
Check the status of your application

RSA / Rule: RSA 485-A:17, Env-Wq 1500

Administrative Use Only	Administrative Use Only	Administrative Use Only	File Number:
			Check No.
			Amount:
			Initials:

1. APPLICANT INFORMATION (INTENDED PERMIT HOLDER)		
Applicant Name: Easter Seals New Hampshire, Inc.	Contact Name: Christopher Miller	
Email: Easter Seals New Hampshire, Inc.	Daytime Telephone: 603 623-8863	
Mailing Address: 555 Auburn Street		
Town or City: Manchester	State: NH	ZIP: 031303-480
2. APPLICANT'S AGENT INFORMATION *If none, check box:* ■		
Agent's Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town or City:	State:	ZIP:
3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT) *If more than one, check box:* ■ *Attach additional sheets as necessary.*		
Owner's Name:	Contact Name:	
Email:	Daytime Telephone:	
Mailing Address:		
Town or City:	State:	ZIP:
4. PROPERTY OWNER'S AGENT INFORMATION *If none, check box:* ☐		
Business Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town or City:	State:	ZIP:
5. CONSULTANT INFORMATION *If none, check box:* ☐		
Engineering Firm: Norway Plains Associates, Inc.	Contact Name: Scott A. Lawler	
Email: SLawler@NorwayPlains.com	Daytime Telephone: 603-335-3948	
Address: PO Box 249		
Town or City: Wolfeboro	State: NH	ZIP: 03851

6. PROJECT TYPE					
☐ Excavation Only	■ Residential	☐ Commercial	☐ Golf Course	☐ School	☐ Municipal
☐ Agricultural	☐ Land Conversion	☐ Other:			

7. PROJECT LOCATION INFORMATION			
Project Name: Easter Seals - Franklin			
Street or Road Address: Holy Cross Road			
Town or City: Franklin		County: Merrimack	
Tax Map: 104	Block:	Lot Number: 406-1 & 406-2	Unit:

Post-development, will the proposed project withdraw from or directly discharge to any of the following?
If yes, identify the purpose.

Stream or Wetland?	☐ Yes ■ No	☐ Withdrawal ☐ Discharge
Purpose:		
Artificial pond created by impounding a stream or wetland?	☐ Yes ■ No	☐ Withdrawal ☐ Discharge
Purpose:		
Unlined pond dug into the water table?	☐ Yes ■ No	☐ Withdrawal ☐ Discharge
Purpose:		

Post-development, will the proposed project discharge to:

- Within one-quarter mile of a surface water impaired for phosphorus and/or nitrogen? ■ No ☐ Yes
- Within one-quarter mile of a Class A surface water or within the watershed area of an Outstanding Resource Water? ■ No ☐ Yes
- Within one-quarter mile of a lake or pond not covered previously? ■ No ☐ Yes

Is the project a high load area? ☐ Yes ■ No

If yes, specify the type of high load land use or activity:

Is the project within a Water Supply Intake Protection Area (WSIPA)? ☐ Yes ■ No

Is the project within a Groundwater Protection Area (GPA)? ■ Yes ☐ No

Will the well setbacks identified in Env-Wq 1508.02 be met? ■ Yes ☐ No

Is any part of the property within the 100-year floodplain? ☐ Yes ■ No

If yes, cut volume, in cubic feet, within the 100-year floodplain: N/A

Fill volume, in cubic feet, within the 100-year floodplain: N/A

■ Project *is* within ¼ mile of a designated river	Name of River: Upper Merrimack River

☐ Project *is not* within ¼ mile of a designated river.

☐ Project *is* within a Coastal/Great Bay Region community.

■ Project *is not* within a Coastal/Great Bay Region community.

8. BRIEF PROJECT DESCRIPTION *(Please do not reply "see attached")*

This is Phase 2 of the Easter Seals Veterans Campus. This phase proposal is to construction an equestrian center at the northern end of the campus. The creation of a series of walking paths and other site amenities to enhance the campus style community. At the southern end of campus a aquatics and fitness center will replace the heating plan building.

9. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT.

Phase 1 under permit No. AoT-2491. The under permit No. AoT-2491 was completed August 2025.

10. ADDITIONAL REQUIRED INFORMATION

A. Date a copy of the application was sent to the municipality, as required by Env-Wq 1503.05(e) (Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the governing body of each municipality in which the project is proposed).

☒ Proof of delivery is attached	Date: 9-17-25

B. Date a copy of the application was sent to the local river advisory committee, if required by Env-Wq 1503.05(e) (Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the Local River Advisory Committee, if the project is within ¼ mile of a designated river).

☒ Proof of delivery is attached	Date: 9-17-25

C. Type of plan required:

☐ Land Conversion ☒ Detailed Development ☐ Excavation, Grading and Reclamation ☐ Steep Slope

D. Additional plans required:

☒ Stormwater Drainage and Hydrologic Soil Groups ☐ Source Control ☐ Chloride Management

E. Total area of disturbance in square feet: 280,860

F. Additional impervious cover as a result of the project, in square feet (*use "-"to indicate a net reduction in impervious coverage):* 96,267.6

Total final impervious cover, in square feet: 210,830.4

G. Total undisturbed cover, in square feet: 397,541

H. Number of lots proposed: 0

I. Total length of roadway, in linear feet: 1056

J. Name(s) of receiving water(s): N/A

K. Identify all other NHDES permits required for the project. For each, indicate whether an application has been filed and is pending. If the required approval has been issued, provide the permit number, registration date, or approval letter number, as applicable.

Type of Approval	Application Filed?	Pending?	If Issued
1. Water Supply Approval	☐ Yes ■ No ☐ N/A	☐	Permit number:
2. Wetlands Permit	☐ Yes ■ No ☐ N/A	☐	Permit number:
3. Shoreland Permit	☐ Yes ■ No ☐ N/A	■	Permit number:
4. UIC Registration	☐ Yes ☐ No ■ N/A	☐	Approval letter date:
5. Large/Small Community Well Approval	☐ Yes ■ No ☐ N/A	☐	Permit number:
6. Large Groundwater Withdrawal Permit	☐ Yes ☐ No ☐ N/A	☐	Permit number:
7. Other:	☐ Yes ☐ No		

L. List all species identified as threatened or endangered or of concern: none

M. Using the NHDES OneStop Data Mapper, with the "surface water impairment" layer turned on, list the impairments identified for each receiving water. If no pollutants are listed, enter "N/A."

n/a

N. Did the applicant or applicant's agent have a pre-application meeting with Alteration of Terrain Bureau staff?

☐ Yes ■ No | If yes, name of staff member:

O. Will blasting of bedrock be required? ☐ Yes ■ No

If yes, estimated quantity of blast rock, in cubic yards: n/a

If yes, standard blasting best management practices notes must be placed on the plans.

NOTE: *If greater than 5,000 cubic yards of blast rock will be generated, a groundwater monitoring program must be developed and submitted to NHDES. Contact Alteration of Terrain Bureau staff for additional detail.*

11. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY *(Submit with application in the order listed below)*

LOOSE:

- ☒ Signed application form, with attached proof(s) of delivery.
- ☒ Check for the application fee, calculated using the fee schedule available on the NHDES land development page.
- ☒ Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale).
- ☒ If the applicant is not the property owner, proof that the applicant will have a legal right to undertake the project on the property if a permit is issued to the applicant.

BOUND, IN A REPORT, IN THE FOLLOWING ORDER:

- ☒ Copy of the signed application form and application checklist.
- ☒ Copy of the check.
- ☒ Copy of the USGS map with the property boundaries outlined (1" = 2,000' scale).
- ☒ Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points.
- ☒ Printout of NHDES OneStop Mapper with "Surface Water Impairments" layer turned on.
- ☒ Printout of NHDES OneStop Mapper with Alteration of Terrain screening layers turned on.
- ☒ Printout of the DataCheck Tool results letter and any relevant correspondence with New Hampshire Fish and Game.
- ☒ United States Department of Agriculture (USDA) Web Soil Survey Map with project's watershed outlined.
- ☒ Aerial photograph (1" = 2,000' scale with the site boundaries outlined).
- ☒ Photographs representative of the site.
- ☒ Groundwater recharge volume calculations (include one Alteration of Terrain Permitting Best Management Practices Worksheet per permit application).
- ☒ Drainage analysis, stamped by a professional engineer (see "Application Checklist" at the end of this document).
- ☒ Riprap apron or other energy dissipation or stability calculations.
- ☒ Site Specific Soil Survey report, stamped and with a certification note prepared by the soil scientist that the survey was done in accordance with the Site Specific Soil Mapping standards of the Society of Soil Scientists of Northern New England.
- ☒ Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)].
- ☐ Registration and Notification Form for Stormwater Infiltration to Groundwater (Underground Injection Control Registration-for underground systems only, including drywells and trenches).
- ☒ Inspection and maintenance manual with, if applicable, long term maintenance agreements [Env-Wq 1503.08(g)].
- ☐ Source control plan.

PLANS:

- ☒ One set of design plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details).
- ☒ Pre- and post-development color-coded soil plans on 11" x 17" (see Application Checklist for details).
- ☒ Pre- and post-construction drainage area plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details).

100-YEAR FLOODPLAIN REPORT:

- ☐ All information required in Env-Wq 1503.09, submitted as a separate report.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- ☐ See Application Checklist (Attachment A) for details.
- ☒ Review application for completeness. Confirm information listed on the application is included with submittal.

12. REQUIRED SIGNATURES

By signing below, I certify that:

- The information contained in or otherwise submitted with this application is true, complete, and not misleading to the best of my knowledge and belief;
- I understand that the submission of false, incomplete, or misleading information constitutes grounds for the department to deny the application, revoke any permit that is granted based on the information, and/or refer the matter to the board of professional engineers established by RSA 310-A:3 if I am a professional engineer; and
- I understand that I am subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641:3.

☐ **APPLICANT** ☐ **APPLICANT'S AGENT**:

Signature:	Date:
Name (print or type):	Title:

☑ **PROPERTY OWNER** ☐ **PROPERTY OWNER'S AGENT:**

Signature: Maureen Beauregard	Date: 9/15/2025
Name (print or type): Maureen Beauregard	Title: President & CEO

EASTER SEALS NEW HAMPSHIRE, INC.
555 Auburn Street
Manchester, NH 03103

Check Date: 09/15/2025
Check Number: 203061

To: TREASURER, STATE OF NEW HAMPSHIRE
NHDES DWGT - PTO PROGRAM
PO BOX 95
CONCORD, NH 03302-0095

Invoice Number	Date	Description	Amount	Discount	Net Amount
ALTERATION OF TERRAIN FEE - FRANKLIN	09-11-2025	PICKUP - ALTERATION OF TERRAIN FEE - PHASE II	$8,750.00	$0.00	$8,750.00
		Totals:	**$8,750.00**	**$0.00**	**$8,750.00**

Easter Seals New Hampshire, Inc.
555 Auburn Street
Manchester, NH 03103

easterseals New Hampshire

Citizens Bank
54-153/114

CHECK DATE	CHECK NO.
09/15/2025	203061
CHECK AMOUNT	

PAY Eight Thousand Seven Hundred Fifty and 00/100*****

$***8,750.00

Amounts in excess of $10,00.00 Require Two Signatures

TO THE ORDER OF
TREASURER, STATE OF NEW HAMPSHIRE
NHDES DWGT - PTO PROGRAM
PO BOX 95
CONCORD, NH 03302-0095

Maureen Beauregard
AUTHORIZED SIGNATURE

⑈203061⑈ ⑆011401533⑆ 33080144 18⑈

9589 0710 5270 3185 8910 33

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☐ Return Receipt (hardcopy)	$ $0.00	
☐ Return Receipt (electronic)	$ $0.00	Postmark Here
☐ Certified Mail Restricted Delivery	$ $0.00	
☐ Adult Signature Required	$ $0.00	
☐ Adult Signature Restricted Delivery	$	
Postage	$13.10	09/18/2025
Total Postage and Fees	$18.40	

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City, State, ZIP+4®: Penacook, NH 03303

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

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Franklin, NH 03235 OFFICIAL USE

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☐ Return Receipt (electronic)	$ $0.00	Postmark Here
☐ Certified Mail Restricted Delivery	$ $0.00	
☐ Adult Signature Required	$ $0.00	
☐ Adult Signature Restricted Delivery	$	
Postage	$21.05	09/18/2025
Total Postage and Fees	$26.35	

Sent To: City of Franklin Planning Dept.
Street and Apt. No., or PO Box No.: 316 Central Street
City, State, ZIP+4®: Franklin, NH 03235

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

ALTERATION OF TERRAIN ATTACHMENT A: PERMIT APPLICATION CHECKLIST

Check each box to indicate the item has been provided or indicate why it does not apply.

DESIGN PLANS

- [x] Plans printed on 34 - 36" by 22 - 24" white paper.
- [x] Professional Engineer stamp.
- [ ] Wetland delineation. **No wetlands on property**
- [x] Temporary erosion control measures.
- [x] Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and nonresidential roof runoff. Guidance on treatment BMPs can be found in the New Hampshire Stormwater Management Manual.
- [x] Pre-existing 2-foot contours.
- [x] Proposed 2-foot contours.
- [ ] Drainage easements protecting the drainage/treatment structures. **No easement needed**
- [ ] Compliance with state statute governing fill and dredge in wetlands, RSA 482- A. Note that artificial detention in wetlands is prohibited. **no wetlands**
- [x] Compliance with the New Hampshire Shoreland Protection Act, RSA 483-B.
- [ ] Benching – needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope. **no slopes greater than 20 feet**
- [x] Check to see if any proposed ponds require state dam permits.

DETAILS

- [x] Typical roadway x-section.
- [x] Detention basin with inverts noted on the outlet structure.
- [x] Stone berm level spreader.
- [x] Outlet protection – riprap aprons.
- [x] A general installation detail for an erosion control blanket.
- [x] Silt fences or mulch berm. **Will be using silt sock**
- [ ] Storm drain inlet protection. Note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement. **no catch basin are proposed**
- [ ] Hay bale barriers. **No haybales used on site**
- [x] Stone check dams.
- [x] Gravel construction exit.
- [x] Temporary sediment trap.
- [x] The treatment BMPs proposed.
- [ ] Any innovative BMPs proposed.

CONSTRUCTION SEQUENCE / EROSION CONTROL

☐ Note that the project must be managed to meet the requirements and intent of RSA 430:53 and Agr 3800 relative to invasive species.

☐ Note that perimeter controls shall be installed prior to earth moving operations.

☐ Note that temporary water diversion (swales, basins, etc.) must be used as necessary until areas are stabilized.

☐ Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site).

☐ Note that all ditches and swales shall be stabilized prior to directing runoff to them.

☐ Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.

☐ Note that all cut and fill slopes shall be seeded or loamed within 72 hours of achieving finished grade

☐ Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall.

☐ Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information.

Example note: The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized.

☐ Note the definition of the word “stable.”

Example note: An area shall be considered stable if one of the following has occurred:

- Base course gravels have been installed in areas to be paved.
- A minimum of 85 percent vegetated growth has been established.
- A minimum of 3 inches of non-erosive material such stone or riprap has been installed.
- Or, erosion control blankets have been properly installed.

☐ Note the limit of time an area may be exposed.

Example note: All areas shall be stabilized within 45 days of initial disturbance.

☐ Provide temporary and permanent seeding specifications. Note that although reed canary grass is listed in the Green Book; it is a problematic species according to the Wetlands Bureau and therefore should not be specified.

☐ Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
- All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
- After October 15, incomplete road or parking surfaces where work has stopped for the winter season shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.

☐ Note at the end of the construction sequence that “Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable.” – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit.

DRAINAGE ANALYSES

Please provide double-side 8 ½" × 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

☐ Professional Engineer stamp.

☐ Rainfall amount obtained from the Northeast Regional Climate Center. Include extreme precipitation table as obtained from this source.

☐ Drainage analyses, in the following order:

- Pre-development analysis: Drainage diagram.
- Pre-development analysis: Area Listing and Soil Listing.
- Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year.
- Pre-development analysis: Full summary of the 10-year storm.
- Post-development analysis: Drainage diagram.
- Post-development analysis: Area Listing and Soil Listing.
- Post-development analysis: Node listing for the 2-year, 10-year and 50-year.
- Post-development analysis: Full summary of the 10-year storm.

☐ Review the Area Listing and Soil Listing reports

- Hydrologic Soil Groups (HSG) match the HSGs on the soil maps provided.
- There is the same or less HSG A soil area after development (check for each HSG).
- There is the same or less "woods" cover in the post-development.
- Undeveloped land was assumed to be in "good" condition.
- The amount of impervious cover in the analyses is correct.

Note: A good check is to subtract the total impervious area used in the pre-analysis from the total impervious area used in the post-analysis. For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses or units proposed. Do these numbers make sense?

☐ Check the storage input used to model the ponds.

☐ Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped.

☐ Check the outlet structure proposed and make sure it matches that modeled.

☐ Check to see if the total areas in the pre and post analyses are same.

☐ Confirm the correct NRCS storm type was modeled (Coos, Carroll and Grafton counties are Type II, all others Type III).

PRE- AND POST-CONSTRUCTION DRAINAGE AREA PLANS

☐ Plans printed on 34 - 36" by 22 - 24" on white paper.

☐ Submit these plans separate from the soil plans.

☐ A north arrow.

☐ A scale.

☐ Labeled subcatchments, reaches and ponds.

- [x] Tc lines.
- [x] A clear delineation of the subcatchment boundaries.
- [ ] Roadway station numbers.
- [x] Culverts and other conveyance structures.

PRE- AND POST-CONSTRUCTION COLOR-CODED SOIL PLANS

- [x] 11” × 17” sheets suitable, as long as it is readable.
- [x] Submit these plans separate from the drainage area plans.
- [x] A north arrow.
- [x] A scale.
- [x] Name of the soil scientist who performed the survey and date the soil survey took place.
- [x] 2-foot contours (5-foot contours if application is for a gravel pit) as well as other surveyed features.
- [ ] Delineation of the soil boundaries and wetland boundaries.
- [ ] Delineation of the subcatchment boundaries.
- [ ] Soil series symbols (e.g., 26).
- [ ] A key or legend identifying each soil series symbol and its associated soil series name (for example: 26 = Windsor).
- [ ] The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, and Impervious = gray).

Please note that excavation projects (including gravel pits) have similar requirements to those above, with the following common exceptions or additions:

- [ ] Drainage report is not needed if site does not have off-site flow.
- [ ] 5-foot contours are allowed rather than 2-foot.
- [ ] No Professional Engineer stamp is needed on the plans.
- [ ] Add a note to the plans that the applicant must provide NHDES a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.
- [ ] Add reclamation notes.
- [ ] A description of the subsurface conditions to the planned depth of excavation, including the elevation of the location of the Seasonal High Water Table (SHWT), as observed and described by a certified soil scientist, or an individual holding a valid permit as a permitted designer as issued by the department’s Subsurface Systems Bureau.

For more resources, refer to the Natural Resources Conservation Service Vegetating New Hampshire Sand and Gravel Pits publication.

FEE $8,750

USGS QUADRANGLE

1" = 2000'

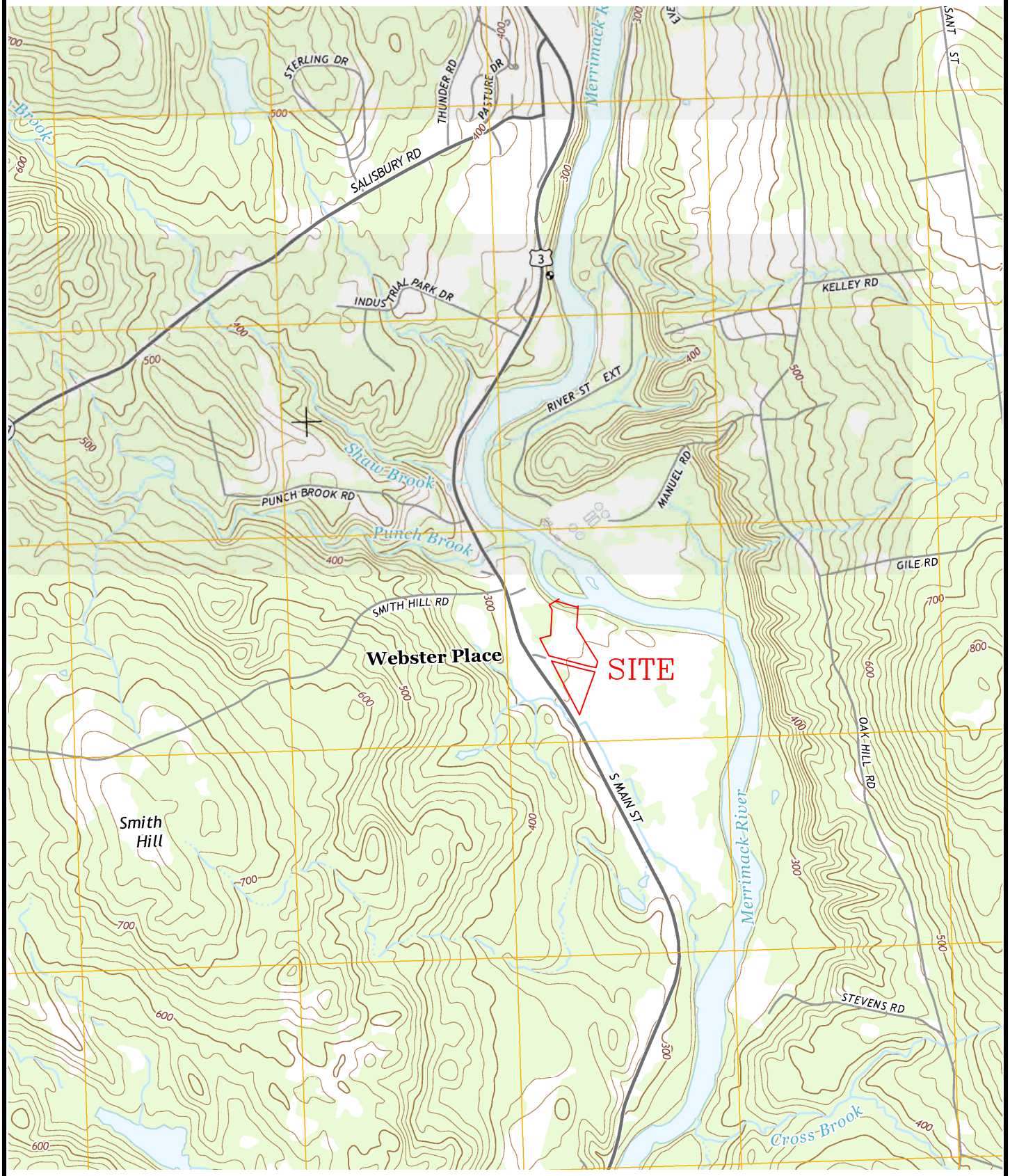

FIGURE 1

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APPENDICES

FIGURES & PLANS

1.0 INTRODUCTION:

This drainage report has been prepared as a supporting document to Easter Seal Franklin project Phase 2. Phase 1 was conpleted July 2025. A drainage report for Phase 1 was submitted to the town and the NHDES. Easterseals New Hampshire is a company that provides services for veteran as well as individuals with diabilities and special needs. They have many locations across New Hampshire and are planning to expand their services in Franklin, NH.

The purpose of any drainage analysis is to apply current mathematical stormwater modeling techniques used in the fields of Civil and Environmental Engineering, to predict the effect of a proposed construction project will have on the subject parcel. Those parcels include directly abutting the project, any downstream property, and/or drainage structures such as culverts, closed drainage systems, etc.

A design that provides adequate control of stormwater, minimizing and/or eliminating impacts to any downstream drainage structures (i.e. municipal culverts, bridges, etc.), is arrived at through an iterative process using the modeling discussed above. The pre-development drainage analysis reflects the modeling performed for the pre-development surface drainage, and for the land in its existing state. The post-development drainage analysis reflects the results of the final drainage design and provides surface drainage values to compare to the pre-development values. In this way, the design engineer and any review agents are provided the necessary information to decide if the proposed design is adequate.

1.1 REVISIONS:

2.0 SITE AND PROJECT DESCRIPTION:

2.1 PROJECT LOCATION:

The site is located on the North and South side of Holy Cross Road. Please refer to Figure 1 (USGS Map) for a pictorial placement of the project area. The parcel is known as Tax Map 104 , Lot 406.1 and 406.2 on the Franklin Assessing Maps, refer to Figure 2 (Tax Map).

2.2 EXISTING SITE FEATURES:

The parcel is developed with a seven building, driveway, sidewalks and associated parking. The rest of the site is grasses and fields. There are no wetlands within the project area.

According to the Natural Resources Conservation Service (NRCS); Custom Soil Resource Report for Merrimack County, New Hampshire; (Appendix A-3).

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
94A	Agawam-Ninigret fine sandy loams, 0 to 3 percent slopes	9.2	50.4%
201A	Ondawa fine sandy loam, 0 to 3 percent slopes, occasionally flooded	9.1	49.6%
Totals for Area of Interest		**18.3**	**100.0%**

2.3 PROJECT DESCRIPTION:

Easter Seals NH, Inc. is proposing to construct Phase 2 of the Veteran Housing facility on the parcel and increase the parking lot. The parcel is bisected by Holly Cross Road. The north parcel 406.1 and the southern parcel 406.2 both have existing structure.

Parcel 406.1 has the following buildings: Bartlett Cottage, Henry, Webster and Burleigh Cottage. There is an existing swimming pool and small one car garage and small gazebo which have been removed during Phase 1. There is a small parking area adjacent to the bartlett Cottage. The majority of site is field and grassed with a small portion of wood to the east.

Phase 1 work was completed July 2025. The site features that have been added are a connector building between Henry and Wester buildings, sidewalks and a 60 space parking lot and the infiltration basin.

Parcel 406.2 has the following buildings: Webster Tay House, under one: roof Mack, Creighton, Annex, School and Chapel. There is a heating building and a small garage. There is a parking area that serves the building behind the Webster Tay House.

Phase 1 work was completed August 2025. The features that have been added are an addition to the Mack Creighton building, a patio, paved parking area, and treatment swale 1 and detention basin.

During Phase1 the Holly Cross road was repaved and a Cul-de-sac was constructed.

Phase 2 includes, at the northern half of the property, a 22,500 square foot Recreation and Equestrian Facility building and associated amenities. This building will consist of an 8,000 square foot horse riding arena an outside and challenge course, outside fenced horse paddocks and dog yard. A 30’ x 36’ accessory barn for tractor and hay storage will be erected near the building to support the facility. This building will provide multitude of therapy and training areas for the veterans and retreat guests.

Access and parking for this facility will be from a new driveway that loops around from the Bartlett Cottage to the Burleigh Cottage. This new driveway will connect to the parking lot for the two residential buildings, providing better circulation throughout the site. The short existing driveway between the Bartlett Cottage and the Henry Building will be eliminated to reduce the overall number of driveways off Holy Cross Road. A gravel driveway and parking areas designated for the horse trailers and equipment will be installed near the proposed barn.

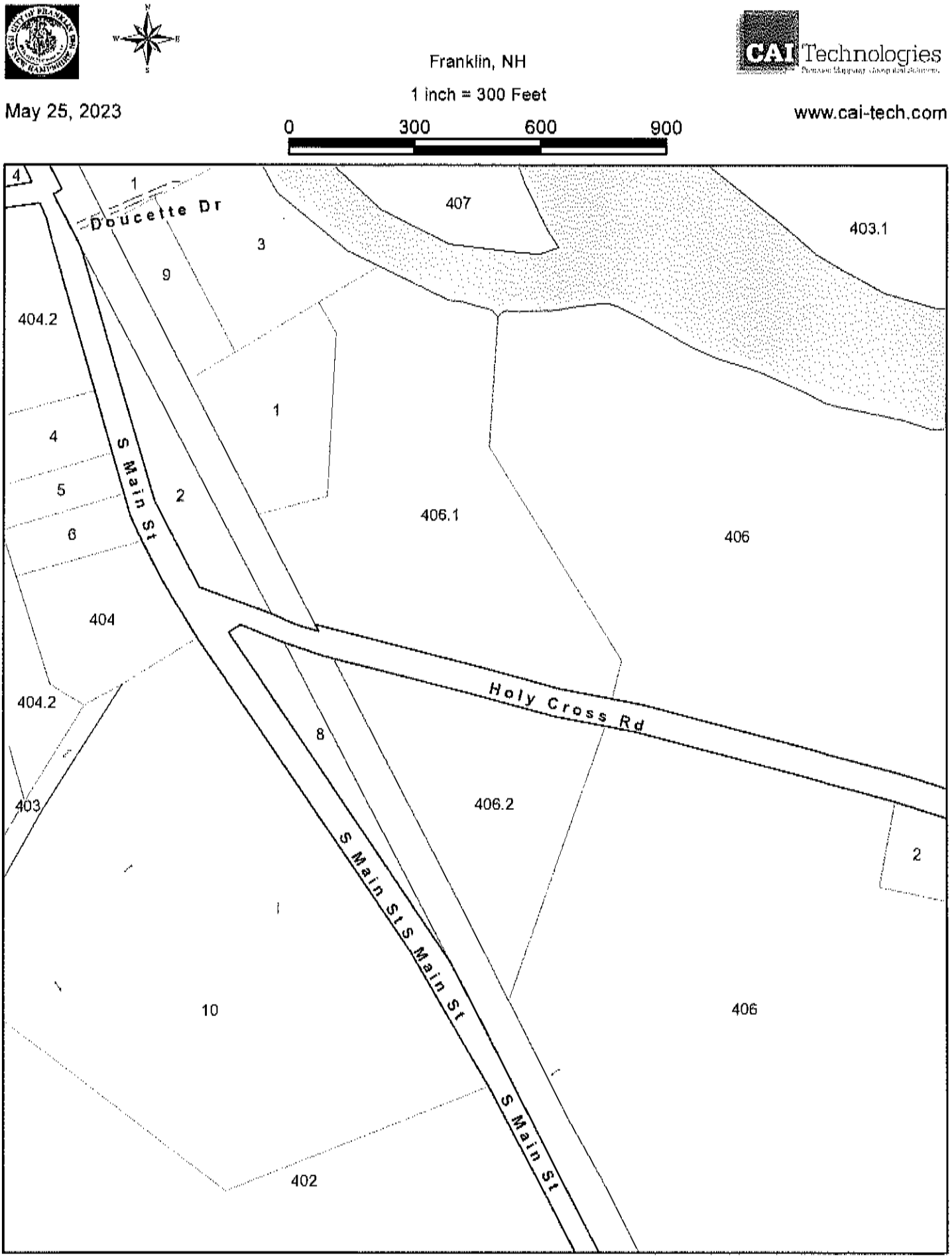
For the southern side of the campus, Easter Seal is proposing a 7,700 square foot Aquatics and Fitness Center that will be constructed in the general location of the old Heating Plant building on the south side of Holy Cross Road, Tax Map 104, Lot 406-2. Access and parking for the building will be shared with the main Retreat Center.

All drainage structures, constructed during phase 1, the infiltration basin, detention basin and treatment swales had been designed for the full build out. The drainage calculation for phase 2 in this report confirmed that all the stormwater manage system can handle the proposed features for Phase 2.

The stormwater management system has been designed to meet the New Hampshire Department of Environmental Services; Alteration of Terrain regulations.

3.0 METHODOLOGY:

The drainage analysis is based on “Urban Hydrology for Small Watersheds”, as written by the U.S. Soil Conservation Service (S.C.S.) and released as Technical Release 55, in June of 1986. A modified TR-20 method was used to generate runoff. The weighted-Q method was used instead of using composite CN values due to widely differing curve numbers present (e.g. pavement and good condition woods on HSG A soils). This modification to the TR-20 method is recommended by the NRCS for model accuracy over the composite CN method used in



Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

WinTR-20, especially when there is a wide difference in curve numbers and lower rainfall amounts (210-VI-NEH Part 630, Ch. 10, pg. 10-16, July 2004). The computer analysis is based on the S.C.S. TR-20 and the stormwater modeling software HYDROCAD™ release 10.1, written by Applied Microcomputer Systems of Chocorua, New Hampshire, was used. The drainage analysis is based on information compiled from the following resources:

- Easter Seal - Franklin – Holly Cross Road Plans;
- USGS Topographic Map – Franklin, NH Quadrangle;
- Aerial Photographs – Google Earth 2015;
- NRCS Custom Soil Resource Report for Merrimack County, New Hampshire;
- Site Specific Soils Map and Test Pits by Joseph W. Noel;
- "Pre- and Post-Development Drainage Plans"

As stated in the introduction, the purpose of this report is to provide information supporting the design of the stormwater control measures employed by this project. A number of sources of information were consulted to prepare the calculations for this infrastructure to check its sufficiency. The USGS Map, Aerial Photos, Test Pit Log, and NRCS Soils Maps for Merrimack County and Site Specific soils map were all consulted. A number of site visits were carried out to confirm site conditions.

The 2, 10, and 50-year storm events have been used to model the stormwater runoff and to determine the adequacy of the chosen stormwater control methods. See Appendix A-12.1 for Extreme Precipitation Tables and other references used in the design and analysis.

If a subcatchment is returned with Times of Concentration (Tc) below the minimum allowed by TR-55 (TR-55 minimum Tc = 0.1 hour = 6 minutes); then Tc values are set in HydroCAD to automatically return a Tc of 6 minutes to insure proper modeling.

A codified system was used to number the Subcatchments, reaches, and ponds, in the drainage analyses. The following Table lists prefixes and their meanings.

3.1 REACH STRUCTURE PREFIXES:

Prefix	Explanation
POA #	Denotes a reach used as a Point of Analysis
TS	Reach

3.2 POND STRUCTURE PREFIXES:

Prefix	Explanation
IB	Infiltration Basin
DB	Detention Basin
BR	Bioretention Basin

4.0 PRE-DEVELOPMENT DRAINAGE ANALYSIS:

The watershed area is 18.3 acres and is divided into two (2) Subcatchments, which flows to one (1) Points of Analysis (POA#). These areas are shown on the Pre-Development Plan in the back of this report.

Table 1 below, summarizes the pre-development runoff occurring during the different storm events for the Subcatchments and at the POA.

Complete HydroCAD model data for the pre-development can be found in Appendix A-7. For a graphical depiction of the Watershed analyzed, flow paths; Subcatchments and POA's refer to the Pre-Development Drainage Plan, Figure D-2 in the pocket at the rear of the report.

TABLE 1: PRE-DEVELOPMENT DRAINAGE ANALYSIS RESULTS SUMMARY:

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	2-yr Volume (Ac.ft.)	10-yr Rate (cfs)	50-yr Rate (cfs)
1	11.00	0.9	0.33	2.9	1.84
2	7.34	3.6	0.58	6.8	12.7
Total	18.10				
POA#1		3.9	0.91	7.7	15.7

5.0 POST-DEVELOPMENT DRAINAGE ANALYSIS:

The proposed topography has divided the site into twenty-one (21) Subcatchments. The post-development drainage analysis was performed by then calculating the runoff from these twenty-one (12) subcatchments, which drain to the analysis point, POA#1. The Post-Development drainage analysis is based on the full build-out of both phase 1 and phase 2. The topography is based on Phase 1 as-built data and Phase 2 proposed grades. This was done to ensure that the stormwater management systems would be sized appropriately for the phase 1. Phase 1 drainage analysis accounted for phase 2 built out. Phase 1 drainage report is on file at the town and on file with the NHDES.

The stormwater runoff from area on Parcel 406.1, flows to four stormwater treatment practices. The equestrian center building's stormwater is directed to Bioretention Basin #3 via a drip edge. The building, parking lots, road and the driveway, sidewalks is directed to a treatment swale which discharges to an infiltration basin which will provide ground water rechage and control of rate of discharge. There are two addition Bioretention Basin that handle a small amount of runoff. The below section go in to detail of each stormwater practice.

The stormwater runoff from the Parcel 406.2, the building, parking lots, road and the driveway, sidewalks is directed to a detention basin for control of rate of discharge.

Table 2, below, summarizes the post-development runoff occurring during the different storm events for all of the Subcatchments and at the POA's.

Complete HydroCAD model data for the post-development can be found in Appendix A-7. For a graphical depiction of the Watershed analyzed, flow paths; subcatchments and POA's refer to the Post-Development Drainage Plan, Figure D-2 in the pocket at the rear of the report.

TABLE 2: POST-DEVELOPMENT DRAINAGE ANALYSIS RESULTS SUMMARY:

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	2-yr Volume (Ac.ft.)	10-yr Rate (cfs)	50-yr Rate (cfs)
1	2.70	0.18	0.05	0.96	2.83
2	3.67	2.9	0.42	4.8	8.2
3	0.13	0.1	0.01	0.1	0.3
4	1.07	2.4	0.20	3.6	5.5
5	0.79	0.6	0.07	1.1	2.1
6	0.57	0.4	0.04	0.8	1.6
7	0.36	0.0	0.01	0.3	0.8
8	1.19	0.2	0.04	0.6	1.4
9	3.50	1.9	0.18	5.0	10.8
10	0.11	0.1	0.01	0.2	0.4
11	0.35	0.4	0.03	0.7	1.3
12	0.35	0.4	0.04	0.7	1.3
13	0.49	0.3	0.03	0.7	1.4

Subcatchment	Area (Ac.)	2-yr Rate (cfs)	2-yr Volume (Ac.ft.)	10-yr Rate (cfs)	50-yr Rate (cfs)
14	0.15	0.1	0.01	0.2	0.4
15	0.56	1.4	0.11	2.0	3.0
16	0.21	0.2	0.01	0.3	0.7
17	0.11	0.3	0.02	0.4	0.6
18	0.24	0.0	0.00	0.1	0.4
19	1.03	0.1	0.02	0.5	1.5
20	0.66	0.1	0.02	0.5	1.4
21	0.06	0.1	0.01	0.2	0.3
Total	18.3				
POA#1		2.6	0.68	5.9	12.6

5.1 STORMWATER CONTROL AND TREATMENT PRACTICES:

5.1.1 TREATMENT SWALES

Two treatment swales have been designed to provide treatment for the stormwater runoff from the proposed development. The swales are grassed lined. They will have a slope of 0.5% that will outlet into the proposed stormwater management practices.

Treatment Swale #2 was constructed during Phase 1.

TABLE 3: SWALE SUMMARY:

	Unit peak discharge (qu) *cfs/mi²/in*	**Water quality volume (WQV)** *cf*	**Water quality flow (WQF)** *cfs*	**Length** *feet*	**Width** *feet*	**Slope**	**Depth of flow (d)** *inches*	**Hydraulic Residence time during the WQF (HRT)** *minutes*
TS1	375	5,881	0.95	200	8	0.5%	4	10
TS2	350	6,372	0.96	200	8	0.5%	4	10

5.1.2 INFILTRATION BASIN (PHASE 1)

This stormwater management design employs an open Infiltration Basins for the groundwater recharge volume requirement, and to reduce the overall increase volume in stormwater generated from the additional impervious coverage. This basin was constructed during Phase 1 and the volume used is the as-built volume. The stormwater entering the basin has been treated by the upstream Treatment Swale #1. The basins have a turf bottom. The spillway has been designed to handle a 100-year storm event if there was no infiltration. The basin is not within any groundwater protection area and not within any water intake protection area. Therefore, the basin bottom must have a separation from the seasonal high water of 1-ft.

Infiltration basin bottom elevation is 275.00-ft which is a minimum depth of 1-foot from the average depth to seasonal high-water table. The two test pits within the Infiltration Basin 1 floor, TP#13, and TP#14 have an average seasonal highwater table at elevation 273.6 feet.

See the infiltration feasibility report for a detail on the test pits used. The basins adhere to the designed guideline found in Env-Wq 1508.06.

TABLE 4: INFILTRATION BASIN SUMMARY:

The table below is a summary of the inflow and out flow and freeboard of the infiltration basin.

Structure	2-yr Storm			10-yr Storm			50-yr Storm		
	Q_{in}	Q_{out}	Freeboard	Q_{in}	Q_{out}	Freeboard	Q_{in}	Q_{out}	Freeboard
	(cfs)	(cfs)	(ft)	(cfs)	(cfs)	(ft)	(cfs)	(cfs)	(ft)
Infiltration Basin	**3.0**	**0.0**	**2.66**	**5.0**	**0.0**	**1.65**	**8.5**	**0.4**	**0.41**

*Q_{out} is the stormwater leaving the system and does not include infiltration.
** Freeboard measured to the top of the earth berm.
Infiltration Basin Berm elevation = 279.00'

5.1.3 INFILTRATION RATES

Field measurement method for determining the design infiltration rate were conducted by John Turner Consulting, Inc. See Appendix A-13 for full Infiltration Testing Report. Below is a summary of the infiltration tests. Refer to the Infiltration Feasibility Report in Appendix A-11 for details on each infiltration basin including test pit locations.

Env-Wq 1504.13 (e) Guelph Permeameter

Infiltration Basin	Infiltration Test #	Depth (in. bgs)	Rate (in/hr)
1	INF-1	2.2	*1.2*
1	INF-2	2.3	*1.8*
1	INF-3	2.2	*1.2*

A factor of safety of 0.5 has been applied to the average $K_{sat(analysis)}$. Thus, the design infiltration rate are as follows;

Infiltration Basin #1 **$K_{sat\ (analysis)}$ = 0.7 inches/hour**

5.1.4 BIORETENTION BASINS

The stormwater management design employs grass lined Bioretention basins to treat and reduce the rate and volume at which stormwater runoff discharges from the site. The bioretention basins treats the stormwater through a filter media. Basin #1 and #2 have a 18 inch thick filter media and Basin #3 uses a 24" media filter. All of the basin handle a 50 year storm event.

TABLE 5: BIORETENTION BASIN SUMMARY:

The table below is a summary of the inflow and out flow and freeboard of the bioretention basin.

Structure	2-yr Storm			10-yr Storm			50-yr Storm		
	Q_{in}	Q_{out}	Freeboard	Q_{in}	Q_{out}	Freeboard	Q_{in}	Q_{out}	Freeboard
	(cfs)	(cfs)	(ft)	(cfs)	(cfs)	(ft)	(cfs)	(cfs)	(ft)
Basin #1	**0.3**	**0**	**1.70**	**0.7**	**0**	**1.29**	**1.4**	**0**	**0.54**
Basin #2	**0.1**	**0**	**2.36**	**0.7**	**0**	**1.45**	**2.1**	**0**	**0.32**
Basin #3	**1.5**	**0**	**1.03**	**2.6**	**0**	**0.83**	**4.5**	**0**	**0.46**

Basin #1 Berm elevation = 283.00'
Basin #2 Berm elevation = 283.00'
Basin #3 Berm elevation = 284.00'
Q_{out} does not include the stormwater infiltrating into the ground.

5.1.5 DETENTION BASIN (PHASE 1)

The stormwater management design employs an open detention basin to reduce the rate at which stormwater runoff discharges from the site. The basin have been designed to adhere rule Env-Wq1508.17. The basin bottom has the bottom 6-inches below the lowest invert of the out pipe. The spillway has been design to handle a 100-year storm event.

TABLE 6: DETENTION BASIN SUMMARY:

The table below is a summary of the inflow and out flow and freeboard of the infiltration basin.

Structure	10-yr Storm			50-yr Storm		
	Q_{in} (cfs)	Q_{out} (cfs)	Freeboard (ft)	Q_{in} (cfs)	Q_{out} (cfs)	Freeboard (ft)
Basin	**4.9**	**3.6**	**1.83**	**8.5**	**5.5**	**1.39**

Berm elevation = 279.00'

6.0 COMPARISON AND CONCLUSION

6.1 COMPARISON

The following table presents a comparison of the results of the pre-development drainage analysis and the post-development drainage analysis and the Points of Analysis.

6.1.1 SUMMARY RESULTS AT THE POA'S:

As can be seen from the comparison table below, the peak stormwater runoff rates at all the points of analysis (POA) have been reduced or equal. These reductions are the result of capturing the stormwater runoff generated by the development and directing it into the infiltration basin, bioretention basins and a detention basin.

TABLE 7: COMPARISON; PRE- & POST-DEVELOPMENT POA'S:

	2-yr Rate (cfs)	2-yr Volume (Ac.ft.)	10-yr Rate (cfs)	50-yr Rate (cfs)
POA#1 Pre	3.9	0.91	7.7	15.7
POA#1 Post	2.6	0.68	5.9	12.6
Change	**-1.3**	**-0.23**	**-1.8**	**-3.1**

6.2 CHANNEL PROTECTION REQUIREMENTS:

All POA meet the requirements of Env-Wq 1507.05(Channel Protection Requirements) (1)(a) which states "The 2-year, 24-hour post-development peak flow rate generated from the proposed disturbance shall be equal to or less than the 2-year, 24-hour pre-development peak flow rate and: The 2 year, 24-hour post-development storm volume, directed to the nearest water body has not increased over the pre-development volume by more than 0.1 acre-feet". Please note the nearest water body is over 2000 feet from the point of discharge and the flow path has a slope less than 2% on average and passes over agricultural field.

6.3 GROUNDWATER RECHARGE VOLUME (GRV):

GRV(req.) = 2,006 cubic feet
GRV(prov.) = 16,988 cubic feet (during a 2-year storm event) (Infiltration Basin)

In each storm event the GRV (req.) volumes of stormwater are required to be infiltrated back into the ground to help maintain the groundwater table. See appendix A-6 for GRV Calculation sheet.

6.4 PEAK RUNOFF CONTROL REQUIREMENTS:

As can be seen above, the 2-year, 10-year, and the 50-year, 24-hour post-development flow rates and volume do not exceed the pre-development flow rates for the respective storm events. This was achieved by use of Bioretention Basins, an Infiltration Basin and a Detention Basin with outlet control structures. Therefore, the overall project has met the peak runoff and volume control requirements.

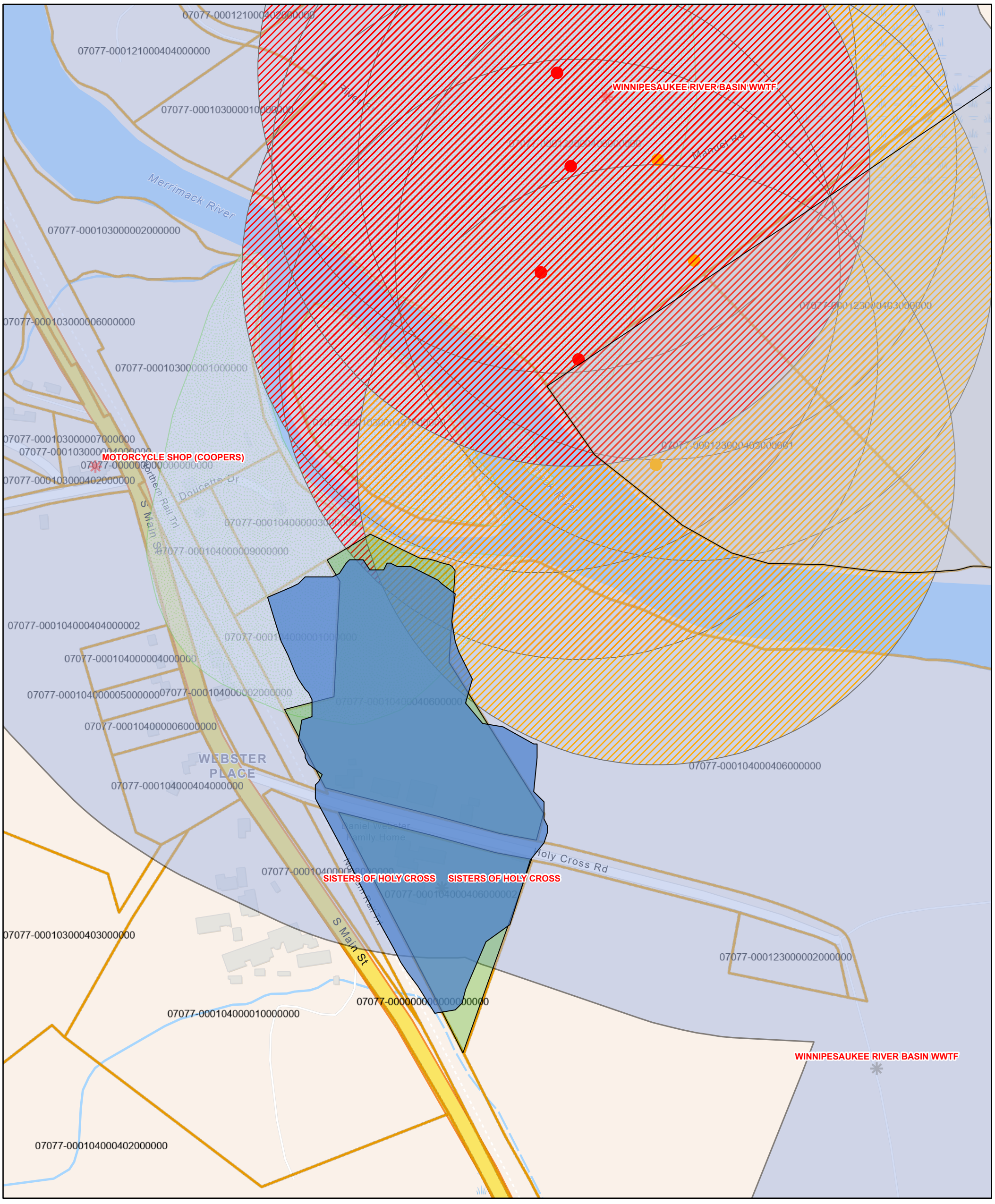
6.5 CONCLUSION:

As seen in the preceding sections, through the implementation of effective stormwater controls, the peak rate of discharge for the post-development stormwater leaving the site is less than or equal the pre-development conditions for all storm events. This was accomplished using the proposed infiltration basin to attenuate the peak rates.

Temporary erosion control has been designed for the project during construction and this in concert with the permanent measures should maintain stormwater runoff quality down gradient, and maintain the sites contribution to offsite drainage systems at current levels. This design meets current Best Management Practices for stormwater control and provides a responsible stormwater management plan for the proposed work.

