

JONES & BEACH ENGINEERS INC.

DRAINAGE ANALYSIS

EROSION AND SEDIMENT CONTROL PLAN

**Liberty Lantern Estates
Tax Map 2, Lot 70
Main Street
Fremont, NH**

Prepared for:

**Haus Emily, LLC
56 Westville Road, Unit 4
Plaistow, NH 03865**



Prepared by:

**Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
10/6/2021
Rev. #1: 11/17/2021
Rev. #2: 11/22/2021
Rev. #3: 12/09/2021
JBE Project No. 20724**



ALTERATION OF TERRAIN PERMIT APPLICATION

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: Haus Emily, LLC		Contact Name: Gary Densen	
Email: cdbuildersinc@comcast.net		Daytime Telephone: 603-382-1715	
Mailing Address: 56 Westville Road, Unit 4			
Town/City: Plaistow		State: NH	Zip Code: 03865

2. APPLICANT'S AGENT INFORMATION If none, check here: ☒

Business Name:		Contact Name:	
Email:		Daytime Telephone:	
Address:			
Town/City:		State:	Zip Code:

3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)

Applicant Name: Timothy and Geraldine Palmer		Contact Name: Timothy Palmer	
Email:		Daytime Telephone:	
Mailing Address: 706 Main St.			
Town/City: Fremont		State: NH	Zip Code: 03044

4. PROPERTY OWNER'S AGENT INFORMATION If none, check here: ☒

Business Name:		Contact Name:	
Email:		Daytime Telephone:	
Address:			
Town/City:		State:	Zip Code:

5. CONSULTANT INFORMATION If none, check here: ☐

Engineering Firm: Jones & Beach Engineers, Inc.		Contact Name: Barry Gier	
Email: bgier@jonesandbeach.com		Daytime Telephone: 603-772-4746	
Address: 85 Portsmouth Ave.			
Town/City: Stratham		State: NH	Zip Code: 03885

6. PROJECT TYPE

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

7. PROJECT LOCATION INFORMATION

Project Name: Liberty Lantern Estates

Street/Road Address: 706 Main St.

Town/City: Fremont

County: Rockingham

Tax Map: 2

Block:

Lot Number: 70

Unit:

Location Coordinates: 42.971047, -71.11343

☒ 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: Drainage system discharge	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Withdrawal	<input checked="" type="checkbox"/> Discharge
2. Man-made pond created by impounding a stream or wetland Purpose:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge
3. Unlined pond dug into the water table Purpose:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> 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 ☐ NoNote: 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: _____☒ 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")**

The purpose of this project is to construct a residential townhouse development on Town of Fremont Tax Map 2, Lot 70. The proposed development will contain 13 residential units with associated parking, drainage, and utilities.

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

10. ADDITIONAL REQUIRED INFORMATIONA. Date a copy of the application was sent to the municipality as required by Env-Wq 1503.05(e)¹: / / .

(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: / / .

(Attach proof of delivery)

C. Type of plan required: ☐ Land Conversion ☒ Detailed Development ☐ Excavation, Grading & Reclamation ☐ Steep SlopeD. Additional plans required: ☒ Stormwater Drainage & Hydrologic Soil Groups ☐ Source Control ☐ Chloride ManagementE. Total area of disturbance: 188,397 square feetF. Additional impervious cover as a result of the project: 49,444 square feet (use the "-" symbol to indicate a net reduction in impervious coverage).Total final impervious cover: 49,444 square feetG. Total undisturbed cover: 1,273,473 square feetH. Number of lots proposed: 1I. Total length of roadway: 1,185 linear feetJ. Name(s) of receiving water(s): Exeter River

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	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
2. Wetlands Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
3. Shoreland Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
4. UIC Registration	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Registration date:
5. Large/Small Community Well Approval	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Approval letter date:
6. Large Groundwater Withdrawal Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
7. Other:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/>	Permit number:

L. List all species identified by the Natural Heritage Bureau as threatened or endangered or of concern: Blanding's Turtles, Spotted TurtlesM. 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."N/AN. Did the applicant/applicant's agent have a pre-application meeting with AOT staff? ☐ Yes ☒ No

If yes, name of staff member:

O. Will blasting of bedrock be required? ☐ Yes ☒ No If yes, estimated quantity of blast rock: 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)
- ☒ 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.nhdfi.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*.
- ☒ Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)]
- ☒ 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)]
- ☒ 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:

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

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- ☐ See Checklist for Details

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

12. REQUIRED SIGNATURES

_____ 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): _____ Title: _____

☐ **PROPERTY OWNER**

☐ **PROPERTY OWNER'S AGENT:**

Signature: _____ Date: _____

Name (print or type): _____ 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
- ☒ 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
- ☐ Temporary sediment trap
- ☒ The treatment BMP's proposed
- ☒ 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.
- ☒ 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

ridge.mauck@des.nh.gov or (603) 271-2147

NHDES Alteration of Terrain Bureau, PO Box 95, Concord, NH 03303-0095

www.des.nh.gov

Please double-side 8 1/2" 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).

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" × 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:

- ☐ Drainage report is not needed if site does not have off-site flow.
- ☐ 5 foot contours allowed rather than 2 foot.
- ☐ No PE stamp needed on the plans.
- ☐ 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.
- ☐ 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>.

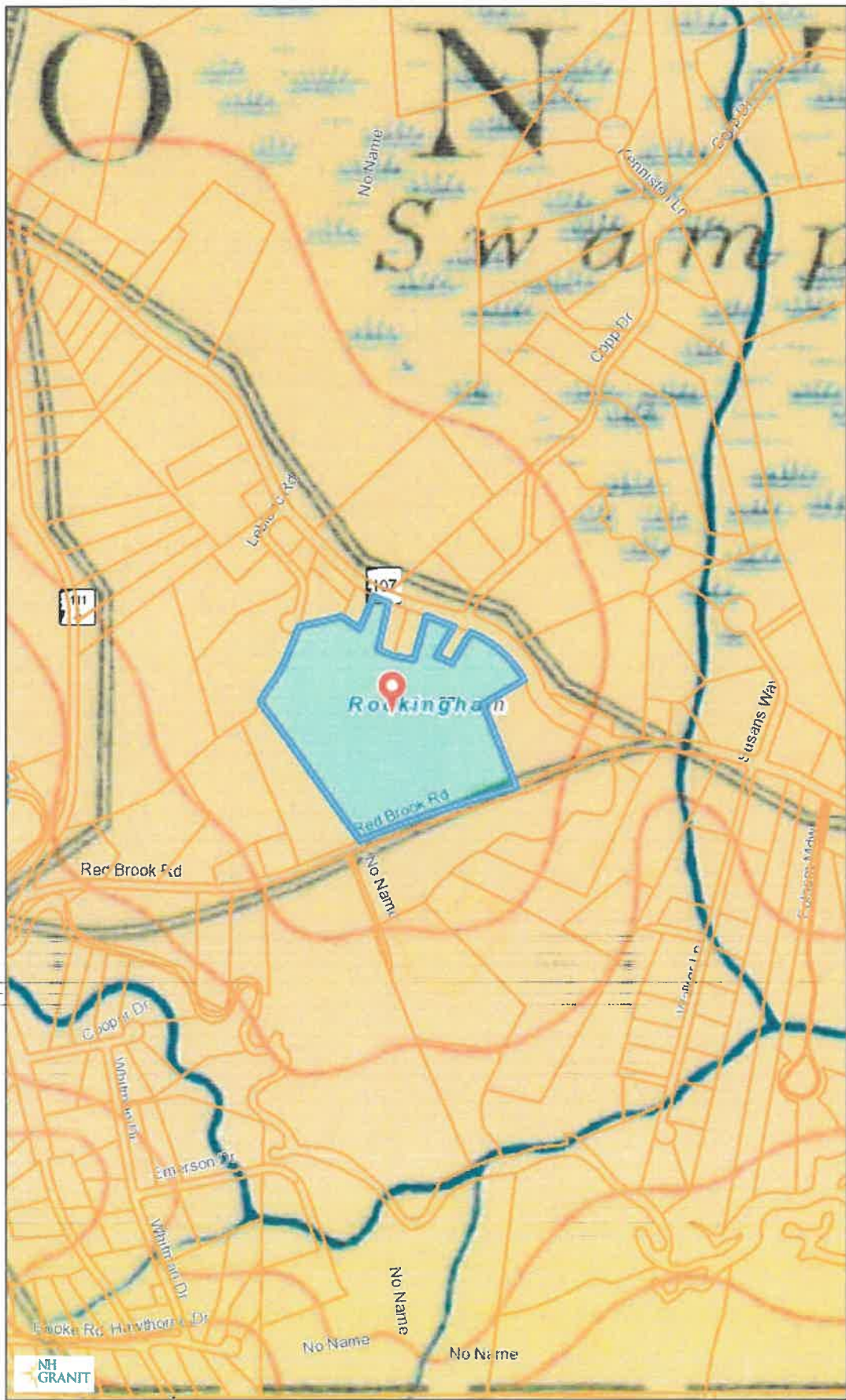
ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

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

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USGS Map



Legend

- Parcels
 - Parcel Polygons
 - Attributes for Additional Lines
- State
- County
- City/Town
- 15-Minute Quadrangle Boun
 - 1919
 - 1918
 - 1893

Map Scale

1: 10,000

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Map Generated: 6/16/2021

Notes



1. EXECUTIVE SUMMARY

The purpose of this project is to construct a residential townhouse development on Town of Fremont Tax Map 2, Lot 70. The proposed development will contain 13 residential units with associated parking, drainage, and utilities. Two models were compiled, one for the area in its existing (pre-development) condition, and a second for its proposed (post-development) condition. The analysis was conducted using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. A summary of the existing and proposed conditions peak rates of runoff is as follows:

EXECUTIVE SUMMARY TABLE										
Analysis Point	1" Storm		2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.00	0.00	0.07	0.01	1.62	0.49	5.42	2.50	11.77	9.15

The drainage design intent for this site is to maintain the post-development peak flow to the pre-development peak flow conditions to the extent practicable and to effectively treat stormwater from the development of this project. This has been accomplished through the use of a gravel wetland to maintain the peak discharge and treat stormwater.

In addition, the potential for increased erosion and sedimentation is handled by way of erosion control blankets, sedimentation sumps, and riprap inlet and outlet protection aprons. The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage system and will be observed during all stages of construction. Existing wetlands and abutting property owners will suffer minimal impact resultant from this development.

AoT Screening Layers



Legend

- Asbestos Disposal Sites
- Environmental Monitoring Site Nonsecure
- Groundwater Classification / GA1
- Groundwater Classification / GA2
- Local Potential Contaminant Sources
- Outstanding Resource Water Watersheds
- Designated Rivers Quarter Buffer
- Parcels
- Parcel Polygons
- Attributes for Additional Lines
- Additional Lines

Map Scale

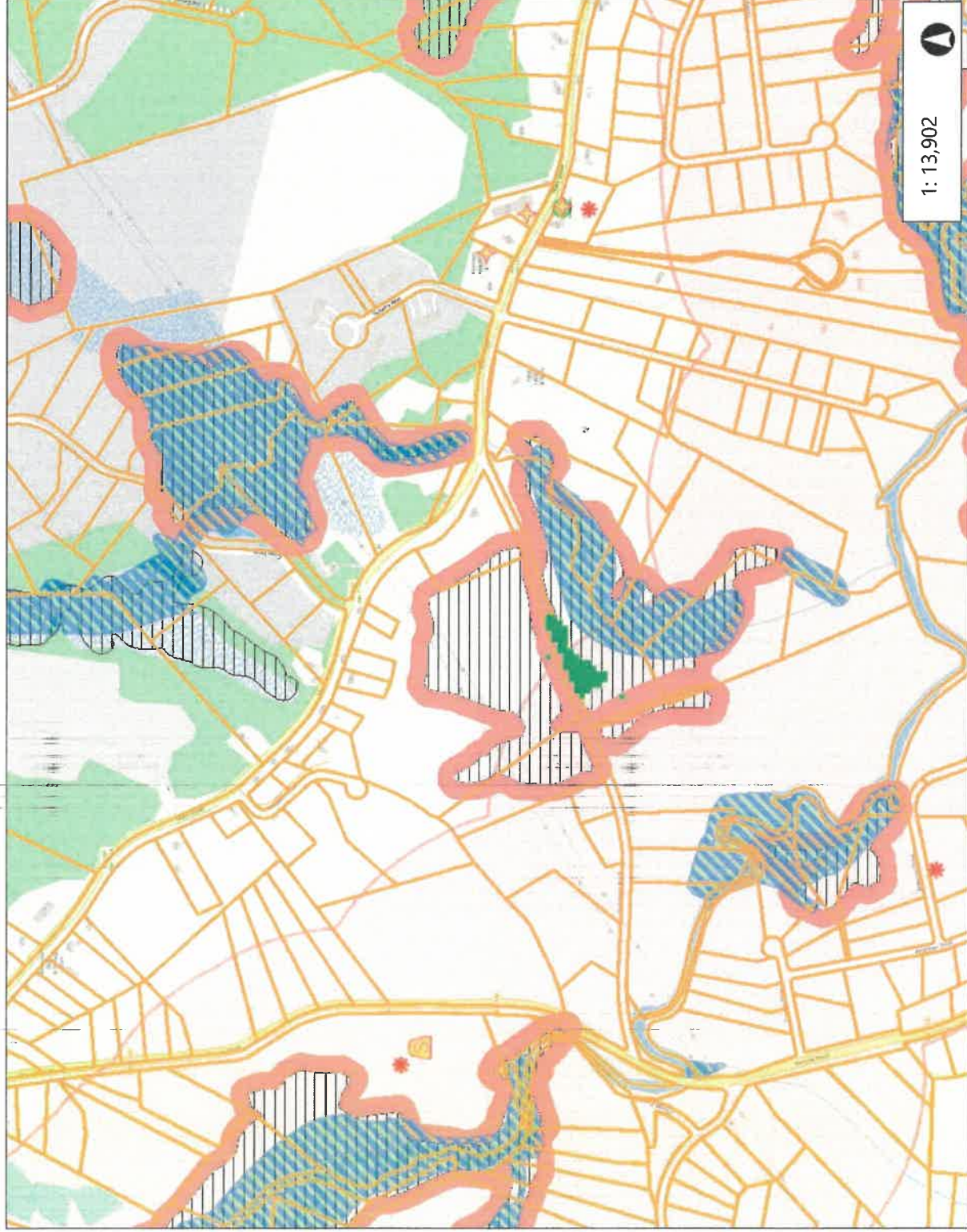
1: 5,000

© NH DES, <http://des.tn.gov>

Map Generated: 9/8/2021

Notes

Surface Impairments Map



1: 13,902

0.4 Miles

0.22

0

0.4

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

WGS_1984_Web_Mercator_Auxiliary_Sphere
© Latitude Geographics Group Ltd.

Legend

- Underground Storage Tank Sit
- Solid Waste Facilities
- Remediation Sites
- NPDES Outfalls
- Hazardous Waste Generators
- Automobile Salvage Yards
- Asbestos Disposal Sites
- Aboveground Storage Tank Sit
- Wetland_Permits_points
- Parcel Polygons
- Parcel Polygons
- Attributes for Additional Lines
- Flood Plain Wetlands Adjacent
- Prime Wetlands with 100 ft Bui
- Prime Wetlands
- Designated Rivers
- Subject to SWQPA
- Not Subject to SWQPA
- Sand Dunes
- backdune
- foredune
- interdune
- other
- Watersheds with Chloride Impairments 2016
- Surface Waters with Impairments 2016 with Quarter Mile Buffer

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

To: Emma Howard, Jones and Beach
PO Box 219
Stratham, NH 03885

From: NHB Review, NH Natural Heritage Bureau
Date: 12/7/2021 (valid until 12/07/2022)
Re: Review by NH Natural Heritage Bureau
Permits: MUNICIPAL POR - Fremont, NHDES - Alteration of Terrain Permit

NHB ID: NHB21-3782 Town: Fremont Location: Main St
Description: Proposed project includes approximately 13 residential homes on a private cul-de-sac to be serviced by on-site wells and septic.
cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments NHB: No Comments At This Time
E&G: Please submit AoT-related documents for NHEG review, AoT review inquiries or wildlife biologist questions to NHEGreview@wildlife.nh.gov. If project related: Include the NHB datacheck results letter number (i.e. NHB21 -3782) in the email subject line at a minimum. Not including this number will affect our response time and delays of our review. Please include the NHB number in the title of the assessment along with a date (year, month, day).

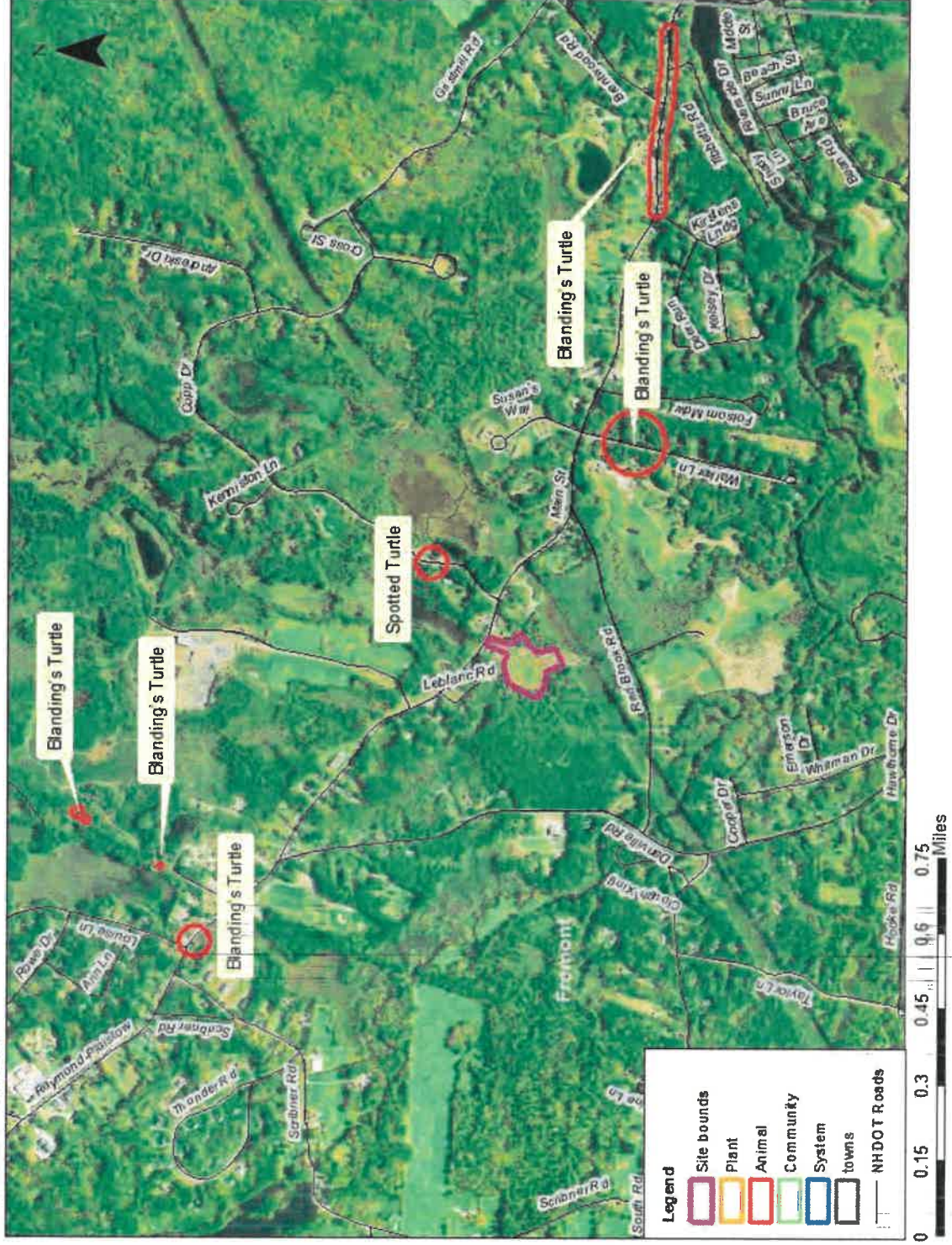
Vertebrate species	State ¹	Federal	Notes
Blanding's Turtle (<i>Emydoidea blandingii</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Spotted Turtle (<i>Clemmys guttata</i>)	T	--	Contact the NH Fish & Game Dept (see below).

¹Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NHEG & G, (603) 271-6544.

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.

NHB21-3782



New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)**Legal Status**

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2012: 1 individual observed.

General Area: --

General Comments: --

Management: --

Comments:

Location

Survey Site Name: Spruce Swamp

Managed By:

County: Rockingham

Town(s): Fremont

Size: .3 acres

Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: --

Dates documented

First reported: 2012-05-18

Last reported: 2012-05-18

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)**Legal Status**

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank: --

Detailed Description: 2008: Area 11550: 1 adult seen. 5 1/2" x 3 1/2". This individual was hit by a car and died.
General Area: 2008: Area 11550: Route 107.
General Comments: --
Management: --
Comments:

Location

Survey Site Name: Spruce Swamp
Managed By:

County: Rockingham
Town(s): Fremont
Size: 7.5 acres

Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2008: Area 11550: Route 107 near intersection with Brentwood Road.

