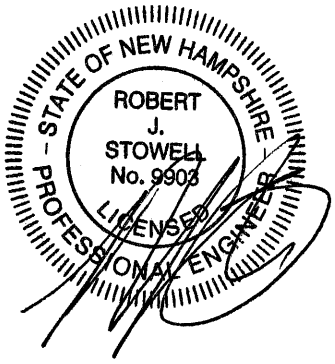
ALTERATION OF TERRAIN APPLICATION
& SITE DEVELOPMENT PLAN
NARRATIVE
FOR

BARRINGTON STORAGE-OFFICE
CALEF HIGHWAY
BARRINGTON, NEW HAMPSHIRE
MAY 2020
REVISED JULY 2020

PREPARED FOR
MILL FALLS REALTY, LLC
P.O. BOX 627
CENTER OSSIPEE, NEW HAMPSHIRE 03814-0627



PREPARED BY
TRITECH ENGINEERING CORPORATION
755 CENTRAL AVENUE
DOVER, NEW HAMPSHIRE 03820

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ALTERATION OF TERRAIN PERMIT APPLICATION

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Water Division/ Alteration of Terrain Bureau/ Land Resources Management

Check the Status of your Application: www.des.nh.gov/onestop

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: MILL FALLS REALTY, LLC	Contact Name: ALBERT ESTES		
Email: JAKE240@COMCAST.NET	Daytime Telephone: (603) 834-0224		
Mailing Address: P.O. BOX 627			
Town/City: CENTER OSSIPEE	State: NH	Zip Code: 03814-0627	
2. APPLICANT'S AGENT INFORMATION If none, check here: ☐			
Business Name: TRITECH ENGINEERING CORPORATION	Contact Name: ROBERT J STOWELL		
Email: RJS@TRITECHENG.COM	Daytime Telephone: (603) 742-8107		
Address: 755 CENTRAL AVENUE			
Town/City: DOVER	State: NH	Zip Code: 03820	
3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)			
Applicant Name:	Contact Name:		
Email:	Daytime Telephone:		
Mailing Address:			
Town/City:	State:	Zip Code:	
4. PROPERTY OWNER'S AGENT INFORMATION If none, check here: ☐			
Business Name: TRITECH ENGINEERING CORPORATION	Contact Name: ROBERT J STOWELL		
Email: RJS@TRITECHENG.COM	Daytime Telephone: (603) 742-8107		
Address: 755 CENTRAL AVENUE			
Town/City: DOVER	State: NH	Zip Code: 03820	
5. CONSULTANT INFORMATION If none, check here: ☐			
Engineering Firm: TRITECH ENGINEERING CORPORATION	Contact Name: ROBERT J STOWELL		
Email: RJS@TRITECHENG.COM	Daytime Telephone: (603) 742-8107		
Address: 755 CENTRAL AVENUE			
Town/City: DOVER	State: NH	Zip Code: 03820	

6. PROJECT TYPE

☐ Excavation Only ☐ Residential ☒ Commercial ☐ Golf Course ☐ School ☐ Municipal
☐ Agricultural ☐ Land Conversion ☐ Other:

7. PROJECT LOCATION INFORMATION

Project Name: BARRINGTON STORAGE-OFFICE

Street/Road Address: CALEF HIGHWAY

Town/City: BARRINGTON	County: STRAFFORD

Tax Map: 220	Block:	Lot Number: 54-7-1 & 54-7-2	Unit:

Location Coordinates: 43.24313 70.98528 ☒ Latitude/Longitude ☐ UTM ☐ State Plane

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

1. Stream or Wetland Purpose: BIORETENTION OUTLET	☒ Yes ☐ No	☐ Withdrawal	☒ Discharge
2. Man-made pond created by impounding a stream or wetland Purpose:	☐ Yes ☒ No	☐ Withdrawal	☐ Discharge
3. Unlined pond dug into the water table Purpose:	☐ Yes ☒ No	☐ Withdrawal	☐ Discharge

Post-development, will the proposed project discharge to:

- A surface water impaired for phosphorus and/or nitrogen? ☒ No ☐ **Yes - include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen**
- A Class A surface water or Outstanding Resource Water? ☒ No ☐ **Yes - include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen**
- A lake or pond not covered previously? ☒ No ☐ **Yes - include information to demonstrate that project will not cause net increase in phosphorus in the lake or pond**

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

Note: Guidance document titled "*Using NHDES's OneStop WebGIS to Locate Protection Areas*" is available online. For more details on the restrictions in these areas, read Chapter 3.1 in Volume 2 of the NH Stormwater Manual.

Is any part of the property within the 100-year floodplain? ☐ Yes ☒ No
If yes: Cut volume: _____ cubic feet within the 100-year floodplain
Fill volume: _____ cubic feet within the 100-year floodplain

☒ Project **IS** within **¼ mile of a designated river** Name of River: ISINGLASS
☐ Project is **NOT** within ¼ mile of a designated river

☐ Project **IS** within **a Coastal/Great Bay Region community** - **include info required by Env-Wq 1503.08(l) if applicable**
☒ Project is **NOT** within a Coastal/Great Bay Region community

8. BRIEF PROJECT DESCRIPTION (PLEASE DO NOT REPLY "SEE ATTACHED")

To construct 43 commercial Storage-Office units with associated infrastructure and utilities

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

None

10. ADDITIONAL REQUIRED INFORMATION

A. Date a copy of the application was sent to the municipality as required by Env-Wq 1503.05(e)[1]: 5/27/2020.
(Attach proof of delivery)

B. Date a copy of the application was sent to the local river advisory committee if required by Env-Wq 1503.05(e)[2]: 5/27/2020.
(Attach proof of delivery)

C. Type of plan required: ☐ Land Conversion ☒ Detailed Development ☐ Excavation, Grading & Reclamation ☐ Steep Slope

D. Additional plans required: ☒ Stormwater Drainage & Hydrologic Soil Groups ☐ Source Control ☐ Chloride Management

E. Total area of disturbance: 271,250 square feet

F. Additional impervious cover as a result of the project: 132,410 square feet (use the "-" symbol to indicate a net reduction in impervious coverage).
Total final impervious cover: 132,410 square feet

G. Total undisturbed cover: 328,880 square feet

H. Number of lots proposed: 2

I. Total length of roadway: 1,945 linear feet

J. Name(s) of receiving water(s): Isinglass

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

Type of Approval	Application Filed?	Status	
		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	☐	Registration date:
5. Large/Small Community Well Approval	☐ Yes ☒ No ☐ N/A	☐	Approval letter date:
6. Large Groundwater Withdrawal Permit	☐ Yes ☐ No ☒ N/A	☐	Permit number:
7. Other:	☐ Yes ☐ No	☐	Permit number:

L. List all species identified by the Natural Heritage Bureau as threatened or endangered or of concern:
N/A

M. Using NHDES's Web GIS OneStop program (www2.des.state.nh.us/gis/onestop/), with the Surface Water Impairment layer turned on, list the impairments identified for each receiving water. If no pollutants are listed, enter "N/A." DISOLVED OXYGEN, E. COLI

N. Did the applicant/applicant's agent have a pre-application meeting with AOT staff? ☒ Yes ☐ No
If yes, name of staff member: Bethann McCarthy

O. Will blasting of bedrock be required? ☐ Yes ☒ No If yes, estimated quantity of blast rock: _____ cubic yards
If yes, standard blasting BMP notes must be placed on the plans, available at:
http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf

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 AOT staff for additional detail.

[1] 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.

[2] 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.

11. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY (SUBMIT WITH APPLICATION IN ORDER LISTED)

LOOSE:

- ☒ Signed application form: des.nh.gov/organization/divisions/water/aot/index.htm (with attached proof(s) of delivery)
- ☒ Check for the application fee: des.nh.gov/organization/divisions/water/aot/fees.htm
- ☒ Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale)
- N/A ☐ If 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.

BIND IN A REPORT IN THE FOLLOWING ORDER:

- ☒ Copy of the signed application form & application checklist (des.nh.gov/organization/divisions/water/aot/index.htm)
- ☒ 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
- ☒ Web GIS printout with the "Surface Water Impairments" layer turned on - http://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx
- ☒ Web GIS printouts with the AOT screening layers turned on - http://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx
- ☒ NHB letter using DataCheck Tool – www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/
- ☒ The Web Soil Survey Map with project's watershed outlined – websoilsurvey.nrcs.usda.gov
- ☒ Aerial photograph (1" = 2,000' scale with the site boundaries outlined)
- ☒ Photographs representative of the site
- ☒ Groundwater Recharge Volume calculations (one worksheet for each permit application): des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- ☒ BMP worksheets (one worksheet for each treatment system): des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- ☒ Drainage analysis, stamped by a professional engineer (see Application Checklist for details)
- ☒ 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, *Site-Specific Soil Mapping Standards for NH & VT, SSSNNE Special Publication No. 3*.
- N/A ☐ Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)]
- N/A ☐ Registration and Notification Form for Storm Water Infiltration to Groundwater (UIC Registration-for underground systems only, including drywells and trenches): (http://des.nh.gov/organization/divisions/water/dwgb/dwspp/gw_discharge)
- ☒ Inspection and maintenance manual with, if applicable, long term maintenance agreements [Env-Wq 1503.08(g)]
- N/A ☐ Source control plan

PLANS:

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

100-YEAR FLOODPLAIN REPORT:

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

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- N/A ☐ See Checklist for Details

☒ **REVIEW APPLICATION FOR COMPLETENESS & CONFIRM INFORMATION LISTED ON THE APPLICATION IS INCLUDED WITH SUBMITTAL.**

12. REQUIRED SIGNATURES

RS By initialing here, I acknowledge that I am required by Env-Wq 1503.20(e) to submit a copy of all approved documents to the department in PDF format on a CD within one week after permit approval.

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.

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

Signature: _____ Date: _____

Name (print or type): ALBERT ESTES Title: _____

☑ PROPERTY OWNER ☐ PROPERTY OWNER'S AGENT:

Signature: _____ Date: _____

Name (print or type): ALBERT ESTES Title: _____

ATTACHMENT A:
ALTERATION OF TERRAIN PERMIT APPLICATION CHECKLIST

Check the box to indicate the item has been provided or provide an explanation why the item does not apply.

DESIGN PLANS

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

☒ PE stamp

☒ Wetland delineation

☒ Temporary erosion control measures

☒ Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and non-residential roof runoff. Guidance on treatment BMPs can be found in Volume 2, Chapter 4 of the NH Stormwater Management Manual.

☒ Pre-existing 2-foot contours

☒ Proposed 2-foot contours

☒ Drainage easements protecting the drainage/treatment structures

☒ Compliance with the Wetlands Bureau, RSA 482- A http://des.nh.gov/organization/divisions/water/wetlands/index.htm. Note that artificial detention in wetlands is not allowed.

☒ Compliance with the Comprehensive Shoreland Protection Act, RSA 483-B. http://des.nh.gov/organization/divisions/water/wetlands/cspa

☒ Benches. Benching is 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.

☒ Check to see if any proposed ponds need state Dam permits. http://des.nh.gov/organization/divisions/water/dam/documents/damdef.pdf

DETAILS

☒ Typical roadway x-section

☒ Detention basin with inverts noted on the outlet structure

N/A ☐ Stone berm level spreader

☒ Outlet protection – riprap aprons

☒ A general installation detail for an erosion control blanket

☒ Silt fences or mulch berm

☒ 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.

☒ Hay bale barriers

☒ Stone check dams

☒ Gravel construction exit

N/A ☐ Temporary sediment trap

☒ The treatment BMP's proposed

N/A ☐ Any innovative BMP's proposed

CONSTRUCTION SEQUENCE/EROSION CONTROL

☒ Note that the project is to be managed in a manner that meets the requirements and intent of RSA 430:53 and Chapter 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/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. (Reed canary grass is listed in the Green Book; however, this 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.

N/A☐ 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 double-side 8 ½” x 11” sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

☒ PE stamp

☒ Rainfall amount obtained from the Northeast Regional Climate Center- http://precip.eas.cornell.edu/. Include extreme precipitation table as obtained from the above referenced website.

☒ 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/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 & Grafton counties are Type II, all others Type III).

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PRE- AND POST-DEVELOPMENT 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.

☒ Tc lines.

☒ A clear delineation of the subcatchment boundaries.

☒ Roadway station numbers.

☒ Culverts and other conveyance structures.

PRE AND POST-DEVELOPMENT COLOR-CODED SOIL PLANS

☒ 11” x 17”sheets suitable, as long as it is readable.

☒ Submit these plans separate from the drainage area plans.

☒ A north arrow.

☒ A scale.

☒ Name of the soil scientist who performed the survey and date the soil survey took place.

☒ 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 which identifies each soil series symbol and its associated soil series name (e.g., 26 = Windsor).

☒ The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, & Impervious = gray).

Please note that excavation projects (e.g., gravel pits) have similar requirements to that above, however the following are common exceptions/additions:

N/A ☐ Drainage report is not needed if site does not have off-site flow.

N/A ☐ 5 foot contours allowed rather than 2 foot.

N/A ☐ No PE stamp needed on the plans.

N/A ☐ Add a note to the plans that the applicant must submit to the Department of Environmental Services 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.

N/A ☐ Add reclamation notes.

See NRCS publication titled: *Vegetating New Hampshire Sand and Gravel Pits* for a good resource, it is posted online at: http://des.nh.gov/organization/divisions/water/aot/categories/publications.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

N/A ☐ If project will discharge stormwater to a surface water impaired for phosphorus and/or nitrogen, include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen.

N/A ☐ If project will discharge stormwater to a Class A surface water or Outstanding Resource Water, include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen.

N/A ☐ If project will discharge stormwater to a lake or pond not covered previously, include information to demonstrate that project will not cause net increase in phosphorus in the lake or pond.

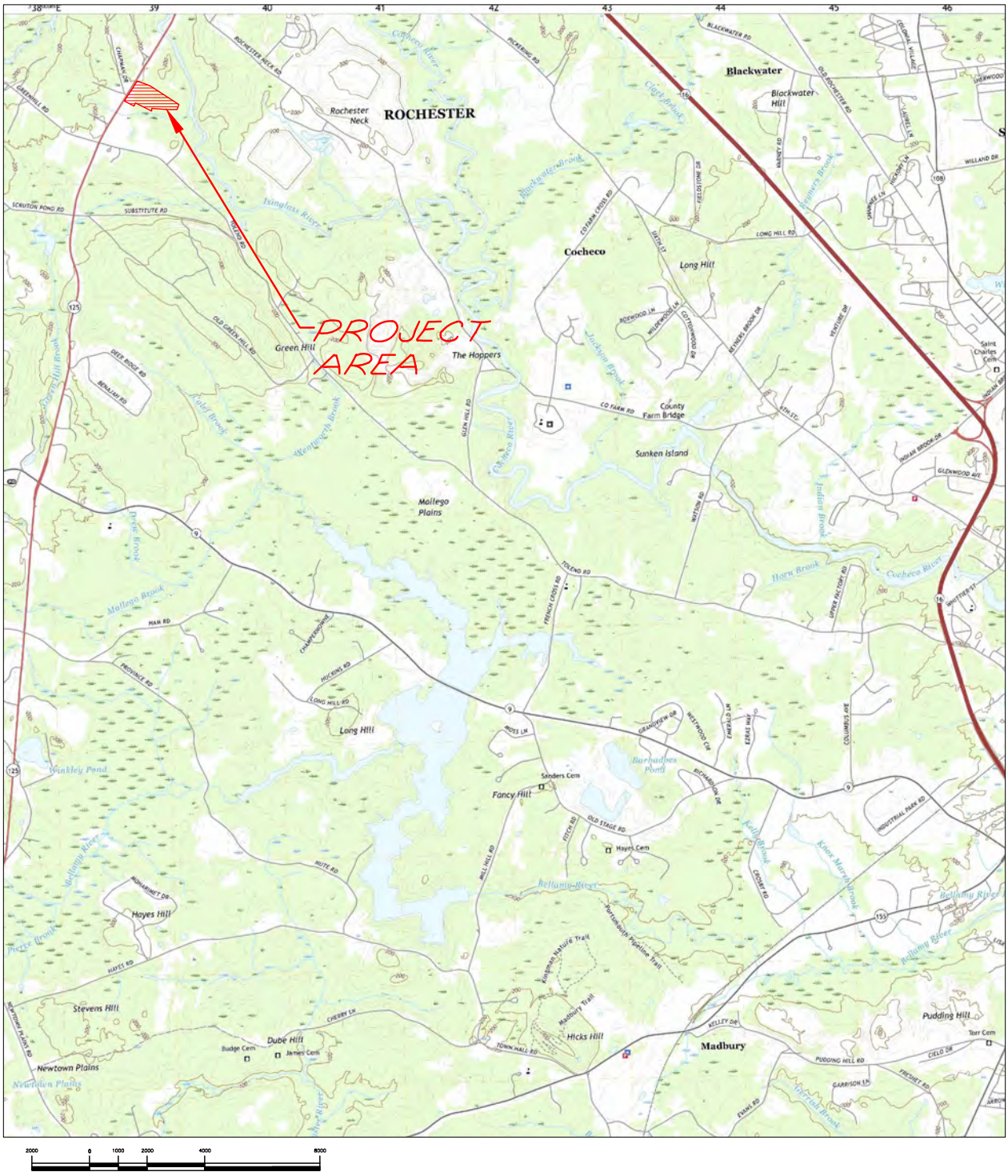
N/A ☐ If project is within a Coastal/Great Bay Region community, include info required by Env-Wq 1503.08(l) if applicable.

N

TRITECH
ENGINEERING CORPORATION

NOTE:

THIS PLAN SHOWS A PORTION OF THE U.S.G.S.: DOVER EAST NH–ME QUADRANGLE, NEW HAMPSHIRE–STRAFFORD CO. 7.5 MINUTE SERIES, 2015 MAP. SITE LOCATION IS APPROXIMATE.



SHEET NO. **LOCUS-1**	USGS WITH PROJECT AREA MILL FALLS REALTY LLC Route 125 TAX MAP: 22, LOT: 54.071 & 54.072 BARRINGTON, NEW HAMPSHIRE APRIL 25, 2019 JOB No. 19107 SCALE: 1:24000	**TRITECH** ENGINEERING CORPORATION 755 CENTRAL AVENUE DOVER, NEW HAMPSHIRE 03820 TELEPHONE 603 742 8107 FAX 603 742 3630

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PROJECT DESCRIPTION

The attached Site Plans are for the Barrington Storage-Office project and show the development of an approximately 8.69-acre parcel. This site is located at Calef Highway in Barrington, New Hampshire. The site is identified on Barrington Tax Maps as Map 220, Lots 54-7-1 & 54-7-2.

The project consists of the construction of 43 Storage-Offices, including the construction of a new roadway, drainage systems, underground septic, on-site private water system and underground electrical service.

Included in the stormwater management system is the construction of a bioretention area exiting the site. The bioretention area is shown on the construction plans and provide permanent stormwater quality and quantity treatment, prior to the stormwater exiting the site.

Proposed site development details are shown on the Construction Plans for Barrington Storage-Offices, as prepared by Tritech Engineering Corporation. Construction plans are based upon an actual on-ground survey performed by Tritech Engineering Corporation and an on-site wetland delineation performed by Highland Soils Services.

METHODOLOGY

This stormwater runoff analysis and drainage design was accomplished using SCS TR-20 Methodology a third party computer software program was used in the facilitation of this analysis. This software is HydroCAD Stormwater Modeling System Version 10.10-3a, by Applied Microcomputer Systems. Analysis and design were performed for the Two-Year, Ten-Year, and Fifty Year Storm Events.

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BARRINGTON STORAGE-OFFICE

CALEF HIGHWAY

BARRINGTON, NEW HAMPSHIRE

MAY 2020
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STORMWATER PEAK RATES & VOLUMES

Year	2		10		50	
Analysis Pt.	PRE	POST	PRE	POST	PRE	POST
1	4.55	4.21	11.64	10.44	24.44	24.30
2	0.65	0.42	1.67	0.99	3.50	1.97
3	0.86	0.80	2.28	2.13	4.90	4.58

Volume Comparison (Acre Feet)

Year	2	
Analysis Pt.	PRE	POST
1	0.668	1.093
2	0.109	0.045
3	0.182	0.170

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STORMWATER RUNOFF QUALITY

Stormwater runoff from roadway is collected in a closed drainage system, pretreated via Sediment Forebays, and treated, detained, and infiltrated via Bioretention areas.

CONCLUSIONS

Treatment of drainage occurs in Sediment Forebays and Bioretention Practices. This Stormwater Management System effectively treats and detains the runoff from the Site Development, while maintaining the down gradient water quality through treatment.

The development of this project will result in no adverse impacts to downstream properties.

SOIL TYPES

On site Test Pits indicate that the site consists of a variety of soils: Windsor/Hinkley Complex, Naumburg, Croghan, Udipsamments, and Udorthents (Bedrock Substratum). Drainage properties range from poorly to excessively drained.

WETLANDS

Highland Soil Services, Michael Mariano, certified wetland and soil scientist, conducted an on site wetlands deliniation investigation of the subject parcel. The wetlands are depicted on the project plan. Highland Soil Services also completed a site-specific soil survey, the results of which are depicted on sheet SSS-1

ADJACENT AREA

The site is zoned Regional Commercial and Residential. The site is bounded to the west by Route 125; to the north by land owned by Royalty Volvo Holdings, as

well as land owned by Mill Falls Realty, LLC; to the South by land owned by Mill Pond Investors, as well as by developed residential lots.

EROSION AND SEDIMENT CONTROL NOTES

The project shall be managed to meet the requirements and intent of rsa 430:53 and AGR 3800 relative to invasive species.

Fugitive dust shall be controlled in accordance with env-a 1000.

CRITICAL AREAS

Anywhere on the site that existing vegetation is to be removed will require immediate erosion control treatment. Special care should be taken where runoff enters wetlands. All storm water practices areas shall be stabilized prior to directing storm water to them; specifically all bioretntion basins and all infiltration practices.

EROSION AND SEDIMENT CONTROL PRACTICES

Erosion and sediment control practices will include the use of rip-rap, and silt fence check dams. All erosion and sediment control practices will be constructed and maintained according to the minimum standards and specifications contained in the "New Hampshire Stormwater Manual, Volume 2".

A. Erosion and Sediment Control Measures

1. The erosion control procedures shall conform to Section 645 of the "Standard Specifications for Road and Bridge Construction" of the NH DOT, and the "New Hampshire Stormwater Manual."
2. During Construction and thereafter, erosion control measures are to be implemented as noted. The smallest practical area of land should be exposed at any one time during development. The amount of exposed areas which are temporarily stabilized without permanent stabilization shall be limited to 5 acres.
3. During grading operations, install stone check dams at 50 foot intervals in drainage swales and at drain inlets where shown. Barriers are to be maintained and cleaned until disturbed areas are stabilized.
4. Any disturbed areas which are to be left temporarily, and which will be regraded later during construction shall be machine hay mulched and seeded with rye grass to prevent erosion.

5. Silt fences and other erosion control measures shall be inspected weekly and after every 0.25" rainfall event during the life of the project. All damaged silt fences shall be repaired. Sediment deposits shall periodically be removed.
6. Avoid the use of future open spaces (loam and seed areas) wherever possible during the construction. Construction traffic shall use the roadbeds of future roads and parking areas.
7. Topsoil required for the establishment of vegetation shall be stock piled in amounts necessary to complete finished grading of all exposed areas.
8. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots or other objectionable material. Stumps shall be disposed by grinding or fill in an approved facility.
9. All fills shall be placed and compacted to reduce erosion, slippage settlement, subsidence or other related problems.
10. All fill shall be placed and compacted in layers not to exceed 8 inches in thickness.
11. Frozen material or soft, mucky or highly compressible material shall not be incorporated into fills.
12. Fill material shall not be placed on a frozen foundation subgrade.
13. Disturbed areas shall be seeded immediately following finished grading.
14. Limit of exposed area that is temporarily stabilized without permanent stabilization is 5 acres or less.
15. All areas not stabilized by Nov. 1st must be protected by Erosion Control Blankets or equivalent and mulched/seeded with winter rye or oats.
16. All disturbed areas must be seed and mulched within 3 days of final grading, permanently stabilized within 15 days of final grading or temporarily stabilized within 45 days of initial disturbance.
17. All ditches and swales are to be stabilized prior to directing runoff to these features.
18. All cut and fill slopes shall be seeded immediately.
19. An area shall be considered stable if one of the following has occurred:
    a. Base course gravels are installed in areas to be paved.
    b. A minimum of 85 % vegetated growth has been established

c. A minimum of 3" of non-erosive material such as stone or riprap has been installed.

d. Erosion control blankets have been properly installed.

B. Vegetative Practice

All ground areas opened up for construction will be regraded, loamed, seeded and mulched in the shortest practical time. All Temporary and Permanent Seeding must be applied prior to October 1st. Employ temporary erosion and sedimentation control devices as detailed in this plan as necessary until adequate stabilization has been assured.

A. Temporary Seeding & Hay Mulching

1. At no time shall any disturbed area remain unstabilized for longer than 30 days. All areas where construction is not completed within 30 days of the initial disturbance shall receive temporary seeding measures.
2. Fertilizer shall be spread on the top layer of loam and worked into the surface. Fertilizer application rate shall be 300 pounds per acre of 10-10-10 fertilizer.
3. Seed shall be Winter Rye, 112 LBS. per acre.
4. Remove stones and trash that will interfere with seeding the area. Where feasible, till the soil to a depth of about 3 inches to prepare a seedbed and mix fertilizer into the soil. The seedbed should be left in a firm and smooth condition. The last tillage operation should be performed across the slope whenever practical.
5. If seeding between May 15th and August 15th, hay mulch shall be applied immediately after seeding at a rate of 1.5 to 2 tons per acre and shall be held in place using appropriate techniques from the Erosion and Sediment Control Handbook.
6. The surface shall be watered and kept moist with a fine spray as required without washing away the soil, until the grass is well established. Any areas which are not satisfactorily covered with grass shall be reseeded, and all noxious weeds are removed.

B. Permanent Seeding & Hay Mulching

ALTERATION OF TERRAIN APPLICATION

& SITE DEVELOPMENT PLAN

NARRATIVE
FOR

BARRINGTON STORAGE-OFFICE
CALEF HIGHWAY

BARRINGTON, NEW HAMPSHIRE

MAY 2020
REVISED JULY 2020

1. All disturbed areas shall be loamed (4") and limed. Lime shall be thoroughly incorporated into the loam layer at a rate of 2 tons per acre.
2. Fertilizer shall be spread on the top layer of loam and worked into then surface. Fertilizer application rate shall be 500 pounds per acre of 10-20-20 fertilizer.
3. Seed shall be 48 lbs. per acre, SCS mixture "c" (20 lbs tall fescue, 20 lbs. creeping red fescue and 8 lbs. birds foot trefoil = 48 lbs total.) The soil shall be lightly raked immediately before seeding. One half the seed shall be sown in one direction and the other half at right angles to the original direction. It shall be lightly raked in to the soil to a depth not over 1/4 inch and rolled with hand roller weighing not over 100 points per linear foot to width.
4. Hay mulch shall be applied immediately after seeding at a rate of 1.5 to 2 tons per acre and shall be held in place using appropriate techniques from the Erosion and Sediment Control Handbook. The surface shall be watered and kept moist with a fine spray as required, without washing away the soil, until the grass is well established. Any areas which are not satisfactorily covered with grass shall be reseeded, and all noxious weeds removed.