APPENDIX A 1

Map by NH DES OneStop Data Mapper



8/22/2025, 10:18:32 AM

Phase 2 - Watershed boundary_Unknown(Polygon).zip - Phase 2 - Watershed boundary_Unknown(Polygon)

NHDES AOT Permits Issued from 2009 to Present

- Active
- Expired

EMD PFAS Groundwater Station Samples with 1000ft Buffer

- PFAS > MCL (2020) Groundwater Stations
- PFOA+PFOS > 70 ppt (AGQS 2016) Groundwater Stations

Remediation Sites

- Closed
- Other

- Designated Rivers Quarter Mile Buffer
- Groundwater Classification Areas GA2
- Parcels

1:5,000

0 0.04 0.08 0.16 mi

0 0.05 0.1 0.2 km

APPENDIX A 2

New Hampshire Department of Environmental Services
DataCheck Results Letter

To: Paul Blanc
POBox 249
Rochester, NH 03866

From: NHDES Ecological Reviews

Date: 8/22/2025 (This letter is valid through 8/22/2026)

Re: Review by NHDES Ecological Reviews of request dated 8/22/2025

Permit Types: Stormwater Pollution Prevention
Alteration of Terrain Permit
Shoreland Standard Permit
Franklin

Project ID: DCT25-2447

Applicant: Paul Blanc

Location: Franklin
Tax Map: 104, Tax Lot: 406-1 & 406-2
Address: 20 & 21 Holy Cross Road

Project Description: Adding buildings and remodeling the existing buildings. The new building will be a horse stable and an aquatic fitness center.

The NHDES Ecological Review database has been checked for records of rare species and exemplary natural communities near the area mapped (see next page). The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. There are currently no recorded occurrences of sensitive species near this project area.

A negative result (no record in the database) does not mean that a sensitive species is not present. These data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to the NH Natural Heritage Bureau and/or the NH Fish and Game Department. However, many areas have never been surveyed or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

MAP OF PROJECT BOUNDARIES FOR: DCT25-2447

APPENDIX A 3

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Merrimack and Belknap Counties, New Hampshire

Phase 2

September 1, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,690 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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 1:24,000.

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: Merrimack and Belknap Counties, New Hampshire
Survey Area Data: Version 30, Sep 3, 2024

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

Date(s) aerial images were photographed: Oct 6, 2022—Oct 22, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
94A	Agawam-Ninigret fine sandy loams, 0 to 3 percent slopes	9.2	50.4%
201A	Ondawa fine sandy loam, 0 to 3 percent slopes, occasionally flooded	9.1	49.6%
Totals for Area of Interest		**18.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Merrimack and Belknap Counties, New Hampshire

94A—Agawam-Ninigret fine sandy loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tx09
Elevation: 160 to 360 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

Agawam and similar soils: 50 percent
Ninigret and similar soils: 25 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agawam

Setting

Landform: Moraines, outwash terraces, kames, kame terraces, outwash plains
Landform position (two-dimensional): Backslope, shoulder, footslope, summit
Landform position (three-dimensional): Side slope, crest, tread, riser, rise
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 11 inches: fine sandy loam
Bw1 - 11 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C1 - 26 to 45 inches: loamy fine sand
2C2 - 45 to 55 inches: loamy fine sand
2C3 - 55 to 65 inches: loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 15 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B

Ecological site: F144BY505ME - Loamy over Sandy
Hydric soil rating: No

Description of Ninigret

Setting

Landform: Kame terraces, moraines, depressions, outwash terraces, kames, drainageways, outwash plains
Landform position (two-dimensional): Backslope, shoulder, footslope, summit
Landform position (three-dimensional): Side slope, crest, tread, rise, dip
Down-slope shape: Convex, concave, linear
Across-slope shape: Convex, concave
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 17 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F144BY505ME - Loamy over Sandy
Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 10 percent
Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 10 percent
Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Occum, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

201A—Ondawa fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2qgvy
Elevation: 0 to 1,800 feet
Mean annual precipitation: 31 to 95 inches
Mean annual air temperature: 27 to 54 degrees F
Frost-free period: 80 to 160 days
Farmland classification: All areas are prime farmland

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

Description of Ondawa

Setting
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from schist and/or coarse-loamy alluvium derived from quartzite and/or coarse-loamy alluvium derived from granite and gneiss

Typical profile
Ap - 0 to 9 inches: fine sandy loam
Bw - 9 to 30 inches: fine sandy loam
C - 30 to 65 inches: loamy fine sand

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: F144BY120ME - Small Floodplain Riparian Complex (reserved), F142XA001NY - Low Floodplain Frigid, F144BY110ME - Broad Floodplain Riparian Complex
Hydric soil rating: No

Minor Components

Podunk

Percent of map unit: 8 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Closed depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Rumney

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Closed depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Sunday

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Adams

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Microfeatures of landform position: Rises
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

APPENDIX A 4

NAIP AERIAL PHOTOGRAPGH

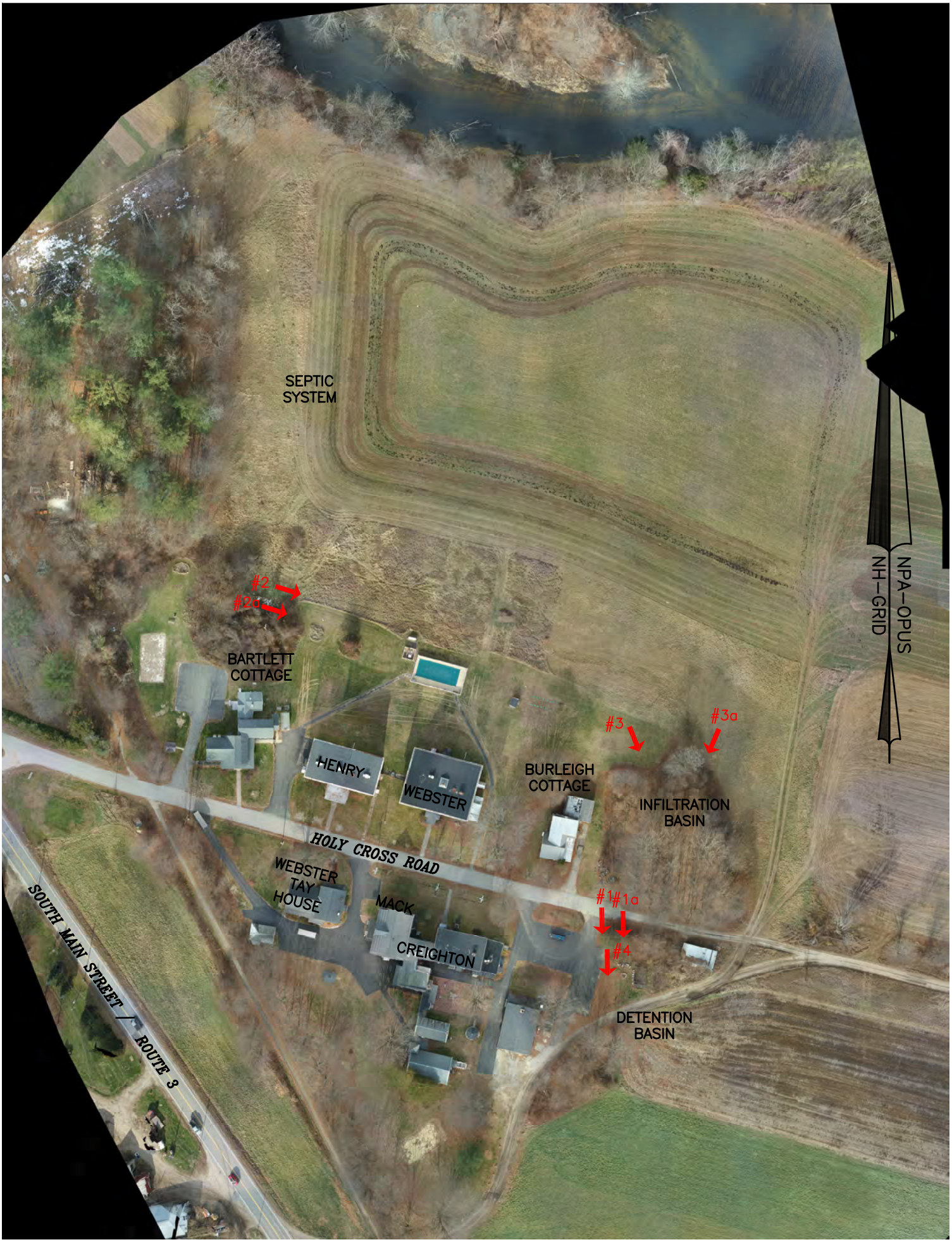
1" = 2000'

APPENDIX 4

APPENDIX A 5

PHOTO LOCATIONS

SCALE: 1" = 150'



Photographs representative of the site for
Easter Seals – Franklin

Photo 1 Looking southeast at proposed location of Detention Basin

Photo taken February 21, 2023.

Photographs representative of the site for
Easter Seals – Franklin

Photo 1a Looking southeast at proposed location of Detention Basin. This is prior to the installation of the outlet structures and spillway. Outlet structure and spillway have been installed (August 2025)

Photo taken July 31, 2025.

Photographs representative of the site for
Easter Seals – Franklin

Photo 2 Looking east at the proposed parking lot.

Photo taken February 21, 2023.

Photographs representative of the site for
Easter Seals – Franklin

Photo 2a Looking east at the proposed parking lot.

Photo taken May 2025.

Photographs representative of the site for
Easter Seals – Franklin

Photo 3 Looking southeast at the location of the proposed infiltration basin.

Photo taken February 21, 2023.

Photographs representative of the site for
Easter Seals – Franklin

Photo 3a Looking south at the location of the proposed infiltration basin. Take at the inlet of the basin.

Photo taken July 2025

Photographs representative of the site for
Easter Seals – Franklin

Photo 4 Looking south at the location of the Treatment Swale #2

Photo taken July 2025

APPENDIX A 6

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Basin / IB1**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

YES		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	← **yes**
3.62	ac	A = Area draining to the practice	
1.69	ac	A_I = Impervious area draining to the practice	
0.47	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.70	ac-in	WQV= 1" x Rv x A	
6,178	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1,545	cf	25% x WQV (check calc for sediment forebay volume)	
TS		Method of pretreatment? (not required for clean or roof runoff)	
none	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	≥ **25%WQV**
32,212	cf	V = Volume[1] (attach a stage-storage table)	≥ **WQV**
6,617	sf	A_{SA} = Surface area of the bottom of the pond	
0.70	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
16.0	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	≤ **72-hrs**
275.00	feet	E_{BTM} = Elevation of the bottom of the basin	
273.60	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
272.90	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.40	feet	D_{SHWT} = Separation from SHWT	≥ *[3]
2.1	feet	D_{ROCK} = Separation from bedrock	≥ *[3]
	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	≥ **24"**
	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
	Yes/No	If a trench or underground system is proposed, has observation well been provided?	←**yes**
		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	← **yes**
YES	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← **yes**
YES	:1	If a basin is proposed, pond side slopes.	≥**3:1**
277.35	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
278.59	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
279.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	← **yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← **yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes: The stormwater entering the pond has been treated by a treatment swale.

Test Pit 13 : SHWT 50" or 273.7'

Test Pit 14: SHWT 54" or 273.5

Soil Type : Ondawa

Infilteration Test #1 = 1.2in/hr, INF#2 = 1.8 in/hr, & INF# 3 = 1.2 IN/HR. Average = 1.4 in/hr

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Bioretention Basin 1 / BR1**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
0.49	ac	A = Area draining to the practice	
0.10	ac	A_I = Impervious area draining to the practice	
0.21	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.24	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.12	ac-in	WQV= 1" x Rv x A	
432	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
108	cf	25% x WQV (check calc for sediment forebay volume)	
324	cf	75% x WQV (check calc for surface sand filter volume)	
Roof Runoff		Method of Pretreatment? (not required for clean or roof runoff)	
NA	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
2,054	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
no	Yes/No	(Use the calculations below)	
8.4	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
na	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
na	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
279.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
na	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
277.30	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
277.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE!	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
2.50	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
2.20	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
282.46	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
283.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
na	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
na	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	na	Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**
If a bioretention area is proposed:			

YES	ac	Drainage Area no larger than 5 ac?	← yes
5,268	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
18.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	C-18	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	> 3:1
Sheet	L-2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
na		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
na	acres	A_{SA} = Surface area of the pervious pavement	
#VALUE!	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
na	inches	D_{FC} = Filter course thickness	12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	mod. 304.1 (see spec)

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Test Pit 21 SHWT @ 62" or Elevation 277.3'

Soil Type Pondunk

Ksat = 0.6 in/hr

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Type/Node Name: **Bioretention Basin 2 / BR2**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
1.42	ac	A = Area draining to the practice	
0.06	ac	A_I = Impervious area draining to the practice	
0.04	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.09	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.12	ac-in	WQV= 1" x Rv x A	
447	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
112	cf	25% x WQV (check calc for sediment forebay volume)	
335	cf	75% x WQV (check calc for surface sand filter volume)	
Roof Runoff		Method of Pretreatment? (not required for clean or roof runoff)	
NA	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
1,128	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
no	Yes/No	(Use the calculations below)	
15.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
na	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
na	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
278.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
na	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
277.00	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
276.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE!	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
2.50	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.50	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
282.68	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
283.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
na	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
24.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	na	Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**
If a bioretention area is proposed:			

YES	ac	Drainage Area no larger than 5 ac?	← yes
9,501	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
18.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	C-18	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	L-2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
na		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
na	acres	A_{SA} = Surface area of the pervious pavement	
#VALUE!	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
na	inches	D_{FC} = Filter course thickness	12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	mod. 304.1 (see spec)

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Estimated SHWT based on test pits with in area used 36" to SHWT

Soil Type Podunk

Ksat = 0.6 in/hr

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

FILTRATION PRACTICE DESIGN CRITERIA (Env-Wq 1508.07)

Type/Node Name: **Bioretention Basin 3**

Enter the type of filtration practice (e.g., bioretention system) and the node name in the drainage analysis, if applicable.

yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
1.23	ac	A = Area draining to the practice	
0.54	ac	A_I = Impervious area draining to the practice	
0.44	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.45	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.55	ac-in	WQV= 1" x Rv x A	
1,987	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
497	cf	25% x WQV (check calc for sediment forebay volume)	
1,491	cf	75% x WQV (check calc for surface sand filter volume)	
Roof Runoff		Method of Pretreatment? (not required for clean or roof runoff)	
NA	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
10,000	sf	A_{SA} = Surface area of the practice	
0.30	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
no	Yes/No	(Use the calculations below)	
7.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
na	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
na	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
-	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
280.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
na	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
279.50	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
277.60	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
#VALUE!	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
2.90	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
1.00	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
283.54	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
284.00	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
na	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
na	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	na	Note what sheet in the plan set contains the filter course specification.	
na	Yes/No	Access grate provided?	**← yes**
If a bioretention area is proposed:			

YES	ac	Drainage Area no larger than 5 ac?	← yes
13,254	cf	V = Volume of storage[3] (attach a stage-storage table)	≥ WQV
24.0	inches	D_{FC} = Filter course thickness	18", or 24" if within GPA
Sheet	C-18	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	≥ 3:1
Sheet	L-2	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
na		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
na	acres	A_{SA} = Surface area of the pervious pavement	
#VALUE!	:1	Ratio of the contributing area to the pervious surface area	≤ 5:1
na	inches	D_{FC} = Filter course thickness	12", or 18" if within GPA
Sheet		Note what sheet in the plan set contains the filter course spec.	mod. 304.1 (see spec)

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Test Pit 24 SHWT @ 37" or Elevation 279.5'

Test Pit 25 SHWT @ 35" or Elevation 279.5'

Soil Type Podunk

Ksat = 0.6 in/hr

Basin within GPA

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

TREATMENT SWALE DESIGN CRITERIA
(Env-Wq 1508.08)

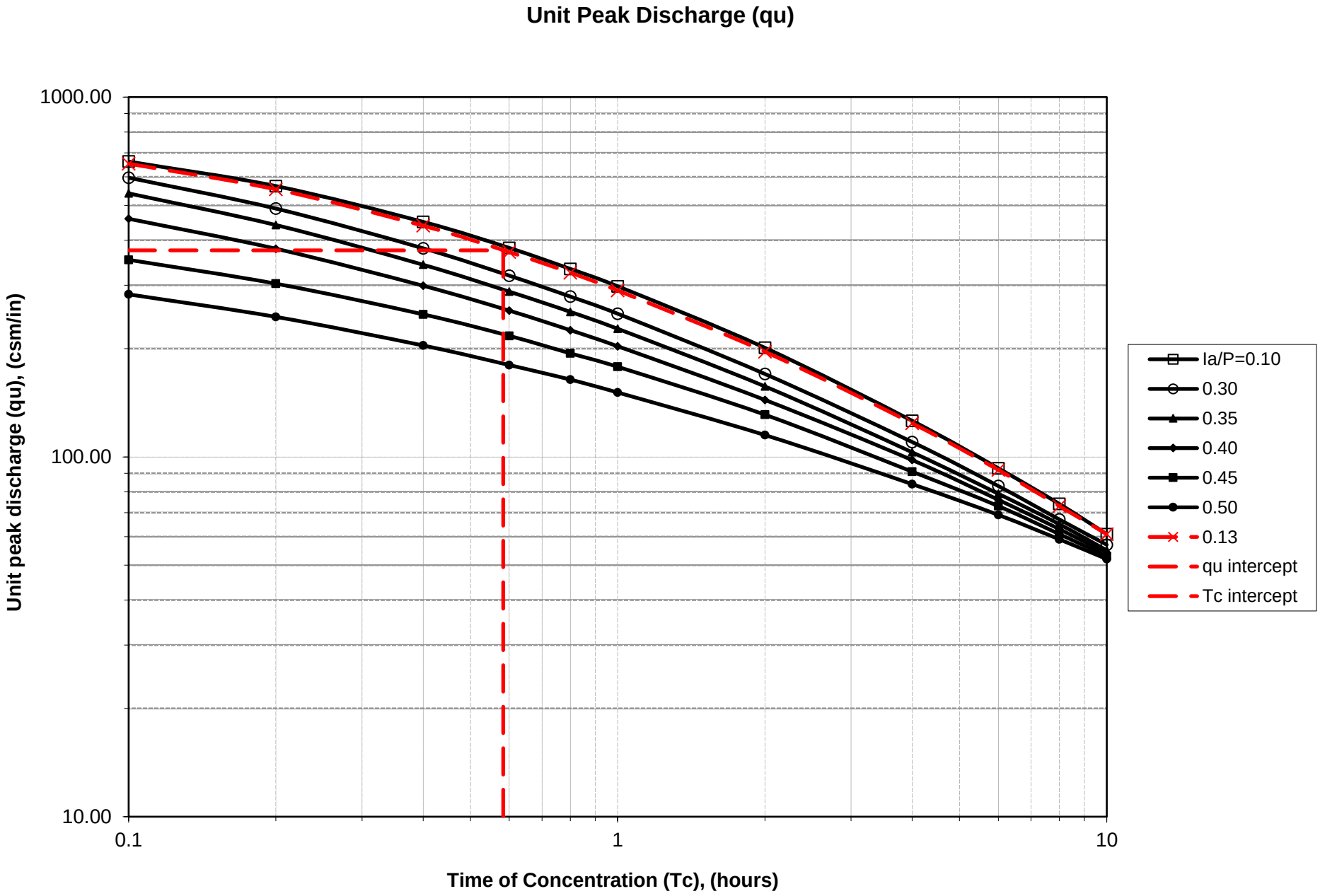
Node Name: Treatment Swale 1 / TS1

Enter the node name in the drainage analysis (e.g., reach TS 5), if applicable.

Yes	Yes/No	Have you reviewed the restrictions on unlined swales outlined in Env-Wq 1508.08(a)?	
No	Yes/No	Is the system lined? (required if not treated or if above SHWT)	
3.24	ac	A = Area draining to the practice	
1.69	ac	A_I = Impervious area draining to the practice	
35.0	minutes	T_c = Time of Concentration	
0.52	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.52	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.68	ac-in	WQV= 1" x Rv x A	
6,109	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1	inches	P = Amount of rainfall. For WQF in NH, P = 1".	
0.52	inches	D_{WQ} = Water quality depth. D_{WQ} = WQV/A	
94	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)	
0.61	inches	S = Potential maximum retention. S = (1000/CN) - 10	
0.121	inches	Ia = initial abstraction. Ia = 0.2S	
375	cfs/mi^2/in	q_u = Unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III	
0.99	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac	
200.00	feet	L = Swale length [1]	**≥ 100'**
8.00	feet	w = Bottom of the swale width[2]	**0 - 8 feet**
273.60	feet	E_{SHWT} = Elevation of SHWT. If none found, use the lowest elev. of test pit.	
279.00	feet	E_{BTM} = Elevation of the bottom of the practice	**≥ E_{SHWT}**
3.0	:1	SS_{RIGHT} = Right side slope	**≥3:1**
3.0	:1	SS_{LEFT} = Left side slope	**≥3:1**
0.005	ft/ft	S = Slope of swale in decimal form[3]	**0.005 - .05**
4.0	inches	d = Flow depth in swale at WQF (attach stage-discharge table)	**≤ 4"**
0.15	unitless	d must be < 4", therefore Manning's n = 0.15	
3.00	ft^2	Cross-sectional area check (assume trapezoidal channel)	
10.11	feet	Check wetted perimeter	
0.94	cfs	WQF_{check}.[4]	**WQF_{check} = WQF?**
-5%		Percent difference between WQF_{check} and WQF [4]	**+/- 10%**
10	minutes	HRT = hydraulic residence time during the WQF	**≥ 10 min**
280.47	ft	Peak elevation of the 10-year storm event[5]	
281.00	ft	Elevation of the top of the swale	
YES	Yes/No	10 peak elevation ≤ the top of swale	**← yes**

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. If > 0.02 (2%) then check dams are required. No additional detention time is credited for check dams.
4. The WQF_{check} & WQF should be near equal (within 10%) if you have selected the correct depth off the stage-
5. If the swale does not discharge the 50-year storm without overtopping, hydrologic routing of secondary discharge

Designer's Notes:


Unit Peak Discharge (qu)
1000.00
100.00
10.00
0.1
1
10
Unit peak discharge (qu), (csm/in)
Time of Concentration (Tc), (hours)
Ia/P=0.10
0.30
0.35
0.40
0.45
0.50
0.13
qu intercept
Tc intercept

Stage-Discharge for Reach TS1: Treatment Swale 1

Elevation (feet)	Discharge (cfs)	Elevation (feet)	Discharge (cfs)	Elevation (feet)	Discharge (cfs)
279.63	0.00	280.16	2.08	280.69	7.19
279.64	0.00	280.17	2.15	280.70	7.31
279.65	0.01	280.18	2.22	280.71	7.44
279.66	0.02	280.19	2.29	280.72	7.57
279.67	0.03	280.20	2.37	280.73	7.70
279.68	0.04	280.21	2.44	280.74	7.83
279.69	0.05	280.22	2.51	280.75	7.96
279.70	0.07	280.23	2.59	280.76	8.09
279.71	0.08	280.24	2.67	280.77	8.22
279.72	0.10	280.25	2.74	280.78	8.36
279.73	0.12	280.26	2.82	280.79	8.49
279.74	0.14	280.27	2.90	280.80	8.63
279.75	0.17	280.28	2.98	280.81	8.76
279.76	0.19	280.29	3.06	280.82	8.90
279.77	0.22	280.30	3.15	280.83	9.04
279.78	0.24	280.31	3.23	280.84	9.18
279.79	0.27	280.32	3.31	280.85	9.32
279.80	0.30	280.33	3.40	280.86	9.47
279.81	0.33	280.34	3.49	280.87	9.61
279.82	0.36	280.35	3.57	280.88	9.76
279.83	0.39	280.36	3.66	280.89	9.90
279.84	0.43	280.37	3.75	280.90	10.05
279.85	0.46	280.38	3.84	280.91	10.20
279.86	0.50	280.39	3.94	280.92	10.35
279.87	0.53	280.40	4.03	280.93	10.50
279.88	0.57	280.41	4.12	280.94	10.65
279.89	0.61	280.42	4.22	280.95	10.80
279.90	0.65	280.43	4.32	280.96	10.96
279.91	0.69	280.44	4.41	280.97	11.11
279.92	0.74	280.45	4.51	280.98	11.27
279.93	0.78	280.46	4.61	280.99	11.43
279.94	0.83	280.47	4.71	281.00	11.59
279.95	0.87	280.48	4.81	281.01	11.75
279.96	0.92	280.49	4.91	281.02	11.91
279.97	0.97	280.50	5.02	281.03	12.07
279.98	1.02	280.51	5.12	281.04	12.23
279.99	1.07	280.52	5.23	281.05	12.40
280.00	1.12	280.53	5.34	281.06	12.57
280.01	1.17	280.54	5.44	281.07	12.73
280.02	1.22	280.55	5.55	281.08	12.90
280.03	1.28	280.56	5.66	281.09	13.07
280.04	1.33	280.57	5.77	281.10	13.24
280.05	1.39	280.58	5.89	281.11	13.41
280.06	1.45	280.59	6.00	281.12	13.59
280.07	1.51	280.60	6.11	281.13	**13.76**
280.08	1.57	280.61	6.23		
280.09	1.63	280.62	6.34		
280.10	1.69	280.63	6.46		
280.11	1.75	280.64	6.58		
280.12	1.82	280.65	6.70		
280.13	1.88	280.66	6.82		
280.14	1.95	280.67	6.94		
280.15	2.02	280.68	7.07		

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

TREATMENT SWALE DESIGN CRITERIA
(Env-Wq 1508.08)

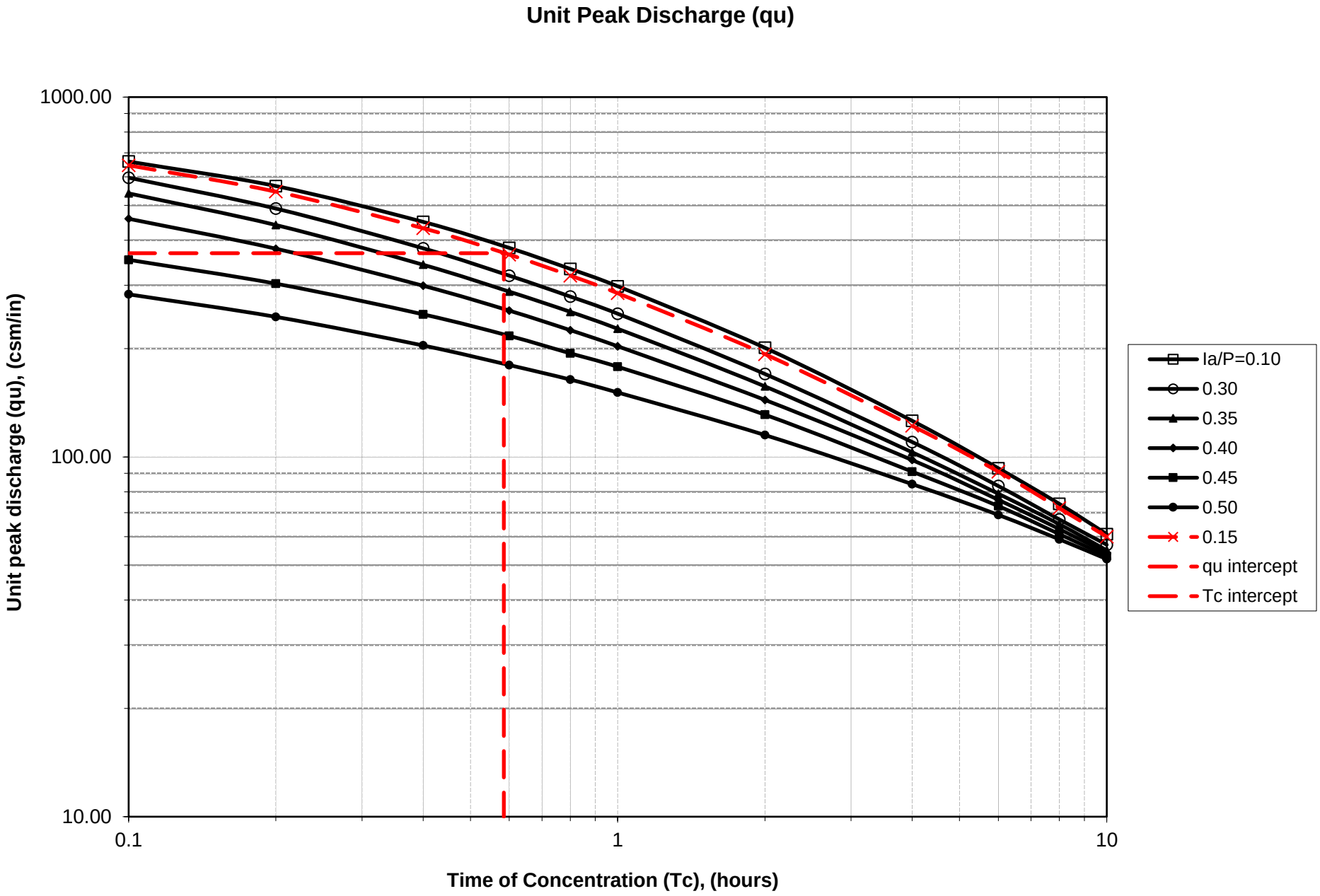
Node Name: Treatment Swale 2 / TS2

Enter the node name in the drainage analysis (e.g., reach TS 5), if applicable.

Yes	Yes/No	Have you reviewed the restrictions on unlined swales outlined in Env-Wq 1508.08(a)?	
No	Yes/No	Is the system lined? (required if not treated or if above SHWT)	
3.79	ac	A = Area draining to the practice	
1.78	ac	A_I = Impervious area draining to the practice	
35.0	minutes	T_c = Time of Concentration	
0.47	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.79	ac-in	WQV= 1" x Rv x A	
6,503	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1	inches	P = Amount of rainfall. For WQF in NH, P = 1".	
0.47	inches	D_{WQ} = Water quality depth. D_{WQ} = WQV/A	
93	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)	
0.70	inches	S = Potential maximum retention. S = (1000/CN) - 10	
0.141	inches	Ia = initial abstraction. Ia = 0.2S	
350	cfs/mi^2/in	q_u = Unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III	
0.98	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac	
200.00	feet	L = Swale length [1]	**≥ 100'**
8.00	feet	w = Bottom of the swale width[2]	**0 - 8 feet**
273.60	feet	E_{SHWT} = Elevation of SHWT. If none found, use the lowest elev. of test pit.	
277.00	feet	E_{BTM} = Elevation of the bottom of the practice	**≥ E_{SHWT}**
3.0	:1	SS_{RIGHT} = Right side slope	**≥3:1**
3.0	:1	SS_{LEFT} = Left side slope	**≥3:1**
0.005	ft/ft	S = Slope of swale in decimal form[3]	**0.005 - .05**
4.0	inches	d = Flow depth in swale at WQF (attach stage-discharge table)	**≤ 4"**
0.15	unitless	d must be < 4", therefore Manning's n = 0.15	
3.00	ft^2	Cross-sectional area check (assume trapezoidal channel)	
10.11	feet	Check wetted perimeter	
0.94	cfs	WQF_{check}.[4]	**WQF_{check} = WQF?**
-4%		Percent difference between WQF_{check} and WQF [4]	**+/- 10%**
10	minutes	HRT = hydraulic residence time during the WQF	**≥ 10 min**
278.63	ft	Peak elevation of the 10-year storm event[5]	
280.00	ft	Elevation of the top of the swale	
YES	Yes/No	10 peak elevation ≤ the top of swale	**← yes**

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. If > 0.02 (2%) then check dams are required. No additional detention time is credited for check dams.
4. The WQF_{check} & WQF should be near equal (within 10%) if you have selected the correct depth off the stage-
5. If the swale does not discharge the 50-year storm without overtopping, hydrologic routing of secondary discharge

Designer's Notes:


Unit Peak Discharge (qu)
1000.00
100.00
10.00
0.1
1
10
Unit peak discharge (qu), (csm/in)
Time of Concentration (Tc), (hours)
Ia/P=0.10
0.30
0.35
0.40
0.45
0.50
0.15
qu intercept
Tc intercept

Stage-Discharge for Reach TS2: Treatment Swale 2 (Phase 1)

Elevation (feet)	Discharge (cfs)	Elevation (feet)	Discharge (cfs)	Elevation (feet)	Discharge (cfs)	Elevation (feet)	Discharge (cfs)
278.30	0.00	278.83	2.08	279.36	7.19	279.89	15.38
278.31	0.00	278.84	2.15	279.37	7.32	279.90	15.57
278.32	0.01	278.85	2.22	279.38	7.44	279.91	15.75
278.33	0.02	278.86	2.29	279.39	7.57	279.92	15.94
278.34	0.03	278.87	2.37	279.40	7.70	279.93	16.13
278.35	0.04	278.88	2.44	279.41	7.83	279.94	16.32
278.36	0.05	278.89	2.51	279.42	7.96	279.95	16.52
278.37	0.07	278.90	2.59	279.43	8.09	279.96	16.71
278.38	0.08	278.91	2.67	279.44	8.22	279.97	16.90
278.39	0.10	278.92	2.74	279.45	8.36	279.98	17.10
278.40	0.12	278.93	2.82	279.46	8.49	279.99	17.30
278.41	0.14	278.94	2.90	279.47	8.63	280.00	17.50
278.42	0.17	278.95	2.98	279.48	8.76	280.01	17.70
278.43	0.19	278.96	3.06	279.49	8.90	280.02	17.90
278.44	0.21	278.97	3.15	279.50	9.04	280.03	18.10
278.45	0.24	278.98	3.23	279.51	9.18	280.04	18.30
278.46	0.27	278.99	3.32	279.52	9.32	280.05	18.51
278.47	0.30	279.00	3.40	279.53	9.47	280.06	18.71
278.48	0.33	279.01	3.49	279.54	9.61	280.07	18.92
278.49	0.36	279.02	3.57	279.55	9.76	280.08	19.13
278.50	0.39	279.03	3.66	279.56	9.90	280.09	19.34
278.51	0.43	279.04	3.75	279.57	10.05	280.10	19.55
278.52	0.46	279.05	3.85	279.58	10.20	280.11	19.76
278.53	0.50	279.06	3.94	279.59	10.35	280.12	19.97
278.54	0.53	279.07	4.03	279.60	10.50	280.13	20.19
278.55	0.57	279.08	4.12	279.61	10.65	280.14	20.40
278.56	0.61	279.09	4.22	279.62	10.80	280.15	20.62
278.57	0.65	279.10	4.32	279.63	10.96	280.16	20.84
278.58	0.69	279.11	4.41	279.64	11.11	280.17	21.06
278.59	0.74	279.12	4.51	279.65	11.27	280.18	21.28
278.60	0.78	279.13	4.61	279.66	11.43	280.19	21.50
278.61	0.83	279.14	4.71	279.67	11.59	280.20	21.72
278.62	0.87	279.15	4.81	279.68	11.75	280.21	21.95
278.63	0.92	279.16	4.91	279.69	11.91	280.22	22.17
278.64	0.97	279.17	5.02	279.70	12.07	280.23	22.40
278.65	1.02	279.18	5.12	279.71	12.24	280.24	22.63
278.66	1.07	279.19	5.23	279.72	12.40	280.25	22.86
278.67	1.12	279.20	5.34	279.73	12.57	280.26	23.09
278.68	1.17	279.21	5.44	279.74	12.73	280.27	23.32
278.69	1.22	279.22	5.55	279.75	12.90	280.28	23.56
278.70	1.28	279.23	5.66	279.76	13.07	280.29	23.79
278.71	1.34	279.24	5.77	279.77	13.24	280.30	**24.03**
278.72	1.39	279.25	5.89	279.78	13.41		
278.73	1.45	279.26	6.00	279.79	13.59		
278.74	1.51	279.27	6.11	279.80	13.76		
278.75	1.57	279.28	6.23	279.81	13.94		
278.76	1.63	279.29	6.34	279.82	14.11		
278.77	1.69	279.30	6.46	279.83	14.29		
278.78	1.75	279.31	6.58	279.84	14.47		
278.79	1.82	279.32	6.70	279.85	14.65		
278.80	1.88	279.33	6.82	279.86	14.83		
278.81	1.95	279.34	6.94	279.87	15.01		
278.82	2.02	279.35	7.07	279.88	15.20		

GROUNDWATER RECHARGE VOLULME (GRV) CALCULATION (Env-Wq 1507.04)

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
2.21	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.25	inches	Rd = Weighted groundwater recharge depth	
0.5525	ac-in	GRV = AI * Rd	
2,006	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12”)	

Provide calculations below showing that the project meets the groundwater recharge requirements (Env-Wq 1507.04):

Pre

HSG B = 2.59

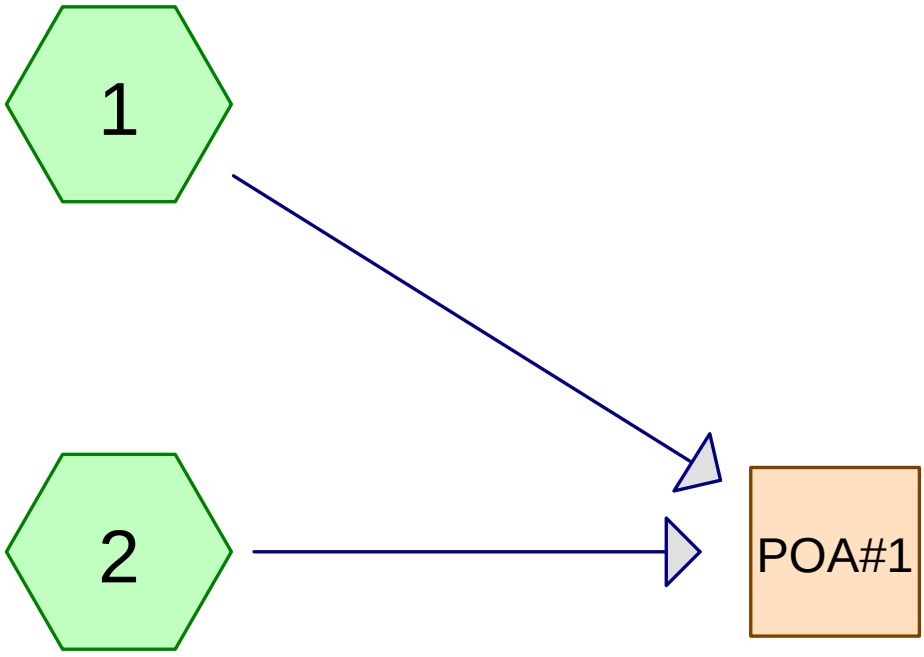
HSG D = 0.04

Post

HSG B = 4.80

HSG D = 0.04

APPENDIX A 7



Tax Map 104 Lot 406

Subcat Reach Pond Link

Routing Diagram for 22380 Phase 2 Pre Development Easter Seal Franklin

Prepared by Norway Plains Associates, Inc

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.90	61	>75% Grass cover, Good HSG B (1, 2)
0.57	80	>75% Grass cover, Good HSG D (2)
0.41	98	Gravel roads HSG B (1, 2)
0.04	98	Gravel roads HSG D (2)
1.30	98	Paved parking HSG B (1, 2)
0.88	98	Roofs HSG B (1, 2)
0.03	98	Water Surface HSG B (1)
3.20	55	Woods, Good HSG B (1, 2)
0.01	77	Woods, Good HSG D (2)
18.34	**66**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
17.72	HSG B	1, 2
0.00	HSG C	
0.62	HSG D	2
0.00	Other	
18.34		**TOTAL AREA**

APPENDIX A 7.1

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

Subcatchment 1: Runoff Area=479,038 sf 5.51% Impervious Runoff Depth=0.36"
Flow Length=1,465' Tc=86.1 min CN=WQ Runoff=0.9 cfs 0.33 af

Subcatchment 2: Runoff Area=319,941 sf 27.97% Impervious Runoff Depth=0.95"
Flow Length=965' Tc=34.6 min CN=WQ Runoff=3.6 cfs 0.58 af

Reach POA#1: Tax Map 104 Lot 406 Inflow=3.9 cfs 0.91 af
Outflow=3.9 cfs 0.91 af

Total Runoff Area = 18.34 ac Runoff Volume = 0.91 af Average Runoff Depth = 0.60"
85.49% Pervious = 15.68 ac 14.51% Impervious = 2.66 ac

APPENDIX A 7.2

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

Subcatchment 1: Runoff Area=479,038 sf 5.51% Impervious Runoff Depth=0.91"
Flow Length=1,465' Tc=86.1 min CN=WQ Runoff=2.9 cfs 0.83 af

Subcatchment 2: Runoff Area=319,941 sf 27.97% Impervious Runoff Depth=1.71"
Flow Length=965' Tc=34.6 min CN=WQ Runoff=6.8 cfs 1.05 af

Reach POA#1: Tax Map 104 Lot 406 Inflow=7.7 cfs 1.88 af
Outflow=7.7 cfs 1.88 af

Total Runoff Area = 18.34 ac Runoff Volume = 1.88 af Average Runoff Depth = 1.23"
85.49% Pervious = 15.68 ac 14.51% Impervious = 2.66 ac

APPENDIX A 7.3

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

Subcatchment 1: Runoff Area=479,038 sf 5.51% Impervious Runoff Depth=2.01"
Flow Length=1,465' Tc=86.1 min CN=WQ Runoff=7.4 cfs 1.84 af

Subcatchment 2: Runoff Area=319,941 sf 27.97% Impervious Runoff Depth=3.06"
Flow Length=965' Tc=34.6 min CN=WQ Runoff=12.7 cfs 1.87 af

Reach POA#1: Tax Map 104 Lot 406 Inflow=15.7 cfs 3.71 af
Outflow=15.7 cfs 3.71 af

Total Runoff Area = 18.34 ac Runoff Volume = 3.71 af Average Runoff Depth = 2.43"
85.49% Pervious = 15.68 ac 14.51% Impervious = 2.66 ac

APPENDIX A 7.4

Summary for Subcatchment 1:

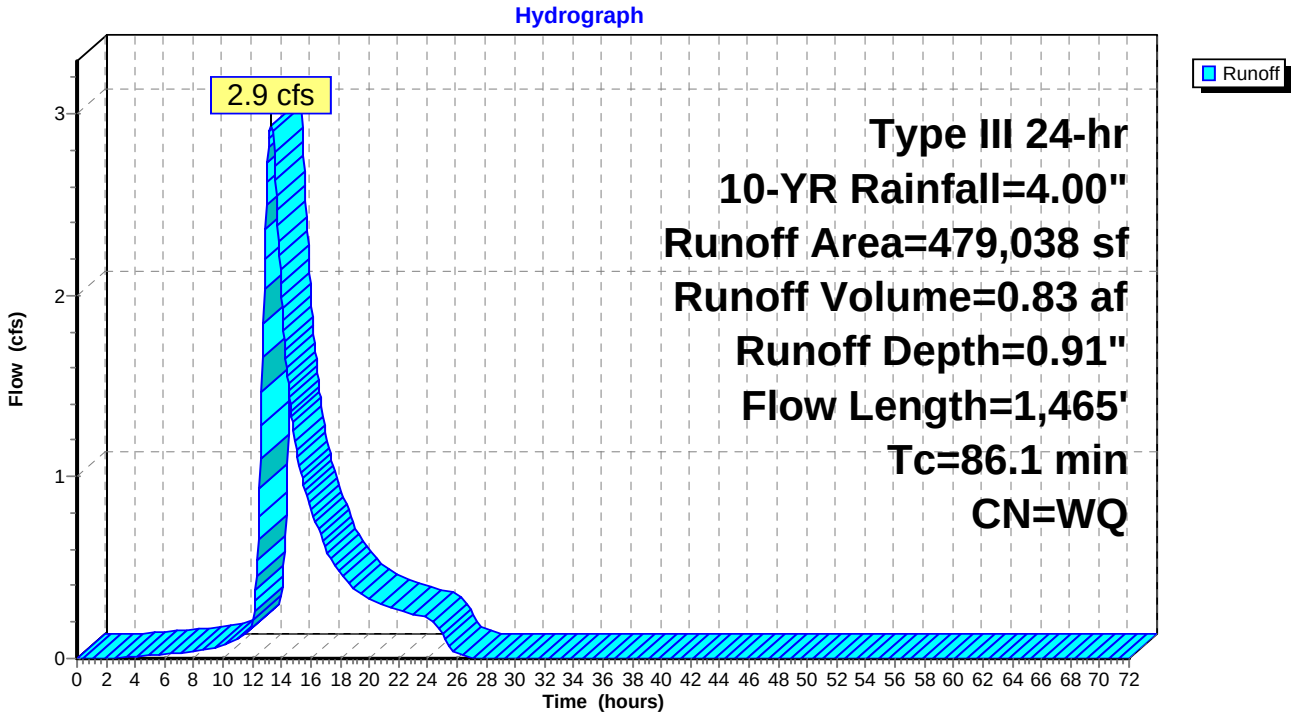
Runoff = 2.9 cfs @ 13.29 hrs, Volume= 0.83 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	14,103	98	Roofs HSG B
*	3,828	98	Gravel roads HSG B
	7,326	98	Paved parking HSG B
	114,307	55	Woods, Good HSG B
	1,149	98	Water Surface HSG B
	338,325	61	>75% Grass cover, Good HSG B
	479,038		Weighted Average
	452,632		94.49% Pervious Area
	26,406		5.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	100	0.0200	0.07		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.74"
3.1	160	0.0300	0.87		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
50.6	950	0.0020	0.31		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
8.6	200	0.0060	0.39		**Shallow Concentrated Flow, D-->E** Woodland Kv= 5.0 fps
0.6	55	0.0100	1.61		**Shallow Concentrated Flow, E-->F** Unpaved Kv= 16.1 fps
86.1	1,465	Total			

Subcatchment 1:



Summary for Subcatchment 2:

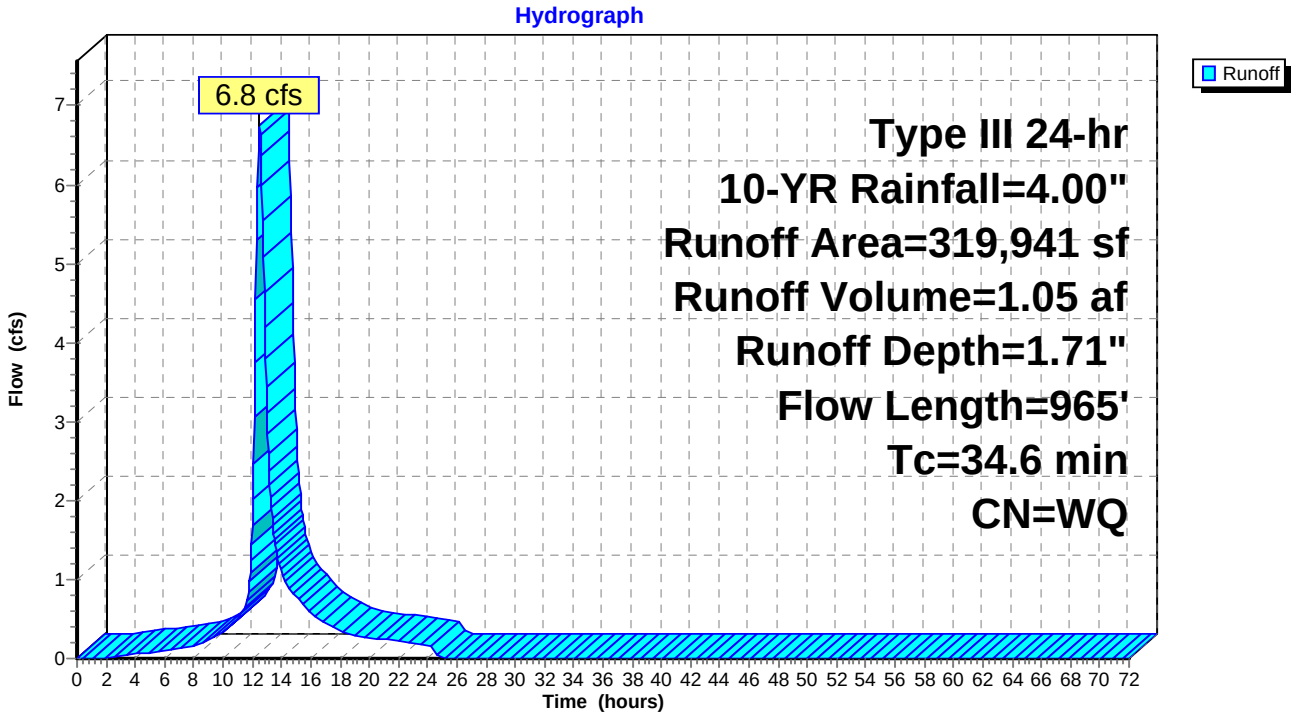
Runoff = 6.8 cfs @ 12.49 hrs, Volume= 1.05 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
*	1,648	98	Gravel roads HSG D
	24,132	98	Roofs HSG B
*	14,218	98	Gravel roads HSG B
	49,489	98	Paved parking HSG B
	591	77	Woods, Good HSG D
	25,172	55	Woods, Good HSG B
	179,974	61	>75% Grass cover, Good HSG B
	24,717	80	>75% Grass cover, Good HSG D
	319,941		Weighted Average
	230,454		72.03% Pervious Area
	89,487		27.97% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0100	0.10		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
10.8	250	0.0060	0.39		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
15.8	665	0.0100	0.70		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
34.6	965	Total			

Subcatchment 2:

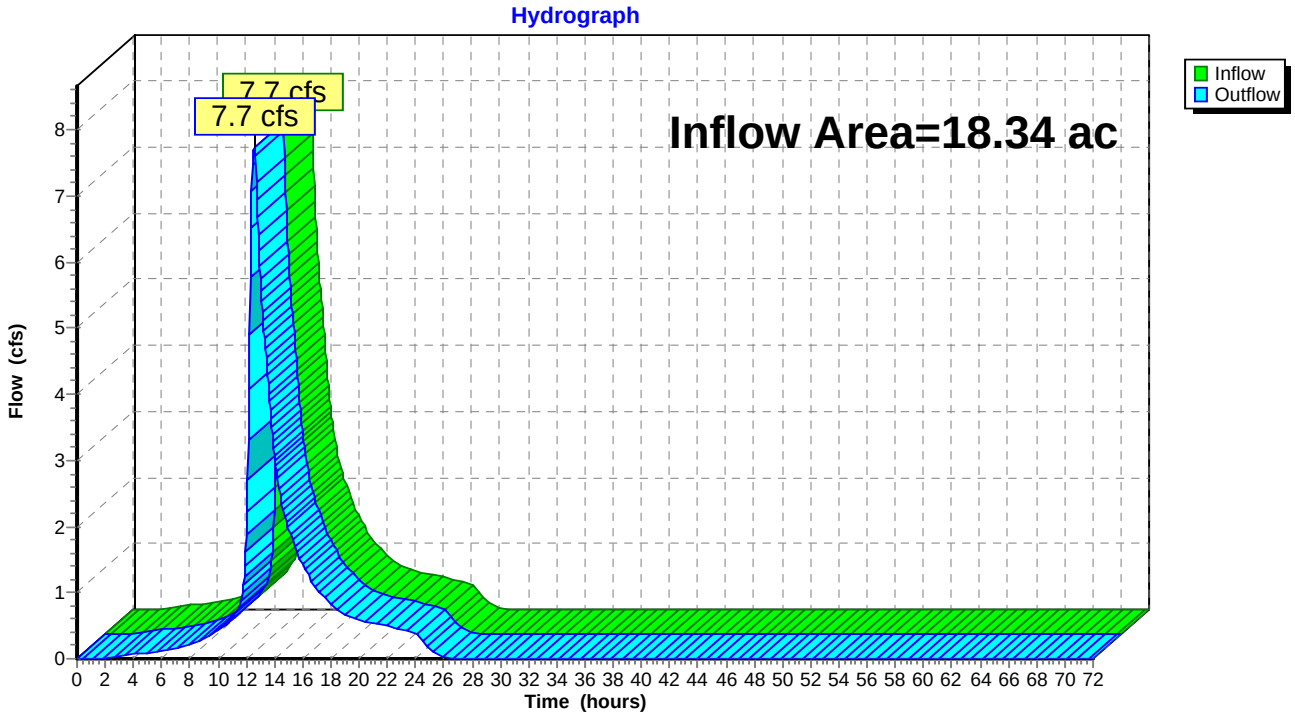


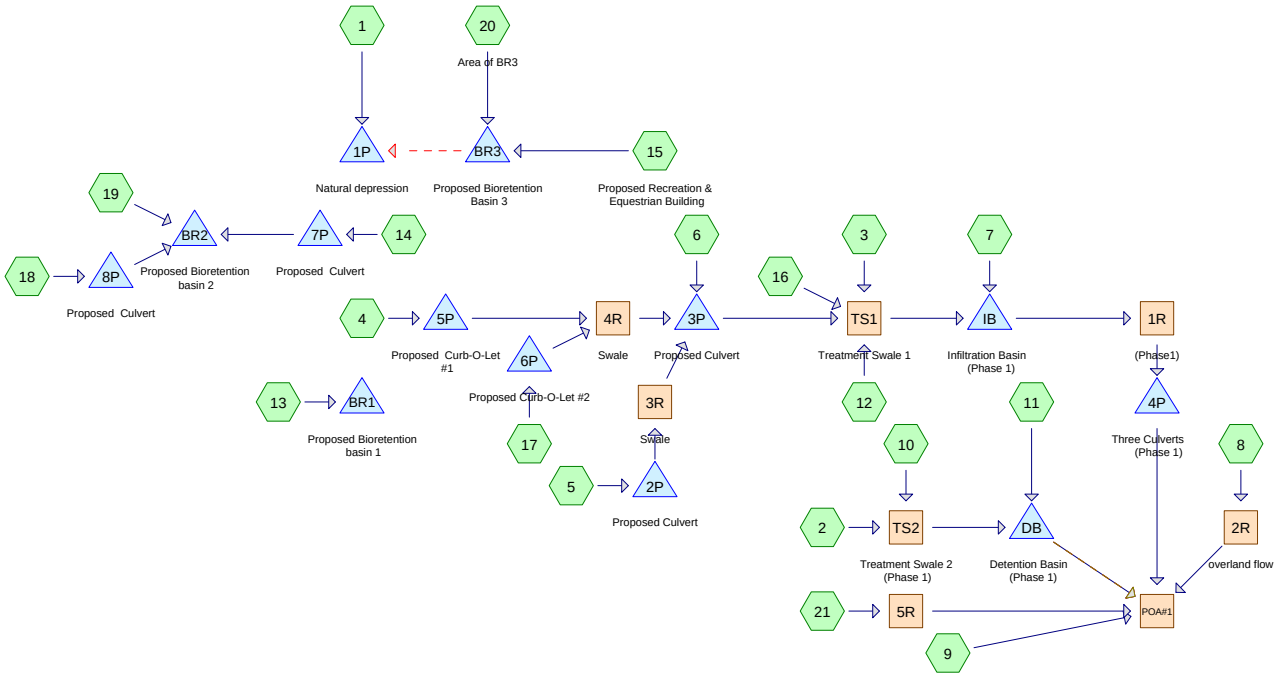
Summary for Reach POA#1: Tax Map 104 Lot 406

Inflow Area = 18.34 ac, 14.51% Impervious, Inflow Depth = 1.23" for 10-YR event
Inflow = 7.7 cfs @ 12.54 hrs, Volume= 1.88 af
Outflow = 7.7 cfs @ 12.54 hrs, Volume= 1.88 af, Atten= 0%, Lag= 0.0 min

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

Reach POA#1: Tax Map 104 Lot 406





Routing Diagram for 22380 Phase 2 Post Development Easter Seal Franklin

Prepared by Norway Plains Associates, Inc

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
10.73	61	>75% Grass cover, Good HSG B (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21)
0.58	80	>75% Grass cover, Good HSG D (2, 9, 10, 11)
0.45	98	Gravel roads HSG B (1, 2, 6, 8, 9, 12, 14, 16, 18, 19, 20)
0.00	98	Gravel roads, HSG B (15)
2.82	98	Paved parking HSG B (2, 4, 5, 6, 9, 12, 13, 14, 15, 17, 19, 21)
0.04	98	Paved parking HSG D (2)
1.53	98	Roofs HSG B (2, 5, 9, 13, 15, 16)
0.00	98	Roofs, HSG B (6)
2.19	55	Woods, Good HSG B (1, 2, 9, 18, 19)
18.34	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.00	HSG A	
17.72	HSG B	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21
0.00	HSG C	
0.62	HSG D	2, 9, 10, 11
0.00	Other	
18.34		**TOTAL AREA**

APPENDIX A 7.5

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

Subcatchment 1: Runoff Area=117,460 sf 0.89% Impervious Runoff Depth=0.23"
Flow Length=355' Tc=30.4 min CN=WQ Runoff=0.2 cfs 0.05 af

Subcatchment 2: Runoff Area=160,143 sf 48.50% Impervious Runoff Depth=1.36"
Flow Length=725' Tc=29.4 min CN=WQ Runoff=2.9 cfs 0.42 af

Subcatchment 3: Runoff Area=5,586 sf 0.00% Impervious Runoff Depth=0.27"
Tc=6.0 min CN=61 Runoff=0.0 cfs 0.00 af

Subcatchment 4: Runoff Area=46,733 sf 86.66% Impervious Runoff Depth=2.21"
Flow Length=440' Tc=6.0 min CN=WQ Runoff=2.4 cfs 0.20 af

Subcatchment 5: Runoff Area=34,787 sf 33.87% Impervious Runoff Depth=1.03"
Flow Length=282' Tc=14.0 min CN=WQ Runoff=0.6 cfs 0.07 af

Subcatchment 6: Runoff Area=24,944 sf 26.29% Impervious Runoff Depth=0.86"
Flow Length=210' Tc=8.9 min CN=WQ Runoff=0.4 cfs 0.04 af

Subcatchment 7: Runoff Area=16,538 sf 0.00% Impervious Runoff Depth=0.27"
Tc=6.0 min CN=61 Runoff=0.0 cfs 0.01 af

Subcatchment 8: Runoff Area=52,160 sf 8.95% Impervious Runoff Depth=0.47"
Flow Length=925' Tc=37.5 min CN=WQ Runoff=0.2 cfs 0.05 af

Subcatchment 9: Runoff Area=152,526 sf 13.60% Impervious Runoff Depth=0.61"
Tc=0.0 min CN=WQ Runoff=1.9 cfs 0.18 af

Subcatchment 10: Runoff Area=4,778 sf 0.00% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.01 af

Subcatchment 11: Runoff Area=15,041 sf 0.00% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.03 af

Subcatchment 12: Runoff Area=15,209 sf 44.68% Impervious Runoff Depth=1.27"
Flow Length=318' Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.04 af

Subcatchment 13: Runoff Area=21,258 sf 21.41% Impervious Runoff Depth=0.75"
Flow Length=131' Tc=6.4 min CN=WQ Runoff=0.3 cfs 0.03 af

Subcatchment 14: Runoff Area=6,374 sf 20.77% Impervious Runoff Depth=0.74"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.01 af

Subcatchment 15: Proposed Recreation & Runoff Area=24,550 sf 92.51% Impervious Runoff Depth=2.34"
Tc=6.0 min CN=WQ Runoff=1.4 cfs 0.11 af

Subcatchment 16: Runoff Area=9,165 sf 38.21% Impervious Runoff Depth=1.13"
Flow Length=190' Tc=6.9 min CN=WQ Runoff=0.2 cfs 0.02 af

Subcatchment 17: Runoff Area=4,690 sf 96.80% Impervious Runoff Depth=2.44"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.02 af

Subcatchment 18: Runoff Area=10,435 sf 0.06% Impervious Runoff Depth=0.22"
Flow Length=255' Tc=12.0 min CN=WQ Runoff=0.0 cfs 0.00 af

Subcatchment 19: Runoff Area=45,130 sf 2.73% Impervious Runoff Depth=0.26"
Flow Length=240' Tc=13.2 min CN=WQ Runoff=0.1 cfs 0.02 af

Subcatchment 20: Area of BR3 Runoff Area=28,904 sf 2.68% Impervious Runoff Depth=0.33"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.02 af

Subcatchment 21: Runoff Area=2,570 sf 90.12% Impervious Runoff Depth=2.29"
Tc=6.0 min CN=WQ Runoff=0.1 cfs 0.01 af

Reach 1R: (Phase1) Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.0 cfs 0.00 af
n=0.069 L=25.0' S=0.0584 '/' Capacity=8.4 cfs Outflow=0.0 cfs 0.00 af

Reach 2R: overland flow Avg. Flow Depth=0.12' Max Vel=0.73 fps Inflow=0.2 cfs 0.05 af
n=0.035 L=100.0' S=0.0083 '/' Capacity=1.9 cfs Outflow=0.2 cfs 0.05 af

Reach 3R: Swale Avg. Flow Depth=0.09' Max Vel=1.64 fps Inflow=0.3 cfs 0.07 af
n=0.022 L=35.0' S=0.0177 '/' Capacity=78.6 cfs Outflow=0.3 cfs 0.07 af

Reach 4R: Swale Avg. Flow Depth=0.40' Max Vel=2.06 fps Inflow=2.6 cfs 0.22 af
n=0.022 L=150.0' S=0.0050 '/' Capacity=41.7 cfs Outflow=2.7 cfs 0.22 af

Reach 5R: Avg. Flow Depth=0.08' Max Vel=1.01 fps Inflow=0.1 cfs 0.01 af
n=0.022 L=290.0' S=0.0086 '/' Capacity=1.9 cfs Outflow=0.1 cfs 0.01 af

Reach POA#1: Inflow=2.6 cfs 0.68 af
Outflow=2.6 cfs 0.68 af

Reach TS1: Treatment Swale 1 Avg. Flow Depth=0.65' Max Vel=0.46 fps Inflow=3.4 cfs 0.39 af
n=0.150 L=200.0' S=0.0050 '/' Capacity=13.8 cfs Outflow=3.0 cfs 0.39 af

Reach TS2: Treatment Swale 2 (Phase 1) Avg. Flow Depth=0.62' Max Vel=0.45 fps Inflow=2.9 cfs 0.42 af
n=0.150 L=200.0' S=0.0050 '/' Capacity=24.0 cfs Outflow=2.8 cfs 0.42 af

Pond 1P: Natural depression Peak Elev=281.59' Storage=1,035 cf Inflow=0.2 cfs 0.05 af
Outflow=0.0 cfs 0.05 af

Pond 2P: Proposed Culvert Peak Elev=281.23' Storage=692 cf Inflow=0.6 cfs 0.07 af
15.0" Round Culvert n=0.013 L=60.0' S=0.0075 '/' Outflow=0.3 cfs 0.07 af

Pond 3P: Proposed Culvert Peak Elev=280.73' Storage=445 cf Inflow=3.2 cfs 0.33 af
24.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=2.8 cfs 0.33 af

Pond 4P: Three Culverts (Phase 1) Peak Elev=277.04' Storage=0 cf Inflow=0.0 cfs 0.00 af
Outflow=0.0 cfs 0.00 af

Pond 5P: Proposed Curb-O-Let #1 Peak Elev=281.27' Storage=32 cf Inflow=2.4 cfs 0.20 af
48.0" x 4.0" Box Culvert n=0.012 L=5.0' S=0.0040 '/' Outflow=2.4 cfs 0.20 af

Pond 6P: Proposed Curb-O-Let #2 Peak Elev=281.05' Storage=9 cf Inflow=0.3 cfs 0.02 af
24.0" x 4.0" Box Culvert n=0.012 L=5.0' S=0.0040 '/' Outflow=0.3 cfs 0.02 af

Pond 7P: Proposed Culvert Peak Elev=282.59' Storage=152 cf Inflow=0.1 cfs 0.01 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0050 '/' Outflow=0.0 cfs 0.01 af

Pond 8P: Proposed Culvert Peak Elev=283.07' Storage=2 cf Inflow=0.0 cfs 0.00 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0375 '/' Outflow=0.0 cfs 0.00 af

Pond BR1: Proposed Bioretention basin 1 Peak Elev=281.30' Storage=647 cf Inflow=0.3 cfs 0.03 af
Outflow=0.0 cfs 0.03 af

Pond BR2: Proposed Bioretention basin 2 Peak Elev=280.64' Storage=930 cf Inflow=0.1 cfs 0.04 af
Outflow=0.0 cfs 0.04 af

Pond BR3: Proposed Bioretention Basin 3 Peak Elev=282.97' Storage=2,504 cf Inflow=1.5 cfs 0.13 af
Discarded=0.1 cfs 0.13 af Secondary=0.0 cfs 0.00 af Outflow=0.1 cfs 0.13 af

Pond DB: Detention Basin (Phase 1) Peak Elev=276.94' Storage=7,508 cf Inflow=2.9 cfs 0.45 af
Primary=0.5 cfs 0.06 af Secondary=0.0 cfs 0.00 af Tertiary=1.5 cfs 0.38 af Outflow=2.0 cfs 0.45 af

Pond IB: Infiltration Basin (Phase 1) Peak Elev=276.34' Storage=10,231 cf Inflow=3.0 cfs 0.40 af
Discarded=0.1 cfs 0.40 af Primary=0.0 cfs 0.00 af Outflow=0.1 cfs 0.40 af

Total Runoff Area = 18.34 ac Runoff Volume = 1.33 af Average Runoff Depth = 0.87"
73.63% Pervious = 13.50 ac 26.37% Impervious = 4.84 ac

APPENDIX A 7.6

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

Subcatchment 1: Runoff Area=117,460 sf 0.89% Impervious Runoff Depth=0.71"
Flow Length=355' Tc=30.4 min CN=WQ Runoff=1.0 cfs 0.16 af

Subcatchment 2: Runoff Area=160,143 sf 48.50% Impervious Runoff Depth=2.25"
Flow Length=725' Tc=29.4 min CN=WQ Runoff=4.8 cfs 0.69 af

Subcatchment 3: Runoff Area=5,586 sf 0.00% Impervious Runoff Depth=0.81"
Tc=6.0 min CN=61 Runoff=0.1 cfs 0.01 af

Subcatchment 4: Runoff Area=46,733 sf 86.66% Impervious Runoff Depth=3.37"
Flow Length=440' Tc=6.0 min CN=WQ Runoff=3.6 cfs 0.30 af

Subcatchment 5: Runoff Area=34,787 sf 33.87% Impervious Runoff Depth=1.81"
Flow Length=282' Tc=14.0 min CN=WQ Runoff=1.1 cfs 0.12 af

Subcatchment 6: Runoff Area=24,944 sf 26.29% Impervious Runoff Depth=1.59"
Flow Length=210' Tc=8.9 min CN=WQ Runoff=0.8 cfs 0.08 af

Subcatchment 7: Runoff Area=16,538 sf 0.00% Impervious Runoff Depth=0.81"
Tc=6.0 min CN=61 Runoff=0.3 cfs 0.03 af

Subcatchment 8: Runoff Area=52,160 sf 8.95% Impervious Runoff Depth=1.08"
Flow Length=925' Tc=37.5 min CN=WQ Runoff=0.6 cfs 0.11 af

Subcatchment 9: Runoff Area=152,526 sf 13.60% Impervious Runoff Depth=1.25"
Tc=0.0 min CN=WQ Runoff=5.0 cfs 0.37 af

Subcatchment 10: Runoff Area=4,778 sf 0.00% Impervious Runoff Depth=1.73"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.02 af

Subcatchment 11: Runoff Area=15,041 sf 0.00% Impervious Runoff Depth=1.85"
Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.05 af

Subcatchment 12: Runoff Area=15,209 sf 44.68% Impervious Runoff Depth=2.13"
Flow Length=318' Tc=6.0 min CN=WQ Runoff=0.7 cfs 0.06 af

Subcatchment 13: Runoff Area=21,258 sf 21.41% Impervious Runoff Depth=1.44"
Flow Length=131' Tc=6.4 min CN=WQ Runoff=0.7 cfs 0.06 af

Subcatchment 14: Runoff Area=6,374 sf 20.77% Impervious Runoff Depth=1.43"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.02 af

Subcatchment 15: Proposed Recreation & Runoff Area=24,550 sf 92.51% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=WQ Runoff=2.0 cfs 0.17 af

Subcatchment 16: Runoff Area=9,165 sf 38.21% Impervious Runoff Depth=1.94"
Flow Length=190' Tc=6.9 min CN=WQ Runoff=0.4 cfs 0.03 af

Subcatchment 17: Runoff Area=4,690 sf 96.80% Impervious Runoff Depth=3.67"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.03 af

Subcatchment 18: Runoff Area=10,435 sf 0.06% Impervious Runoff Depth=0.70"
Flow Length=255' Tc=12.0 min CN=WQ Runoff=0.1 cfs 0.01 af

Subcatchment 19: Runoff Area=45,130 sf 2.73% Impervious Runoff Depth=0.75"
Flow Length=240' Tc=13.2 min CN=WQ Runoff=0.5 cfs 0.07 af

Subcatchment 20: Area of BR3 Runoff Area=28,904 sf 2.68% Impervious Runoff Depth=0.89"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.05 af

Subcatchment 21: Runoff Area=2,570 sf 90.12% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=WQ Runoff=0.2 cfs 0.02 af

Reach 1R: (Phase1) Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.0 cfs 0.00 af
n=0.069 L=25.0' S=0.0584 '/' Capacity=8.4 cfs Outflow=0.0 cfs 0.00 af

Reach 2R: overland flow Avg. Flow Depth=0.20' Max Vel=1.01 fps Inflow=0.6 cfs 0.11 af
n=0.035 L=100.0' S=0.0083 '/' Capacity=1.9 cfs Outflow=0.6 cfs 0.11 af

Reach 3R: Swale Avg. Flow Depth=0.13' Max Vel=2.05 fps Inflow=0.6 cfs 0.12 af
n=0.022 L=35.0' S=0.0177 '/' Capacity=78.6 cfs Outflow=0.6 cfs 0.12 af

Reach 4R: Swale Avg. Flow Depth=0.49' Max Vel=2.31 fps Inflow=4.0 cfs 0.33 af
n=0.022 L=150.0' S=0.0050 '/' Capacity=41.7 cfs Outflow=4.0 cfs 0.33 af

Reach 5R: Avg. Flow Depth=0.11' Max Vel=1.14 fps Inflow=0.2 cfs 0.02 af
n=0.022 L=290.0' S=0.0086 '/' Capacity=1.9 cfs Outflow=0.2 cfs 0.02 af

Reach POA#1: Inflow=5.9 cfs 1.24 af
Outflow=5.9 cfs 1.24 af

Reach TS1: Treatment Swale 1 Avg. Flow Depth=0.85' Max Vel=0.54 fps Inflow=5.4 cfs 0.64 af
n=0.150 L=200.0' S=0.0050 '/' Capacity=13.8 cfs Outflow=4.9 cfs 0.64 af

Reach TS2: Treatment Swale 2 (Phase 1) Avg. Flow Depth=0.84' Max Vel=0.53 fps Inflow=4.9 cfs 0.70 af
n=0.150 L=200.0' S=0.0050 '/' Capacity=24.0 cfs Outflow=4.7 cfs 0.70 af

Pond 1P: Natural depression Peak Elev=281.88' Storage=3,743 cf Inflow=1.0 cfs 0.16 af
Outflow=0.1 cfs 0.16 af

Pond 2P: Proposed Culvert Peak Elev=281.35' Storage=1,133 cf Inflow=1.1 cfs 0.12 af
15.0" Round Culvert n=0.013 L=60.0' S=0.0075 '/' Outflow=0.6 cfs 0.12 af

Pond 3P: Proposed Culvert Peak Elev=280.96' Storage=826 cf Inflow=5.0 cfs 0.53 af
24.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=4.4 cfs 0.53 af

Pond 4P: Three Culverts (Phase 1) Peak Elev=277.04' Storage=0 cf Inflow=0.0 cfs 0.00 af
Outflow=0.0 cfs 0.00 af

Pond 5P: Proposed Curb-O-Let #1 Peak Elev=281.44' Storage=32 cf Inflow=3.6 cfs 0.30 af
48.0" x 4.0" Box Culvert n=0.012 L=5.0' S=0.0040 '/' Outflow=3.7 cfs 0.30 af

Pond 6P: Proposed Curb-O-Let #2 Peak Elev=281.14' Storage=24 cf Inflow=0.4 cfs 0.03 af
24.0" x 4.0" Box Culvert n=0.012 L=5.0' S=0.0040 '/' Outflow=0.3 cfs 0.03 af

Pond 7P: Proposed Culvert Peak Elev=282.65' Storage=253 cf Inflow=0.2 cfs 0.02 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0050 '/' Outflow=0.1 cfs 0.02 af

Pond 8P: Proposed Culvert Peak Elev=283.18' Storage=4 cf Inflow=0.1 cfs 0.01 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0375 '/' Outflow=0.1 cfs 0.01 af

Pond BR1: Proposed Bioretention basin 1 Peak Elev=281.71' Storage=1,609 cf Inflow=0.7 cfs 0.06 af
Outflow=0.0 cfs 0.06 af

Pond BR2: Proposed Bioretention basin 2 Peak Elev=281.55' Storage=3,163 cf Inflow=0.7 cfs 0.10 af
Outflow=0.0 cfs 0.09 af

Pond BR3: Proposed Bioretention Basin 3 Peak Elev=283.17' Storage=5,154 cf Inflow=2.6 cfs 0.22 af
Discarded=0.1 cfs 0.22 af Secondary=0.0 cfs 0.00 af Outflow=0.1 cfs 0.22 af

Pond DB: Detention Basin (Phase 1) Peak Elev=277.17' Storage=9,613 cf Inflow=4.9 cfs 0.76 af
Primary=1.0 cfs 0.14 af Secondary=0.0 cfs 0.00 af Tertiary=2.5 cfs 0.62 af Outflow=3.6 cfs 0.75 af

Pond IB: Infiltration Basin (Phase 1) Peak Elev=277.35' Storage=19,451 cf Inflow=5.1 cfs 0.66 af
Discarded=0.2 cfs 0.66 af Primary=0.0 cfs 0.00 af Outflow=0.2 cfs 0.66 af

Total Runoff Area = 18.34 ac Runoff Volume = 2.44 af Average Runoff Depth = 1.60"
73.63% Pervious = 13.50 ac 26.37% Impervious = 4.84 ac

APPENDIX A 7.7

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

Subcatchment 1: Runoff Area=117,460 sf 0.89% Impervious Runoff Depth=1.74"
Flow Length=355' Tc=30.4 min CN=WQ Runoff=2.8 cfs 0.39 af

Subcatchment 2: Runoff Area=160,143 sf 48.50% Impervious Runoff Depth=3.72"
Flow Length=725' Tc=29.4 min CN=WQ Runoff=8.2 cfs 1.14 af

Subcatchment 3: Runoff Area=5,586 sf 0.00% Impervious Runoff Depth=1.92"
Tc=6.0 min CN=61 Runoff=0.3 cfs 0.02 af

Subcatchment 4: Runoff Area=46,733 sf 86.66% Impervious Runoff Depth=5.14"
Flow Length=440' Tc=6.0 min CN=WQ Runoff=5.5 cfs 0.46 af

Subcatchment 5: Runoff Area=34,787 sf 33.87% Impervious Runoff Depth=3.18"
Flow Length=282' Tc=14.0 min CN=WQ Runoff=2.1 cfs 0.21 af

Subcatchment 6: Runoff Area=24,944 sf 26.29% Impervious Runoff Depth=2.90"
Flow Length=210' Tc=8.9 min CN=WQ Runoff=1.6 cfs 0.14 af

Subcatchment 7: Runoff Area=16,538 sf 0.00% Impervious Runoff Depth=1.92"
Tc=6.0 min CN=61 Runoff=0.8 cfs 0.06 af

Subcatchment 8: Runoff Area=52,160 sf 8.95% Impervious Runoff Depth=2.25"
Flow Length=925' Tc=37.5 min CN=WQ Runoff=1.5 cfs 0.22 af

Subcatchment 9: Runoff Area=152,526 sf 13.60% Impervious Runoff Depth=2.47"
Tc=0.0 min CN=WQ Runoff=10.8 cfs 0.72 af

Subcatchment 10: Runoff Area=4,778 sf 0.00% Impervious Runoff Depth=3.22"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.03 af

Subcatchment 11: Runoff Area=15,041 sf 0.00% Impervious Runoff Depth=3.39"
Tc=6.0 min CN=WQ Runoff=1.3 cfs 0.10 af

Subcatchment 12: Runoff Area=15,209 sf 44.68% Impervious Runoff Depth=3.58"
Flow Length=318' Tc=6.0 min CN=WQ Runoff=1.3 cfs 0.10 af

Subcatchment 13: Runoff Area=21,258 sf 21.41% Impervious Runoff Depth=2.71"
Flow Length=131' Tc=6.4 min CN=WQ Runoff=1.4 cfs 0.11 af

Subcatchment 14: Runoff Area=6,374 sf 20.77% Impervious Runoff Depth=2.69"
Tc=6.0 min CN=WQ Runoff=0.4 cfs 0.03 af

Subcatchment 15: Proposed Recreation & Runoff Area=24,550 sf 92.51% Impervious Runoff Depth=5.35"
Tc=6.0 min CN=WQ Runoff=3.0 cfs 0.25 af

Subcatchment 16: Runoff Area=9,165 sf 38.21% Impervious Runoff Depth=3.34"
Flow Length=190' Tc=6.9 min CN=WQ Runoff=0.7 cfs 0.06 af

Subcatchment 17: Runoff Area=4,690 sf 96.80% Impervious Runoff Depth=5.51"
Tc=6.0 min CN=WQ Runoff=0.6 cfs 0.05 af

Subcatchment 18: Runoff Area=10,435 sf 0.06% Impervious Runoff Depth=1.73"
Flow Length=255' Tc=12.0 min CN=WQ Runoff=0.4 cfs 0.03 af

Subcatchment 19: Runoff Area=45,130 sf 2.73% Impervious Runoff Depth=1.79"
Flow Length=240' Tc=13.2 min CN=WQ Runoff=1.6 cfs 0.15 af

Subcatchment 20: Area of BR3 Runoff Area=28,904 sf 2.68% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=WQ Runoff=1.5 cfs 0.11 af

Subcatchment 21: Runoff Area=2,570 sf 90.12% Impervious Runoff Depth=5.27"
Tc=6.0 min CN=WQ Runoff=0.3 cfs 0.03 af

Reach 1R: (Phase1) Avg. Flow Depth=0.04' Max Vel=0.61 fps Inflow=0.4 cfs 0.09 af
n=0.069 L=25.0' S=0.0584 '/' Capacity=8.4 cfs Outflow=0.4 cfs 0.09 af

Reach 2R: overland flow Avg. Flow Depth=0.30' Max Vel=1.31 fps Inflow=1.5 cfs 0.22 af
n=0.035 L=100.0' S=0.0083 '/' Capacity=1.9 cfs Outflow=1.5 cfs 0.22 af

Reach 3R: Swale Avg. Flow Depth=0.18' Max Vel=2.52 fps Inflow=1.2 cfs 0.21 af
n=0.022 L=35.0' S=0.0177 '/' Capacity=78.6 cfs Outflow=1.2 cfs 0.21 af

Reach 4R: Swale Avg. Flow Depth=0.61' Max Vel=2.59 fps Inflow=6.1 cfs 0.51 af
n=0.022 L=150.0' S=0.0050 '/' Capacity=41.7 cfs Outflow=6.0 cfs 0.51 af

Reach 5R: Avg. Flow Depth=0.13' Max Vel=1.28 fps Inflow=0.3 cfs 0.03 af
n=0.022 L=290.0' S=0.0086 '/' Capacity=1.9 cfs Outflow=0.3 cfs 0.03 af

Reach POA#1: Inflow=12.6 cfs 2.32 af
Outflow=12.6 cfs 2.32 af

Reach TS1: Treatment Swale 1 Avg. Flow Depth=1.12' Max Vel=0.63 fps Inflow=8.7 cfs 1.04 af
n=0.150 L=200.0' S=0.0050 '/' Capacity=13.8 cfs Outflow=8.0 cfs 1.04 af

Reach TS2: Treatment Swale 2 (Phase 1) Avg. Flow Depth=1.13' Max Vel=0.63 fps Inflow=8.3 cfs 1.17 af
n=0.150 L=200.0' S=0.0050 '/' Capacity=24.0 cfs Outflow=8.1 cfs 1.17 af

Pond 1P: Natural depression Peak Elev=282.21' Storage=10,642 cf Inflow=2.8 cfs 0.39 af
Outflow=0.2 cfs 0.39 af

Pond 2P: Proposed Culvert Peak Elev=281.52' Storage=1,914 cf Inflow=2.1 cfs 0.21 af
15.0" Round Culvert n=0.013 L=60.0' S=0.0075 '/' Outflow=1.2 cfs 0.21 af

Pond 3P: Proposed Culvert Peak Elev=281.30' Storage=1,573 cf Inflow=8.1 cfs 0.86 af
24.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=6.9 cfs 0.86 af

Pond 4P: Three Culverts (Phase 1) Peak Elev=277.28' Storage=13 cf Inflow=0.4 cfs 0.09 af
Outflow=0.4 cfs 0.09 af

Pond 5P: Proposed Curb-O-Let #1 Peak Elev=281.92' Storage=32 cf Inflow=5.5 cfs 0.46 af
48.0" x 4.0" Box Culvert n=0.012 L=5.0' S=0.0040 '/' Outflow=5.5 cfs 0.46 af

Pond 6P: Proposed Curb-O-Let #2 Peak Elev=281.26' Storage=32 cf Inflow=0.6 cfs 0.05 af
24.0" x 4.0" Box Culvert n=0.012 L=5.0' S=0.0040 '/' Outflow=0.6 cfs 0.05 af

Pond 7P: Proposed Culvert Peak Elev=282.74' Storage=416 cf Inflow=0.4 cfs 0.03 af
12.0" Round Culvert n=0.013 L=30.0' S=0.0050 '/' Outflow=0.2 cfs 0.03 af

Pond 8P: Proposed Culvert Peak Elev=283.32' Storage=8 cf Inflow=0.4 cfs 0.03 af
12.0" Round Culvert n=0.013 L=20.0' S=0.0375 '/' Outflow=0.4 cfs 0.03 af

Pond BR1: Proposed Bioretention basin 1 Peak Elev=282.46' Storage=3,592 cf Inflow=1.4 cfs 0.11 af
Outflow=0.0 cfs 0.10 af

Pond BR2: Proposed Bioretention basin 2 Peak Elev=282.68' Storage=7,779 cf Inflow=2.1 cfs 0.22 af
Outflow=0.0 cfs 0.15 af

Pond BR3: Proposed Bioretention Basin 3 Peak Elev=283.54' Storage=10,312 cf Inflow=4.5 cfs 0.36 af
Discarded=0.1 cfs 0.36 af Secondary=0.0 cfs 0.00 af Outflow=0.1 cfs 0.36 af

Pond DB: Detention Basin (Phase 1) Peak Elev=277.61' Storage=14,078 cf Inflow=8.5 cfs 1.27 af
Primary=1.7 cfs 0.28 af Secondary=0.0 cfs 0.00 af Tertiary=3.7 cfs 0.98 af Outflow=5.5 cfs 1.26 af

Pond IB: Infiltration Basin (Phase 1) Peak Elev=278.59' Storage=32,679 cf Inflow=8.5 cfs 1.10 af
Discarded=0.2 cfs 0.89 af Primary=0.4 cfs 0.09 af Outflow=0.6 cfs 0.98 af

Total Runoff Area = 18.34 ac Runoff Volume = 4.43 af Average Runoff Depth = 2.90"
73.63% Pervious = 13.50 ac 26.37% Impervious = 4.84 ac

APPENDIX A 7.8

Summary for Subcatchment 1:

CarlsonPlanXYPos|988001.4917|331107.7095|

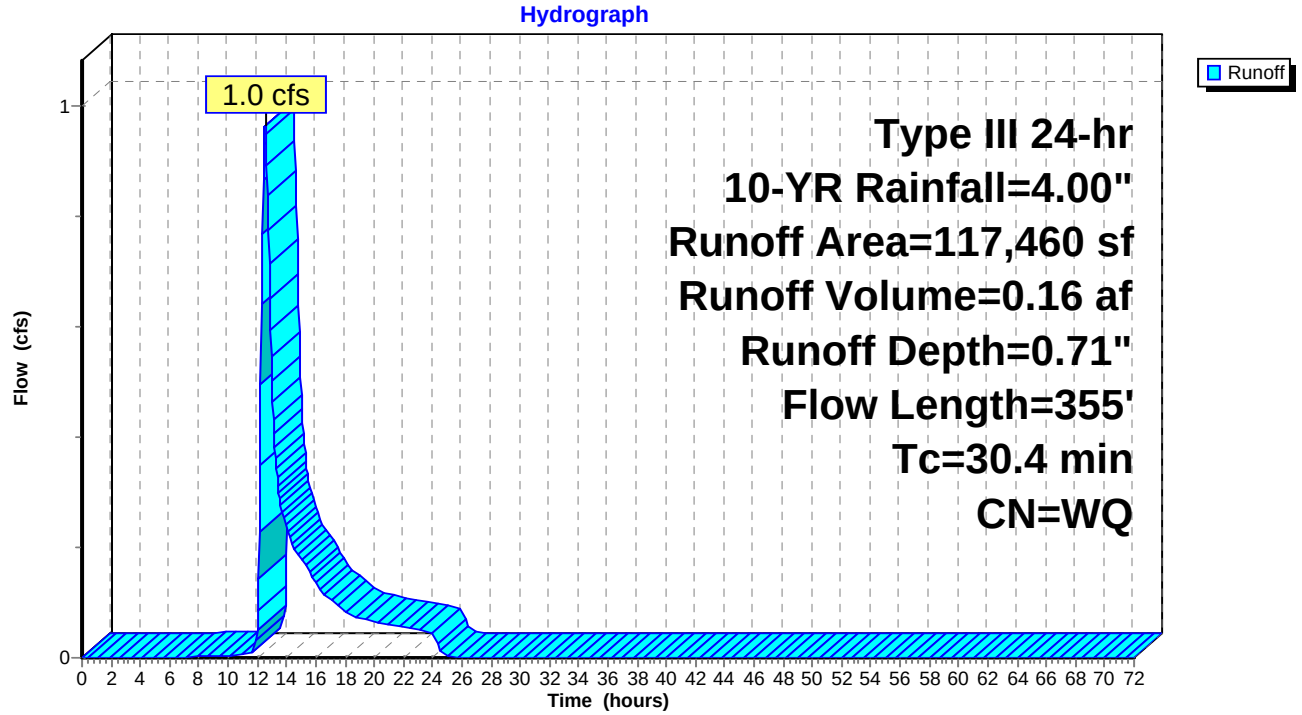
Runoff = 1.0 cfs @ 12.53 hrs, Volume= 0.16 af, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	52,067	55	Woods, Good HSG B
*	1,046	98	Gravel roads HSG B
	64,347	61	>75% Grass cover, Good HSG B
	117,460		Weighted Average
	116,414		99.11% Pervious Area
	1,046		0.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.2	100	0.0200	0.07		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.74"
3.1	160	0.0300	0.87		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
4.1	95	0.0030	0.38		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
30.4	355	Total			

Subcatchment 1:



Summary for Subcatchment 2:

CarlsonPlanXYPos|988327.7690|330482.7952|

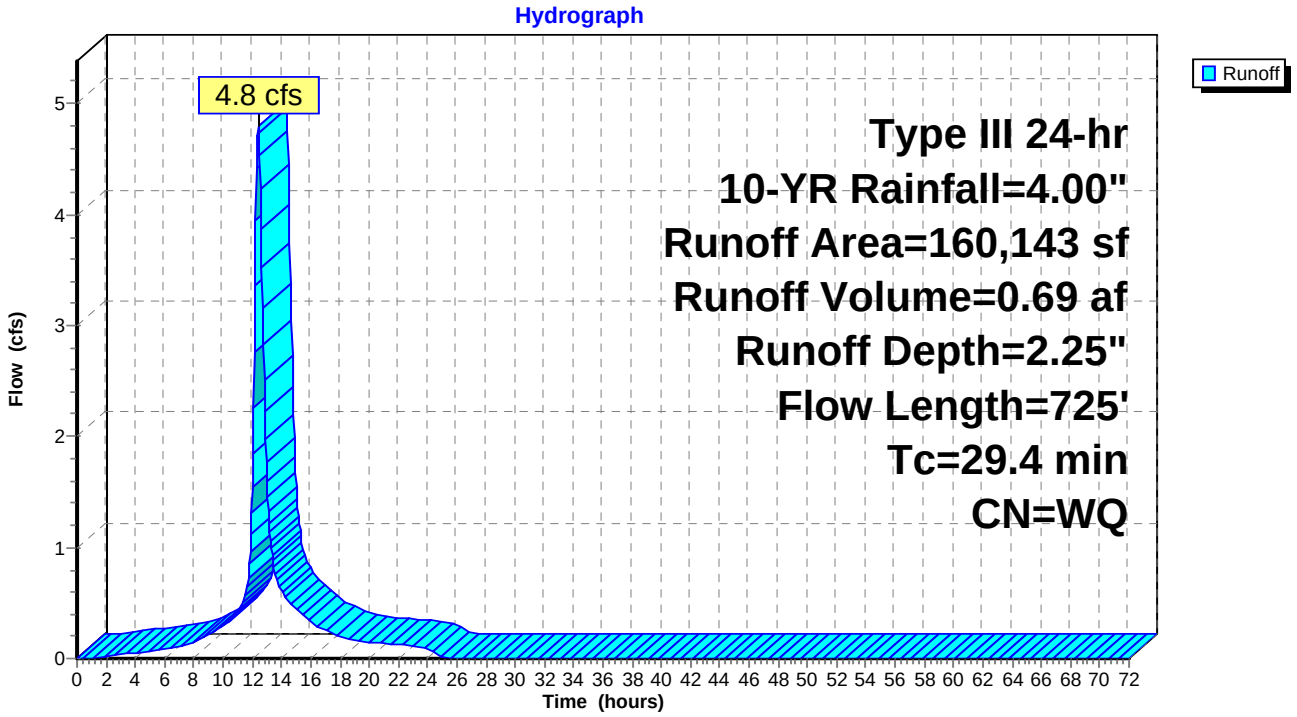
Runoff = 4.8 cfs @ 12.40 hrs, Volume= 0.69 af, Depth= 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
*	23	98	Gravel roads HSG B
	2,080	55	Woods, Good HSG B
	1,807	98	Paved parking HSG D
	24,965	98	Roofs HSG B
	50,872	98	Paved parking HSG B
	79,784	61	>75% Grass cover, Good HSG B
	612	80	>75% Grass cover, Good HSG D
	160,143		Weighted Average
	82,476		51.50% Pervious Area
	77,667		48.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	20	0.0050	0.03		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.74"
10.6	50	0.0050	0.08		**Sheet Flow, B-->C** Grass: Short n= 0.150 P2= 2.74"
2.8	60	0.0050	0.35		**Shallow Concentrated Flow, C-->D** Woodland Kv= 5.0 fps
0.5	65	0.0100	2.03		**Shallow Concentrated Flow, D-->E** Paved Kv= 20.3 fps
4.4	530	0.0100	2.03		**Shallow Concentrated Flow, E-->F** Paved Kv= 20.3 fps
29.4	725	Total			

Subcatchment 2:



Summary for Subcatchment 3:

CarlsonPlanXYPos|988484.0823|330510.2102|

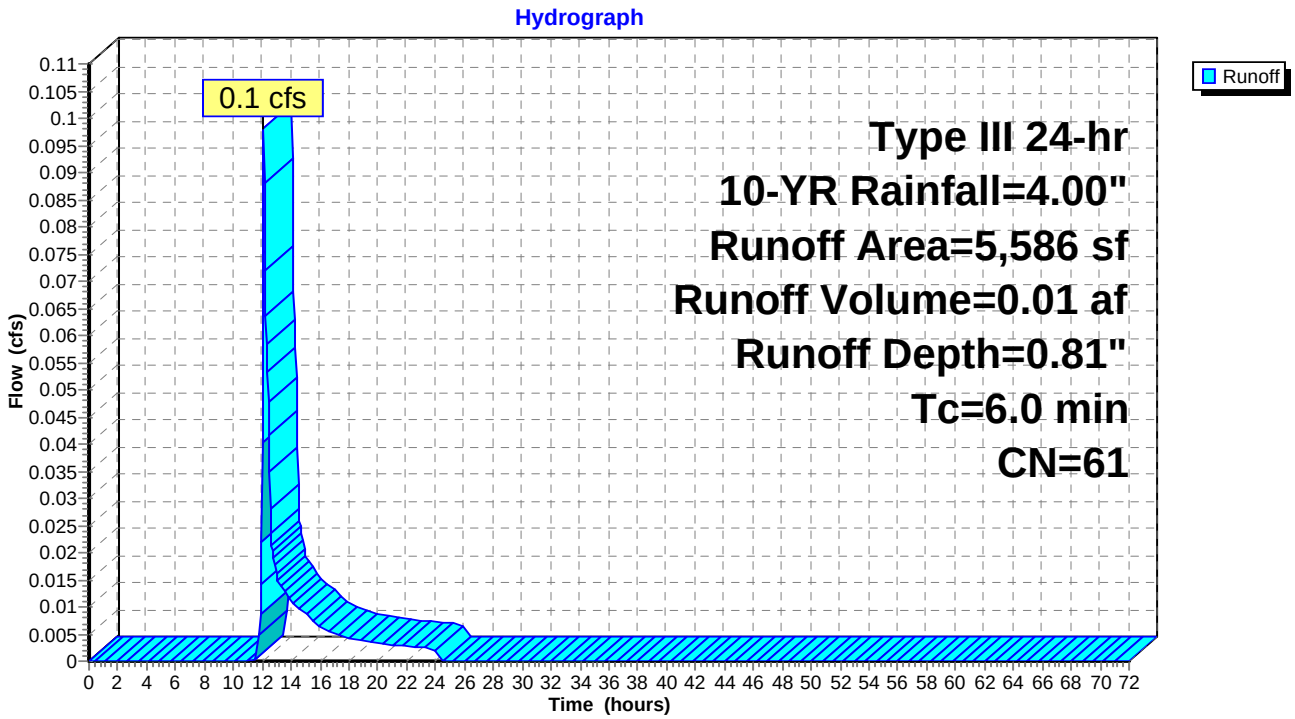
Runoff = 0.1 cfs @ 12.11 hrs, Volume= 0.01 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
5,586	61	>75% Grass cover, Good HSG B
5,586		100.00% Pervious Area

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

Subcatchment 3:



Summary for Subcatchment 4:

CarlsonPlanXYPos|988057.9236|330714.2832|

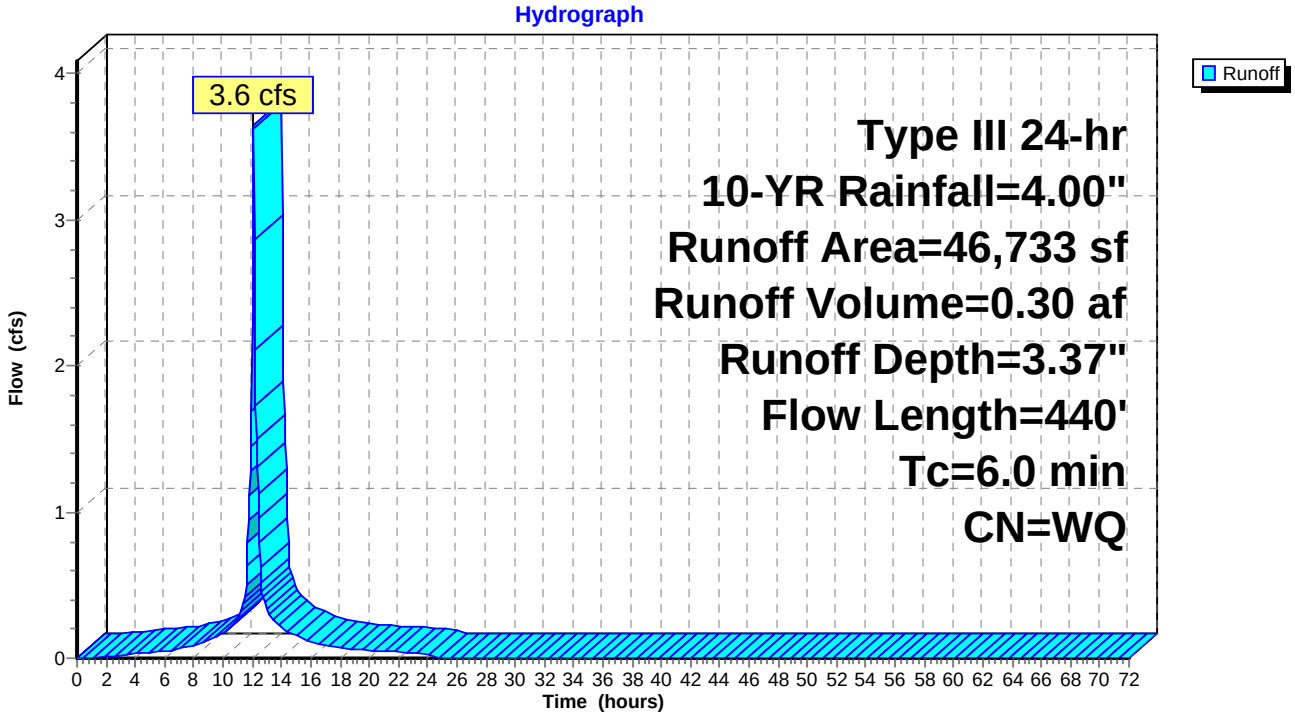
Runoff = 3.6 cfs @ 12.09 hrs, Volume= 0.30 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
40,499	98	Paved parking HSG B
6,234	61	>75% Grass cover, Good HSG B
46,733		Weighted Average
6,234		13.34% Pervious Area
40,499		86.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0150	1.13		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 2.74"
2.8	340	0.0100	2.03		**Shallow Concentrated Flow, B-->C** Paved Kv= 20.3 fps
4.3	440	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4:



Summary for Subcatchment 5:

CarlsonPlanXYPos|988215.3453|330613.8202|

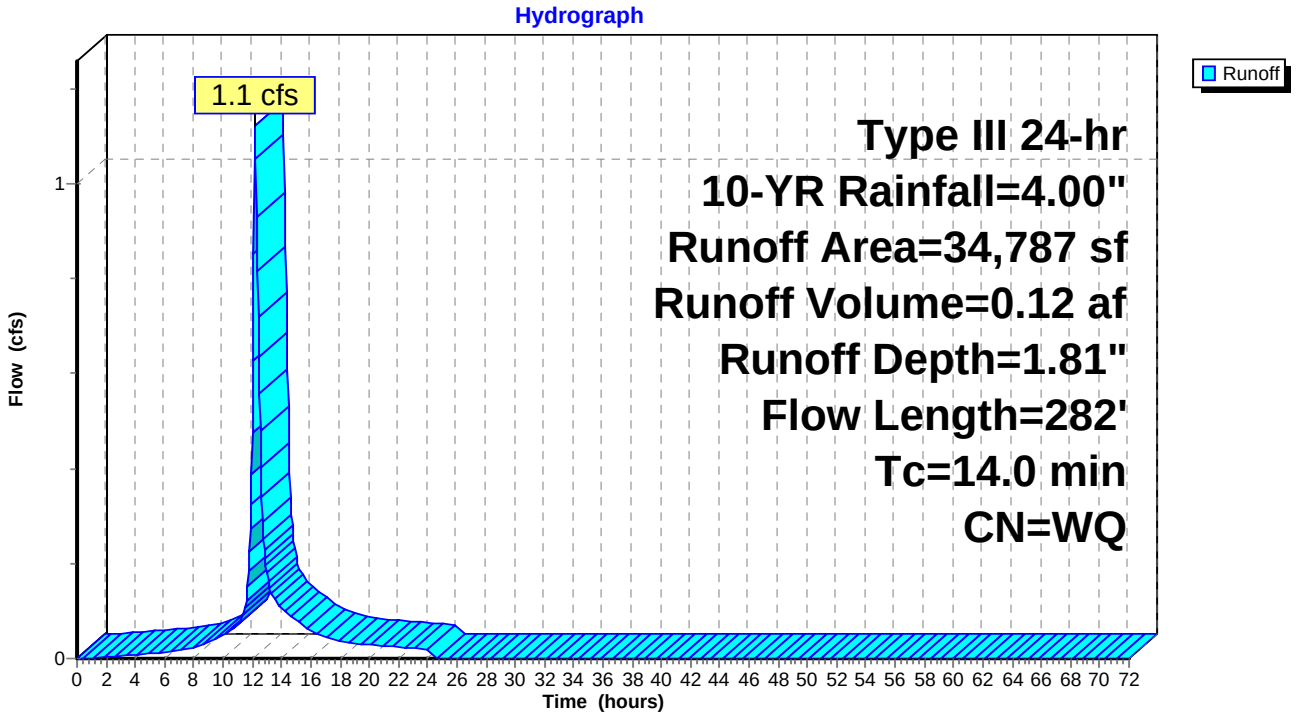
Runoff = 1.1 cfs @ 12.20 hrs, Volume= 0.12 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
10,931	98	Roofs HSG B
850	98	Paved parking HSG B
23,006	61	>75% Grass cover, Good HSG B
34,787		Weighted Average
23,006		66.13% Pervious Area
11,781		33.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	25	0.0050	0.07		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
2.4	100	0.0100	0.70		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0300	7.86	6.17	**Pipe Channel, C-->D** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
1.3	17	0.0010	0.22		**Shallow Concentrated Flow, D-->E** Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0020	1.55	0.54	**Pipe Channel, E-->F** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.013 Corrugated PE, smooth interior
3.9	90	0.0030	0.38		**Shallow Concentrated Flow, F-->G** Short Grass Pasture Kv= 7.0 fps
14.0	282	Total			