Dates documented

First reported: 2008-07-15 Last reported: 2008-07-15

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)**Legal Status**

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2011: Area 12959: 1 adult observed.
General Area: 2011: Area 12959: On the side of the road. There are wetland areas on both sides of the road that dry up in the summer time.
General Comments: --
Management: --
Comments:

Location

Survey Site Name: Greenwood Pond
Managed By:

County: Rockingham
Town(s): Fremont
Size: 7.7 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2011: Area 12959: Walker Lane, Fremont, 100 ft. from the intersection with Rte. 107.

Dates documented

First reported: 2011-06-27 Last reported: 2011-06-27

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)**Legal Status**

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2012: 1 turtle observed on 4/16. 1 turtle observed on 5/18.

General Area: --

General Comments: --

Management: --

Comments:

Location

Survey Site Name: Spruce Swamp
Managed By: Manchester-Portsmouth RR Bed

County: Rockingham

Town(s): Fremont

Size: .0 acres

Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: --

Dates documented

First reported: 2012-04-16

Last reported: 2012-05-18

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)**Legal Status**

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2013: Area 13537: 1 adult observed, sex unknown.
General Area: 2013: Area 13537: Little stream with culvert under roadway.
General Comments: --
Management: --
Comments:

Location

Survey Site Name: Spruce Swamp
Managed By:

County: Rockingham
Town(s): Fremont
Size: 1.9 acres Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2013: Area 13537: Crossing Route 107 in Fremont.

Dates documented

First reported: 2013-07-03 Last reported: 2013-07-03

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Spotted Turtle (*Clemmys guttata*)

Legal Status

Federal: Not listed

State: Listed Threatened

Conservation Status

Global: Demonstrably widespread, abundant, and secure

State: Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Excellent quality, condition and landscape context ('A' on a scale of A-D).

Comments on Rank: --

Detailed Description: 2018: 2018 Survey area: 15 males, 7 females, and 2 juveniles captured in trap survey. 2013: Area 13438: 1 adult observed, sex unknown, crossing road. 2012: FR_Ref_3_1: 1 turtle observed on 4/19. 1 turtle observed on 5/18. Observations made through binoculars. 2008: Area 11621: 1 turtle seen. Area 11641: 5 turtles seen. 2007: Area 12457: 1 female observed.

General Area: 2013: Area 13438: Roadside, coniferous forest. 2008: Area 11641: All the turtles were in the wetland west of the RR tracks. 2007: Area 12457: Crossing from upland oak - pine woods toward pond in open gravelly area and large wetland complex.

General Area:

General Comments: _____

Management --

Comments:

Location

Survey Site Name: Spruce Swamp

Managed By: Manchester-Portsmouth RR Bed

County: Rockingham

Town(s): Fremont

Size: 18.8 acres

Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2013: Area 13438: Beede Hill Road, Fremont. 2008: Area 11621: Wetlands west of old RR bed through Spruce Swamp. 2007: Area 12457: Copp Drive at fire pond near Red Brook.

Dates documented

First reported: 2007-05-10

Last reported: 2018-07-27

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

Soil Map—Rockingham County, New Hampshire



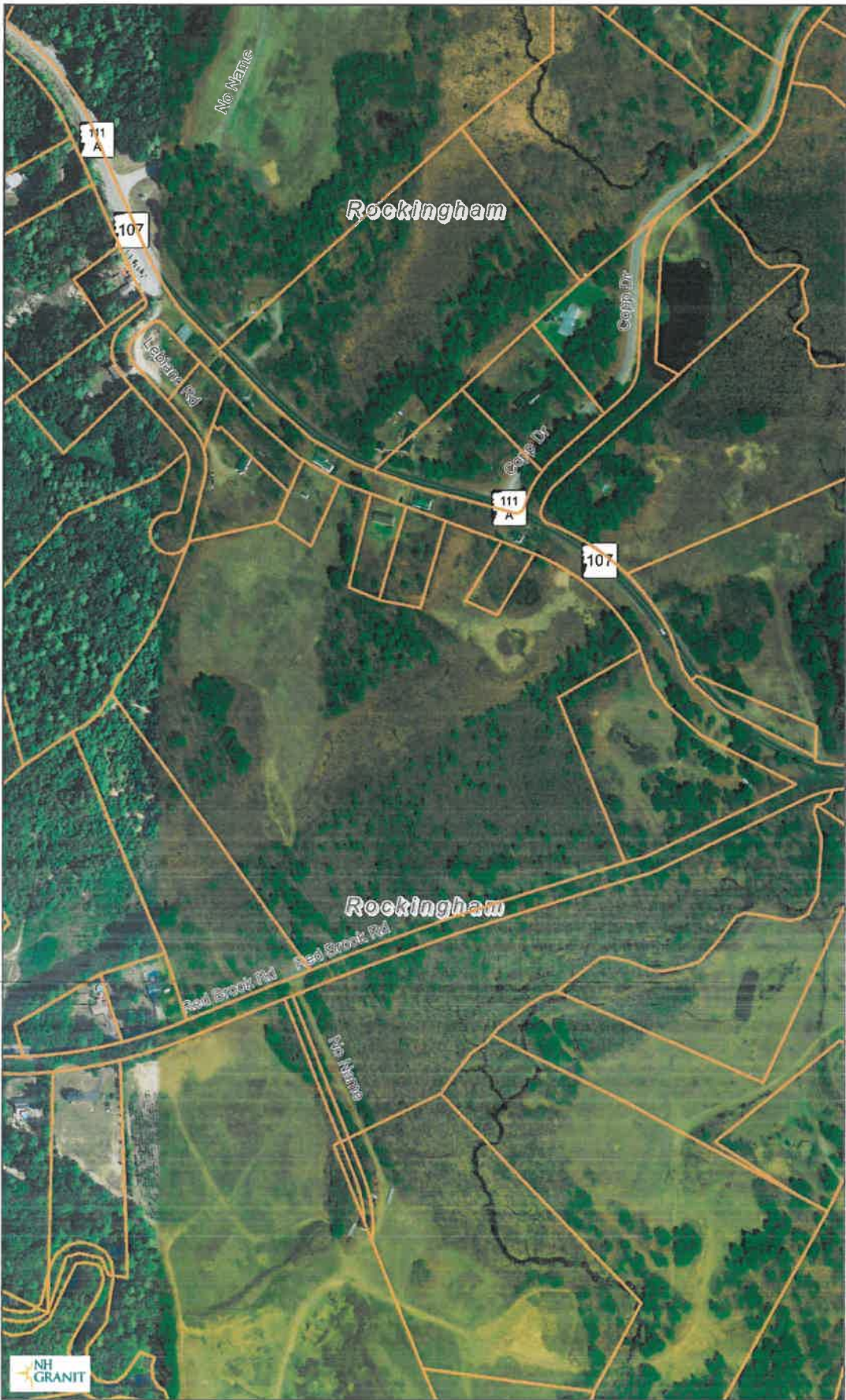
Map Scale: 1:5,800 if printed on A landscape (11" x 8.5") sheet.

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12B	Hinckley loamy sand, 3 to 8 percent slopes	19.9	11.5%
12C	Hinckley loamy sand, 8 to 15 percent slopes	35.4	20.4%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	0.1	0.1%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	24.2	14.0%
295	Freetown mucky peat, 0 to 2 percent slopes	36.5	21.1%
298	Pits, sand and gravel	29.2	16.9%
299	Udorthents, smoothed	5.2	3.0%
313A	Deerfield loamy fine sand, 0 to 3 percent slopes	5.3	3.1%
313B	Deerfield loamy fine sand, 3 to 8 percent slopes	0.7	0.4%
314A	Pipestone sand, 0 to 5 percent slopes	14.0	8.1%
395	Swansea mucky peat, 0 to 2 percent slopes	2.4	1.4%
447B	Scituate-Newfields complex, 3 to 8 percent slopes, very stony	0.1	0.1%
Totals for Area of Interest		173.0	100.0%

Aerial Map



- Legend**
- Parcels
 - Parcel Polygons
 - Attributes for Additional Lines
 - State
 - County
 - City/Town

Map Scale
1: 5,000

© NH GRANIT, www.granit.unh.edu
Map Generated: 6/21/2021

Notes





LOOKING SOUTH FROM MAIN STREET AT ENTRANCE



LOOKING SOUTHWEST FROM EX. GRAVEL DRIVEWAY



LOOKING SOUTH FROM EX. GRAVEL DRIVEWAY



LOOKING NORTH FROM P.S.N.H. EASEMENT



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

2.22	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
-	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
-	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
-	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.40	inches	Rd = Weighted groundwater recharge depth	
0.8888	ac-in	GRV = AI * Rd	
3,226	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):

Drip Edge #1: Vol = 694 cf

Drip Edge #2: Vol = 694 cf

Drip Edge #3: Vol = 694 cf

Drip Edge #4: Vol = 694 cf

Drip Edge #5: Vol = 694 cf

Drip Edge #6: Vol = 694 cf

Drip Edge #7: Vol = 694 cf

Drip Edge #8: Vol = 694 cf

Drip Edge #9: Vol = 694 cf

Drip Edge #10: Vol = 694 cf

Drip Edge #11: Vol = 694 cf

Drip Edge #12: Vol = 694 cf

Drip Edge #13: Vol = 694 cf

Total Volume = 9,022 cf

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 10 YR Rainfall=4.73"

Printed 11/23/2021

Stage-Area-Storage for Pond DE1: DRIP EDGE #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.10	434	0	199.75	434	460
197.15	434	9	199.80	434	469
197.20	434	17	199.85	434	477
197.25	434	26	199.90	434	486
197.30	434	35	199.95	434	495
197.35	434	43	200.00	434	503
197.40	434	52	200.05	434	512
197.45	434	61	200.10	434	521
197.50	434	69	200.15	434	529
197.55	434	78	200.20	434	538
197.60	434	87	200.25	434	547
197.65	434	95	200.30	434	556
197.70	434	104	200.35	434	564
197.75	434	113	200.40	434	573
197.80	434	122	200.45	434	582
197.85	434	130	200.50	434	590
197.90	434	139	200.55	434	599
197.95	434	148	200.60	434	608
198.00	434	156	200.65	434	616
198.05	434	165	200.70	434	625
198.10	434	174	200.75	434	634
198.15	434	182	200.80	434	642
198.20	434	191	200.85	434	651
198.25	434	200	200.90	434	660
198.30	434	208	200.95	434	668
198.35	434	217	201.00	434	677
198.40	434	226	201.05	434	686
198.45	434	234	201.10	434	694
198.50	434	243	201.15	434	703
198.55	434	252	201.20	434	712
198.60	434	260	201.25	434	720
198.65	434	269	201.30	434	729
198.70	434	278	201.35	434	738
198.75	434	286	201.40	434	746
198.80	434	295	201.45	434	755
198.85	434	304	201.50	434	764
198.90	434	312	201.55	434	773
198.95	434	321	201.60	434	781
199.00	434	330	201.65	434	790
199.05	434	339	201.70	434	799
199.10	434	347	201.75	434	807
199.15	434	356	201.80	434	816
199.20	434	365	201.85	434	825
199.25	434	373	201.90	434	833
199.30	434	382	201.95	434	842
199.35	434	391	202.00	434	851
199.40	434	399	202.05	434	859
199.45	434	408	202.10	434	868
199.50	434	417			
199.55	434	425			
199.60	434	434			
199.65	434	443			
199.70	434	451			

Top of Drip Edge = 201.10

Vol = 694 cf

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 5 YR Rainfall=3.95"

Printed 11/17/2021

Stage-Area-Storage for Pond DE2: DRIP EDGE #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.50	434	0	200.15	434	460
197.55	434	9	200.20	434	469
197.60	434	17	200.25	434	477
197.65	434	26	200.30	434	486
197.70	434	35	200.35	434	495
197.75	434	43	200.40	434	503
197.80	434	52	200.45	434	512
197.85	434	61	200.50	434	521
197.90	434	69	200.55	434	529
197.95	434	78	200.60	434	538
198.00	434	87	200.65	434	547
198.05	434	95	200.70	434	556
198.10	434	104	200.75	434	564
198.15	434	113	200.80	434	573
198.20	434	122	200.85	434	582
198.25	434	130	200.90	434	590
198.30	434	139	200.95	434	599
198.35	434	148	201.00	434	608
198.40	434	156	201.05	434	616
198.45	434	165	201.10	434	625
198.50	434	174	201.15	434	634
198.55	434	182	201.20	434	642
198.60	434	191	201.25	434	651
198.65	434	200	201.30	434	660
198.70	434	208	201.35	434	668
198.75	434	217	201.40	434	677
198.80	434	226	201.45	434	686
198.85	434	234	201.50	434	694
198.90	434	243	201.55	434	703
198.95	434	252	201.60	434	712
199.00	434	260	201.65	434	720
199.05	434	269	201.70	434	729
199.10	434	278	201.75	434	738
199.15	434	286	201.80	434	746
199.20	434	295	201.85	434	755
199.25	434	304	201.90	434	764
199.30	434	312	201.95	434	773
199.35	434	321	202.00	434	781
199.40	434	330	202.05	434	790
199.45	434	339	202.10	434	799
199.50	434	347	202.15	434	807
199.55	434	356	202.20	434	816
199.60	434	365	202.25	434	825
199.65	434	373	202.30	434	833
199.70	434	382	202.35	434	842
199.75	434	391	202.40	434	851
199.80	434	399	202.45	434	859
199.85	434	408	202.50	434	868
199.90	434	417			
199.95	434	425			
200.00	434	434			
200.05	434	443			
200.10	434	451			

Top of Drip Edge = 201.50

Vol = 694 cf

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 5 YR Rainfall=3.95"

Printed 11/17/2021

Stage-Area-Storage for Pond DE3: DRIP EDGE #3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
196.95	434	0	199.60	434	460
197.00	434	9	199.65	434	469
197.05	434	17	199.70	434	477
197.10	434	26	199.75	434	486
197.15	434	35	199.80	434	495
197.20	434	43	199.85	434	503
197.25	434	52	199.90	434	512
197.30	434	61	199.95	434	521
197.35	434	69	200.00	434	529
197.40	434	78	200.05	434	538
197.45	434	87	200.10	434	547
197.50	434	95	200.15	434	556
197.55	434	104	200.20	434	564
197.60	434	113	200.25	434	573
197.65	434	122	200.30	434	582
197.70	434	130	200.35	434	590
197.75	434	139	200.40	434	599
197.80	434	148	200.45	434	608
197.85	434	156	200.50	434	616
197.90	434	165	200.55	434	625
197.95	434	174	200.60	434	634
198.00	434	182	200.65	434	642
198.05	434	191	200.70	434	651
198.10	434	200	200.75	434	660
198.15	434	208	200.80	434	668
198.20	434	217	200.85	434	677
198.25	434	226	200.90	434	686
198.30	434	234	200.95	434	694
198.35	434	243	201.00	434	703
198.40	434	252	201.05	434	712
198.45	434	260	201.10	434	720
198.50	434	269	201.15	434	729
198.55	434	278	201.20	434	738
198.60	434	286	201.25	434	746
198.65	434	295	201.30	434	755
198.70	434	304	201.35	434	764
198.75	434	312	201.40	434	773
198.80	434	321	201.45	434	781
198.85	434	330	201.50	434	790
198.90	434	339	201.55	434	799
198.95	434	347	201.60	434	807
199.00	434	356	201.65	434	816
199.05	434	365	201.70	434	825
199.10	434	373	201.75	434	833
199.15	434	382	201.80	434	842
199.20	434	391	201.85	434	851
199.25	434	399	201.90	434	859
199.30	434	408	201.95	434	868
199.35	434	417			
199.40	434	425			
199.45	434	434			
199.50	434	443			
199.55	434	451			

Top of Drip Edge = 200.95

Vol = 694 cf

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 5 YR Rainfall=3.95"

Printed 11/17/2021

Stage-Area-Storage for Pond DE4: DRIP EDGE #4

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
196.55	434	0	199.20	434	460
196.60	434	9	199.25	434	469
196.65	434	17	199.30	434	477
196.70	434	26	199.35	434	486
196.75	434	35	199.40	434	495
196.80	434	43	199.45	434	503
196.85	434	52	199.50	434	512
196.90	434	61	199.55	434	521
196.95	434	69	199.60	434	529
197.00	434	78	199.65	434	538
197.05	434	87	199.70	434	547
197.10	434	95	199.75	434	556
197.15	434	104	199.80	434	564
197.20	434	113	199.85	434	573
197.25	434	122	199.90	434	582
197.30	434	130	199.95	434	590
197.35	434	139	200.00	434	599
197.40	434	148	200.05	434	608
197.45	434	156	200.10	434	616
197.50	434	165	200.15	434	625
197.55	434	174	200.20	434	634
197.60	434	182	200.25	434	642
197.65	434	191	200.30	434	651
197.70	434	200	200.35	434	660
197.75	434	208	200.40	434	668
197.80	434	217	200.45	434	677
197.85	434	226	200.50	434	686
197.90	434	234	200.55	434	694
197.95	434	243	200.60	434	703
198.00	434	252	200.65	434	712
198.05	434	260	200.70	434	720
198.10	434	269	200.75	434	729
198.15	434	278	200.80	434	738
198.20	434	286	200.85	434	746
198.25	434	295	200.90	434	755
198.30	434	304	200.95	434	764
198.35	434	312	201.00	434	773
198.40	434	321	201.05	434	781
198.45	434	330	201.10	434	790
198.50	434	339	201.15	434	799
198.55	434	347	201.20	434	807
198.60	434	356	201.25	434	816
198.65	434	365	201.30	434	825
198.70	434	373	201.35	434	833
198.75	434	382	201.40	434	842
198.80	434	391	201.45	434	851
198.85	434	399	201.50	434	859
198.90	434	408	201.55	434	868
198.95	434	417			
199.00	434	425			
199.05	434	434			
199.10	434	443			
199.15	434	451			

Top of Drip Edge = 200.55

Vol = 694 cf

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

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Type III 24-hr 5 YR Rainfall=3.95"

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Stage-Area-Storage for Pond DE5: DRIP EDGE #5

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.65	434	0	200.30	434	460
197.70	434	9	200.35	434	469
197.75	434	17	200.40	434	477
197.80	434	26	200.45	434	486
197.85	434	35	200.50	434	495
197.90	434	43	200.55	434	503
197.95	434	52	200.60	434	512
198.00	434	61	200.65	434	521
198.05	434	69	200.70	434	529
198.10	434	78	200.75	434	538
198.15	434	87	200.80	434	547
198.20	434	95	200.85	434	556
198.25	434	104	200.90	434	564
198.30	434	113	200.95	434	573
198.35	434	122	201.00	434	582
198.40	434	130	201.05	434	590
198.45	434	139	201.10	434	599
198.50	434	148	201.15	434	608
198.55	434	156	201.20	434	616
198.60	434	165	201.25	434	625
198.65	434	174	201.30	434	634
198.70	434	182	201.35	434	642
198.75	434	191	201.40	434	651
198.80	434	200	201.45	434	660
198.85	434	208	201.50	434	668
198.90	434	217	201.55	434	677
198.95	434	226	201.60	434	686
199.00	434	234	201.65	434	694
199.05	434	243	201.70	434	703
199.10	434	252	201.75	434	712
199.15	434	260	201.80	434	720
199.20	434	269	201.85	434	729
199.25	434	278	201.90	434	738
199.30	434	286	201.95	434	746
199.35	434	295	202.00	434	755
199.40	434	304	202.05	434	764
199.45	434	312	202.10	434	773
199.50	434	321	202.15	434	781
199.55	434	330	202.20	434	790
199.60	434	339	202.25	434	799
199.65	434	347	202.30	434	807
199.70	434	356	202.35	434	816
199.75	434	365	202.40	434	825
199.80	434	373	202.45	434	833
199.85	434	382	202.50	434	842
199.90	434	391	202.55	434	851
199.95	434	399	202.60	434	859
200.00	434	408	202.65	434	868
200.05	434	417			
200.10	434	425			
200.15	434	434			
200.20	434	443			
200.25	434	451			

Top of Drip Edge = 201.65

Vol = 694 cf

20724-PROP-DRAINAGE

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Type III 24-hr 5 YR Rainfall=3.95"

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Stage-Area-Storage for Pond DE6: DRIP EDGE #6

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.65	434	0	200.30	434	460
197.70	434	9	200.35	434	469
197.75	434	17	200.40	434	477
197.80	434	26	200.45	434	486
197.85	434	35	200.50	434	495
197.90	434	43	200.55	434	503
197.95	434	52	200.60	434	512
198.00	434	61	200.65	434	521
198.05	434	69	200.70	434	529
198.10	434	78	200.75	434	538
198.15	434	87	200.80	434	547
198.20	434	95	200.85	434	556
198.25	434	104	200.90	434	564
198.30	434	113	200.95	434	573
198.35	434	122	201.00	434	582
198.40	434	130	201.05	434	590
198.45	434	139	201.10	434	599
198.50	434	148	201.15	434	608
198.55	434	156	201.20	434	616
198.60	434	165	201.25	434	625
198.65	434	174	201.30	434	634
198.70	434	182	201.35	434	642
198.75	434	191	201.40	434	651
198.80	434	200	201.45	434	660
198.85	434	208	201.50	434	668
198.90	434	217	201.55	434	677
198.95	434	226	201.60	434	686
199.00	434	234	201.65	434	694
199.05	434	243	201.70	434	703
199.10	434	252	201.75	434	712
199.15	434	260	201.80	434	720
199.20	434	269	201.85	434	729
199.25	434	278	201.90	434	738
199.30	434	286	201.95	434	746
199.35	434	295	202.00	434	755
199.40	434	304	202.05	434	764
199.45	434	312	202.10	434	773
199.50	434	321	202.15	434	781
199.55	434	330	202.20	434	790
199.60	434	339	202.25	434	799
199.65	434	347	202.30	434	807
199.70	434	356	202.35	434	816
199.75	434	365	202.40	434	825
199.80	434	373	202.45	434	833
199.85	434	382	202.50	434	842
199.90	434	391	202.55	434	851
199.95	434	399	202.60	434	859
200.00	434	408	202.65	434	868
200.05	434	417			
200.10	434	425			
200.15	434	434			
200.20	434	443			
200.25	434	451			