CONSTRUCTION SEQUENCE

1. Do not begin construction until all local, state and federal permits have been applied for and received.
2. Install silt fences and hay bale barriers necessary to control erosion and prevent sediment contamination of wetlands prior to any earth moving activities.
3. Cut and remove trees, shrubs, saplings, brush, vines and other debris and rubbish as required for drainage construction.
4. Care shall be taken to preserve the infiltration capacity of the infiltrating soil. See the New Hampshire Stormwater Manual for additional information.
5. Construct stormwater Bioretention Area #1. Do not direct runoff to these practices until the practice and contributing areas are fully stabilized.
6. Cut and remove trees, shrubs, saplings, brush, vines and other debris and rubbish as required for remaining site.
7. Construct roadway and utilities.
8. Loam and seed disturbed areas in accordance with vegetative practice and general construction notes. Cut and fill slopes shall be seeded immediately after their construction.

9. All areas receiving runoff, including but not limited to the stormwater infiltration and bioretention areas, shall be stabilized prior to directing runoff to them.
10. All soils that are finish graded must be stabilized within 72 hours of disturbance.
11. Maintain disturbed areas as necessary.
12. 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.

MAINTENANCE

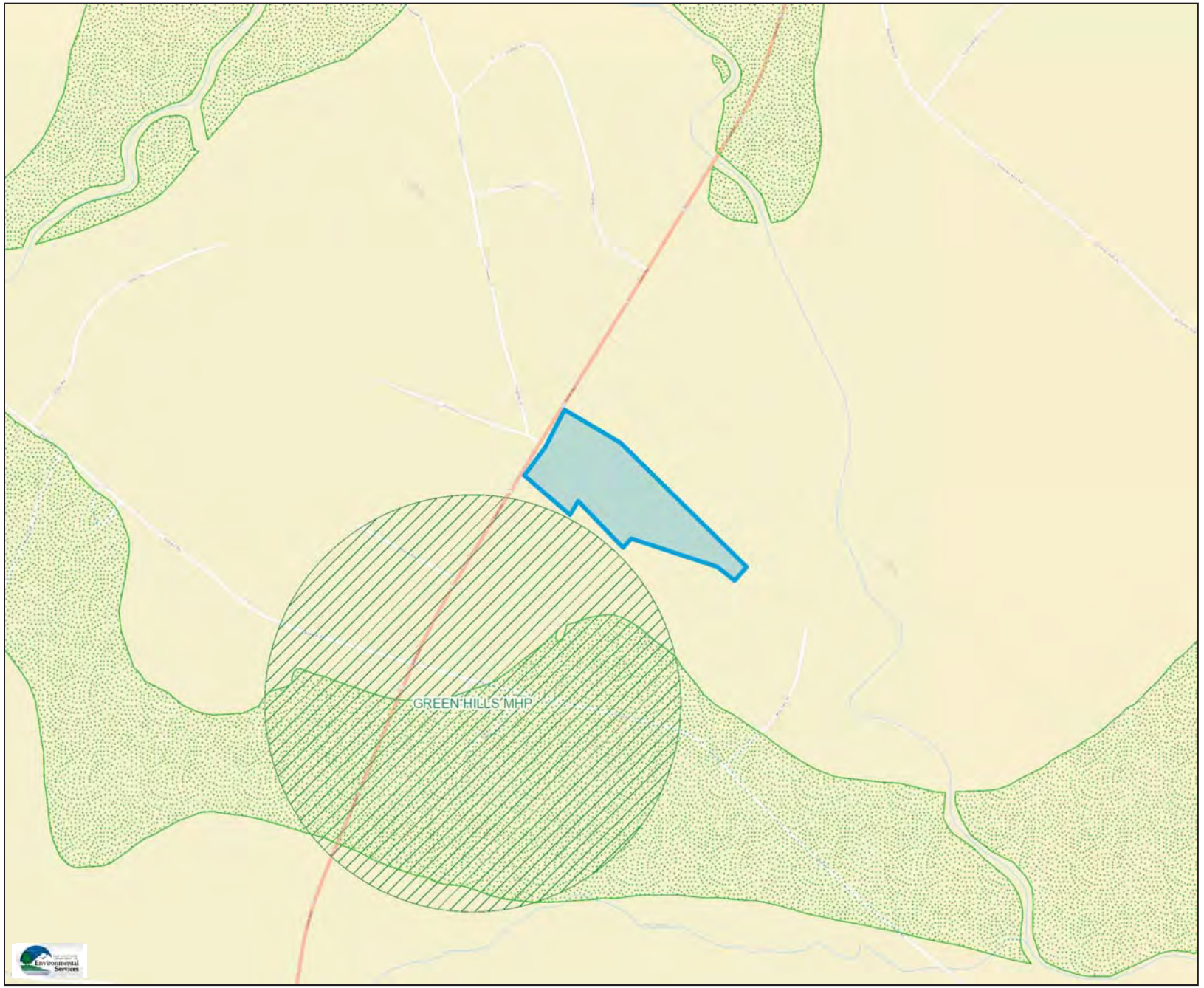
During the period of construction and/or until long term vegetation is established:

1. Seeded areas will be fertilized and reseeded as necessary to insure vegetative establishment.
2. The side slopes will be checked after each significant rainfall.
3. The side slopes will be checked weekly and repaired when necessary until adequate vegetation is established.
4. The silt fence barriers will be checked regularly. Necessary repairs will be made to correct undermining or deterioration of the structures.

WINTER CONSTRUCTION NOTES

1. All proposed vegetated areas which do not exhibit a minimum of 85 % vegetation growth by October 15th, or which are disturbed after October 15th, 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 melts.
2. All ditches or swales which do not exhibit a minimum of 85 % vegetation growth by October 15th, or which are disturbed after October 15th, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
3. After November 15th, 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.

Groundwater Protection Areas



Legend

- Groundwater Classification A GA1
- Groundwater Classification A GA2
- Wellhead Protection Areas

Map Scale

1: 10,000

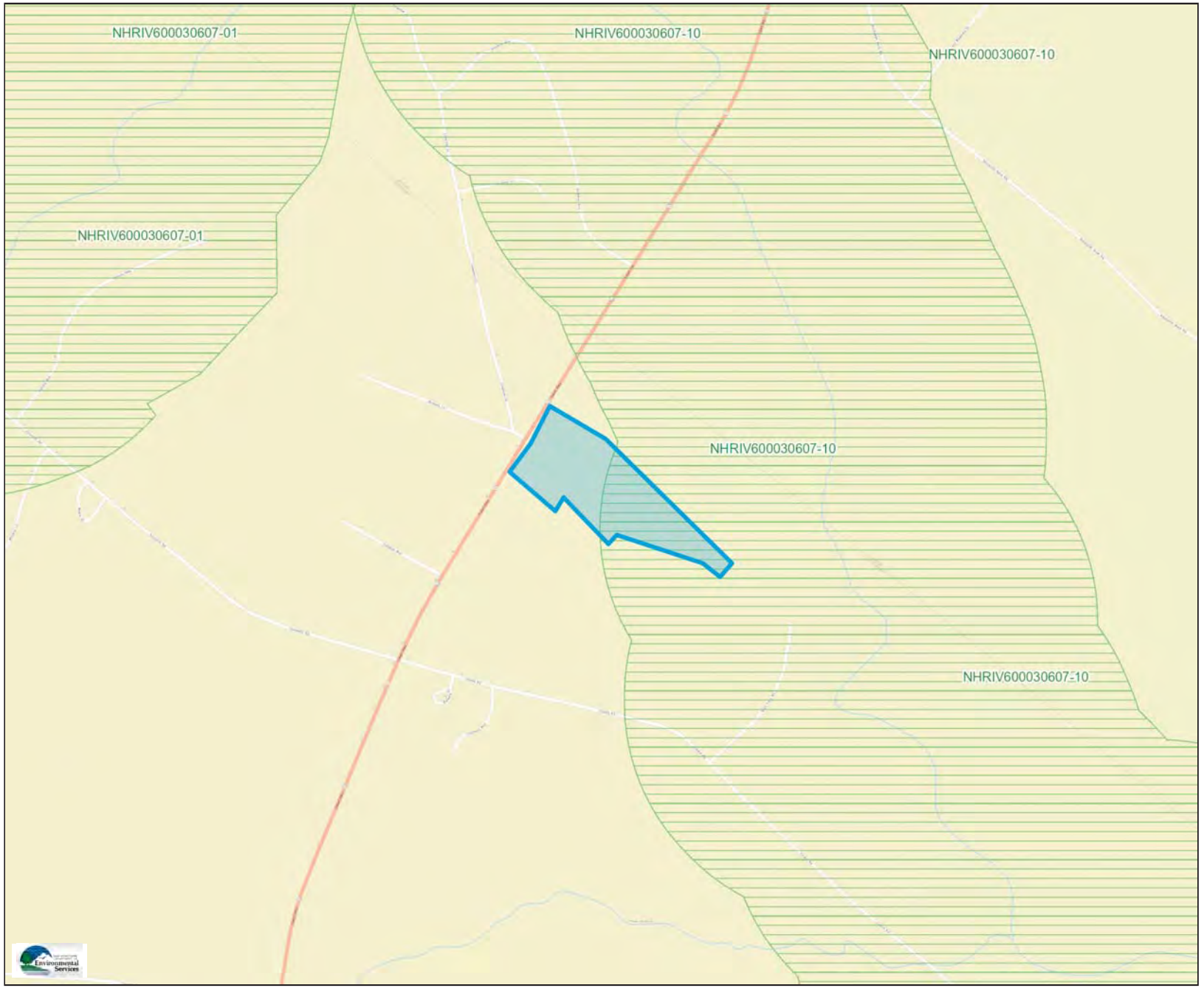
© NH DES, http://des.nh.gov

Map Generated: 10/23/2019

Notes

Groundwater Classification Areas GA1, GA2, & Wellhead Protection Areas

Surface Water Impairments



Legend

- Lakes with a Quarter Mile Bu
- All Features
- All Lakes, with a Quarter Mil Buffer
- Outstanding Resource Wate Watersheds
- Surface Waters with Impairn 2016 with Quarter Mile Buffe
- Watersheds with Chloride Impairments 2016

Map Scale

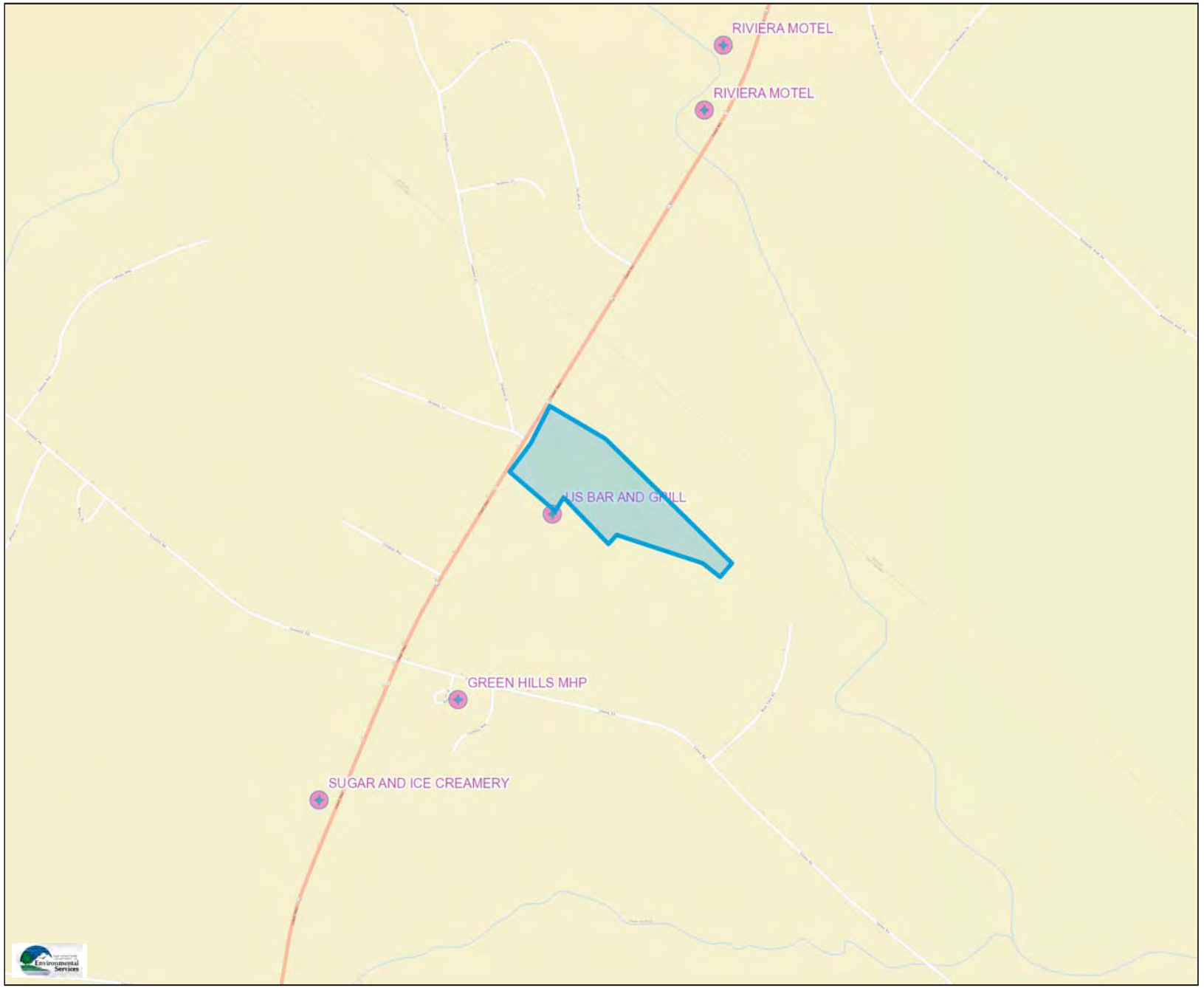
1: 10,000

© NH DES, http://des.nh.gov

Map Generated: 10/23/2019

Notes

Water Supply Intake & Public Water Supply Wells



Legend

- Public Water Supply Wells
- Water Supply Intake Protect Areas

Map Scale

1: 10,000

© NH DES, http://des.nh.gov

Map Generated: 10/23/2019

Notes

New Hampshire Natural Heritage Bureau

To: Matthew Francoeur
755 Central Ave
Dover, NH 03820

Date: 5/7/2020

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 5/7/2020

NHB File ID: NHB20-1290 Applicant: Robert Stowell

Location: Tax Map(s)/Lot(s): Map 220 Lots 54-7-1 & 54-7-2
Dover

Project Description: Construction of 43 storage offices, including construction of a new roadway, drainage systems, underground septic, city water, and underground electrical service.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

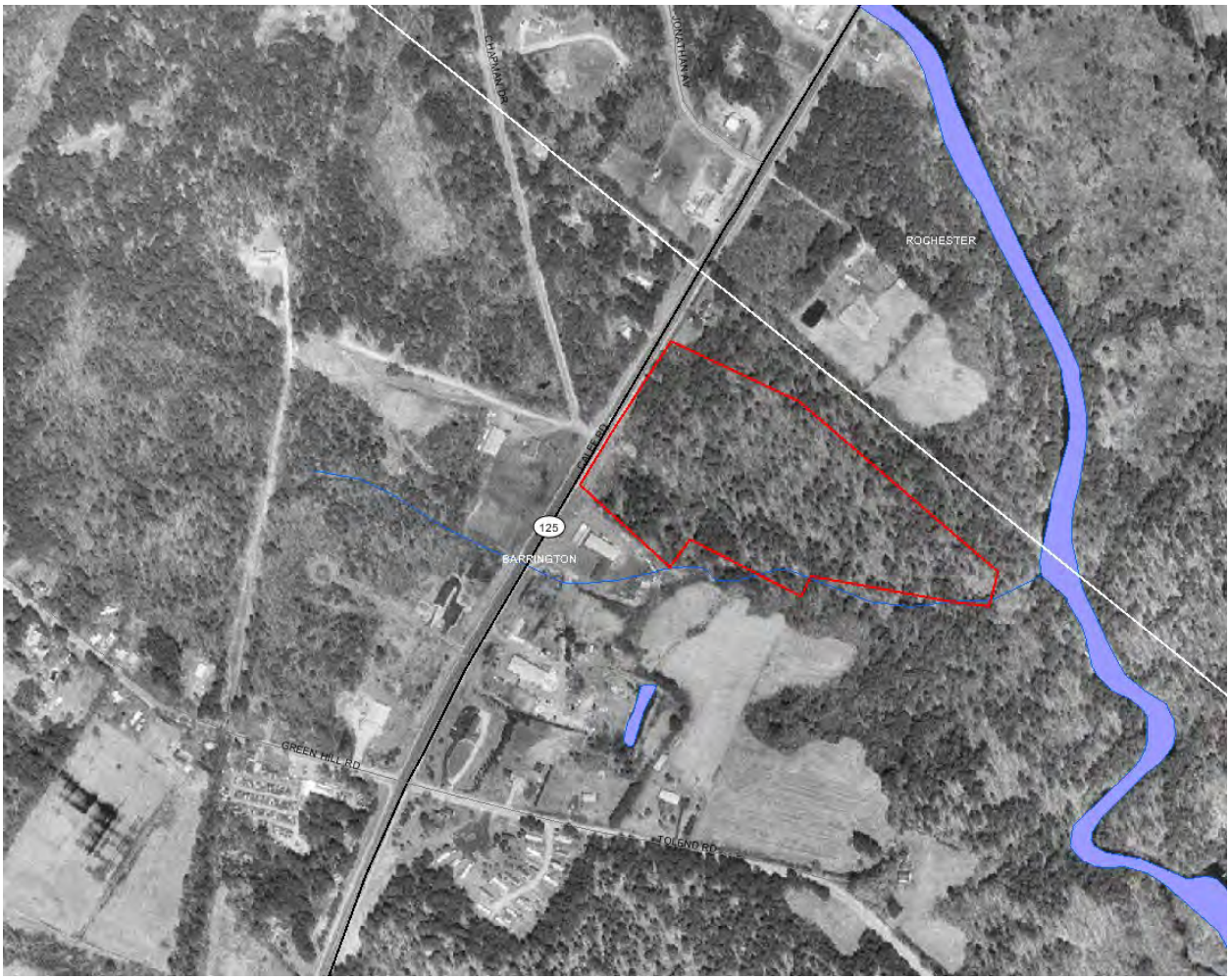
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed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

This report is valid through 5/6/2021.

Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
172 Pembroke Road
Concord NH 03301

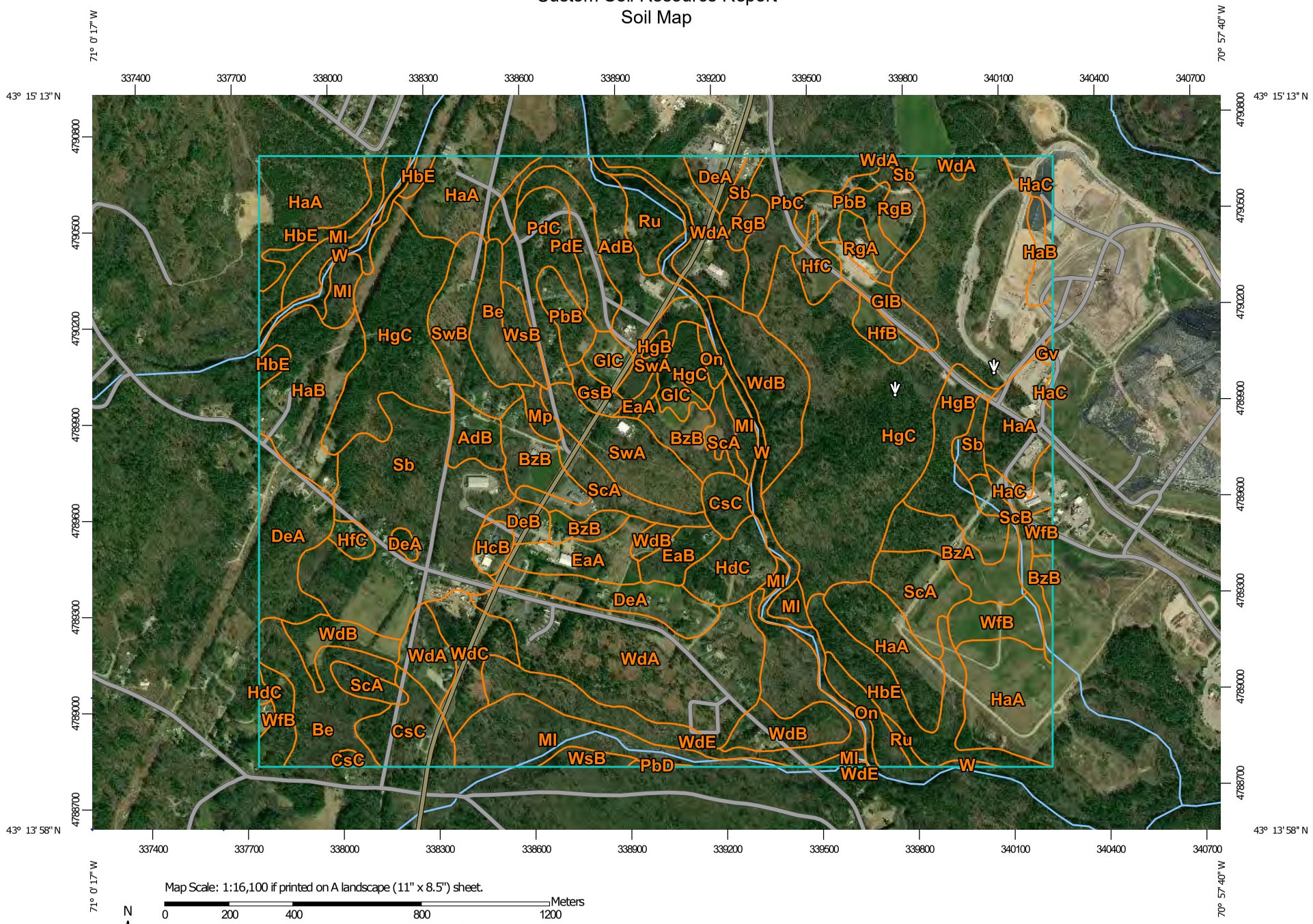
MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB20-1290



Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
172 Pembroke Road
Concord NH 03301

Custom Soil Resource Report
Soil Map



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 1:20,000.

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: Strafford County, New Hampshire
Survey Area Data: Version 19, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AdB	Acton very stony fine sandy loam, 0 to 8 percent slopes	29.4	2.5%
Be	Biddeford silty clay loam	33.1	2.8%
BzA	Buxton silt loam, 0 to 3 percent slopes	15.5	1.3%
BzB	Buxton silt loam, 3 to 8 percent slopes	26.0	2.2%
CsC	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	20.7	1.8%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	44.7	3.8%
DeB	Deerfield loamy fine sand, 3 to 8 percent slopes	4.6	0.4%
EaA	Elmwood fine sandy loam, 0 to 3 percent slopes	14.3	1.2%
EaB	Elmwood fine sandy loam, 3 to 8 percent slopes	6.8	0.6%
GlB	Gloucester fine sandy loam, 3 to 8 percent slopes	7.6	0.6%
GlC	Gloucester fine sandy loam, 8 to 15 percent slopes	8.1	0.7%
GsB	Gloucester very stony fine sandy loam, 3 to 8 percent slopes	3.8	0.3%
Gv	Gravel and borrow pits	0.7	0.1%
HaA	Hinckley loamy sand, 0 to 3 percent slopes	97.9	8.3%
HaB	Hinckley loamy sand, 3 to 8 percent slopes	33.2	2.8%
HaC	Hinckley loamy sand, 8 to 15 percent slopes	10.4	0.9%
HbE	Hinckley loamy sand, 15 to 60 percent slopes	33.7	2.9%
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	3.9	0.3%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	12.7	1.1%
HfB	Hollis-Gloucester fine sandy loams, 3 to 8 percent slopes	4.8	0.4%
HfC	Hollis-Gloucester fine sandy loams, 8 to 15 percent slopes	8.5	0.7%
HgB	Hollis-Gloucester very rocky fine sandy loams, 3 to 8 percent slopes	19.9	1.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HgC	Hollis-Gloucester very rocky fine sandy loams, 8 to 15 percent slopes	192.6	16.4%
Ml	Mixed alluvial land, wet	46.2	3.9%
Mp	Freetown and Swansea mucky peats, 0 to 2 percent slopes	3.0	0.3%
On	Ondawa fine sandy loam	8.4	0.7%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	16.6	1.4%
PbC	Paxton fine sandy loam, 8 to 15 percent slopes	18.9	1.6%
PbD	Paxton fine sandy loam, 15 to 25 percent slopes	0.5	0.0%
PdC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	19.8	1.7%
PdE	Paxton very stony fine sandy loam, 25 to 60 percent slopes	11.8	1.0%
RgA	Ridgebury fine sandy loam, 0 to 3 percent slopes	4.1	0.3%
RgB	Ridgebury fine sandy loam, 3 to 8 percent slopes	11.1	0.9%
Ru	Rumney fine sandy loam	10.8	0.9%
Sb	Saugatuck loamy sand	77.3	6.6%
ScA	Scantic silt loam, 0 to 3 percent slopes	34.9	3.0%
ScB	Scantic silt loam, 3 to 8 percent slopes	6.7	0.6%
SwA	Swanton fine sandy loam, 0 to 3 percent slopes	27.5	2.3%
SwB	Swanton fine sandy loam, 3 to 8 percent slopes	17.3	1.5%
W	Water	23.1	2.0%
WdA	Windsor loamy sand, 0 to 3 percent slopes	86.6	7.4%
WdB	Windsor loamy sand, 3 to 8 percent slopes	42.9	3.7%
WdC	Windsor loamy sand, 8 to 15 percent slopes	15.2	1.3%
WdE	Windsor loamy sand, 15 to 60 percent slopes	32.9	2.8%
WfB	Windsor loamy fine sand, clay subsoil variant, 0 to 8 percent slopes	17.7	1.5%
WsB	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	8.8	0.8%
Totals for Area of Interest		**1,174.7**	**100.0%**

BARRINGTON STORAGE OFFICE
CALEF HIGHWAY, BARRINGTON NH

2000 0 1000 2000 4000 8000

1"=2000'

Photo 1 - STA 0+00 Looking East

Photo 2 - STA 5+00 Looking West

Photo 3 - STA 5+00 Looking North

Photo 4 - STA 5+00 Looking West

Photo 5 - STA 5+00 Looking South

Groundwater Recharge Volume (GRV) Calculation

-	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
0.24	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
2.84	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
0.18	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.11	inches	Rd = weighted groundwater recharge depth	
0.344	ac-in	GRV = AI * Rd	
1,249	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):

Stone Drip Edges at Buildings (Units 1-23 & 36-43)

Total Linear Footage (1,300 ft) x (5.0 ft) Wide x (1.0 ft) Deep = 6,500 cf

Where 1,249 cf is Required

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **BARRINGTON STORAGE OFFICE - BIORETENTION BASIN #1**

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

Yes		Have you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a)?	
4.20	ac	A = Area draining to the practice	
3.07	ac	A_I = Impervious area draining to the practice	
0.73	decimal	I = percent impervious area draining to the practice, in decimal form	
0.71	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
2.97	ac-in	WQV= 1" x Rv x A	
10,792	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,698	cf	25% x WQV (check calc for sediment forebay volume)	
8,094	cf	75% x WQV (check calc for surface sand filter volume)	
Deep Sump CB		Method of Pretreatment? (not required for clean or roof runoff)	
N/A	cf	V_{SED} = sediment forebay volume, if used for pretreatment	← ≥ 25%WQV
11,386	sf	A_{SA} = surface area of the practice	
5.00	iph	$Ksat_{DESIGN}$ = design infiltration rate[1]	
Yes	Yes/No	If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
2.3	hours	T_{DRAIN} = drain time = V / (A_{SA} * I_{DESIGN})	← ≤ 72-hrs
174.50	feet	E_{FC} = elevation of the bottom of the filter course material[2]	
173.50	feet	E_{UD} = invert elevation of the underdrain (UD), if applicable	
175.80	feet	E_{SHWT} = elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
175.30	feet	E_{ROCK} = elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
1.00	feet	$D_{FC\ to\ UD}$ = depth to UD from the bottom of the filter course	← ≥ 1'
(0.80)	feet	$D_{FC\ to\ ROCK}$ = depth to bedrock from the bottom of the filter course	← ≥ 1'
(1.30)	feet	$D_{FC\ to\ SHWT}$ = depth to SHWT from the bottom of the filter course	← ≥ 1'
179.60	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
180.00	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
	cf	V = volume of storage[3] (attach a stage-storage table)	← ≥ 75%WQV
	inches	D_{FC} = filter course thickness	← 18", or 24" if within GPA
Sheet		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**
31,545	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-3	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	← **≥3:1**
Sheet	C-3	Note what sheet in the plan set contains the planting plans and surface cover	