Subcatchment 5:



Summary for Subcatchment 6:

CarlsonPlanXYPos|988239.9980|330732.2993|

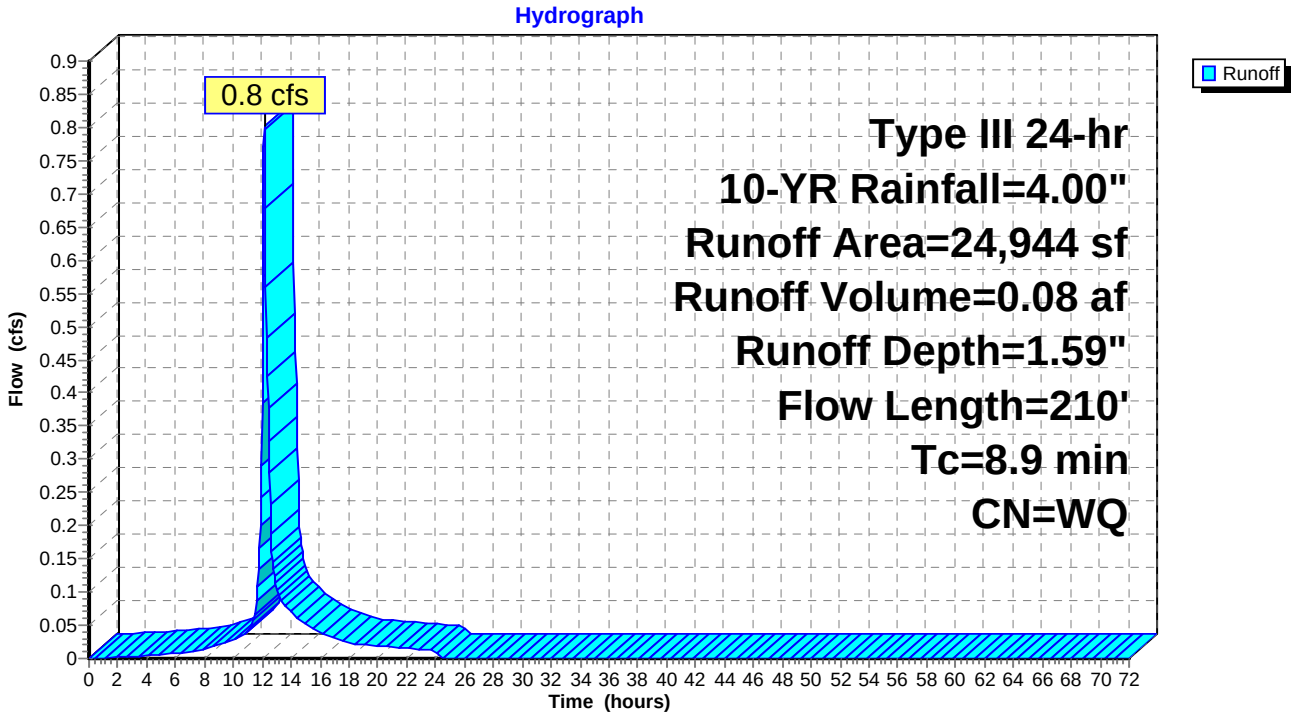
Runoff = 0.8 cfs @ 12.13 hrs, Volume= 0.08 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
*	3,289	98	Gravel roads HSG B
	3,217	98	Paved parking HSG B
	18,386	61	>75% Grass cover, Good HSG B
	52	98	Roofs, HSG B
	24,944		Weighted Average
	18,386		73.71% Pervious Area
	6,558		26.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0150	0.12		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
1.8	95	0.0150	0.86		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.3	65	0.0050	4.28	41.75	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022
8.9	210	Total			

Subcatchment 6:



Summary for Subcatchment 7:

CarlsonPlanXYPos|988511.2437|330447.2217|

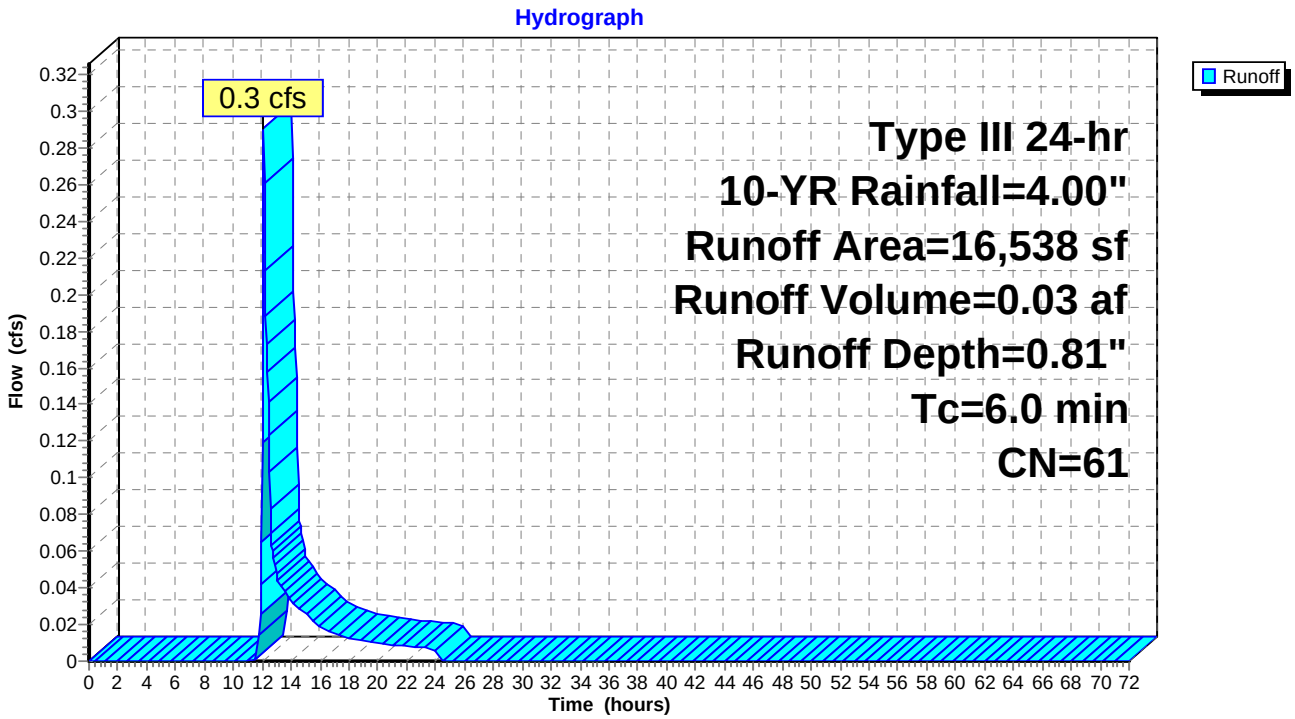
Runoff = 0.3 cfs @ 12.11 hrs, Volume= 0.03 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
16,538	61	>75% Grass cover, Good HSG B
16,538		100.00% Pervious Area

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

Subcatchment 7:



Summary for Subcatchment 8:

CarlsonPlanXYPos|988553.3397|330553.4347|

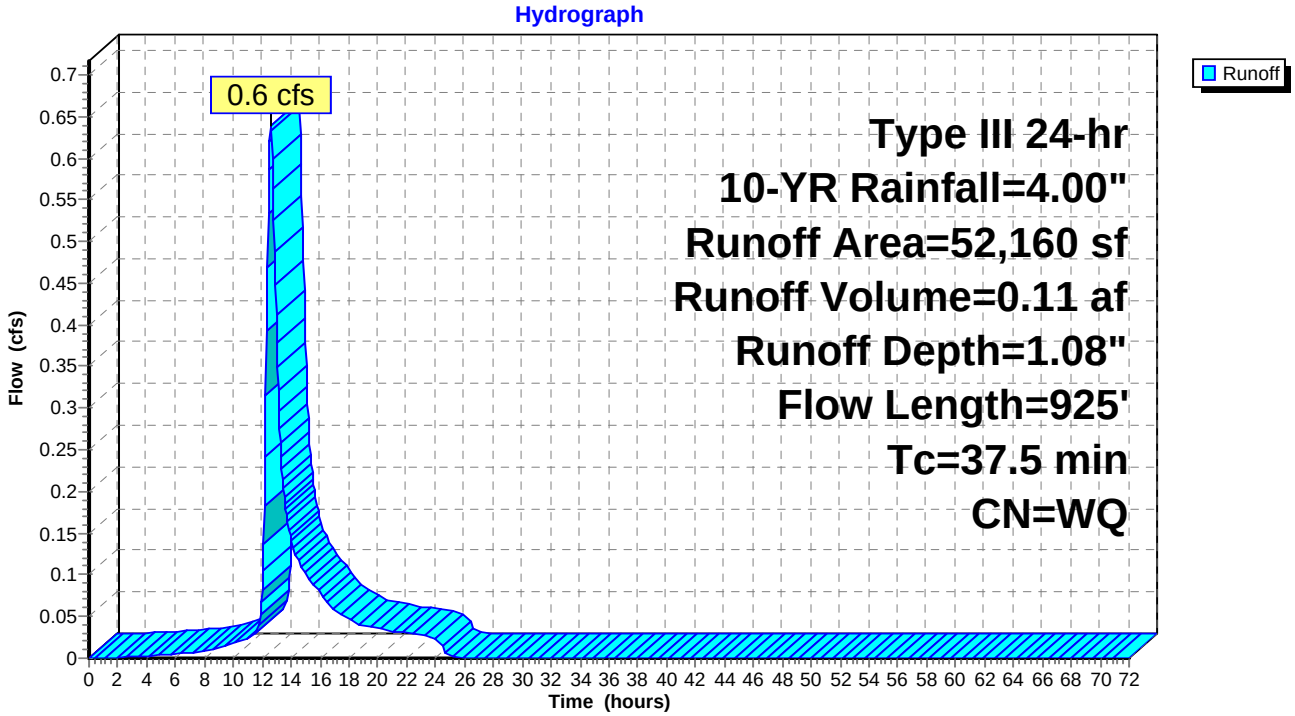
Runoff = 0.6 cfs @ 12.58 hrs, Volume= 0.11 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
*	4,667	98	Gravel roads HSG B
	47,493	61	>75% Grass cover, Good HSG B
	52,160		Weighted Average
	47,493		91.05% Pervious Area
	4,667		8.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0100	0.10		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
29.5	875	0.0050	0.49		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
37.5	925	Total			

Subcatchment 8:



Summary for Subcatchment 9:

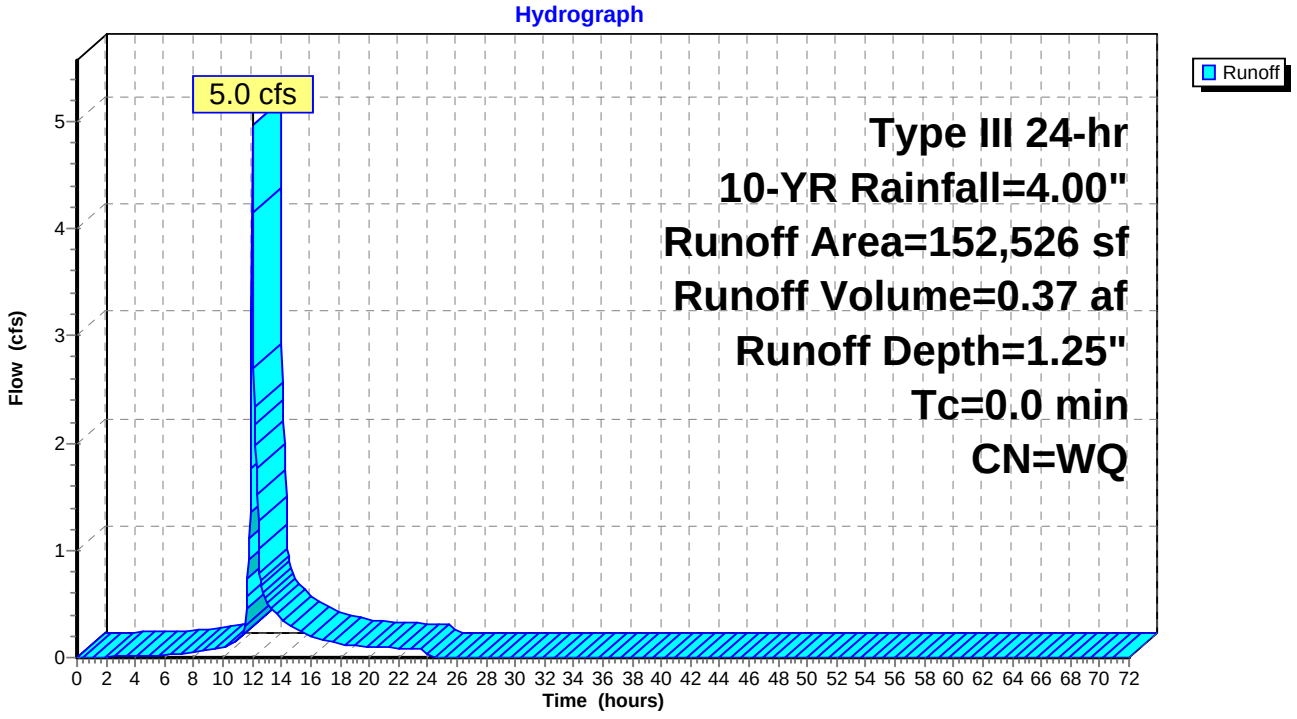
CarlsonPlanXYPos|988101.7789|330131.4639|

Runoff = 5.0 cfs @ 12.01 hrs, Volume= 0.37 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	14,898	55	Woods, Good HSG B
	4,783	98	Roofs HSG B
	10,148	98	Paved parking HSG B
*	5,817	98	Gravel roads HSG B
	108,592	61	>75% Grass cover, Good HSG B
	8,288	80	>75% Grass cover, Good HSG D
	152,526		Weighted Average
	131,778		86.40% Pervious Area
	20,748		13.60% Impervious Area

Subcatchment 9:



Summary for Subcatchment 10:

CarlsonPlanXYPos|988400.4843|330046.6016|

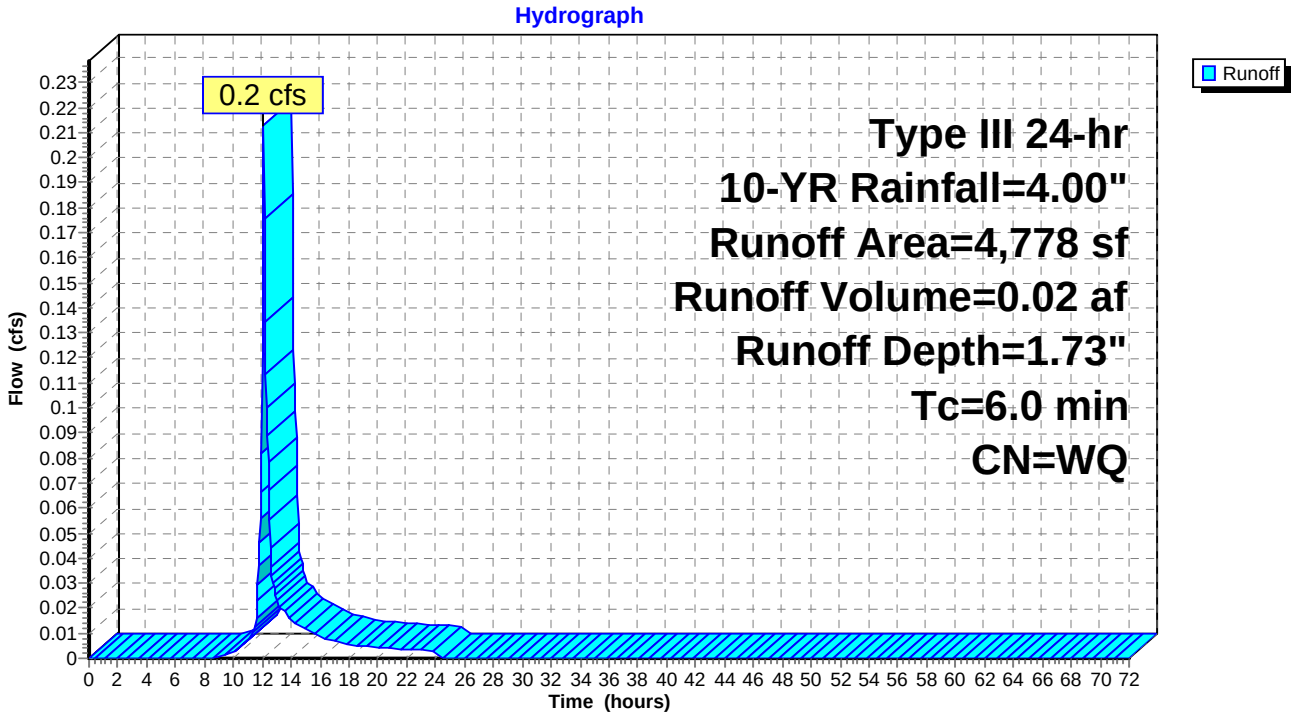
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.02 af, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
1,211	61	>75% Grass cover, Good HSG B
3,567	80	>75% Grass cover, Good HSG D
4,778		Weighted Average
4,778		100.00% Pervious Area

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

Subcatchment 10:



Summary for Subcatchment 11:

CarlsonPlanXYPos|988481.7286|330203.9394|

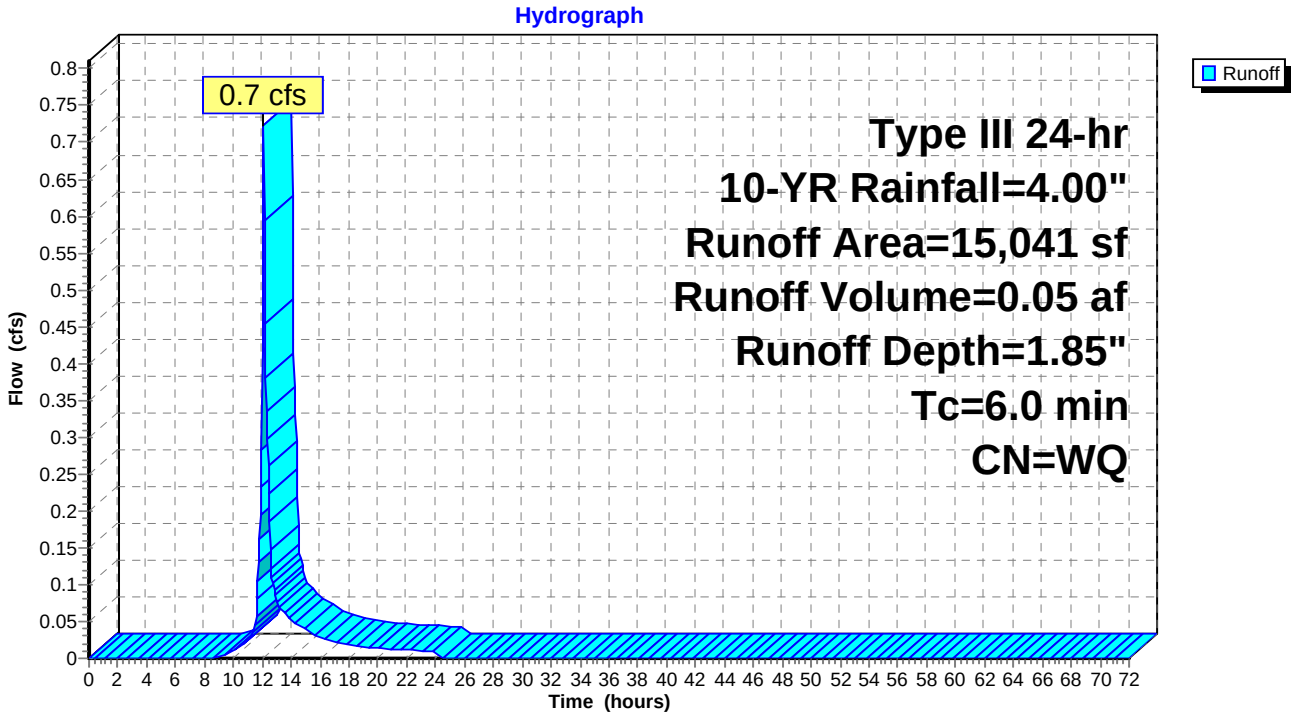
Runoff = 0.7 cfs @ 12.09 hrs, Volume= 0.05 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
2,359	61	>75% Grass cover, Good HSG B
12,682	80	>75% Grass cover, Good HSG D
15,041		Weighted Average
15,041		100.00% Pervious Area

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

Subcatchment 11:



Summary for Subcatchment 12:

CarlsonPlanXYPos|988394.5605|330546.8150|

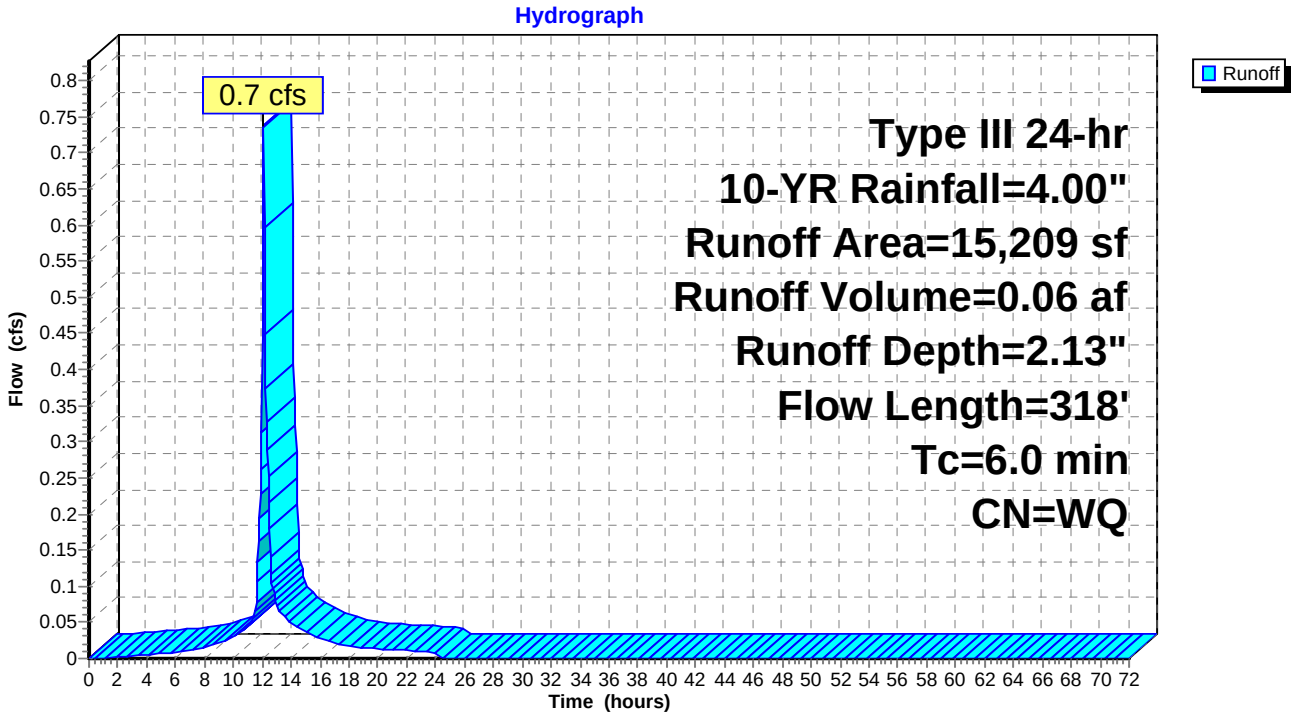
Runoff = 0.7 cfs @ 12.09 hrs, Volume= 0.06 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	6,282	98	Paved parking HSG B
*	514	98	Gravel roads HSG B
	8,413	61	>75% Grass cover, Good HSG B
	15,209		Weighted Average
	8,413		55.32% Pervious Area
	6,796		44.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0800	0.24		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
0.6	42	0.0250	1.11		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
0.2	27	0.0100	2.03		**Shallow Concentrated Flow, C-->D** Paved Kv= 20.3 fps
0.0	9	0.3000	3.83		**Shallow Concentrated Flow, D-->E** Short Grass Pasture Kv= 7.0 fps
0.7	190	0.0050	4.28	41.75	**Trap/Vee/Rect Channel Flow, E-->F** Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.022 Earth, clean & straight
5.0	318	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 12:



Summary for Subcatchment 13:

CarlsonPlanXYPos|987967.8433|330639.3370|

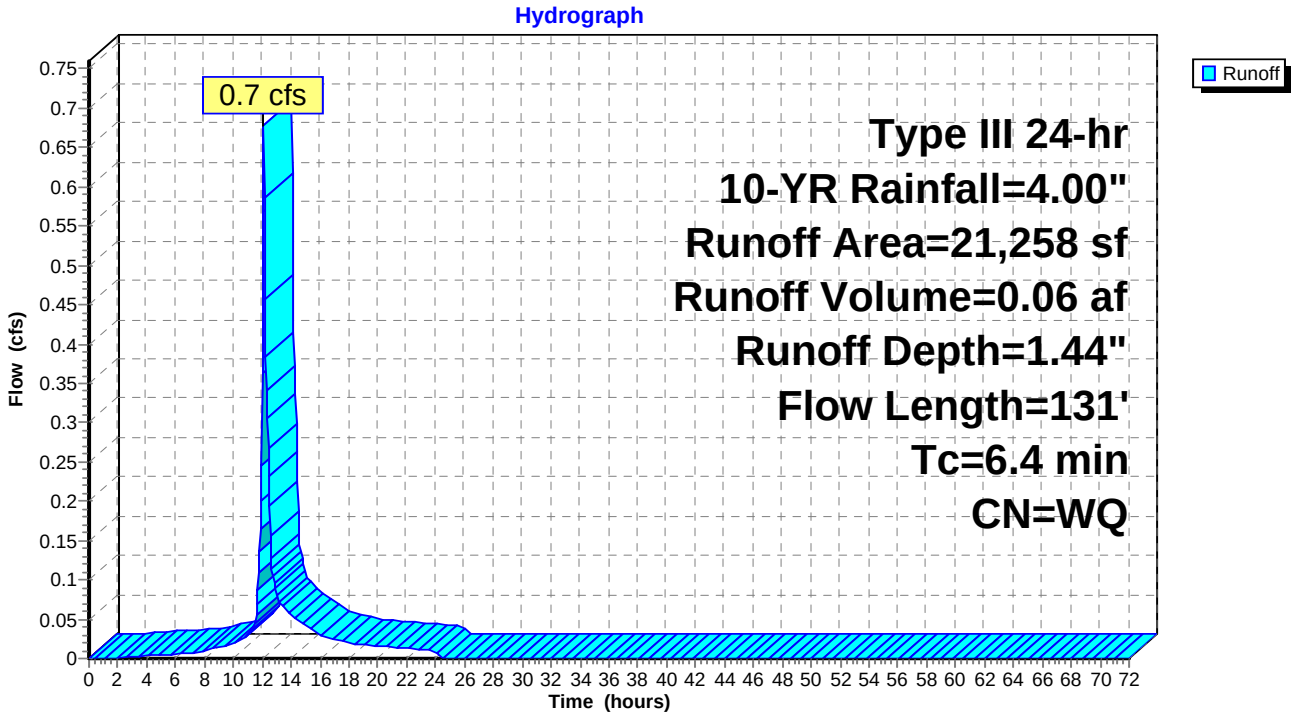
Runoff = 0.7 cfs @ 12.10 hrs, Volume= 0.06 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
2,194	98	Roofs HSG B
2,357	98	Paved parking HSG B
16,707	61	>75% Grass cover, Good HSG B
21,258		Weighted Average
16,707		78.59% Pervious Area
4,551		21.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	45	0.0400	0.18		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
0.1	6	0.0200	0.73		**Sheet Flow, B-->C** Smooth surfaces n= 0.011 P2= 2.74"
1.7	50	0.0050	0.49		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
0.4	30	0.0400	1.40		**Shallow Concentrated Flow, D-->E** Short Grass Pasture Kv= 7.0 fps
6.4	131	Total			

Subcatchment 13:



Summary for Subcatchment 14:

CarlsonPlanXYPos|988055.7750|330800.0618|

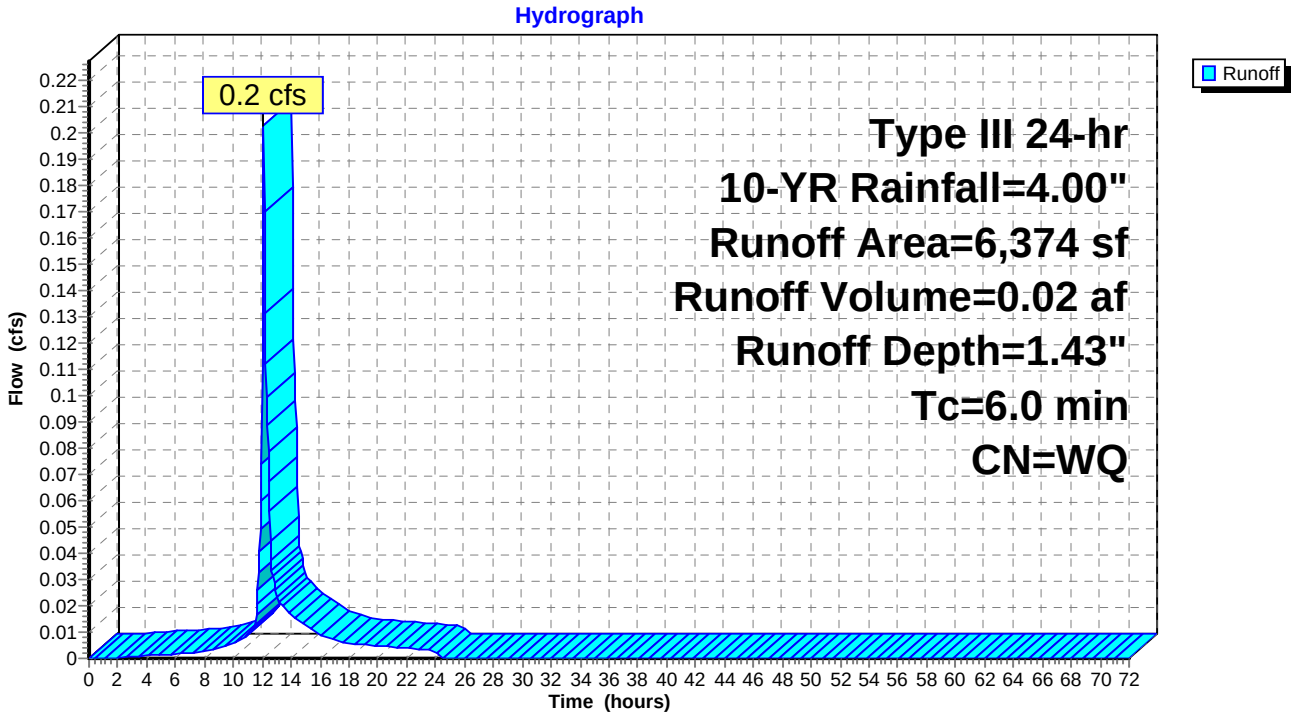
Runoff = 0.2 cfs @ 12.10 hrs, Volume= 0.02 af, Depth= 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	1,233	98	Paved parking HSG B
*	91	98	Gravel roads HSG B
	5,050	61	>75% Grass cover, Good HSG B
	6,374		Weighted Average
	5,050		79.23% Pervious Area
	1,324		20.77% Impervious Area

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

Subcatchment 14:



Summary for Subcatchment 15: Proposed Recreation & Equestrian Building

CarlsonPlanXYPos|988158.6839|330849.4992|

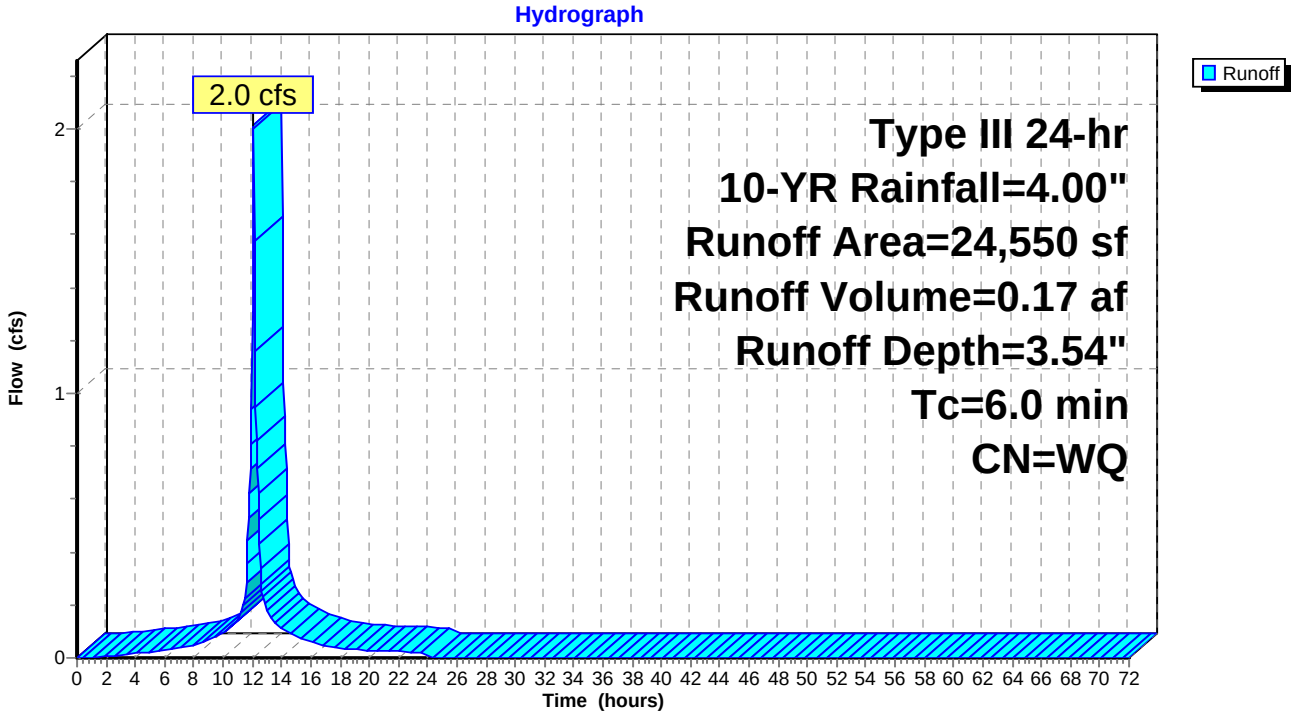
Runoff = 2.0 cfs @ 12.09 hrs, Volume= 0.17 af, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	22,538	98	Roofs HSG B
	132	98	Paved parking HSG B
	1,838	61	>75% Grass cover, Good HSG B
*	42	98	Gravel roads, HSG B
	24,550		Weighted Average
	1,838		7.49% Pervious Area
	22,712		92.51% Impervious Area

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

Subcatchment 15: Proposed Recreation & Equestrian Building



Summary for Subcatchment 16:

CarlsonPlanXYPos|988296.2361|330793.6086|

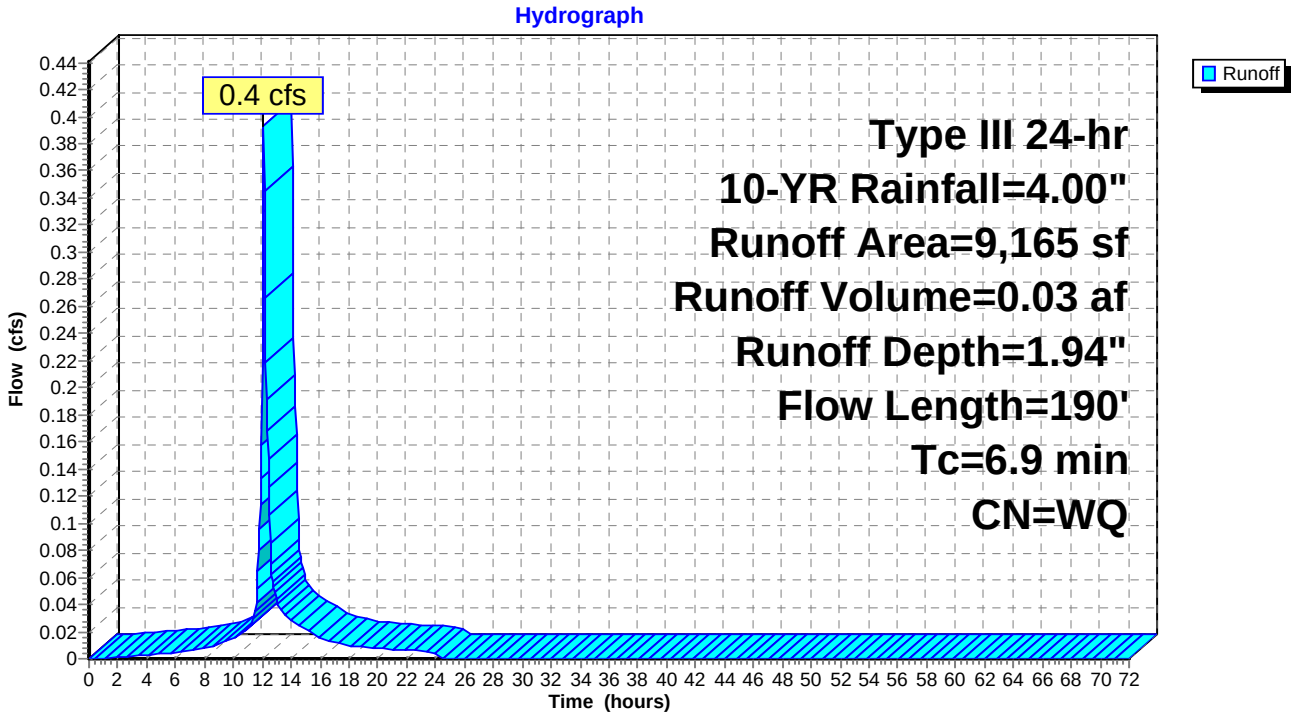
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.03 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	1,039	98	Roofs HSG B
*	2,463	98	Gravel roads HSG B
	5,663	61	>75% Grass cover, Good HSG B
	9,165		Weighted Average
	5,663		61.79% Pervious Area
	3,502		38.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	50	0.0500	0.20		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 2.74"
2.7	140	0.0150	0.86		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
6.9	190	Total			

Subcatchment 16:



Summary for Subcatchment 17:

CarlsonPlanXYPos|988276.4566|330651.6732|

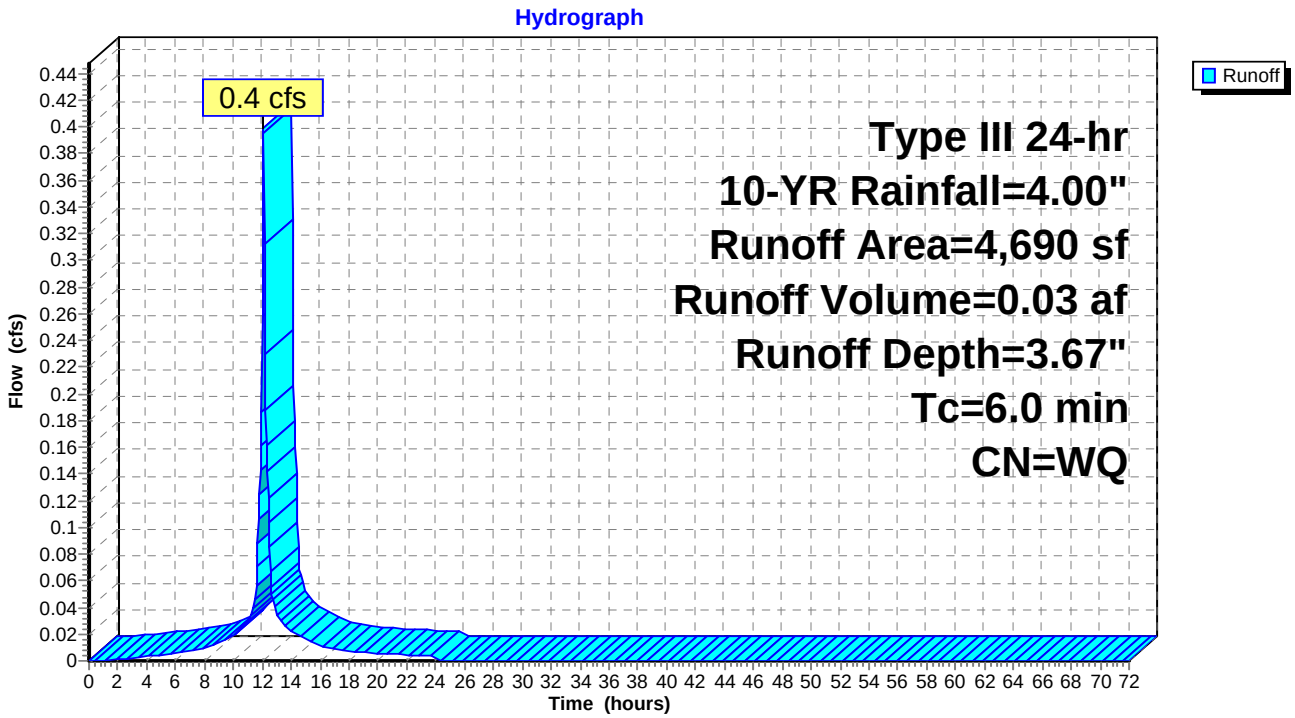
Runoff = 0.4 cfs @ 12.09 hrs, Volume= 0.03 af, Depth= 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
4,540	98	Paved parking HSG B
150	61	>75% Grass cover, Good HSG B
4,690		Weighted Average
150		3.20% Pervious Area
4,540		96.80% Impervious Area

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

Subcatchment 17:



Summary for Subcatchment 18:

CarlsonPlanXYPos|987818.0706|330682.2302|

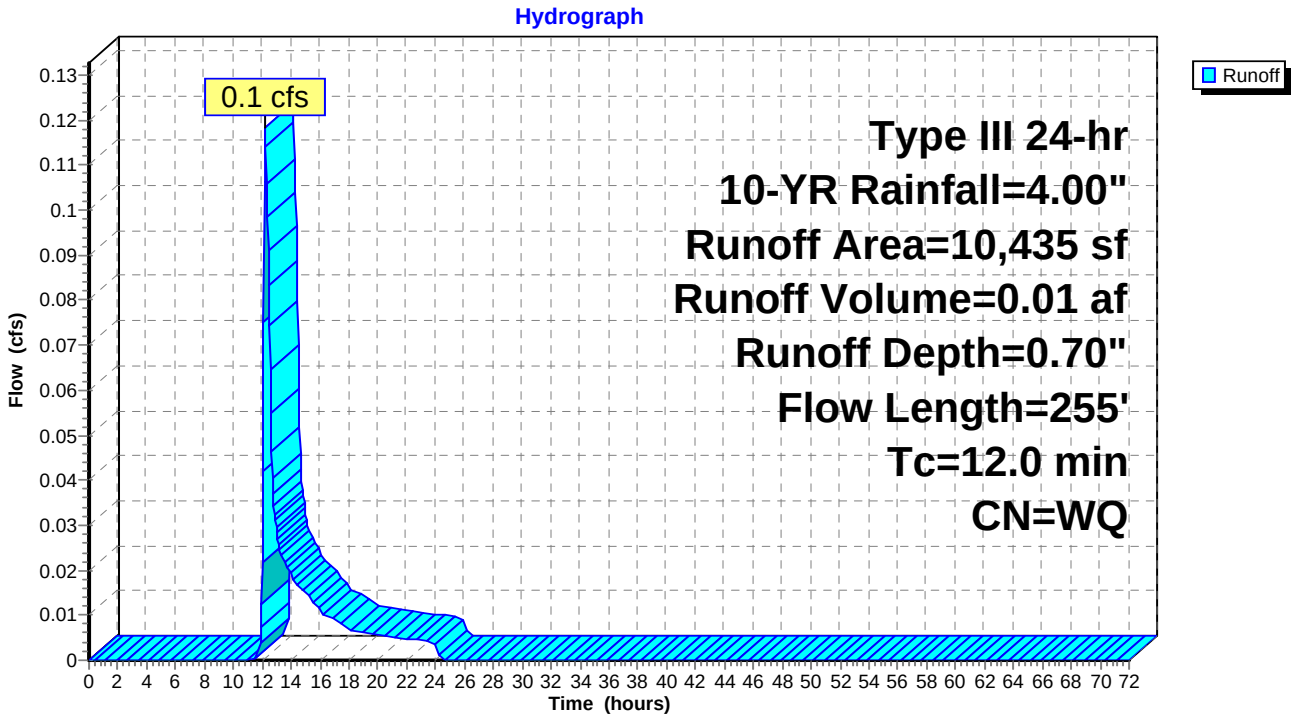
Runoff = 0.1 cfs @ 12.21 hrs, Volume= 0.01 af, Depth= 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	4,166	55	Woods, Good HSG B
*	6	98	Gravel roads HSG B
	6,263	61	>75% Grass cover, Good HSG B
	10,435		Weighted Average
	10,429		99.94% Pervious Area
	6		0.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	20	0.0050	0.03		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.74"
0.9	235	0.0090	4.29	15.02	**Trap/Vee/Rect Channel Flow, B-->C** Bot.W=1.00' D=1.00' Z= 2.5 '/' Top.W=6.00' n= 0.022
12.0	255	Total			

Subcatchment 18:



Summary for Subcatchment 19:

CarlsonPlanXYPos|987854.6425|330894.1045|

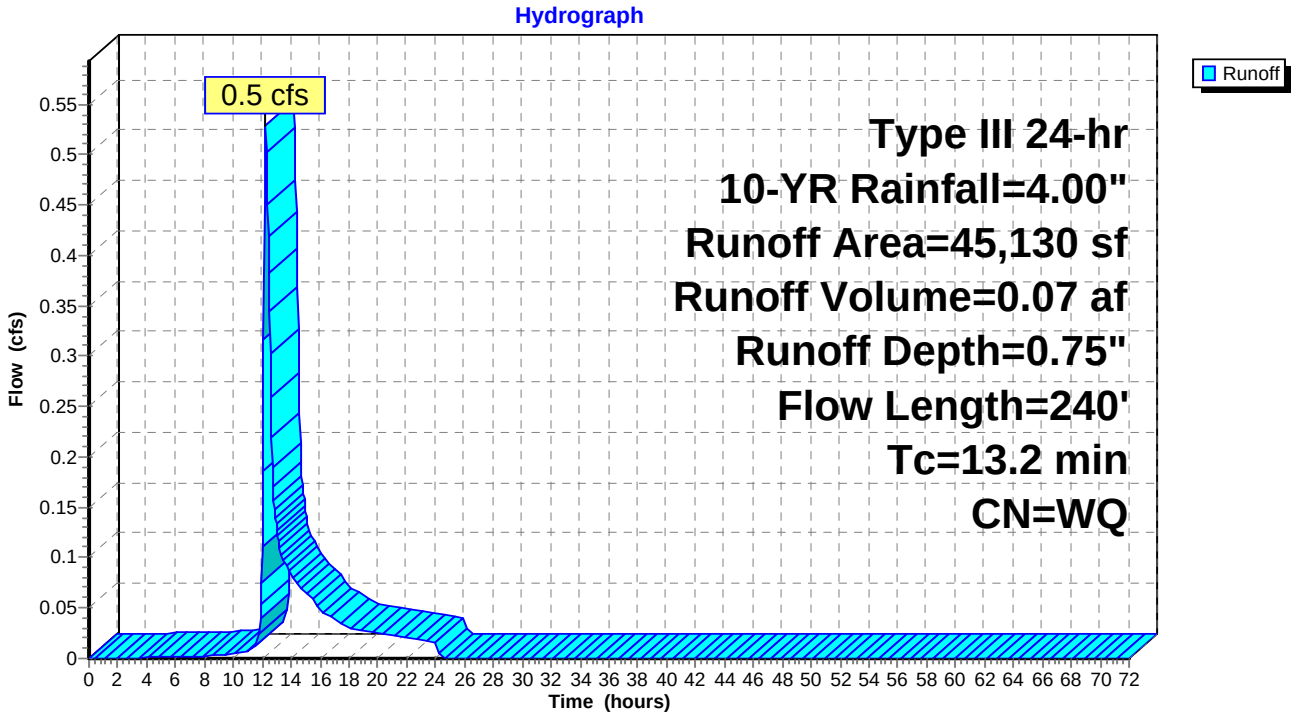
Runoff = 0.5 cfs @ 12.22 hrs, Volume= 0.07 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
	22,320	55	Woods, Good HSG B
	449	98	Paved parking HSG B
*	785	98	Gravel roads HSG B
	21,576	61	>75% Grass cover, Good HSG B
	45,130		Weighted Average
	43,896		97.27% Pervious Area
	1,234		2.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0400	0.08		**Sheet Flow, A-->B** Woods: Light underbrush n= 0.400 P2= 2.74"
2.6	135	0.0300	0.87		**Shallow Concentrated Flow, B-->C** Woodland Kv= 5.0 fps
0.5	55	0.0800	1.98		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
13.2	240	Total			