Top of Drip Edge = 201.65

Vol = 694 cf

20724-PROP-DRAINAGE

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Stage-Area-Storage for Pond DE7: DRIP EDGE #7

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.25	434	0	199.90	434	460
197.30	434	9	199.95	434	469
197.35	434	17	200.00	434	477
197.40	434	26	200.05	434	486
197.45	434	35	200.10	434	495
197.50	434	43	200.15	434	503
197.55	434	52	200.20	434	512
197.60	434	61	200.25	434	521
197.65	434	69	200.30	434	529
197.70	434	78	200.35	434	538
197.75	434	87	200.40	434	547
197.80	434	95	200.45	434	556
197.85	434	104	200.50	434	564
197.90	434	113	200.55	434	573
197.95	434	122	200.60	434	582
198.00	434	130	200.65	434	590
198.05	434	139	200.70	434	599
198.10	434	148	200.75	434	608
198.15	434	156	200.80	434	616
198.20	434	165	200.85	434	625
198.25	434	174	200.90	434	634
198.30	434	182	200.95	434	642
198.35	434	191	201.00	434	651
198.40	434	200	201.05	434	660
198.45	434	208	201.10	434	668
198.50	434	217	201.15	434	677
198.55	434	226	201.20	434	686
198.60	434	234	201.25	434	694
198.65	434	243	201.30	434	703
198.70	434	252	201.35	434	712
198.75	434	260	201.40	434	720
198.80	434	269	201.45	434	729
198.85	434	278	201.50	434	738
198.90	434	286	201.55	434	746
198.95	434	295	201.60	434	755
199.00	434	304	201.65	434	764
199.05	434	312	201.70	434	773
199.10	434	321	201.75	434	781
199.15	434	330	201.80	434	790
199.20	434	339	201.85	434	799
199.25	434	347	201.90	434	807
199.30	434	356	201.95	434	816
199.35	434	365	202.00	434	825
199.40	434	373	202.05	434	833
199.45	434	382	202.10	434	842
199.50	434	391	202.15	434	851
199.55	434	399	202.20	434	859
199.60	434	408	202.25	434	868
199.65	434	417			
199.70	434	425			
199.75	434	434			
199.80	434	443			
199.85	434	451			

Top of Drip Edge = 201.25

Vol = 694 cf

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Stage-Area-Storage for Pond DE8: DRIP EDGE #8

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
196.30	434	0	198.95	434	460
196.35	434	9	199.00	434	469
196.40	434	17	199.05	434	477
196.45	434	26	199.10	434	486
196.50	434	35	199.15	434	495
196.55	434	43	199.20	434	503
196.60	434	52	199.25	434	512
196.65	434	61	199.30	434	521
196.70	434	69	199.35	434	529
196.75	434	78	199.40	434	538
196.80	434	87	199.45	434	547
196.85	434	95	199.50	434	556
196.90	434	104	199.55	434	564
196.95	434	113	199.60	434	573
197.00	434	122	199.65	434	582
197.05	434	130	199.70	434	590
197.10	434	139	199.75	434	599
197.15	434	148	199.80	434	608
197.20	434	156	199.85	434	616
197.25	434	165	199.90	434	625
197.30	434	174	199.95	434	634
197.35	434	182	200.00	434	642
197.40	434	191	200.05	434	651
197.45	434	200	200.10	434	660
197.50	434	208	200.15	434	668
197.55	434	217	200.20	434	677
197.60	434	226	200.25	434	686
197.65	434	234	200.30	434	694
197.70	434	243	200.35	434	703
197.75	434	252	200.40	434	712
197.80	434	260	200.45	434	720
197.85	434	269	200.50	434	729
197.90	434	278	200.55	434	738
197.95	434	286	200.60	434	746
198.00	434	295	200.65	434	755
198.05	434	304	200.70	434	764
198.10	434	312	200.75	434	773
198.15	434	321	200.80	434	781
198.20	434	330	200.85	434	790
198.25	434	339	200.90	434	799
198.30	434	347	200.95	434	807
198.35	434	356	201.00	434	816
198.40	434	365	201.05	434	825
198.45	434	373	201.10	434	833
198.50	434	382	201.15	434	842
198.55	434	391	201.20	434	851
198.60	434	399	201.25	434	859
198.65	434	408	201.30	434	868
198.70	434	417			
198.75	434	425			
198.80	434	434			
198.85	434	443			
198.90	434	451			

Top of Drip Edge = 200.30

Vol = 694 cf

20724-PROP-DRAINAGE

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Stage-Area-Storage for Pond DE9: DRIP EDGE #9

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
195.45	434	0	198.10	434	460
195.50	434	9	198.15	434	469
195.55	434	17	198.20	434	477
195.60	434	26	198.25	434	486
195.65	434	35	198.30	434	495
195.70	434	43	198.35	434	503
195.75	434	52	198.40	434	512
195.80	434	61	198.45	434	521
195.85	434	69	198.50	434	529
195.90	434	78	198.55	434	538
195.95	434	87	198.60	434	547
196.00	434	95	198.65	434	556
196.05	434	104	198.70	434	564
196.10	434	113	198.75	434	573
196.15	434	122	198.80	434	582
196.20	434	130	198.85	434	590
196.25	434	139	198.90	434	599
196.30	434	148	198.95	434	608
196.35	434	156	199.00	434	616
196.40	434	165	199.05	434	625
196.45	434	174	199.10	434	634
196.50	434	182	199.15	434	642
196.55	434	191	199.20	434	651
196.60	434	200	199.25	434	660
196.65	434	208	199.30	434	668
196.70	434	217	199.35	434	677
196.75	434	226	199.40	434	686
196.80	434	234	199.45	434	694
196.85	434	243	199.50	434	703
196.90	434	252	199.55	434	712
196.95	434	260	199.60	434	720
197.00	434	269	199.65	434	729
197.05	434	278	199.70	434	738
197.10	434	286	199.75	434	746
197.15	434	295	199.80	434	755
197.20	434	304	199.85	434	764
197.25	434	312	199.90	434	773
197.30	434	321	199.95	434	781
197.35	434	330	200.00	434	790
197.40	434	339	200.05	434	799
197.45	434	347	200.10	434	807
197.50	434	356	200.15	434	816
197.55	434	365	200.20	434	825
197.60	434	373	200.25	434	833
197.65	434	382	200.30	434	842
197.70	434	391	200.35	434	851
197.75	434	399	200.40	434	859
197.80	434	408	200.45	434	868
197.85	434	417			
197.90	434	425			
197.95	434	434			
198.00	434	443			
198.05	434	451			

Top of Drip Edge = 199.45

Vol = 694 cf

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Stage-Area-Storage for Pond DE10: DRIP EDGE #10

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
195.55	434	0	198.20	434	460
195.60	434	9	198.25	434	469
195.65	434	17	198.30	434	477
195.70	434	26	198.35	434	486
195.75	434	35	198.40	434	495
195.80	434	43	198.45	434	503
195.85	434	52	198.50	434	512
195.90	434	61	198.55	434	521
195.95	434	69	198.60	434	529
196.00	434	78	198.65	434	538
196.05	434	87	198.70	434	547
196.10	434	95	198.75	434	556
196.15	434	104	198.80	434	564
196.20	434	113	198.85	434	573
196.25	434	122	198.90	434	582
196.30	434	130	198.95	434	590
196.35	434	139	199.00	434	599
196.40	434	148	199.05	434	608
196.45	434	156	199.10	434	616
196.50	434	165	199.15	434	625
196.55	434	174	199.20	434	634
196.60	434	182	199.25	434	642
196.65	434	191	199.30	434	651
196.70	434	200	199.35	434	660
196.75	434	208	199.40	434	668
196.80	434	217	199.45	434	677
196.85	434	226	199.50	434	686
196.90	434	234	199.55	434	694
196.95	434	243	199.60	434	703
197.00	434	252	199.65	434	712
197.05	434	260	199.70	434	720
197.10	434	269	199.75	434	729
197.15	434	278	199.80	434	738
197.20	434	286	199.85	434	746
197.25	434	295	199.90	434	755
197.30	434	304	199.95	434	764
197.35	434	312	200.00	434	773
197.40	434	321	200.05	434	781
197.45	434	330	200.10	434	790
197.50	434	339	200.15	434	799
197.55	434	347	200.20	434	807
197.60	434	356	200.25	434	816
197.65	434	365	200.30	434	825
197.70	434	373	200.35	434	833
197.75	434	382	200.40	434	842
197.80	434	391	200.45	434	851
197.85	434	399	200.50	434	859
197.90	434	408	200.55	434	868
197.95	434	417			
198.00	434	425			
198.05	434	434			
198.10	434	443			
198.15	434	451			

Top of Drip Edge = 199.55

Vol = 694 cf

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Stage-Area-Storage for Pond DE11: DRIP EDGE #11

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.20	434	0	199.85	434	460
197.25	434	9	199.90	434	469
197.30	434	17	199.95	434	477
197.35	434	26	200.00	434	486
197.40	434	35	200.05	434	495
197.45	434	43	200.10	434	503
197.50	434	52	200.15	434	512
197.55	434	61	200.20	434	521
197.60	434	69	200.25	434	529
197.65	434	78	200.30	434	538
197.70	434	87	200.35	434	547
197.75	434	95	200.40	434	556
197.80	434	104	200.45	434	564
197.85	434	113	200.50	434	573
197.90	434	122	200.55	434	582
197.95	434	130	200.60	434	590
198.00	434	139	200.65	434	599
198.05	434	148	200.70	434	608
198.10	434	156	200.75	434	616
198.15	434	165	200.80	434	625
198.20	434	174	200.85	434	634
198.25	434	182	200.90	434	642
198.30	434	191	200.95	434	651
198.35	434	200	201.00	434	660
198.40	434	208	201.05	434	668
198.45	434	217	201.10	434	677
198.50	434	226	201.15	434	686
198.55	434	234	201.20	434	694
198.60	434	243	201.25	434	703
198.65	434	252	201.30	434	712
198.70	434	260	201.35	434	720
198.75	434	269	201.40	434	729
198.80	434	278	201.45	434	738
198.85	434	286	201.50	434	746
198.90	434	295	201.55	434	755
198.95	434	304	201.60	434	764
199.00	434	312	201.65	434	773
199.05	434	321	201.70	434	781
199.10	434	330	201.75	434	790
199.15	434	339	201.80	434	799
199.20	434	347	201.85	434	807
199.25	434	356	201.90	434	816
199.30	434	365	201.95	434	825
199.35	434	373	202.00	434	833
199.40	434	382	202.05	434	842
199.45	434	391	202.10	434	851
199.50	434	399	202.15	434	859
199.55	434	408	202.20	434	868
199.60	434	417			
199.65	434	425			
199.70	434	434			
199.75	434	443			
199.80	434	451			

Top of Drip Edge = 201.20

Vol = 694 cf

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Stage-Area-Storage for Pond DE12: DRIP EDGE #12

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
196.45	434	0	199.10	434	460
196.50	434	9	199.15	434	469
196.55	434	17	199.20	434	477
196.60	434	26	199.25	434	486
196.65	434	35	199.30	434	495
196.70	434	43	199.35	434	503
196.75	434	52	199.40	434	512
196.80	434	61	199.45	434	521
196.85	434	69	199.50	434	529
196.90	434	78	199.55	434	538
196.95	434	87	199.60	434	547
197.00	434	95	199.65	434	556
197.05	434	104	199.70	434	564
197.10	434	113	199.75	434	573
197.15	434	122	199.80	434	582
197.20	434	130	199.85	434	590
197.25	434	139	199.90	434	599
197.30	434	148	199.95	434	608
197.35	434	156	200.00	434	616
197.40	434	165	200.05	434	625
197.45	434	174	200.10	434	634
197.50	434	182	200.15	434	642
197.55	434	191	200.20	434	651
197.60	434	200	200.25	434	660
197.65	434	208	200.30	434	668
197.70	434	217	200.35	434	677
197.75	434	226	200.40	434	686
197.80	434	234	200.45	434	694
197.85	434	243	200.50	434	703
197.90	434	252	200.55	434	712
197.95	434	260	200.60	434	720
198.00	434	269	200.65	434	729
198.05	434	278	200.70	434	738
198.10	434	286	200.75	434	746
198.15	434	295	200.80	434	755
198.20	434	304	200.85	434	764
198.25	434	312	200.90	434	773
198.30	434	321	200.95	434	781
198.35	434	330	201.00	434	790
198.40	434	339	201.05	434	799
198.45	434	347	201.10	434	807
198.50	434	356	201.15	434	816
198.55	434	365	201.20	434	825
198.60	434	373	201.25	434	833
198.65	434	382	201.30	434	842
198.70	434	391	201.35	434	851
198.75	434	399	201.40	434	859
198.80	434	408	201.45	434	868
198.85	434	417			
198.90	434	425			
198.95	434	434			
199.00	434	443			
199.05	434	451			

Top of Drip Edge = 200.45

Vol = 694 cf

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

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Type III 24-hr 5 YR Rainfall=3.95"

Printed 11/17/2021

Stage-Area-Storage for Pond DE13: DRIP EDGE #13

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
197.25	434	0	199.90	434	460
197.30	434	9	199.95	434	469
197.35	434	17	200.00	434	477
197.40	434	26	200.05	434	486
197.45	434	35	200.10	434	495
197.50	434	43	200.15	434	503
197.55	434	52	200.20	434	512
197.60	434	61	200.25	434	521
197.65	434	69	200.30	434	529
197.70	434	78	200.35	434	538
197.75	434	87	200.40	434	547
197.80	434	95	200.45	434	556
197.85	434	104	200.50	434	564
197.90	434	113	200.55	434	573
197.95	434	122	200.60	434	582
198.00	434	130	200.65	434	590
198.05	434	139	200.70	434	599
198.10	434	148	200.75	434	608
198.15	434	156	200.80	434	616
198.20	434	165	200.85	434	625
198.25	434	174	200.90	434	634
198.30	434	182	200.95	434	642
198.35	434	191	201.00	434	651
198.40	434	200	201.05	434	660
198.45	434	208	201.10	434	668
198.50	434	217	201.15	434	677
198.55	434	226	201.20	434	686
198.60	434	234	201.25	434	694
198.65	434	243	201.30	434	703
198.70	434	252	201.35	434	712
198.75	434	260	201.40	434	720
198.80	434	269	201.45	434	729
198.85	434	278	201.50	434	738
198.90	434	286	201.55	434	746
198.95	434	295	201.60	434	755
199.00	434	304	201.65	434	764
199.05	434	312	201.70	434	773
199.10	434	321	201.75	434	781
199.15	434	330	201.80	434	790
199.20	434	339	201.85	434	799
199.25	434	347	201.90	434	807
199.30	434	356	201.95	434	816
199.35	434	365	202.00	434	825
199.40	434	373	202.05	434	833
199.45	434	382	202.10	434	842
199.50	434	391	202.15	434	851
199.55	434	399	202.20	434	859
199.60	434	408	202.25	434	868
199.65	434	417			
199.70	434	425			
199.75	434	434			
199.80	434	443			
199.85	434	451			

Top of Drip Edge = 201.25

Vol = 694 cf



GRAVEL WETLAND DESIGN CRITERIA (Env-Wq 1508.05)

Type/Node Name: 1P- GRAVEL WETLAND #1

Enter the node name in the drainage analysis if applicable.

10.13	ac	A = Area draining to the practice	
1.43	ac	A_i = Impervious area draining to the practice	
0.14	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.18	unitless	R_v = Runoff coefficient = $0.05 + (0.9 \times I)$	
1.79	ac-in	$WQV = 1'' \times R_v \times A$	
6,505	cf	WQV conversion (ac-in \times 43,560 sf/ac \times 1ft/12")	
650	cf	10% \times WQV (check calc for sediment forebay)	
2,927	cf	45% \times WQV (check calc for gravel wetland treatment bay volume)	
658	cf	V_{SED} = Sediment forebay volume	$\geq 10\%WQV$
2,971	cf	V_{TB1} = Volume of treatment bay 1 ¹	$\geq 45\%WQV$
2,930	cf	V_{TB2} = Volume of treatment bay 2 ¹	$\geq 45\%WQV$
0.15	cfs	$2Q_{avg} = 2 \times WQV / 24 \text{ hrs} \times (1 \text{ hr} / 3600 \text{ sec})^6$	
194.03	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.13	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	$< 2Q_{avg}$
27.80	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	$\geq 24\text{-hrs}$
3.00	:1	Pond side slopes	$\geq 3:1$
192.00	ft	Elevation of SHWT	
190.00	ft	SHWT - 2 feet	
193.81	ft	E_{pp} = Elevation of the permanent pool (elevation of lowest orifice) ³	$\leq E_{SHWT} - 2 \text{ ft}$
60.00	ft	Length of the flow path between the inlet and outlet in each cell	$\geq 15 \text{ ft}$
baffel tee w/ screen		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of $\leq 6''$)?	
194.77	ft	Peak elevation of the 50-year storm event (E_{50})	
196.00	ft	Berm elevation of the pond	
YES		$E_{50} \leq$ the berm elevation?	\leftarrow yes
Qualified professional that developed the planting plan Name, Profession:			

1. Volume stored above the wetland soil and below the high flow by-pass.
2. To ensure orifice is sized so that WQV is released at a relatively stable rate.
3. 4" to 8" below the wetland soil. If lowest orifice is higher than (SHWT - 2 feet), and saturated hydraulic conductivity (Ksat) is greater than 0.015 in/hr, the system must be lined.