If porous pavement is proposed:

		Type of pavement proposed (concrete? Asphalt? Pavers? Etc)	
	acres	A_{SA} = surface area of the pervious pavement	
	:1	ratio of the contributing area to the pervious surface area	← **≤ 5:1**
	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.	← **304.1 sand**

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:

Summary for Pond BIO-1: BIORETENTION-1

Inflow Area = 4.129 ac, 72.68% Impervious, Inflow Depth = 5.06" for 50-YR SEACOAST event
Inflow = 21.12 cfs @ 12.12 hrs, Volume= 1.740 af
Outflow = 4.31 cfs @ 12.61 hrs, Volume= 1.650 af, Atten= 80%, Lag= 29.6 min
Primary = 4.31 cfs @ 12.61 hrs, Volume= 1.650 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 179.60' @ 12.61 hrs Surf.Area= 11,543 sf Storage= 37,136 cf

Plug-Flow detention time= 282.1 min calculated for 1.650 af (95% of inflow)
Center-of-Mass det. time= 252.9 min (1,029.8 - 776.9)

Volume	Invert	Avail.Storage	Storage Description
#1	173.25'	41,865 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.25	6,338	0.0	0	0
173.26	6,338	40.0	25	25
174.24	6,338	40.0	2,484	2,510
174.25	6,338	40.0	25	2,535
174.49	6,338	40.0	608	3,144
174.50	6,338	20.0	13	3,156
175.99	6,338	20.0	1,889	5,045
176.00	6,338	100.0	63	5,108
178.00	9,138	100.0	15,476	20,584
179.50	11,386	100.0	15,393	35,977
180.00	12,164	100.0	5,888	41,865

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**15.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 173.50' / 173.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	179.00'	**0.5" x 4.5" Horiz. Orifice/Grate X 14.00 columns** X 4 rows C= 0.600 in 22.0" x 22.0" Grate (26% open area) Limited to weir flow at low heads
#3	Device 1	173.55'	**6.0" Round UnderDrain** L= 240.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 173.55' / 173.50' S= 0.0002 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#4	Device 3	173.25'	**6.000 in/hr Exfiltration over Surface area**
#5	Primary	179.60'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=4.31 cfs @ 12.61 hrs HW=179.60' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 4.31 cfs of 13.83 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 3.27 cfs @ 3.73 fps)
  - **3=UnderDrain** (Barrel Controls 1.05 cfs @ 5.32 fps)
    - **4=Exfiltration** (Passes 1.05 cfs of 1.60 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.08 fps)

Stage-Area-Storage for Pond BIO-1: BIORETENTION-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
173.25	6,338	0
173.35	6,338	254
173.45	6,338	507
173.55	6,338	761
173.65	6,338	1,014
173.75	6,338	1,268
173.85	6,338	1,521
173.95	6,338	1,775
174.05	6,338	2,028
174.15	6,338	2,282
174.25	6,338	2,535
174.35	6,338	2,789
174.45	6,338	3,042
174.55	6,338	3,220
174.65	6,338	3,346
174.75	6,338	3,473
174.85	6,338	3,600
174.95	6,338	3,727
175.05	6,338	3,854
175.15	6,338	3,980
175.25	6,338	4,107
175.35	6,338	4,234
175.45	6,338	4,361
175.55	6,338	4,487
175.65	6,338	4,614
175.75	6,338	4,741
175.85	6,338	4,868
175.95	6,338	4,994
176.05	6,408	5,427
176.15	6,548	6,075
176.25	6,688	6,737
176.35	6,828	7,412
176.45	6,968	8,102
176.55	7,108	8,806
176.65	7,248	9,524
176.75	7,388	10,256
176.85	7,528	11,001
176.95	7,668	11,761
177.05	7,808	12,535
177.15	7,948	13,323
177.25	8,088	14,125
177.35	8,228	14,940
177.45	8,368	15,770
177.55	8,508	16,614
177.65	8,648	17,472
177.75	8,788	18,344
177.85	8,928	19,229
177.95	9,068	20,129
178.05	9,213	21,043
178.15	9,363	21,972
178.25	9,513	22,916
178.35	9,663	23,875
178.45	9,812	24,848
178.55	9,962	25,837
178.65	10,112	26,841
178.75	10,262	27,859
178.85	10,412	28,893
178.95	10,562	29,942
179.05	10,712	31,005
179.15	10,861	32,084
179.25	11,011	33,178
179.35	11,161	34,286
179.45	11,311	35,410
179.55	11,464	36,549
179.65	11,619	37,703
179.75	11,775	38,873
179.85	11,931	40,058
179.95	**12,086**	**41,259**

DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,
& SITE DEVELOPMENT PLAN
NARRATIVE
FOR

BARRINGTON STORAGE-OFFICE
ROUTE 125
BARRINGTON, NEW HAMPSHIRE

MAY 2020
REVISED JULY 2020

PREPARED FOR

MILL FALLS REALTY, LLC

P.O. BOX 627
CENTER OSSIPEE, NEW HAMPSHIRE 03814-0627

PREPARED BY

TRITECH ENGINEERING CORPORATION
755 CENTRAL AVENUE
DOVER, NEW HAMPSHIRE 03820

DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,
& SITE DEVELOPMENT PLAN
NARRATIVE
FOR

BARRINGTON STORAGE-OFFICE
CALEF HIGHWAY
BARRINGTON, NEW HAMPSHIRE

MAY 2020
REVISED JULY 2020

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DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,

& SITE DEVELOPMENT PLAN

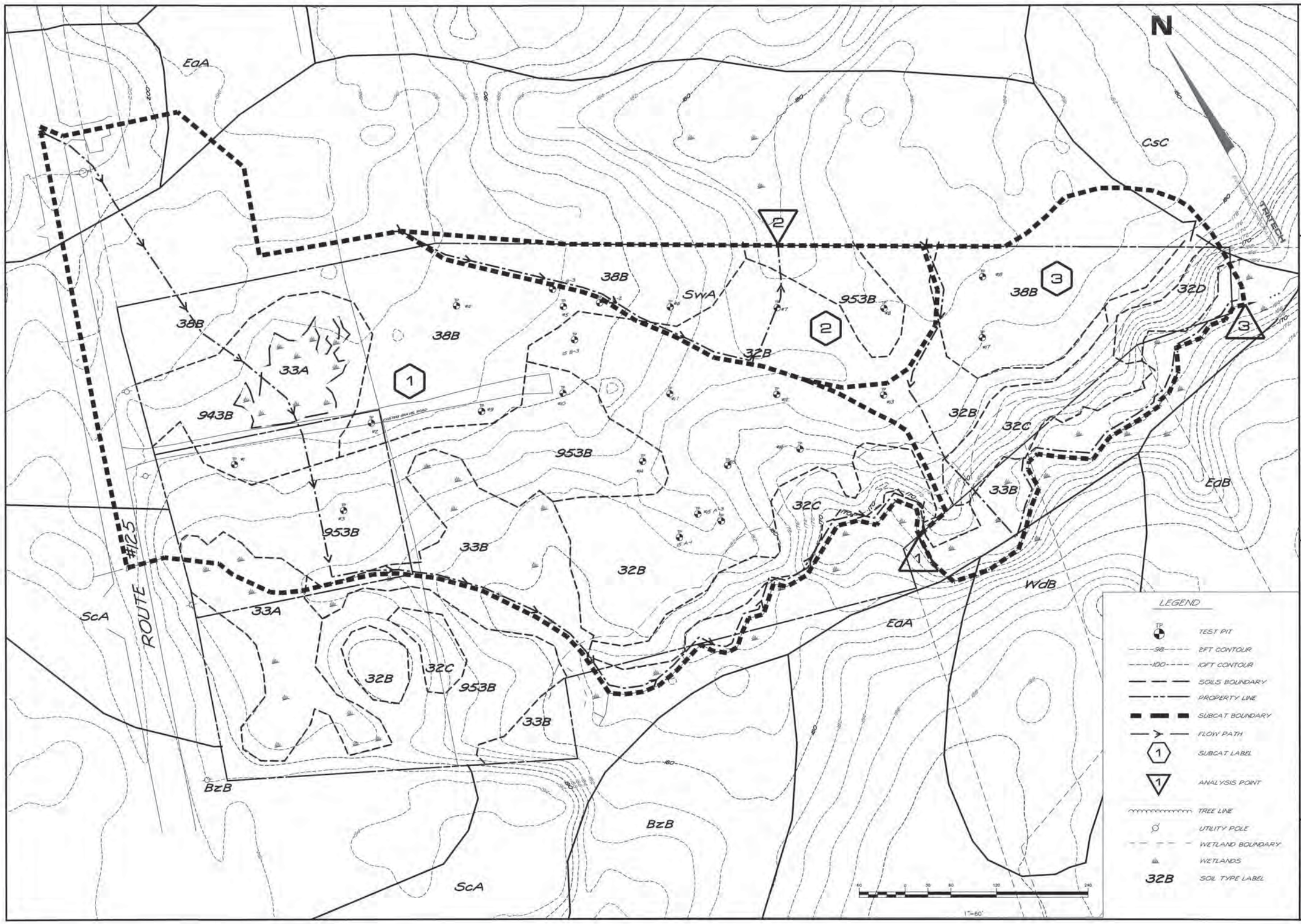
NARRATIVE
FOR

BARRINGTON STORAGE-OFFICE
CALEF HIGHWAY

BARRINGTON, NEW HAMPSHIRE

MAY 2020
REVISED JULY 2020

SECTION I
COMPUTATIONS



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REVISIONS:
DATE: DESCRIPTION:

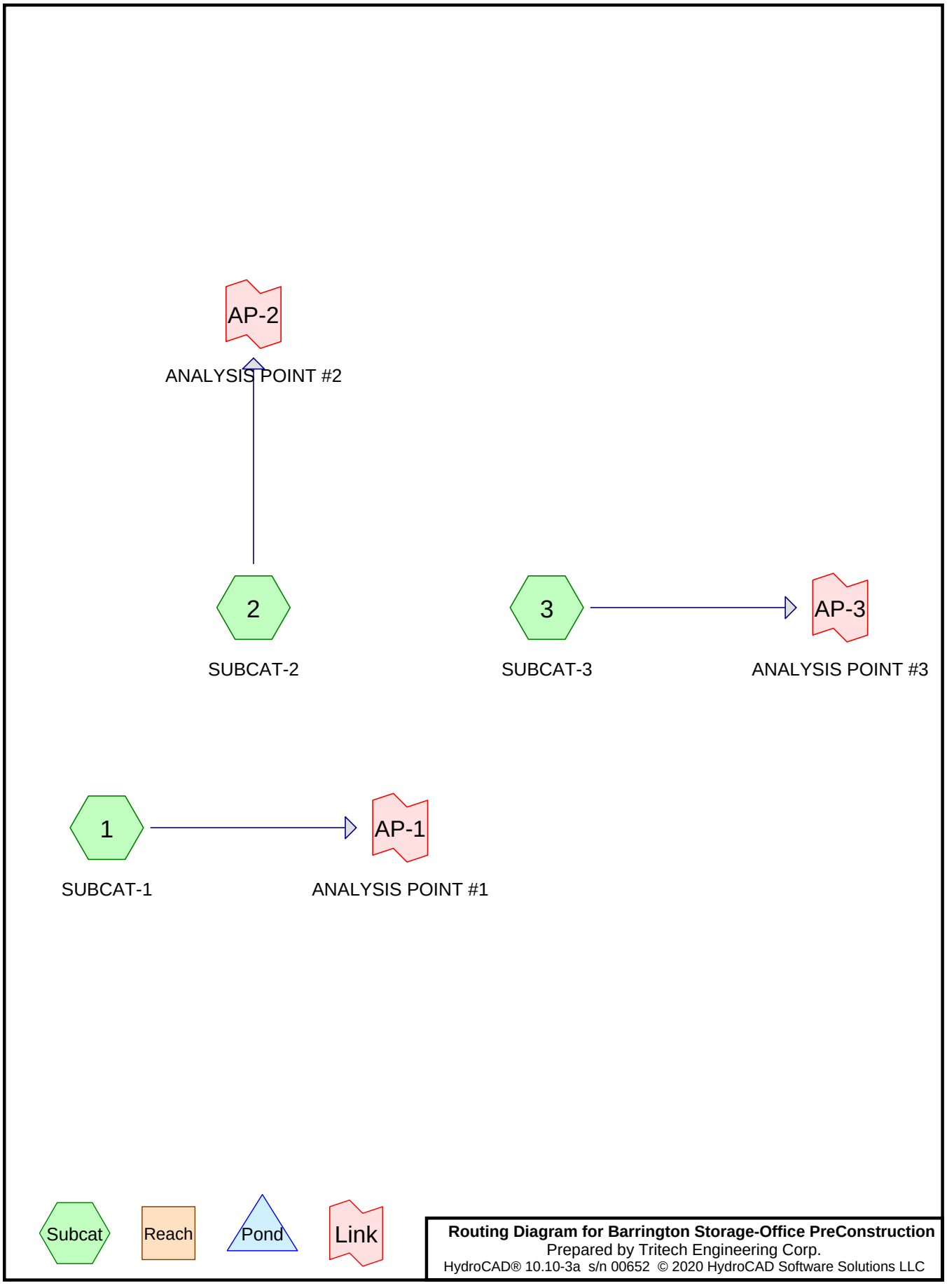
STATE OF NEW HAMPSHIRE - ROBERT STOWELL NO. 9662 - PROFESSIONAL ENGINEER

PRECONSTRUCTION DRAINAGE PLAN

BARRINGTON STORAGE OFFICE

ROUTE #125
BARRINGTON, NEW HAMPSHIRE
MAY 29, 2020 JOB No. 19107
SCALE: 1" = 60'

SHEET No.
D-1



Routing Diagram for Barrington Storage-Office PreConstruction
Prepared by Tritech Engineering Corp.
HydroCAD® 10.10-3a s/n 00652 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.217	39	>75% Grass cover, Good, HSG A (1)
0.472	61	>75% Grass cover, Good, HSG B (1)
0.185	98	Paved roads w/curbs & sewers, HSG A (1)
0.359	98	Paved roads w/curbs & sewers, HSG B (1)
0.064	30	Woods, Good, HSG A (3)
0.948	55	Woods, Good, HSG B (1, 3)
11.258	70	Woods, Good, HSG C (1, 2, 3)
1.844	77	Woods, Good, HSG D (1, 3)
15.348	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.467	HSG A	1, 3
1.779	HSG B	1, 3
11.258	HSG C	1, 2, 3
1.844	HSG D	1, 3
0.000	Other	
15.348		**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: SUBCAT-1 Runoff Area=460,054 sf 5.15% Impervious Runoff Depth=0.76"
Flow Length=1,730' Tc=32.1 min CN=70 Runoff=4.55 cfs 0.668 af

Subcatchment 2: SUBCAT-2 Runoff Area=75,335 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=655' Tc=42.0 min CN=70 Runoff=0.65 cfs 0.109 af

Subcatchment 3: SUBCAT-3 Runoff Area=133,174 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=950' Tc=60.3 min CN=69 Runoff=0.86 cfs 0.182 af

Link AP-1: ANALYSIS POINT #1 Inflow=4.55 cfs 0.668 af
Primary=4.55 cfs 0.668 af

Link AP-2: ANALYSIS POINT #2 Inflow=0.65 cfs 0.109 af
Primary=0.65 cfs 0.109 af

Link AP-3: ANALYSIS POINT #3 Inflow=0.86 cfs 0.182 af
Primary=0.86 cfs 0.182 af

Total Runoff Area = 15.348 ac Runoff Volume = 0.959 af Average Runoff Depth = 0.75"
96.45% Pervious = 14.804 ac 3.55% Impervious = 0.544 ac

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: SUBCAT-1 Runoff Area=460,054 sf 5.15% Impervious Runoff Depth=1.77"
Flow Length=1,730' Tc=32.1 min CN=70 Runoff=11.64 cfs 1.555 af

Subcatchment 2: SUBCAT-2 Runoff Area=75,335 sf 0.00% Impervious Runoff Depth=1.77"
Flow Length=655' Tc=42.0 min CN=70 Runoff=1.67 cfs 0.255 af

Subcatchment 3: SUBCAT-3 Runoff Area=133,174 sf 0.00% Impervious Runoff Depth=1.69"
Flow Length=950' Tc=60.3 min CN=69 Runoff=2.28 cfs 0.431 af

Link AP-1: ANALYSIS POINT #1 Inflow=11.64 cfs 1.555 af
Primary=11.64 cfs 1.555 af

Link AP-2: ANALYSIS POINT #2 Inflow=1.67 cfs 0.255 af
Primary=1.67 cfs 0.255 af

Link AP-3: ANALYSIS POINT #3 Inflow=2.28 cfs 0.431 af
Primary=2.28 cfs 0.431 af

Total Runoff Area = 15.348 ac Runoff Volume = 2.241 af Average Runoff Depth = 1.75"
96.45% Pervious = 14.804 ac 3.55% Impervious = 0.544 ac

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: SUBCAT-1 Runoff Area=460,054 sf 5.15% Impervious Runoff Depth=3.60"
Flow Length=1,730' Tc=32.1 min CN=70 Runoff=24.44 cfs 3.170 af

Subcatchment 2: SUBCAT-2 Runoff Area=75,335 sf 0.00% Impervious Runoff Depth=3.60"
Flow Length=655' Tc=42.0 min CN=70 Runoff=3.50 cfs 0.519 af

Subcatchment 3: SUBCAT-3 Runoff Area=133,174 sf 0.00% Impervious Runoff Depth=3.50"
Flow Length=950' Tc=60.3 min CN=69 Runoff=4.90 cfs 0.891 af

Link AP-1: ANALYSIS POINT #1 Inflow=24.44 cfs 3.170 af
Primary=24.44 cfs 3.170 af

Link AP-2: ANALYSIS POINT #2 Inflow=3.50 cfs 0.519 af
Primary=3.50 cfs 0.519 af

Link AP-3: ANALYSIS POINT #3 Inflow=4.90 cfs 0.891 af
Primary=4.90 cfs 0.891 af

Total Runoff Area = 15.348 ac Runoff Volume = 4.580 af Average Runoff Depth = 3.58"
96.45% Pervious = 14.804 ac 3.55% Impervious = 0.544 ac

Summary for Subcatchment 1: SUBCAT-1

Runoff = 11.64 cfs @ 12.48 hrs, Volume= 1.555 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
9,461	39	>75% Grass cover, Good, HSG A
8,063	98	Paved roads w/curbs & sewers, HSG A
29,252	55	Woods, Good, HSG B
20,582	61	>75% Grass cover, Good, HSG B
15,638	98	Paved roads w/curbs & sewers, HSG B
319,802	70	Woods, Good, HSG C
57,256	77	Woods, Good, HSG D
460,054	70	Weighted Average
436,353		94.85% Pervious Area
23,701		5.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		**Sheet Flow, Sheet Paved** Smooth surfaces n= 0.011 P2= 3.00"
6.3	55	0.0200	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, Shallow Paved** Paved Kv= 20.3 fps
12.6	600	0.0250	0.79		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
10.0	425	0.0200	0.71		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
1.5	320	0.0075	3.66	48.82	**Parabolic Channel, Stream** W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.040 Mountain streams
0.0	40	0.2000	18.91	252.10	**Parabolic Channel, Stream** W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.040 Mountain streams
0.9	220	0.0100	4.23	56.37	**Parabolic Channel, Stream** W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.040 Mountain streams
32.1	1,730	Total			

Summary for Subcatchment 2: SUBCAT-2

Runoff = 1.67 cfs @ 12.60 hrs, Volume= 0.255 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
75,335	70	Woods, Good, HSG C
75,335		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0150	0.07		**Sheet Flow, Sheet Woods** Woods: Light underbrush n= 0.400 P2= 3.00"
6.1	225	0.0150	0.61		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
4.8	145	0.0400	0.50		**Shallow Concentrated Flow, Shallow Woods** Forest w/Heavy Litter Kv= 2.5 fps
6.2	185	0.0100	0.50		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
42.0	655	Total			

Summary for Subcatchment 3: SUBCAT-3

Runoff = 2.28 cfs @ 12.86 hrs, Volume= 0.431 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
2,799	30	Woods, Good, HSG A
12,043	55	Woods, Good, HSG B
95,250	70	Woods, Good, HSG C
23,082	77	Woods, Good, HSG D
133,174	69	Weighted Average
133,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.0	100	0.0100	0.03		**Sheet Flow, Sheet Woods** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.5	130	0.0150	0.61		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
1.1	75	0.0500	1.12		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
0.5	60	0.1800	2.12		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
4.2	585	0.0075	2.31	7.69	**Parabolic Channel, Stream** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.040 Mountain streams
60.3	950	Total			

Summary for Link AP-1: ANALYSIS POINT #1

Inflow Area = 10.561 ac, 5.15% Impervious, Inflow Depth = 1.77" for 10-YR SEACOAST event
Inflow = 11.64 cfs @ 12.48 hrs, Volume= 1.555 af
Primary = 11.64 cfs @ 12.48 hrs, Volume= 1.555 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: ANALYSIS POINT #2

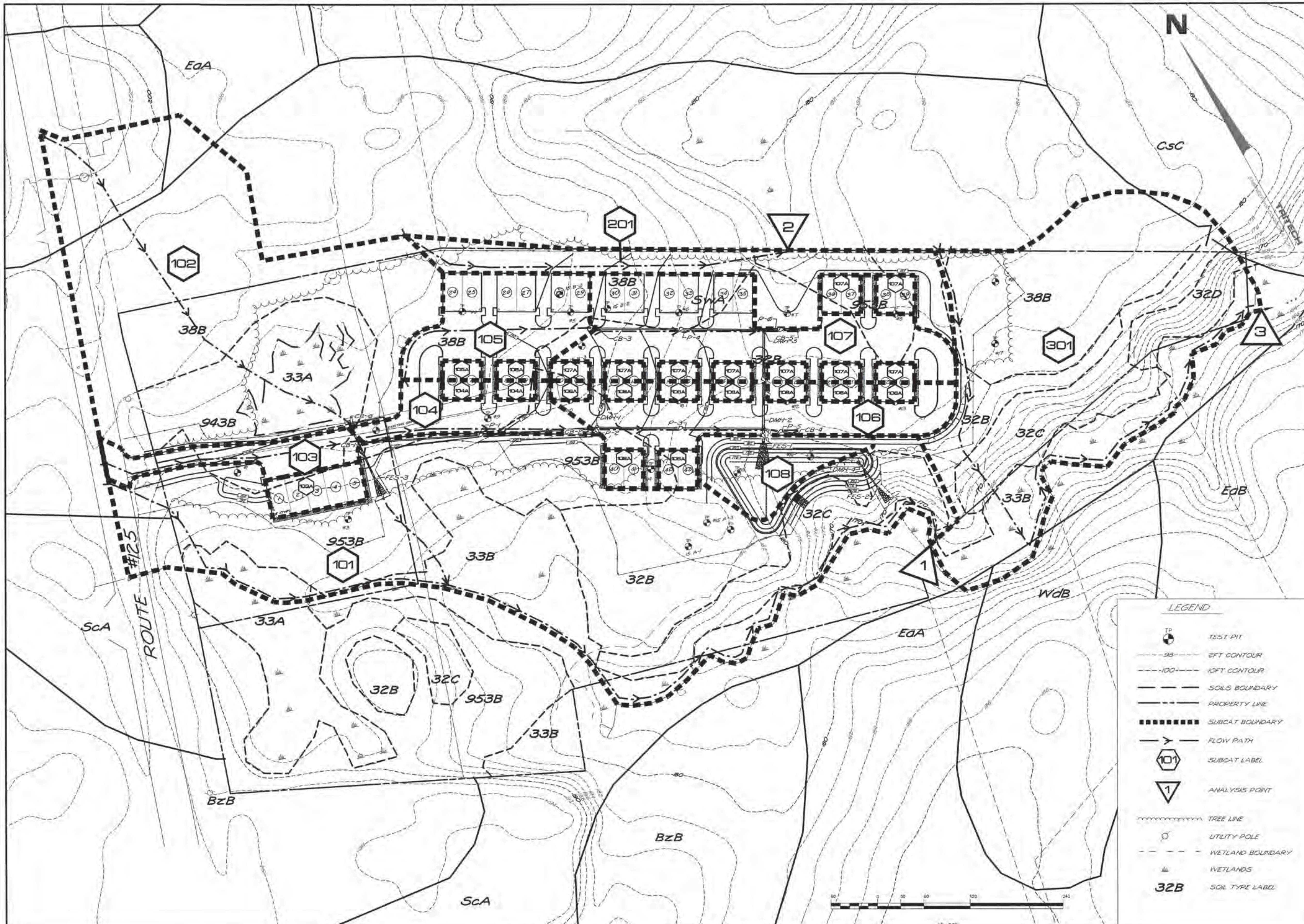
Inflow Area = 1.729 ac, 0.00% Impervious, Inflow Depth = 1.77" for 10-YR SEACOAST event
Inflow = 1.67 cfs @ 12.60 hrs, Volume= 0.255 af
Primary = 1.67 cfs @ 12.60 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Summary for Link AP-3: ANALYSIS POINT #3

Inflow Area = 3.057 ac, 0.00% Impervious, Inflow Depth = 1.69" for 10-YR SEACOAST event
Inflow = 2.28 cfs @ 12.86 hrs, Volume= 0.431 af
Primary = 2.28 cfs @ 12.86 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs



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755 CENTRAL AVENUE
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REVISIONS	
DATE:	DESCRIPTION:
6/30/20	REVISED PER PEER REVIEW