Subcatchment 19:



Summary for Subcatchment 20: Area of BR3

CarlsonPlanXYPos|988186.9149|331041.8988|

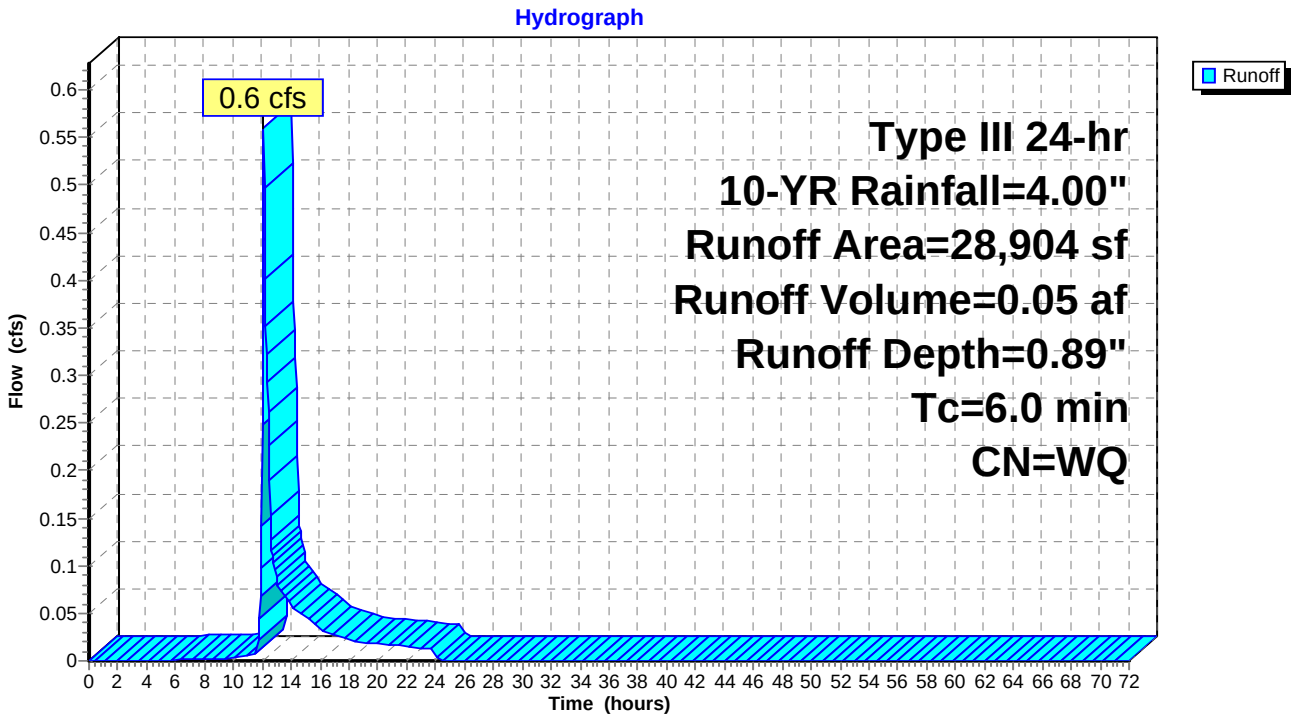
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 0.05 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

	Area (sf)	CN	Description
*	775	98	Gravel roads HSG B
	28,129	61	>75% Grass cover, Good HSG B
	28,904		Weighted Average
	28,129		97.32% Pervious Area
	775		2.68% Impervious Area

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

Subcatchment 20: Area of BR3



Summary for Subcatchment 21:

CarlsonPlanXYPos|988237.8330|330183.6869|

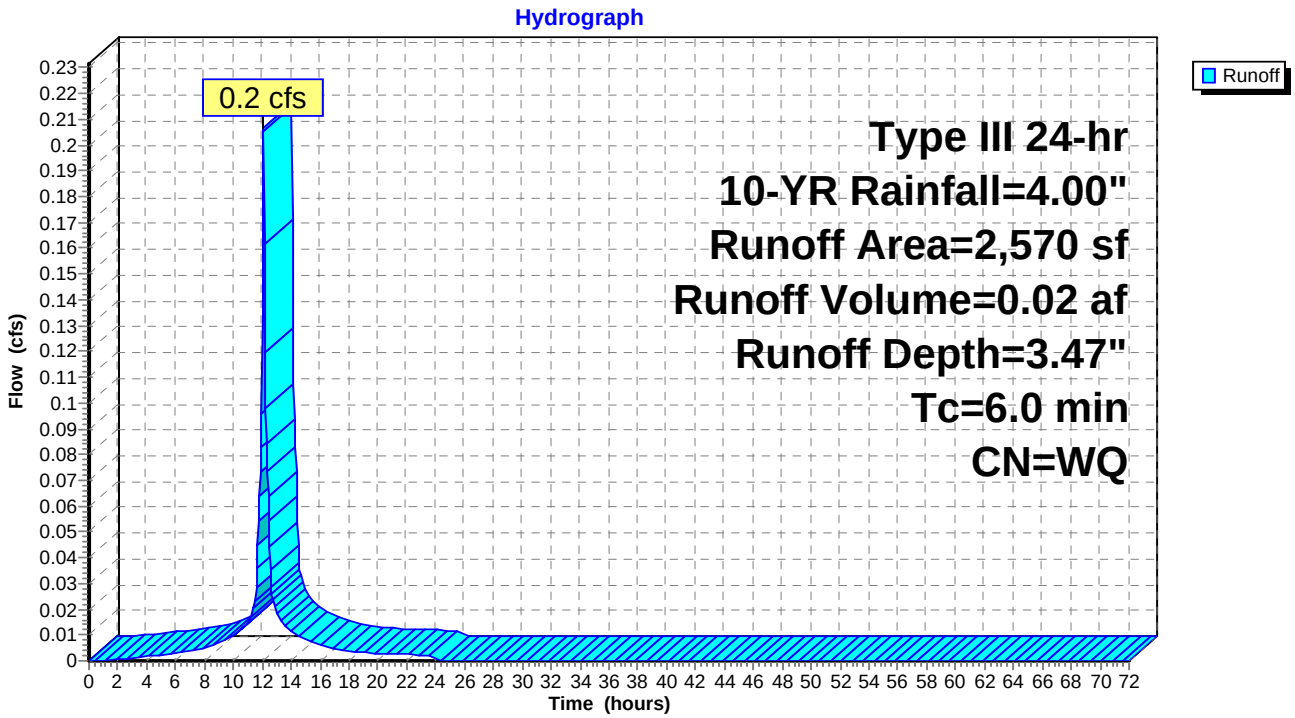
Runoff = 0.2 cfs @ 12.09 hrs, Volume= 0.02 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.00"

Area (sf)	CN	Description
2,316	98	Paved parking HSG B
254	61	>75% Grass cover, Good HSG B
2,570		Weighted Average
254		9.88% Pervious Area
2,316		90.12% Impervious Area

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

Subcatchment 21:



Summary for Reach 1R: (Phase1)

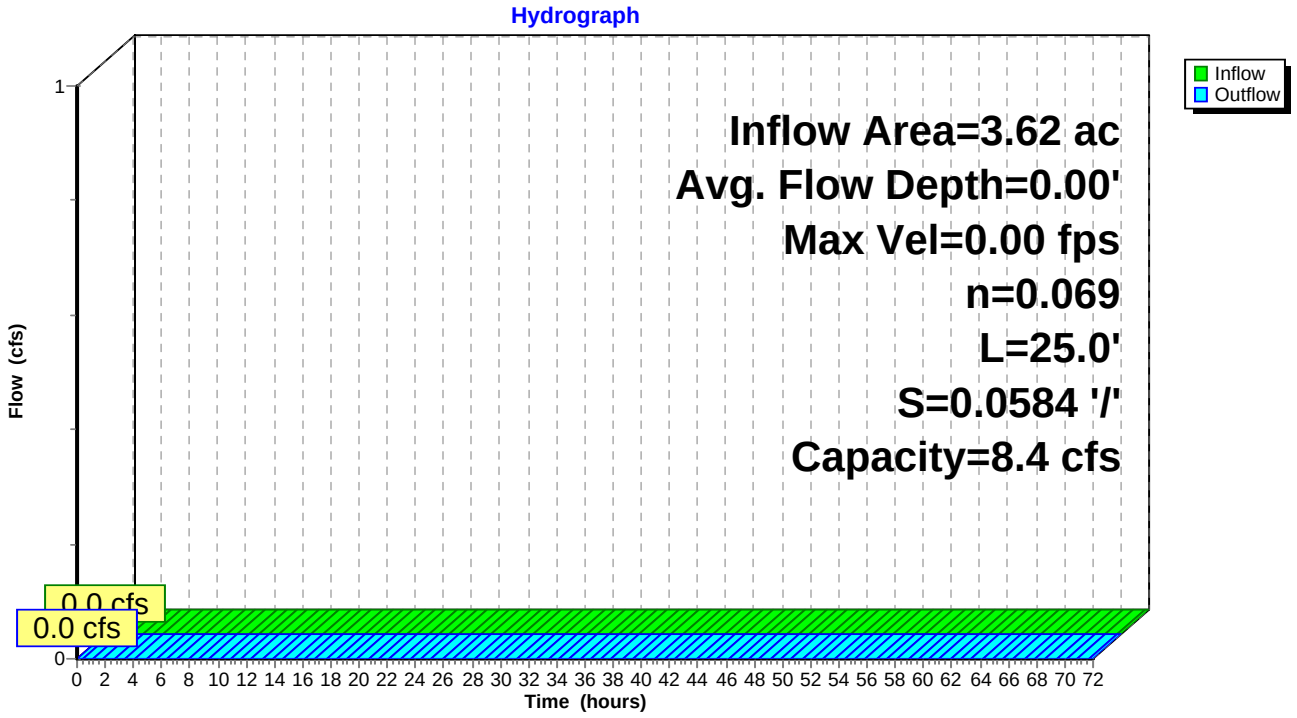
Inflow Area = 3.62 ac, 46.73% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.25' Flow Area= 4.2 sf, Capacity= 8.4 cfs

16.00' x 0.25' deep channel, n= 0.069 Riprap, 6-inch
Side Slope Z-value= 3.0 '/' Top Width= 17.50'
Length= 25.0' Slope= 0.0584 '/'
Inlet Invert= 278.50', Outlet Invert= 277.04'

Reach 1R: (Phase1)



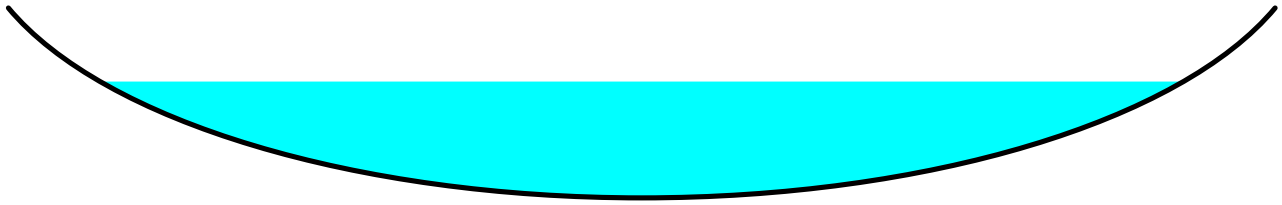
Summary for Reach 2R: overland flow

Inflow Area = 1.20 ac, 8.95% Impervious, Inflow Depth = 1.08" for 10-YR event
Inflow = 0.6 cfs @ 12.58 hrs, Volume= 0.11 af
Outflow = 0.6 cfs @ 12.60 hrs, Volume= 0.11 af, Atten= 0%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.01 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 4.6 min

Peak Storage= 63 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.20' , Surface Width= 4.69'
Bank-Full Depth= 0.33' Flow Area= 1.3 sf, Capacity= 1.9 cfs

6.00' x 0.33' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 100.0' Slope= 0.0083 '/'
Inlet Invert= 277.83', Outlet Invert= 277.00'



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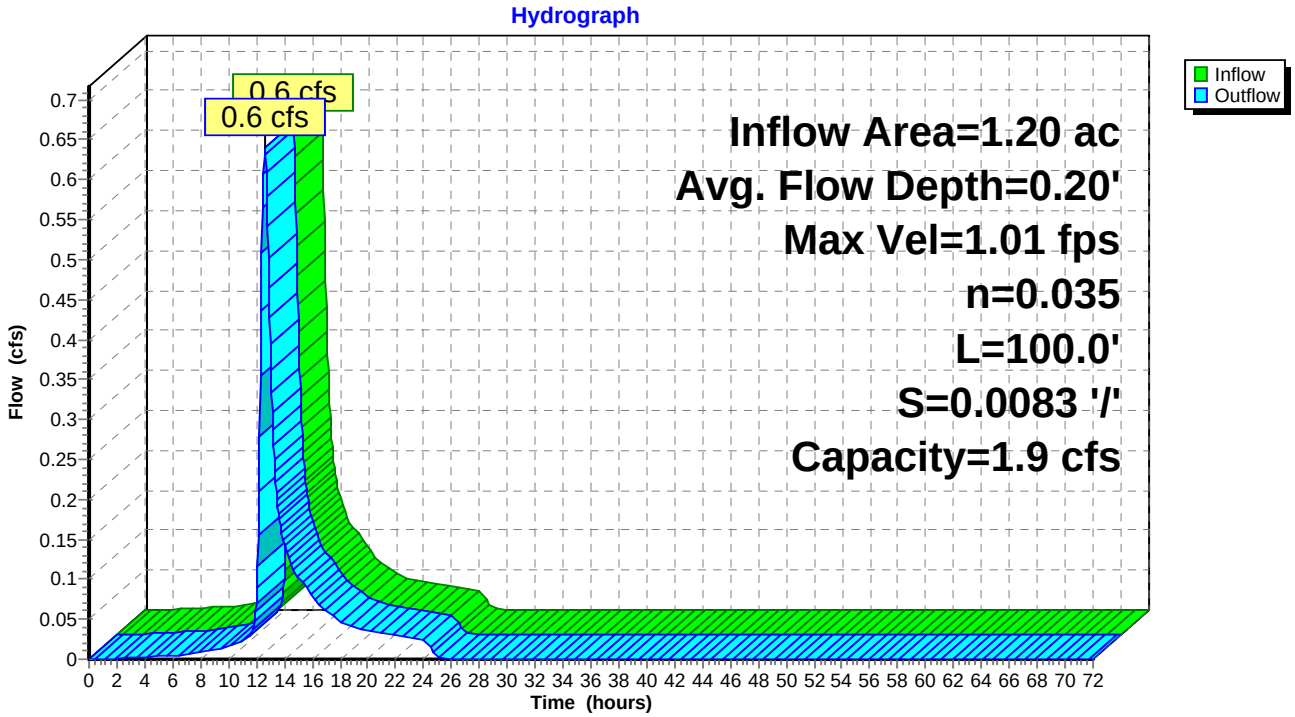
Reach 2R: overland flow



Summary for Reach 3R: Swale

Inflow Area = 0.80 ac, 33.87% Impervious, Inflow Depth = 1.81" for 10-YR event
Inflow = 0.6 cfs @ 12.46 hrs, Volume= 0.12 af
Outflow = 0.6 cfs @ 12.46 hrs, Volume= 0.12 af, Atten= 0%, Lag= 0.2 min

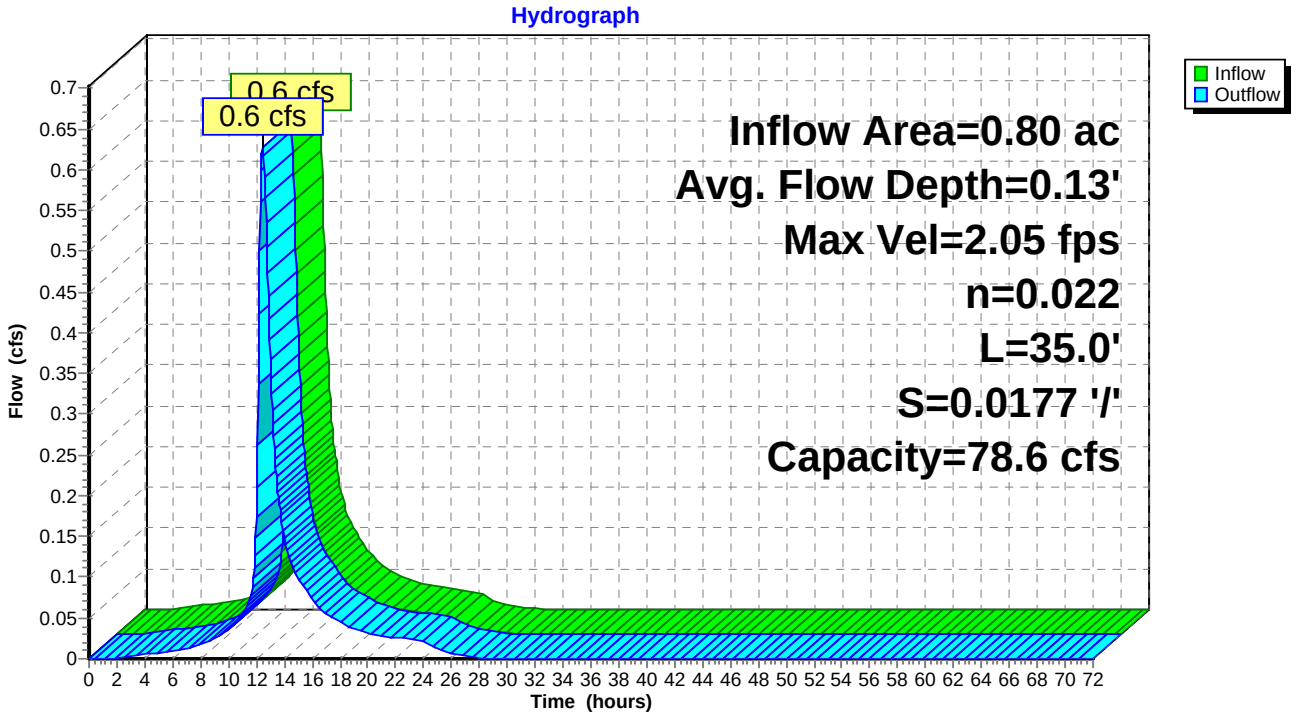
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.05 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 0.8 min

Peak Storage= 11 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 2.77'
Bank-Full Depth= 1.50' Flow Area= 9.8 sf, Capacity= 78.6 cfs

2.00' x 1.50' deep channel, n= 0.022
Side Slope Z-value= 3.0 '/' Top Width= 11.00'
Length= 35.0' Slope= 0.0177 '/'
Inlet Invert= 280.50', Outlet Invert= 279.88'

‡

Reach 3R: Swale



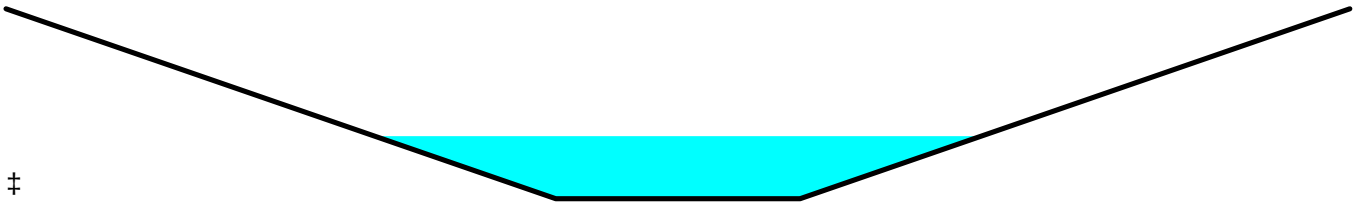
Summary for Reach 4R: Swale

Inflow Area = 1.18 ac, 87.59% Impervious, Inflow Depth = 3.40" for 10-YR event
Inflow = 4.0 cfs @ 12.09 hrs, Volume= 0.33 af
Outflow = 4.0 cfs @ 12.10 hrs, Volume= 0.33 af, Atten= 1%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.31 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.70 fps, Avg. Travel Time= 3.6 min

Peak Storage= 258 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 4.97'
Bank-Full Depth= 1.50' Flow Area= 9.8 sf, Capacity= 41.7 cfs

2.00' x 1.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 11.00'
Length= 150.0' Slope= 0.0050 '/'
Inlet Invert= 280.63', Outlet Invert= 279.88'



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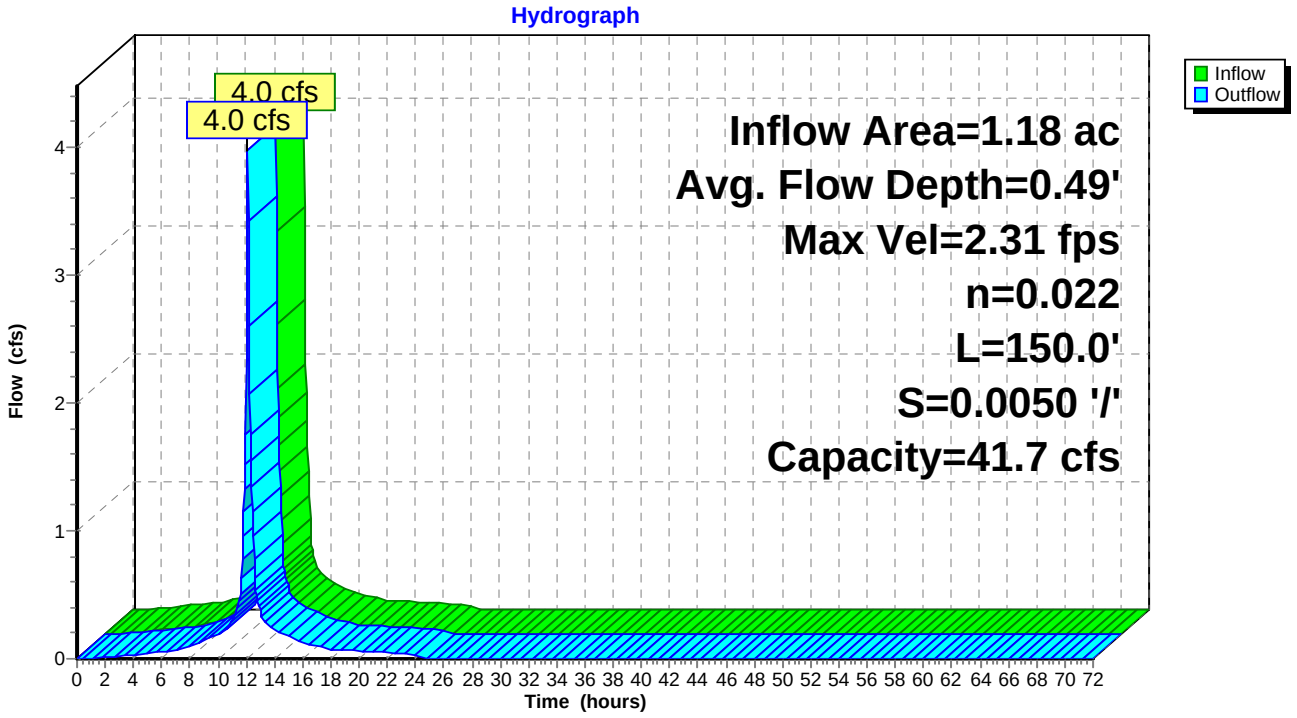
Reach 4R: Swale



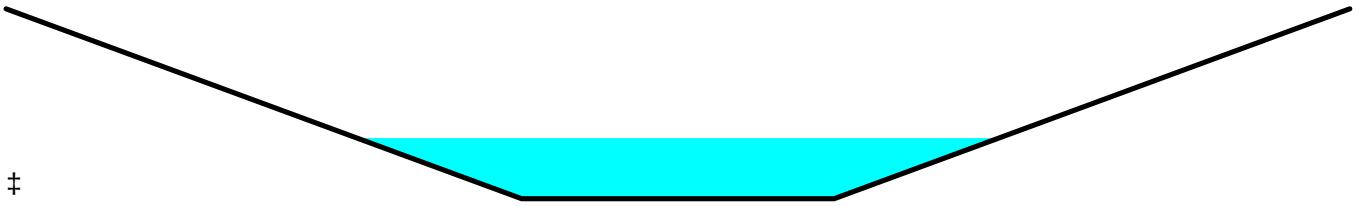
Summary for Reach 5R:

Inflow Area = 0.06 ac, 90.12% Impervious, Inflow Depth = 3.47" for 10-YR event
Inflow = 0.2 cfs @ 12.09 hrs, Volume= 0.02 af
Outflow = 0.2 cfs @ 12.13 hrs, Volume= 0.02 af, Atten= 11%, Lag= 2.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.14 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.33 fps, Avg. Travel Time= 14.6 min

Peak Storage= 47 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 2.05'
Bank-Full Depth= 0.33' Flow Area= 0.9 sf, Capacity= 1.9 cfs

1.00' x 0.33' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 5.0 '/' Top Width= 4.30'
Length= 290.0' Slope= 0.0086 '/'
Inlet Invert= 279.50', Outlet Invert= 277.00'



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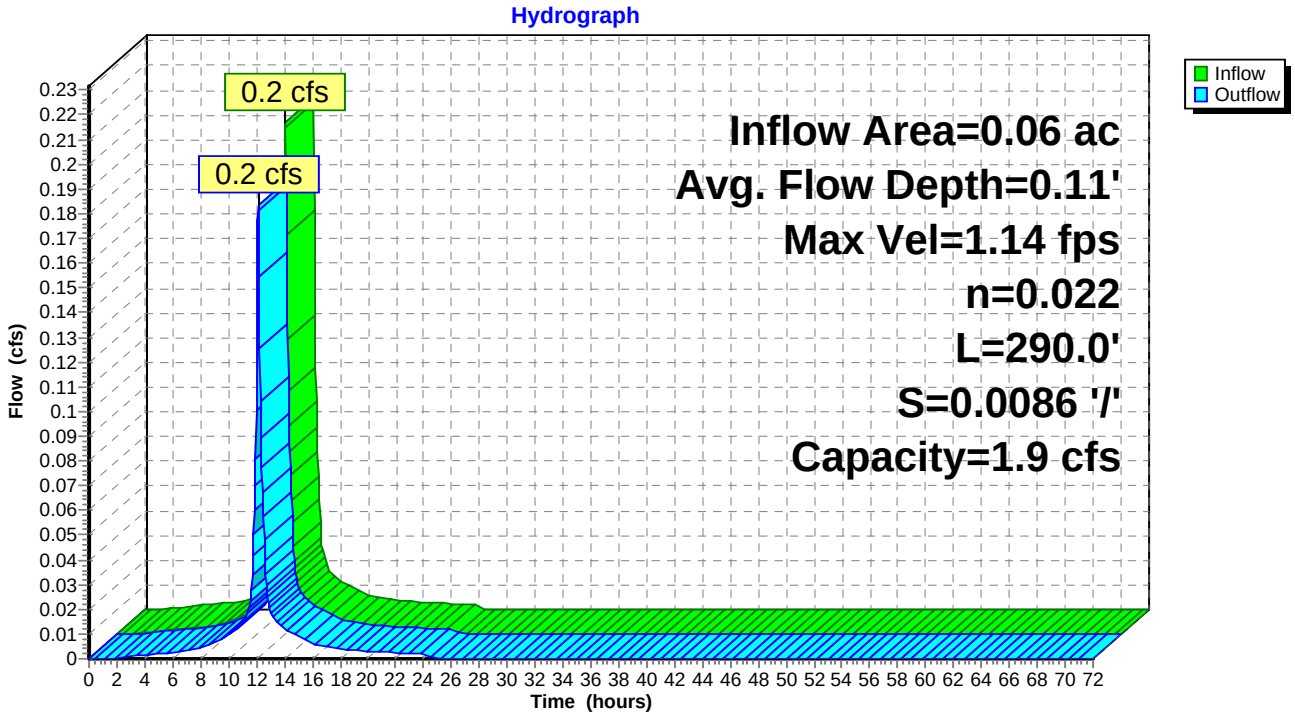
Reach 5R:

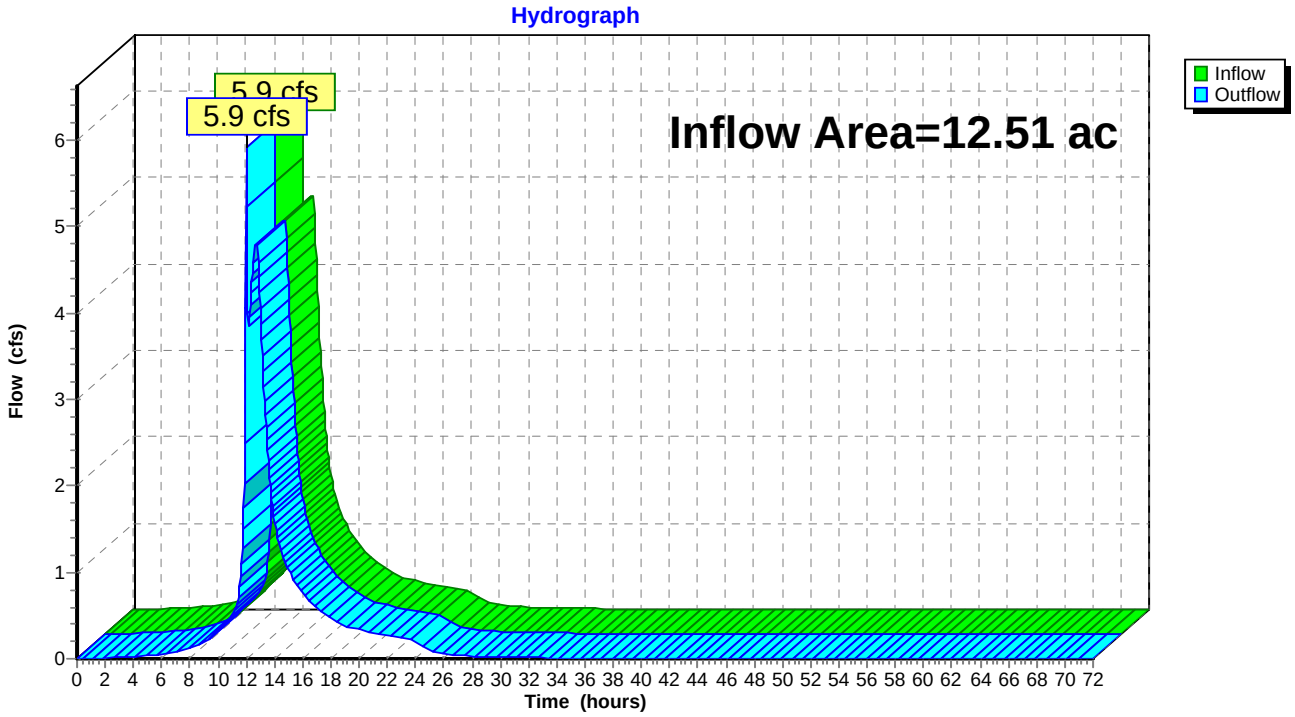


Summary for Reach POA#1:

Inflow Area = 12.51 ac, 32.87% Impervious, Inflow Depth = 1.19" for 10-YR event
Inflow = 5.9 cfs @ 12.01 hrs, Volume= 1.24 af
Outflow = 5.9 cfs @ 12.01 hrs, Volume= 1.24 af, Atten= 0%, Lag= 0.0 min

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

Reach POA#1:



Summary for Reach TS1: Treatment Swale 1

Inflow Area = 3.24 ac, 52.21% Impervious, Inflow Depth = 2.35" for 10-YR event
Inflow = 5.4 cfs @ 12.15 hrs, Volume= 0.64 af
Outflow = 4.9 cfs @ 12.22 hrs, Volume= 0.64 af, Atten= 9%, Lag= 4.2 min

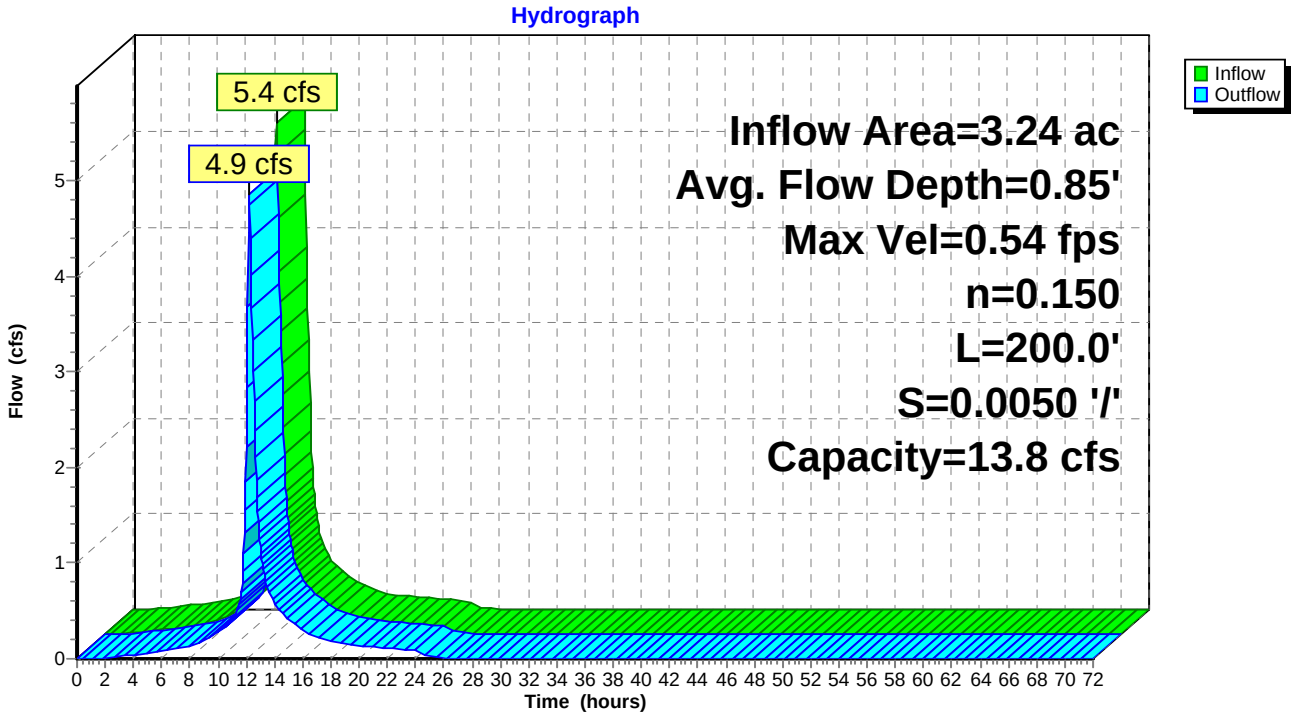
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.54 fps, Min. Travel Time= 6.2 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 27.0 min

Peak Storage= 1,805 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.85' , Surface Width= 13.13'
Bank-Full Depth= 1.50' Flow Area= 18.8 sf, Capacity= 13.8 cfs

8.00' x 1.50' deep channel, n= 0.150
Side Slope Z-value= 3.0 '/' Top Width= 17.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 279.63', Outlet Invert= 278.63'

‡

Reach TS1: Treatment Swale 1



Summary for Reach TS2: Treatment Swale 2 (Phase 1)

Treament swale constructed during Phase 1

Inflow Area = 3.79 ac, 47.09% Impervious, Inflow Depth = 2.23" for 10-YR event
Inflow = 4.9 cfs @ 12.40 hrs, Volume= 0.70 af
Outflow = 4.7 cfs @ 12.48 hrs, Volume= 0.70 af, Atten= 4%, Lag= 4.5 min

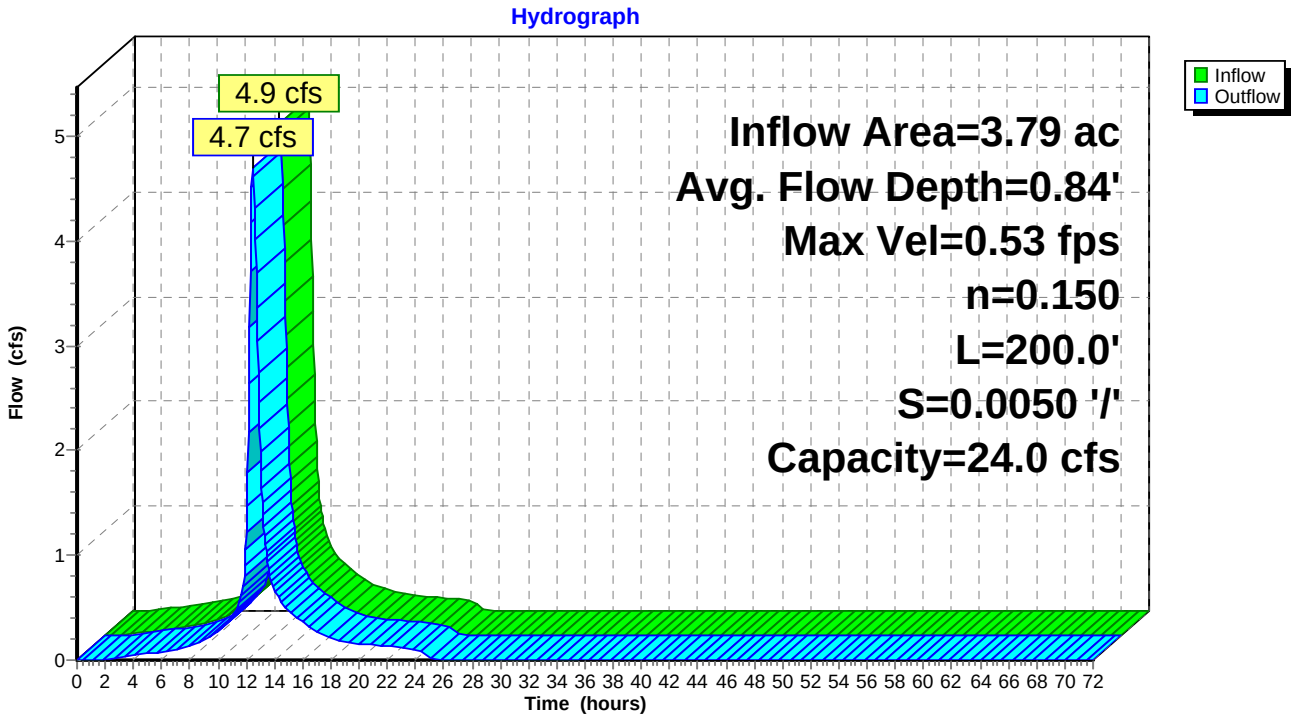
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.53 fps, Min. Travel Time= 6.3 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 22.9 min

Peak Storage= 1,766 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.84' , Surface Width= 13.04'
Bank-Full Depth= 2.00' Flow Area= 28.0 sf, Capacity= 24.0 cfs

8.00' x 2.00' deep channel, n= 0.150
Side Slope Z-value= 3.0 '/' Top Width= 20.00'
Length= 200.0' Slope= 0.0050 '/'
Inlet Invert= 278.30', Outlet Invert= 277.30'

‡

Reach TS2: Treatment Swale 2 (Phase 1)



Summary for Pond 1P: Natural depression

Inflow Area = 2.70 ac, 0.89% Impervious, Inflow Depth = 0.71" for 10-YR event
Inflow = 1.0 cfs @ 12.53 hrs, Volume= 0.16 af
Outflow = 0.1 cfs @ 17.24 hrs, Volume= 0.16 af, Atten= 90%, Lag= 282.6 min
Discarded = 0.1 cfs @ 17.24 hrs, Volume= 0.16 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 281.88' @ 17.24 hrs Surf.Area= 14,551 sf Storage= 3,743 cf

Plug-Flow detention time= 545.0 min calculated for 0.16 af (100% of inflow)
Center-of-Mass det. time= 545.9 min (1,461.5 - 915.6)

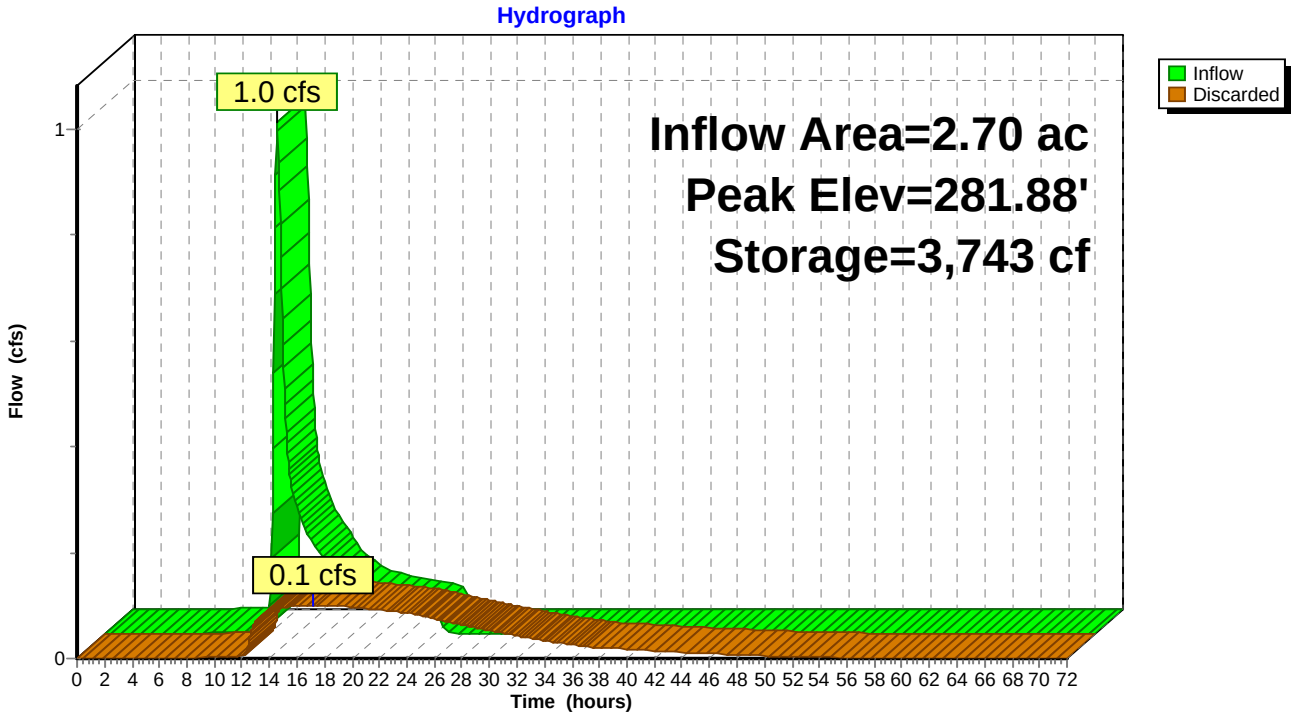
Volume	Invert	Avail.Storage	Storage Description
#1	281.00'	45,656 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
281.00	100	0	0	100
281.50	3,175	640	640	3,176
282.00	19,880	5,167	5,806	19,881
283.00	64,000	39,850	45,656	64,007

Device	Routing	Invert	Outlet Devices
#1	Discarded	281.00'	**0.300 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.1 cfs @ 17.24 hrs HW=281.88' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Pond 1P: Natural depression



Summary for Pond 2P: Proposed Culvert

Inflow Area = 0.80 ac, 33.87% Impervious, Inflow Depth = 1.81" for 10-YR event
Inflow = 1.1 cfs @ 12.20 hrs, Volume= 0.12 af
Outflow = 0.6 cfs @ 12.46 hrs, Volume= 0.12 af, Atten= 44%, Lag= 15.5 min
Primary = 0.6 cfs @ 12.46 hrs, Volume= 0.12 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 281.35' @ 12.46 hrs Surf.Area= 4,110 sf Storage= 1,133 cf

Plug-Flow detention time= 50.0 min calculated for 0.12 af (100% of inflow)
Center-of-Mass det. time= 49.2 min (849.6 - 800.4)

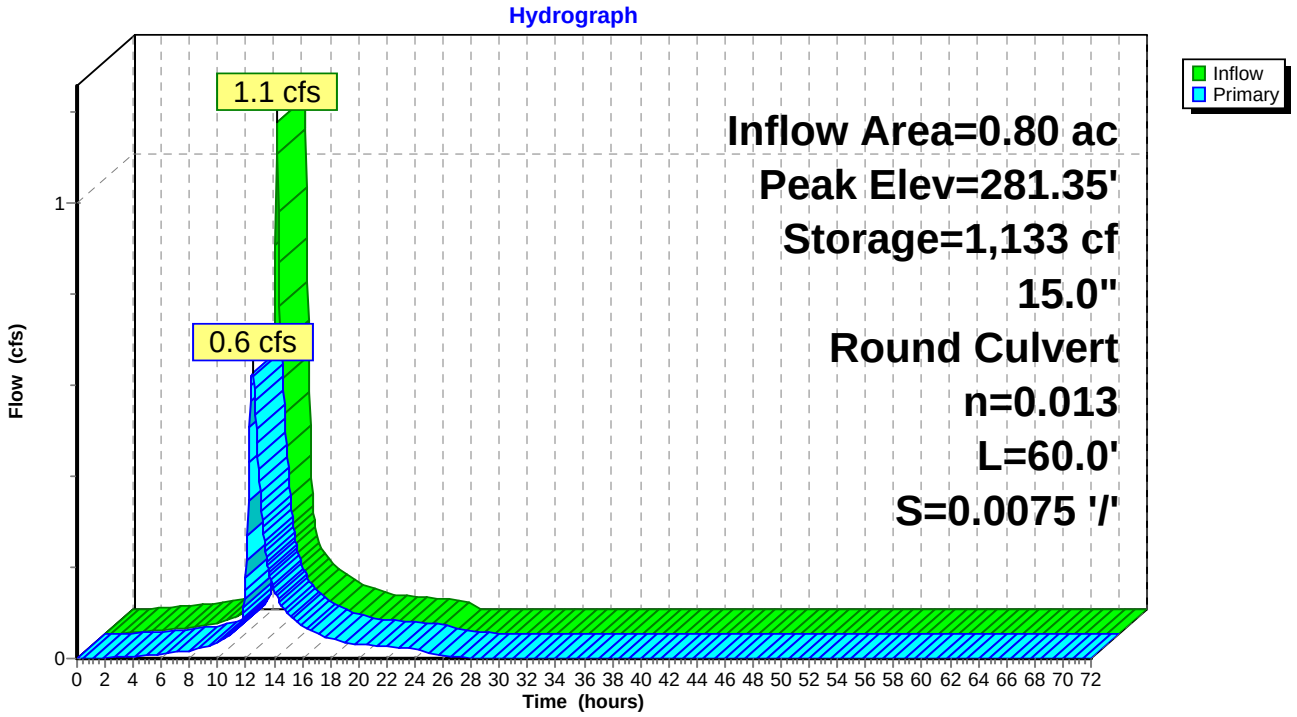
Volume	Invert	Avail.Storage	Storage Description
#1	280.95'	4,898 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
280.95	50	0	0	50
281.00	2,190	43	43	2,190
281.50	5,100	1,772	1,815	5,102
282.00	7,300	3,084	4,898	7,306

Device	Routing	Invert	Outlet Devices
#1	Primary	280.95'	**15.0" Round Culvert** L= 60.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 280.95' / 280.50' S= 0.0075 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.6 cfs @ 12.46 hrs HW=281.35' TW=280.63' (Dynamic Tailwater)
↳**1=Culvert** (Barrel Controls 0.6 cfs @ 2.75 fps)

Pond 2P: Proposed Culvert



Summary for Pond 3P: Proposed Culvert

Inflow Area = 2.55 ac, 57.02% Impervious, Inflow Depth = 2.50" for 10-YR event
Inflow = 5.0 cfs @ 12.11 hrs, Volume= 0.53 af
Outflow = 4.4 cfs @ 12.17 hrs, Volume= 0.53 af, Atten= 13%, Lag= 3.5 min
Primary = 4.4 cfs @ 12.17 hrs, Volume= 0.53 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 280.96' @ 12.17 hrs Surf.Area= 1,987 sf Storage= 826 cf

Plug-Flow detention time= 2.1 min calculated for 0.53 af (100% of inflow)
Center-of-Mass det. time= 2.2 min (788.5 - 786.4)