Designer's Notes:

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

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Type III 24-hr 10 YR Rainfall=4.73"

Printed 12/9/2021

Stage-Area-Storage for Pond F1: Forebay #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
192.00	156	0	194.65	912	1,313
192.05	165	8	194.70	930	1,360
192.10	174	16	194.75	947	1,406
192.15	183	25	194.80	965	1,454
192.20	193	35	194.85	983	1,503
192.25	203	45	194.90	1,001	1,553
192.30	213	55	194.95	1,020	1,603
192.35	223	66	195.00	1,038	1,655
192.40	234	77	195.05	1,057	1,707
192.45	244	89	195.10	1,076	1,760
192.50	255	102	195.15	1,095	1,815
192.55	267	115	195.20	1,114	1,870
192.60	278	129	195.25	1,133	1,926
192.65	290	143	195.30	1,153	1,983
192.70	302	158	195.35	1,172	2,041
192.75	314	173	195.40	1,192	2,100
192.80	327	189	195.45	1,212	2,160
192.85	340	206	195.50	1,232	2,222
192.90	353	223	195.55	1,253	2,284
192.95	366	241	195.60	1,273	2,347
193.00	379	259	195.65	1,294	2,411
193.05	393	279	195.70	1,315	2,476
193.10	407	299	195.75	1,336	2,542
193.15	421	319	195.80	1,357	2,610
193.20	436	341	195.85	1,378	2,678
193.25	450	363	195.90	1,400	2,748
193.30	465	386	195.95	1,421	2,818
193.35	480	410	196.00	1,443	2,890
193.40	496	434			
193.45	512	459			
193.50	527	485			
193.55	544	512			
193.60	560	539			
193.65	577	568			
193.70	594	597			
193.75	611	627			
193.80	628	658			
193.85	646	690			
193.90	664	723			
193.95	682	756			
194.00	700	791			
194.05	715	826			
194.10	731	863			
194.15	747	899			
194.20	762	937			
194.25	778	976			
194.30	795	1,015			
194.35	811	1,055			
194.40	827	1,096			
194.45	844	1,138			
194.50	861	1,180			
194.55	878	1,224			
194.60	895	1,268			

Lowest Outlet= 193.80

Vol Req'd=650 CF

Vol Prov'd=658 CF

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

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Type III 24-hr 50 YR Rainfall=7.22"

Printed 12/8/2021

Stage-Area-Storage for Pond C1: Gravel Wetland #1: Cell #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
192.00	1,038	0	193.06	1,624	1,400
192.02	1,048	21	193.08	1,637	1,432
192.04	1,058	42	193.10	1,649	1,465
192.06	1,068	63	193.12	1,662	1,498
192.08	1,078	85	193.14	1,674	1,532
192.10	1,088	106	193.16	1,687	1,565
192.12	1,098	128	193.18	1,699	1,599
192.14	1,108	150	193.20	1,712	1,633
192.16	1,118	172	193.22	1,724	1,667
192.18	1,128	195	193.24	1,737	1,702
192.20	1,139	218	193.26	1,750	1,737
192.22	1,149	240	193.28	1,763	1,772
192.24	1,159	264	193.30	1,775	1,807
192.26	1,170	287	193.32	1,788	1,843
192.28	1,180	310	193.34	1,801	1,879
192.30	1,191	334	193.36	1,814	1,915
192.32	1,201	358	193.38	1,827	1,952
192.34	1,212	382	193.40	1,840	1,988
192.36	1,223	406	193.42	1,853	2,025
192.38	1,233	431	193.44	1,867	2,062
192.40	1,244	456	193.46	1,880	2,100
192.42	1,255	481	193.48	1,893	2,138
192.44	1,266	506	193.50	1,906	2,176
192.46	1,276	531	193.52	1,920	2,214
192.48	1,287	557	193.54	1,933	2,252
192.50	1,298	583	193.56	1,947	2,291
192.52	1,309	609	193.58	1,960	2,330
192.54	1,320	635	193.60	1,974	2,370
192.56	1,332	662	193.62	1,987	2,409
192.58	1,343	689	193.64	2,001	2,449
192.60	1,354	715	193.66	2,014	2,489
192.62	1,365	743	193.68	2,028	2,530
192.64	1,376	770	193.70	2,042	2,570
192.66	1,388	798	193.72	2,056	2,611
192.68	1,399	826	193.74	2,070	2,652
192.70	1,411	854	193.76	2,083	2,694
192.72	1,422	882	193.78	2,097	2,736
192.74	1,434	911	193.80	2,111	2,778
192.76	1,445	939	193.82	2,125	2,820
192.78	1,457	968	193.84	2,140	2,863
192.80	1,469	998	193.86	2,154	2,906
192.82	1,480	1,027	193.88	2,168	2,949
192.84	1,492	1,057	193.90	2,182	2,993
192.86	1,504	1,087	193.92	2,196	3,036
192.88	1,516	1,117	193.94	2,211	3,080
192.90	1,528	1,147	193.96	2,225	3,125
192.92	1,540	1,178	193.98	2,240	3,169
192.94	1,552	1,209	194.00	2,254	3,214
192.96	1,564	1,240			
192.98	1,576	1,272			
193.00	1,588	1,303			
193.02	1,600	1,335			
193.04	1,612	1,367			

Top of Berm = 193.89

Vol Req'd = 2,927

Vol Provided= 2,971

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

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Type III 24-hr 50 YR Rainfall=7.22"

Printed 12/8/2021

Stage-Area-Storage for Pond C2: Gravel Wetland #1: Cell #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
192.00	1,002	0	193.06	1,604	1,369
192.02	1,012	20	193.08	1,616	1,401
192.04	1,022	40	193.10	1,629	1,433
192.06	1,032	61	193.12	1,642	1,466
192.08	1,042	82	193.14	1,655	1,499
192.10	1,053	103	193.16	1,668	1,532
192.12	1,063	124	193.18	1,681	1,566
192.14	1,073	145	193.20	1,694	1,599
192.16	1,084	167	193.22	1,707	1,633
192.18	1,094	189	193.24	1,720	1,668
192.20	1,105	211	193.26	1,733	1,702
192.22	1,115	233	193.28	1,746	1,737
192.24	1,126	255	193.30	1,759	1,772
192.26	1,137	278	193.32	1,773	1,807
192.28	1,147	301	193.34	1,786	1,843
192.30	1,158	324	193.36	1,799	1,879
192.32	1,169	347	193.38	1,813	1,915
192.34	1,180	370	193.40	1,826	1,951
192.36	1,191	394	193.42	1,840	1,988
192.38	1,201	418	193.44	1,854	2,025
192.40	1,212	442	193.46	1,867	2,062
192.42	1,224	467	193.48	1,881	2,100
192.44	1,235	491	193.50	1,895	2,137
192.46	1,246	516	193.52	1,909	2,175
192.48	1,257	541	193.54	1,922	2,214
192.50	1,268	566	193.56	1,936	2,252
192.52	1,280	592	193.58	1,950	2,291
192.54	1,291	617	193.60	1,964	2,330
192.56	1,302	643	193.62	1,978	2,370
192.58	1,314	670	193.64	1,992	2,409
192.60	1,325	696	193.66	2,007	2,449
192.62	1,337	723	193.68	2,021	2,490
192.64	1,348	749	193.70	2,035	2,530
192.66	1,360	776	193.72	2,049	2,571
192.68	1,372	804	193.74	2,064	2,612
192.70	1,384	831	193.76	2,078	2,654
192.72	1,395	859	193.78	2,093	2,695
192.74	1,407	887	193.80	2,107	2,737
192.76	1,419	915	193.82	2,122	2,780
192.78	1,431	944	193.84	2,136	2,822
192.80	1,443	973	193.86	2,151	2,865
192.82	1,455	1,002	193.88	2,166	2,908
192.84	1,467	1,031	193.90	2,180	2,952
192.86	1,479	1,060	193.92	2,195	2,995
192.88	1,492	1,090	193.94	2,210	3,039
192.90	1,504	1,120	193.96	2,225	3,084
192.92	1,516	1,150	193.98	2,240	3,128
192.94	1,528	1,181	194.00	2,255	3,173
192.96	1,541	1,211			
192.98	1,553	1,242			
193.00	1,566	1,273			
193.02	1,578	1,305			
193.04	1,591	1,337			

Top of Berm = 193.89

Vol Req'd = 2,927

Vol Provided= 2,930

20724-PROP-DRAINAGE

Prepared by Jones & Beach Engineers

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Type III 24-hr 50 YR Rainfall=7.22"

Printed 12/8/2021

Stage-Area-Storage for Pond 1P: Gravel Wetland #1

Elevation (feet)	Discharge (cfs)	Storage (cubic-feet)	Elevation (feet)	Discharge (cfs)	Storage (cubic-feet)
192.00	0.00	0	194.65	3.12	9,851
192.05	0.00	103	194.70	3.45	10,133
192.10	0.00	209	194.75	3.79	10,417
192.15	0.00	317	194.80	4.15	10,704
192.20	0.00	428	194.85	4.52	10,994
192.25	0.00	542	194.90	4.90	11,285
192.30	0.00	658	194.95	5.28	11,579
192.35	0.00	777	195.00	5.68	11,875
192.40	0.00	898	195.05	6.19	12,174
192.45	0.00	1,022	195.10	6.79	12,475
192.50	0.00	1,149	195.15	7.46	12,779
192.55	0.00	1,279	195.20	8.18	13,084
192.60	0.00	1,411	195.25	8.96	13,393
192.65	0.00	1,547	195.30	9.80	13,703
192.70	0.00	1,685	195.35	10.69	14,016
192.75	0.00	1,826	195.40	11.62	14,332
192.80	0.00	1,970	195.45	12.60	14,650
192.85	0.00	2,117	195.50	13.63	14,970
192.90	0.00	2,267	195.55	14.69	15,293
192.95	0.00	2,421	195.60	15.81	15,619
193.00	0.00	2,577	195.65	16.87	15,947
193.05	0.00	2,736	195.70	17.96	16,277
193.10	0.00	2,898	195.75	19.07	16,610
193.15	0.00	3,064	195.80	20.20	16,945
193.20	0.00	3,232	195.85	21.33	17,283
193.25	0.00	3,404	195.90	22.49	17,624
193.30	0.00	3,579	195.95	23.65	17,967
193.35	0.00	3,758	196.00	24.81	18,312
193.40	0.00	3,939			
193.45	0.00	4,124			
193.50	0.00	4,313			
193.55	0.00	4,505			
193.60	0.00	4,700			
193.65	0.00	4,898			
193.70	0.00	5,100			
193.75	0.00	5,306			
193.80	0.00	5,515			
193.85	0.01	5,728			
193.90	0.02	5,944			
193.95	0.06	6,164			
194.00	0.10	6,388			
194.05	0.19	6,641			
194.10	0.43	6,896			
194.15	0.58	7,153			
194.20	0.76	7,413			
194.25	0.95	7,675			
194.30	1.17	7,939			
194.35	1.40	8,205			
194.40	1.65	8,474			
194.45	1.91	8,745			
194.50	2.19	9,018			
194.55	2.49	9,293			
194.60	2.79	9,571			

WQV=6,505 CF

WQV Elev=194.03 CF

Q @ WQV Elev=0.13 CFS

5. DRAINAGE ANALYSIS

5.1 INTRODUCTION

The purpose of this project is to construct a residential development containing 13 1,500 sq.ft. building on Town of Fremont Tax Map 2, Lot 70. The proposed development will contain residential townhouses with associated parking, drainage, and utilities. The project will be serviced by two on-site wells and 2 on-site septic systems.

5.2 METHODOLOGY

The existing and proposed watersheds were modeled utilizing HydroCAD stormwater software, version 9.10. The watersheds were analyzed utilizing the SCS TR-20 methodology for hydrograph development and the TR-55 methodology for Time of Concentration (Tc) determination. The Dynamic-Storage-Indicating method for reach and pond routing was utilized. Type III, 24-hour hydrographs were developed for the 2-year, 10-year, 25-year, and 50-year storm events, corresponding to rainfall events of 3.11", 4.73", 6.01", and 7.22" respectively.

Existing topography and site features were obtained through aerial topography and on-ground topography completed by Jones & Beach Engineers. Existing soil conditions were derived from a combination of a site specific wetland delineation performed by GZA Geoenvironmental Inc., and soils information obtained from the NRCS Web Soil Survey.

5.3 EXISTING CONDITIONS ANALYSIS

The study area consists of the subject property and upstream contributing area. The study area contains 24.373 acres including offsite contributing areas. The existing site is currently undeveloped. The center of the property is open and mostly covered with tall grass and shrubs. The boundaries of the property are forested. To the north and northeast, the study area includes abutting properties with impervious surfaces such as houses, driveways, and roads. The high point of this study is in the northernmost corner. The site drains from north to south. The site drains to a wetland area resulting in one analysis point (AP-1) for this study.

The majority of the soils for this site are described as Hydrological Soils "A". A small section of soils on the eastern edge of the study along the boundary of the wetland area are described as Hydrological Soils "D". There is a small portion of Hydrological Soils "B" on the western side of the study area.

One Analysis Point (AP) is defined for this project. Analysis Point #1 is defined as the wetland boundary on the southern side of the development. All stormwater is collected overland and drains to this point.

5.4 PROPOSED CONDITIONS ANALYSIS

The proposed site includes the construction of a residential development containing 13 units with associated roadway, parking, drainage, and utilities.

The addition of the proposed impervious paved areas and building causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), the net result being a potential increase in peak rates of runoff from the site. To mitigate the potential increase in the peak rate of runoff and to effectively treat the subsequent stormwater runoff the following Best Management Practices (BMP's) have been employed at the Analysis Point as follows:

The majority of the stormwater associated with the proposed area to be developed including the roadway, driveways, and houses is collected in a close drainage system within the proposed roadway. The roadway is superelevated between station 3+00 and 11+85 and curbing is used along this section of the roadway. Catch basins (CB-101, CB-102, CB-103, CB-104) collect runoff from the roadway and surrounding upstream areas. The catch basin system is conveyed through pipes (P-201, P-202, P-203, P-204) and drains to Forebay #1 (F1). Forebay #1 flows into Gravel Wetland #1. Gravel Wetland #1 is released by Outlet Structure #1 through a culvert (P-206) to Analysis Point #1.

The northernmost area along Main Street is split by the proposed crowned roadway. Stormwater to the west of the roadway travels via roadside ditch to a field drain (CB-105) and a culvert (P-205) conveys this stormwater to forebay #1 (F1).

Each building drains to a Drip Edge/Infiltration Trench (DE1, DE2, DE3, DE4, DE5, DE6, DE7, DE8, DE9, DE10, DE11, DE12, DE13) to the rear of the structure. All drip edges drain to the closed drainage system.

Stormwater to the east to the proposed driveway drains to a roadside ditch that flows into Forebay #1.

There is a portion of the site that directly flows into the existing wetland. This includes a section to the south and west of the property that is downgrade of the proposed drainage structures.

5.5 FREMONT STORMWATER REQUIREMENTS:

SECTION 1.20.C. 1.

- a. Buffers - Stormwater management and erosion and sediment control practices located within the specified buffers have been discussed and approved by the Planning Board.
- b. LID practices – appropriate LID practices such as roof runoff infiltration via Drip Edge infiltration have been utilized on-site.
- c. Plantings - Stormwater treatment areas have been planted with native plantings.
- d. Drain time - Stormwater treatment (gravel wetland) has been designed to drain with 72-hours.
- e. Salt Storage – No on-site salt storage is proposed.

- f. Surface Runoff – All surface runoff from impervious areas is directed to stormwater treatment prior to being discharged.
- g. Stormwater treated on-site – Stormwater generated from impervious areas is treated on-site prior to being discharged.
- h. Treatment removal rates – Stormwater treatment method includes use of a gravel wetland which provides treatment rates of TSS=95%, TN=85%, TP=64%.
- i. Runoff Control – Stormwater features have been designed to limit the post-development peak runoff to the pre-development rates. Groundwater recharge has been provided as required. See Executive Summary and Groundwater Recharge Volume calculations.
- j. Flooding – Stormwater systems have been designed to prevent flooding.
- k. Upstream flows – The stormwater system has been designed to allow the passage of upstream and upgradient flows.
- l. Site Vegetation – Existing site vegetation has been maintained to the extent practicable.

5.6 CONCLUSION

The proposed site development will have minimal adverse effect on abutting infrastructures or properties by way of stormwater runoff or siltation if properly constructed in accordance with this Drainage Analysis and approved project plan set. The post-construction peak rates of runoff for the site will be lower than the existing conditions for all analyzed storm events. Appropriate steps will be taken to control erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, vegetated treatment swales, detention ponds, and riprap outlet protection aprons. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced with regular inspections throughout the construction process.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

Barry W. Gier, PE
Vice-President

14.6 DRAINAGE CALCUALTIONS

PRE-DEVELOPMENT CONDITIONS ANALYSIS

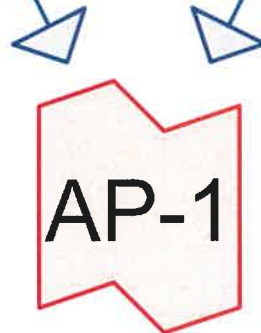
- 14.6.1 1-Inch 24-Hour Summary Analysis
- 14.6.2 2-Year 24-Hour Summary Analysis
- 14.6.3 10-Year 24-Hour Complete Analysis
- 14.6.4 25-Year 24-Hour Summary Analysis
- 14.6.5 50-Year 24-Hour Summary Analysis



EX-WS-1



EX-WS-2



Analysis Point 1



Routing Diagram for 20724-EXIST-DRAINAGE

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20724-EXIST-DRAINAGE

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
13.090	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.694	80	>75% Grass cover, Good, HSG D (1S, 2S)
0.408	72	Dirt roads, HSG A (1S)
0.528	96	Gravel surface, HSG A (2S)
0.188	96	Gravel surface, HSG D (2S)
0.527	98	Paved roads w/curbs & sewers, HSG A (1S)
0.378	83	Paved roads w/open ditches, 50% imp, HSG A (2S)
0.326	83	Woods, Poor, HSG D (1S)
8.155	32	Woods/grass comb., Good, HSG A (1S, 2S)
0.079	58	Woods/grass comb., Good, HSG B (1S)
24.373	43	TOTAL AREA

20724-EXIST-DRAINAGE

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
23.086	HSG A	1S, 2S
0.079	HSG B	1S
0.000	HSG C	
1.208	HSG D	1S, 2S
0.000	Other	
24.373		TOTAL AREA

20724-EXIST-DRAINAGE

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PRE-DEVELOPMENT

Type III 24-hr 1" Rainfall=1.00"

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Page 1

Time span=5.00-40.00 hrs, dt=0.05 hrs, 701 points

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 1S: EX-WS-1

Runoff Area=801,986 sf 2.86% Impervious Runoff Depth=0.00"
Flow Length=1,460' Tc=33.5 min CN=41 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: EX-WS-2

Runoff Area=259,716 sf 3.17% Impervious Runoff Depth=0.00"
Flow Length=443' Tc=11.6 min CN=49 Runoff=0.00 cfs 0.000 af

Link AP-1: Analysis Point 1

Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 24.373 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
97.06% Pervious = 23.658 ac 2.94% Impervious = 0.716 ac

20724-EXIST-DRAINAGE*Type III 24-hr 2-Year Rainfall=3.11"*

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Time span=5.00-40.00 hrs, dt=0.05 hrs, 701 points

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 1S: EX-WS-1Runoff Area=801,986 sf 2.86% Impervious Runoff Depth=0.00"
Flow Length=1,460' Tc=33.5 min CN=41 Runoff=0.02 cfs 0.006 af**Subcatchment 2S: EX-WS-2**Runoff Area=259,716 sf 3.17% Impervious Runoff Depth=0.09"
Flow Length=443' Tc=11.6 min CN=49 Runoff=0.07 cfs 0.046 af**Link AP-1: Analysis Point 1**Inflow=0.07 cfs 0.052 af
Primary=0.07 cfs 0.052 af**Total Runoff Area = 24.373 ac Runoff Volume = 0.052 af Average Runoff Depth = 0.03"**
97.06% Pervious = 23.658 ac 2.94% Impervious = 0.716 ac

20724-EXIST-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.73"

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Page 1

Time span=5.00-40.00 hrs, dt=0.05 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1

Runoff Area=801,986 sf 2.86% Impervious Runoff Depth=0.21"
Flow Length=1,460' Tc=33.5 min CN=41 Runoff=0.61 cfs 0.324 af

Subcatchment2S: EX-WS-2

Runoff Area=259,716 sf 3.17% Impervious Runoff Depth=0.54"
Flow Length=443' Tc=11.6 min CN=49 Runoff=1.62 cfs 0.267 af

Link AP-1: Analysis Point 1

Inflow=1.62 cfs 0.591 af
Primary=1.62 cfs 0.591 af

Total Runoff Area = 24.373 ac Runoff Volume = 0.591 af Average Runoff Depth = 0.29"
97.06% Pervious = 23.658 ac 2.94% Impervious = 0.716 ac

20724-EXIST-DRAINAGE

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Type III 24-hr 10-Year Rainfall=4.73"

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Summary for Subcatchment 1S: EX-WS-1

Runoff = 0.61 cfs @ 13.07 hrs, Volume= 0.324 af, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.73"

Area (sf)	CN	Description
17,761	72	Dirt roads, HSG A
22,936	98	Paved roads w/curbs & sewers, HSG A
464,921	39	>75% Grass cover, Good, HSG A
265,132	32	Woods/grass comb., Good, HSG A
3,456	58	Woods/grass comb., Good, HSG B
13,580	80	>75% Grass cover, Good, HSG D
14,200	83	Woods, Poor, HSG D
801,986	41	Weighted Average
779,050		97.14% Pervious Area
22,936		2.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	64	0.0200	1.26		Sheet Flow, Over Pavement Smooth surfaces n= 0.011 P2= 3.20"
6.3	36	0.0200	0.10		Sheet Flow, Through Grass Grass: Dense n= 0.240 P2= 3.20"
8.7	634	0.0300	1.21		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
0.2	23	0.0870	2.06		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
17.5	703	0.0180	0.67		Shallow Concentrated Flow, woods Woodland Kv= 5.0 fps
33.5	1,460	Total			

Summary for Subcatchment 2S: EX-WS-2

Runoff = 1.62 cfs @ 12.30 hrs, Volume= 0.267 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.73"

Area (sf)	CN	Description
16,463	83	Paved roads w/open ditches, 50% imp, HSG A
105,296	39	>75% Grass cover, Good, HSG A
23,005	96	Gravel surface, HSG A
90,116	32	Woods/grass comb., Good, HSG A
16,652	80	>75% Grass cover, Good, HSG D
8,184	96	Gravel surface, HSG D
259,716	49	Weighted Average
251,485		96.83% Pervious Area
8,232		3.17% Impervious Area

20724-EXIST-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.73"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	19	0.0200	0.99		Sheet Flow, EX ROAD Smooth surfaces n= 0.011 P2= 3.20"
7.4	82	0.0700	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.0	114	0.0700	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.9	228	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.6	443	Total			

Summary for Link AP-1: Analysis Point 1

Inflow Area = 24.373 ac, 2.94% Impervious, Inflow Depth = 0.29" for 10-Year event
 Inflow = 1.62 cfs @ 12.32 hrs, Volume= 0.591 af
 Primary = 1.62 cfs @ 12.32 hrs, Volume= 0.591 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-40.00 hrs, dt= 0.05 hrs

20724-EXIST-DRAINAGE*Type III 24-hr Custom Rainfall=6.01"*

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Time span=5.00-40.00 hrs, dt=0.05 hrs, 701 points

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 1S: EX-WS-1Runoff Area=801,986 sf 2.86% Impervious Runoff Depth=0.56"
Flow Length=1,460' Tc=33.5 min CN=41 Runoff=3.40 cfs 0.859 af**Subcatchment 2S: EX-WS-2**Runoff Area=259,716 sf 3.17% Impervious Runoff Depth=1.08"
Flow Length=443' Tc=11.6 min CN=49 Runoff=4.65 cfs 0.535 af**Link AP-1: Analysis Point 1**Inflow=5.42 cfs 1.394 af
Primary=5.42 cfs 1.394 af**Total Runoff Area = 24.373 ac Runoff Volume = 1.394 af Average Runoff Depth = 0.69"**
97.06% Pervious = 23.658 ac 2.94% Impervious = 0.716 ac