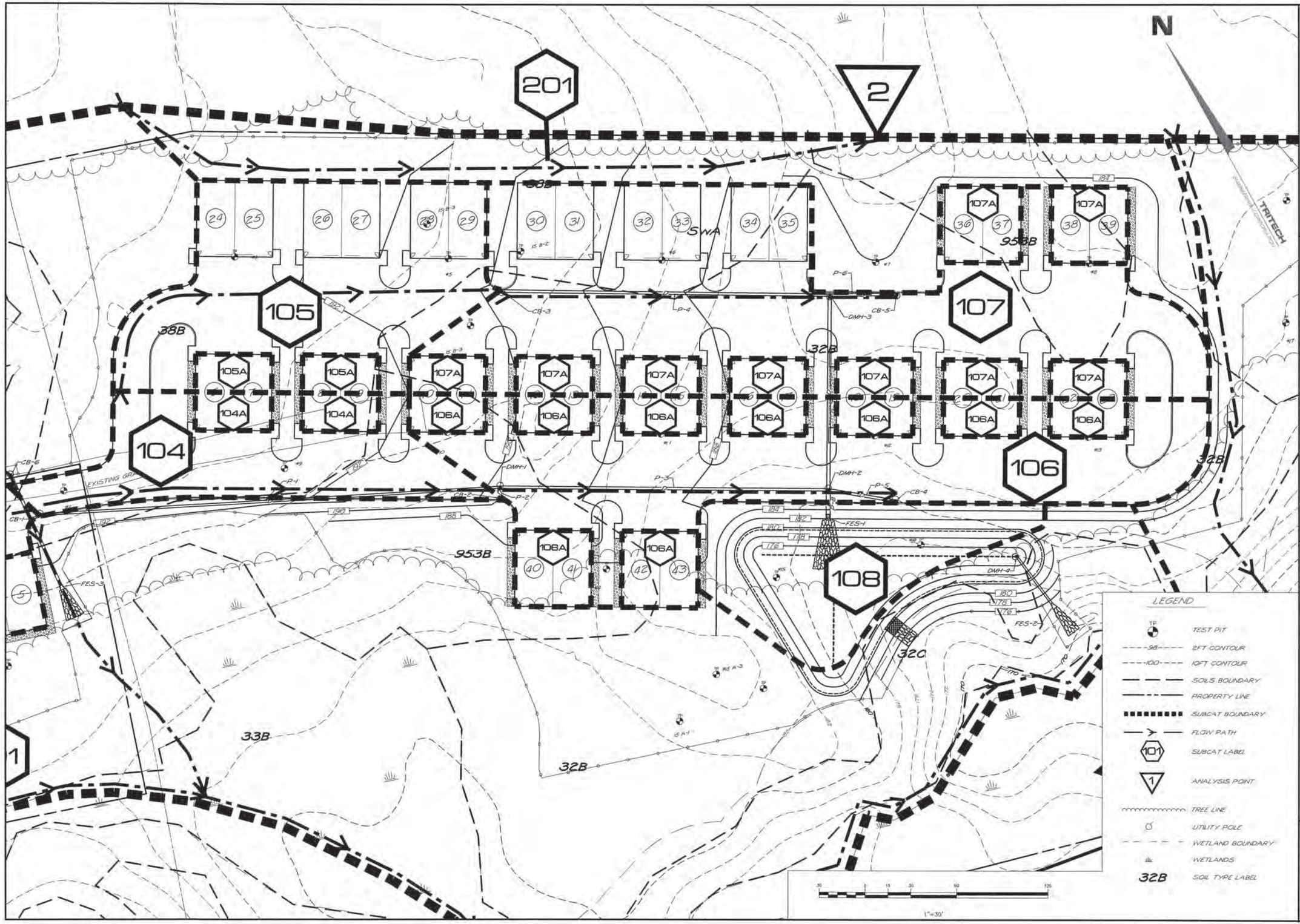
STATE OF NEW HAMPSHIRE · ROBERT J. STOWELL No. 9903 · LICENSED PROFESSIONAL ENGINEER

POSTCONSTRUCTION DRAINAGE PLAN

BARRINGTON STORAGE OFFICE

ROUTE #125
BARRINGTON, NEW HAMPSHIRE
MAY 29, 2020 JOB No. 19107
SCALE: 1" = 60'

SHEET No. **D-2**



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TELEPHONE 603 749 9171
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REVISIONS
DATE: DESCRIPTION:
8/20/20 ADDED TO PLAN SET

STATE OF NEW HAMPSHIRE - ROBERT J. STOWELL No. 9003 - LICENSED PROFESSIONAL ENGINEER

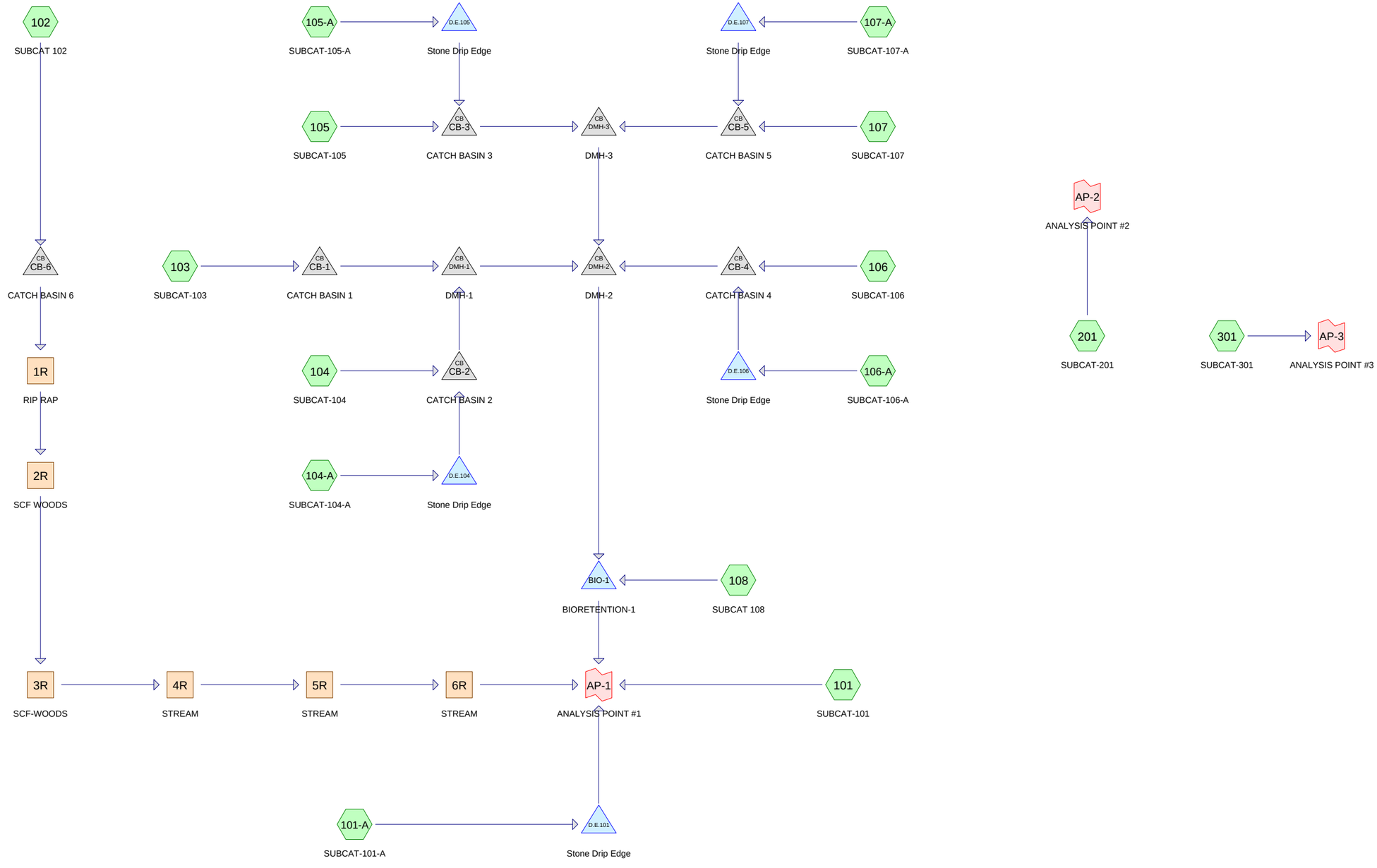
POSTCONSTRUCTION DRAINAGE PLAN

BARRINGTON STORAGE OFFICE

ROUTE #125
BARRINGTON, NEW HAMPSHIRE
JOB No. 19107

MAY 29, 2020
SCALE: 1" = 30'

SHEET No.
D-3



Routing Diagram for Barrington Storage-Office PostConstruction

Prepared by Tritech Engineering Corp.

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.217	39	>75% Grass cover, Good, HSG A (102)
0.390	61	>75% Grass cover, Good, HSG B (101, 102)
3.094	74	>75% Grass cover, Good, HSG C (101, 102, 104, 105, 106, 107, 108, 201, 301)
0.185	98	Paved roads w/curbs & sewers, HSG A (102)
0.384	98	Paved roads w/curbs & sewers, HSG B (101, 102, 103)
1.782	98	Paved roads w/curbs & sewers, HSG C (103, 104, 105, 106, 107)
1.234	98	Roofs, HSG C (101-A, 103, 104-A, 105, 105-A, 106-A, 107, 107-A)
0.064	30	Woods, Good, HSG A (301)
1.004	55	Woods, Good, HSG B (101, 102, 301)
5.148	70	Woods, Good, HSG C (101, 102, 201, 301)
1.844	77	Woods, Good, HSG D (101, 102, 301)
15.348	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.467	HSG A	102, 301
1.779	HSG B	101, 102, 103, 301
11.258	HSG C	101, 101-A, 102, 103, 104, 104-A, 105, 105-A, 106, 106-A, 107, 107-A, 108, 201, 301
1.844	HSG D	101, 102, 301
0.000	Other	
15.348		**TOTAL AREA**

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: SUBCAT-101 Runoff Area=188,382 sf 1.53% Impervious Runoff Depth=0.91"
Flow Length=1,370' Tc=25.3 min CN=73 Runoff=2.59 cfs 0.327 af

Subcatchment 101-A: SUBCAT-101-A Runoff Area=3,125 sf 100.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=98 Runoff=0.21 cfs 0.017 af

Subcatchment 102: SUBCAT 102 Runoff Area=146,573 sf 13.29% Impervious Runoff Depth=0.71"
Flow Length=575' Slope=0.0200 '/' Tc=17.7 min CN=69 Runoff=1.70 cfs 0.200 af

Subcatchment 103: SUBCAT-103 Runoff Area=14,699 sf 100.00% Impervious Runoff Depth=2.85"
Flow Length=330' Tc=4.4 min CN=98 Runoff=1.07 cfs 0.080 af

Subcatchment 104: SUBCAT-104 Runoff Area=13,835 sf 78.81% Impervious Runoff Depth=2.33"
Flow Length=268' Tc=11.9 min CN=93 Runoff=0.70 cfs 0.062 af

Subcatchment 104-A: SUBCAT-104-A Runoff Area=2,500 sf 100.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 105: SUBCAT-105 Runoff Area=25,054 sf 77.47% Impervious Runoff Depth=2.33"
Flow Length=268' Tc=11.9 min CN=93 Runoff=1.26 cfs 0.112 af

Subcatchment 105-A: SUBCAT-105-A Runoff Area=2,500 sf 100.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment 106: SUBCAT-106 Runoff Area=28,969 sf 73.36% Impervious Runoff Depth=2.24"
Flow Length=228' Tc=12.3 min CN=92 Runoff=1.39 cfs 0.124 af

Subcatchment 106-A: SUBCAT-106-A Runoff Area=13,750 sf 100.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.075 af

Subcatchment 107: SUBCAT-107 Runoff Area=49,993 sf 63.90% Impervious Runoff Depth=1.97"
Flow Length=228' Tc=12.3 min CN=89 Runoff=2.15 cfs 0.189 af

Subcatchment 107-A: SUBCAT-107-A Runoff Area=13,750 sf 100.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.075 af

Subcatchment 108: SUBCAT 108 Runoff Area=14,789 sf 0.00% Impervious Runoff Depth=0.96"
Tc=6.0 min CN=74 Runoff=0.36 cfs 0.027 af

Subcatchment 201: SUBCAT-201 Runoff Area=26,125 sf 0.00% Impervious Runoff Depth=0.91"
Flow Length=500' Tc=17.4 min CN=73 Runoff=0.42 cfs 0.045 af

Subcatchment 301: SUBCAT-301 Runoff Area=124,494 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=950' Tc=60.3 min CN=69 Runoff=0.80 cfs 0.170 af

Reach 1R: RIP RAP Avg. Flow Depth=0.23' Max Vel=1.27 fps Inflow=1.70 cfs 0.200 af
n=0.041 L=20.0' S=0.0100 '/' Capacity=23.00 cfs Outflow=1.70 cfs 0.200 af

Reach 2R: SCF WOODS Avg. Flow Depth=0.19' Max Vel=0.57 fps Inflow=1.70 cfs 0.200 af
n=0.120 L=165.0' S=0.0330 '/' Capacity=57.21 cfs Outflow=1.61 cfs 0.200 af

Reach 3R: SCF-WOODS Avg. Flow Depth=0.23' Max Vel=0.35 fps Inflow=1.61 cfs 0.200 af
n=0.120 L=270.0' S=0.0100 '/' Capacity=31.48 cfs Outflow=1.30 cfs 0.200 af

Reach 4R: STREAM Avg. Flow Depth=0.36' Max Vel=1.24 fps Inflow=1.30 cfs 0.200 af
n=0.040 L=320.0' S=0.0075 '/' Capacity=48.82 cfs Outflow=1.28 cfs 0.200 af

Reach 5R: STREAM Avg. Flow Depth=0.17' Max Vel=3.88 fps Inflow=1.28 cfs 0.200 af
n=0.040 L=40.0' S=0.2000 '/' Capacity=252.10 cfs Outflow=1.28 cfs 0.200 af

Reach 6R: STREAM Avg. Flow Depth=0.34' Max Vel=1.36 fps Inflow=1.28 cfs 0.200 af
n=0.040 L=220.0' S=0.0100 '/' Capacity=56.37 cfs Outflow=1.27 cfs 0.200 af

Pond BIO-1: BIORETENTION-1 Peak Elev=177.08' Storage=12,785 cf Inflow=6.42 cfs 0.593 af
Outflow=0.78 cfs 0.567 af

Pond CB-1: CATCH BASIN 1 Peak Elev=189.16' Inflow=1.07 cfs 0.080 af
15.0" Round Culvert n=0.013 L=300.0' S=0.0110 '/' Outflow=1.07 cfs 0.080 af

Pond CB-2: CATCH BASIN 2 Peak Elev=185.94' Inflow=0.70 cfs 0.062 af
15.0" Round Culvert n=0.013 L=7.0' S=0.0143 '/' Outflow=0.70 cfs 0.062 af

Pond CB-3: CATCH BASIN 3 Peak Elev=185.67' Inflow=1.26 cfs 0.112 af
18.0" Round Culvert n=0.013 L=215.0' S=0.0253 '/' Outflow=1.26 cfs 0.112 af

Pond CB-4: CATCH BASIN 4 Peak Elev=180.00' Inflow=1.39 cfs 0.124 af
18.0" Round Culvert n=0.013 L=44.0' S=0.0261 '/' Outflow=1.39 cfs 0.124 af

Pond CB-5: CATCH BASIN 5 Peak Elev=180.40' Inflow=2.15 cfs 0.189 af
18.0" Round Culvert n=0.013 L=44.0' S=0.0102 '/' Outflow=2.15 cfs 0.189 af

Pond CB-6: CATCH BASIN 6 Peak Elev=189.62' Inflow=1.70 cfs 0.200 af
18.0" Round Culvert n=0.013 L=80.0' S=0.0150 '/' Outflow=1.70 cfs 0.200 af

Pond D.E.101: Stone Drip Edge Peak Elev=189.68' Storage=169 cf Inflow=0.21 cfs 0.017 af
Discarded=0.04 cfs 0.017 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.017 af

Pond D.E.104: Stone Drip Edge Peak Elev=192.98' Storage=157 cf Inflow=0.17 cfs 0.014 af
Discarded=0.03 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.014 af

Pond D.E.105: Stone Drip Edge Peak Elev=192.98' Storage=157 cf Inflow=0.17 cfs 0.014 af
Discarded=0.03 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.014 af

Pond D.E.106: Stone Drip Edge Peak Elev=185.39' Storage=830 cf Inflow=0.94 cfs 0.075 af
Discarded=0.16 cfs 0.075 af Primary=0.00 cfs 0.000 af Outflow=0.16 cfs 0.075 af

Pond D.E.107: Stone Drip Edge Peak Elev=185.38' Storage=822 cf Inflow=0.94 cfs 0.075 af
Discarded=0.21 cfs 0.075 af Primary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.075 af

Pond DMH-1: DMH-1 Peak Elev=185.85' Inflow=1.58 cfs 0.142 af
18.0" Round Culvert n=0.013 L=215.0' S=0.0321 '/' Outflow=1.58 cfs 0.142 af

Pond DMH-2: DMH-2 Peak Elev=179.38' Inflow=6.11 cfs 0.566 af
30.0" Round Culvert n=0.013 L=18.0' S=0.0083 '/' Outflow=6.11 cfs 0.566 af

Pond DMH-3: DMH-3 Peak Elev=180.00' Inflow=3.41 cfs 0.300 af
24.0" Round Culvert n=0.013 L=128.0' S=0.0059 '/' Outflow=3.41 cfs 0.300 af

Link AP-1: ANALYSIS POINT #1 Inflow=4.21 cfs 1.093 af
Primary=4.21 cfs 1.093 af

Link AP-2: ANALYSIS POINT #2 Inflow=0.42 cfs 0.045 af
Primary=0.42 cfs 0.045 af

Link AP-3: ANALYSIS POINT #3 Inflow=0.80 cfs 0.170 af
Primary=0.80 cfs 0.170 af

Total Runoff Area = 15.348 ac Runoff Volume = 1.529 af Average Runoff Depth = 1.20"
76.64% Pervious = 11.762 ac 23.36% Impervious = 3.586 ac

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: SUBCAT-101 Runoff Area=188,382 sf 1.53% Impervious Runoff Depth=1.99"
Flow Length=1,370' Tc=25.3 min CN=73 Runoff=6.07 cfs 0.719 af

Subcatchment 101-A: SUBCAT-101-A Runoff Area=3,125 sf 100.00% Impervious Runoff Depth=4.39"
Tc=6.0 min CN=98 Runoff=0.32 cfs 0.026 af

Subcatchment 102: SUBCAT 102 Runoff Area=146,573 sf 13.29% Impervious Runoff Depth=1.69"
Flow Length=575' Slope=0.0200 '/' Tc=17.7 min CN=69 Runoff=4.56 cfs 0.475 af

Subcatchment 103: SUBCAT-103 Runoff Area=14,699 sf 100.00% Impervious Runoff Depth=4.39"
Flow Length=330' Tc=4.4 min CN=98 Runoff=1.62 cfs 0.124 af

Subcatchment 104: SUBCAT-104 Runoff Area=13,835 sf 78.81% Impervious Runoff Depth=3.84"
Flow Length=268' Tc=11.9 min CN=93 Runoff=1.12 cfs 0.102 af

Subcatchment 104-A: SUBCAT-104-A Runoff Area=2,500 sf 100.00% Impervious Runoff Depth=4.39"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Subcatchment 105: SUBCAT-105 Runoff Area=25,054 sf 77.47% Impervious Runoff Depth=3.84"
Flow Length=268' Tc=11.9 min CN=93 Runoff=2.02 cfs 0.184 af

Subcatchment 105-A: SUBCAT-105-A Runoff Area=2,500 sf 100.00% Impervious Runoff Depth=4.39"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.021 af

Subcatchment 106: SUBCAT-106 Runoff Area=28,969 sf 73.36% Impervious Runoff Depth=3.73"
Flow Length=228' Tc=12.3 min CN=92 Runoff=2.27 cfs 0.207 af

Subcatchment 106-A: SUBCAT-106-A Runoff Area=13,750 sf 100.00% Impervious Runoff Depth=4.39"
Tc=6.0 min CN=98 Runoff=1.43 cfs 0.116 af

Subcatchment 107: SUBCAT-107 Runoff Area=49,993 sf 63.90% Impervious Runoff Depth=3.42"
Flow Length=228' Tc=12.3 min CN=89 Runoff=3.67 cfs 0.327 af

Subcatchment 107-A: SUBCAT-107-A Runoff Area=13,750 sf 100.00% Impervious Runoff Depth=4.39"
Tc=6.0 min CN=98 Runoff=1.43 cfs 0.116 af

Subcatchment 108: SUBCAT 108 Runoff Area=14,789 sf 0.00% Impervious Runoff Depth=2.07"
Tc=6.0 min CN=74 Runoff=0.82 cfs 0.059 af

Subcatchment 201: SUBCAT-201 Runoff Area=26,125 sf 0.00% Impervious Runoff Depth=1.99"
Flow Length=500' Tc=17.4 min CN=73 Runoff=0.99 cfs 0.100 af

Subcatchment 301: SUBCAT-301 Runoff Area=124,494 sf 0.00% Impervious Runoff Depth=1.69"
Flow Length=950' Tc=60.3 min CN=69 Runoff=2.13 cfs 0.403 af

Reach 1R: RIP RAP Avg. Flow Depth=0.41' Max Vel=1.76 fps Inflow=4.56 cfs 0.475 af
n=0.041 L=20.0' S=0.0100 '/' Capacity=23.00 cfs Outflow=4.55 cfs 0.475 af

Reach 2R: SCF WOODS Avg. Flow Depth=0.31' Max Vel=0.78 fps Inflow=4.55 cfs 0.475 af
n=0.120 L=165.0' S=0.0330 '/' Capacity=57.21 cfs Outflow=4.42 cfs 0.475 af

Reach 3R: SCF-WOODS Avg. Flow Depth=0.38' Max Vel=0.49 fps Inflow=4.42 cfs 0.475 af
n=0.120 L=270.0' S=0.0100 '/' Capacity=31.48 cfs Outflow=3.85 cfs 0.475 af

Reach 4R: STREAM Avg. Flow Depth=0.60' Max Vel=1.72 fps Inflow=3.85 cfs 0.475 af
n=0.040 L=320.0' S=0.0075 '/' Capacity=48.82 cfs Outflow=3.80 cfs 0.475 af

Reach 5R: STREAM Avg. Flow Depth=0.28' Max Vel=5.39 fps Inflow=3.80 cfs 0.475 af
n=0.040 L=40.0' S=0.2000 '/' Capacity=252.10 cfs Outflow=3.80 cfs 0.475 af

Reach 6R: STREAM Avg. Flow Depth=0.56' Max Vel=1.90 fps Inflow=3.80 cfs 0.475 af
n=0.040 L=220.0' S=0.0100 '/' Capacity=56.37 cfs Outflow=3.78 cfs 0.474 af

Pond BIO-1: BIORETENTION-1 Peak Elev=178.39' Storage=24,276 cf Inflow=13.16 cfs 1.035 af
Outflow=0.93 cfs 0.999 af

Pond CB-1: CATCH BASIN 1 Peak Elev=189.31' Inflow=1.62 cfs 0.124 af
15.0" Round Culvert n=0.013 L=300.0' S=0.0110 '/' Outflow=1.62 cfs 0.124 af

Pond CB-2: CATCH BASIN 2 Peak Elev=186.23' Inflow=1.35 cfs 0.105 af
15.0" Round Culvert n=0.013 L=7.0' S=0.0143 '/' Outflow=1.35 cfs 0.105 af

Pond CB-3: CATCH BASIN 3 Peak Elev=185.88' Inflow=2.22 cfs 0.187 af
18.0" Round Culvert n=0.013 L=215.0' S=0.0253 '/' Outflow=2.22 cfs 0.187 af

Pond CB-4: CATCH BASIN 4 Peak Elev=180.51' Inflow=3.50 cfs 0.221 af
18.0" Round Culvert n=0.013 L=44.0' S=0.0261 '/' Outflow=3.50 cfs 0.221 af

Pond CB-5: CATCH BASIN 5 Peak Elev=181.11' Inflow=4.78 cfs 0.340 af
18.0" Round Culvert n=0.013 L=44.0' S=0.0102 '/' Outflow=4.78 cfs 0.340 af

Pond CB-6: CATCH BASIN 6 Peak Elev=190.17' Inflow=4.56 cfs 0.475 af
18.0" Round Culvert n=0.013 L=80.0' S=0.0150 '/' Outflow=4.56 cfs 0.475 af

Pond D.E.101: Stone Drip Edge Peak Elev=190.00' Storage=249 cf Inflow=0.32 cfs 0.026 af
Discarded=0.04 cfs 0.024 af Primary=0.18 cfs 0.002 af Outflow=0.22 cfs 0.026 af

Pond D.E.104: Stone Drip Edge Peak Elev=193.00' Storage=160 cf Inflow=0.26 cfs 0.021 af
Discarded=0.03 cfs 0.018 af Primary=0.29 cfs 0.003 af Outflow=0.32 cfs 0.021 af

Pond D.E.105: Stone Drip Edge Peak Elev=193.00' Storage=160 cf Inflow=0.26 cfs 0.021 af
Discarded=0.03 cfs 0.018 af Primary=0.29 cfs 0.003 af Outflow=0.32 cfs 0.021 af

Pond D.E.106: Stone Drip Edge Peak Elev=185.50' Storage=936 cf Inflow=1.43 cfs 0.116 af
Discarded=0.16 cfs 0.101 af Primary=1.28 cfs 0.014 af Outflow=1.44 cfs 0.116 af

Pond D.E.107: Stone Drip Edge Peak Elev=185.50' Storage=936 cf Inflow=1.43 cfs 0.116 af
Discarded=0.21 cfs 0.102 af Primary=1.27 cfs 0.013 af Outflow=1.48 cfs 0.116 af

Pond DMH-1: DMH-1 Peak Elev=186.06' Inflow=2.60 cfs 0.228 af
18.0" Round Culvert n=0.013 L=215.0' S=0.0321 '/' Outflow=2.60 cfs 0.228 af

Pond DMH-2: DMH-2 Peak Elev=180.02' Inflow=12.46 cfs 0.976 af
30.0" Round Culvert n=0.013 L=18.0' S=0.0083 '/' Outflow=12.46 cfs 0.976 af

Pond DMH-3: DMH-3 Peak Elev=180.60' Inflow=6.88 cfs 0.527 af
24.0" Round Culvert n=0.013 L=128.0' S=0.0059 '/' Outflow=6.88 cfs 0.527 af

Link AP-1: ANALYSIS POINT #1 Inflow=10.44 cfs 2.194 af
Primary=10.44 cfs 2.194 af

Link AP-2: ANALYSIS POINT #2 Inflow=0.99 cfs 0.100 af
Primary=0.99 cfs 0.100 af

Link AP-3: ANALYSIS POINT #3 Inflow=2.13 cfs 0.403 af
Primary=2.13 cfs 0.403 af

Total Runoff Area = 15.348 ac Runoff Volume = 2.997 af Average Runoff Depth = 2.34"
76.64% Pervious = 11.762 ac 23.36% Impervious = 3.586 ac

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment101: SUBCAT-101 Runoff Area=188,382 sf 1.53% Impervious Runoff Depth=3.92"
Flow Length=1,370' Tc=25.3 min CN=73 Runoff=12.14 cfs 1.412 af

Subcatchment101-A: SUBCAT-101-A Runoff Area=3,125 sf 100.00% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.040 af

Subcatchment102: SUBCAT 102 Runoff Area=146,573 sf 13.29% Impervious Runoff Depth=3.50"
Flow Length=575' Slope=0.0200 '/' Tc=17.7 min CN=69 Runoff=9.75 cfs 0.981 af

Subcatchment103: SUBCAT-103 Runoff Area=14,699 sf 100.00% Impervious Runoff Depth=6.74"
Flow Length=330' Tc=4.4 min CN=98 Runoff=2.45 cfs 0.190 af

Subcatchment104: SUBCAT-104 Runoff Area=13,835 sf 78.81% Impervious Runoff Depth=6.15"
Flow Length=268' Tc=11.9 min CN=93 Runoff=1.75 cfs 0.163 af

Subcatchment104-A: SUBCAT-104-A Runoff Area=2,500 sf 100.00% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.032 af

Subcatchment105: SUBCAT-105 Runoff Area=25,054 sf 77.47% Impervious Runoff Depth=6.15"
Flow Length=268' Tc=11.9 min CN=93 Runoff=3.16 cfs 0.295 af

Subcatchment105-A: SUBCAT-105-A Runoff Area=2,500 sf 100.00% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=98 Runoff=0.39 cfs 0.032 af

Subcatchment106: SUBCAT-106 Runoff Area=28,969 sf 73.36% Impervious Runoff Depth=6.04"
Flow Length=228' Tc=12.3 min CN=92 Runoff=3.58 cfs 0.334 af

Subcatchment106-A: SUBCAT-106-A Runoff Area=13,750 sf 100.00% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=98 Runoff=2.16 cfs 0.177 af