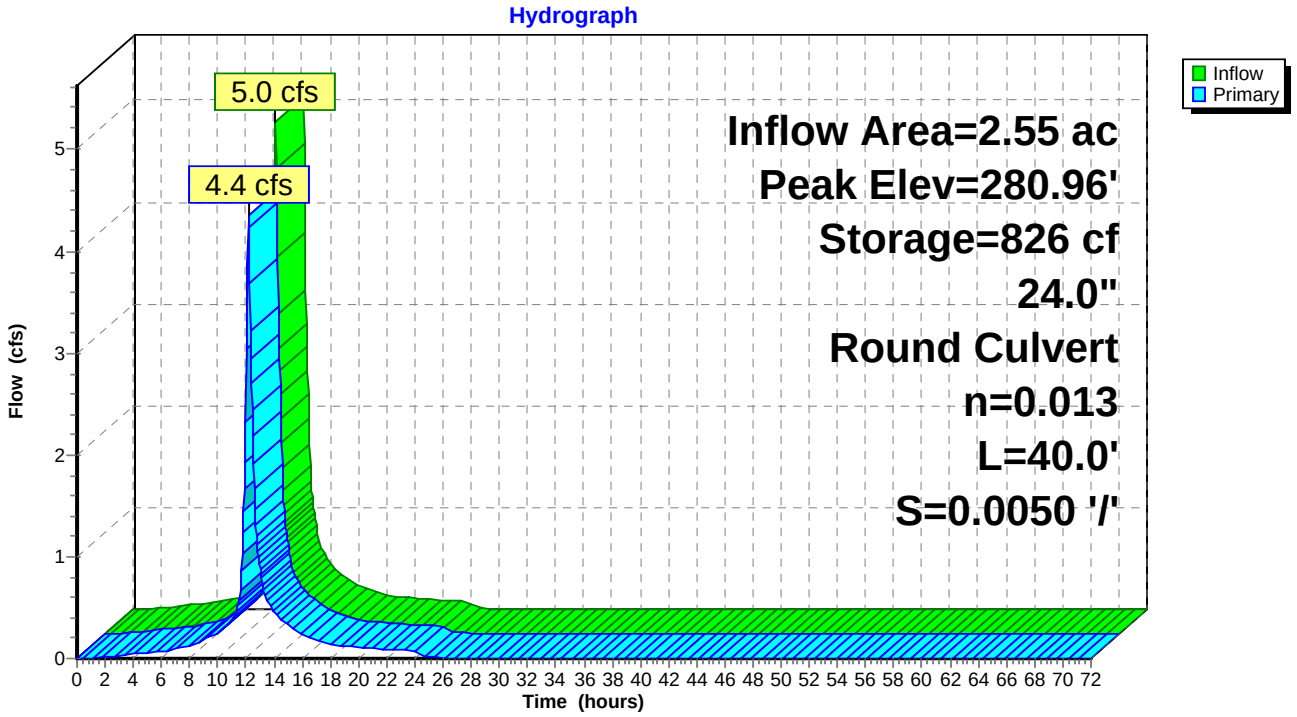
Volume	Invert	Avail.Storage	Storage Description
#1	279.88'	2,087 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
279.88	20	0	0	20
280.00	105	7	7	105
281.00	2,100	892	898	2,103
281.50	2,666	1,189	2,087	2,675

Device	Routing	Invert	Outlet Devices
#1	Primary	279.88'	**24.0" Round Culvert** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 279.88' / 279.68' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=4.3 cfs @ 12.17 hrs HW=280.96' TW=280.46' (Dynamic Tailwater)
↳**1=Culvert** (Barrel Controls 4.3 cfs @ 3.62 fps)

Pond 3P: Proposed Culvert



Summary for Pond 4P: Three Culverts (Phase 1)

Culverts were installed during Phase 1

Inflow Area = 3.62 ac, 46.73% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af, Atten= 0%, Lag= 0.0 min
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 277.04' @ 0.00 hrs Surf.Area= 50 sf Storage= 0 cf

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

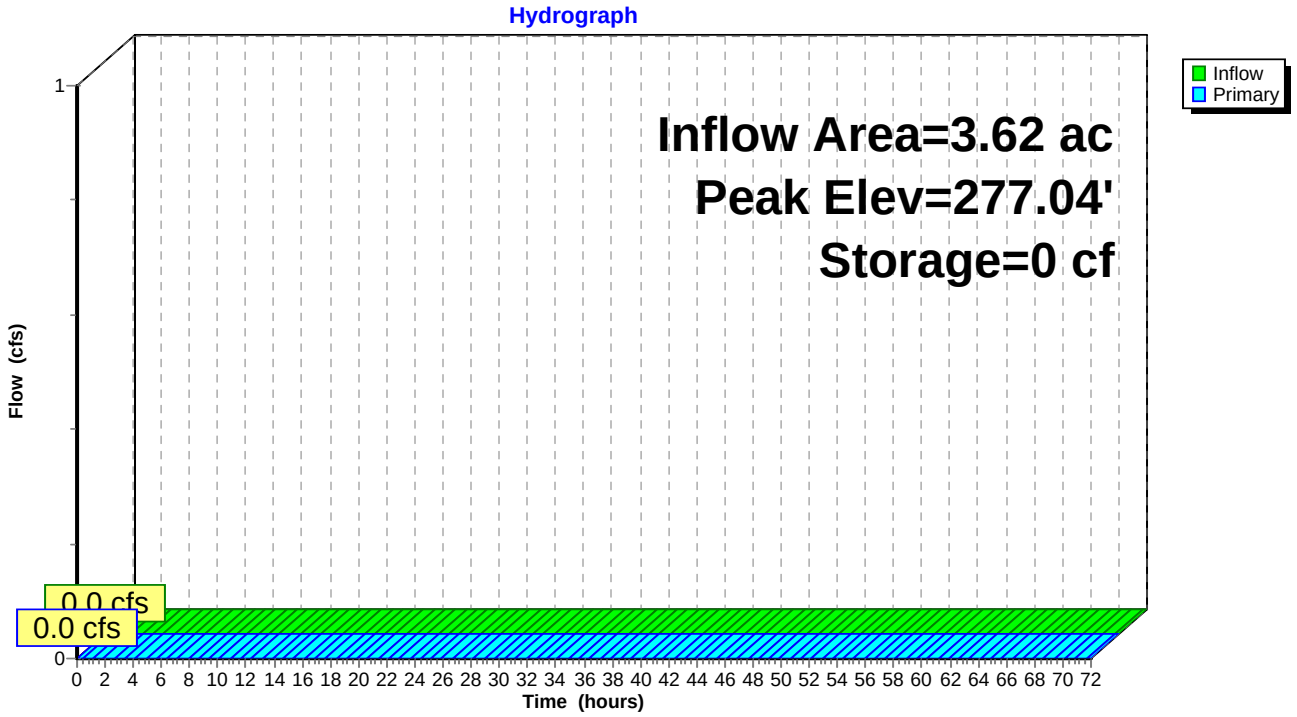
Volume	Invert	Avail.Storage	Storage Description
#1	277.04'	131 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
277.04	50	0	0	50
278.00	80	62	62	91
278.50	205	69	131	217

Device	Routing	Invert	Outlet Devices
#1	Primary	277.10'	**12.0" Round Phase 1 Culvert A** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 277.10' / 276.57' S= 0.0088 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Primary	277.04'	**12.0" Round Phase 1 Culvert B** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 277.04' / 276.56' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Primary	277.15'	**12.0" Round Phase 1 Culvert C** L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 277.15' / 276.57' S= 0.0097 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=277.04' TW=0.00' (Dynamic Tailwater)
- **1=Phase 1 Culvert A** (Controls 0.0 cfs)
- **2=Phase 1 Culvert B** (Controls 0.0 cfs)
- **3=Phase 1 Culvert C** (Controls 0.0 cfs)

Pond 4P: Three Culverts (Phase 1)



Summary for Pond 5P: Proposed Curb-O-Let #1

Inflow Area = 1.07 ac, 86.66% Impervious, Inflow Depth = 3.37" for 10-YR event
Inflow = 3.6 cfs @ 12.09 hrs, Volume= 0.30 af
Outflow = 3.7 cfs @ 12.09 hrs, Volume= 0.30 af, Atten= 0%, Lag= 0.0 min
Primary = 3.7 cfs @ 12.09 hrs, Volume= 0.30 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 281.44' @ 12.09 hrs Surf.Area= 250 sf Storage= 32 cf

Plug-Flow detention time= 1.2 min calculated for 0.30 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (756.6 - 756.4)

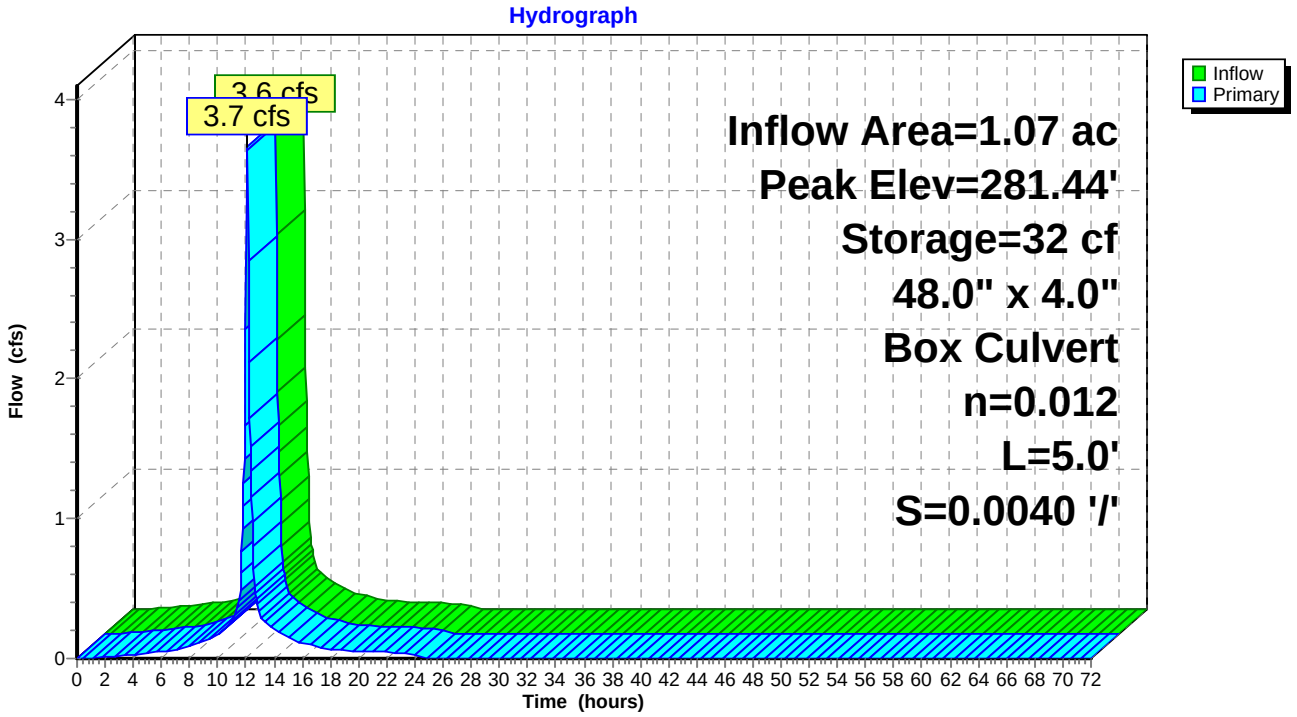
Volume	Invert	Avail.Storage	Storage Description
#1	280.90'	32 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
280.90	20	0	0	20
281.18	250	32	32	250

Device	Routing	Invert	Outlet Devices
#1	Primary	280.90'	**48.0" W x 4.0" H Box Culvert** L= 5.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 280.90' / 280.88' S= 0.0040 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.33 sf

Primary OutFlow Max=3.5 cfs @ 12.09 hrs HW=281.43' TW=281.11' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.5 cfs @ 2.59 fps)

Pond 5P: Proposed Curb-O-Let #1



Summary for Pond 6P: Proposed Curb-O-Let #2

Inflow Area = 0.11 ac, 96.80% Impervious, Inflow Depth = 3.67" for 10-YR event
Inflow = 0.4 cfs @ 12.09 hrs, Volume= 0.03 af
Outflow = 0.3 cfs @ 12.08 hrs, Volume= 0.03 af, Atten= 13%, Lag= 0.0 min
Primary = 0.3 cfs @ 12.08 hrs, Volume= 0.03 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 281.14' @ 12.15 hrs Surf.Area= 205 sf Storage= 24 cf

Plug-Flow detention time= 1.6 min calculated for 0.03 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (753.5 - 752.9)

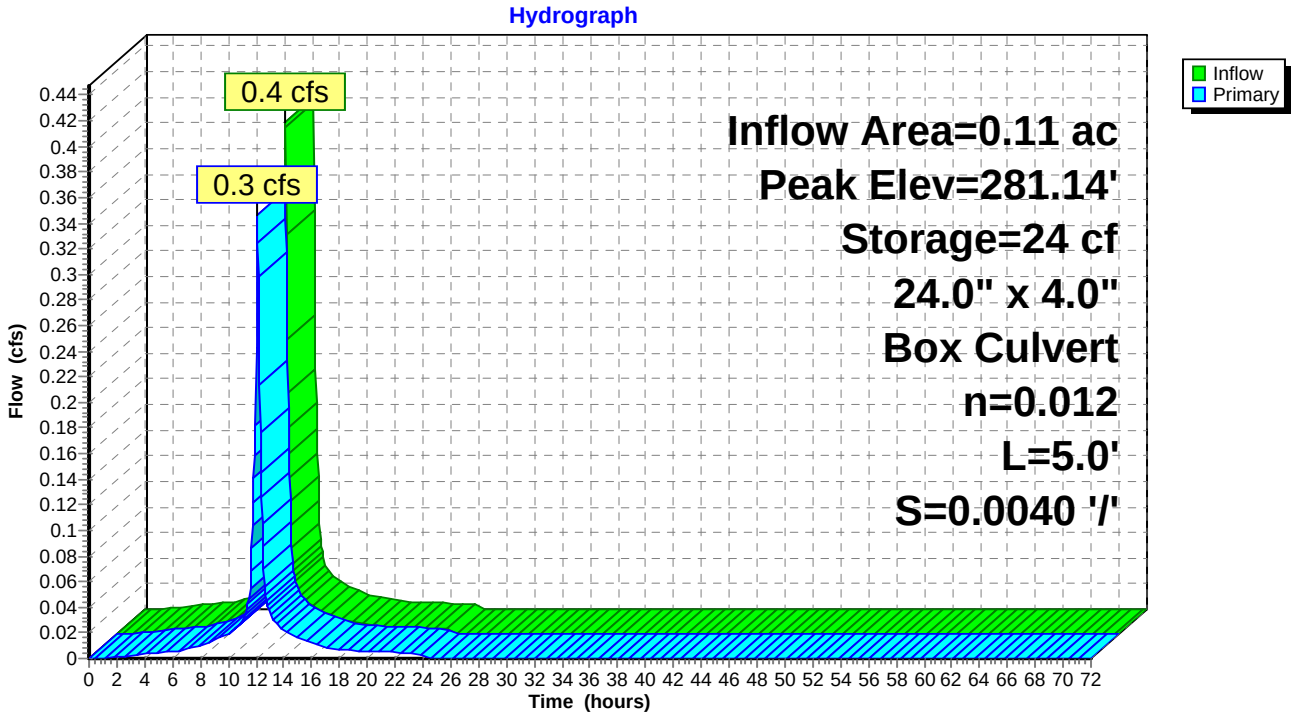
Volume	Invert	Avail.Storage	Storage Description
#1	280.90'	32 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
280.90	20	0	0	20
281.18	250	32	32	250

Device	Routing	Invert	Outlet Devices
#1	Primary	280.90'	**24.0" W x 4.0" H Box Culvert** L= 5.0' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 280.90' / 280.88' S= 0.0040 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.67 sf

Primary OutFlow Max=0.0 cfs @ 12.08 hrs HW=281.09' TW=281.11' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.0 cfs)

Pond 6P: Proposed Curb-O-Let #2



Summary for Pond 7P: Proposed Culvert

Inflow Area = 0.15 ac, 20.77% Impervious, Inflow Depth = 1.43" for 10-YR event
Inflow = 0.2 cfs @ 12.10 hrs, Volume= 0.02 af
Outflow = 0.1 cfs @ 12.45 hrs, Volume= 0.02 af, Atten= 67%, Lag= 21.1 min
Primary = 0.1 cfs @ 12.45 hrs, Volume= 0.02 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 282.65' @ 12.45 hrs Surf.Area= 1,728 sf Storage= 253 cf
Flood Elev= 282.80' Surf.Area= 1,880 sf Storage= 518 cf

Plug-Flow detention time= 160.7 min calculated for 0.02 af (99% of inflow)
Center-of-Mass det. time= 155.4 min (969.8 - 814.5)

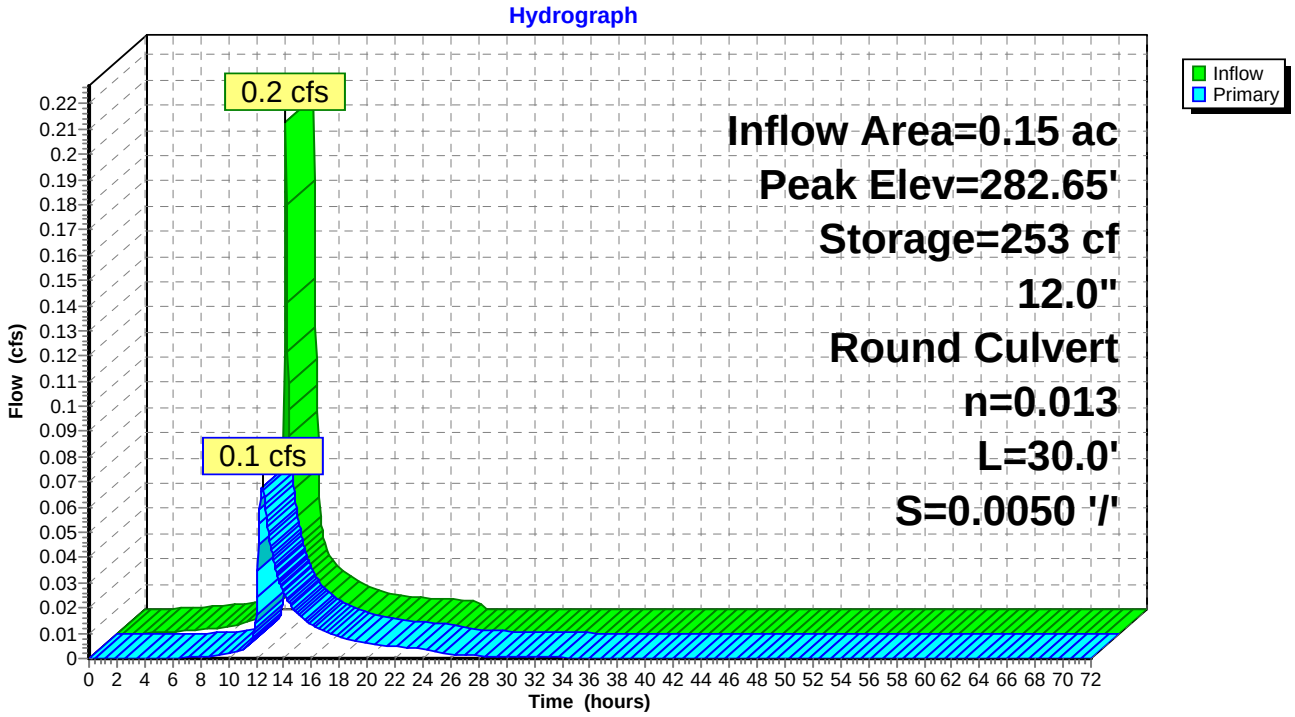
Volume	Invert	Avail.Storage	Storage Description
#1	282.50'	915 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
282.50	1,576	0	0	1,576
283.00	2,098	915	915	2,103

Device	Routing	Invert	Outlet Devices
#1	Primary	282.50'	**12.0" Round Culvert** L= 30.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 282.50' / 282.35' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.45 hrs HW=282.65' TW=280.64' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.1 cfs @ 1.35 fps)

Pond 7P: Proposed Culvert



Summary for Pond 8P: Proposed Culvert

Inflow Area = 0.24 ac, 0.06% Impervious, Inflow Depth = 0.70" for 10-YR event
Inflow = 0.1 cfs @ 12.21 hrs, Volume= 0.01 af
Outflow = 0.1 cfs @ 12.22 hrs, Volume= 0.01 af, Atten= 0%, Lag= 0.3 min
Primary = 0.1 cfs @ 12.22 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 283.18' @ 12.22 hrs Surf.Area= 27 sf Storage= 4 cf

Plug-Flow detention time= 2.4 min calculated for 0.01 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (905.3 - 903.9)

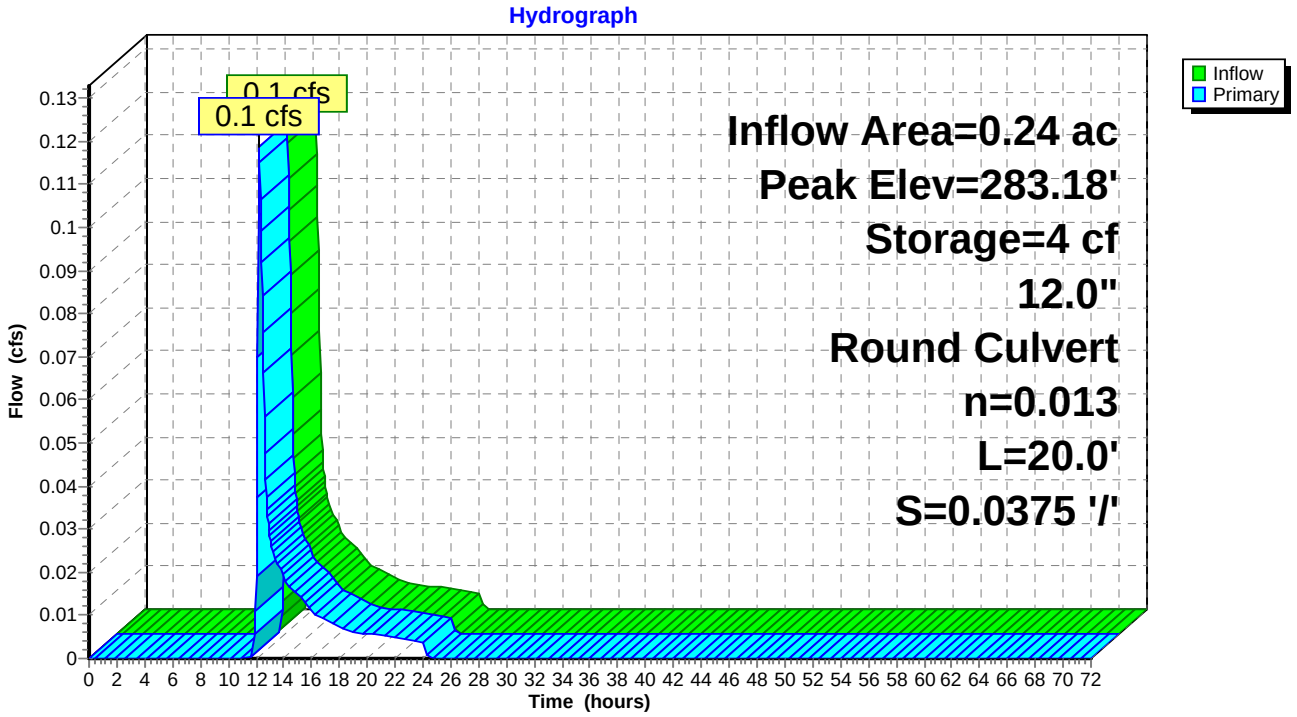
Volume	Invert	Avail.Storage	Storage Description
#1	283.00'	220 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
283.00	20	0	0	20
284.00	75	45	45	80
285.00	300	175	220	309

Device	Routing	Invert	Outlet Devices
#1	Primary	283.00'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 283.00' / 282.25' S= 0.0375 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.1 cfs @ 12.22 hrs HW=283.18' TW=280.33' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.1 cfs @ 1.26 fps)

Pond 8P: Proposed Culvert



Summary for Pond BR1: Proposed Bioretention basin 1

Inflow Area = 0.49 ac, 21.41% Impervious, Inflow Depth = 1.44" for 10-YR event
Inflow = 0.7 cfs @ 12.10 hrs, Volume= 0.06 af
Outflow = 0.0 cfs @ 19.02 hrs, Volume= 0.06 af, Atten= 97%, Lag= 415.3 min
Discarded = 0.0 cfs @ 19.02 hrs, Volume= 0.06 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 281.71' @ 19.02 hrs Surf.Area= 2,453 sf Storage= 1,609 cf

Plug-Flow detention time= 913.6 min calculated for 0.06 af (100% of inflow)
Center-of-Mass det. time= 913.4 min (1,726.9 - 813.5)

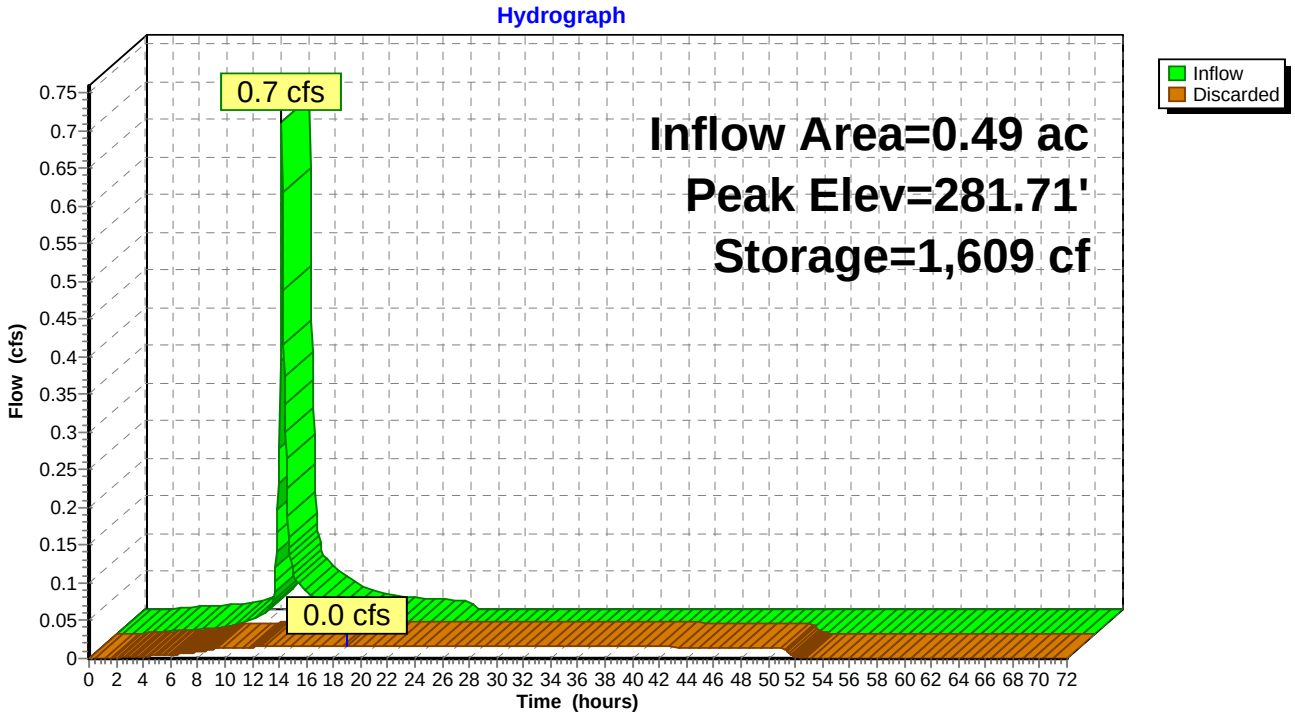
Volume	Invert	Avail.Storage	Storage Description
#1	281.00'	5,268 cf	**Basin (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
281.00	2,054	0	0	2,054
283.00	3,260	5,268	5,268	3,313

Device	Routing	Invert	Outlet Devices
#1	Discarded	281.00'	**0.300 in/hr Podunk 117B Ksat=0.6in/hr over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.0 cfs @ 19.02 hrs HW=281.71' (Free Discharge)
↑**1=Podunk 117B Ksat=0.6in/hr** (Exfiltration Controls 0.0 cfs)

Pond BR1: Proposed Bioretention basin 1



Summary for Pond BR2: Proposed Bioretention basin 2

Inflow Area = 1.42 ac, 4.14% Impervious, Inflow Depth = 0.81" for 10-YR event
Inflow = 0.7 cfs @ 12.23 hrs, Volume= 0.10 af
Outflow = 0.0 cfs @ 24.10 hrs, Volume= 0.09 af, Atten= 97%, Lag= 712.6 min
Discarded = 0.0 cfs @ 24.10 hrs, Volume= 0.09 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 281.55' @ 24.10 hrs Surf.Area= 3,127 sf Storage= 3,163 cf

Plug-Flow detention time= 1,435.3 min calculated for 0.08 af (88% of inflow)
Center-of-Mass det. time= 1,372.2 min (2,277.2 - 905.0)

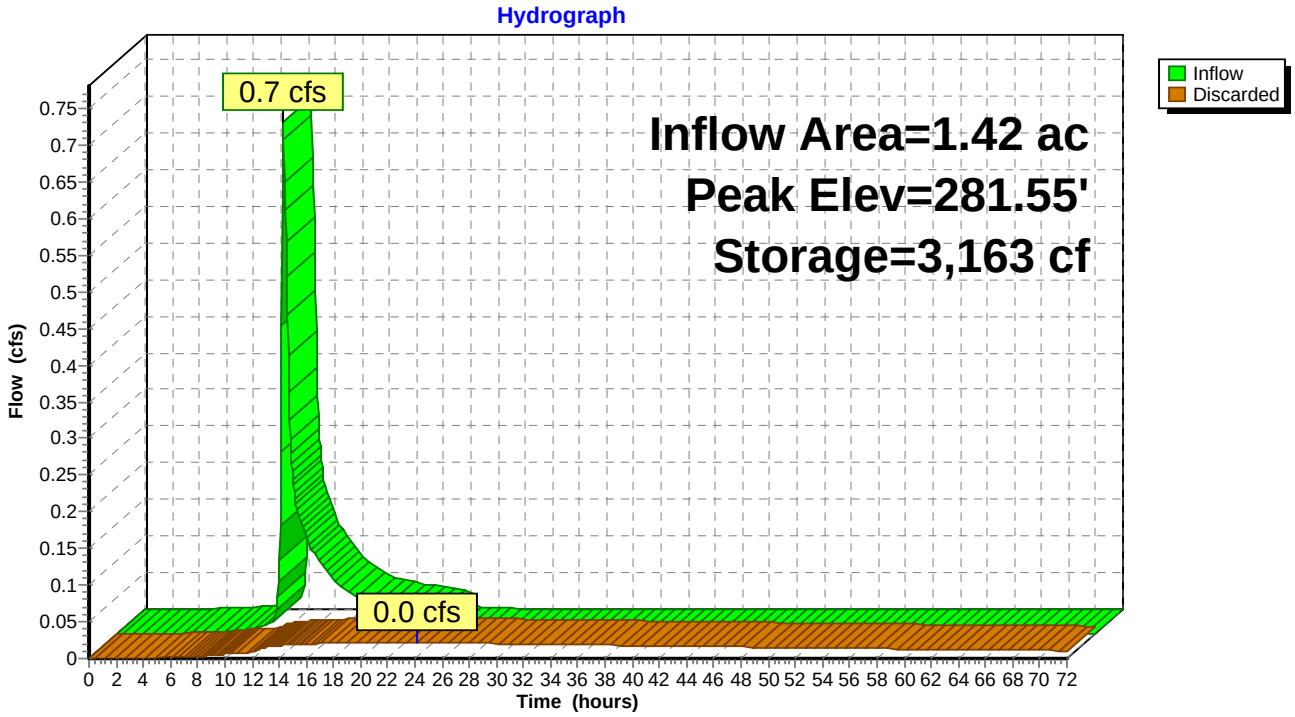
Volume	Invert	Avail.Storage	Storage Description
#1	280.00'	9,501 cf	**Basin (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
280.00	1,128	0	0	1,128
282.00	3,900	4,750	4,750	3,921
283.00	5,656	4,751	9,501	5,694

Device	Routing	Invert	Outlet Devices
#1	Discarded	280.00'	**0.300 in/hr Podunk 117B Ksat=0.6in/hr over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.0 cfs @ 24.10 hrs HW=281.55' (Free Discharge)
↑**1=Podunk 117B Ksat=0.6in/hr** (Exfiltration Controls 0.0 cfs)

Pond BR2: Proposed Bioretention basin 2



Summary for Pond BR3: Proposed Bioretention Basin 3

Inflow Area = 1.23 ac, 43.94% Impervious, Inflow Depth = 2.11" for 10-YR event
Inflow = 2.6 cfs @ 12.09 hrs, Volume= 0.22 af
Outflow = 0.1 cfs @ 15.97 hrs, Volume= 0.22 af, Atten= 96%, Lag= 232.7 min
Discarded = 0.1 cfs @ 15.97 hrs, Volume= 0.22 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 283.17' @ 15.97 hrs Surf.Area= 13,515 sf Storage= 5,154 cf

Plug-Flow detention time= 520.1 min calculated for 0.22 af (100% of inflow)
Center-of-Mass det. time= 519.9 min (1,301.8 - 781.9)

Volume	Invert	Avail.Storage	Storage Description
#1	282.75'	16,883 cf	**Basin (Conic)** Listed below (Recalc)

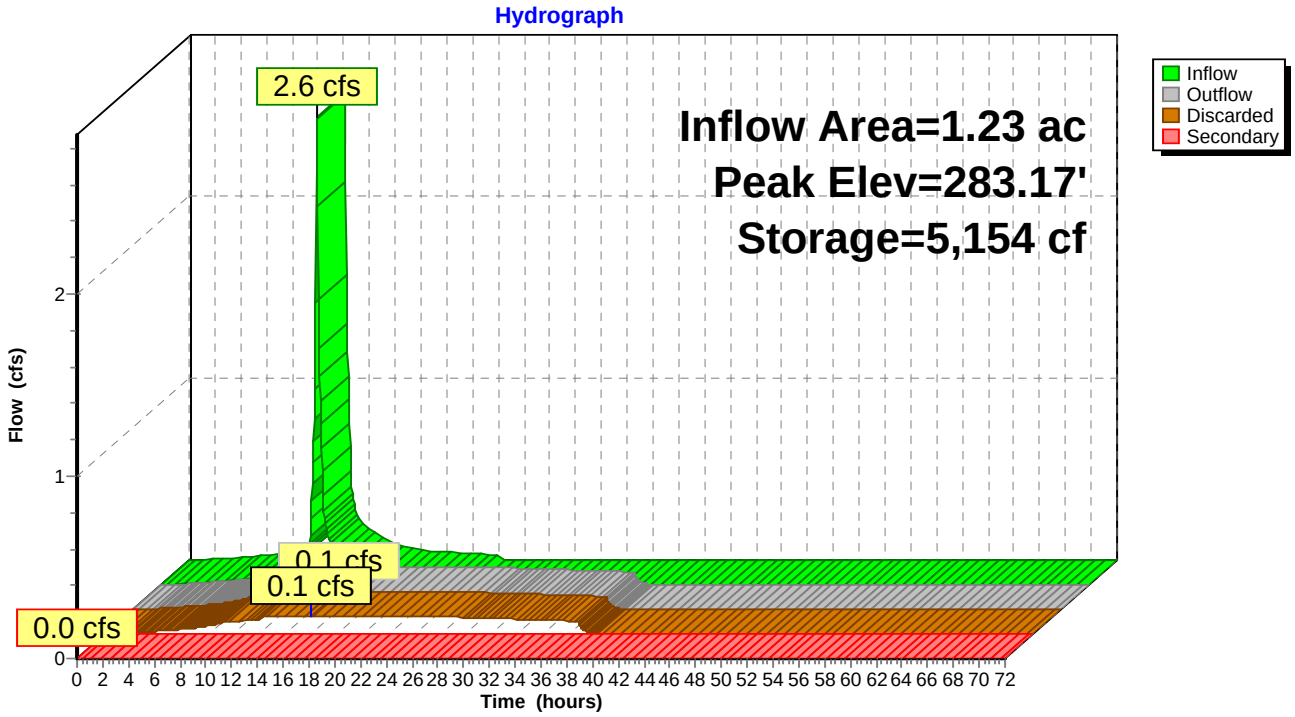
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
282.75	10,000	0	0	10,000
283.00	13,282	2,901	2,901	13,283
284.00	14,694	13,982	16,883	14,756

Device	Routing	Invert	Outlet Devices
#1	Discarded	282.75'	**0.300 in/hr Ondawa 201A Ksat=0.6in/hr over Surface area** Phase-In= 0.01'
#2	Secondary	283.75'	**10.0' long x 6.5' breadth emergency spillway detail** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.52 2.70 2.68 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.67 2.68 2.71 2.75 2.81

Discarded OutFlow Max=0.1 cfs @ 15.97 hrs HW=283.17' (Free Discharge)
1=Ondawa 201A Ksat=0.6in/hr (Exfiltration Controls 0.1 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=282.75' TW=281.00' (Dynamic Tailwater)
2=emergency spillway detail (Controls 0.0 cfs)

Pond BR3: Proposed Bioretention Basin 3



Summary for Pond DB: Detention Basin (Phase 1)

Pond was constructed during Phase I.
The volume is the As-built volume.

Inflow Area = 4.13 ac, 43.16% Impervious, Inflow Depth = 2.20" for 10-YR event
Inflow = 4.9 cfs @ 12.46 hrs, Volume= 0.76 af
Outflow = 3.6 cfs @ 12.74 hrs, Volume= 0.75 af, Atten= 28%, Lag= 16.4 min
Primary = 1.0 cfs @ 12.74 hrs, Volume= 0.14 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af
Tertiary = 2.5 cfs @ 12.74 hrs, Volume= 0.62 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Automatic Starting Elev= 276.35' Surf.Area= 7,798 sf Storage= 2,638 cf
Peak Elev= 277.17' @ 12.74 hrs Surf.Area= 9,389 sf Storage= 9,613 cf (6,975 cf above start)

Plug-Flow detention time= 157.4 min calculated for 0.69 af (92% of inflow)
Center-of-Mass det. time= 86.7 min (901.2 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	276.00'	32,569 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
276.00	7,279	0	0	7,279
277.00	8,808	8,031	8,031	8,841
278.00	12,400	10,553	18,584	12,451
279.00	15,631	13,984	32,569	15,709

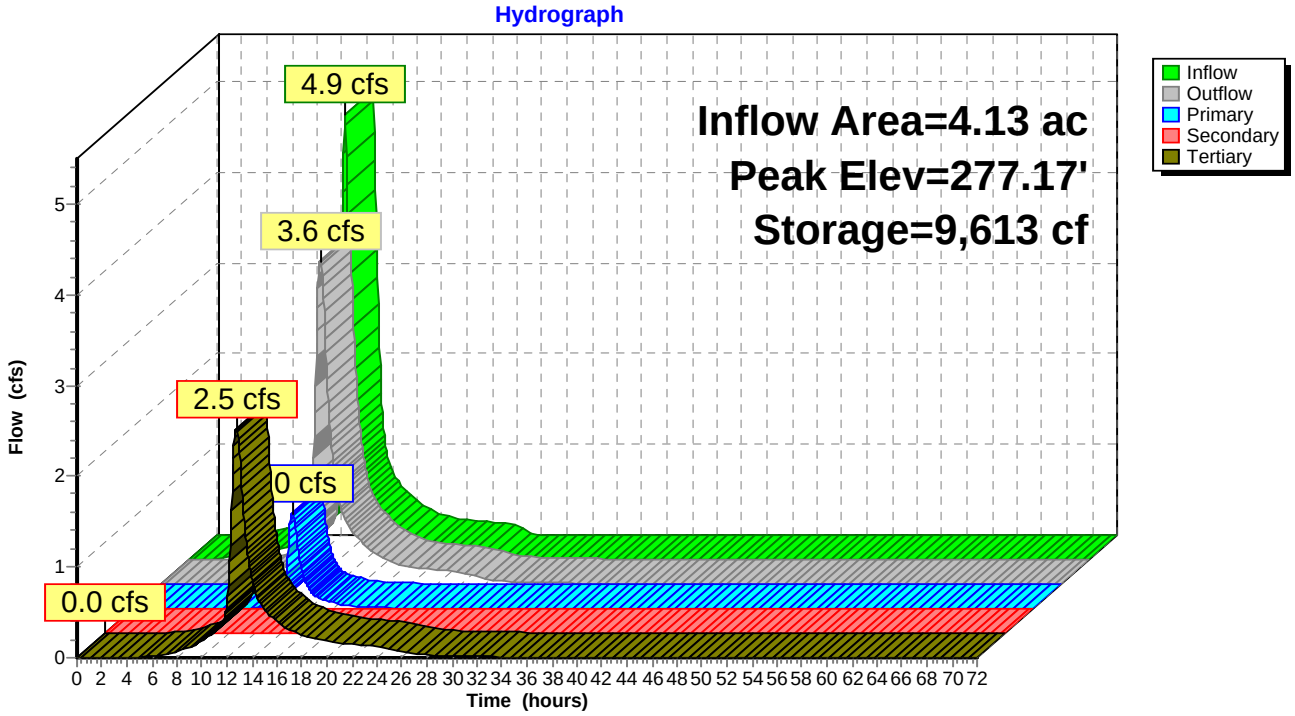
Device	Routing	Invert	Outlet Devices
#1	Secondary	277.65'	**100.0' long x 11.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.53 2.59 2.70 2.68 2.67 2.68 2.66 2.64
#2	Primary	276.50'	**10.0" Round Culvert A** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.50' / 276.03' S= 0.0235 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#3	Tertiary	276.35'	**10.0" Round Culvert B** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.35' / 276.14' S= 0.0105 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#4	Tertiary	276.43'	**10.0" Round Culvert C** L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 276.43' / 276.07' S= 0.0180 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.0 cfs @ 12.74 hrs HW=277.17' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert A** (Inlet Controls 1.0 cfs @ 2.21 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=276.35' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Tertiary OutFlow Max=2.5 cfs @ 12.74 hrs HW=277.17' TW=0.00' (Dynamic Tailwater)
├─**3=Culvert B** (Inlet Controls 1.3 cfs @ 2.44 fps)
└─**4=Culvert C** (Inlet Controls 1.2 cfs @ 2.32 fps)

Pond DB: Detention Basin (Phase 1)



Summary for Pond IB: Infiltration Basin (Phase 1)

Pond was constructed during Phase I.
The volume is the As-built volume
Stormwater entering has been treated
Test Pit 13:
SHWT 50" or elev.=273.7'
Test Pit 14"
SHWT 54" OR elev.=273.5'
Soils Type: Ondawa , Ksat = 0.6in/hr
GRVreq = 1,479 cf
Infiltration Test results:
INF-1 = 1.2 in/hr
INF-2 = 1.8 in/hr
INF-3 = 1.2 in/hr
Average = 1.4 in/hr

Inflow Area = 3.62 ac, 46.73% Impervious, Inflow Depth = 2.19" for 10-YR event
Inflow = 5.1 cfs @ 12.21 hrs, Volume= 0.66 af
Outflow = 0.2 cfs @ 19.22 hrs, Volume= 0.66 af, Atten= 97%, Lag= 420.5 min
Discarded = 0.2 cfs @ 19.22 hrs, Volume= 0.66 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 277.35' @ 19.22 hrs Surf.Area= 9,792 sf Storage= 19,451 cf

Plug-Flow detention time= 1,198.6 min calculated for 0.66 af (100% of inflow)
Center-of-Mass det. time= 1,199.3 min (2,005.2 - 805.9)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	37,661 cf	**Basin (Conic)** Listed below (Recalc)

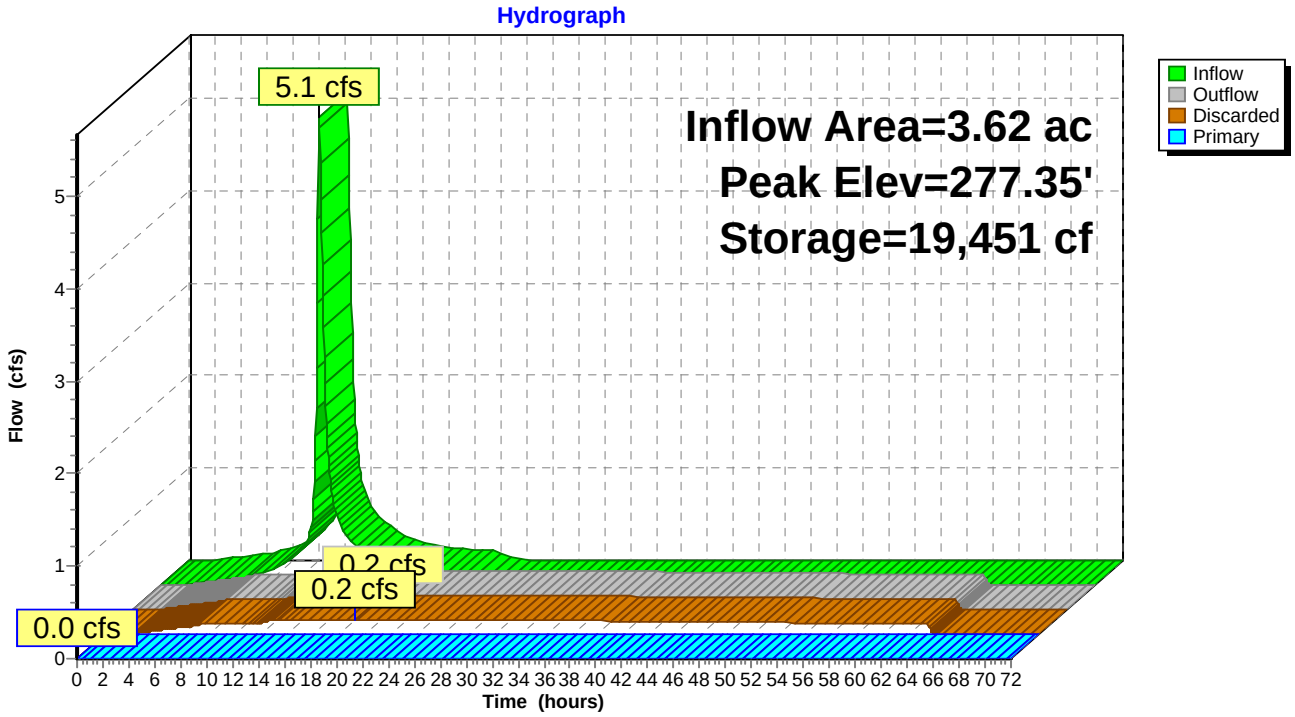
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
275.00	6,617	0	0	6,617
276.00	8,133	7,362	7,362	8,163
277.00	9,363	8,741	16,103	9,437
278.00	10,617	9,983	26,086	10,740
279.00	12,560	11,575	37,661	12,720

Device	Routing	Invert	Outlet Devices
#1	Discarded	275.00'	**0.700 in/hr Exfiltration over Wetted area** Phase-In= 0.01'
#2	Primary	278.55'	**20.0' long x 9.2' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.47 2.55 2.70 2.69 2.68 2.69 2.67 2.64 2.64 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68

Discarded OutFlow Max=0.2 cfs @ 19.22 hrs HW=277.35' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=275.00' TW=278.50' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond IB: Infiltration Basin (Phase 1)



APPENDIX A 8

Project Name: Easter Seal Project Location.: Holy Cross Lane, Fran
Project No.: 22380 Date: 25-Aug By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: 12" in to BR2

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**0.10**	**cfs**	←	**From HydroCAD**
Channel Bottom Width =	**2**	**ft.**		
Slope (along channel) =	**0.01**	**ft/ft**		
Left Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Right Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Depth of Flow =	**0.4**	**ft.**	←	**Iterative User Input**
Manning's 'n' =	0.0330			
Area =	4.00	sq.ft.		
Wetted Perimeter =	18.02	ft.		
Hydraulic Radius =	0.22	ft.		
Top Width =	18.00	ft.		
Velocity =	1.65	ft/sec		
Q (determined) =	**6.60**	**cfs**	**FLOW DEPTH ACHIEVED**	

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**12**	**Inches**	←	**From HydroCAD**
Tail Water Depth (TW) =	**0.40**	**ft.**		
Length of Apron (La) =	7	ft.		
Width of Apron @ Do (Wo) =	3	ft.		
Width of Apron @ D.S. End (W) =	10	ft.		
Width of Apron if Channel (W) =	2	ft.		

*If outleting to flat area use Tailwater (TW) = 0.2 x Do = 0.20

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.00 ft. or 0.0 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use 9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Easter Seal Project Location.: Holy Cross Lane, Fran
Project No.: 22380 Date: 25-Aug By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: 12" in to BR2

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**0.20**	**cfs** ←		**From HydroCAD**
Channel Bottom Width =	**2**	**ft.**		
Slope (along channel) =	**0.01**	**ft/ft**		
Left Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Right Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Depth of Flow =	**0.3**	**ft.** ←		**Iterative User Input**
Manning's 'n' =	0.0330			
Area =	2.40	sq.ft.		
Wetted Perimeter =	14.01	ft.		
Hydraulic Radius =	0.17	ft.		
Top Width =	14.00	ft.		
Velocity =	1.39	ft/sec		
Q (determined) =	**3.33**	**cfs**	**FLOW DEPTH ACHIEVED**	

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**12**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.30**	**ft.**	
Length of Apron (La) =	7	ft.	
Width of Apron @ Do (Wo) =	3	ft.	
Width of Apron @ D.S. End (W) =	10	ft.	
Width of Apron if Channel (W) =	2	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do = 0.20

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.01 ft. or 0.1 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use** **9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Easter Seal Project Location.: Holy Cross Lane, Frank
Project No.: 22380 Date: 7-Jun By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: Out let to swale

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**0.60**	**cfs** ←		**From HydroCAD**
Channel Bottom Width =	**4**	**ft.**		
Slope (along channel) =	**0.01**	**ft/ft**		
Left Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Right Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Depth of Flow =	**0.12**	**ft.** ←		**Iterative User Input**
Manning's 'n' =	0.0330			
Area =	0.77	sq.ft.		
Wetted Perimeter =	8.81	ft.		
Hydraulic Radius =	0.09	ft.		
Top Width =	8.80	ft.		
Velocity =	0.89	ft/sec		
Q (determined) =	**0.68**	**cfs**	**FLOW DEPTH ACHIEVED**	

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**15**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.12**	**ft.**	
Length of Apron (La) =	10	ft.	
Width of Apron @ Do (Wo) =	4	ft.	
Width of Apron @ D.S. End (W) =	13	ft.	
Width of Apron if Channel (W) =	4	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do = 0.25

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.07 ft. or 0.8 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use 9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Easter Seal Project Location.: Holy Cross Lane, Frank
Project No.: 22380 Date: 25-Aug By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: Out into Swale

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**4.40**	**cfs** ←		**From HydroCAD**
Channel Bottom Width =	**8**	**ft.**		
Slope (along channel) =	**0.005**	**ft/ft**		
Left Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Right Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Depth of Flow =	**0.3**	**ft.** ←		**Iterative User Input**
Manning's 'n' =	0.0330			
Area =	4.20	sq.ft.		
Wetted Perimeter =	20.01	ft.		
Hydraulic Radius =	0.21	ft.		
Top Width =	20.00	ft.		
Velocity =	1.12	ft/sec		
Q (determined) =	**4.72**	**cfs**	**FLOW DEPTH ACHIEVED**	

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**24**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.30**	**ft.**	
Length of Apron (La) =	17	ft.	
Width of Apron @ Do (Wo) =	6	ft.	
Width of Apron @ D.S. End (W) =	23	ft.	
Width of Apron if Channel (W) =	8	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do 0.40

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 =** **0.24** **ft. or** **2.9** **Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE:** **3** **Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use** **9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

Project Name: Easter Seal Project Location.: Holy Cross Lane, Frank
Project No.: 22380 Date: 25-Aug By: PCB Chk'd By: SAL

Design Storm: 10 Year

Apron Location: Roof drain to BR3

DOWNSTREAM CHANNEL (OR SPREADER) HYDRAULICS:

Q (required) =	**2.00**	**cfs** ←		**From HydroCAD**
Channel Bottom Width =	**4**	**ft.**		
Slope (along channel) =	**0.02**	**ft/ft**		
Left Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Right Side Slope =	**20**	**h:v ang. =**	2.86	deg.
Depth of Flow =	**0.2**	**ft.** ←		**Iterative User Input**
Manning's 'n' =	0.0330			
Area =	1.60	sq.ft.		
Wetted Perimeter =	12.01	ft.		
Hydraulic Radius =	0.13	ft.		
Top Width =	12.00	ft.		
Velocity =	1.66	ft/sec		
Q (determined) =	**2.66**	**cfs**	**FLOW DEPTH ACHIEVED**	

La AND W CALCULATIONS:

Culvert Diameter (Do) =	**12**	**Inches** ←	**From HydroCAD**
Tail Water Depth (TW) =	**0.20**	**ft.**	
Length of Apron (La) =	11	ft.	
Width of Apron @ Do (Wo) =	3	ft.	
Width of Apron @ D.S. End (W) =	14	ft.	
Width of Apron if Channel (W) =	4	ft.	