20724-EXIST-DRAINAGE

Type III 24-hr Custom Rainfall=6.01"

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Summary for Subcatchment 1S: EX-WS-1

Runoff = 3.40 cfs @ 12.70 hrs, Volume= 0.859 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=6.01"

Area (sf)	CN	Description
17,761	72	Dirt roads, HSG A
22,936	98	Paved roads w/curbs & sewers, HSG A
464,921	39	>75% Grass cover, Good, HSG A
265,132	32	Woods/grass comb., Good, HSG A
3,456	58	Woods/grass comb., Good, HSG B
13,580	80	>75% Grass cover, Good, HSG D
14,200	83	Woods, Poor, HSG D
801,986	41	Weighted Average
779,050		97.14% Pervious Area
22,936		2.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	64	0.0200	1.26		Sheet Flow, Over Pavement Smooth surfaces n= 0.011 P2= 3.20"
6.3	36	0.0200	0.10		Sheet Flow, Through Grass Grass: Dense n= 0.240 P2= 3.20"
8.7	634	0.0300	1.21		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
0.2	23	0.0870	2.06		Shallow Concentrated Flow, grass Short Grass Pasture Kv= 7.0 fps
17.5	703	0.0180	0.67		Shallow Concentrated Flow, woods Woodland Kv= 5.0 fps
33.5	1,460	Total			

Summary for Subcatchment 2S: EX-WS-2

Runoff = 4.65 cfs @ 12.21 hrs, Volume= 0.535 af, Depth= 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.05 hrs
Type III 24-hr Custom Rainfall=6.01"

Area (sf)	CN	Description
16,463	83	Paved roads w/open ditches, 50% imp, HSG A
105,296	39	>75% Grass cover, Good, HSG A
23,005	96	Gravel surface, HSG A
90,116	32	Woods/grass comb., Good, HSG A
16,652	80	>75% Grass cover, Good, HSG D
8,184	96	Gravel surface, HSG D
259,716	49	Weighted Average
251,485		96.83% Pervious Area
8,232		3.17% Impervious Area

20724-EXIST-DRAINAGE

Type III 24-hr Custom Rainfall=6.01"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	19	0.0200	0.99		Sheet Flow, EX ROAD Smooth surfaces n= 0.011 P2= 3.20"
7.4	82	0.0700	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 3.20"
1.0	114	0.0700	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.9	228	0.0700	1.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
11.6	443	Total			

Summary for Link AP-1: Analysis Point 1

Inflow Area = 24.373 ac, 2.94% Impervious, Inflow Depth = 0.69" for Custom event
 Inflow = 5.42 cfs @ 12.51 hrs, Volume= 1.394 af
 Primary = 5.42 cfs @ 12.51 hrs, Volume= 1.394 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-40.00 hrs, dt= 0.05 hrs

20724-EXIST-DRAINAGE*Type III 24-hr 25-Year Rainfall=6.01"*

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Time span=5.00-40.00 hrs, dt=0.05 hrs, 701 points

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 1S: EX-WS-1Runoff Area=801,986 sf 2.86% Impervious Runoff Depth=0.56"
Flow Length=1,460' Tc=33.5 min CN=41 Runoff=3.40 cfs 0.859 af**Subcatchment 2S: EX-WS-2**Runoff Area=259,716 sf 3.17% Impervious Runoff Depth=1.08"
Flow Length=443' Tc=11.6 min CN=49 Runoff=4.65 cfs 0.535 af**Link AP-1: Analysis Point 1**Inflow=5.42 cfs 1.394 af
Primary=5.42 cfs 1.394 af**Total Runoff Area = 24.373 ac Runoff Volume = 1.394 af Average Runoff Depth = 0.69"**
97.06% Pervious = 23.658 ac 2.94% Impervious = 0.716 ac

20724-EXIST-DRAINAGE*Type III 24-hr 50-Year Rainfall=7.22"*

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Page 6

Time span=5.00-40.00 hrs, dt=0.05 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

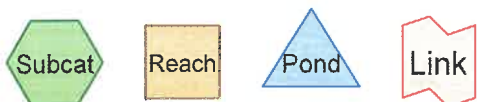
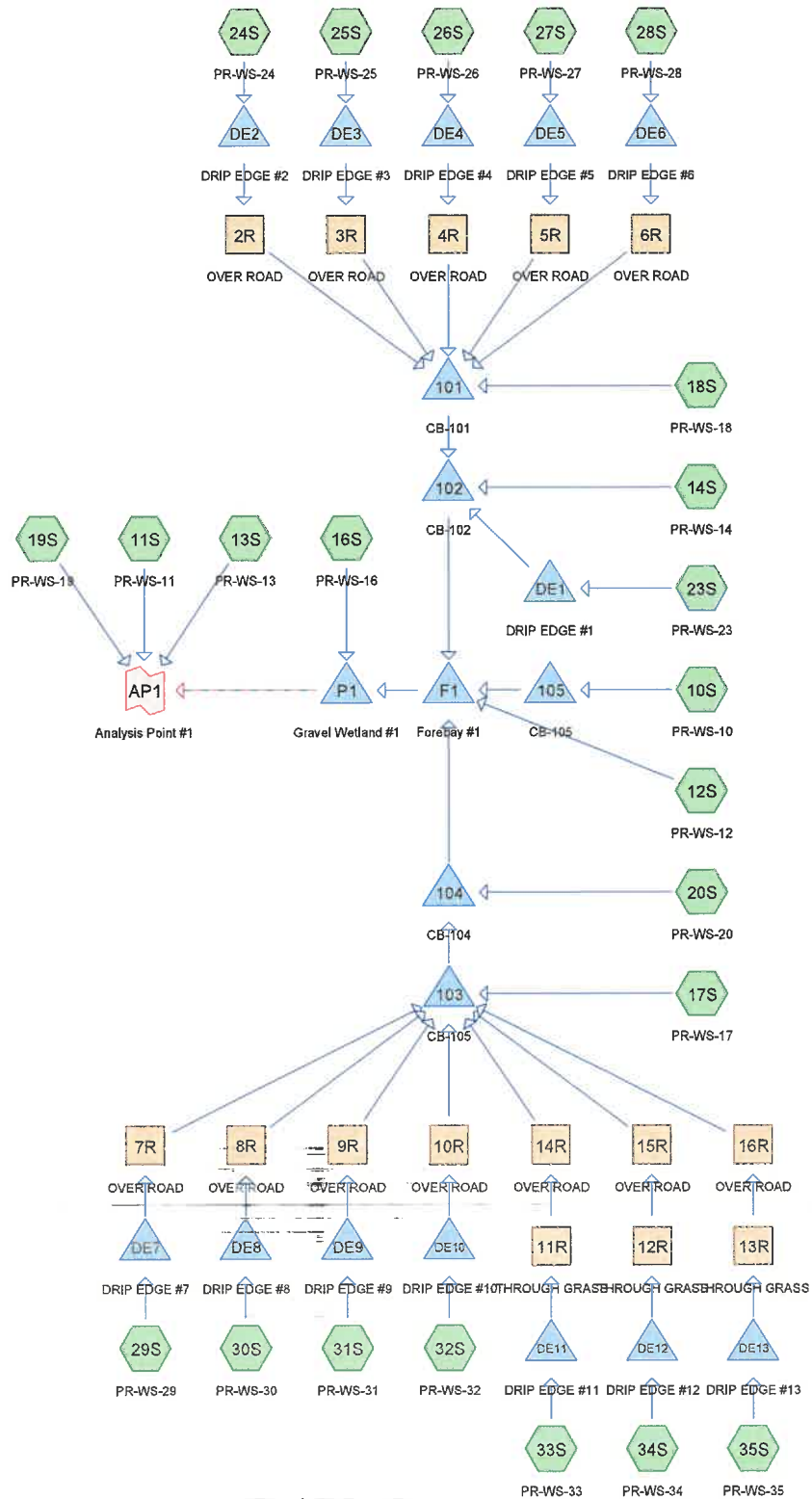
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-WS-1Runoff Area=801,986 sf 2.86% Impervious Runoff Depth=1.01"
Flow Length=1,460' Tc=33.5 min CN=41 Runoff=8.00 cfs 1.544 af**Subcatchment 2S: EX-WS-2**Runoff Area=259,716 sf 3.17% Impervious Runoff Depth=1.70"
Flow Length=443' Tc=11.6 min CN=49 Runoff=8.35 cfs 0.844 af**Link AP-1: Analysis Point 1**Inflow=11.77 cfs 2.388 af
Primary=11.77 cfs 2.388 af**Total Runoff Area = 24.373 ac Runoff Volume = 2.388 af Average Runoff Depth = 1.18"**
97.06% Pervious = 23.658 ac 2.94% Impervious = 0.716 ac

14.7 APPENDIX II

POST-DEVELOPMENT CONDITIONS ANALYSIS

- | | |
|--------|-----------------------------------|
| 14.7.1 | 1-Inch 24-Hour Summary Analysis |
| 14.7.2 | 2-Year 24-Hour Summary Analysis |
| 14.7.3 | 10-Year 24-Hour Complete Analysis |
| 14.7.4 | 25-Year 24-Hour Summary Analysis |
| 14.7.5 | 50-Year 24-Hour Summary Analysis |



Routing Diagram for 20724-PROP-DRAINAGE
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20724-PROP-DRAINAGE

Prepared by {enter your company name here}

Printed 12/13/2021

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
9.094	39	>75% Grass cover, Good, HSG A (10S, 11S, 12S, 13S, 14S, 16S, 17S, 18S, 19S, 20S)
0.572	80	>75% Grass cover, Good, HSG D (11S, 19S)
0.408	72	Dirt roads, HSG A (10S)
0.004	96	Gravel surface, HSG A (11S)
0.511	98	Paved roads w/curbs & sewers, HSG A (12S, 17S, 18S, 20S)
1.097	83	Paved roads w/open ditches, 50% imp, HSG A (10S, 11S, 13S, 14S)
0.614	98	Roofs, HSG A (23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S)
11.358	32	Woods/grass comb., Good, HSG A (10S, 11S, 13S, 14S, 18S, 19S)
0.079	58	Woods/grass comb., Good, HSG B (19S)
0.635	79	Woods/grass comb., Good, HSG D (19S)
24.373	43	TOTAL AREA

20724-PROP-DRAINAGE

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
23.086	HSG A	10S, 11S, 12S, 13S, 14S, 16S, 17S, 18S, 19S, 20S, 23S, 24S, 25S, 26S, 27S, 28S, 29S, 30S, 31S, 32S, 33S, 34S, 35S
0.079	HSG B	19S
0.000	HSG C	
1.208	HSG D	11S, 19S
0.000	Other	
24.373		TOTAL AREA

20724-PROP-DRAINAGE

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POST-DEVELOPMENT

Type III 24-hr 1" Rainfall=1.00"

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Page 1

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: PR-WS-10Runoff Area=197,548 sf 5.88% Impervious Runoff Depth=0.00"
Flow Length=916' Tc=20.9 min CN=46 Runoff=0.00 cfs 0.000 af**Subcatchment 11S: PR-WS-11**Runoff Area=259,720 sf 3.66% Impervious Runoff Depth=0.00"
Flow Length=495' Tc=22.5 min CN=43 Runoff=0.00 cfs 0.000 af**Subcatchment 12S: PR-WS-12**Runoff Area=18,306 sf 25.12% Impervious Runoff Depth=0.00"
Flow Length=286' Tc=9.2 min CN=54 Runoff=0.00 cfs 0.000 af**Subcatchment 13S: PR-WS-13**Runoff Area=42,094 sf 2.85% Impervious Runoff Depth=0.00"
Flow Length=381' Tc=10.7 min CN=39 Runoff=0.00 cfs 0.000 af**Subcatchment 14S: PR-WS-14**Runoff Area=12,954 sf 12.19% Impervious Runoff Depth=0.00"
Flow Length=187' Tc=7.5 min CN=49 Runoff=0.00 cfs 0.000 af**Subcatchment 16S: PR-WS-16**Runoff Area=13,253 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=50' Tc=7.0 min CN=39 Runoff=0.00 cfs 0.000 af**Subcatchment 17S: PR-WS-17**Runoff Area=34,634 sf 22.82% Impervious Runoff Depth=0.00"
Flow Length=318' Tc=10.4 min CN=52 Runoff=0.00 cfs 0.000 af**Subcatchment 18S: PR-WS-18**Runoff Area=132,441 sf 5.53% Impervious Runoff Depth=0.00"
Flow Length=720' Tc=18.6 min CN=38 Runoff=0.00 cfs 0.000 af**Subcatchment 19S: PR-WS-19**Runoff Area=318,622 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=772' Tc=20.4 min CN=37 Runoff=0.00 cfs 0.000 af**Subcatchment 20S: PR-WS-20**Runoff Area=5,372 sf 45.25% Impervious Runoff Depth=0.00"
Flow Length=259' Tc=7.0 min CN=66 Runoff=0.00 cfs 0.000 af**Subcatchment 23S: PR-WS-23**Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79"
Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af**Subcatchment 24S: PR-WS-24**Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79"
Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af**Subcatchment 25S: PR-WS-25**Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79"
Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af**Subcatchment 26S: PR-WS-26**Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79"
Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af**Subcatchment 27S: PR-WS-27**Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79"
Tc=0.0 min CN=98 Runoff=0.05 cfs 0.003 af**Subcatchment 28S: PR-WS-28**Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79"
Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af

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POST-DEVELOPMENT
Type III 24-hr 1" Rainfall=1.00"

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Subcatchment 29S: PR-WS-29	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Subcatchment 30S: PR-WS-30	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Subcatchment 31S: PR-WS-31	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Subcatchment 32S: PR-WS-32	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Subcatchment 33S: PR-WS-33	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Subcatchment 34S: PR-WS-34	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Subcatchment 35S: PR-WS-35	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=0.79" Tc=7.0 min CN=98 Runoff=0.04 cfs 0.003 af
Reach 2R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=120.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 3R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=45.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 4R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=25.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 5R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=100.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 6R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=162.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 7R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=205.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 8R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=115.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 9R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=40.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 10R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=35.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 11R: THROUGH GRASS	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.022 L=100.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

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POST-DEVELOPMENT

Type III 24-hr 1" Rainfall=1.00"

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Reach 12R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=55.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 13R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=45.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 14R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 ' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 15R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 ' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 16R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 ' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Pond 101: CB-101 Peak Elev=195.20' Storage=0.000 af Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.012 L=143.0' S=0.0049 ' Outflow=0.00 cfs 0.000 af

Pond 102: CB-102 Peak Elev=194.40' Storage=0.000 af Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 ' Outflow=0.00 cfs 0.000 af

Pond 103: CB-105 Peak Elev=194.30' Storage=0.000 af Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.012 L=128.0' S=0.0051 ' Outflow=0.00 cfs 0.000 af

Pond 104: CB-104 Peak Elev=193.45' Storage=0.000 af Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0050 ' Outflow=0.00 cfs 0.000 af

Pond 105: CB-105 Peak Elev=197.50' Storage=0.000 af Inflow=0.00 cfs 0.000 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0592 ' Outflow=0.00 cfs 0.000 af

Pond C1: Gravel Wetland #1: Cell #1 Peak Elev=0.00' Storage=0 cf

Pond C2: Gravel Wetland #1: Cell #2 Peak Elev=0.00' Storage=0 cf

Pond DE1: DRIP EDGE #1 Peak Elev=197.16' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE10: DRIP EDGE #10 Peak Elev=195.61' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE11: DRIP EDGE #11 Peak Elev=197.26' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE12: DRIP EDGE #12 Peak Elev=196.51' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE13: DRIP EDGE #13 Peak Elev=197.31' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

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Type III 24-hr 1" Rainfall=1.00"

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Pond DE2: DRIP EDGE #2 Peak Elev=197.56' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE3: DRIP EDGE #3 Peak Elev=197.01' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE4: DRIP EDGE #4 Peak Elev=196.61' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE5: DRIP EDGE #5 Peak Elev=197.72' Storage=12 cf Inflow=0.05 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE6: DRIP EDGE #6 Peak Elev=197.71' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE7: DRIP EDGE #7 Peak Elev=197.31' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE8: DRIP EDGE #8 Peak Elev=196.36' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond DE9: DRIP EDGE #9 Peak Elev=195.51' Storage=10 cf Inflow=0.04 cfs 0.003 af
Discarded=0.03 cfs 0.003 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.003 af

Pond F1: Forebay #1 Peak Elev=192.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P1: Gravel Wetland #1 Peak Elev=192.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link AP1: Analysis Point #1 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 24.373 ac Runoff Volume = 0.040 af Average Runoff Depth = 0.02"
93.13% Pervious = 22.700 ac 6.87% Impervious = 1.674 ac

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Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: PR-WS-10

Runoff Area=197,548 sf 5.88% Impervious Runoff Depth=0.05"
Flow Length=916' Tc=20.9 min CN=46 Runoff=0.03 cfs 0.018 af

Subcatchment 11S: PR-WS-11

Runoff Area=259,720 sf 3.66% Impervious Runoff Depth=0.02"
Flow Length=495' Tc=22.5 min CN=43 Runoff=0.01 cfs 0.008 af

Subcatchment 12S: PR-WS-12

Runoff Area=18,306 sf 25.12% Impervious Runoff Depth=0.20"
Flow Length=286' Tc=9.2 min CN=54 Runoff=0.03 cfs 0.007 af

Subcatchment 13S: PR-WS-13

Runoff Area=42,094 sf 2.85% Impervious Runoff Depth=0.00"
Flow Length=381' Tc=10.7 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 14S: PR-WS-14

Runoff Area=12,954 sf 12.19% Impervious Runoff Depth=0.09"
Flow Length=187' Tc=7.5 min CN=49 Runoff=0.00 cfs 0.002 af

Subcatchment 16S: PR-WS-16

Runoff Area=13,253 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=50' Tc=7.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 17S: PR-WS-17

Runoff Area=34,634 sf 22.82% Impervious Runoff Depth=0.15"
Flow Length=318' Tc=10.4 min CN=52 Runoff=0.03 cfs 0.010 af

Subcatchment 18S: PR-WS-18

Runoff Area=132,441 sf 5.53% Impervious Runoff Depth=0.00"
Flow Length=720' Tc=18.6 min CN=38 Runoff=0.00 cfs 0.000 af

Subcatchment 19S: PR-WS-19

Runoff Area=318,622 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=772' Tc=20.4 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment 20S: PR-WS-20

Runoff Area=5,372 sf 45.25% Impervious Runoff Depth=0.60"
Flow Length=259' Tc=7.0 min CN=66 Runoff=0.07 cfs 0.006 af

Subcatchment 23S: PR-WS-23

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 24S: PR-WS-24

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 25S: PR-WS-25

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 26S: PR-WS-26

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af

Subcatchment 27S: PR-WS-27

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88"
Tc=0.0 min CN=98 Runoff=0.16 cfs 0.011 af

Subcatchment 28S: PR-WS-28

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88"
Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af

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POST-DEVELOPMENT

Type III 24-hr 2 YR Rainfall=3.11"

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Subcatchment 29S: PR-WS-29	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Subcatchment 30S: PR-WS-30	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Subcatchment 31S: PR-WS-31	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Subcatchment 32S: PR-WS-32	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Subcatchment 33S: PR-WS-33	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Subcatchment 34S: PR-WS-34	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Subcatchment 35S: PR-WS-35	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=2.88" Tc=7.0 min CN=98 Runoff=0.14 cfs 0.011 af
Reach 2R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=120.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 3R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=45.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 4R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=25.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 5R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=100.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 6R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=162.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 7R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=205.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 8R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=115.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 9R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=40.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 10R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=35.0' S=0.0100 ' / ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 11R: THROUGH GRASS	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.022 L=100.0' S=0.0100 ' / ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

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Reach 12R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.022 L=55.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 13R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.022 L=45.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 14R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 15R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 16R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Pond 101: CB-101 Peak Elev=195.20' Storage=0.000 af Inflow=0.00 cfs 0.000 af
 12.0" Round Culvert n=0.012 L=143.0' S=0.0049 '/' Outflow=0.00 cfs 0.000 af

Pond 102: CB-102 Peak Elev=194.43' Storage=0.000 af Inflow=0.00 cfs 0.002 af
 12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=0.00 cfs 0.002 af

Pond 103: CB-105 Peak Elev=194.40' Storage=0.000 af Inflow=0.03 cfs 0.010 af
 12.0" Round Culvert n=0.012 L=128.0' S=0.0051 '/' Outflow=0.03 cfs 0.010 af

Pond 104: CB-104 Peak Elev=193.69' Storage=0.000 af Inflow=0.07 cfs 0.016 af
 12.0" Round Culvert n=0.012 L=44.0' S=0.0050 '/' Outflow=0.06 cfs 0.016 af

Pond 105: CB-105 Peak Elev=197.58' Storage=0.000 af Inflow=0.03 cfs 0.018 af
 12.0" Round Culvert n=0.012 L=60.0' S=0.0592 '/' Outflow=0.03 cfs 0.018 af