Subcatchment107: SUBCAT-107 Runoff Area=49,993 sf 63.90% Impervious Runoff Depth=5.69"
Flow Length=228' Tc=12.3 min CN=89 Runoff=5.95 cfs 0.544 af

Subcatchment107-A: SUBCAT-107-A Runoff Area=13,750 sf 100.00% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=98 Runoff=2.16 cfs 0.177 af

Subcatchment108: SUBCAT 108 Runoff Area=14,789 sf 0.00% Impervious Runoff Depth=4.02"
Tc=6.0 min CN=74 Runoff=1.60 cfs 0.114 af

Subcatchment201: SUBCAT-201 Runoff Area=26,125 sf 0.00% Impervious Runoff Depth=3.92"
Flow Length=500' Tc=17.4 min CN=73 Runoff=1.97 cfs 0.196 af

Subcatchment301: SUBCAT-301 Runoff Area=124,494 sf 0.00% Impervious Runoff Depth=3.50"
Flow Length=950' Tc=60.3 min CN=69 Runoff=4.58 cfs 0.833 af

Reach 1R: RIP RAP Avg. Flow Depth=0.63' Max Vel=2.24 fps Inflow=9.75 cfs 0.981 af
n=0.041 L=20.0' S=0.0100 '/' Capacity=23.00 cfs Outflow=9.75 cfs 0.981 af

Reach 2R: SCF WOODS Avg. Flow Depth=0.44' Max Vel=0.99 fps Inflow=9.75 cfs 0.981 af
n=0.120 L=165.0' S=0.0330 '/' Capacity=57.21 cfs Outflow=9.55 cfs 0.981 af

Reach 3R: SCF-WOODS Avg. Flow Depth=0.55' Max Vel=0.64 fps Inflow=9.55 cfs 0.981 af
n=0.120 L=270.0' S=0.0100 '/' Capacity=31.48 cfs Outflow=8.68 cfs 0.981 af

Reach 4R: STREAM Avg. Flow Depth=0.88' Max Vel=2.19 fps Inflow=8.68 cfs 0.981 af
n=0.040 L=320.0' S=0.0075 '/' Capacity=48.82 cfs Outflow=8.59 cfs 0.981 af

Reach 5R: STREAM Avg. Flow Depth=0.41' Max Vel=6.91 fps Inflow=8.59 cfs 0.981 af
n=0.040 L=40.0' S=0.2000 '/' Capacity=252.10 cfs Outflow=8.59 cfs 0.981 af

Reach 6R: STREAM Avg. Flow Depth=0.82' Max Vel=2.42 fps Inflow=8.59 cfs 0.981 af
n=0.040 L=220.0' S=0.0100 '/' Capacity=56.37 cfs Outflow=8.56 cfs 0.980 af

Pond BIO-1: BIORETENTION-1 Peak Elev=179.60' Storage=37,136 cf Inflow=21.12 cfs 1.740 af
Outflow=4.31 cfs 1.650 af

Pond CB-1: CATCH BASIN 1 Peak Elev=189.51' Inflow=2.45 cfs 0.190 af
15.0" Round Culvert n=0.013 L=300.0' S=0.0110 '/' Outflow=2.45 cfs 0.190 af

Pond CB-2: CATCH BASIN 2 Peak Elev=186.53' Inflow=2.08 cfs 0.171 af
15.0" Round Culvert n=0.013 L=7.0' S=0.0143 '/' Outflow=2.08 cfs 0.171 af

Pond CB-3: CATCH BASIN 3 Peak Elev=186.12' Inflow=3.49 cfs 0.303 af
18.0" Round Culvert n=0.013 L=215.0' S=0.0253 '/' Outflow=3.49 cfs 0.303 af

Pond CB-4: CATCH BASIN 4 Peak Elev=181.37' Inflow=5.68 cfs 0.378 af
18.0" Round Culvert n=0.013 L=44.0' S=0.0261 '/' Outflow=5.68 cfs 0.378 af

Pond CB-5: CATCH BASIN 5 Peak Elev=182.97' Inflow=8.01 cfs 0.584 af
18.0" Round Culvert n=0.013 L=44.0' S=0.0102 '/' Outflow=8.01 cfs 0.584 af

Pond CB-6: CATCH BASIN 6 Peak Elev=191.81' Inflow=9.75 cfs 0.981 af
18.0" Round Culvert n=0.013 L=80.0' S=0.0150 '/' Outflow=9.75 cfs 0.981 af

Pond D.E.101: Stone Drip Edge Peak Elev=190.01' Storage=250 cf Inflow=0.49 cfs 0.040 af
Discarded=0.04 cfs 0.032 af Primary=0.67 cfs 0.008 af Outflow=0.72 cfs 0.040 af

Pond D.E.104: Stone Drip Edge Peak Elev=193.01' Storage=160 cf Inflow=0.39 cfs 0.032 af
Discarded=0.03 cfs 0.024 af Primary=0.43 cfs 0.008 af Outflow=0.45 cfs 0.032 af

Pond D.E.105: Stone Drip Edge Peak Elev=193.01' Storage=160 cf Inflow=0.39 cfs 0.032 af
Discarded=0.03 cfs 0.024 af Primary=0.43 cfs 0.008 af Outflow=0.45 cfs 0.032 af

Pond D.E.106: Stone Drip Edge Peak Elev=185.51' Storage=936 cf Inflow=2.16 cfs 0.177 af
Discarded=0.16 cfs 0.134 af Primary=2.53 cfs 0.043 af Outflow=2.69 cfs 0.177 af

Pond D.E.107: Stone Drip Edge Peak Elev=185.51' Storage=936 cf Inflow=2.16 cfs 0.177 af
Discarded=0.21 cfs 0.137 af Primary=2.58 cfs 0.040 af Outflow=2.79 cfs 0.177 af

Pond DMH-1: DMH-1 Peak Elev=186.35' Inflow=4.17 cfs 0.361 af
18.0" Round Culvert n=0.013 L=215.0' S=0.0321 '/' Outflow=4.17 cfs 0.361 af

Pond DMH-2: DMH-2 Peak Elev=180.66' Inflow=19.68 cfs 1.626 af
30.0" Round Culvert n=0.013 L=18.0' S=0.0083 '/' Outflow=19.68 cfs 1.626 af

Pond DMH-3: DMH-3 Peak Elev=181.55' Inflow=11.36 cfs 0.888 af
24.0" Round Culvert n=0.013 L=128.0' S=0.0059 '/' Outflow=11.36 cfs 0.888 af

Link AP-1: ANALYSIS POINT #1 Inflow=24.30 cfs 4.050 af
Primary=24.30 cfs 4.050 af

Link AP-2: ANALYSIS POINT #2 Inflow=1.97 cfs 0.196 af
Primary=1.97 cfs 0.196 af

Link AP-3: ANALYSIS POINT #3 Inflow=4.58 cfs 0.833 af
Primary=4.58 cfs 0.833 af

Total Runoff Area = 15.348 ac Runoff Volume = 5.521 af Average Runoff Depth = 4.32"
76.64% Pervious = 11.762 ac 23.36% Impervious = 3.586 ac

Summary for Subcatchment 101: SUBCAT-101

Runoff = 6.07 cfs @ 12.37 hrs, Volume= 0.719 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
3,282	55	Woods, Good, HSG B
2,372	61	>75% Grass cover, Good, HSG B
2,875	98	Paved roads w/curbs & sewers, HSG B
98,068	70	Woods, Good, HSG C
35,915	74	>75% Grass cover, Good, HSG C
45,870	77	Woods, Good, HSG D
188,382	73	Weighted Average
185,507		98.47% Pervious Area
2,875		1.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0200	1.05		**Sheet Flow, Sheet Paved** Smooth surfaces n= 0.011 P2= 3.00"
4.9	70	0.0600	0.24		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
1.7	90	0.0300	0.87		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
5.8	175	0.0100	0.50		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
10.0	425	0.0200	0.71		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
1.5	320	0.0075	3.66	48.82	**Parabolic Channel, Stream** W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.040 Mountain streams
0.0	40	0.2000	18.91	252.10	**Parabolic Channel, Stream** W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.040 Mountain streams
0.9	220	0.0100	4.23	56.37	**Parabolic Channel, Stream** W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.040 Mountain streams
25.3	1,370	Total			

Summary for Subcatchment 101-A: SUBCAT-101-A

Runoff = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
3,125	98	Roofs, HSG C
3,125		100.00% Impervious Area

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

Summary for Subcatchment 102: SUBCAT 102

Runoff = 4.56 cfs @ 12.25 hrs, Volume= 0.475 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
9,461	39	>75% Grass cover, Good, HSG A
8,063	98	Paved roads w/curbs & sewers, HSG A
28,410	55	Woods, Good, HSG B
14,637	61	>75% Grass cover, Good, HSG B
11,420	98	Paved roads w/curbs & sewers, HSG B
51,719	70	Woods, Good, HSG C
11,506	74	>75% Grass cover, Good, HSG C
11,357	77	Woods, Good, HSG D
146,573	69	Weighted Average
127,090		86.71% Pervious Area
19,483		13.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	45	0.0200	1.14		**Sheet Flow, Sheet Road** Smooth surfaces n= 0.011 P2= 3.00"
6.3	55	0.0200	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, Shallow Paved** Paved Kv= 20.3 fps
10.6	450	0.0200	0.71		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
17.7	575	Total			

Summary for Subcatchment 103: SUBCAT-103

Runoff = 1.62 cfs @ 12.06 hrs, Volume= 0.124 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
2,444	98	Paved roads w/curbs & sewers, HSG B
3,125	98	Roofs, HSG C
9,130	98	Paved roads w/curbs & sewers, HSG C
14,699	98	Weighted Average
14,699		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0100	1.01		**Sheet Flow, Sheet Road** Smooth surfaces n= 0.011 P2= 3.00"
2.7	230	0.0050	1.44		**Shallow Concentrated Flow, Shallow Road** Paved Kv= 20.3 fps
4.4	330	Total			

Summary for Subcatchment 104: SUBCAT-104

Runoff = 1.12 cfs @ 12.16 hrs, Volume= 0.102 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
2,931	74	>75% Grass cover, Good, HSG C
10,904	98	Paved roads w/curbs & sewers, HSG C
13,835	93	Weighted Average
2,931		21.19% Pervious Area
10,904		78.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0050	0.08		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
0.5	28	0.0200	1.03		**Sheet Flow, Sheet Road** Smooth surfaces n= 0.011 P2= 3.00"
1.3	190	0.0150	2.49		**Shallow Concentrated Flow, Shallow Road** Paved Kv= 20.3 fps
11.9	268	Total			

Summary for Subcatchment 104-A: SUBCAT-104-A

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
2,500	98	Roofs, HSG C
2,500		100.00% Impervious Area

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

Summary for Subcatchment 105: SUBCAT-105

Runoff = 2.02 cfs @ 12.16 hrs, Volume= 0.184 af, Depth= 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
5,644	74	>75% Grass cover, Good, HSG C
11,910	98	Paved roads w/curbs & sewers, HSG C
7,500	98	Roofs, HSG C
25,054	93	Weighted Average
5,644		22.53% Pervious Area
19,410		77.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0050	0.08		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
0.5	28	0.0200	1.03		**Sheet Flow, Sheet Road** Smooth surfaces n= 0.011 P2= 3.00"
1.3	190	0.0150	2.49		**Shallow Concentrated Flow, Shallow Road** Paved Kv= 20.3 fps
11.9	268	Total			

Summary for Subcatchment 105-A: SUBCAT-105-A

Runoff = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
2,500	98	Roofs, HSG C
2,500		100.00% Impervious Area

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

Summary for Subcatchment 106: SUBCAT-106

Runoff = 2.27 cfs @ 12.16 hrs, Volume= 0.207 af, Depth= 3.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
7,716	74	>75% Grass cover, Good, HSG C
21,253	98	Paved roads w/curbs & sewers, HSG C
28,969	92	Weighted Average
7,716		26.64% Pervious Area
21,253		73.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0050	0.08		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
0.5	28	0.0200	1.03		**Sheet Flow, Sheet Road** Smooth surfaces n= 0.011 P2= 3.00"
1.7	150	0.0050	1.44		**Shallow Concentrated Flow, Shallow Road** Paved Kv= 20.3 fps
12.3	228	Total			

Summary for Subcatchment 106-A: SUBCAT-106-A

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.116 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
13,750	98	Roofs, HSG C
13,750		100.00% Impervious Area

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

Summary for Subcatchment 107: SUBCAT-107

Runoff = 3.67 cfs @ 12.17 hrs, Volume= 0.327 af, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
18,045	74	>75% Grass cover, Good, HSG C
7,500	98	Roofs, HSG C
24,448	98	Paved roads w/curbs & sewers, HSG C
49,993	89	Weighted Average
18,045		36.10% Pervious Area
31,948		63.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	50	0.0050	0.08		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
0.5	28	0.0200	1.03		**Sheet Flow, Sheet Road** Smooth surfaces n= 0.011 P2= 3.00"
1.7	150	0.0050	1.44		**Shallow Concentrated Flow, Shallow Road** Paved Kv= 20.3 fps
12.3	228	Total			

Summary for Subcatchment 107-A: SUBCAT-107-A

Runoff = 1.43 cfs @ 12.08 hrs, Volume= 0.116 af, Depth= 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
13,750	98	Roofs, HSG C
13,750		100.00% Impervious Area

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

Summary for Subcatchment 108: SUBCAT 108

Runoff = 0.82 cfs @ 12.09 hrs, Volume= 0.059 af, Depth= 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
14,789	74	>75% Grass cover, Good, HSG C
14,789		100.00% Pervious Area

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

Summary for Subcatchment 201: SUBCAT-201

Runoff = 0.99 cfs @ 12.24 hrs, Volume= 0.100 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
21,075	74	>75% Grass cover, Good, HSG C
5,050	70	Woods, Good, HSG C
26,125	73	Weighted Average
26,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0150	0.15		**Sheet Flow, Sheet Grass** Grass: Short n= 0.150 P2= 3.00"
3.3	170	0.0150	0.86		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
2.7	230	0.0400	1.40		**Shallow Concentrated Flow, Shallow Grass** Short Grass Pasture Kv= 7.0 fps
17.4	500	Total			

Summary for Subcatchment 301: SUBCAT-301

Runoff = 2.13 cfs @ 12.86 hrs, Volume= 0.403 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR SEACOAST Rainfall=4.63"

Area (sf)	CN	Description
2,799	30	Woods, Good, HSG A
12,043	55	Woods, Good, HSG B
17,154	74	>75% Grass cover, Good, HSG C
69,412	70	Woods, Good, HSG C
23,086	77	Woods, Good, HSG D
124,494	69	Weighted Average
124,494		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.0	100	0.0100	0.03		**Sheet Flow, Sheet Woods** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.5	130	0.0150	0.61		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
1.1	75	0.0500	1.12		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
0.5	60	0.1800	2.12		**Shallow Concentrated Flow, Shallow Woods** Woodland Kv= 5.0 fps
4.2	585	0.0075	2.31	7.69	**Parabolic Channel, Stream** W=5.00' D=1.00' Area=3.3 sf Perim=5.5' n= 0.040 Mountain streams
60.3	950	Total			

Summary for Reach 1R: RIP RAP

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth = 1.69" for 10-YR SEACOAST event
Inflow = 4.56 cfs @ 12.25 hrs, Volume= 0.475 af
Outflow = 4.55 cfs @ 12.26 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.76 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 0.5 min

Peak Storage= 52 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 7.48'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 23.00 cfs

5.00' x 1.00' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 3.0 '/' Top Width= 11.00'
Length= 20.0' Slope= 0.0100 '/'
Inlet Invert= 187.75', Outlet Invert= 187.55'

‡

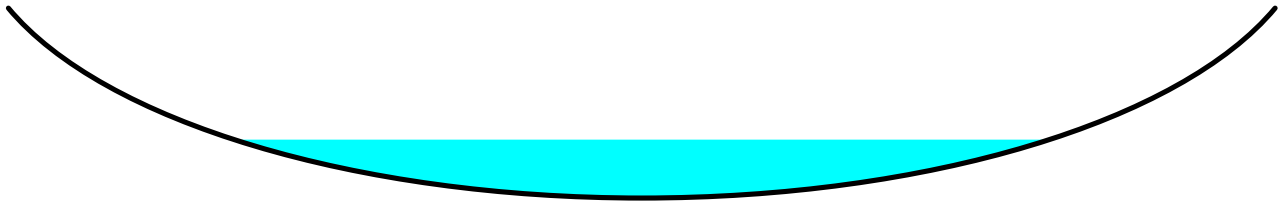
Summary for Reach 2R: SCF WOODS

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth = 1.69" for 10-YR SEACOAST event
Inflow = 4.55 cfs @ 12.26 hrs, Volume= 0.475 af
Outflow = 4.42 cfs @ 12.31 hrs, Volume= 0.475 af, Atten= 3%, Lag= 2.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.78 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.28 fps, Avg. Travel Time= 10.0 min

Peak Storage= 933 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.31' , Surface Width= 27.68'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 57.21 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.120 Heavy timber, flow below branches
Length= 165.0' Slope= 0.0330 '/'
Inlet Invert= 187.55', Outlet Invert= 182.10'



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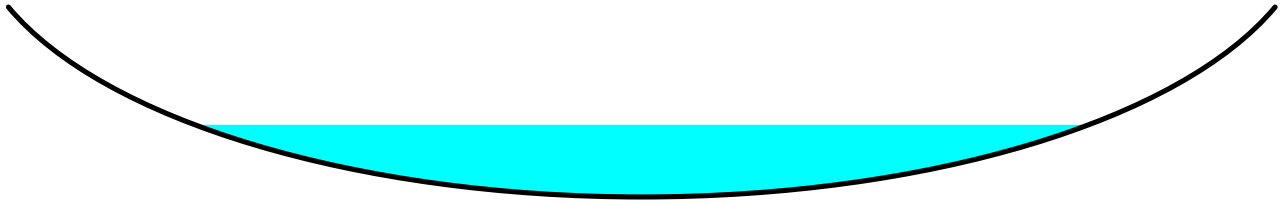
Summary for Reach 3R: SCF-WOODS

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth = 1.69" for 10-YR SEACOAST event
Inflow = 4.42 cfs @ 12.31 hrs, Volume= 0.475 af
Outflow = 3.85 cfs @ 12.42 hrs, Volume= 0.475 af, Atten= 13%, Lag= 7.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.49 fps, Min. Travel Time= 9.1 min
Avg. Velocity = 0.18 fps, Avg. Travel Time= 24.3 min

Peak Storage= 2,099 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 30.78'
Bank-Full Depth= 1.00' Flow Area= 33.3 sf, Capacity= 31.48 cfs

50.00' x 1.00' deep Parabolic Channel, n= 0.120 Heavy timber, flow below branches
Length= 270.0' Slope= 0.0100 '/'
Inlet Invert= 182.05', Outlet Invert= 179.35'



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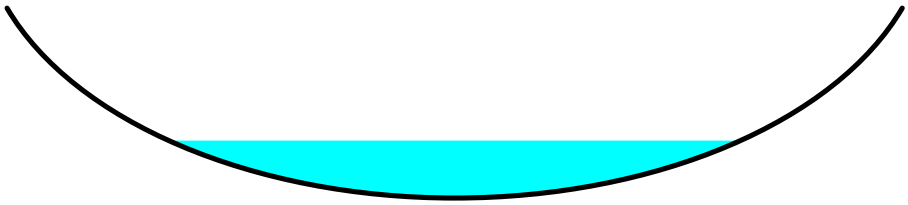
Summary for Reach 4R: STREAM

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth > 1.69" for 10-YR SEACOAST event
Inflow = 3.85 cfs @ 12.42 hrs, Volume= 0.475 af
Outflow = 3.80 cfs @ 12.47 hrs, Volume= 0.475 af, Atten= 1%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.72 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.66 fps, Avg. Travel Time= 8.1 min

Peak Storage= 707 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.60' , Surface Width= 5.49'
Bank-Full Depth= 2.00' Flow Area= 13.3 sf, Capacity= 48.82 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 320.0' Slope= 0.0075 '/'
Inlet Invert= 179.35', Outlet Invert= 176.95'



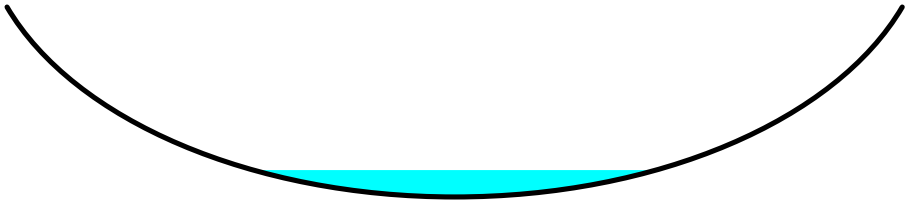
Summary for Reach 5R: STREAM

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth > 1.69" for 10-YR SEACOAST event
Inflow = 3.80 cfs @ 12.47 hrs, Volume= 0.475 af
Outflow = 3.80 cfs @ 12.47 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 5.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 0.3 min

Peak Storage= 28 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.28' , Surface Width= 3.75'
Bank-Full Depth= 2.00' Flow Area= 13.3 sf, Capacity= 252.10 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 40.0' Slope= 0.2000 '/'
Inlet Invert= 176.95', Outlet Invert= 168.95'



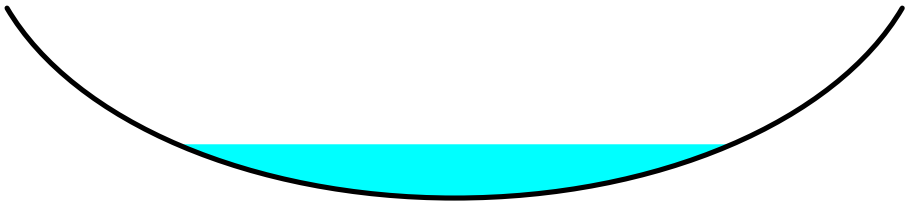
Summary for Reach 6R: STREAM

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth > 1.69" for 10-YR SEACOAST event
Inflow = 3.80 cfs @ 12.47 hrs, Volume= 0.475 af
Outflow = 3.78 cfs @ 12.49 hrs, Volume= 0.474 af, Atten= 0%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.90 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 5.0 min

Peak Storage= 438 cf @ 12.49 hrs
Average Depth at Peak Storage= 0.56' , Surface Width= 5.31'
Bank-Full Depth= 2.00' Flow Area= 13.3 sf, Capacity= 56.37 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.040 Mountain streams
Length= 220.0' Slope= 0.0100 '/'
Inlet Invert= 168.95', Outlet Invert= 166.75'



Summary for Pond BIO-1: BIORETENTION-1

Inflow Area = 4.129 ac, 72.68% Impervious, Inflow Depth = 3.01" for 10-YR SEACOAST event
Inflow = 13.16 cfs @ 12.14 hrs, Volume= 1.035 af
Outflow = 0.93 cfs @ 13.58 hrs, Volume= 0.999 af, Atten= 93%, Lag= 86.5 min
Primary = 0.93 cfs @ 13.58 hrs, Volume= 0.999 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 178.39' @ 13.58 hrs Surf.Area= 9,725 sf Storage= 24,276 cf

Plug-Flow detention time= 297.6 min calculated for 0.999 af (97% of inflow)
Center-of-Mass det. time= 277.5 min (1,066.8 - 789.3)

Volume	Invert	Avail.Storage	Storage Description
#1	173.25'	41,865 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.25	6,338	0.0	0	0
173.26	6,338	40.0	25	25
174.24	6,338	40.0	2,484	2,510
174.25	6,338	40.0	25	2,535
174.49	6,338	40.0	608	3,144
174.50	6,338	20.0	13	3,156
175.99	6,338	20.0	1,889	5,045
176.00	6,338	100.0	63	5,108
178.00	9,138	100.0	15,476	20,584
179.50	11,386	100.0	15,393	35,977
180.00	12,164	100.0	5,888	41,865

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**15.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 173.50' / 173.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	179.00'	**0.5" x 4.5" Horiz. Orifice/Grate X 14.00 columns** X 4 rows C= 0.600 in 22.0" x 22.0" Grate (26% open area)

			Limited to weir flow at low heads
#3	Device 1	173.55'	**6.0" Round UnderDrain** L= 240.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 173.55' / 173.50' S= 0.0002 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#4	Device 3	173.25'	**6.000 in/hr Exfiltration over Surface area**
#5	Primary	179.60'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.93 cfs @ 13.58 hrs HW=178.39' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.93 cfs of 12.20 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=UnderDrain** (Barrel Controls 0.93 cfs @ 4.71 fps)
    - **4=Exfiltration** (Passes 0.93 cfs of 1.35 cfs potential flow)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond CB-1: CATCH BASIN 1

Inflow Area =	0.337 ac,100.00% Impervious,	Inflow Depth =	4.39"	for 10-YR SEACOAST event
Inflow =	1.62 cfs @	12.06 hrs, Volume=	0.124 af	
Outflow =	1.62 cfs @	12.06 hrs, Volume=	0.124 af, Atten= 0%, Lag= 0.0 min	
Primary =	1.62 cfs @	12.06 hrs, Volume=	0.124 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 189.31' @ 12.06 hrs
Flood Elev= 193.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	188.60'	**15.0" Round Culvert** L= 300.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.60' / 185.30' S= 0.0110 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.61 cfs @ 12.06 hrs HW=189.31' TW=186.02' (Dynamic Tailwater)
- **1=Culvert** (Inlet Controls 1.61 cfs @ 2.26 fps)

Summary for Pond CB-2: CATCH BASIN 2

Inflow Area =	0.375 ac, 82.06% Impervious,	Inflow Depth =	3.34"	for 10-YR SEACOAST event
Inflow =	1.35 cfs @	12.12 hrs, Volume=	0.105 af	
Outflow =	1.35 cfs @	12.12 hrs, Volume=	0.105 af, Atten= 0%, Lag= 0.0 min	
Primary =	1.35 cfs @	12.12 hrs, Volume=	0.105 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 186.23' @ 12.12 hrs
Flood Elev= 189.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	185.40'	**15.0" Round Culvert**

L= 7.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 185.40' / 185.30' S= 0.0143 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.33 cfs @ 12.12 hrs HW=186.22' TW=186.05' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.33 cfs @ 1.56 fps)

Summary for Pond CB-3: CATCH BASIN 3

Inflow Area = 0.633 ac, 79.52% Impervious, Inflow Depth = 3.54" for 10-YR SEACOAST event
Inflow = 2.22 cfs @ 12.14 hrs, Volume= 0.187 af
Outflow = 2.22 cfs @ 12.14 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.14 hrs, Volume= 0.187 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 185.88' @ 12.14 hrs
Flood Elev= 189.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	185.10'	**18.0" Round Culvert**
			L= 215.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 185.10' / 179.65' S= 0.0253 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.21 cfs @ 12.14 hrs HW=185.88' TW=180.59' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.21 cfs @ 2.38 fps)

Summary for Pond CB-4: CATCH BASIN 4

Inflow Area = 0.981 ac, 81.94% Impervious, Inflow Depth = 2.70" for 10-YR SEACOAST event
Inflow = 3.50 cfs @ 12.14 hrs, Volume= 0.221 af
Outflow = 3.50 cfs @ 12.14 hrs, Volume= 0.221 af, Atten= 0%, Lag= 0.0 min
Primary = 3.50 cfs @ 12.14 hrs, Volume= 0.221 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 180.51' @ 12.14 hrs
Flood Elev= 184.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.40'	**18.0" Round Culvert**
			L= 44.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 179.40' / 178.25' S= 0.0261 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.47 cfs @ 12.14 hrs HW=180.51' TW=180.02' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.47 cfs @ 3.46 fps)