*If outleting to flat area use Tailwater (TW) = 0.2 x Do = 0.20

Tailwater TW to be hand calc'd if not outleting to flat area w/ invert out at grade

ROCK RIP-RAP SIZE:

d50 = (0.02 x Q^(4/3))/(TW x Do) **d50 = 0.25 ft. or 3.0 Inches**

*Use a minimum of 3 Inch d50 if Rip Rap to be installed **USE: 3 Inches***

ROCK RIP-RAP GRADATION:

(Taken from Table 7-24 of NHDES Erosion Control Handbook)

% of Weight Smaller Than the Given Size	Size of Stone (inches)		
100	5	to	6
85	4	to	5
50	3	to	5
15	1	to	2

Minimum Rock RipRap Blanket Thickness = 9 **in. use 9** in.

Minimum 6 inch sand/gravel bedding or geotextile fabric required under all rock riprap

FORMULAE USED:

(Reference NHDES Erosion Control Handbook, Pages 7-114, 7-115)

Note: This spreadsheet was generated using the print-out "Pipe Outlet Protection Apron Design and d50 Riprap Sizing" prepared by Ed Minick of the Rockingham County Conservation District as a guide.

Manning's Uniform Channel Flow:	Q = 1.486*(A x r^(2/3) x s^(1/2)) / n
Length of Apron (La) TW < Do/2:	La = (1.8 x Q/(Do^(1.5)) + 7Do
Length of Apron (La) TW > Do/2:	La = (3.0 x Q/(Do^(1.5)) + 7Do
Width of Apron @ D.S. End TW < Do/2:	W = 3Do + La
Width of Apron @ D.S. End TW >= Do/2:	W = 3Do + 0.4La
Width of D.S. End if Channel:	W = Channel Bottom Width
Width of Apron at Culvert:	Wo = 3 xDo

APPENDIX A 9

JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908
(207) 384-5587

*CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR*

August 26, 2025

Mr. Scott Lawler
Norway Plains Associates, Inc.
P.O. Box 249
Rochester, New Hampshire 03866

RE: Supplemental Information For Site-Specific Soil Map Report, Easter Seals New Hampshire Inc., 20 & 21 Holy Cross Road, Franklin, New Hampshire

Dear Scott:

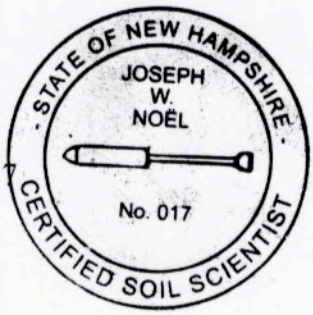
This supplemental letter is to provide pertinent information for the Site-Specific Survey where the limits/scope of soil mapping was expanded. The additional fieldwork was conducted on May 2, 2025. Eight additional backhoe excavated test pits were conducted. Three test pits were conducted in the areas under construction for stormwater planning and five test pits were conducted to expand the Site-Specific Soil Map.

The soil mapping conducted on May 2, 2025 expanded two of the existing map units (201A - Ondawa, occasionally flooded and 117A -Podunk, occasionally flooded). The only real change of note is the addition of Map Unit 117E (i.e., "E" slopes). This Podunk, occasionally flooded map unit contains steep erodible banks along the Merrimack River and has severe limits to development. This area should be avoided due to the erodible nature of these soils. No official test pit in this map unit with "E" slopes was feasible.

Please feel free to call if you have any questions or need additional information.

Sincerely,

Joseph W. Noel, CPSS/SC
New Hampshire Certified Soil Scientist #017



SITE-SPECIFIC

SOIL MAP REPORT

FOR

EASTER SEALS NEW HAMPSHIRE INC.
20 & 21 HOLY CROSS ROAD
FRANKLIN, NEW HAMPSHIRE

PREPARED FOR:

NORWAY PLAINS ASSOCIATES, INC.
P.O. BOX 249
ROCHESTER, NEW HAMPSHIRE 03866

PREPARED BY:

JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908

JUNE 12, 2023
JWN #23-19

JOSEPH W. NOEL
P.O. BOX 174
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*CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR*

INTRODUCTION

On April 24, 2023 and June 8, 2023, a portion of the property located at 20 & 21 Holy Cross Road in Franklin, New Hampshire was soil mapped following *Site-Specific Soil Mapping Standards for New Hampshire and Vermont* (Society of Soil Scientists of Northern New England, Version 7.0, July 2021). Refer to soil map for mapping limits. This type of soil map uses soil series names and is within the technical standards of the National Cooperative Soil Survey. The purpose of the survey is to comply with the soil mapping requirements of RSA 485-A:17 and NH DES Env-Wq 1500, Alteration of Terrain for expansion and/or renovations at the Easter Seals facility. The soil mapping legend conforms to the New Hampshire State-Wide Numerical Soils Legend.

The soil mapping area is situated to the south and west and adjacent to the nearby Merrimack River on a floodplain terrace. Besides the areas developed with access roads, parking, buildings, and grassed yards, the remainder of the property is utilized primarily for agricultural purposes. Test pits were limited in areas currently developed in order to avoid disruption to any existing utilities that might be below the surface.

A base map was provided by Norway Plains Associates, Inc. that contained: 2-foot contours, existing conditions and test pits conducted by the undersigned. This map was used for ground control and to assist in generating the Site-Specific Soil Survey. Mr. Daniel Coons, NH Certified Wetland Scientist #264 of Ilex Wetlands Consultants found no wetlands on the property. Nineteen backhoe excavated test pits were conducted on April 24, 2023 for stormwater planning and soil mapping purposes (test pit log information has been provided to Norway Plains Associates, Inc.). There is no Test Pit 9. If additional soil observations are conducted, the soil map may be revised/fine-tuned.

SOIL MAP UNITS

Map Symbol: **117**
Soil Series: **Podunk, occasionally flooded**

The Podunk series consists of a moderately well drained soil that formed in alluvial deposits. These soils are very deep to bedrock and are found throughout the mapping area. They are in areas that are nearly level to gently sloping and are in an intermediate position on the landscape. These soils have a seasonal highwater table ranging from 15 inches to 38 inches. Textures typically range from a loamy very fine sand to very fine sandy loam to fine sand. Test pits 3, 6, 7, 8, 15, 19 and 20 represent examples of the Podunk soils. Test pit 6 represents a Podunk soil with a stratum of very gravelly coarse sand in the C horizon. Test pit 20 represents a Podunk soil with disturbed surface layers that may be a result of farming practices or possibly due to past flooding events. The areas around Test pit 15 and the barn also have disturbed soils from agricultural practices. Slopes range from 0-8%. The hydrologic soil group is B. This map unit may contain up to 10% inclusions of

Ondawa occasionally flooded and the Podunk Variant (somewhat poorly drained) soils along with some limited disturbed areas (i.e., test pit 18 – Udorthents over Podunk-like).

Map Symbol: 119
Soil Series: Podunk, Variant (somewhat poorly drained), occasionally flooded

This series consists of somewhat poorly drained soils that formed in alluvial deposits. These soils are found in one map unit within the mapping area and are of limited extent. Textures typically range from loamy very fine sand to fine sand. Test pits 16 and 17 are examples of this map unit. These soils have common distinct/prominent redoximorphic features within 15 inches (i.e., high seasonal highwater table). These soils are very deep to bedrock and are on an intermediate position on the landscape. The hydrologic soil group is estimated to be D due to the soils being somewhat poorly drained and having a high watertable. The slopes range from 0-3%. These map units may contain inclusions up to 10% of the moderately well drained Podunk soil along with disturbed areas (i.e., Udorthents).

Map Symbol: 201
Soil Series: Ondawa, occasionally flooded

The Ondawa series consists of a well drained soil that formed in alluvial deposits. These soils are very deep to bedrock and are found in two mapping units within the mapping area. These soils are in areas that are nearly level to gently sloping and are in high to intermediate position on the landscape. These soils have a seasonal highwater table >40 inches. Textures typically range from a loamy very fine sand to very fine sandy loam to fine sand. Test pits 1, 2, 4, 5, 13 and 14 are representative of the Ondawa soil. Slopes range from 0-3%. The hydrologic soil group is B. This map unit may contain up to 10% inclusions of moderately well drained Podunk, the Podunk Variant (somewhat poorly drained) soils along with some surface debris noted (bricks, asphalt, etc).

Map Symbol: 299
Soil Series: Udorthents, smoothed

This map unit represents the areas that have been developed (buildings, parking, access roads and utilities) along with associated lawned areas that has been filled and regraded. Also noted were areas that contained: crushed gravel, wood chips, concrete blocks, asphalt, boulders, etc. The soils here were most likely the Ondawa soils with lesser amounts of the Podunk soils prior to development with natural drainage classes of well drained and moderately well drained respectively. These soils are very deep to bedrock. The area is nearly level to gently sloping and has an intermediate position on the landscape. Textures range from gravelly fine sandy loam to sandy loam underlain by loamy very fine sand and fine sand with a seasonal highwater table estimated to be between 3 and 4 feet below the surface. Test pits 10, 11 and 12 represent the disturbed soil conditions of this map unit. Slopes range from 3-8%. The hydrologic soil group is estimated to be D for the impervious surfaces (building, pavement, etc.) and B for the regraded/smoothed soil areas that are supporting vegetation. This map unit may contain up to 20% inclusions of the natural Ondawa and Podunk soils. One area with steep slopes around the root cellar foundation was also included in this map unit.

CLOSING

Inaccuracies or deficiencies in the base map may be unknowingly reflected in the soil survey, particularly in the boundary line placement between soil map units. This map was designed to

provide soil information for the expansion/renovations for the Easter Seals facility and to meet Alteration of Terrain requirements and may not be adequate for other purposes.

Joseph W. Noel, CPSS/SC
New Hampshire Certified Soil Scientist #017

APPENDIX A 10

INFILTRATION FEASIBILITY REPORT

PREPARED FOR:
Easter Seals NH, Inc.
Franklin, NH
Merrimack County
Phase 2
August 2025

PREPARED BY:

NORWAY PLAINS ASSOCIATES, INC.

Scott A. Lawler, P.E.
N.H. Reg. #10026

2 CONTINENTAL BOULEVARD, P.O. BOX 249, ROCHESTER, NEW HAMPSHIRE 03866-0249 (603) 335-3948

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APPENDICES

1.0 INTRODUCTION

The purpose of this report is to address the requirements of Env-Wq 1503.08(f)(3) and 1504.13 for the proposed practices which relies on the infiltration of stormwater into the ground. There are two infiltration basins used to infiltrate stormwater runoff for the project.

1.1 INFILTRATION BASIN

Infiltration basin is employed on the site to control the rate of discharge, the volume, comply with ground water recharge requirements and used to treat the storwmater from the proposed site. The basin will have a turf bottom with an spillway. The runoff entering this basin will have been treated by a treatment swale. This infiltration basin will be 4.25 feet deep, which will provide 0.5 feet of freeboard during the 50-year storm event. The emergency spillway has an elevation 331.0 feet. The emergency spillway has been designed for a 100-year storm event if the basin had no infiltration.

1.1.1 LOCATION OF THE PRACTICE:

The infiltration basin will be constructed to the southwest of the developed area.

1.1.2 DESCRIPTION OF THE EXISTING TOPOGRAPHY:

The proposed infiltration basin will be constructed in a lightly wood area with an average slope of 1% to 2%.

1.1.3 LOCATION OF THE TEST PITS

Test pits 13 and 14 were dug within the proposed system area. The proposed infiltration system has a basal area of 7,465 square feet, thus requires 2 test pits to be dug.

1.1.4 TEST PIT DATA

Test pit 13 and 14 were dug, observed and recorded on April 26, 2023 by Joseph W. Noel NH Certified Soil Scientist #17. The test pits were flagged in the field, numbered, and the locations are noted on the plans provided. Bedrock was not encountered at any of the test pit locations.

1.1.5 TEST PIT PROFILE DESCRIPTION

Test Pit 13

Ap	0-12 inches	dark brown (10YR 3/3) very fine sandy loam, friable, granular
Bw	12-39 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, massive to blocky
BC	39-50 inches	yellowish brown (10YR 5/4) very fine sand, friable, massive
C	50-60 inches	light olive brown (2.5Y 5/3) fine sand, friable, massive, common faint and few distinct redox features

High Water Table @ 50"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Ondawa

Test Pit 14

Ap	0-11 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, granular
Bw	11-50 inches	dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/4) loamy very fine sand and very fine sand, friable, massive to blocky
BC	50-54 inches	light olive brown (2.5Y 5/4) fine sand, friable, massive
C	54-65 inches	light olive brown (2.5Y 5/3) fine sand & very fine sand, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 54"
Observed Water Table none to 65"
Restrictive Horizon none to 65"
Bedrock none to 65"
Soil Series: Ondawa

1.1.6 ELEVATION OF THE SEASONAL HIGH WATER TABLE (SHWT):

The depth to the estimated seasonal high-water table for test pit 13 was 50 inches, test pit 14 was 54 inches. There was no ledge encountered to a depth of 5.5 feet at any of the test pits. The existing ground elevation near the location of the test pit 13 is 277.8' and 14 is 277.9 feet. The estimated seasonal high water was determined based on the average of the three test pits, which has an elevation of 276.6 feet. The basin bottom was set at 1 feet above ESHWT at 275.00'.

1.1.7 DESIGN INFILTRATION RATE

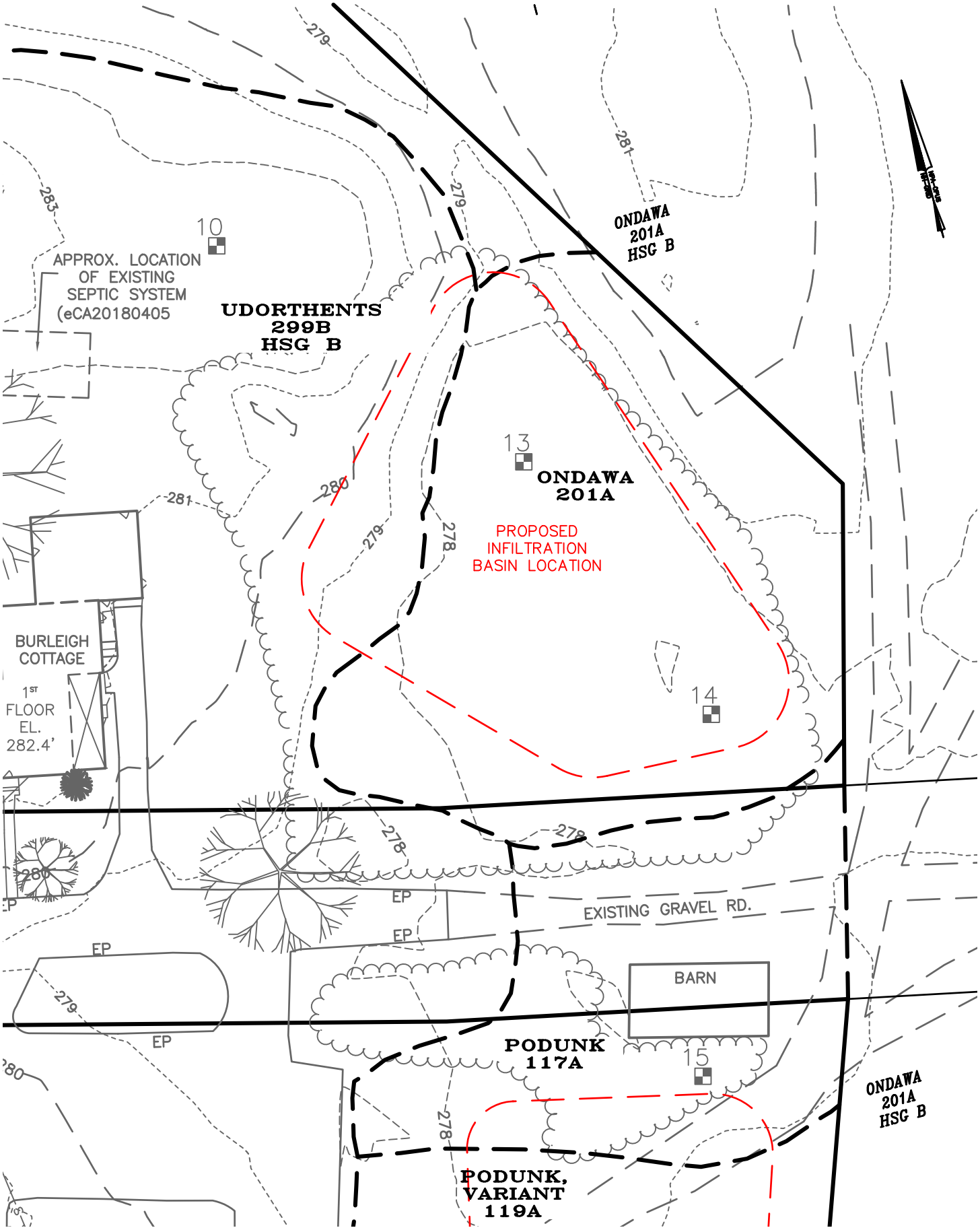
The infiltration rate was determined using Field Measurement method as described in Env-Wq1504.14(e)(1) Guelph Permeater test by John Turner Consulting.

Infiltration Basin	Infiltration Test #	Depth (in. bgs)	Rate (in/hr)
1	INF-1	2.2	*1.2*
1	INF-2	2.3	*1.8*
1	INF-3	2.2	*1.2*

A factor of safety of 0.5 has been applied to the average $K_{sat(analysis)}$. Thus, the design infiltration rate are as follows Infiltration Basin #1 **$K_{sat\ (analysis)}$ = 0.7 inches/hour**

APPENDIX A–10.1

SCALE: 1" = 40'



APPENDIX A 11

STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE MANUAL

PREPARED FOR:
Easter Seals NH, Inc.
Franklin, NH
Merrimack County

August 2025
(Phase 2)

PREPARED BY:

NORWAY PLAINS ASSOCIATES, INC.

Scott A. Lawler, P.E.
N.H. Reg. #10026

2 CONTINENTAL BOULEVARD, P.O. BOX 249, ROCHESTER, NEW HAMPSHIRE 03866-0249 (603) 335-3948

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APPENDICES

1.0 INTRODUCTION:

The purpose of this Manual is to:

1) Make the Property Owner/Facility Operator explicitly aware of the maintenance responsibility that goes along with the design prepared for them at the Parcel 406.1 and 406.2 , Holly Cross Road, Franklin NH

2) Provide maintenance and inspection guidelines to be followed by this property owner, their successors and assigns and the agents thereof.

1.1 SUMMARY OF STORMWATER MANAGEMENT PRACTICES ON-SITE:

There are three (3) primary stormwater management practices employed on the site that will require routine inspection and maintenance to insure proper functioning of stormwater controls into the future.

1) TREAMENT SWALES
2) INFILTRATION BASIN
3) DETENTION BASIN
4) BIORETNETION BASINS

1.2 RESPONSIBLE PARTIES:

Property Owner:
Easter Seals New Hampshire, Inc.
555 Auburn Street
Manchester, NH 03103-4803

Christopher Miller
Senior Vice President for Property Management and Development
603-621-3423 (office)
cmiller@Eastersealsnh.org

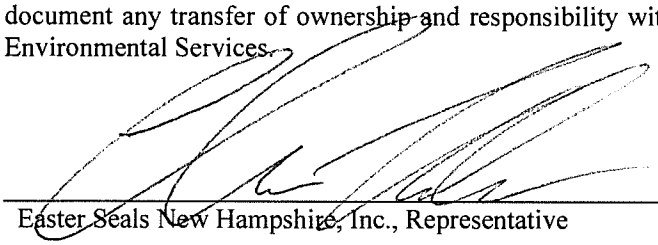
1.3 TRANSFER OF RESPONSIBILITY:

In the event that the property is sold or transferred to another party, Easter Seals New Hampshire, Inc. shall notify the City of Franklin of the transfer of ownership and responsibility for the stormwater management practices discussed in this manual. The mailing address is:

City of Franklin
316 Franklin Street
Franklin, NH 03235

1.4 LONGTERM AGREEMENT

I the undersigned have read this inspection and maintenance manual. With the signature below I acknowledge that it is Easter Seals New Hampshire, Inc.'s responsibility to maintain or have maintained by qualified professionals all of the stormwater management practices outlined in this manual for perpetuity and that all successors and assigns of Easter Seals New Hampshire, Inc. will be responsible for inspection and maintenance of the stormwater management practices as well. I also acknowledge that it is responsibility of Easter Seals New Hampshire, Inc. to document any transfer of ownership and responsibility with the City of Franklin and Hampshire Department of Environmental Services.



Easter Seals New Hampshire, Inc., Representative

7/18/23

Date

2.0 INSPECTION & MAINTENANCE (CONSTRUCTION):

During Construction it is important to maintain the site where construction is ongoing in a manner that minimizes tracking of silt, sediment and construction materials both onto the base and sub-base for pavement areas and the completed pavement areas as well as the bottoms of the DETENTION BASIN, INFILTRATION BASIN and TREATMENT SWALE. Sediment should be monitored at all Silt Fence throughout construction and excessive build up should be removed and disposed of in accordance with state and local requirements.

2.1 INSPECTION (CONSTRUCTION):

1) The Site Construction Contractor Shall perform a daily inspection of the entire site to insure that construction activities as not impacting:

    a. Areas not currently under construction shall be

    b. Areas under construction but sensitive to sediment and silt deposition
        - Gravel and crushed gravel base courses of the Pavement
        - Treatment Swale
        - Detention Basin
        - Infiltration Basin
        - Bioretention Basin

2) The Site Superintendent or his designee shall walk the perimeter of the site taking note of any sedimentation /siltation that may be occurring.

3) All silt fences/silt sock shall be inspected weekly and after each rain event.

4) The Stabilized Construction Exits shall be inspected daily to insure any mud, sediment and or silt is not tracked off site and is limited on site.

2.2 MAINTENANCE (CONSTRUCTION):

The Site Construction Contractor shall be responsible for all erosion and sediment control devices during construction. Refer to the Plan Set “EASTER SEALS - FRANKLIN, HOLLY CROSS ROAD PREPARED FOR EASTER SEALS NH, INC”.

1) For all best management practices (BMP’s) locations, details on proper installation and, construction sequencing.

2) In an effort to limit travel on the DETENTION BASIN and INFILTRATION BASIN area, this area should be constructed early in the construction sequence and stabilized as soon as possible.

3) If silt, sand, or sediment becomes noticeably deposited on areas of travel not within the work zone these areas shall be swept or cleaned as appropriate.

3.0 INSPECTION & MAINTENANCE (OPERATION):

To insure the prolonged operational life of all the stormwater management practices employed on the site it is imperative that a logical and thorough inspection and maintenance plan be implemented. The following sections outline the Inspection & Maintenance Schedule and methods to be employed on site after the completion of construction during the operational life of individual stormwater management practices employed.

3.1 GENERAL SITE:

The site shall undergo general inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist):

1) **Litter and Trash pick-up and removal:**
    a. **Inspection Frequency:**
        - Weekly

    b. **Minimum Inspection Requirements:**
        - Inspect the site within the limits of the lawn areas for blown or loose litter.

    c. **Maintenance/Cleanout Threshold:**
        - Clean as required;
        - Clean when visually apparent litter or trash spillage occurs.

3.2 PAVED AREAS:

The proposed driveways and parking areas shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist)

1) **Parking Lot Sweeping:**
    a. **Inspection/Maintenance Frequency:**
        - At least 1 time per year, preferably 2 times a year (Early Spring prior to May 15 and Fall prior to October 15) it is mandatory that the parking areas be swept to limit the amount of sand and sediment entering the OPEN DRAINAGE SYSTEM, and ultimately the TREATMENT SWALE, INFILTRATION BASIN and DETENTION BASIN.

    b. **Minimum Inspection Requirements:**
        - Mandatory sweeping performed by a qualified professional*
        - Typical street sweeping equipment is acceptable for sweeping paved areas.

2) **De-icing Agents:**
    The use of sand/salt mixture or salt as a de-icing agent is allowed **BUT**, should be monitored and applied in minimum amounts necessary. The owners are encouraged to retain a Green SnowPro certified contractor for snow removal and mitigate salt usage.

    a. **Inspection/Maintenance Frequency:**
        - After every plowing, the site manager shall inspect the parking area to determine the need for deicing application.

    b. **Minimum Inspection/Maintenance Requirements:**

- Sand/Salt mixture shall be applied only as necessary. This will vary depending on sun exposure. The amount of salt used in the mixture shall be minimized to the extent possible to keep the sand from freezing.
- Salt shall be applied only as necessary and a little as possible to deice the paved surfaces.

3.3 BIORETENTION BASIN

The Bioretention Basin shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist)

1) **Bioretention Basins:**
   a. **Inspection/Maintenance Frequency:**
      - Inspect pretreatment measures (i.e. sediment fore bays) Bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.
      - Inspect surface bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.
      - Inspect surface after any rainfall event of 2.5-inches in a 24-hour period or greater.
      - Conduct periodic mowing of the basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the basin embankments when mowing the rest of the site is recommended. Water the grasses as needed following construction.
      - Inspect all of the vegetation semi-annually during first year and annually after.
      - Inspect the outlet structure and outlet pipes bi-annually for debris or built-up sediments about the stand pipe and trash grate

   b. **Minimum Inspection/Maintenance Requirements:**
      - Water to promote plan growth and survival, mainly during the first two years and during dry periods.
      - Conduct routine maintenance mowing at least monthly.
      - Inspect site following rainfall events. Add/replace vegetation in any eroded areas.
      - Prune and weed swale to maintain appearance. Remove accumulated trash and debris.
      - Inspect inflow area for sediment accumulation. Remove any accumulated sediment or debris.
      - Inspect site for erosion as well as sediment and mulch which have been moved around in the garden. Add/replace vegetation in any eroded areas.
      - Inspect rain garden for dead or dying vegetation. Replace vegetation as needed.
      - Test planting bed for pH. If the pH is below 5.2, limestone should be applied. If the pH is about 8.0, iron sulfate and sulfur should be applied.
      - Remove and replace bioretention soil mixture if basin does not drain after 72-hours after a rain event.

3.4 IN-GROUND INFILTRATION BASIN:

The In-Ground Infiltration Basins shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist).

1) **In-ground Infiltration Basins:**
   a. **Inspection/Maintenance Frequency:**

- Inspect pretreatment measures bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.
- Inspect infiltration surface bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.
- Inspect infiltration surface after any rainfall event of 2.5-inches in a 24-hour period or greater.
- Conduct periodic mowing of the infiltration basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the infiltration basin embankments when mowing the rest of the site is recommended.

b. Minimum Inspection/Maintenance Requirements:

- Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary to restore infiltration capacity.
- Perform maintenance and rehabilitation based on inspections.
- Remove debris (if any) from infiltration basin inlet based on inspection.
- If the infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional (i.e. professional engineer, certified soils scientist, etc.) should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration surface.

3.5 TREATMENT SWALES AND DRAINAGE DITCHES:

The Treatment Swale and Drainage Ditches shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices, Inspection & Maintenance Checklist)

1) Treatment Swales and Drainage Ditches:

a. Inspection/Maintenance Frequency:

- Inspect the swale and ditches bi-annually; once in the spring prior to May 15 and once in the fall prior to October 15.
- Inspect the swale and ditches after any rainfall event of 2.5-inches in a 24-hour period or greater.
- Conduct periodic mowing of the swale and ditches (bottom and embankments) at least twice a year to eliminate woody growth from the embankments and bottom. Mowing the swale and ditches when mowing the rest of the site is recommended.

b. Minimum Inspection/Maintenance Requirements:

- Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary. Restore grass cover as necessary.
- Perform maintenance and rehabilitation based on inspections.

3.6 DETENTION BASIN:

The Detention basin shall undergo inspection as follows (see Appendix A-1 for Stormwater Management Practices).

Maintenance Requirements

1. Inspect detention surface bi-annually, once in the spring and once in the fall prior to October 15th.
2. Inspection surface after any rainfall event of 0.25 inches or greater in a 24-hour period.
3. Remove and dispose of accumulated sediment based on inspection. Repair area and remove as

necessary to restore detention capacity.
4. Remove debris.
5. Mow bottom, side slopes and berm.
6. Spillway shall and outlet pipes shall be inspected at least annually by a qualified professional.

3.7 SEDIMENT & WASTE MATERIAL DISPOSAL:

All material removed from the PAVEMENT and the STORMWATER MANAGEMENT PRACTICES on site shall be disposed of in accordance with local, state and federal regulations offsite.

3.8 QUALIFIED STORMWATER SYSTEM MAINTENANCE SERVICE:

It is strongly recommended that the maintenance of the Stormwater Management Practices outlined above, excepting the General Site Maintenance, be performed by a qualified company such as:

Stormwater Compliance, LLC
8 Blue Moon Drive
North Yarmouth, ME 04097
207-712-7181
info@stormwatercomp.com

Companies of this nature have all of the necessary equipment to maintain closed drainage systems.

3.9 CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described in Appendix A-2. They should be controlled as described by Douglas Cygan with New Hampshire Department of Agriculture, Markets & Food, 603-271-3488, doug.cygan@agr.nh.gov

4.0 RECORD KEEPING; LONG TERM INSPECTION & MAINTENANCE:

Inspection and maintenance logs for stormwater practices employed by new development and re-development with substantial stormwater management infrastructure shall be kept and provided to representative of the NHDES – Alteration of Terrain Program upon request.

APPENDIX A-1:

STORMWATER MANAGEMENT SYSTEM: INSPECTION & MAINTENANCE CHECKLIST

STORMWATER MANAGEMENT SYSTEM: INSPECTION AND MAINTENANCE LOG

Appendix A- 1
Stormwater Management System:
Inspection and Maintenance Checklist

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
General Site:			
Litter and Trash pick-up	Weekly	• Inspect the site within the limits of the lawn areas for blown or loose litter.	• Clean as required • Clean when visually apparent litter or trash spillage has occurred
Control of Invasive Species	Monthly	• Inspect the site where plantings have occurred for any species listed in appendix A-2.	• Disposed of the invasive species in accordance with A-2.
Paved Surface Inspection	Twice per year – spring and fall	Check all gravel surfaces for erosion	Re-grade as needed to promote sheet flow and prevent channelization of runoff on the gravel surface
De-icing Agent Application	• After every plowing, the site manager shall inspect the parking area to determine the need for sand application.	• Sand shall be applied only as necessary. This will vary depending on sun exposure. The use of sand shall be minimized. • Salt shall be applied only as necessary. This will vary depending on sun exposure. The use of salt shall be minimized.	• After plowing of appreciable snowfall
Detention Basin	• Twice per year – spring(Prior to May 15 and prior to Oct 15th fall)	• Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary to restore detention capacity. • Remove debris (if any) from detention basin inlet based on inspection.	• Conduct periodic mowing of the detention basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the detention basin embankments when mowing the rest of the site is recommended.
Drainage Pipes	• 1 time every 2 years (Early Spring after April 15 or Fall after October 15)	• Check for sediment accumulation; • Check for clogging	• Sediment depth $\geq$ 1-inch • Clog
In-ground Infiltration Basin	• Inspect pretreatment measures (i.e. sediment fore bays) Bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15. • Inspect infiltration surface bi-annually. Once in the spring prior to May 15 and once in the fall prior to October 15.	• Remove and dispose of accumulated sediment based on inspection. Repair area of removal as necessary to restore infiltration capacity. • Perform maintenance and rehabilitation based on inspections. • Remove debris (if any) from infiltration basin inlet based on inspection.	N/A

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
	• Inspect infiltration surface after any rainfall event of 2.5-inches in a 24-hour period or greater. • Conduct periodic mowing of the infiltration basin slopes and embankments (minimum twice a year) to eliminate woody growth from the embankments and bottom. Mowing the infiltration basin embankments when mowing the rest of the site is recommended.	• If the infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional (i.e. professional engineer, certified soils scientist, etc.) should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration surface.	
Treatment Swales and Drainage Ditches	• Inspect bi-annually, once in the spring prior to May 15 and once in the fall prior to Oct. 15 • Inspect after any rainfall greater than 2.5 inches in 24-hours	• Conduct periodic mowing at least twice per year to eliminate woody growth from the sides and bottom	• Remove and dispose of accumulated sediment. Repair area of removal as necessary. Restore grass cover as necessary.

Stormwater Management System Inspection & Maintenance Log

Date Inspected	Inspector	Cleaning/Repair Needed (List Items/Comments)	Date of Cleaning repair	Performed By

Regular Inspection and Maintenance Guidance for Bioretention Systems

Maintenance of bioretention systems can typically be performed as part of standard landscaping. Regular inspection and maintenance is critical to the effective operation of bioretention systems to insure they remain clear of leaves and debris and free draining. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less frequent maintenance needs depending on a variety of factors including but not limited to: the occurrence of large storm events, overly wet or dry periods, regional hydrologic conditions, and the upstream land use.

ACTIVITIES

The most common maintenance activity is the removal of sediment and organic debris from the system and bypass structures. Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system, including infiltration rate and nutrient uptake. Vegetation care is important to system productivity and health.

ACTIVITY	FREQUENCY
CLOGGING AND SYSTEM PERFORMANCE	
A record should be kept of the time to drain for the system completely after a storm event. The system should drain completely within 72 hours.	After every major storm in the first few months, then annually at minimum.
Check to insure the filter surface remains well draining after storm events. **Remedy**: If filter bed is clogged, draining poorly, or standing water covers more than 50% of the surface 48 hours after a precipitation event, then remove top few inches of discolored material. Till, or rake remaining material as needed.	
Check inlets and outlets for leaves and debris. **Remedy**: Rake in and around the system to clear it of debris. Also, clear the inlet and overflow if obstructed.	Quarterly initially, annually as a minimum thereafter.
Check for animal burrows and short-circuiting in the system. **Remedy:** Soil erosion from short circuiting or animal boroughs should be repaired when they occur. The holes should be filled and lightly compacted	
Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets, outlets, sidewalls.	
VEGETATION	
Check for robust vegetation coverage throughout the system and dead or dying plants. **Remedy:** Vegetation should cover > 75% of the system and should be cared for as needed.	Annually or as needed

CHECKLIST FOR INSPECTION OF BIORETENTION SYSTEM

Location:
Inspector:
Date:
Time:
Site Conditions:
Days Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Initial Inspection After Planting and Mulching		
Plants are stable, roots not exposed	**S** **U**	
Surface is at design level, no evidence of preferential flow/shoving	**S** **U**	
Inlet and outlet/bypass are functional	**S** **U**	
2. Debris Cleanup (1 time/year minimum, Spring/Fall)		
Litter, leaves, and dead vegetation removed from the system	**S** **U**	
Prune/mow vegetation	**S** **U**	
3. Standing Water (1 time/year and/or after large storm events)		
No evidence of standing water after 24-48 hours since rainfall	**S** **U**	
4. Vegetation Condition and Coverage		
Vegetation condition good with good coverage (typically > 75%)	**S** **U**	
5. Other Issues		
Note any additional issues not previously covered.	**S** **U**	

Corrective Action Needed	Due Date
1.	
2.	
3.	
Inspector Signature	**Date**

APPENDIX A-2:

CONTROL OF INVASIVE PLANTS

CONTROL OF INVASIVE PLANTS

During maintenance activities, check for the presence of invasive plants and remove in a safe manner as described on the following pages. They should be controlled as described on the following pages.

Background:

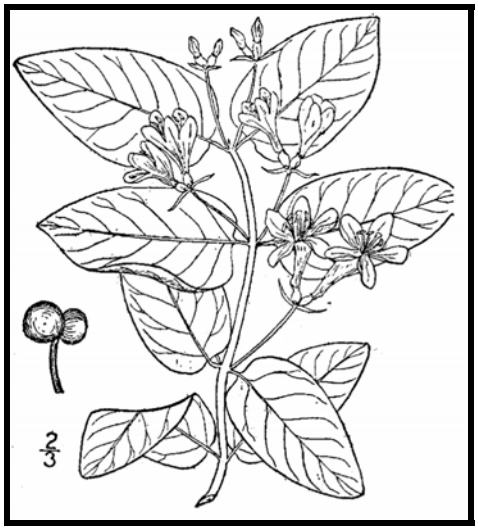
Invasive plants are introduced, alien, or non-native plants, which have been moved by people from their native habitat to a new area. Some exotic plants are imported for human use such as landscaping, erosion control, or food crops. They also can arrive as "hitchhikers" among shipments of other plants, seeds, packing materials, or fresh produce. Some exotic plants become invasive and cause harm by:

- becoming weedy and overgrown;
- killing established shade trees;
- obstructing pipes and drainage systems;
- forming dense beds in water;
- lowering water levels in lakes, streams, and wetlands;
- destroying natural communities;
- promoting erosion on stream banks and hillsides; and
- resisting control except by hazardous chemical.

UNIVERSITY of NEW HAMPSHIRE COOPERATIVE EXTENSION

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

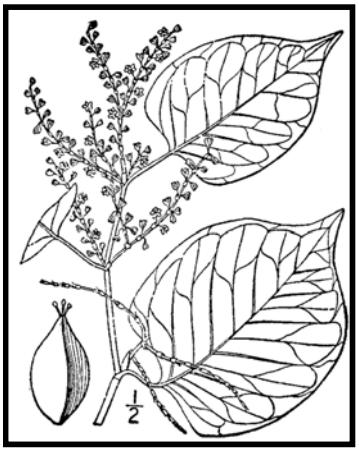
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame’s rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">Fruits and Seeds
  </td><td>Prior to flowering
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>During and following flowering
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(Phragmites australis)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>Fruits, Seeds, Plant Fragments
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn’t materially influence disposal activities.</td><td>Small infestation
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

APPENDIX A-3:

DE-ICING LOG

Deicing Log

Date Applied	Type of Deicing Material	Amount Applied

NHDES-W-07-071

ANNUAL SALT ACCOUNTING REPORT

Voluntary Certified Salt Applicator Program
Watershed Management Bureau
Watershed Assistance Section

RSA/Rule: RSA 489-C, Env-Wq 2204

Name: Date:
Certificate Number: Type of Certificate: Master / Individual
Affiliated Business Name: (if none, enter "none")

Below are the three reporting elements necessary for recertification under the Voluntary Certified Salt Applicator Program (aka. Green SnowPro) per Env-Wq 2200.

1) Deicer type and amount.

Complete the table below for each type of deicer used last winter including the unit reported. If you do not know the amount of deicer used by type please report the total amount of all deicers used in the TOTAL row at the end of the table.

TYPE OF DEICER USED	SOLID MATERIAL AMOUNT: (indicate tons, pounds or yards)	LIQUID VOLUME: (in gallons)
SALT, DRY		
SALT, PREWETTED IN THE SPREADER		
SALT, PREWETTED IN THE PILE		
CALCIUM CHLORIDE, DRY		
CALCIUM CHLORIDE, LIQUID		
CALCIUM MAGNESIUM ACETATE, DRY		
CALCIUM MAGNESIUM ACETATE, LIQUID		
POTASSIUM ACETATE, DRY		
POTASSIUM ACETATE, LIQUID		
SAND		
SAND/SALT MIX		
LIQUID BRINE		
OTHER:		
TOTAL DEICER USED LAST WINTER		

Form Continued on Next Page →

(603) 271-2457 | salt@des.nh.gov
PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

2) Location and area treated

List the town(s) and square feet of paved surface treated with salt/deicer last winter in each town:

TOWN	SQUARE FEET OF PAVED SURFACE TREATED

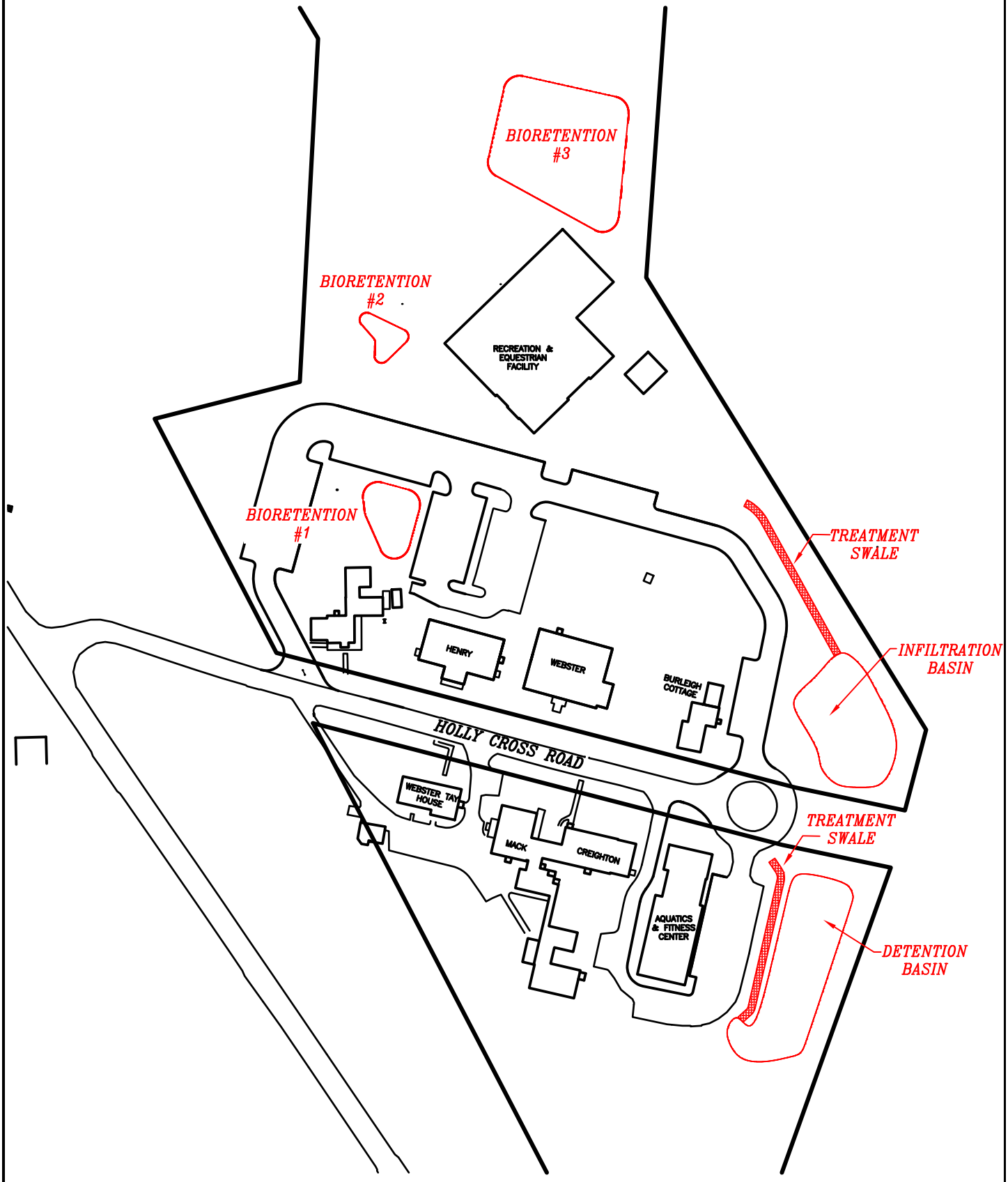
3) Subordinates

Master certificate holders are required to list all subordinates working and reporting under their certification:

NAME

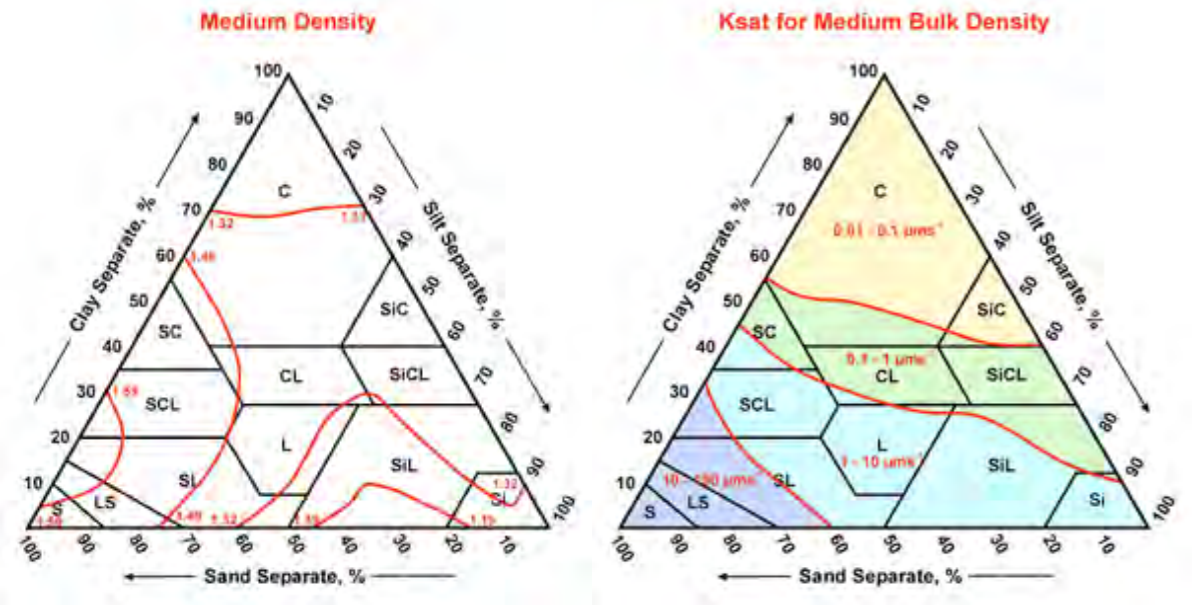
BMP LOCATION

SCALE: 1" = 150'



APPENDIX A 12.2

K_{sat} VALUES
FOR
NEW HAMPSHIRE SOILS
(Including Hydrologic and DES Soil Lot Sizing Groups)



From: Guide for Estimating Ksat from Soil Properties (**Exhibit 618-9**). (http://soils.usda.gov/technical/handbook/contents/part618ex.html)

Sponsored by the Society of Soil Scientists of Northern New England
SSSNNE Special Publication No. 5
September, 2009

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over silt
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Ricker	674	2.0	6.0	2.00	6.0	A	4	rganic over bedrock (up to 4" of minera	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

no longer recognized
organic materials

APPENDIX A 13

23-1174 S

June 23, 2023

Norway Plains Associate, Inc.
Attention: Scott Lawler
2 Continental Boulevard, P.O. Box 249
Rochester, NH 03866

Subject: Field Infiltration Testing Services
Easter Seals Facility
Holy Cross Road
Franklin, New Hampshire

Dear Scott:

In accordance with our Proposal, dated June 15, 2023, we have performed field infiltration testing for the subject project. This letter summarizes our findings, and its contents are subject to the limitations set forth in Appendix A.

1.0 SCOPE AND PURPOSE

The purpose of our services was to test field infiltration rates at three locations on the site. Our scope of services has included field infiltration testing using a Guelph Permeameter in accordance with the NHDES analysis method, soils laboratory testing and preparation of this letter.

2.0 EXPLORATIONS AND TESTING

On June 16, 2023, S. W. Cole Engineering, Inc. (S.W.COLE) performed field infiltration testing using a Guelph Permeameter at three locations specified by Norway Plains Associate, Inc. at about 2 feet below the existing ground surface.

The first infiltration test (INF-1) was performed in the northern portion of the wooded area, the second test (INF-2) was performed in the central area, and the third test (INF-3) was performed closest to Holy Cross Road. The approximate testing locations are shown on the “Exploration Location Plan” attached in Appendix B. The following table summarizes the test depths and unsaturated infiltration rates:

INFILTRATION TEST RESULTS	
Test	**Unsaturated Rate (in/hour)**
INF-1 @ 2.2’ bgs	1.2
INF-2 @ 2.3’ bgs	1.8
INF-3 @ 2.2’ bgs	1.2

The results above are the direct value from the field testing and no safety factor has been applied. Infiltration results may vary depending on material gradation and compaction effort on the material.