Pond DE1: DRIP EDGE #1 Peak Elev=197.72' Storage=107 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE10: DRIP EDGE #10 Peak Elev=196.17' Storage=108 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE11: DRIP EDGE #11 Peak Elev=197.83' Storage=109 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE12: DRIP EDGE #12 Peak Elev=197.07' Storage=108 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE13: DRIP EDGE #13 Peak Elev=197.87' Storage=107 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE2: DRIP EDGE #2 Peak Elev=198.11' Storage=106 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.04 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.011 af

Pond DE3: DRIP EDGE #3 Peak Elev=197.57' Storage=107 cf Inflow=0.14 cfs 0.011 af
 Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

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Type III 24-hr 2 YR Rainfall=3.11"

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Pond DE4: DRIP EDGE #4 Peak Elev=197.17' Storage=108 cf Inflow=0.14 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE5: DRIP EDGE #5 Peak Elev=198.28' Storage=110 cf Inflow=0.16 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE6: DRIP EDGE #6 Peak Elev=198.28' Storage=109 cf Inflow=0.14 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE7: DRIP EDGE #7 Peak Elev=197.88' Storage=110 cf Inflow=0.14 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE8: DRIP EDGE #8 Peak Elev=196.93' Storage=109 cf Inflow=0.14 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond DE9: DRIP EDGE #9 Peak Elev=196.07' Storage=108 cf Inflow=0.14 cfs 0.011 af
Discarded=0.03 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.011 af

Pond F1: Forebay #1 Peak Elev=193.80' Storage=661 cf Inflow=0.09 cfs 0.043 af
Outflow=0.07 cfs 0.028 af

Pond P1: Gravel Wetland #1 Peak Elev=192.53' Storage=1,216 cf Inflow=0.07 cfs 0.028 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link AP1: Analysis Point #1 Inflow=0.01 cfs 0.008 af
Primary=0.01 cfs 0.008 af

Total Runoff Area = 24.373 ac Runoff Volume = 0.198 af Average Runoff Depth = 0.10"
93.13% Pervious = 22.700 ac 6.87% Impervious = 1.674 ac

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Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: PR-WS-10

Runoff Area=197,548 sf 5.88% Impervious Runoff Depth=0.40"
Flow Length=916' Tc=20.9 min CN=46 Runoff=0.67 cfs 0.152 af

Subcatchment 11S: PR-WS-11

Runoff Area=259,720 sf 3.66% Impervious Runoff Depth=0.28"
Flow Length=495' Tc=22.5 min CN=43 Runoff=0.43 cfs 0.140 af

Subcatchment 12S: PR-WS-12

Runoff Area=18,306 sf 25.12% Impervious Runoff Depth=0.79"
Flow Length=286' Tc=9.2 min CN=54 Runoff=0.25 cfs 0.028 af

Subcatchment 13S: PR-WS-13

Runoff Area=42,094 sf 2.85% Impervious Runoff Depth=0.15"
Flow Length=381' Tc=10.7 min CN=39 Runoff=0.02 cfs 0.012 af

Subcatchment 14S: PR-WS-14

Runoff Area=12,954 sf 12.19% Impervious Runoff Depth=0.54"
Flow Length=187' Tc=7.5 min CN=49 Runoff=0.09 cfs 0.013 af

Subcatchment 16S: PR-WS-16

Runoff Area=13,253 sf 0.00% Impervious Runoff Depth=0.15"
Flow Length=50' Tc=7.0 min CN=39 Runoff=0.01 cfs 0.004 af

Subcatchment 17S: PR-WS-17

Runoff Area=34,634 sf 22.82% Impervious Runoff Depth=0.69"
Flow Length=318' Tc=10.4 min CN=52 Runoff=0.35 cfs 0.045 af

Subcatchment 18S: PR-WS-18

Runoff Area=132,441 sf 5.53% Impervious Runoff Depth=0.12"
Flow Length=720' Tc=18.6 min CN=38 Runoff=0.05 cfs 0.031 af

Subcatchment 19S: PR-WS-19

Runoff Area=318,622 sf 0.00% Impervious Runoff Depth=0.10"
Flow Length=772' Tc=20.4 min CN=37 Runoff=0.09 cfs 0.058 af

Subcatchment 20S: PR-WS-20

Runoff Area=5,372 sf 45.25% Impervious Runoff Depth=1.55"
Flow Length=259' Tc=7.0 min CN=66 Runoff=0.20 cfs 0.016 af

Subcatchment 23S: PR-WS-23

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49"
Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment 24S: PR-WS-24

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49"
Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment 25S: PR-WS-25

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49"
Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment 26S: PR-WS-26

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49"
Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af

Subcatchment 27S: PR-WS-27

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49"
Tc=0.0 min CN=98 Runoff=0.25 cfs 0.018 af

Subcatchment 28S: PR-WS-28

Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49"
Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af

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Subcatchment 29S: PR-WS-29	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Subcatchment 30S: PR-WS-30	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Subcatchment 31S: PR-WS-31	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Subcatchment 32S: PR-WS-32	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Subcatchment 33S: PR-WS-33	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Subcatchment 34S: PR-WS-34	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Subcatchment 35S: PR-WS-35	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=4.49" Tc=7.0 min CN=98 Runoff=0.21 cfs 0.018 af
Reach 2R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=120.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 3R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=45.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 4R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=25.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 5R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=100.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 6R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=162.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 7R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=205.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 8R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=115.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 9R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=40.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 10R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=35.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 11R: THROUGH GRASS	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.022 L=100.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

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Reach 12R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=55.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 13R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=45.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 14R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 ' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 15R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 ' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 16R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 ' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Pond 101: CB-101 Peak Elev=195.32' Storage=0.000 af Inflow=0.05 cfs 0.031 af
12.0" Round Culvert n=0.012 L=143.0' S=0.0049 ' Outflow=0.05 cfs 0.031 af

Pond 102: CB-102 Peak Elev=194.56' Storage=0.000 af Inflow=0.09 cfs 0.044 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 ' Outflow=0.09 cfs 0.044 af

Pond 103: CB-105 Peak Elev=194.63' Storage=0.000 af Inflow=0.35 cfs 0.045 af
12.0" Round Culvert n=0.012 L=128.0' S=0.0051 ' Outflow=0.35 cfs 0.045 af

Pond 104: CB-104 Peak Elev=193.97' Storage=0.000 af Inflow=0.52 cfs 0.061 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0050 ' Outflow=0.52 cfs 0.061 af

Pond 105: CB-105 Peak Elev=197.94' Storage=0.000 af Inflow=0.67 cfs 0.152 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0592 ' Outflow=0.67 cfs 0.152 af

Pond DE1: DRIP EDGE #1 Peak Elev=198.29' Storage=207 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE10: DRIP EDGE #10 Peak Elev=196.75' Storage=209 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE11: DRIP EDGE #11 Peak Elev=198.41' Storage=211 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE12: DRIP EDGE #12 Peak Elev=197.65' Storage=209 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE13: DRIP EDGE #13 Peak Elev=198.45' Storage=207 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE2: DRIP EDGE #2 Peak Elev=198.68' Storage=205 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE3: DRIP EDGE #3 Peak Elev=198.14' Storage=207 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

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Pond DE4: DRIP EDGE #4 Peak Elev=197.75' Storage=209 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE5: DRIP EDGE #5 Peak Elev=198.87' Storage=211 cf Inflow=0.25 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE6: DRIP EDGE #6 Peak Elev=198.86' Storage=210 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE7: DRIP EDGE #7 Peak Elev=198.47' Storage=213 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE8: DRIP EDGE #8 Peak Elev=197.52' Storage=212 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond DE9: DRIP EDGE #9 Peak Elev=196.65' Storage=209 cf Inflow=0.21 cfs 0.018 af
Discarded=0.04 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.018 af

Pond F1: Forebay #1 Peak Elev=193.87' Storage=704 cf Inflow=1.18 cfs 0.285 af
Outflow=1.42 cfs 0.270 af

Pond P1: Gravel Wetland #1 Peak Elev=194.06' Storage=6,698 cf Inflow=1.42 cfs 0.274 af
Primary=0.25 cfs 0.141 af Secondary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.141 af

Link AP1: Analysis Point #1 Inflow=0.49 cfs 0.351 af
Primary=0.49 cfs 0.351 af

Total Runoff Area = 24.373 ac Runoff Volume = 0.729 af Average Runoff Depth = 0.36"
93.13% Pervious = 22.700 ac 6.87% Impervious = 1.674 ac

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Summary for Subcatchment 10S: PR-WS-10

Runoff = 0.67 cfs @ 12.54 hrs, Volume= 0.152 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
23,212	83	Paved roads w/open ditches, 50% imp, HSG A
121,388	39	>75% Grass cover, Good, HSG A
17,761	72	Dirt roads, HSG A
35,187	32	Woods/grass comb., Good, HSG A
197,548	46	Weighted Average
185,942		94.12% Pervious Area
11,606		5.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	25	0.0200	1.01		Sheet Flow, EX ROAD
					Smooth surfaces n= 0.011 P2= 3.01"
10.9	75	0.0240	0.12		Sheet Flow, GRASS
					Grass: Dense n= 0.240 P2= 3.01"
7.6	497	0.0240	1.08		Shallow Concentrated Flow,
					Short Grass Pasture Kv= 7.0 fps
2.0	319	0.1500	2.71		Shallow Concentrated Flow, GRASS
					Short Grass Pasture Kv= 7.0 fps
20.9	916	Total			

Summary for Subcatchment 11S: PR-WS-11

Runoff = 0.43 cfs @ 12.64 hrs, Volume= 0.140 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
19,004	83	Paved roads w/open ditches, 50% imp, HSG A
95,627	39	>75% Grass cover, Good, HSG A
193	96	Gravel surface, HSG A
120,042	32	Woods/grass comb., Good, HSG A
24,854	80	>75% Grass cover, Good, HSG D
259,720	43	Weighted Average
250,218		96.34% Pervious Area
9,502		3.66% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	38	0.0010	0.33		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.01"
5.3	62	0.0967	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 3.01"
0.2	20	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.2	78	0.0510	1.13		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.7	181	0.0660	1.80		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
12.2	116	0.0010	0.16		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
22.5	495	Total			

Summary for Subcatchment 12S: PR-WS-12

Runoff = 0.25 cfs @ 12.17 hrs, Volume= 0.028 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
4,598	98	Paved roads w/curbs & sewers, HSG A
13,708	39	>75% Grass cover, Good, HSG A
18,306	54	Weighted Average
13,708		74.88% Pervious Area
4,598		25.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	25	0.0200	1.01		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.01"
7.1	75	0.0700	0.18		Sheet Flow, Grass: Dense n= 0.240 P2= 3.01"
1.7	186	0.0700	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
9.2	286	Total			

Summary for Subcatchment 13S: PR-WS-13

Runoff = 0.02 cfs @ 13.81 hrs, Volume= 0.012 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

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Area (sf)	CN	Description
2,401	83	Paved roads w/open ditches, 50% imp, HSG A
22,591	39	>75% Grass cover, Good, HSG A
17,102	32	Woods/grass comb., Good, HSG A
42,094	39	Weighted Average
40,894		97.15% Pervious Area
1,201		2.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	15	0.0200	0.91		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.01"
7.8	85	0.0700	0.18		Sheet Flow, GRASS Grass: Dense n= 0.240 P2= 3.01"
1.4	200	0.1200	2.42		Shallow Concentrated Flow, GRASS Short Grass Pasture Kv= 7.0 fps
1.2	81	0.0490	1.11		Shallow Concentrated Flow, TREE Woodland Kv= 5.0 fps
10.7	381	Total			

Summary for Subcatchment 14S: PR-WS-14

Runoff = 0.09 cfs @ 12.18 hrs, Volume= 0.013 af, Depth= 0.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
3,159	83	Paved roads w/open ditches, 50% imp, HSG A
8,189	39	>75% Grass cover, Good, HSG A
1,606	32	Woods/grass comb., Good, HSG A
12,954	49	Weighted Average
11,375		87.81% Pervious Area
1,580		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	100	0.1800	0.27		Sheet Flow, Grass: Dense n= 0.240 P2= 3.01"
1.4	87	0.0230	1.06		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.5	187	Total			

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Summary for Subcatchment 16S: PR-WS-16

Runoff = 0.01 cfs @ 13.75 hrs, Volume= 0.004 af, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
13,253	39	>75% Grass cover, Good, HSG A
13,253		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50		0.12		Direct Entry,

Summary for Subcatchment 17S: PR-WS-17

Runoff = 0.35 cfs @ 12.21 hrs, Volume= 0.045 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
7,905	98	Paved roads w/curbs & sewers, HSG A
26,729	39	>75% Grass cover, Good, HSG A
34,634	52	Weighted Average
26,729		77.18% Pervious Area
7,905		22.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	74	0.0500	0.15		Sheet Flow, Grass: Dense n= 0.240 P2= 3.01"
0.6	26	0.0100	0.77		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.01"
1.8	218	0.0100	2.03		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.4	318	Total			

Summary for Subcatchment 18S: PR-WS-18

Runoff = 0.05 cfs @ 14.85 hrs, Volume= 0.031 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

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Area (sf)	CN	Description
7,325	98	Paved roads w/curbs & sewers, HSG A
41,884	39	>75% Grass cover, Good, HSG A
83,232	32	Woods/grass comb., Good, HSG A
132,441	38	Weighted Average
125,116		94.47% Pervious Area
7,325		5.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	100	0.0800	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.01"
3.5	300	0.0800	1.41		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.0	90	0.0440	1.47		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.4	230	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
18.6	720	Total			

Summary for Subcatchment 19S: PR-WS-19

Runoff = 0.09 cfs @ 15.15 hrs, Volume= 0.058 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
49,828	39	>75% Grass cover, Good, HSG A
237,577	32	Woods/grass comb., Good, HSG A
27,680	79	Woods/grass comb., Good, HSG D
81	80	>75% Grass cover, Good, HSG D
3,456	58	Woods/grass comb., Good, HSG B
318,622	37	Weighted Average
318,622		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.1000	0.14		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.01"
8.8	672	0.0650	1.27		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
20.4	772	Total			

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Subcatchment 20S: PR-WS-20

Runoff = 0.20 cfs @ 12.11 hrs, Volume= 0.016 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,431	98	Paved roads w/curbs & sewers, HSG A
2,941	39	>75% Grass cover, Good, HSG A
5,372	66	Weighted Average
2,941		54.75% Pervious Area
2,431		45.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	259		0.62		Direct Entry,

Summary for Subcatchment 23S: PR-WS-23

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 24S: PR-WS-24

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

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Summary for Subcatchment 25S: PR-WS-25

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 26S: PR-WS-26

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 27S: PR-WS-27

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

Runoff = 0.25 cfs @ 12.00 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Subcatchment 28S: PR-WS-28

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 29S: PR-WS-29

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 30S: PR-WS-30

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Subcatchment 31S: PR-WS-31

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 32S: PR-WS-32

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 33S: PR-WS-33

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Subcatchment 34S: PR-WS-34

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Subcatchment 35S: PR-WS-35

Runoff = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=4.73"

Area (sf)	CN	Description
2,058	98	Roofs, HSG A
2,058		100.00% Impervious Area

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

Summary for Reach 2R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
 Length= 120.0' Slope= 0.0100 '/'
 Inlet Invert= 201.50', Outlet Invert= 200.30'

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Summary for Reach 3R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 45.0' Slope= 0.0100 '/'
Inlet Invert= 200.95', Outlet Invert= 200.50'

‡

Summary for Reach 4R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 25.0' Slope= 0.0100 '/'
Inlet Invert= 200.55', Outlet Invert= 200.30'

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Reach 5R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 100.0' Slope= 0.0100 '/
Inlet Invert= 201.65', Outlet Invert= 200.65'

‡

Summary for Reach 6R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 162.0' Slope= 0.0100 '/
Inlet Invert= 201.65', Outlet Invert= 200.03'

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Reach 7R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 205.0' Slope= 0.0100 '/'
Inlet Invert= 201.25', Outlet Invert= 199.20'

‡

Summary for Reach 8R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 115.0' Slope= 0.0100 '/'
Inlet Invert= 200.30', Outlet Invert= 199.15'

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Summary for Reach 9R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 40.0' Slope= 0.0100 '/'
Inlet Invert= 199.45', Outlet Invert= 199.05'

‡

Summary for Reach 10R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 549.61 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 35.0' Slope= 0.0100 '/'
Inlet Invert= 199.45', Outlet Invert= 199.10'

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Reach 11R: THROUGH GRASS

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 324.77 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 201.20', Outlet Invert= 200.20'

‡

Summary for Reach 12R: THROUGH GRASS

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 324.77 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 55.0' Slope= 0.0100 '/'
Inlet Invert= 200.45', Outlet Invert= 199.90'

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Summary for Reach 13R: THROUGH GRASS

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 324.77 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 45.0' Slope= 0.0100 '/'
Inlet Invert= 201.25', Outlet Invert= 200.80'



Summary for Reach 14R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity= 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 777.26 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 200.20', Outlet Invert= 199.70'

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Type III 24-hr 10 YR Rainfall=4.73"

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Summary for Reach 15R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 777.26 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 199.90', Outlet Invert= 199.40'

‡

Summary for Reach 16R: OVER ROAD

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 0.00" for 10 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 777.26 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.013 Asphalt, smooth
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 200.80', Outlet Invert= 200.30'

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Summary for Pond 101: CB-101

Inflow Area = 3.277 ac, 12.34% Impervious, Inflow Depth = 0.11" for 10 YR event
Inflow = 0.05 cfs @ 14.85 hrs, Volume= 0.031 af
Outflow = 0.05 cfs @ 14.85 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.3 min
Primary = 0.05 cfs @ 14.85 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 195.32' @ 14.85 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.7 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 0.7 min (1,062.6 - 1,061.9)

Volume	Invert	Avail.Storage	Storage Description
#1	195.20'	0.001 af	4.20'D x 4.00'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	195.20'	12.0" Round P-201 L= 143.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 195.20' / 194.50' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.05 cfs @ 14.85 hrs HW=195.32' (Free Discharge)
↑ **1=P-201** (Barrel Controls 0.05 cfs @ 1.31 fps)

Summary for Pond 102: CB-102

[79] Warning: Submerged Pond 101 Primary device # 1 OUTLET by 0.06'

Inflow Area = 3.621 ac, 13.47% Impervious, Inflow Depth = 0.15" for 10 YR event
Inflow = 0.09 cfs @ 12.18 hrs, Volume= 0.044 af
Outflow = 0.09 cfs @ 12.19 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.9 min
Primary = 0.09 cfs @ 12.19 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 194.56' @ 12.19 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.9 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (1,023.3 - 1,022.4)

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Volume	Invert	Avail.Storage	Storage Description
#1	194.40'	0.002 af	5.20'D x 5.10'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	194.40'	12.0" Round P-202 L= 100.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 194.40' / 193.90' S= 0.0050 '/ Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.09 cfs @ 12.19 hrs HW=194.56' (Free Discharge)↑**1=P-202** (Barrel Controls 0.09 cfs @ 1.55 fps)**Summary for Pond 103: CB-105**

Inflow Area = 1.126 ac, 45.50% Impervious, Inflow Depth = 0.48" for 10 YR event
 Inflow = 0.35 cfs @ 12.21 hrs, Volume= 0.045 af
 Outflow = 0.35 cfs @ 12.21 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.35 cfs @ 12.21 hrs, Volume= 0.045 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 194.63' @ 12.21 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.5 min calculated for 0.045 af (100% of inflow)
 Center-of-Mass det. time= 0.5 min (916.4 - 915.9)

Volume	Invert	Avail.Storage	Storage Description
#1	194.30'	0.001 af	4.00'D x 4.20'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	194.30'	12.0" Round P-203 L= 128.0' Ke= 0.700 Inlet / Outlet Invert= 194.30' / 193.65' S= 0.0051 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.35 cfs @ 12.21 hrs HW=194.63' (Free Discharge)↑**1=P-203** (Barrel Controls 0.35 cfs @ 2.32 fps)**Summary for Pond 104: CB-104**

[79] Warning: Submerged Pond 103 Primary device # 1 OUTLET by 0.32'

Inflow Area = 1.249 ac, 45.47% Impervious, Inflow Depth = 0.59" for 10 YR event
 Inflow = 0.52 cfs @ 12.17 hrs, Volume= 0.061 af
 Outflow = 0.52 cfs @ 12.17 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.52 cfs @ 12.17 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 193.97' @ 12.17 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 1.0 min calculated for 0.061 af (100% of inflow)
 Center-of-Mass det. time= 0.6 min (903.0 - 902.4)

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Volume	Invert	Avail.Storage	Storage Description
#1	193.45'	0.002 af	4.00'D x 5.55'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	193.55'	12.0" Round P-204 L= 44.0' Ke= 0.700 Inlet / Outlet Invert= 193.55' / 193.33' S= 0.0050 ' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 12.17 hrs HW=193.97' (Free Discharge)↑**1=P-204** (Barrel Controls 0.50 cfs @ 2.41 fps)**Summary for Pond 105: CB-105**