Summary for Pond CB-5: CATCH BASIN 5

Inflow Area = 1.463 ac, 71.69% Impervious, Inflow Depth = 2.79" for 10-YR SEACOAST event
Inflow = 4.78 cfs @ 12.13 hrs, Volume= 0.340 af
Outflow = 4.78 cfs @ 12.13 hrs, Volume= 0.340 af, Atten= 0%, Lag= 0.0 min
Primary = 4.78 cfs @ 12.13 hrs, Volume= 0.340 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 181.11' @ 12.13 hrs
Flood Elev= 184.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.55'	**18.0" Round Culvert** L= 44.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.55' / 179.10' S= 0.0102 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.74 cfs @ 12.13 hrs HW=181.10' TW=180.60' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.74 cfs @ 2.68 fps)

Summary for Pond CB-6: CATCH BASIN 6

Inflow Area = 3.365 ac, 13.29% Impervious, Inflow Depth = 1.69" for 10-YR SEACOAST event
Inflow = 4.56 cfs @ 12.25 hrs, Volume= 0.475 af
Outflow = 4.56 cfs @ 12.25 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min
Primary = 4.56 cfs @ 12.25 hrs, Volume= 0.475 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 190.17' @ 12.25 hrs
Flood Elev= 192.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	188.95'	**18.0" Round Culvert** L= 80.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.95' / 187.75' S= 0.0150 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.55 cfs @ 12.25 hrs HW=190.17' TW=188.16' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.55 cfs @ 2.96 fps)

Summary for Pond D.E.101: Stone Drip Edge

Inflow Area = 0.072 ac,100.00% Impervious, Inflow Depth = 4.39" for 10-YR SEACOAST event
Inflow = 0.32 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.22 cfs @ 12.21 hrs, Volume= 0.026 af, Atten= 31%, Lag= 7.7 min
Discarded = 0.04 cfs @ 11.68 hrs, Volume= 0.024 af
Primary = 0.18 cfs @ 12.21 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 190.00' @ 12.21 hrs Surf.Area= 625 sf Storage= 249 cf

Plug-Flow detention time= 29.4 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 29.4 min (778.7 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1	189.00'	250 cf	**5.00'W x 125.00'L x 1.00'H Drip Edges** 625 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	189.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	189.99'	**125.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.04 cfs @ 11.68 hrs HW=189.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.16 cfs @ 12.21 hrs HW=190.00' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.16 cfs @ 0.21 fps)

Summary for Pond D.E.104: Stone Drip Edge

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth = 4.39" for 10-YR SEACOAST event
Inflow = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af
Outflow = 0.32 cfs @ 12.12 hrs, Volume= 0.021 af, Atten= 0%, Lag= 2.2 min
Discarded = 0.03 cfs @ 11.61 hrs, Volume= 0.018 af
Primary = 0.29 cfs @ 12.12 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 193.00' @ 12.12 hrs Surf.Area= 400 sf Storage= 160 cf

Plug-Flow detention time= 27.9 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 27.9 min (777.3 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1	192.00'	160 cf	**5.00'W x 80.00'L x 1.00'H Drip Edges** 400 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	192.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	192.99'	**80.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 11.61 hrs HW=192.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.28 cfs @ 12.12 hrs HW=193.00' TW=186.22' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.28 cfs @ 0.30 fps)

Summary for Pond D.E.105: Stone Drip Edge

Inflow Area = 0.057 ac,100.00% Impervious, Inflow Depth = 4.39" for 10-YR SEACOAST event
Inflow = 0.26 cfs @ 12.08 hrs, Volume= 0.021 af
Outflow = 0.32 cfs @ 12.12 hrs, Volume= 0.021 af, Atten= 0%, Lag= 2.2 min
Discarded = 0.03 cfs @ 11.61 hrs, Volume= 0.018 af
Primary = 0.29 cfs @ 12.12 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 193.00' @ 12.12 hrs Surf.Area= 400 sf Storage= 160 cf

Plug-Flow detention time= 27.9 min calculated for 0.021 af (100% of inflow)
Center-of-Mass det. time= 27.9 min (777.3 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1	192.00'	160 cf	**5.00'W x 80.00'L x 1.00'H Drip Edges** 400 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	192.00'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	192.99'	**80.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 11.61 hrs HW=192.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.28 cfs @ 12.12 hrs HW=193.00' TW=185.88' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.28 cfs @ 0.30 fps)

Summary for Pond D.E.106: Stone Drip Edge

Inflow Area = 0.316 ac,100.00% Impervious, Inflow Depth = 4.39" for 10-YR SEACOAST event
Inflow = 1.43 cfs @ 12.08 hrs, Volume= 0.116 af
Outflow = 1.44 cfs @ 12.14 hrs, Volume= 0.116 af, Atten= 0%, Lag= 3.4 min
Discarded = 0.16 cfs @ 11.64 hrs, Volume= 0.101 af
Primary = 1.28 cfs @ 12.14 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 185.50' @ 12.14 hrs Surf.Area= 2,340 sf Storage= 936 cf

Plug-Flow detention time= 28.3 min calculated for 0.116 af (100% of inflow)
Center-of-Mass det. time= 28.3 min (777.6 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1	184.50'	936 cf	**6.50'W x 360.00'L x 1.00'H Drip Edges** 2,340 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	184.50'	**3.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	185.49'	**360.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.16 cfs @ 11.64 hrs HW=184.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=1.26 cfs @ 12.14 hrs HW=185.50' TW=180.51' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 1.26 cfs @ 0.29 fps)

Summary for Pond D.E.107: Stone Drip Edge

Inflow Area = 0.316 ac,100.00% Impervious, Inflow Depth = 4.39" for 10-YR SEACOAST event
Inflow = 1.43 cfs @ 12.08 hrs, Volume= 0.116 af
Outflow = 1.48 cfs @ 12.13 hrs, Volume= 0.116 af, Atten= 0%, Lag= 2.8 min
Discarded = 0.21 cfs @ 12.13 hrs, Volume= 0.102 af
Primary = 1.27 cfs @ 12.13 hrs, Volume= 0.013 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 185.50' @ 12.13 hrs Surf.Area= 2,340 sf Storage= 936 cf

Plug-Flow detention time= 26.4 min calculated for 0.116 af (100% of inflow)
Center-of-Mass det. time= 26.4 min (775.8 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1	184.50'	936 cf	**6.50'W x 360.00'L x 1.00'H Drip Edges** 2,340 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	184.50'	**3.000 in/hr Exfiltration over Wetted area** Phase-In= 0.10'
#2	Primary	185.49'	**360.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 12.13 hrs HW=185.50' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=1.26 cfs @ 12.13 hrs HW=185.50' TW=181.11' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 1.26 cfs @ 0.29 fps)

Summary for Pond DMH-1: DMH-1

Inflow Area = 0.712 ac, 90.56% Impervious, Inflow Depth = 3.84" for 10-YR SEACOAST event
Inflow = 2.60 cfs @ 12.12 hrs, Volume= 0.228 af
Outflow = 2.60 cfs @ 12.12 hrs, Volume= 0.228 af, Atten= 0%, Lag= 0.0 min
Primary = 2.60 cfs @ 12.12 hrs, Volume= 0.228 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 186.06' @ 12.12 hrs
Flood Elev= 189.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	185.20'	**18.0" Round Culvert** L= 215.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 185.20' / 178.30' S= 0.0321 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.58 cfs @ 12.12 hrs HW=186.05' TW=179.87' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.58 cfs @ 2.48 fps)

Summary for Pond DMH-2: DMH-2

Inflow Area = 3.789 ac, 79.20% Impervious, Inflow Depth = 3.09" for 10-YR SEACOAST event
Inflow = 12.46 cfs @ 12.14 hrs, Volume= 0.976 af
Outflow = 12.46 cfs @ 12.14 hrs, Volume= 0.976 af, Atten= 0%, Lag= 0.0 min
Primary = 12.46 cfs @ 12.14 hrs, Volume= 0.976 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 180.02' @ 12.14 hrs
Flood Elev= 185.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.15'	**30.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.15' / 178.00' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=12.44 cfs @ 12.14 hrs HW=180.02' TW=177.05' (Dynamic Tailwater)
1=Culvert (Barrel Controls 12.44 cfs @ 4.40 fps)

Summary for Pond DMH-3: DMH-3

Inflow Area = 2.096 ac, 74.05% Impervious, Inflow Depth = 3.02" for 10-YR SEACOAST event
Inflow = 6.88 cfs @ 12.13 hrs, Volume= 0.527 af
Outflow = 6.88 cfs @ 12.13 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min
Primary = 6.88 cfs @ 12.13 hrs, Volume= 0.527 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 180.60' @ 12.13 hrs
Flood Elev= 184.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.00'	**24.0" Round Culvert** L= 128.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.00' / 178.25' S= 0.0059 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=6.83 cfs @ 12.13 hrs HW=180.60' TW=179.99' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 6.83 cfs @ 3.47 fps)

Summary for Link AP-1: ANALYSIS POINT #1

Inflow Area = 11.890 ac, 30.16% Impervious, Inflow Depth > 2.21" for 10-YR SEACOAST event
Inflow = 10.44 cfs @ 12.42 hrs, Volume= 2.194 af
Primary = 10.44 cfs @ 12.42 hrs, Volume= 2.194 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Summary for Link AP-2: ANALYSIS POINT #2

Inflow Area = 0.600 ac, 0.00% Impervious, Inflow Depth = 1.99" for 10-YR SEACOAST event
Inflow = 0.99 cfs @ 12.24 hrs, Volume= 0.100 af
Primary = 0.99 cfs @ 12.24 hrs, Volume= 0.100 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

Summary for Link AP-3: ANALYSIS POINT #3

Inflow Area = 2.858 ac, 0.00% Impervious, Inflow Depth = 1.69" for 10-YR SEACOAST event
Inflow = 2.13 cfs @ 12.86 hrs, Volume= 0.403 af
Primary = 2.13 cfs @ 12.86 hrs, Volume= 0.403 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs

DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,

& SITE DEVELOPMENT PLAN

NARRATIVE
FOR

BARRINGTON STORAGE-OFFICE
CALEF HIGHWAY

BARRINGTON, NEW HAMPSHIRE

MAY 2020
REVISED JULY 2020

SECTION II

EXHIBITS

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.984 degrees West
Latitude	43.243 degrees North
Elevation	0 feet
Date/Time	Thu, 07 May 2020 10:37:42 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.49	0.65	0.81	1.02	**1yr**	0.70	0.98	1.19	1.53	1.97	2.55	2.82	**1yr**	2.26	2.71	3.13	3.85	4.42	**1yr**
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.16	1.49	1.89	2.41	3.08	3.44	**2yr**	2.73	3.30	3.80	4.53	5.16	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.57	**5yr**	1.06	1.44	1.84	2.36	3.03	3.89	4.39	**5yr**	3.44	4.22	4.85	5.70	6.45	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.84	**10yr**	1.23	1.69	2.17	2.80	3.60	4.63	5.29	**10yr**	4.10	5.09	5.83	6.79	7.64	**10yr**
25yr	0.47	0.74	0.94	1.30	1.73	2.27	**25yr**	1.49	2.08	2.69	3.50	4.53	5.85	6.77	**25yr**	5.18	6.51	7.43	8.56	9.55	**25yr**
50yr	0.52	0.83	1.07	1.49	2.01	2.67	**50yr**	1.74	2.45	3.18	4.15	5.40	6.98	8.16	**50yr**	6.18	7.85	8.94	10.20	11.32	**50yr**
100yr	0.59	0.95	1.22	1.72	2.34	3.14	**100yr**	2.02	2.88	3.75	4.92	6.42	8.33	9.84	**100yr**	7.38	9.46	10.76	12.16	13.42	**100yr**
200yr	0.65	1.06	1.38	1.97	2.73	3.70	**200yr**	2.36	3.39	4.44	5.85	7.65	9.95	11.87	**200yr**	8.81	11.42	12.96	14.51	15.92	**200yr**
500yr	0.77	1.26	1.65	2.39	3.35	4.58	**500yr**	2.89	4.21	5.52	7.33	9.64	12.60	15.22	**500yr**	11.15	14.64	16.56	18.33	19.97	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.36	0.44	0.60	0.73	0.90	**1yr**	0.63	0.88	0.91	1.25	1.50	1.97	2.47	**1yr**	1.74	2.38	2.92	3.29	3.96	**1yr**
2yr	0.31	0.48	0.59	0.80	0.99	1.18	**2yr**	0.86	1.15	1.35	1.81	2.33	2.99	3.34	**2yr**	2.65	3.21	3.69	4.41	5.03	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.60	2.13	2.76	3.60	4.05	**5yr**	3.19	3.90	4.52	5.34	6.03	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.56	1.81	2.42	3.11	4.12	4.69	**10yr**	3.65	4.51	5.24	6.16	6.90	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.91	**25yr**	1.35	1.87	2.12	2.83	3.61	4.92	5.67	**25yr**	4.36	5.45	6.39	7.40	8.17	**25yr**
50yr	0.49	0.74	0.92	1.33	1.78	2.19	**50yr**	1.54	2.14	2.37	3.19	4.03	5.62	6.54	**50yr**	4.97	6.29	7.43	8.52	9.42	**50yr**
100yr	0.55	0.82	1.03	1.49	2.05	2.52	**100yr**	1.77	2.46	2.68	3.58	4.48	6.41	7.54	**100yr**	5.67	7.25	8.64	9.81	10.74	**100yr**
200yr	0.61	0.91	1.16	1.68	2.34	2.89	**200yr**	2.02	2.82	3.00	4.03	4.99	7.30	8.70	**200yr**	6.46	8.37	10.06	11.30	12.26	**200yr**
500yr	0.71	1.06	1.36	1.98	2.82	3.49	**500yr**	2.43	3.41	3.52	4.70	5.76	8.62	10.50	**500yr**	7.63	10.10	12.31	13.63	14.56	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.07	**1yr**	0.75	1.05	1.23	1.72	2.17	2.77	3.02	**1yr**	2.45	2.91	3.35	4.14	4.74	**1yr**
2yr	0.33	0.50	0.62	0.84	1.03	1.24	**2yr**	0.89	1.21	1.46	1.93	2.50	3.19	3.55	**2yr**	2.82	3.42	3.93	4.67	5.32	**2yr**
5yr	0.39	0.60	0.75	1.02	1.30	1.57	**5yr**	1.12	1.53	1.83	2.47	3.16	4.17	4.72	**5yr**	3.69	4.54	5.18	6.08	6.84	**5yr**
10yr	0.45	0.70	0.87	1.21	1.56	1.90	**10yr**	1.35	1.85	2.21	3.00	3.81	5.14	5.86	**10yr**	4.55	5.64	6.44	7.42	8.29	**10yr**
25yr	0.55	0.84	1.05	1.50	1.97	2.43	**25yr**	1.70	2.38	2.84	3.91	4.89	6.80	7.83	**25yr**	6.02	7.53	8.54	9.80	10.75	**25yr**
50yr	0.64	0.98	1.22	1.75	2.35	2.93	**50yr**	2.03	2.86	3.44	4.75	5.93	8.40	9.75	**50yr**	7.44	9.38	10.59	12.03	13.19	**50yr**
100yr	0.75	1.13	1.42	2.05	2.81	3.53	**100yr**	2.42	3.45	4.17	5.80	7.20	10.39	12.16	**100yr**	9.19	11.69	13.12	14.78	16.09	**100yr**
200yr	0.87	1.31	1.66	2.40	3.35	4.26	**200yr**	2.89	4.17	5.06	7.08	8.74	12.89	15.18	**200yr**	11.40	14.60	16.27	18.15	19.66	**200yr**
500yr	1.06	1.58	2.04	2.96	4.21	5.45	**500yr**	3.63	5.32	6.53	9.24	11.30	17.17	20.35	**500yr**	15.19	19.57	21.62	23.87	25.66	**500yr**

Powered by ACIS Northeast Regional Climate Center

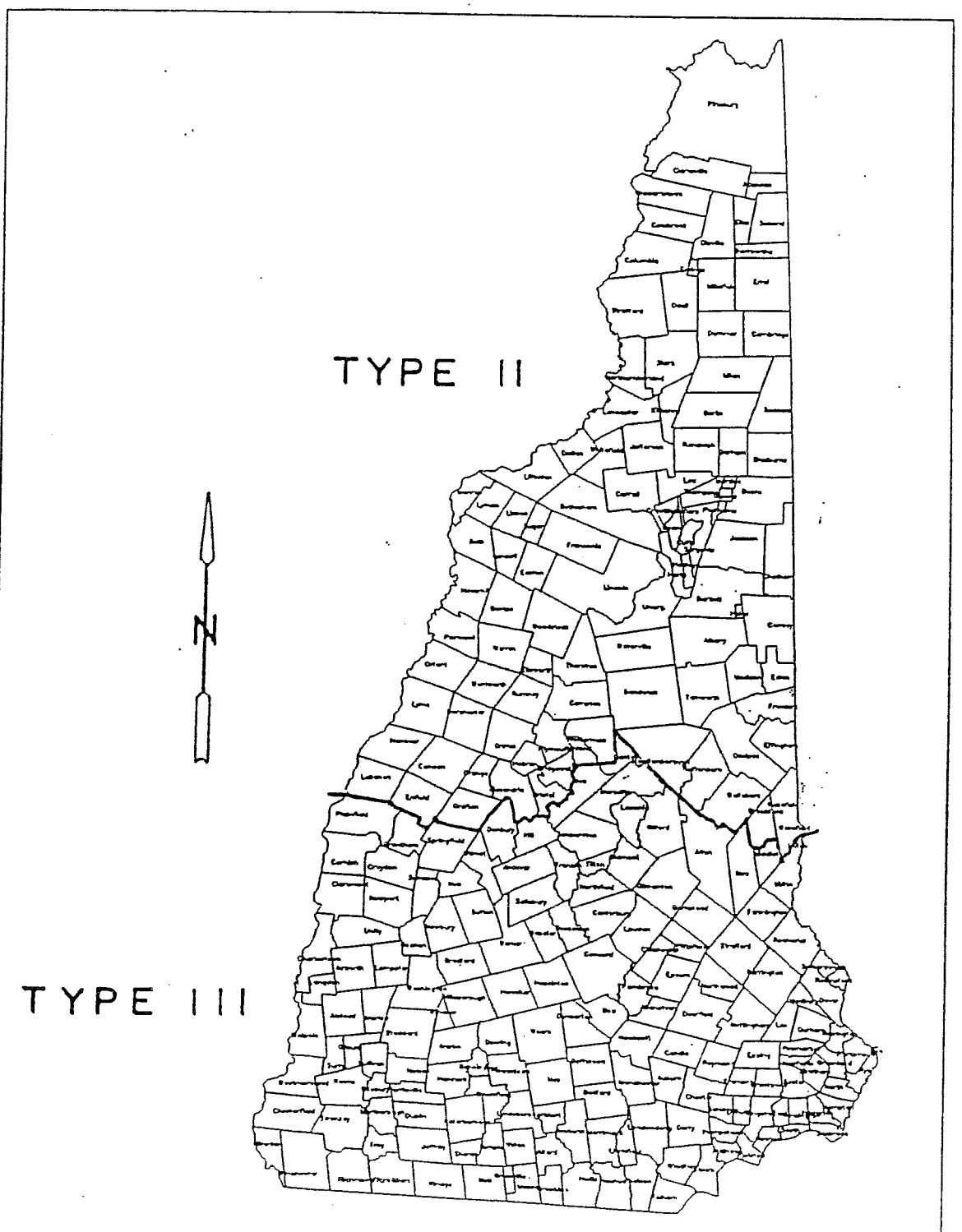


FIGURE 6-5 -- BOUNDARY FOR SCS RAINFALL DISTRIBUTION

Source: USDA Soil Conservation Service

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
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
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
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand 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
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Madawaska, aquentic	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
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
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
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
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep

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
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
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
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	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
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
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
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
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
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
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over silt
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
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
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
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	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
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C

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
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
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
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
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
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
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
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
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
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
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
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
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
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
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
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
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
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	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
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand 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
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam

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
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
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	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
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Ricker	674	2.0	6.0	2.00	6.0	A	4	Organic over bedrock (up to 4" of mineral)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep

no longer recognized
organic materials

TABLE 6-4.1 -- RUNOFF CURVE NUMBERS (Average Watershed Condition)

COVER DESCRIPTION Cover type and hydrologic condition	Average percent impervious area[2]	CURVE NUMBERS FOR HYDROLOGIC SOIL GROUP A	B	C	D
FULLY DEVELOPED URBAN AREAS[1] (Vegetation Established)					
Lawns, open spaces, parks, golf courses, cemeteries, etc.					
good condition; grass cover on 75% or more of the area		39	61	74	80
fair condition; grass cover on 50% to 75% of the area		49	69	79	84
poor condition; grass cover on 50% or less of the area		68	79	86	89
Paved parking lots, roofs, driveways, etc.		98	98	98	98
Streets and roads;					
paved with curbs and storm sewers		98	98	98	98
gravel		76	85	89	91
dirt		72	82	87	89
paved with open ditches		83	89	92	93
Commercial and business areas	85	89	92	94	95
Industrial districts	72	81	88	91	93
Row houses, town houses, and residential					
with lot sizes 1/8 acre or less	65	77	85	90	92
Residential					
Average lot size					
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acre	12	46	65	77	82
DEVELOPING URBAN AREAS[3] (No vegetation Established)					
Newly graded area		77	86	91	94

1. For land uses with impervious areas, curve numbers are computed assuming that 100% of runoff from impervious areas is directly connected to the drainage system. Pervious areas (lawn) are considered to be equivalent to lawns in good condition and the impervious areas have an RCN of 98.

2. Includes paved streets.

3. Use for the design of temporary measures during grading and construction. Impervious area percent for urban areas under development vary considerably. The user will determine the percent impervious. Then using the newly graded area RCN and Table 6-4, the composite RCN can be computed for any degree of development.

Source: USDA Soil Conservation Service

TABLE 6-4.2 -- RUNOFF CURVE NUMBERS (Average Watershed Condition)

COVER DESCRIPTION			CURVE NUMBERS FOR HYDROLOGIC SOIL GROUP			
Cover type and hydrologic condition		Hydrologic condition[4]	A	B	C	D
CULTIVATED AGRICULTURAL LAND						
Fallow	Bare soil		77	86	91	94
	Crop residue cover (CR)	poor	76	85	90	93
	CR	good	74	83	88	90
Row crops	Straight row (SR)	poor	72	81	88	91
	SR	good	67	78	85	89
	SR & CR	poor	71	80	87	90
	SR & CR	good	64	75	82	85
	Contoured (C)	poor	70	79	84	88
	C	good	65	75	82	86
	C & CR	poor	69	78	83	87
	C & CR	good	64	74	81	85
	Contoured & Terraces (C&T)	poor	66	74	80	82
	C&T	good	62	71	78	81
	C&T & CR	poor	65	73	79	81
	C&T & CR	good	61	70	77	80
Small grain	SR	poor	65	76	84	88
	SR	good	63	75	83	87
	SR & CR	poor	64	75	83	86
	SR & CR	good	60	72	80	84
	C	poor	63	74	82	85
	C	good	61	73	81	84
	C & CR	poor	62	73	81	84
	C & CR	good	60	72	80	83
	C&T	poor	61	72	79	82
	C&T	good	59	70	78	81
	C&T & CR	poor	60	71	78	81
	C&T & CR	good	58	69	77	80
Close-seeded Legumes or Rotation Meadow[5]	SR	poor	66	77	85	89
	SR	good	58	72	81	85
	C	poor	64	75	83	85
	C	good	55	69	78	83
	C&T	poor	63	73	80	83
	C&T	good	51	67	76	80

4. For conservation tillage poor hydrologic condition, 5 to 20 percent of the surface is covered with residue (less than 750 #/acre row crops or 300#/acre small grain).
   For conservation tillage good hydrologic condition, more than 20 percent of the surface is covered with residue (greater than 750 #/acre row crops or 300 #/acre small grain).
5. Close-drilled or broadcast.

Source: USDA Soil Conservation Service

TABLE 6-4.3 -- RUNOFF CURVE NUMBERS (Average Watershed Condition)

COVER DESCRIPTION Cover type and hydrologic condition	Hydrologic condition[6]	CURVE NUMBERS FOR HYDROLOGIC SOIL GROUP A	B	C	D
NON-CULTIVATED AGRICULTURAL LAND					
Pasture, grassland, or range - continuous forage for grazing	poor	68	79	86	89
	fair	49	69	79	84
	good	39	61	74	80
Meadow - continuous grass, protected from grazing and generally mowed for hay	---	30	58	71	78
Woods-grass combination (orchard or tree farm)	poor	57	73	82	86
	fair	43	65	76	82
	good	32	58	72	79
Brush - brush-weed-grass mixture with brush the major element	poor	48	67	77	83
	fair	35	56	70	77
	good	30	48	65	73
Woods	poor	45	66	77	83
	fair	36	60	73	79
	good	30	55	70	77
Farmsteads - buildings, lanes, driveways, and surrounding lots	---	59	74	82	86

6. Poor hydrologic condition has less than 50 percent ground cover density.
Fair hydrologic condition has between 50 and 75 percent ground cover density.
Good hydrologic condition has more than 75 percent ground cover density.