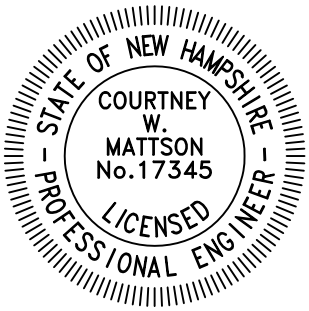
A composite sample of soil was collected from test locations INF-1 and INF-3 and returned to our laboratory for grain size analyses testing. The test result shows that the soil present at approximately 2.2 feet classifies as a silt with sand. The laboratory test result is attached in Appendix C.

3.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project.

Sincerely,

S. W. Cole Engineering, Inc.



Courtney W. Mattson, P.E.
Project Geotechnical Engineer

CWM:tjb

APPENDIX A

Limitations

This report has been prepared for the exclusive use of Norway Plains Associate, Inc. for specific application to the project at Holy Cross Road in Franklin, New Hampshire. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The infiltration test results only represent the specific test location. Variations in subsurface conditions such as soil composition and density may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it may be necessary to evaluate their nature and provide supplemental infiltration testing to reflect the differing conditions.

S. W. Cole Engineering, Inc.'s scope of work was limited to conducting and providing field infiltration results. It is the responsibility of the design engineer to appropriately incorporate the test results into the design and follow applicable local and federal permitting and design regulations.

APPENDIX B

Figure

N

LEGEND

APPROXIMATE INFILTRATION TEST LOCATION

NOTES:

1. EXPLORATION LOCATION PLAN PREPARED FROM ORTHOIMAGERY ENTITLED "NH_2010_2011_1FT_RGB," PROVIDED BY THE NHGRANIT.

2. THE INFILTRATION TEST LOCATIONS WERE SELECTED BY OTHERS AND SUBSEQUENTLY ESTABLISHED IN THE FIELD BY S. W. COLE ENGINEERING, INC. USING A RECREATIONAL GRADE GPS.

3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. INFILTRATION TEST LETTER.

4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND IS NOT TO BE USED FOR CONSTRUCTION.

0 25 50 100 150
Feet

S.W.COLE ENGINEERING, INC.

NORWAY PLAINS ASSOCIATE, INC.

EXPLORATION LOCATION PLAN

FIELD INFILTRATION TESTING SERVICES
EASTER SEALS FACILITY: HOLY CROSS ROAD
FRANKLIN, NEW HAMPSHIRE

Job No.	23-1174	Scale	1" = 50'
Date:	06/21/2023	Sheet	1

APPENDIX C

Laboratory Test Result

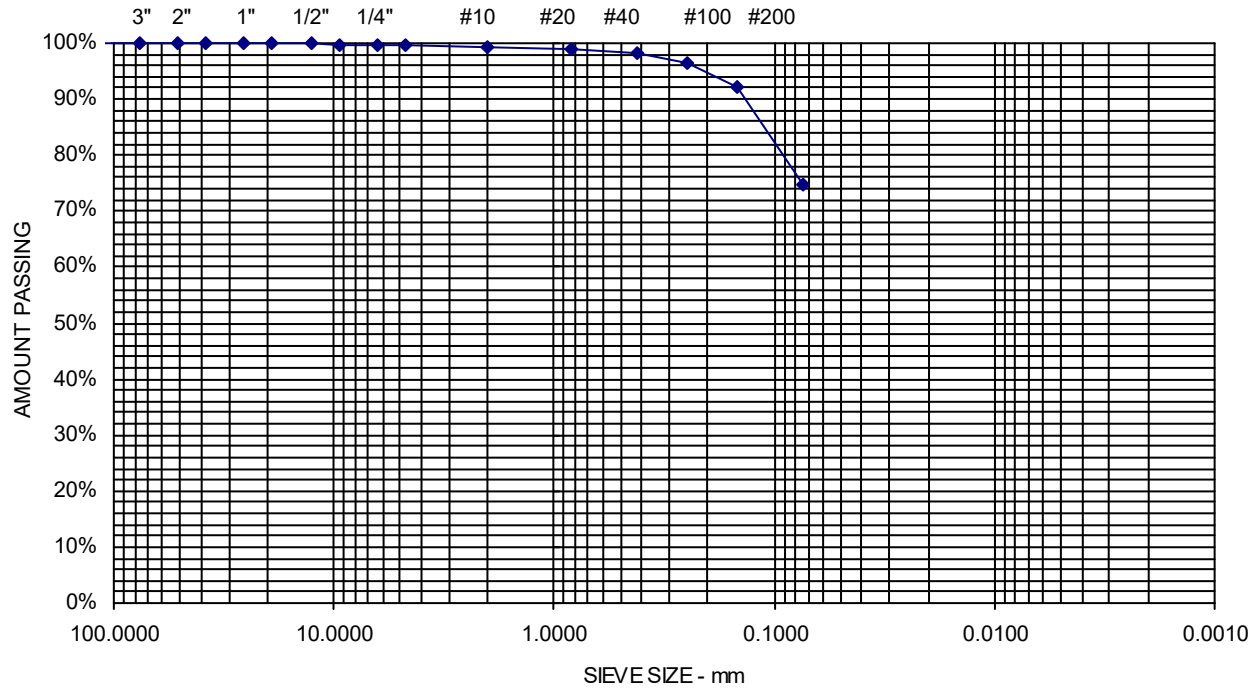
S.W.COLE ENGINEERING, INC.

Report of Gradation

ASTM C-117 & C-136

Project Name	FRANKLIN NH - EASTER SEALS - INFILTRATION TESTING SERVICES	Project Number	23-1174
		Lab ID	7704M
Client	NORWAY PLAINS ASSOCIATES, INC.	Date Received	6/19/2023
		Date Completed	6/22/2023
Material Source	**INF-1/3 @ 2.2 FT**	Tested By	DANIEL JACK

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
150 mm	**6"**	**100**	
100 mm	**4"**	**100**	
75 mm	**3"**	**100**	
50 mm	**2"**	**100**	
38.1 mm	**1-1/2"**	**100**	
25.0 mm	**1"**	**100**	
19.0 mm	**3/4"**	**100**	
12.5 mm	**1/2"**	**100**	
9.5 mm	**3/8"**	**100**	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0.3% Gravel
2.00 mm	**No. 10**	**99**	
850 um	**No. 20**	**99**	
425 um	**No. 40**	**98**	24.8% Sand
250 um	**No. 60**	**96**	
150 um	**No. 100**	**92**	
75 um	**No. 200**	**74.9**	74.9% Fines



Comments: Moisture Content = 15.3%

Sheet

PLANS:
APPENDIX D-1, D-2, D-3, D-4, D-5, & D-6

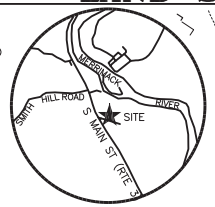
LAND SURVEYORS

CIVIL ENGINEERS

Drawing Location = M:\2022\22380\DWG\22380 SP-2.dwg
Thu, 11 Sep 2025 - 10:34am

LEGEND

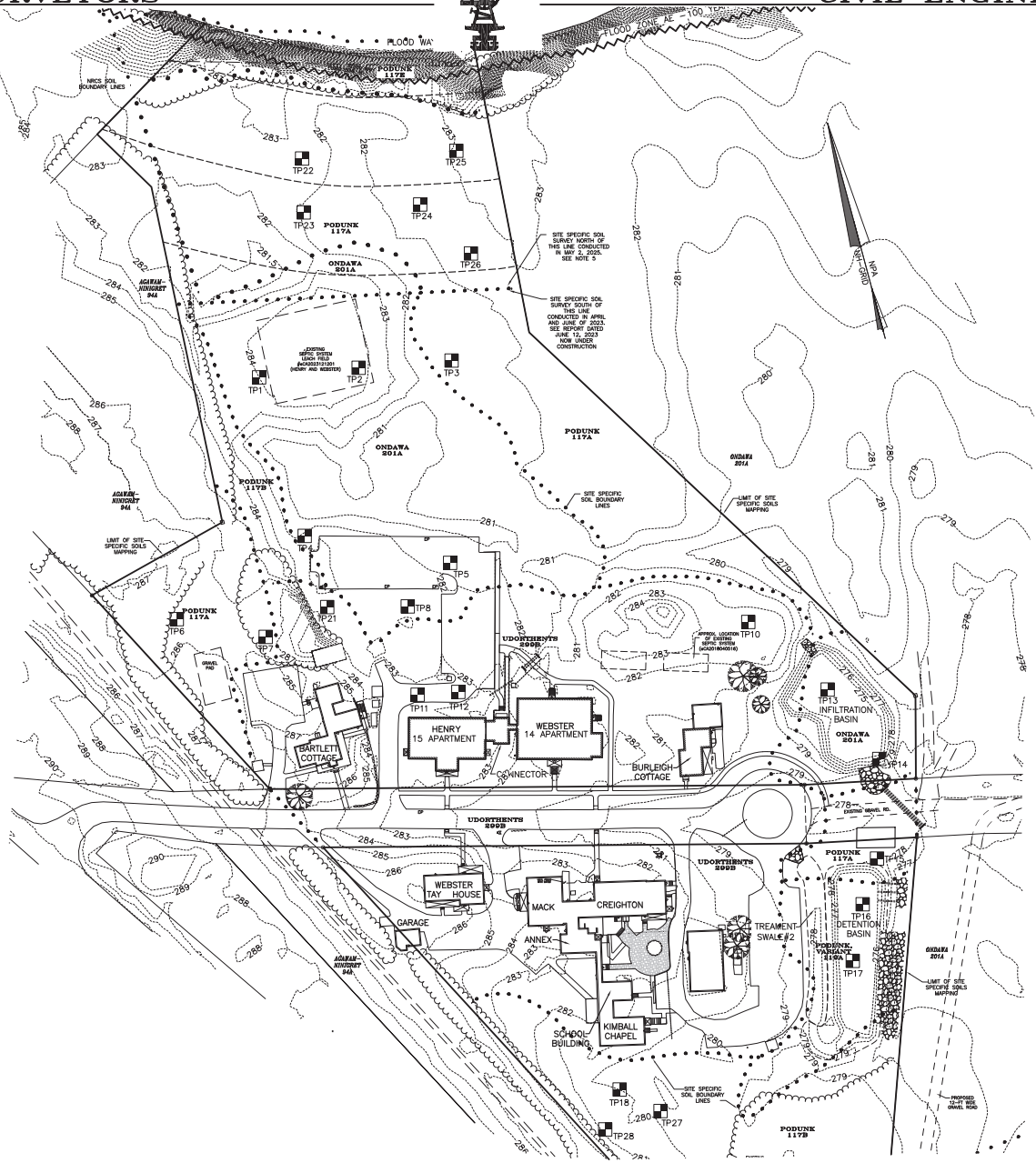
- PROPERTY LINE
- EXISTING TREE LINE
- EXISTING STONEWALLS
- 256 EXISTING CONTOUR LINE (NAVD88)
- EXISTING DRAIN LINE
- SITE SPECIFIC SOIL LINES
- NRCS SOIL LINES
- 258 SITE SPECIFIC SOIL TYPE
- 258 NRCS SOIL TYPE
- TP1 TEST PIT LOCATION & NUMBER



LOCATION MAP
N.T.S

1. SOIL SHOWN FROM NRCS:

MAP UNIT SYMBOL	MAP UNIT NAME	HSG	SOILS GROUP
94A	AGAWAM–NINIGRET	B	2 / 3
201A	ONDAWA	B	2



SITE–SPECIFIC SOIL MAP NOTES

1) THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR USE BY NORWAY PLAINS ASSOCIATES, INC. FOR EXPANSION AND/OR RENOVATION OF THE EASTER SEALS FACILITY LOCATED ON HOLY CROSS ROAD IN FRANKLIN, NEW HAMPSHIRE AND TO MEET ALTERATION OF TERRAIN REQUIREMENTS. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST (NH CERTIFIED SOIL SCIENTIST #017), AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A REPORT THAT ACCOMPANIES THIS MAP DATED JUNE 12, 2023 AND A SUPPLEMENTAL LETTER DATED AUGUST 26, 2025.
2) THIS DETAILED SITE–SPECIFIC SOIL MAP CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, AS AMENDED, "SITE–SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT".
3) THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485–A:17 AND NH DES ENV–WQ 1500, ALTERATION OF TERRAIN.
4) MR. DANIEL COONS, NH CERTIFIED WETLAND SCIENTIST #264, OF ILEX WETLANDS CONSULTANTS FOUND NO WETLANDS ON THE PROPERTY.
5) THE BASE MAP WAS PRODUCED BY NORWAY PLAINS ASSOCIATES, INC. IT CONTAINS THE EXISTING CONDITIONS AND TEST PIT LOCATIONS. SOIL MAPPING FIELDWORK WAS CONDUCTED ON APRIL 24, 2023 AND JUNE 8, 2023. NINETEEN BACKHOE EXCAVATED TEST PITS WERE CONDUCTED FOR STORMWATER PLANNING AND SOIL MAPPING PURPOSES. THERE IS NO TEST PIT 9. THE SOIL MAPPING WAS CONDUCTED ON A LIMITED EXTENT OF THE PROPERTY AND THE LIMITS ARE MARKED ON THE SOIL MAP. IF ADDITIONAL SOIL OBSERVATIONS/TEST PITS ARE CONDUCTED, THE SOIL MAP MAY BE REVISED/FINE–TUNED. ON MAY 2, 2025, EIGHT ADDITIONAL TEST PITS WERE CONDUCTED (THREE TEST PITS WITHIN AREAS UNDER CONSTRUCTION FOR STORMWATER PLANNING AND FIVE OTHERS WERE CONDUCTED TO EXPAND THE SITE–SPECIFIC SOIL MAP).
6) THE HYDROLOGIC SOIL GROUP (HSG) FOR THE ONDAWA (201 MAP UNIT) WERE TAKEN FROM THE SSSNNE SPECIAL PUBLICATION NO. 5. THE HSG FOR THE PODUNK, OCCASIONALLY FLOODED (117 MAP UNIT) IS NOT IN THE SSSNNE PUBLICATION BUT WAS ESTIMATED TO BE THE SAME AS THE PODUNK, FREQUENTLY FLOODED (104 MAP UNIT) WHICH IS IN THE SSSNNE PUBLICATION. THE PODUNK, VARIANT (119 MAP UNIT) IS ALSO NOT LISTED IN THE SSSNNE PUBLICATION BUT WAS ESTIMATED AS A HSG OF D DUE TO THE SOMEWHAT POORLY DRAINED DRAINAGE CLASS. THE UDORTHENTS (299 MAP UNIT) WAS USED IN THE DEVELOPED AREAS (I.E., BUILDINGS, PARKING, ACCESS ROADS., AND UTILITIES, ETC.). SOIL AREAS WITHIN THE 299 MAP UNIT WAS LIKELY TO HAVE BEEN THE ONDAWA AND PODUNK SOILS PRIOR TO DEVELOPMENT. THE HSG IS ESTIMATED TO BE D FOR CURRENT IMPERVIOUS SURFACES AND B IN AREAS WITH REGRADED/SMOOTHED SOIL CONDITIONS. UPDATED HSG DESIGNATIONS IN THE NRCS WEB SOIL SURVEY MAY BE DIFFERENT THAN THE REQUIRED SSSNNE SPECIAL PUBLICATION NO. 5.

SOIL LEGEND

NUMERICAL SYMBOL	SOIL MAP UNIT NAME	HSG
117	PODUNK, OCCASIONALLY FLOODED	B
119	PODUNK, VARIANT (SOMEWHAT POORLY DRAINED), OCCASIONALLY FLOODED	D
201	ONDAWA, OCCASIONALLY FLOODED	B
299	UDORTHENTS, SMOOTHED	B & D

ALPHA SLOPE SYMBOL RANGE

A	0–3%
B	3–8%
E	>25% (STEEP, ERODIBLE BANK OF THE MERRIMACK RIVER)

JOSEPH W. NOEL
NH CERTIFIED SOIL SCIENTIST #017

Joseph W. Noel
No. 017
CERTIFIED SOIL SCIENTIST
STATE OF NEW HAMPSHIRE

TAX MAP 104, LOTS 406–01 & 406–02
OWNER OF RECORD:
EASTER SEALS NEW HAMPSHIRE INC.
555 AUBURN ST
MANCHESTER, NH
BOOK 3801, PG 1081

SITE SPECIFIC SOIL MAP

TAX MAP 104
LOTS 406–01 & 406–02
HOLY CROSS ROAD
FRANKLIN, NH
PREPARED FOR:
EASTER SEALS NH, INC.
MAY 2025

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 INCH = 60 FEET

D–1

FILE NO. 533
PLAN NO. C–3369
DWG. NO. 22380 SP–2

31 Mooney Street, Alton, N.H. 603–875–3948

NORWAY PLAINS ASSOCIATES, INC.

2 Continental Blvd., Rochester, N.H. 603–335–3948

TEST PIT LOGS
EASTER SEALS NEW HAMPSHIRE INC.
TAX MAP 104 – LOTS 406-01 & 406-02
20 & 21 HOLY CROSS ROAD
FRANKLIN, NEW HAMPSHIRE

Test Pits Conducted: April 24, 2023
By: Joseph W. Noel
New Hampshire Certified Soil Scientist #017
New Hampshire Designer of Subsurface Disposal Systems #1104

Test Pit 1

Ap	0-11 inches	dark brown (10YR 3/3) very fine sandy loam, friable, granular
Bw	11-20 inches	dark yellowish brown (10YR 4/4) very fine sandy loam, friable, massive to blocky
BC	20-42 inches	light yellowish brown (10YR 6/4) loamy very fine sand, friable, massive
C1	42-52 inches	light olive brown (2.5Y 5/3) very fine sand, friable, massive, common distinct redox features
C2	52-82 inches	light olive brown (2.5Y 5/3) very fine sandy loam, friable, massive, common distinct redox features

Seasonal High Water Table @ 42"
Observed Water Table none to 82"
Restrictive Horizon none to 82"
Bedrock none to 82"
Soil Series: Ondawa

Test Pit 2

Ap	0-10 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	10-36 inches	dark yellowish brown (10YR 4/4) loamy very fine sand, friable, massive to blocky
Bt	36-44 inches	light olive brown (2.5Y 5/4) very fine sand, friable, massive
C1	44-81 inches	light olive brown (2.5Y 5/3) very fine sand, friable, massive, common distinct redox features
C2	81-108 inches	olive gray (5Y 5/2) very fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 44"
Observed Water Table none to 108"
Restrictive Horizon none to 108"
Bedrock none to 108"
Soil Series: Ondawa

Test Pit 3

Ap	0-11 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	11-38 inches	yellowish brown (10YR 5/6) loamy very fine sand, friable, massive, to blocky
C	38-62 inches	light olive brown (2.5Y 5/3) loamy very fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 38"
Observed Water Table none to 62"
Restrictive Horizon none to 62"
Bedrock none to 62"
Soil Series: Podunk

Test Pit 4

Ap	0-20 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	20-42 inches	dark yellowish brown (10YR 4/4) loamy very fine sand, friable, massive to blocky
C1	42-59 inches	light olive brown (2.5Y 5/3) very fine sand, friable, massive, common distinct redox features
C2	59-70 inches	light olive brown (2.5Y 5/4) fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 42"
Observed Water Table none to 70"
Restrictive Horizon none to 70"
Bedrock none to 70"
Soil Series: Ondawa

Test Pit 5

Ap	0-9 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	9-42 inches	yellowish brown (10YR 5/6) loamy very fine sand, friable, massive to blocky
C	42-65 inches	light olive brown (2.5Y 5/3) loamy fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 42"
Observed Water Table none to 65"
Restrictive Horizon none to 65"
Bedrock none to 65"
Soil Series: Ondawa

Test Pit 6

Ap	0-10 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, granular
Bw	10-29 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, blocky
BC	29-48 inches	yellowish brown (10YR 5/4) very fine sandy loam, friable, massive, common faint and few distinct redox features
C	48-54 inches	dark yellowish brown (10YR 4/6) very gravelly coarse sand, loose, single grain, common distinct redox features

Seasonal High Water Table @ 29"
Observed Water Table @ 48"
Restrictive Horizon none to 54"
Bedrock none to 54"
Soil Series: Podunk

Test Pit 7

Ap	0-9 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, granular
Bw	9-25 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, blocky
C	25-58 inches	light olive brown (2.5Y 5/3) very fine sandy loam, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 25"
Observed Water Table @ 55"
Restrictive Horizon none to 58"
Bedrock none to 58"
Soil Series: Podunk

Test Pit 8

Ap	0-4 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	4-37 inches	strong brown (7.5YR 4/6) loamy very fine sand, friable, blocky
C1	37-56 inches	light olive brown (2.5Y 5/4) loamy very fine sand, friable, massive, common distinct redox features
C2	56-60 inches	light olive brown (2.5Y 5/3) fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 37"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 9
No Test Pit 9 conducted

Test Pit 10

^Ap	0-10 inches	very dark brown (10YR 2/2) loamy very fine sand fill material, friable, granular
^Bw	10-20 inches	yellowish brown (10YR 5/6) gravelly loamy sand fill material, friable, massive with strong brown (7.5YR 4/6) iron masses at base of horizon (not redox features)
^BC	20-47 inches	yellowish brown (10YR 5/4) loamy very fine sand to very fine sandy loam fill material, friable, massive

Natural Soil Surface

Ab1	47-50 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, massive, common faint redox features
Ab2	50-57 inches	dark brown (10YR 3/3) loamy very fine sand, friable, massive, common faint redox features

Seasonal High Water Table @ 47"
Observed Water Table none to 57"
Restrictive Horizon none to 57"
Bedrock none to 57"
Soil Series: Udorthents/disturbed

Test Pit 11

^A	0-6 inches	dark brown (10YR 3/3) loamy very fine sand fill material, friable, granular
^A/B	6-22 inches	mixed dark brown (10YR 3/3) with dark yellowish brown (10YR 4/6) loamy very fine sand fill material, friable, massive

Natural Soil Surface

Ab	22-43 inches	dark brown (10YR 3/3) loamy very fine sand, friable, massive
Bb	43-54 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, massive
C	54-67 inches	light olive brown (2.5Y 5/4) very fine sand, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 54"
Observed Water Table none to 67"
Restrictive Horizon none to 67"
Bedrock none to 67"
Soil Series: Udorthents over Podunk

Test Pit 12

^A	0-4 inches	dark brown (10YR 3/3) very fine sandy loam fill material, friable, granular
^Bw	4-18 inches	light olive brown (2.5Y 5/4) loamy very fine sand fill material, friable, massive

Natural Soil Surface

Ab	18-25 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, massive
Bb	25-48 inches	yellowish brown (10YR 5/4) loamy very fine sand, friable, massive
C	48-57 inches	light olive brown (2.5Y 5/3) very fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 48"
Observed Water Table none to 57"
Restrictive Horizon none to 57"
Bedrock none to 57"
Soil Series: Udorthents over Podunk

Test Pit 13

Ap	0-12 inches	dark brown (10YR 3/3) very fine sandy loam, friable, granular
Bw	12-39 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, massive to blocky
BC	39-50 inches	yellowish brown (10YR 5/4) very fine sand, friable, massive
C	50-60 inches	light olive brown (2.5Y 5/3) fine sand, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 50"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Ondawa

Test Pit 14

Ap	0-11 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, granular
Bw	11-50 inches	dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/4) loamy very fine sandand very fine sand, friable, massive to blocky
BC	50-54 inches	light olive brown (2.5Y 5/4) fine sand, friable, massive
C	54-65 inches	light olive brown (2.5Y 5/3) fine sand & very fine sand, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 54"
Observed Water Table none to 65"
Restrictive Horizon none to 65"
Bedrock none to 65"
Soil Series: Ondawa

Test Pit 15 (influenced by adjacent field access road)

Ap	0-14 inches	very dark brown (10YR 2/2) very fine sandy loam, friable, granular
Bw	14-25 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, massive to blocky
BC	25-60 inches	light olive brown (2.5Y 5/3) loamy very fine sand, friable, massive, common distinct redox features
C	60-65 inches	olive (5Y 5/3) fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 25"
Observed Water Table none to 65"
Restrictive Horizon none to 65"
Bedrock none to 65"
Soil Series: Podunk

Test Pit 16

Ap	0-8 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, granular
Bw1	8-10 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, massive to blocky
Bw2	10-47 inches	dark yellowish brown (10YR 4/6) and light olive brown (2.5Y 5/4) loamy very fine sand, friable, massive to blocky, common distinct redox features
C	47-60 inches	olive gray (5Y 5/2) fine sand, friable, massive, common distinct and prominent redox features

Seasonal High Water Table @ 10"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk Variant (somewhat poorly drained)

Test Pit 17

Ap1	0-8 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, granular
Ap2	8-14 inches	very dark brown (10YR 2/2) loamy very fine sand, friable, blocky, common prominent redox concentrations
Bw	14-31 inches	dark yellowish brown (10YR 4/6) loamy very fine sand, friable, massive, common distinct and prominent redox features
C	31-58 inches	olive (5Y 5/3) loamy very fine sand, friable, massive, common distinct and prominent redox features

Seasonal High Water Table @ 8"
Observed Water Table none to 58"
Restrictive Horizon none to 58"
Bedrock none to 58"
Soil Series: Podunk Variant (somewhat poorly drained)

Test Pit 18

^A	0-35 inches	dark brown (10YR 3/3) loamy very fine sand fill material, friable, granular to blocky

Natural Soil Surface

Ab	35-38 inches	very dark grayish brown (10YR 3/2) loamy very fine sand, friable, granular, common faint and distinct redox features
Bb	38-57 inches	light olive brown (2.5Y 5/4) loamy very fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 35"
Observed Water Table none to 57"
Restrictive Horizon none to 57"
Bedrock none to 57"
Soil Series: Udorthents over Podunk-like

Test Pit 19

Ap	0-15 inches	very dark brown (10YR 2/2) fine sandy loam, friable, granular
Bw	15-28 inches	light olive brown (2.5Y 5/3) loamy sand, friable, massive, common distinct redox features
C	28-55 inches	olive (5Y 5/3) very fine sandy loam to loamy very fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 15"
Observed Water Table none to 55"
Restrictive Horizon none to 55"
Bedrock none to 55"
Soil Series: Podunk

Test Pit 20 (disturbed surface layers)

Ap	0-10 inches	very dark brown (10YR 2/2) fine sandy loam, friable, granular
Bw	10-21 inches	light olive brown (2.5Y 5/4) fine sandy loam, friable, blocky
BC	21-35 inches	olive brown (2.5Y 4/4) very fine sandy loam, friable, massive, common distinct redox features

Original Soil Surface

Ab	35-41 inches	black (2.5Y 2.5/1) very fine sandy loam, friable, massive, common prominent redox concentrations
BC	41-60 inches	light olive brown (2.5Y 5/3) & olive (5Y 5/3) very fine sandy loam, friable, massive, common distinct and prominent redox features

Seasonal High Water Table @ 21"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk - disturbed

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*CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR*

May 5, 2025

TEST PIT LOGS
EASTER SEALS NEW HAMPSHIRE INC.
TAX MAP 104 – LOTS 406-01 & 406-02
20 & 21 HOLY CROSS ROAD
FRANKLIN, NEW HAMPSHIRE

Test Pits Conducted: May 2, 2025
By: Joseph W. Noel
New Hampshire Certified Soil Scientist #017
New Hampshire Designer of Subsurface Disposal Systems #1104

Test Pit 21

^A	0-46 inches	mixed topsoil layers of very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) loamy very fine sand, friable, granular to blocky
C1	46-62 inches	light olive brown (2.5Y 5/4) loamy very fine sand, friable, massive
C2	62-64 inches	light olive brown (2.5Y 5/4) loamy very fine sand, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 62"
Observed Water Table none to 64"
Restrictive Horizon none to 64"
Bedrock none to 64"
Soil Series: Udorthents over Podunk

Test Pit 22

Ap	0-9 inches	dark brown (10YR 3/3) very fine sandy loam, friable, granular
Bw	9-37 inches	yellowish brown (10YR 5/4) loamy very fine sand, friable, blocky
C	37-60 inches	light olive brown (2.5Y 5/3) fine sand, friable, massive, common fa and few distinct redox features

Seasonal High Water Table @ 37"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 23

Ap	0-9 inches	dark brown (10YR 3/3) very fine sandy loam, friable, granular
Bw	9-37 inches	yellowish brown (10YR 5/4) loamy very fine sand, friable, blocky
C	37-60 inches	light olive brown (2.5Y 5/3) fine sand, friable, massive, common fa and few distinct redox features

Seasonal High Water Table @ 37"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 24

Ap	0-10 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	10-37 inches	yellowish brown (10YR 5/4) loamy very fine sand, friable, blocky
C	37-60 inches	light olive brown (2.5Y 5/3) very fine sandy loam to silt, friab massive, common faint and few distinct redox features

Seasonal High Water Table @ 37"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 25

Ap	0-10 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw	10-37 inches	yellowish brown (10YR 5/4) loamy very fine sand, friable, blocky
C	37-60 inches	light olive brown (2.5Y 5/3) very fine sandy loam, friable, massive, common faint and few distinct redox features

Seasonal High Water Table @ 37"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 26

Ap	0-10 inches	dark brown (10YR 3/3) loamy very fine sand, friable, granular
Bw1	10-35 inches	yellowish brown (10YR 5/6) loamy very fine sand, friable, blocky
BC	35-54 inches	yellowish brown (10YR 5/4) very fine sand, friable, massive, common distinct and few faint redox features
C	54-60 inches	olive (5Y 5/3) fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 35"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 27

Ap	0-18 inches	very dark brown (10YR 2/2) very fine sandy loam, friable, granular
Bw	18-28 inches	yellowish brown (10YR 5/6) loamy very fine sand, friable, blocky, common distinct redox features
BC/C	28-60 inches	light olive brown (2.5Y 5/4) loamy very fine sand, friable, massive, common distinct redox features

Seasonal High Water Table @ 18"
Observed Water Table none to 60"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk

Test Pit 28

Ap	0-12 inches	very dark brown (10YR 2/2) very fine sandy loam, friable, granular
Bw	12-43 inches	mixed light olive brown (2.5Y 5/3) and (2.5Y 5/6) loamy very fine sand, friable, massive, common distinct redox features
2C	43-60 inches	yellowish red (5YR 5/8) gravelly coarse sand, loose, single grain, common faint redox features (seeping water observed)

Seasonal High Water Table @ 12"
Observed Water Table @ 43"
Restrictive Horizon none to 60"
Bedrock none to 60"
Soil Series: Podunk Variant (somewhat poorly drained)

TEST PIT RESULTS

TAX MAP 104
LOTS 406-01 & 406-02
HOLY CROSS ROAD
FRANKLIN, NH
PREPARED FOR:
EASTER SEALS NH, INC.
MAY 2023 AND MAY 2025

D-2

FILE NO. 533
PLAN NO. C-xxx
DWG. NO. 22380

LAND SURVEYORS

CIVIL ENGINEERS

LEGEND

- PROPERTY LINE
- JURISDICTIONAL WETLANDS
- EXISTING TREE LINE
- EXISTING DRAIN LINE
- 232 EXISTING CONTOUR LINE
- EXISTING UTILITY POLE
- EXISTING TEST PIT
- 29B EXISTING SOIL TYPE
- NRCS SOIL TYPE BOUNDARY LINE
- SITE SPECIFIC SOIL TYPE BOUNDARY LINE
- SUBCATCHMENT BOUNDARIES
- SUBCATCHMENT DRAINAGE PATH
- 7 SUBCATCHMENT AREA
- STI DRAINAGE BASINS OR CATCH BASINS
- R1 DRAINAGE REACHES
- POA#1 POINTS OF ANALYSIS

SOIL LEGEND

NUMERICAL	SYMBOL	SOIL MAP UNIT NAME	HSG
117		Podunk, occasionally flooded	B
119		Podunk, Variant (somewhat poorly drained), occasionally flooded	D
201		Ondawa, occasionally flooded	B
299		Udorthents, smoothed	B & D

ALPHA SLOPE SYMBOL	RANGE
A	0-3%
B	3-8%

PRE-DEVELOPMENT DRAINAGE ANALYSIS PLAN

TAX MAP 104
LOTS 406-01 & 406-02
HOLY CROSS ROAD
FRANKLIN, NH
PREPARED FOR:
EASTER SEALS NH, INC.
2023

GRAPHIC SCALE

80 0 40 80 160 320

1 INCH = 80 FT.

D-3

FILE NO. 533
PLAN NO. C-xxx
DWG. NO. 22380 SP-2

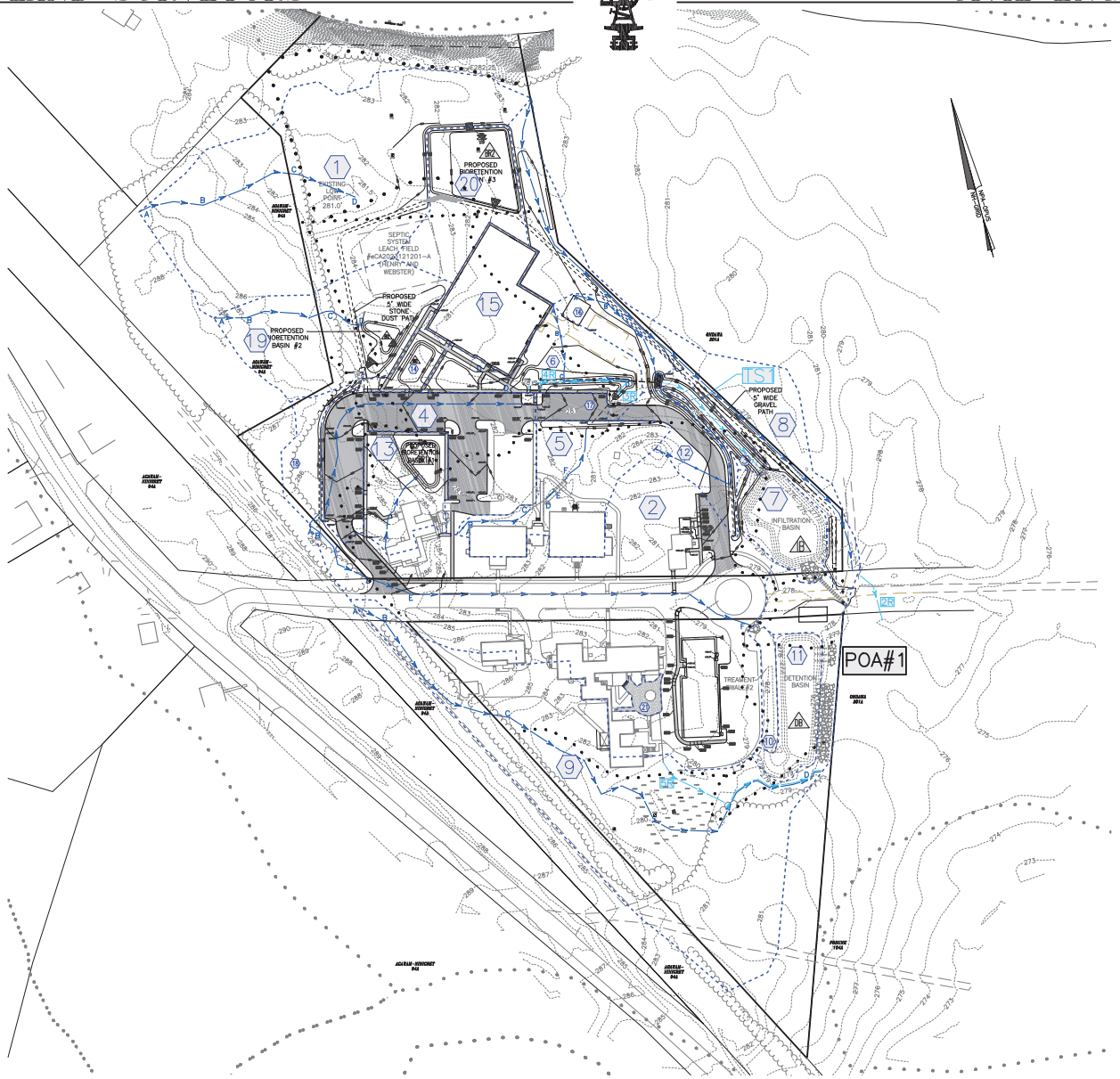
31 Mooney Street, Alton, N.H. 603-875-3948

NORWAY PLAINS ASSOCIATES, INC.

2 Continental Blvd., Rochester, N.H. 603-335-3948

LAND SURVEYORS

CIVIL ENGINEERS



SCOTT LAWLER No.10026 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

LEGEND

- PROPERTY LINE
- JURISDICTIONAL WETLANDS
- EXISTING TREE LINE
- EXISTING DRAIN LINE
- 232 EXISTING CONTOUR LINE (BASED ON AS-BUILT PHASE 1)
- EXISTING UTILITY POLE
- pit EXISTING TEST PIT
- 29B EXISTING SOIL TYPE
- NRCS SOIL TYPE BOUNDARY LINE
- SITE SPECIFIC SOIL TYPE BOUNDARY LINE
- SUBCATCHMENT BOUNDARIES
- SUBCATCHMENT DRAINAGE PATH
- 7 SUBCATCHMENT AREA
- STI DRAINAGE BASINS OR CATCH BASINS
- R1 DRAINAGE REACHES
- POA#1 POINTS OF ANALYSIS

SOIL LEGEND

NUMERICAL	SYMBOL	SOIL MAP UNIT NAME	HSG
117		Podunk, occasionally flooded	B
119		Podunk, Variant (somewhat poorly drained), occasionally flooded	B
201		Ondawa, occasionally flooded	B
299		Udorthents, smoothed	B & D

ALPHA SLOPE SYMBOL	RANGE
A	0-3%
B	3-8%

POST-DEVELOPMENT DRAINAGE ANALYSIS PLAN

TAX MAP 104
LOTS 406-01 & 406-02
HOLY CROSS ROAD
FRANKLIN, NH
PREPARED FOR:
EASTER SEALS NH, INC.
AUGUST 2025
GRAPHIC SCALE

80 0 40 80 160 320

1 INCH = 80 FT.

D-4

FILE NO. 533
PLAN NO. C-xxx
DWG. NO. 22380

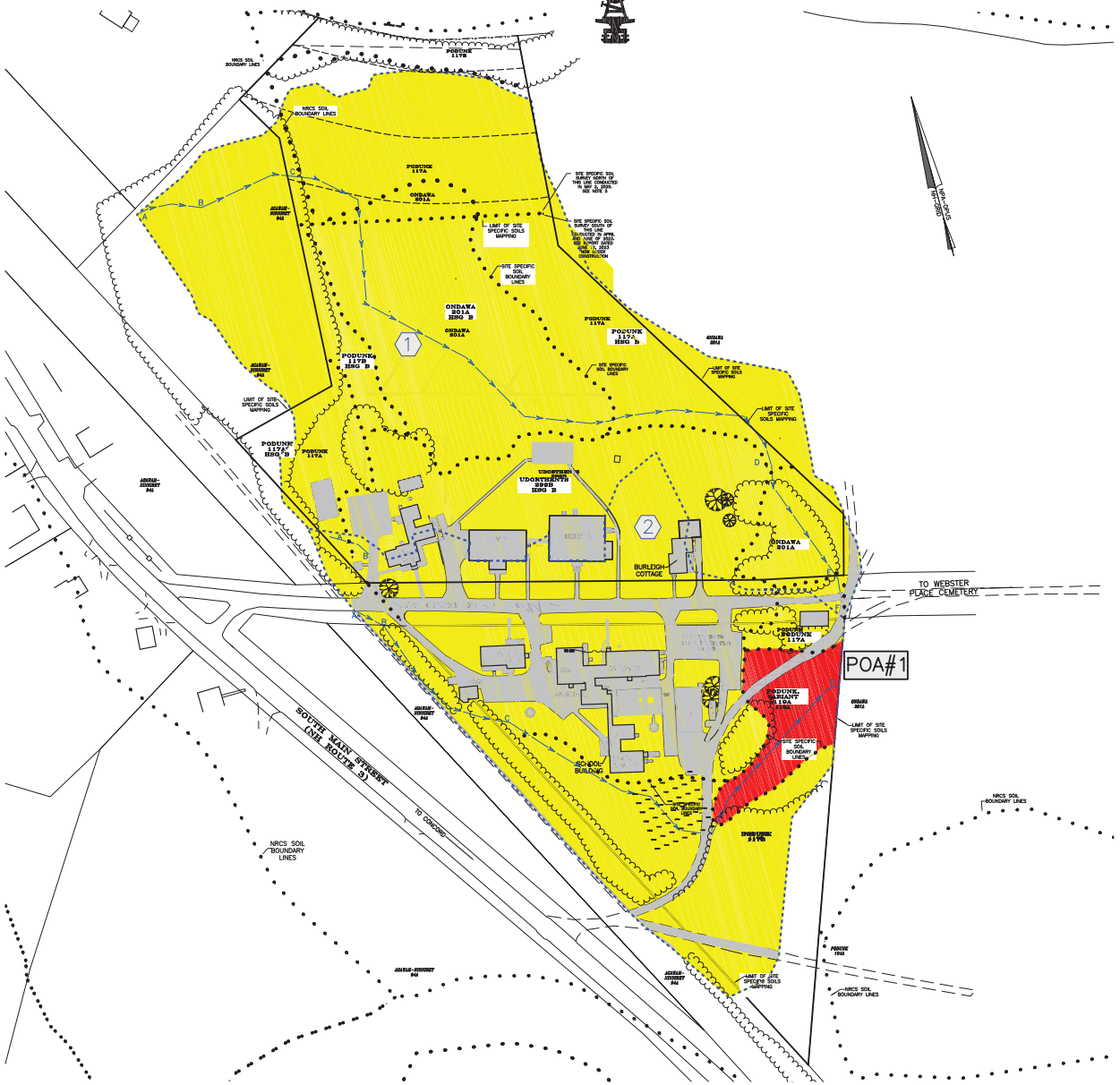
31 Mooney Street, Alton, N.H. 603-875-3948

NORWAY PLAINS ASSOCIATES, INC.

2 Continental Blvd., Rochester, N.H. 603-335-3948

LAND SURVEYORS

CIVIL ENGINEERS



SCOTT LAWLER No.10026 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

LEGEND

- PROPERTY LINE
- JURISDICTIONAL WETLANDS
- EXISTING TREE LINE
- EXISTING DRAIN LINE
- 232 EXISTING CONTOUR LINE
- EXISTING UTILITY POLE
- EXISTING TEST PIT
- 29B EXISTING SOIL TYPE
- NRCS SOIL TYPE BOUNDARY LINE
- SITE SPECIFIC SOIL TYPE BOUNDARY LINE
- SUBCATCHMENT BOUNDARIES
- SUBCATCHMENT DRAINAGE PATH
- 7 SUBCATCHMENT AREA
- STI DRAINAGE BASINS OR CATCH BASINS
- R1 DRAINAGE REACHES
- POA#1 POINTS OF ANALYSIS

SOIL LEGEND

NUMERICAL SYMBOL	SOIL MAP UNIT NAME	HSG
117	PODUNK, OCCASIONALLY FLOODED	B
119	PODUNK, VARIANT (SOMEWHAT POORLY DRAINED), OCCASIONALLY FLOODED	D
201	ONDAWA, OCCASIONALLY FLOODED	B
299	UDORTHENTS, SMOOTHED	B & D

ALPHA SLOPE SYMBOL	RANGE
A	0–3%
B	3–8%
E	>25% (STEEP, ERODIBLE BANK OF THE MERRIMACK RIVER)

JOSEPH W. NOEL
NH CERTIFIED SOIL SCIENTIST #017

PRE–DEVELOPMENT DRAINAGE HYDROLOGIC SOIL GROUP PLAN

TAX MAP 104
LOTS 406–01 & 406–02
HOLY CROSS ROAD
FRANKLIN, NH

PREPARED FOR:
EASTER SEALS NH, INC.

JULY 2023
GRAPHIC SCALE

80 0 40 80 160 320

1 INCH = 80 FT.

FILE NO. 533
PLAN NO. C–xxx
DWG. NO. 22380

D–5

31 Mooney Street, Alton, N.H. 603–875–3948

NORWAY PLAINS ASSOCIATES, INC.

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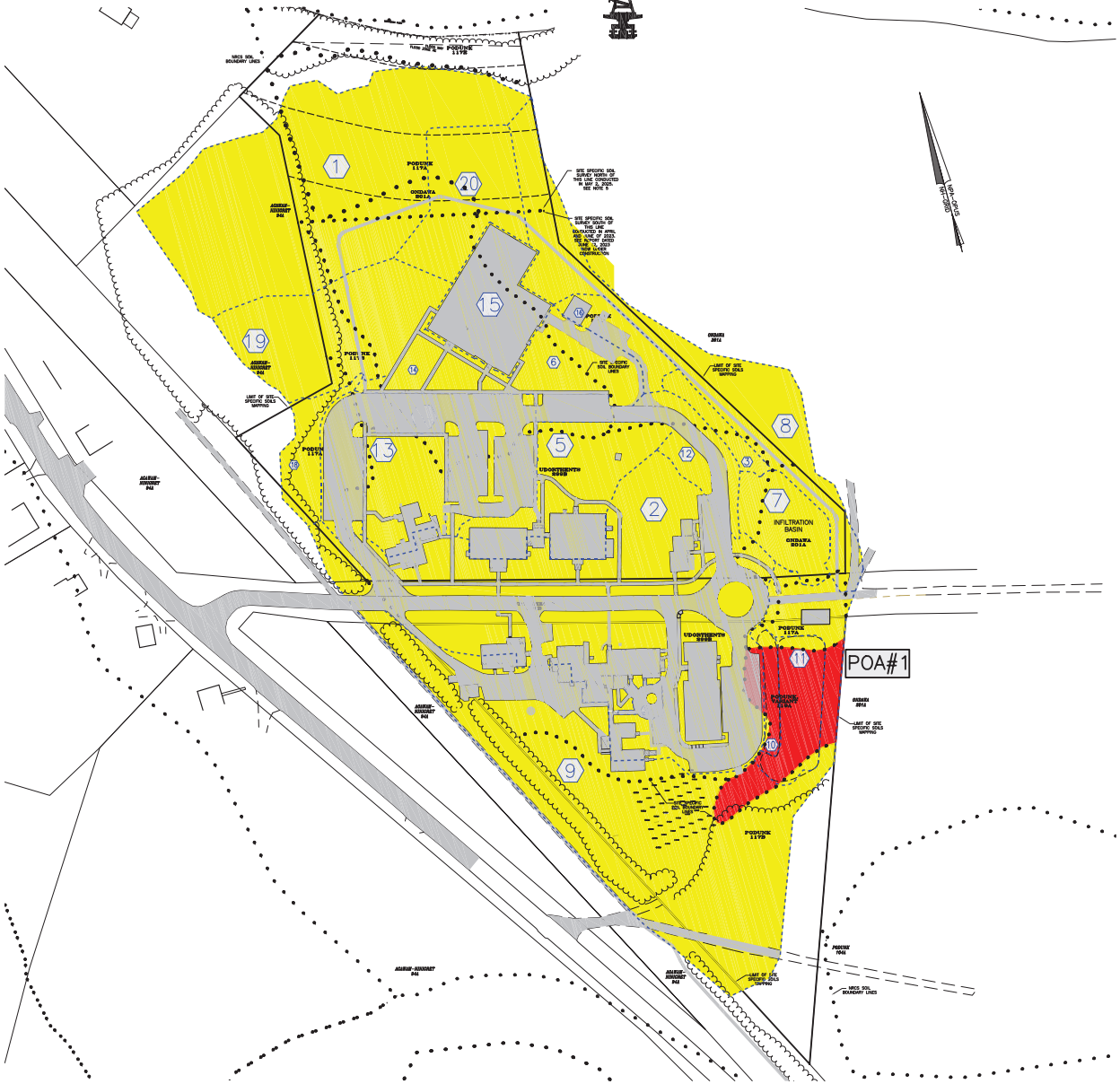
LAND SURVEYORS

CIVIL ENGINEERS

HYDRAULIC SOIL GROUPS

- GROUP "A"
- GROUP "B"
- GROUP "C"
- GROUP "D"
- IMPERVIOUS



LEGEND

- PROPERTY LINE
- JURISDICTIONAL WETLANDS
- EXISTING TREE LINE
- EXISTING DRAIN LINE
- 232 EXISTING CONTOUR LINE
- EXISTING UTILITY POLE
- EXISTING TEST PIT
- 29B EXISTING SOIL TYPE
- NRCS SOIL TYPE BOUNDARY LINE
- SITE SPECIFIC SOIL TYPE BOUNDARY LINE
- SUBCATCHMENT BOUNDARIES
- SUBCATCHMENT DRAINAGE PATH
- 7 SUBCATCHMENT AREA
- STI DRAINAGE BASINS OR CATCH BASINS
- R1 DRAINAGE REACHES
- POA#1 POINTS OF ANALYSIS

SOIL LEGEND

NUMERICAL SYMBOL	SOIL MAP UNIT NAME	HSG
117	PODUNK, OCCASIONALLY FLOODED	B
119	PODUNK, VARIANT (SOMEWHAT POORLY DRAINED), OCCASIONALLY FLOODED	D
201	ONDAWA, OCCASIONALLY FLOODED	B
299	UDORTHENTS, SMOOTHED	B & D

ALPHA SLOPE SYMBOL RANGE

A	0–3%
B	3–8%
E	>25% (STEEP, ERODIBLE BANK OF THE MERRIMACK RIVER)

JOSEPH W. NOEL
NH CERTIFIED SOIL SCIENTIST #017

POST–DEVELOPMENT DRAINAGE HYDROLOGIC SOIL GROUP PLAN

TAX MAP 104
LOTS 406–01 & 406–02
HOLY CROSS ROAD
FRANKLIN, NH

PREPARED FOR:
EASTER SEALS NH, INC.

AUGUST 2025
GRAPHIC SCALE

80 0 40 80 160 320

1 INCH = 80 FT.

D–6

FILE NO. 533
PLAN NO. C–xxx
DWG. NO. 22380

31 Mooney Street, Alton, N.H. 603–875–3948

NORWAY PLAINS ASSOCIATES, INC.

2 Continental Blvd., Rochester, N.H. 603–335–3948