Inflow Area = 4.535 ac, 5.88% Impervious, Inflow Depth = 0.40" for 10 YR event
 Inflow = 0.67 cfs @ 12.54 hrs, Volume= 0.152 af
 Outflow = 0.67 cfs @ 12.54 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.1 min
 Primary = 0.67 cfs @ 12.54 hrs, Volume= 0.152 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 197.94' @ 12.54 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.3 min calculated for 0.152 af (100% of inflow)
 Center-of-Mass det. time= 0.3 min (963.4 - 963.1)

Volume	Invert	Avail.Storage	Storage Description
#1	197.50'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder

Device	Routing	Invert	Outlet Devices
#1	Primary	197.50'	12.0" Round P-205 L= 60.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 197.50' / 193.95' S= 0.0592 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.67 cfs @ 12.54 hrs HW=197.94' (Free Discharge)↑**1=P-205** (Inlet Controls 0.67 cfs @ 1.99 fps)**Summary for Pond DE1: DRIP EDGE #1**

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af, Atten= 81%, Lag= 27.1 min
 Discarded = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.29' @ 12.55 hrs Surf.Area= 434 sf Storage= 207 cf

Plug-Flow detention time= 33.1 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 33.0 min (782.9 - 749.9)

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Volume	Invert	Avail.Storage	Storage Description
#1	197.10'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.10	434	295.1	0	0	434
201.10	434	295.1	1,736	1,736	1,614
202.10	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.10'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 193.10'
#2	Primary	201.10'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.55 hrs HW=198.29' (Free Discharge)

↑1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=197.10' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond DE10: DRIP EDGE #10

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af, Atten= 82%, Lag= 27.4 min
 Discarded = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 196.75' @ 12.56 hrs Surf.Area= 434 sf Storage= 209 cf

Plug-Flow detention time= 34.1 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 34.1 min (784.0 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	195.55'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
195.55	434	295.1	0	0	434
199.55	434	295.1	1,736	1,736	1,614
200.55	434	295.1	434	2,170	1,910

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Device	Routing	Invert	Outlet Devices
#1	Discarded	195.55'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 191.00'
#2	Primary	199.55'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.56 hrs HW=196.75' (Free Discharge)

↑1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=195.55' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond DE11: DRIP EDGE #11

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af, Atten= 82%, Lag= 27.8 min
 Discarded = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 198.41' @ 12.56 hrs Surf.Area= 434 sf Storage= 211 cf

Plug-Flow detention time= 35.2 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 35.1 min (785.0 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	197.20'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.20	434	295.1	0	0	434
201.20	434	295.1	1,736	1,736	1,614
202.20	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.20'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 192.00'
#2	Primary	201.20'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

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Discarded OutFlow Max=0.04 cfs @ 12.56 hrs HW=198.41' (Free Discharge)

↑1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=197.20' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond DE12: DRIP EDGE #12

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af, Atten= 82%, Lag= 27.4 min
 Discarded = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 197.65' @ 12.55 hrs Surf.Area= 434 sf Storage= 209 cf

Plug-Flow detention time= 34.0 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 33.9 min (783.8 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	196.45'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.45	434	295.1	0	0	434
200.45	434	295.1	1,736	1,736	1,614
201.45	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.45'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 192.00'
#2	Primary	200.45'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.55 hrs HW=197.65' (Free Discharge)

↑1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.45' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond DE13: DRIP EDGE #13

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af, Atten= 81%, Lag= 27.1 min
 Discarded = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.45' @ 12.55 hrs Surf.Area= 434 sf Storage= 207 cf

Plug-Flow detention time= 33.3 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 33.2 min (783.1 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	197.25'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.25	434	295.1	0	0	434
201.25	434	295.1	1,736	1,736	1,614
202.25	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.25'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 193.16'
#2	Primary	201.25'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.55 hrs HW=198.45' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=197.25' (Free Discharge)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DE2: DRIP EDGE #2

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.54 hrs, Volume= 0.018 af, Atten= 81%, Lag= 26.7 min
 Discarded = 0.04 cfs @ 12.54 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

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Peak Elev= 198.68' @ 12.54 hrs Surf.Area= 434 sf Storage= 205 cf

Plug-Flow detention time= 31.9 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 31.9 min (781.7 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	197.50'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.50	434	295.1	0	0	434
201.50	434	295.1	1,736	1,736	1,614
202.50	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.50'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 194.00'
#2	Primary	201.50'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.54 hrs HW=198.68' (Free Discharge)↑ **1=Exfiltration** (Controls 0.04 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=197.50' (Free Discharge)↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond DE3: DRIP EDGE #3**

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af, Atten= 81%, Lag= 27.1 min
 Discarded = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 198.14' @ 12.55 hrs Surf.Area= 434 sf Storage= 207 cf

Plug-Flow detention time= 33.1 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 33.0 min (782.9 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	196.95'	868 cf	Custom Stage Data (irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.95	434	295.1	0	0	434
200.95	434	295.1	1,736	1,736	1,614
201.95	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.95'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 192.95'
#2	Primary	200.95'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.55 hrs HW=198.14' (Free Discharge)↑**1=Exfiltration** (Controls 0.04 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=196.95' (Free Discharge)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond DE4: DRIP EDGE #4**

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af, Atten= 82%, Lag= 27.4 min
 Discarded = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 197.75' @ 12.56 hrs Surf.Area= 434 sf Storage= 209 cf

Plug-Flow detention time= 34.1 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 34.1 min (784.0 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	196.55'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.55	434	295.1	0	0	434
200.55	434	295.1	1,736	1,736	1,614
201.55	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.55'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 192.00'
#2	Primary	200.55'	149.2' long x 2.0' 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

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2.50 3.00 3.50

Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88

2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.56 hrs HW=197.75' (Free Discharge)↑**1=Exfiltration** (Controls 0.04 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=196.55' (Free Discharge)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond DE5: DRIP EDGE #5**

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event

Inflow = 0.25 cfs @ 12.00 hrs, Volume= 0.018 af

Outflow = 0.04 cfs @ 12.45 hrs, Volume= 0.018 af, Atten= 85%, Lag= 26.8 min

Discarded = 0.04 cfs @ 12.45 hrs, Volume= 0.018 af

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 198.87' @ 12.45 hrs Surf.Area= 434 sf Storage= 211 cf

Plug-Flow detention time= 35.0 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 34.9 min (778.3 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1	197.65'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.65	434	295.1	0	0	434
201.65	434	295.1	1,736	1,736	1,614
202.65	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.65'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 192.66'
#2	Primary	201.65'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.45 hrs HW=198.87' (Free Discharge)↑**1=Exfiltration** (Controls 0.04 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=197.65' (Free Discharge)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

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Summary for Pond DE6: DRIP EDGE #6

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af, Atten= 82%, Lag= 27.7 min
 Discarded = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.86' @ 12.56 hrs Surf.Area= 434 sf Storage= 210 cf

Plug-Flow detention time= 34.9 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 34.8 min (784.7 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	197.65'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.65	434	295.1	0	0	434
201.65	434	295.1	1,736	1,736	1,614
202.65	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.65'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 192.66'
#2	Primary	201.65'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.56 hrs HW=198.86' (Free Discharge)

↑ **1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=197.65' (Free Discharge)

↑ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DE7: DRIP EDGE #7

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.57 hrs, Volume= 0.018 af, Atten= 83%, Lag= 28.2 min
 Discarded = 0.04 cfs @ 12.57 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

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Peak Elev= 198.47' @ 12.57 hrs Surf.Area= 434 sf Storage= 213 cf

Plug-Flow detention time= 36.5 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 36.4 min (786.3 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	197.25'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
197.25	434	295.1	0	0	434
201.25	434	295.1	1,736	1,736	1,614
202.25	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	197.25'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 191.00'
#2	Primary	201.25'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.57 hrs HW=198.47' (Free Discharge)↑**1=Exfiltration** (Controls 0.04 cfs)**Primary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=197.25' (Free Discharge)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond DE8: DRIP EDGE #8**

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af, Atten= 82%, Lag= 28.0 min
 Discarded = 0.04 cfs @ 12.56 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 197.52' @ 12.56 hrs Surf.Area= 434 sf Storage= 212 cf

Plug-Flow detention time= 35.8 min calculated for 0.018 af (100% of inflow)

Center-of-Mass det. time= 35.7 min (785.6 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	196.30'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
196.30	434	295.1	0	0	434
200.30	434	295.1	1,736	1,736	1,614
201.30	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	196.30'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 190.66'
#2	Primary	200.30'	149.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.56 hrs HW=197.52' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.30' (Free Discharge)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond DE9: DRIP EDGE #9

Inflow Area = 0.047 ac, 100.00% Impervious, Inflow Depth = 4.49" for 10 YR event
 Inflow = 0.21 cfs @ 12.10 hrs, Volume= 0.018 af
 Outflow = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af, Atten= 82%, Lag= 27.4 min
 Discarded = 0.04 cfs @ 12.55 hrs, Volume= 0.018 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 196.65' @ 12.55 hrs Surf.Area= 434 sf Storage= 209 cf

Plug-Flow detention time= 34.0 min calculated for 0.018 af (100% of inflow)
 Center-of-Mass det. time= 33.9 min (783.8 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1	195.45'	868 cf	Custom Stage Data (Irregular) Listed below (Recalc) 2,170 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
195.45	434	295.1	0	0	434
199.45	434	295.1	1,736	1,736	1,614
200.45	434	295.1	434	2,170	1,910

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.45'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 191.00'
#2	Primary	199.45'	149.2' long x 2.0' 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

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2.50 3.00 3.50
 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88
 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.04 cfs @ 12.55 hrs HW=196.65' (Free Discharge)

↑1=Exfiltration (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=195.45' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond F1: Forebay #1

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

[81] Warning: Exceeded Pond 104 by 0.25' @ 28.35 hrs

Inflow Area = 9.826 ac, 14.53% Impervious, Inflow Depth = 0.35" for 10 YR event
 Inflow = 1.18 cfs @ 12.43 hrs, Volume= 0.285 af
 Outflow = 1.42 cfs @ 12.31 hrs, Volume= 0.270 af, Atten= 0%, Lag= 0.0 min
 Primary = 1.42 cfs @ 12.31 hrs, Volume= 0.270 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 193.87' @ 12.30 hrs Surf.Area= 653 sf Storage= 704 cf

Plug-Flow detention time= 39.0 min calculated for 0.270 af (95% of inflow)
 Center-of-Mass det. time= 13.5 min (967.4 - 954.0)

Volume	Invert	Avail.Storage	Storage Description
#1	192.00'	2,890 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
192.00	156	61.6	0	0	156
194.00	700	109.0	791	791	822
196.00	1,443	145.4	2,099	2,890	1,601

Device	Routing	Invert	Outlet Devices
#1	Primary	193.80'	30.0' long x 4.0' 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) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.26 cfs @ 12.31 hrs HW=193.87' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Weir Controls 1.26 cfs @ 0.62 fps)

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Summary for Pond P1: Gravel Wetland #1

[81] Warning: Exceeded Pond F1 by 0.24' @ 16.70 hrs

Inflow Area = 10.130 ac, 14.10% Impervious, Inflow Depth = 0.32" for 10 YR event
 Inflow = 1.42 cfs @ 12.31 hrs, Volume= 0.274 af
 Outflow = 0.25 cfs @ 16.58 hrs, Volume= 0.141 af, Atten= 82%, Lag= 256.4 min
 Primary = 0.25 cfs @ 16.58 hrs, Volume= 0.141 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 194.06' @ 16.58 hrs Surf.Area= 9,601 sf Storage= 6,698 cf

Plug-Flow detention time= 400.7 min calculated for 0.141 af (52% of inflow)
 Center-of-Mass det. time= 240.0 min (1,208.3 - 968.3)

Volume	Invert	Avail.Storage	Storage Description
#1	192.00'	3,214 cf	Cell #1 (Irregular) Listed below (Recalc)
#2	192.00'	3,173 cf	Cell #2 (Irregular) Listed below (Recalc)
#3	194.00'	11,924 cf	Ex. Detention (Irregular) Listed below (Recalc)
		18,312 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
192.00	1,038	167.0	0	0	1,038
194.00	2,254	221.4	3,214	3,214	2,764

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
192.00	1,002	176.5	0	0	1,002
194.00	2,255	230.8	3,173	3,173	2,808

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
194.00	5,038	297.6	0	0	5,038
196.00	6,937	335.2	11,924	11,924	7,034

Device	Routing	Invert	Outlet Devices
#1	Device 3	193.81'	6.0" Vert. Pref Pipe Out C= 0.600 Limited to weir flow at low heads 4.0' long Top of Weir Plate Cv= 2.62 (C= 3.28) 24.0" Round P-206 L= 83.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 193.80' / 193.39' S= 0.0049'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 3	194.03'	
#3	Primary	193.80'	
#4	Secondary	195.00'	4.0' long x 4.0' breadth Emergency Overflow Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

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Primary OutFlow Max=0.24 cfs @ 16.58 hrs HW=194.06' (Free Discharge)

↑ **3=P-206** (Passes 0.24 cfs of 0.32 cfs potential flow)

↑ **1=Pref Pipe Out** (Orifice Controls 0.17 cfs @ 1.71 fps)

↑ **2=Top of Weir Plate** (Weir Controls 0.07 cfs @ 0.58 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=192.00' (Free Discharge)

↑ **4=Emergency Overflow** (Controls 0.00 cfs)

Summary for Link AP1: Analysis Point #1

Inflow Area = 24.373 ac, 6.87% Impervious, Inflow Depth > 0.17" for 10 YR event

Inflow = 0.49 cfs @ 16.38 hrs, Volume= 0.351 af

Primary = 0.49 cfs @ 16.38 hrs, Volume= 0.351 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

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Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: PR-WS-10	Runoff Area=197,548 sf 5.88% Impervious Runoff Depth=0.87" Flow Length=916' Tc=20.9 min CN=46 Runoff=2.07 cfs 0.329 af
Subcatchment 11S: PR-WS-11	Runoff Area=259,720 sf 3.66% Impervious Runoff Depth=0.68" Flow Length=495' Tc=22.5 min CN=43 Runoff=1.77 cfs 0.337 af
Subcatchment 12S: PR-WS-12	Runoff Area=18,306 sf 25.12% Impervious Runoff Depth=1.45" Flow Length=286' Tc=9.2 min CN=54 Runoff=0.55 cfs 0.051 af
Subcatchment 13S: PR-WS-13	Runoff Area=42,094 sf 2.85% Impervious Runoff Depth=0.45" Flow Length=381' Tc=10.7 min CN=39 Runoff=0.16 cfs 0.036 af
Subcatchment 14S: PR-WS-14	Runoff Area=12,954 sf 12.19% Impervious Runoff Depth=1.08" Flow Length=187' Tc=7.5 min CN=49 Runoff=0.26 cfs 0.027 af
Subcatchment 16S: PR-WS-16	Runoff Area=13,253 sf 0.00% Impervious Runoff Depth=0.45" Flow Length=50' Tc=7.0 min CN=39 Runoff=0.05 cfs 0.011 af
Subcatchment 17S: PR-WS-17	Runoff Area=34,634 sf 22.82% Impervious Runoff Depth=1.29" Flow Length=318' Tc=10.4 min CN=52 Runoff=0.86 cfs 0.086 af
Subcatchment 18S: PR-WS-18	Runoff Area=132,441 sf 5.53% Impervious Runoff Depth=0.40" Flow Length=720' Tc=18.6 min CN=38 Runoff=0.36 cfs 0.100 af
Subcatchment 19S: PR-WS-19	Runoff Area=318,622 sf 0.00% Impervious Runoff Depth=0.35" Flow Length=772' Tc=20.4 min CN=37 Runoff=0.64 cfs 0.211 af
Subcatchment 20S: PR-WS-20	Runoff Area=5,372 sf 45.25% Impervious Runoff Depth=2.45" Flow Length=259' Tc=7.0 min CN=66 Runoff=0.33 cfs 0.025 af
Subcatchment 23S: PR-WS-23	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 24S: PR-WS-24	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 25S: PR-WS-25	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 26S: PR-WS-26	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 27S: PR-WS-27	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=0.0 min CN=98 Runoff=0.32 cfs 0.023 af
Subcatchment 28S: PR-WS-28	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af

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Subcatchment 29S: PR-WS-29	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 30S: PR-WS-30	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 31S: PR-WS-31	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 32S: PR-WS-32	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 33S: PR-WS-33	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 34S: PR-WS-34	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Subcatchment 35S: PR-WS-35	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=5.77" Tc=7.0 min CN=98 Runoff=0.27 cfs 0.023 af
Reach 2R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=120.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 3R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=45.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 4R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=25.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 5R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=100.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 6R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=162.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 7R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=205.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 8R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=115.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 9R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=40.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 10R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=35.0' S=0.0100 ' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 11R: THROUGH GRASS	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.022 L=100.0' S=0.0100 ' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

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Type III 24-hr 25 YR Rainfall=6.01"

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Reach 12R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=55.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 13R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=45.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 14R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 15R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 16R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Pond 101: CB-101 Peak Elev=195.54' Storage=0.000 af Inflow=0.36 cfs 0.100 af
12.0" Round Culvert n=0.012 L=143.0' S=0.0049 '/' Outflow=0.36 cfs 0.100 af

Pond 102: CB-102 Peak Elev=194.79' Storage=0.000 af Inflow=0.47 cfs 0.127 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=0.47 cfs 0.127 af

Pond 103: CB-105 Peak Elev=194.83' Storage=0.000 af Inflow=0.86 cfs 0.086 af
12.0" Round Culvert n=0.012 L=128.0' S=0.0051 '/' Outflow=0.86 cfs 0.086 af

Pond 104: CB-104 Peak Elev=194.21' Storage=0.000 af Inflow=1.14 cfs 0.111 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0050 '/' Outflow=1.14 cfs 0.111 af

Pond 105: CB-105 Peak Elev=198.38' Storage=0.000 af Inflow=2.07 cfs 0.329 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0592 '/' Outflow=2.07 cfs 0.329 af

Pond DE1: DRIP EDGE #1 Peak Elev=198.77' Storage=290 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

Pond DE10: DRIP EDGE #10 Peak Elev=197.24' Storage=293 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

Pond DE11: DRIP EDGE #11 Peak Elev=198.90' Storage=295 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

Pond DE12: DRIP EDGE #12 Peak Elev=198.13' Storage=292 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

Pond DE13: DRIP EDGE #13 Peak Elev=198.92' Storage=290 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

Pond DE2: DRIP EDGE #2 Peak Elev=199.15' Storage=287 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

Pond DE3: DRIP EDGE #3 Peak Elev=198.62' Storage=290 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af

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Type III 24-hr 25 YR Rainfall=6.01"

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Pond DE4: DRIP EDGE #4Peak Elev=198.24' Storage=293 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af**Pond DE5: DRIP EDGE #5**Peak Elev=199.35' Storage=295 cf Inflow=0.32 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af**Pond DE6: DRIP EDGE #6**Peak Elev=199.35' Storage=294 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af**Pond DE7: DRIP EDGE #7**Peak Elev=198.97' Storage=298 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af**Pond DE8: DRIP EDGE #8**Peak Elev=198.01' Storage=297 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af**Pond DE9: DRIP EDGE #9**Peak Elev=197.13' Storage=292 cf Inflow=0.27 cfs 0.023 af
Discarded=0.04 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.023 af**Pond F1: Forebay #1**Peak Elev=193.94' Storage=747 cf Inflow=3.50 cfs 0.618 af
Outflow=3.59 cfs 0.602 af**Pond P1: Gravel Wetland #1**Peak Elev=194.30' Storage=7,918 cf Inflow=3.64 cfs 0.614 af
Primary=1.15 cfs 0.481 af Secondary=0.00 cfs 0.000 af Outflow=1.15 cfs 0.481 af**Link AP1: Analysis Point #1**Inflow=2.50 cfs 1.065 af
Primary=2.50 cfs 1.065 af**Total Runoff Area = 24.373 ac Runoff Volume = 1.509 af Average Runoff Depth = 0.74"**
93.13% Pervious = 22.700 ac 6.87% Impervious = 1.674 ac

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Type III 24-hr 50 YR Rainfall=7.22"

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Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: PR-WS-10	Runoff Area=197,548 sf 5.88% Impervious Runoff Depth=1.43" Flow Length=916' Tc=20.9 min CN=46 Runoff=4.03 cfs 0.540 af
Subcatchment 11S: PR-WS-11	Runoff Area=259,720 sf 3.66% Impervious Runoff Depth=1.17" Flow Length=495' Tc=22.5 min CN=43 Runoff=3.83 cfs 0.582 af
Subcatchment 12S: PR-WS-12	Runoff Area=18,306 sf 25.12% Impervious Runoff Depth=2.17" Flow Length=286' Tc=9.2 min CN=54 Runoff=0.88 cfs 0.076 af
Subcatchment 13S: PR-WS-13	Runoff Area=42,094 sf 2.85% Impervious Runoff Depth=0.85" Flow Length=381' Tc=10.7 min CN=39 Runoff=0.43 cfs 0.068 af
Subcatchment 14S: PR-WS-14	Runoff Area=12,954 sf 12.19% Impervious Runoff Depth=1.70" Flow Length=187' Tc=7.5 min CN=49 Runoff=0.47 cfs 0.042 af
Subcatchment 16S: PR-WS-16	Runoff Area=13,253 sf 0.00% Impervious Runoff Depth=0.85" Flow Length=50' Tc=7.0 min CN=39 Runoff=0.15 cfs 0.022 af
Subcatchment 17S: PR-WS-17	Runoff Area=34,634 sf 22.82% Impervious Runoff Depth=1.98" Flow Length=318' Tc=10.4 min CN=52 Runoff=1.43 cfs 0.131 af
Subcatchment 18S: PR-WS-18	Runoff Area=132,441 sf 5.53% Impervious Runoff Depth=0.77" Flow Length=720' Tc=18.6 min CN=38 Runoff=1.04 cfs 0.196 af
Subcatchment 19S: PR-WS-19	Runoff Area=318,622 sf 0.00% Impervious Runoff Depth=0.70" Flow Length=772' Tc=20.4 min CN=37 Runoff=2.07 cfs 0.426 af
Subcatchment 20S: PR-WS-20	Runoff Area=5,372 sf 45.25% Impervious Runoff Depth=3.38" Flow Length=259' Tc=7.0 min CN=66 Runoff=0.46 cfs 0.035 af
Subcatchment 23S: PR-WS-23	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 24S: PR-WS-24	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 25S: PR-WS-25	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 26S: PR-WS-26	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 27S: PR-WS-27	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=0.0 min CN=98 Runoff=0.38 cfs 0.027 af
Subcatchment 28S: PR-WS-28	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af