Source: USDA Soil Conservation Service

Appendix C: Manning's Number Table

VALUES OF THE ROUGHNESS COEFFICIENT n
(**Boldface** figures are values generally recommended in design)

Type of channel and description	Minimum	Normal	Maximum
A. CLOSED CONDUITS FLOWING PARTLY FULL			
A-1. Metal			
a. Brass, smooth	0.009	**0.010**	0.013
b. Steel			
1. Lockbar and welded	0.010	0.012	0.014
2. Riveted and spiral	0.013	0.016	0.017
c. Cast iron			
1. Coated	0.010	0.013	0.014
2. Uncoated	0.011	0.014	0.016
d. Wrought iron			
1. Black	0.012	0.014	0.015
2. Galvanized	0.013	0.016	0.017
e. Corrugated metal			
1. Subdrain	0.017	0.019	0.021
2. Storm drain	0.021	**0.024**	0.030
A-2. Nonmetal			
a. Lucite	0.008	0.009	0.010
b. Glass	0.009	**0.010**	0.013
c. Cement			
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.011	0.013	0.015
d. Concrete			
1. Culvert, straight and free of debris	0.010	0.011	0.013
2. Culvert with bends, connections, and some debris	0.011	**0.013**	0.014
3. Finished	0.011	0.012	0.014
4. Sewer with manholes, inlet, etc., straight	0.013	0.015	0.017
5. Unfinished, steel form	0.012	0.013	0.014
6. Unfinished, smooth wood form	0.012	**0.014**	0.016
7. Unfinished, rough wood form	0.015	0.017	0.020
e. Wood			
1. Stave	0.010	0.012	0.014
2. Laminated, treated	0.015	0.017	0.020
f. Clay			
1. Common drainage tile	0.011	**0.013**	0.017
2. Vitrified sewer	0.011	0.014	0.017
3. Vitrified sewer with manholes, inlet, etc.	0.013	0.015	0.017
4. Vitrified subdrain with open joint	0.014	**0.016**	0.018
g. Brickwork			
1. Glazed	0.011	**0.013**	0.015
2. Lined with cement mortar	0.012	**0.015**	0.017
h. Sanitary sewers coated with sewage slimes, with bends and connections	0.012	**0.013**	0.016
i. Paved invert, sewer, smooth bottom	0.016	0.019	0.020
j. Rubble masonry, cemented	0.018	0.025	0.030

VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
B. LINED OR BUILT-UP CHANNELS			
B-1. Metal			
a. Smooth steel surface			
1. Unpainted	0.011	**0.012**	0.014
2. Painted	0.012	0.013	0.017
b. Corrugated	0.021	0.025	0.030
B-2. Nonmetal			
a. Cement			
1. Neat, surface	0.010	0.011	0.013
2. Mortar	0.011	0.013	0.015
b. Wood			
1. Planed, untreated	0.010	0.012	0.014
2. Planed, creosoted	0.011	0.012	0.015
3. Unplaned	0.011	0.013	0.015
4. Plank with battens	0.012	0.015	0.018
5. Lined with roofing paper	0.010	0.014	0.017
c. Concrete			
1. Trowel finish	0.011	**0.013**	0.015
2. Float finish	0.013	0.015	0.016
3. Finished, with gravel on bottom	0.015	0.017	0.020
4. Unfinished	0.014	0.017	0.020
5. Gunite, good section	0.016	0.019	0.023
6. Gunite, wavy section	0.018	0.022	0.025
7. On good excavated rock	0.017	0.020	
8. On irregular excavated rock	0.022	0.027	
d. Concrete bottom float finished with sides of			
1. Dressed stone in mortar	0.015	0.017	0.020
2. Random stone in mortar	0.017	0.020	0.024
3. Cement rubble masonry, plastered	0.016	0.020	0.024
4. Cement rubble masonry	0.020	0.025	0.030
5. Dry rubble or riprap	0.020	0.030	0.035
e. Gravel bottom with sides of			
1. Formed concrete	0.017	0.020	0.025
2. Random stone in mortar	0.020	0.023	0.026
3. Dry rubble or riprap	0.023	0.033	0.036
f. Brick			
1. Glazed	0.011	**0.013**	0.015
2. In cement mortar	0.012	**0.015**	0.018
g. Masonry			
1. Cemented rubble	0.017	**0.025**	0.030
2. Dry rubble	0.023	0.032	0.035
h. Dressed ashlar	0.013	0.015	0.017
i. Asphalt			
1. Smooth	0.013	0.013	
2. Rough	0.016	0.016	
j. Vegetal lining	0.030	.....	0.500

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Values of the Roughness Coefficient *n* (continued)

Type of channel and description	Minimum	Normal	Maximum
C. Excavated or Dredged			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
D. Natural Streams			
D-1. Minor streams (top width at flood stage <100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

Values of the Roughness Coefficient *n* (continued)

Type of channel and description	Minimum	Normal	Maximum
b. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
1. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
2. Bottom: cobbles with large boulders	0.040	0.050	0.070
D-2. Flood plains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
D-3. Major streams (top width at flood stage >100 ft). The *n* value is less than that for minor streams of similar description, because banks offer less effective resistance.			
a. Regular section with no boulders or brush	0.025	.....	0.060
b. Irregular and rough section	0.035	.....	0.100

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Appendix D1: Broad-Crested Weir Coefficients for Sharp-Edged Crests

The following table lists *English* weir coefficients for broad crested weirs with a sharp-edged crest of various breadths. These coefficients are automatically entered into the lookup table for a broad crested weir whenever a crest breadth is entered as described on page 89. If breadth falls between two listed values, interpolated coefficients are automatically used. Breadths outside the listed range will use the first or last coefficient values without extrapolation. Values are automatically converted to the current input units as described on page 43.

	Weir Breadth--(ft)										
Head	0.50	0.75	1.00	1.50	2.00	2.50	3.00	4.00	5.00	10.0	15.0
0.2	2.80	2.75	2.69	2.62	2.54	2.48	2.44	2.38	2.34	2.49	2.68
0.4	2.92	2.80	2.72	2.64	2.61	2.60	2.58	2.54	2.50	2.56	2.70
0.6	3.08	2.89	2.75	2.64	2.61	2.60	2.68	2.69	2.70	2.70	2.70
0.8	3.30	3.04	2.85	2.68	2.60	2.60	2.67	2.68	2.68	2.69	2.64
1.0	3.32	3.14	2.98	2.75	2.66	2.64	2.65	2.67	2.68	2.68	2.63
1.2	3.32	3.20	3.08	2.86	2.70	2.65	2.64	2.67	2.66	2.69	2.64
1.4	3.32	3.26	3.20	2.92	2.77	2.68	2.64	2.65	2.65	2.67	2.64
1.6	3.32	3.29	3.28	3.07	2.89	2.75	2.68	2.66	2.65	2.64	2.63
1.8	3.32	3.32	3.31	3.07	2.88	2.74	2.68	2.66	2.65	2.64	2.63
2.0	3.32	3.31	3.30	3.03	2.85	2.76	2.72	2.68	2.65	2.64	2.63
2.5	3.32	3.32	3.31	3.28	3.07	2.89	2.81	2.72	2.67	2.64	2.63
3.0	3.32	3.32	3.32	3.32	3.20	3.05	2.92	2.73	2.66	2.64	2.63
3.5	3.32	3.32	3.32	3.32	3.32	3.19	2.97	2.76	2.68	2.64	2.63
4.0	3.32	3.32	3.32	3.32	3.32	3.32	3.07	2.79	2.70	2.64	2.63
4.5	3.32	3.32	3.32	3.32	3.32	3.32	3.32	2.88	2.74	2.64	2.63
5.0	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.07	2.79	2.64	2.63
5.5	3.32	3.32	3.32	3.32	3.32	3.32	3.32	3.32	2.88	2.64	2.63

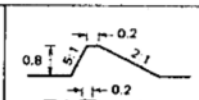
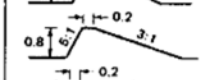
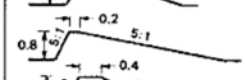
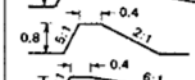
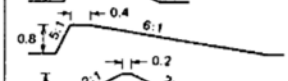
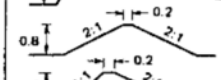
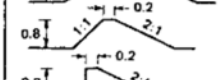
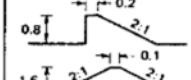
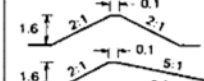
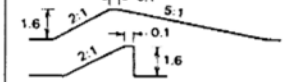
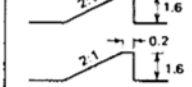
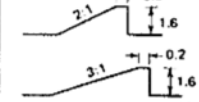
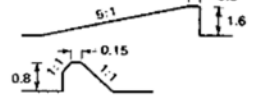
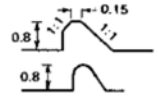
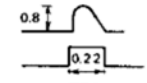
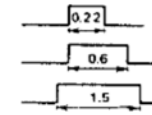
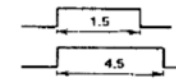
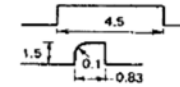
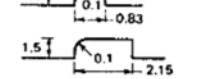
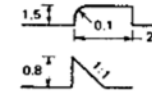
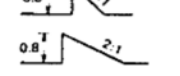
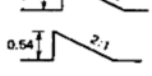
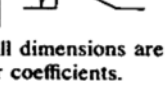
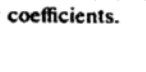
This table was derived from information in HANDBOOK OF HYDRAULICS by Brater and King, 1976.

Appendix D2: Broad-Crested Weir Coefficients for Assorted Profiles

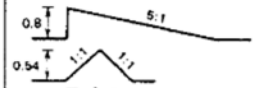
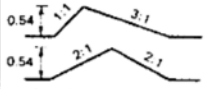
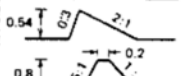
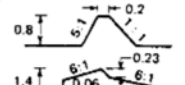
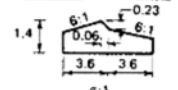
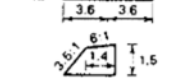
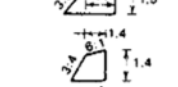
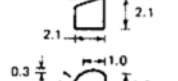
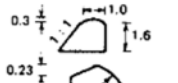
Coefficients for the following weirs may be entered automatically by specifying the appropriate Profile ID number on the HydroCAD weir screen.

Note: This table contains *metric* weir coefficients. To obtain English coefficients **multiply the values in this table by 1.811** as described on page 43.

Discharge Coefficients for Broad-Crested Weirs

	Cross section	Upstream head *h* [m]							
		0.15	0.30	0.45	0.60	0.75	0.90	1.20	1.50
1		1.61	1.86	1.98					
2		1.60	1.80	1.90					
3		1.58	1.75	1.79					
4		1.53	1.64	1.77					
5		1.54	1.62	1.69					
6		1.72	1.88	1.98					
7		1.65	1.88	2.00					
8		1.53	1.80	1.93					
9					1.96	1.96	1.97	1.99	2.02
10					1.94	1.92	1.89	1.92	1.97
11			2.12	2.10	2.08	2.08	2.06	2.04	2.00
12			1.88	1.96	2.01	2.04	2.05	2.05	2.05
13					1.96	1.96	1.96	1.96	1.96
14					1.86	1.86	1.86	1.86	1.86
15		1.81	2.00						
16		2.10	2.35						
17		1.57	1.73	1.80	1.82	1.83	1.83		
18		1.44	1.46	1.55	1.56	1.69	1.76	1.84	
19		1.43	1.47	1.45	1.46	1.47	1.46	1.48	1.59
20		1.48	1.45	1.44	1.44				
21			1.56	1.60	1.65	1.70	1.74	1.84	1.92
22			1.56	1.56	1.55	1.55	1.55	1.55	1.54
23		2.13	2.13	2.13					
24		1.93	1.94	1.94					
25		1.94	1.98	1.97					

*All dimensions are in meters. Tabulated values represent metric weir coefficients.

	Cross section	Upstream head *h* [m]							
		0.15	0.30	0.45	0.60	0.75	0.90	1.20	1.50
26		1.69	1.73	1.73					
27		2.28	2.25	2.06					
28		2.08	2.12	2.12					
29		1.92	1.93	1.92					
30		2.10	2.13	2.13					
31		2.03	2.03	2.01					
32		2.03	2.03	2.01					
33		1.65	1.94	2.10					
34			1.72	1.76	1.76	1.76	1.76	1.76	1.76
35				1.87	1.84	1.81	1.82	1.82	1.85
36			1.91	1.90	1.87	1.84	1.83	1.86	1.90
37						1.89	1.87	1.87	1.88
38			1.81	1.81	1.82	1.86	1.90	1.97	2.01
39		1.13	1.82 1.89	1.83 1.90	1.85 1.88	1.87 1.88	1.88 1.90	1.95	2.06
40		1.76	1.86 1.92	1.90 1.98	1.93 2.06	1.96 2.04	1.97 2.04	2.03	2.11
41		1.72	1.90	2.00	2.06	2.10	2.13		
42		1.78	1.84	1.89	1.93	1.97	2.00		
43		1.75	1.81	1.85	1.88	1.90	1.92	1.95	
44		1.80	1.92	1.95	1.94	1.85	1.82		
45		1.94	1.94	1.95	1.92	1.85	1.81	1.79	
46		1.72	1.72	1.70	1.72	1.76	1.79	1.85	
47		1.70	1.71	1.82					
48			2.09						

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Appendix E: Culvert Entrance Loss Coefficients

The following table lists entrance loss coefficients for concrete, corrugated metal, and box culverts. These values are automatically provided by HydroCAD when the corresponding entrance description is selected for a given culvert.

Although comparable data is not available for corrugated plastic pipe, it is believed to be similar to corrugated metal, and the same entries are listed for "CPP" in the internal lookup table.

Entrance Loss Coefficients.

Type of Structure and Design of Entrance	Coefficient, k_e
Pipe, Concrete	
Projecting from fill, groove end	0.2
Projecting from fill, sq. cut end	0.5
Headwall or headwall and wingwalls	
Groove end of pipe	0.2
Square-edge	0.5
Rounded (radius = 1/12D)	0.1
Mitered to conform to fill slope	0.7
End-Section conforming to fill slope*	0.5
Pipe, or Pipe-Arch, Corrugated Metal	
Projecting from fill (no headwall)	0.9
Headwall or headwall end wingwalls	
Square-edge	0.5
Mitered to conform to fill slope	0.7
End-Section conforming to fill slope*	0.5
Box, Reinforced Concrete	
Headwall parallel to embankment (no wingwalls)	
Square-edged on 3 edges	0.5
Rounded on 3 edges to radius of 1/12 barrel dimension	0.2
Wingwalls at 30° to 75° to barrel	
Square-edged at crown	0.4
Crown edge rounded to radius of 1/12 barrel dimension	0.2
Wingwalls at 10° to 30° to barrel	
Square-edged at crown	0.5
Wingwalls parallel (extension of sides)	
Square-edged at crown	0.7

*Note: "End Section conforming to fill slope", made of either metal or concrete, are the sections commonly available from manufacturers. From limited hydraulic tests they are equivalent in operation to a headwall in both inlet and outlet control. Some end sections, incorporating a closed taper have a superior hydraulic performance.

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Appendix F: Sheet Flow Roughness Coefficients

HydroCAD provides the following table of roughness coefficients for use with the Sheet Flow procedure (see page 54). This information is taken directly from NEH Table 15-1, with slight abbreviation of the descriptions. If you decide to substitute other roughness coefficients, note that these values are specifically for sheet flow, and are generally larger than the regular Manning's numbers for comparable surfaces.

Surface Description	n
Smooth surfaces	.011
Fallow	.05
Cultivated: Residue<=20%	.06
Cultivated: Residue>20%	.17
Grass: Short	.15
Grass: Dense	.24
Grass: Bermuda	.41
Range	.13
Woods: Light underbrush	.40
Woods: Dense underbrush	.80

Note: These coefficients may also be appropriate when using a reach to model artificially created sheet flow (as from a level spreader) as long as the depth of flow is limited to approximately 1/10 foot.

Appendix G: Velocity Factors

The Shallow Concentrated Flow procedure (a.k.a. Upland Method) uses a *velocity factor*, K_V, as listed below. The first two surfaces (paved and unpaved) are the basis for TR-55 Figure 3-1, and the factors were originally obtained from TR-55 Appendix F. The remaining surfaces were taken from NEH-4 Figure 15.2, with the factors derived from that chart. Subsequent revisions to NEH Part 630 provide *numerical* K_V values which are in good agreement with the original chart, except for "Grassed Waterways", which appears to have changed from 15.0 to 16.13, making it the same as the TR-55 "Unpaved" condition. For compatibility with previous calculations, the HydroCAD lookup table continues to supply the original K_V values as listed below. If different values are required for any reason, HydroCAD allows direct K_V entry instead of using the lookup table. See page 55 for further details on Shallow Concentrated Flow.

Surface Description	K_V [ft/sec]	K_V [m/sec]
Paved	20.33	6.2
Unpaved	16.13	4.92
Grassed Waterway	15.0	4.57
Nearly Bare & Untilled	10.0	3.05
Cultivated Straight Rows	9.0	2.74
Short Grass Pasture	7.0	2.13
Woodland	5.0	1.52
Forest w/Heavy Litter	2.5	0.76

Some descriptions have been abbreviated. Velocity factors have the same units as a velocity, and may be converted between English and metric as described on page 43.

H y d r o C A D ®

Stormwater Modeling System

Version 10

Owner's Manual

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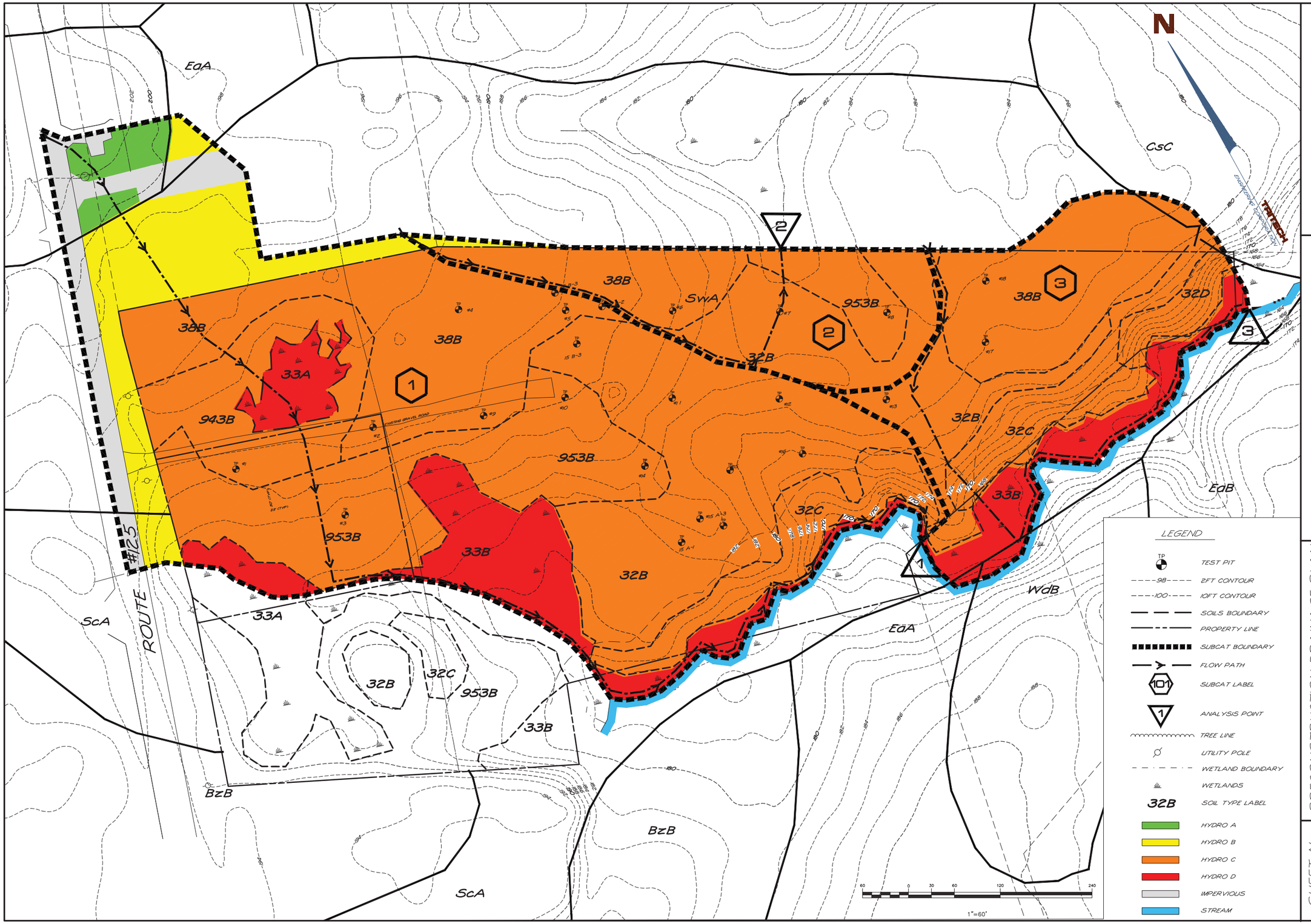

TRITECH
ENGINEERING CORPORATION
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DOVER, NEW HAMPSHIRE 03820
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FAX 603 742 3630

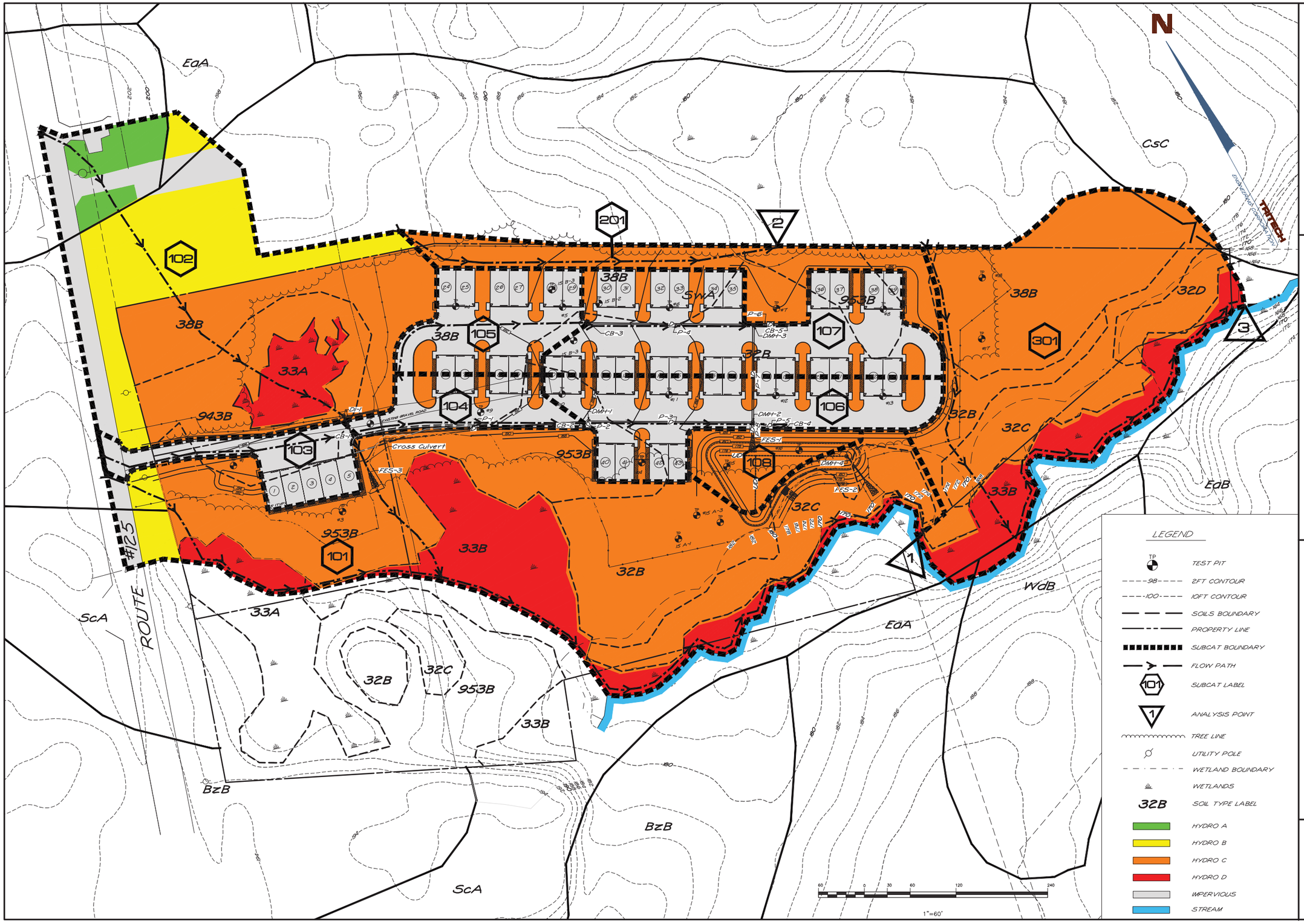
REVISIONS
DATE: DESCRIPTION:

PRECONSTRUCTION DRAINAGE PLAN

BARRINGTON STORAGE OFFICE

ROUTE #125
BARRINGTON, NEW HAMPSHIRE
MAY 29, 2020
JOB No. 19107
SCALE: 1" = 60'

SHEET No.
D-1C



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D-2C

DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,
& SITE DEVELOPMENT PLAN
NARRATIVE
FOR
BARRINGTON STORAGE OFFICE
ROUTE 125
MAY 2020
REVISED JULY 2020

RIPRAP SIZING FOR BIO 1 CULVERT OUTLET - 25 YEAR STORM

Apron Length La =(3.0 * Q / 1.5 * D) + 7 * D

Q = Flow
D = Inner diameter of Pipe
La = Length

Q = 2.25 cfs
D = 1.25 ft
La = 12.4 ft

Apron Width at End W = (3 * D) +(0.4 * L)

L = Length
D = Inner diameter of Pipe
W = Width

L = 12.4 ft
D = 1.25 ft
W = 8.7 ft

Apron Width at Culvert W = 3 * D

D = Inner diameter of Pipe
W = Width

D = 1.25 ft
W = 3.8 ft

Riprap Diameter D50 = (.02 * Q ^(1.3)) / (TW *D)

Q = Flow
TW = Tailwater Elevation
D = Inner diameter of Pipe
D50 = Riprap Diameter

Q = 2.25 cfs
TW = 0.3 ft
D = 1.25 ft
D50 = 1.84 in

Use 3" for D50

DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,
& SITE DEVELOPMENT PLAN
NARRATIVE
FOR
BARRINGTON STORAGE OFFICE
ROUTE 125
MAY 2020
REVISED JULY 2020

RIPRAP SIZING FOR FES-2 - 25 YEAR STORM

Apron Length La =(3.0 * Q / 1.5 * D) + 7 * D

Q = Flow
D = Inner diameter of Pipe
La = Length

Q = 16.96 cfs
D = 2.50 ft
La = 31.1 ft

Apron Width at End W = (3 * D) +(0.4 * L)

L = Length
D = Inner diameter of Pipe
W = Width

L = 31.1 ft
D = 2.50 ft
W = 19.9 ft

Apron Width at Culvert W = 3 * D

D = Inner diameter of Pipe
W = Width

D = 2.50 ft
W = 7.5 ft

Riprap Diameter D50 = (.02 * Q ^(1.3)) / (TW *D)

Q = Flow
TW = Tailwater Elevation
D = Inner diameter of Pipe
D50 = Riprap Diameter

Q = 16.96 cfs
TW = 0.72 ft
D = 2.50 ft
D50 = 5.29 in

Use 6" for D50

DRAINAGE ANALYSIS,
EROSION AND SEDIMENT CONTROL,
& SITE DEVELOPMENT PLAN
NARRATIVE
FOR
BARRINGTON STORAGE OFFICE
ROUTE 125
MAY 2020
REVISED JULY 2020

RIPRAP SIZING FOR FES-3 - 25 YEAR STORM

Apron Length La =(3.0 * Q / 1.5 * D) + 7 * D

Q = Flow
D = Inner diameter of Pipe
La = Length

Q = 7.17 cfs
D = 1.50 ft
La = 20.1 ft

Apron Width at End W = (3 * D) +(0.4 * L)

L = Length
D = Inner diameter of Pipe
W = Width

L = 20.1 ft
D = 1.50 ft
W = 12.5 ft

Apron Width at Culvert W = 3 * D

D = Inner diameter of Pipe
W = Width

D = 1.50 ft
W = 4.5 ft

Riprap Diameter D50 = (.02 * Q ^(1.3)) / (TW *D)

Q = Flow
TW = Tailwater Elevation
D = Inner diameter of Pipe
D50 = Riprap Diameter

Q = 7.17 cfs
TW = 0.85 ft
D = 1.50 ft
D50 = 2.44 in

Use 3" for D50

SOIL REPORT

October 14, 2019

Estes
Route 125
Barrington NH
Map 220 Lots 54-7-1 & 51-7-2

Location: East side of Route 125 approximately 0.2 miles south of the Rochester city line, .35 miles south of the Isinglass River crossing.

Purpose: The high intensity soil map was prepared for a proposed contractor park with on-site wells and on-site subsurface wastewater disposal.

Landscape: Generally gently sloping north to south with steeper slopes along a stream at the southern property lines.

Wetlands: There are four wetlands on the property. All are palustrine forested wetlands.

- An isolated wetland in the NW corner adjacent to the proposed roadway.
- A wetland just off the property approximately midway along the northerly property line. The buffer along this wetland encroaches on the subject lot.
- A large wetland in the SW corner that drains to the unnamed stream.
- A narrow wetland at the base of steeper slopes along the stream running west to east along the southerly property lines.

Wetlands were identified in accordance with the 1987 *US Army Corps of Engineers Wetland Delineation Manual* and the 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0.* Hydric soils were identified by *Field Indicators for Identifying Hydric Soils in New England*, version 4, May 2017. A routine determination, as described in the manual, was followed. The wetland boundary was flagged in pink and numbered for location by Tritech Engineering, Dover NH

Soils: Soils consist of moderately well drained and somewhat poorly drained silty marine sediments and similar soils with a sandy overwash. Slopes are generally less than 8% except along the stream. Similar but poorly drained soils occupy the wetlands.

Methodology: The soil map was prepared in accordance with the *Site Specific Soil Mapping Standards for NH and VT, Special Publication No. 3 – Version 5.0,* December 2017 by the Society of Soil Scientists of Northern New England and standards established by the National Cooperative Soil Survey. The soil survey was prepared by Michael Mariano, NH Certified Soil Scientist #076.

A plan provided by Tritech Engineering, Dover NH at 1" = 60' with 2' contours was used as a base map. Existing monumentation, located test pits, and topographic features were used as

control. Pits were dug by an excavator to classify soils at the series level. Pits were located by Tritech Engineering.

Soil boundaries were observed throughout their length and their placement corresponds to changes in soil properties or landform. The identification of soils is based on the NH Numerical Legend, which classifies soil at the series level.

Map unit purity:

- Map units contain 75 percent or more of pedons that fit within the range of the taxon that provides the name for the map unit, or are in similar taxa.
- No one dissimilar soil is greater than the named taxa
- The total amount of dissimilar inclusions do not exceed 25%.
- No singular dissimilar soil will make up more than 10% of the mapping unit
- Limiting inclusions do not exceed 15% of the map unit.

Drainage Classes:

***Very Poorly Drained*:** There are small inclusions of very poorly drained soils in the wetlands but they are not of sufficient area or occurrence to warrant a separate mapping unit.

Poorly Drained: Poorly drained soils occupy the areas delineated as wetlands. In these soils, water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of free water is shallow or very shallow and common or persistent.

33 Scitico: These soils are found in the wetlands.

Somewhat Poorly Drained*:* Water is removed slowly enough to keep the soil wet for significant periods of time, but not the entire year. A seasonal high water table ranges from 7-14 inches in depth from October to May, but may recede to over 30 inches in depth during the summer. These soils may be classified as hydric soils in depressions.

953 Boxford: These soils occupy uplands just above poorly drained soils.

Moderately Well Drained: Water is removed from the soil somewhat slowly. There is a seasonal high water table at 15-40 inches from November through May. The 323 soils contain a hardpan in the subsoil. There are few limitations that can't be overcome.

38 Eldridge, 32 Boxford: These are the dominant soils on the landscape and occupy most of the nearly level uplands

Well Drained: There are no well drained soils in large enough units to be separated. Small spots of well drained Eldridge, deep phase in the NE corner are treated as inclusions in the moderately well drained mapping unit

***Excessively Drained*:** There are no excessively drained soils on the property

Slope Classes:

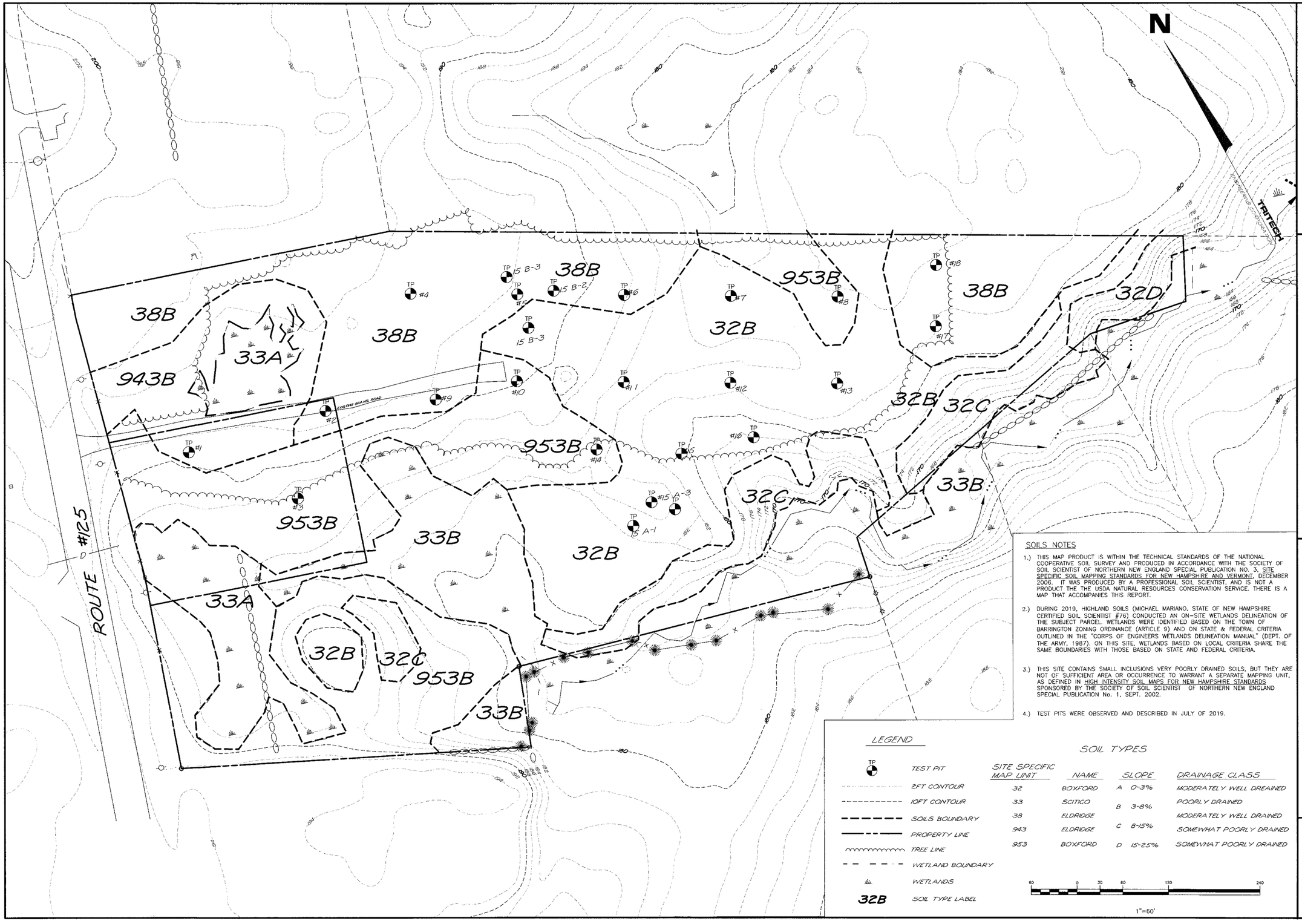
A	0-3%
B	3-8%
C	8-15%
D	15-25%

Soil Map Legend

32	Boxford
33	Scitico
38	Eldridge
953	Boxford somewhat poorly drained

This map product is within the technical standards of the National Cooperative Soil Survey and produced in accordance with the Society of Soil Scientists of Northern New England Publication *Site Specific Soil Mapping Standards for NH and VT, Special Publication No. 3 – Version 5.0*. It was produced by a professional soil scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a map that accompanies this report.

Highland Soil Services
75 Prospect St., Somersworth NH 03878



SOILS NOTES

1.) THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY AND PRODUCED IN ACCORDANCE WITH THE SOCIETY OF SOIL SCIENTIST OF NORTHERN NEW ENGLAND SPECIAL PUBLICATION NO. 3, SITE SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT, DECEMBER 2006. IT WAS PRODUCED BY A PROFESSIONAL SOIL SCIENTIST, AND IS NOT A PRODUCT THE THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A MAP THAT ACCOMPANIES THIS REPORT.

2.) DURING 2019, HIGHLAND SOILS (MICHAEL MARIANO, STATE OF NEW HAMPSHIRE CERTIFIED SOIL SCIENTIST #76) CONDUCTED AN ON-SITE WETLANDS DELINEATION OF THE SUBJECT PARCEL. WETLANDS WERE IDENTIFIED BASED ON THE TOWN OF BARRINGTON ZONING ORDINANCE (ARTICLE 9) AND ON STATE & FEDERAL CRITERIA OUTLINED IN THE "CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL" (DEPT. OF THE ARMY, 1987). ON THIS SITE, WETLANDS BASED ON LOCAL CRITERIA SHARE THE SAME BOUNDARIES WITH THOSE BASED ON STATE AND FEDERAL CRITERIA.

3.) THIS SITE CONTAINS SMALL INCLUSIONS VERY POORLY DRAINED SOILS, BUT THEY ARE NOT OF SUFFICIENT AREA OR OCCURRENCE TO WARRANT A SEPARATE MAPPING UNIT, AS DEFINED IN HIGH INTENSITY SOIL MAPS FOR NEW HAMPSHIRE STANDARDS SPONSORED BY THE SOCIETY OF SOIL SCIENTIST OF NORTHERN NEW ENGLAND SPECIAL PUBLICATION No. 1, SEPT. 2002.

4.) TEST PITS WERE OBSERVED AND DESCRIBED IN JULY OF 2019.

LEGEND

- TP — TEST PIT
- 2FT CONTOUR
- 10FT CONTOUR
- SOILS BOUNDARY
- PROPERTY LINE
- TREE LINE
- WETLAND BOUNDARY
- WETLANDS
- 32B — SOIL TYPE LABEL

SOIL TYPES

SITE SPECIFIC MAP UNIT	NAME	SLOPE	DRAINAGE CLASS
32	BOXFORD	A 0-3%	MODERATELY WELL DREAINED
33	SCITICO	B 3-8%	POORLY DRAINED
38	ELDRIDGE		MODERATELY WELL DRAINED
943	ELDRIDGE	C 8-15%	SOMEWHAT POORLY DRAINED
953	BOXFORD	D 15-25%	SOMEWHAT POORLY DRAINED

60 0 30 60 120 240
1"=60'

TRITECH
ENGINEERING CONSIDERATION
785 CENTRAL AVENUE
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TELEPHONE 603 749 9171
FAX 603 749 9253

REVISIONS

DATE:	DESCRIPTION:
5/22/20	GENERAL REVISIONS

SITE SPECIFIC SOILS PLAN

BARRINGTON STORAGE OFFICE

ROUTE #125
BARRINGTON, NEW HAMPSHIRE
NOVEMBER 11, 2019 JOB No. 19107
SCALE: 1" = 100'

SHEET NO. **SSS-1**

Boxford Silt Loam
0 to 8 Percent Slopes

Mapping Symbol: 32, moderately well drained
953, somewhat poorly drained

Setting

Parent Material:	Silty marine sediments
Landform:	Convex plains, broad drainageways
Position on Landscape:	First terrace above the stream
Slope Range:	0 -8 percent

Composition and Soil Characteristics

Drainage Class:	Moderately well drained; seasonal high water table at 15 to 40 inches. OR..somewhat poorly drained with seasonal high water table at 7 to 14 inches
Hydrologic Group:	C/D
Surface Runoff	Rapid
Permeability	Slow. Very slow in subsoil
Depth to Bedrock	> 40 inches
Hydric conditions	Possible in somewhat poorly drained areas

Inclusions within Mapping Unit

Similar:	Scitico silt loam – poorly drained
Contrasting:	Swanton – sandy over silty

Use and Management

Well suited to moderately well suited for proposed project..

Eldridge Sandy Loam
3 to 25 percent slopes

Mapping Symbol: 38

Setting

Parent Material:	Glacial outwash over silty marine sediments
Landform:	Outwash plains
Position on Landscape:	Broad terraces above lowlands
Slope Range:	3 to 25 percent

Composition and Soil Characteristics

Drainage Class:	Moderately well drained; seasonal high water table at 15 to 40 inches
Hydrologic Group:	C
Surface Runoff	Moderate
Permeability	Moderate – slow in silty subsoil
Depth to Bedrock	> 40 inches
Hydric conditions	No

Inclusions Within Mapping Unit

Similar:	Eldridge deep phase - >40” to silt loam subsoil Swanton – somewhat poorly drained.
Contrasting:	Boxford– silty throughout

Use and Management

This soil is well suited to development. A seasonal high water table is the limiting factor. Subsurface wastewater disposal is permitted.

Scitico Silt Loam
0-3 Percent Slopes

Map Symbol: 33, poorly drained

Setting

Parent Material:	Silty marine sediments
Landform:	Lowlands
Position on Landscape:	Depressions, drainageways, wetlands
Slope Range:	0 to 8 percent

Composition and Soil Characteristics

Drainage Class:	Poorly drained; seasonal high water table at 0 to 7 inches.
Hydrologic Group:	D
Surface Runoff	Slow
Permeability	Slow. Very slow in subsoil
Depth to Bedrock	> 40 inches
Hydric conditions	Yes

Inclusions within Mapping Unit

Similar:	Boxford - somewhat poorly drained
Contrasting:	Swanton, poorly drained

Use and Management

This soil is poorly suited to development. Areas mapped as Scitico are classified as wetlands and permitting is required for any activity in those wetlands. Wetness is the limiting factor with a water table at or near the surface during most months of the year. Subsurface wastewater disposal is not permitted.

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 1

00 – 07”	Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
07 – 14”	Dark yellowish brown (10YR4/6) sandy loam; moderate medium granular structure; moist friable.
14 – 30”	Olive gray (2.5Y5/2) silt loam; many redox depletions and concentrations; moderate medium blocky structure; moist, firm.
30 – 54”	Olive gray (5Y5/3) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge
Estimated SHWT at 14” – redox features
Restrictive layer at 30”
Water observed at 50”

Test Pit 2

00 – 04”	Dark brown (10YR3/4) fine sandy loam; weak fine granular structure; moist, friable.
04 – 18”	Yellowish brown (10YR5/6) fine sandy loam; moderate medium granular structure; moist friable.
18 – 34”	Yellowish brown (10YR5/6) sandy loam; common redox concentrations in 7.5YR5/8 and 2.5YR4/6 and few depletions in 10YR6/1); moderate medium granular structure; moist, friable.
34 – 48”	Yellowish brown (10YR5/6) loamy fine sand with redox features as in above horizon; massive structure; moist, friable.
48 – 60”	Olive gray (2.5Y5/2) silty clay loam; many redox features in 10YR6/1 and 7.5YR5/8; strong medium blocky structure’ moist, very firm.

Series: Eldridge
Estimated SHWT at 18” – redox features
Restrictive layer at 48”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 3

00 – 08”	Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
08 – 13”	Light olive brown (2.5Y5/4) silt loam; moderate medium granular structure; moist friable.
13 – 29”	Light olive brown (2.5Y5/4) silt loam; common redox features in 10YR6/1 and 7.5YR5/8; moderate medium blocky structure; moist, firm.
29 – 54”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 13” – redox features
Restrictive layer at 29”

Test Pit 4

00 – 04”	Dark brown (10YR3/4) fine sandy loam; weak fine granular structure; moist, friable.
04 – 10”	Strong brown (7.5YR5/8) sandy loam; moderate medium granular structure; moist friable.
10 – 20”	Brown (10YR4/4) sandy loam; moderate medium granular structure; moist, friable
20 – 27”	Light olive brown (2.5Y5/4) sandy loam; many redox depletions in 10YR6/1and concentrations in 7.5YR5/8; moderate medium granular structure; moist, friable
27 - 54”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge
Estimated SHWT at 20” – redox features
Restrictive layer at 27”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 5

00 – 05”	Dark brown (10YR3/4) fine sandy loam; weak fine granular structure; moist, friable.
05 – 20”	Strong brown (7.5YR5/8) sandy loam; moderate medium granular structure; moist friable.
20 – 24”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1 and 7.5YR5/8; moderate medium granular structure; moist, friable
24 – 48”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge
Estimated SHWT at 20” – redox features
Restrictive layer at 27”

Test Pit 6

00 – 04”	Dark brown (10YR3/4) fine sandy loam; weak fine granular structure; moist, friable.
04 – 10”	Strong brown (7.5YR5/8) sandy loam; moderate medium granular structure; moist friable.
10 – 20”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1 and 7.5YR5/8; moderate medium granular structure; moist, friable
20 – 27”	Light olive brown (2.5Y5/4) sandy loam; many redox depletions and concentrations; moderate medium granular structure; moist, friable.
27 – 48”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge
Estimated SHWT at 20” – redox features
Restrictive layer at 27”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 7

00 – 05”	Dark brown (10YR4/3) silt loam; weak fine granular structure; moist, friable.
05 – 19”	Yellowish brown (10YR5/6) silt loam; moderate medium granular structure; moist friable.
19 – 26”	Light olive brown (2.5Y5/4) silt loam; many redox features in 10YR6/1 and 7.5YR5/8; moderate medium granular structure; moist, friable
26 – 48”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 19” – redox features
Restrictive layer at 26”

Test Pit 8

00 – 03”	Dark brown (10YR4/3) silt loam; weak fine granular structure; moist, friable.
03 – 10”	Light olive brown (2.5Y5/4) silt loam; massive structure; moist friable.
10 – 15”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1 and 7.5YR5/8; moderate medium blocky structure; moist, firm.
15 – 36”	Olive gray (5Y5/3) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 13” – redox features
Restrictive layer at 29”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 9

00 – 06”	Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
06 – 16”	Strong brown (7.5YR5/8) sandy loam; moderate medium granular structure; moist friable.
16 – 25”	Brown (10YR4/4) sandy loam; weak medium granular structure; moist, friable
25 – 30”	Light olive brown (2.5Y5/4) sandy loam; few redox depletions and concentrations; moderate medium granular structure; moist, friable.
30 – 48”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge
Estimated SHWT at 25” – redox features
Restrictive layer at 30”

Test Pit 10

00 – 04”	Dark brown (10YR3/4) fine sandy loam; weak fine granular structure; moist, friable.
04 – 14”	Light olive brown (2.5Y5/4) silt loam; moderate medium granular structure; moist friable.
14 – 19”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1 and 7.5YR5/8; moderate medium granular structure; moist, friable
19 – 48”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 14” – redox features
Restrictive layer at 19”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 11

00 – 06”	Dark brown (10YR3/4) very fine sandy loam; weak fine granular structure; moist, friable.
06 – 18”	Light olive brown (2.5Y5/4) silt loam; massive structure; moist friable.
18 – 27”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1; massive structure; moist, friable
27 – 48”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 18” – redox features
Restrictive layer at 27”

Test Pit 12

00 – 04”	Dark brown (10YR3/4) very fine sandy loam; weak fine granular structure; moist, friable.
04 – 18”	Yellowish brown (10YR6/6) silt loam; massive structure; moist friable.
18 – 24”	Yellowish brown (10YR5/6) silt loam; few redox features in 10YR6/1; massive structure; moist, friable
24 – 60”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 18” – redox features
Restrictive layer at 24”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 13

00 – 05”	Dark brown (10YR3/4) fine sandy loam; weak fine granular structure; moist, friable.
05 – 10”	Strong brown (7.5YR5/8) fine sandy loam; weak fine granular structure; moist, friable.
10 – 21”	Yellowish brown (10YR5/6) fine sandy loam; moderate medium granular structure; moist friable.
21 – 38”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1 and 10YR5/6; massive structure; moist, friable
38 – 60”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 21” – redox features
Restrictive layer at 38”

Test Pit 14

00 – 03”	Dark brown (10YR3/4) very fine sandy loam; weak fine granular structure; moist, friable.
03 – 14”	Light olive brown (2.5Y5/4) silt loam; massive structure; moist friable.
14 – 19”	Light olive brown (2.5Y5/4) silt loam; common redox features in 10YR6/1; massive structure; moist, friable
19 – 60”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 14” – redox features
Restrictive layer at 19”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 15

00 – 05”	Dark brown (10YR3/4) silt loam; weak fine granular structure; moist, friable.
05 – 18”	Light olive brown (2.5Y5/4) silt loam; massive structure; moist friable.
18 – 23”	Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1; massive structure; moist, friable
23 – 60”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 18” – redox features
Restrictive layer at 23”

Test Pit 16

00 – 06”	Dark brown (10YR3/4) very fine sandy loam; weak fine granular structure; moist, friable.
06 – 18”	Yellowish brown (10YR5/6) silt loam; weak fine granular structure; moist friable.
18 – 24”	Yellowish brown (10YR5/6) silt loam; few redox features in 10YR6/1; massive structure; moist, friable
24 – 48”	Olive gray (5Y5/3) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Boxford
Estimated SHWT at 18” – redox features
Restrictive layer at 24”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 17

00 – 06”	Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
06 – 24”	Yellowish brown (10YR5/6) fine sandy loam; weak medium granular structure; moist friable.
24 – 28”	Brown (10YR4/6) fine sandy loam; weak medium granular structure; moist, friable
28 – 34”	Light olive brown (2.5Y5/4) silt loam; few redox depletions and concentrations; moderate medium granular structure; moist, friable.
34 – 60”	Olive gray (5Y5/2) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge
Estimated SHWT at 26” – redox features
Restrictive layer at 34”

Test Pit 18

00 – 06”	Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
06 – 11”	Yellowish brown (10YR5/6) fine sandy loam; moderate medium granular structure; moist friable.
11 – 24”	Light olive brown (2.5Y5/4) fine sandy loam; moderate medium granular structure; moist, friable
24 – 45”	Yellowish brown (10YR5/6) loamy sand; weak medium granular structure; moist, friable.
45 – 52”	Yellowish brown (10YR5/6) loamy fine sand; few redox depletions in 10YR6/1; massive structure; moist, friable.
52 – 60”	Olive gray (2.5Y5/2)and yellowish brown (10YR5/6) silty clay loam; many redox depletions and concentrations; strong medium blocky structure; moist, very firm.

Series: Eldridge, well drained, deep phase
Estimated SHWT at 45” – redox features
Restrictive layer at 52”

Test Pit Descriptions

Estes
Route 125
Barrington NH
August 12, 2019
Pits dug on July 30,2019

Test Pit 19 north side of garage Original A horizon removed

00 – 19"	Yellowish brown (10YR5/6) gravelly sand fill; single grain; dry, loose.
19 – 29"	Light gray (10YR7/1) sand; few black concretion; single grain; moist, loose.
29 – 40"	Yellowish brown (10YR5/6) and strong brown (7.5YR5/8) sand; many redow depletions in 10YR6/1; single grain' moist, loose

Series: Fill over sandy till
Estimated SHWT at 19" – Mn concretions
Restrictive layer: none to 40"

BARRINGTON STORAGE-OFFICE

Stormwater Management, Maintenance & Inspection Plan

Route #125
Barrington, New Hampshire

MAY 2020

Prepared for: Mill Fall Realty, LLC
P.O. Box 627
Center Ossipee, New Hampshire 03814-0627

Prepared by: Tritech Engineering Corporation
755 Central Avenue
Dover, New Hampshire 03820

Introduction

Tritech Engineering Corporation has prepared the following Stormwater Management System Inspection & Maintenance Plan for Barrington Storage-Office, located at Route 125, Barrington, New Hampshire. The intent of this plan is to provide Barrington Storage-Office with a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this development.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. By following the enclosed procedures, Barrington Storage-Office, will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Stormwater Management System Components

The Barrington Storage-Office Stormwater Management System is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

Non-Structural BMP's

Non-Structural best management practices (BMP's) are designed to minimize and/or remove contaminants before they enter the stormwater collection system. Several of these BMP's have been incorporated into the Stormwater Management System including pavement sweeping, reduced use of road salt, and litter/trash removal. These types of BMP's are a highly effective initial treatment measure for reducing stormwater pollutant loading.

Closed Drainage Collection and Piping System

The closed drainage system is designed to collect and convey stormwater runoff from the paved areas and infiltrate stormwater back into the water table. Stormwater is collected in a catch basin located with a deep sump to provide storage areas for sediment and control sediment outflow.

Deep Sump Hooded Catch Basins

Catch Basins located in the parking area collect and convey stormwater runoff from the paved areas. Catch basins are designed with deep sumps to provide storage areas for sediment and control sediment outflow. Hooded sumps remove oil, grease, and floatable debris from stormwater runoff.

Bio Retention Pond

A Bio Retention Pond collect stormwater from ground runoff, as well as roadway runoff after pretreatment in Deep Sump Hooded Catch Basins, and allow contaminants and sedimentation to be contained. Bio Retention Ponds allow rainwater to be infiltrated and recharge groundwater on the side, and treated excess water is allowed to exit pond through rectangular weir spillway.

Inspection & Maintenance Plan

By implementing the following procedures, Barrington Storage-Office will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

Pavement Sweeping:	Sweep Pavement Area at least three times per year or more as necessary. Spring pavement sweeping shall be performed as early as possible.
Litter/Trash Removal:	Routinely inspect all dumpster locations for spillage and clean as necessary.
Deicing Agents:	Use sand as the primary agent for parking lot safety during ice and snow conditions. Minimize the use of road salt (sodium chloride) during the winter. Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
Closed Drainage	Inspect all catch basins monthly for floatable objects and remove as required.
Infiltration Piping:	Inspect infiltration piping once every year and remove accumulated sediment or replace as designed in place.
Infiltration Area:	Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
Bioretention Basins and Forebays:	Inspect detention basins twice annually for floatables and remove as required. Inspect forebays, detention basins, outlet structure, and outlet weir twice annually and remove accumulated sand and sediment.
Invasive Species:	During maintenance and inspection activities, check for the presence of invasive species and dispose of in accordance with the procedures contained herein.

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 is not 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>

Annual Report: Submit an annual Inspection & Maintenance Report to the City of Barrington's Planning Department by January 1st of each year. The report should include a summary of the system's maintenance requirements and repairs, and copies of the Inspection & Maintenance Log Sheets.

Additionally, Inspection and Maintenance Records must be provided to NHDES upon request.

Inspection & Maintenance Checklist/Log

The following pages contain an Inspection & Maintenance Checklist and blank copy of the Stormwater Management System's Inspection & Maintenance Log. These forms are provided to assist Barrington Storage-Office with the inspection and maintenance of Barrington Storage-Office Stormwater Management System.

Stormwater Management System

Inspection & Maintenance Checklist

Barrington Storage-Office

BMP/System Component	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance/Cleanout Threshold
Pavement Sweeping	3 times per year	N/A	N/A
Litter/Trash Removal	Routinely	Inspect outdoor waste receptacles areas for spillage.	Clean as required.
Deicing Agents	N/A	N/A	Use sand as primary agent for parking lot safety during winter.
Closed Drainage System			
Catch Basins	2 times per year 1 time per month	Check for sediment accumulation in sump and on sock. Check for floatable contaminants.	≥ 2 ft. sediment depth. ≥ 3 in. floatable depth.
Drainage Pipes	1 time per 2 years	Check for sediment accumulation/clogging.	≥ 2 in. sediment depth.
Infiltration			
Infiltration Pipes	1 time per year	Check for sediment accumulation/clogging.	≥ 4 in. sediment depth.
Annual Report	1 time per year	Submit Annual Report, including all Inspection & Maintenance Logs, to the Dover Planning Department.	N/A

Stormwater Management System

Inspection & Maintenance Log

Barrington Storage-Office

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed (*List Items/Comments)*	Date of Cleaning/Repair	Performed By

CERTIFICATE OF UNDERSTANDING

Stormwater Management, Maintenance & Inspection Plan

Project: Barrington Storage-Office
Route # 125
Barrington, New Hampshire
MAY 2020

Owner: Mill Falls Realty, LLC
P.O. Box 627
Center Ossipee, New Hampshire 03814-0627

Engineer: Tritech Engineering Corporation
755 Central Avenue
Dover, New Hampshire 03820

Project Reference Plans:

Site Development Plans for:
Barrington Storage-Office
Route #125
Barrington, New Hampshire

Specifically:
T-1, T-2, EX-1, SP-1 through SP-9, La-1, Li-1, & CUP-1.

Project Drainage Analysis References:

Drainage Analysis, Erosion and Sedimentation Control, & Site Development Plan for:
Barrington Storage-Office
Route #125
Barrington, New Hampshire
May 2020

Site Plan Review Approval was granted by the Somersworth Planning Board _____

Conditional Use Permit was granted by the Somersworth Planning Board_____

I, Albert Estes, as President of Mill Falls Realty, LLC, the property owner, am familiar with the references above and understand this Stormwater Management, Maintenance, and Inspection Plan, and my responsibilities identified herein.

_____ _____

Albert Estes, President Date