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Type III 24-hr 50 YR Rainfall=7.22"

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Subcatchment 29S: PR-WS-29	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 30S: PR-WS-30	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 31S: PR-WS-31	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 32S: PR-WS-32	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 33S: PR-WS-33	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 34S: PR-WS-34	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Subcatchment 35S: PR-WS-35	Runoff Area=2,058 sf 100.00% Impervious Runoff Depth=6.98" Tc=7.0 min CN=98 Runoff=0.32 cfs 0.027 af
Reach 2R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=120.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 3R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=45.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 4R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=25.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 5R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=100.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 6R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=162.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 7R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=205.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 8R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=115.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 9R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=40.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 10R: OVER ROAD	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.013 L=35.0' S=0.0100 '/' Capacity=549.61 cfs Outflow=0.00 cfs 0.000 af
Reach 11R: THROUGH GRASS	Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af n=0.022 L=100.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

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Type III 24-hr 50 YR Rainfall=7.22"

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Reach 12R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=55.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 13R: THROUGH GRASS Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.022 L=45.0' S=0.0100 '/' Capacity=324.77 cfs Outflow=0.00 cfs 0.000 af

Reach 14R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 15R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Reach 16R: OVER ROAD Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.013 L=25.0' S=0.0200 '/' Capacity=777.26 cfs Outflow=0.00 cfs 0.000 af

Pond 101: CB-101 Peak Elev=195.80' Storage=0.000 af Inflow=1.04 cfs 0.196 af
12.0" Round Culvert n=0.012 L=143.0' S=0.0049 '/' Outflow=1.05 cfs 0.196 af

Pond 102: CB-102 Peak Elev=195.08' Storage=0.000 af Inflow=1.27 cfs 0.238 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=1.27 cfs 0.238 af

Pond 103: CB-105 Peak Elev=195.02' Storage=0.000 af Inflow=1.43 cfs 0.131 af
12.0" Round Culvert n=0.012 L=128.0' S=0.0051 '/' Outflow=1.43 cfs 0.131 af

Pond 104: CB-104 Peak Elev=194.44' Storage=0.000 af Inflow=1.83 cfs 0.166 af
12.0" Round Culvert n=0.012 L=44.0' S=0.0050 '/' Outflow=1.83 cfs 0.166 af

Pond 105: CB-105 Peak Elev=199.46' Storage=0.001 af Inflow=4.03 cfs 0.540 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0592 '/' Outflow=4.03 cfs 0.540 af

Pond DE1: DRIP EDGE #1 Peak Elev=199.24' Storage=372 cf Inflow=0.32 cfs 0.027 af
Discarded=0.05 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.027 af

Pond DE10: DRIP EDGE #10 Peak Elev=197.71' Storage=375 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE11: DRIP EDGE #11 Peak Elev=199.38' Storage=379 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE12: DRIP EDGE #12 Peak Elev=198.61' Storage=375 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE13: DRIP EDGE #13 Peak Elev=199.39' Storage=372 cf Inflow=0.32 cfs 0.027 af
Discarded=0.05 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.027 af

Pond DE2: DRIP EDGE #2 Peak Elev=199.62' Storage=367 cf Inflow=0.32 cfs 0.027 af
Discarded=0.05 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.027 af

Pond DE3: DRIP EDGE #3 Peak Elev=199.09' Storage=372 cf Inflow=0.32 cfs 0.027 af
Discarded=0.05 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.027 af

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Type III 24-hr 50 YR Rainfall=7.22"

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Pond DE4: DRiP EDGE #4 Peak Elev=198.71' Storage=375 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE5: DRiP EDGE #5 Peak Elev=199.83' Storage=379 cf Inflow=0.38 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE6: DRiP EDGE #6 Peak Elev=199.83' Storage=378 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE7: DRiP EDGE #7 Peak Elev=199.46' Storage=383 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE8: DRiP EDGE #8 Peak Elev=198.49' Storage=381 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond DE9: DRiP EDGE #9 Peak Elev=197.61' Storage=375 cf Inflow=0.32 cfs 0.027 af
Discarded=0.04 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.027 af

Pond F1: Forebay #1 Peak Elev=194.01' Storage=799 cf Inflow=6.93 cfs 1.019 af
Outflow=6.96 cfs 1.004 af

Pond P1: Gravel Wetland #1 Peak Elev=194.77' Storage=10,527 cf Inflow=7.09 cfs 1.026 af
Primary=3.93 cfs 0.893 af Secondary=0.00 cfs 0.000 af Outflow=3.93 cfs 0.893 af

Link AP1: Analysis Point #1 Inflow=9.15 cfs 1.969 af
Primary=9.15 cfs 1.969 af

Total Runoff Area = 24.373 ac Runoff Volume = 2.474 af Average Runoff Depth = 1.22"
93.13% Pervious = 22.700 ac 6.87% Impervious = 1.674 ac

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	71.115 degrees West
Latitude	42.974 degrees North
Elevation	0 feet
Date/Time	Thu, 27 May 2021 13:05:15 -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	0.50	0.66	0.82	1.04	1yr	0.71	0.99	1.21	1.55	2.00	2.60	2.79	1yr	2.30	2.68	3.09	3.78	4.39	1yr
2yr	0.32	0.50	0.62	0.81	1.02	1.30	2yr	0.88	1.18	1.51	1.91	2.43	3.11	3.45	2yr	2.75	3.31	3.83	4.54	5.17	2yr
5yr	0.38	0.59	0.74	0.99	1.26	1.62	5yr	1.09	1.47	1.89	2.42	3.08	3.95	4.43	5yr	3.49	4.26	4.88	5.79	6.55	5yr
10yr	0.42	0.66	0.84	1.14	1.48	1.92	10yr	1.28	1.74	2.26	2.89	3.70	4.73	5.35	10yr	4.19	5.15	5.86	6.98	7.83	10yr
25yr	0.49	0.79	1.00	1.38	1.83	2.40	25yr	1.58	2.17	2.83	3.66	4.70	6.01	6.88	25yr	5.32	6.62	7.47	8.93	9.92	25yr
50yr	0.56	0.90	1.15	1.60	2.16	2.85	50yr	1.86	2.57	3.38	4.38	5.64	7.22	8.34	50yr	6.39	8.02	8.98	10.78	11.88	50yr
100yr	0.63	1.02	1.31	1.86	2.54	3.39	100yr	2.19	3.04	4.04	5.25	6.76	8.66	10.09	100yr	7.67	9.71	10.79	13.01	14.23	100yr
200yr	0.72	1.17	1.51	2.17	2.99	4.02	200yr	2.58	3.60	4.80	6.27	8.10	10.40	12.23	200yr	9.20	11.76	12.98	15.71	17.05	200yr
500yr	0.85	1.40	1.83	2.65	3.72	5.05	500yr	3.21	4.51	6.06	7.95	10.30	13.25	15.76	500yr	11.73	15.16	16.57	20.20	21.69	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.88	1yr	0.63	0.86	1.00	1.29	1.56	2.15	2.55	1yr	1.90	2.45	2.86	3.48	3.93	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.18	2yr	0.86	1.16	1.35	1.79	2.29	3.00	3.30	2yr	2.65	3.17	3.68	4.34	4.95	2yr
5yr	0.36	0.55	0.68	0.94	1.19	1.41	5yr	1.03	1.38	1.60	2.09	2.69	3.58	3.95	5yr	3.17	3.79	4.37	5.42	5.91	5yr
10yr	0.40	0.61	0.75	1.05	1.36	1.62	10yr	1.17	1.58	1.81	2.36	3.02	4.07	4.49	10yr	3.60	4.32	4.96	6.34	6.68	10yr
25yr	0.46	0.69	0.86	1.23	1.62	1.92	25yr	1.40	1.88	2.12	2.74	3.51	4.78	5.32	25yr	4.23	5.12	5.90	7.80	8.61	25yr
50yr	0.51	0.77	0.96	1.38	1.85	2.20	50yr	1.60	2.15	2.38	3.08	3.95	5.39	6.02	50yr	4.77	5.79	6.71	9.14	9.96	50yr
100yr	0.57	0.86	1.08	1.56	2.13	2.52	100yr	1.84	2.46	2.68	3.45	4.42	5.92	6.80	100yr	5.24	6.54	7.66	10.71	11.50	100yr
200yr	0.64	0.96	1.21	1.75	2.45	2.88	200yr	2.11	2.81	3.01	3.86	4.96	6.60	9.31	200yr	5.84	8.95	8.75	12.57	13.30	200yr
500yr	0.75	1.11	1.43	2.07	2.95	3.45	500yr	2.54	3.37	3.52	4.48	5.79	7.59	11.41	500yr	6.71	10.97	10.44	15.56	16.11	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.45	0.54	0.73	0.90	1.08	1yr	0.78	1.05	1.25	1.67	2.11	2.86	3.20	1yr	2.53	3.08	3.48	4.05	4.86	1yr
2yr	0.33	0.51	0.63	0.86	1.06	1.26	2yr	0.91	1.23	1.46	1.91	2.44	3.29	3.64	2yr	2.91	3.50	4.03	4.76	5.50	2yr
5yr	0.41	0.63	0.78	1.07	1.36	1.61	5yr	1.17	1.58	1.86	2.43	3.10	4.32	4.97	5yr	3.82	4.78	5.44	6.18	7.24	5yr
10yr	0.48	0.75	0.92	1.29	1.67	1.97	10yr	1.44	1.92	2.25	2.94	3.72	5.39	6.32	10yr	4.77	6.08	6.84	7.66	9.06	10yr
25yr	0.61	0.93	1.15	1.65	2.17	2.56	25yr	1.87	2.50	2.92	3.79	4.74	7.21	8.74	25yr	6.38	8.41	9.26	10.18	11.22	25yr
50yr	0.72	1.10	1.36	1.96	2.64	3.12	50yr	2.28	3.05	3.55	4.58	5.70	8.99	11.19	50yr	7.96	10.76	11.66	12.63	13.79	50yr
100yr	0.86	1.30	1.63	2.35	3.23	3.80	100yr	2.78	3.72	4.32	5.56	6.88	11.44	14.31	100yr	10.13	13.76	14.66	15.68	16.99	100yr
200yr	1.02	1.54	1.95	2.82	3.93	4.65	200yr	3.39	4.54	5.28	6.75	8.28	14.37	15.59	200yr	12.72	14.99	18.43	19.46	20.94	200yr
500yr	1.29	1.92	2.47	3.59	5.11	6.05	500yr	4.41	5.91	6.86	8.74	10.61	19.44	20.99	500yr	17.20	20.18	24.96	25.91	27.65	500yr

Project Name: Liberty Lantern Estates

JBE #: 20724

Town/City: Fremont, NH

Date: 12/9/2021

Rip Rap Outlet Protection Calculation

Outlet Designation: P-202

Pipe Size (Do): 12 in. = 1 ft

Q10 (cfs): 0.09 cfs

Tailwater Elevation (TW): 0.25 (FT) if TW = 0, assume 3"/0.25'

Apron Length (La):

TW < Do YES $La = 1.8Q/Do^{1.5} + 7Do$
La = 7.16 ft

TW > Do No $La = 3.0Q/Do^{1.5} + 7Do$
La =

Apron Width (W₂):

TW < Do $W_2 = 3Do + La$
W₂ = 10.16 ft.

TW > Do $W_2 = 3Do + .4La$
W₂ = ft.

Rip-Rap Diameter (D₅₀):

D₅₀: $D_{50} = 0.02Q^{1.3}/TW*Do$
D₅₀ = 0.00 ft. 0.04 in.

Use 3" minimum D₅₀ ==> D50 = 3 in.

Rip-Rap Thickness (T):

$T = 2.5*D_{50}$
T = 7.5 in.

Apron Width (W₁):

$W_1 = 3*Do$
W₁ = 3 ft.

Project Name:	Liberty Lantern Estates	JBE #:	20724
Town/City:	Fremont, NH	Date:	12/9/2021
Rip Rap Outlet Protection Calculation			

Outlet Designation: P-206
 Pipe Size (Do): 12 in. = 1 ft
 Q10 (cfs): 0.52 cfs
 Tailwater Elevation (TW): 0.25 (FT) if TW = 0, assume 3"/0.25'

Apron Length (La):

TW < Do	YES	$La = 1.8Q/Do^{1.5} + 7Do$ $La = 7.94$ ft
TW > Do	No	$La = 3.0Q/Do^{1.5} + 7Do$ $La =$

Apron Width (W₂):

TW < Do	$W_2 = 3Do + La$ $W_2 = 10.94$ ft.
TW > Do	$W_2 = 3Do + .4La$ $W_2 =$ ft.

Rip-Rap Diameter (D₅₀):

D ₅₀ :	$D_{50} = 0.02Q^{1.3}/TW*Do$ $D_{50} = 0.03$ ft. 0.41 in.
	Use 3" minimum D ₅₀ ==> D50 = 3 in.

Rip-Rap Thickness (T):

	$T = 2.5*D_{50}$ $T = 7.5$ in.
--	-----------------------------------

Apron Width (W₁):

	$W_1 = 3*Do$ $W_1 = 3$ ft.
--	-------------------------------

Project Name: Liberty Lantern Estates JBE #: 20724
Town/City: Fremont, NH Date: 12/9/2021

Rip Rap Outlet Protection Calculation

Outlet Designation: P-206
Pipe Size (Do): 12 in. = 1 ft
Q10 (cfs): 0.67 cfs
Tailwater Elevation (TW): 0.25 (FT) if TW = 0, assume 3"/0.25'

Apron Length (La):

TW < Do YES $La = 1.8Q/Do^{1.5} + 7Do$
La = 8.21 ft

TW > Do No $La = 3.0Q/Do^{1.5} + 7Do$
La =

Apron Width (W₂):

TW < Do $W_2 = 3Do + La$
W₂ = 11.21 ft.

TW > Do $W_2 = 3Do + .4La$
W₂ = ft.

Rip-Rap Diameter (D₅₀):

D₅₀: $D_{50} = 0.02Q^{1.3}/TW*Do$
D₅₀ = 0.05 ft. 0.57 in.

Use 3" minimum D₅₀ ==> D50 = 3 in.

Rip-Rap Thickness (T):

$T = 2.5*D_{50}$
T = 7.5 in.

Apron Width (W₁):

$W_1 = 3*Do$
W₁ = 3 ft.

Project Name:	Liberty Lantern Estates	JBE #:	20724
Town/City:	Fremont, NH	Date:	12/9/2021
Rip Rap Outlet Protection Calculation			

Outlet Designation: P-206

Pipe Size (Do): 18 in. = 1.5 ft

Q10 (cfs): 0.25 cfs

Tailwater Elevation (TW): 0.25 (FT) if TW = 0, assume 3"/0.25'

Apron Length (La):

TW < Do YES $La = 1.8Q/Do^{1.5} + 7Do$
 $La =$ 10.74 ft

TW > Do No $La = 3.0Q/Do^{1.5} + 7Do$
 $La =$

Apron Width (W₂):

TW < Do $W_2 = 3Do + La$
 $W_2 =$ 15.24 ft.

TW > Do $W_2 = 3Do + .4La$
 $W_2 =$ ft.

Rip-Rap Diameter (D₅₀):

D₅₀: $D_{50} = 0.02Q^{1.3}/TW*Do$
 $D_{50} =$ 0.01 ft. 0.11 in.

Use 3" minimum D₅₀ ==> D₅₀ = 3 in.

Rip-Rap Thickness (T):

$T = 2.5*D_{50}$
 $T =$ 7.5 in.

Apron Width (W₁):

$W_1 = 3*Do$
 $W_1 =$ 4.5 ft.



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SITE-SPECIFIC SOIL MAPPING REPORT

Main Street (NH Route 107)

Tax Map 2, Lot 7

Fremont, New Hampshire

May 5, 2021

File No. 04.0191168.00



PREPARED FOR:

Jones & Beach Engineers, Inc.
Stratham, New Hampshire

GZA GeoEnvironmental, Inc.

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VIA EMAIL

May 5, 2021
File No. 04.0191168.00

Mr. Barry Gier
Jones & Beach Engineers, Inc.
65 Portsmouth Avenue, P.O. Box 219
Stratham, New Hampshire 03885

Re: Site-Specific Soil Mapping Report
Main Street (NH RT 107)
Tax Map 2, Lot 7
Fremont, New Hampshire

Dear Mr. Gier:

This report presents the findings of Site-Specific Soil Mapping conducted on Tax Map 2, Lot 7 located off of Main Street in Fremont, New Hampshire. This report summarizes the results of the field work completed in February and March 2021 to identify Site soils and develop mapping.

Should you have any questions, please feel free to contact Lindsey White at 603-232-8753 or lindsey.white@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Lindsey White, Soil Scientist Apprentice
Project Manager

Tracy L. Tarr, CWS, CESSWI
Associate Principal

Deborah M. Zarta Gier, CNRP
Consultant/Reviewer

James Long, CWS, CSS
Soil Scientist

LEW/DMZ/TLT:kr

p:\04\jobs\0191100s\04.0191168.00\work\sssm report\final 04.0191168.00 fremont jb sssm rpt 050421 dmz.docx

Attachment: Site-Specific Soil Mapping Report



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FIGURE

FIGURE 1 SITE-SPECIFIC SOIL MAP

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1.0 INTRODUCTION

This report presents the findings of Site-Specific Soil Mapping conducted by GZA GeoEnvironmental, Inc. (GZA) at Tax Map 2, Lot 7 located off of Main Street (Route 107) in Fremont, New Hampshire (Site) during February and March 2021. The Site is approximately 30 acres and consists of former sand and gravel pits in the northern portion of the Site, while the remainder of the Site is forested. The Site is bordered to the east by residential properties and Main Street, to the south by Red Brook Road, to the west by an undeveloped, forested lot, and to the north by residential property. The Site also contains a utility line that bisects the property.

GZA understands the Site is proposed to be developed as a residential subdivision, to be located in the northern portion of the property (see **Figure 1 – Site Specific Soil Map**). GZA also understands a site-specific soil map is required to support the potential development of the Site and Alteration of Terrain permitting through the New Hampshire Department of Environmental Services, which is on-going by Jones & Beach Engineers. This report is subject to the Limitations in **Appendix A**.

2.0 METHODOLOGY

The soil mapping of the Site was conducted in accordance with the standards set forth in the Society of Soil Scientists of Northern New England (SSSNNE) Publication No. 3 "Site-Specific Soil Mapping Standards for New Hampshire and Vermont, Version 5.0" dated December 2017 by New Hampshire Certified Soil Scientists (CSS) James H. Long (CSS #15). The Site-Specific Soil Mapping Standards are based on a universally recognized taxonomic system of soil classification and are supported by national soil mapping standards established by the USDA National Cooperative Soil Survey.

This investigation has been prepared based on a combination of publicly available databases and site-specific data collected by on-site observations. This report provides soil information including soil drainage classification, physical characteristics, and depth to bedrock (if encountered). Soil characteristics on the property were assessed through the evaluation of hand-dug test pits conducted throughout the property on February 24 and March 1, 2021. Test pits were completed with a tile spade and soil auger and were dug to a minimum depth of 40 inches for the purpose of evaluating and identifying the soils' characteristics. Locations were selected when changes in slope, vegetation or soil surface were observed. When changes were noted from one hole to the next involving soil drainage or parent material, a soil boundary was placed on the map between the holes to reflect the transition between the soils as it occurs on the landscape. The slopes of the soil map units were measured in the field using a clinometer and augmented by the topography shown on the Existing Conditions Plan prepared by Jones and Beach, Engineers, Inc., dated 2/22/2021. For the purposes of this report, GZA considered the minimum size delineation area of a Site-Specific Soil Survey map unit as 2,000 square feet, with the exception being poorly or very poorly drained soil areas that are jurisdictional wetlands, as derived from the *High Intensity Soil Mapping Standards for New Hampshire*, December 2017 by the Society of Soil Scientists of Northern New England. Wetland delineations on the Site were previously conducted by GZA, Inc. on November 13 and 23, 2020 (See Wetland Delineation Report prepared by GZA and dated January 7, 2021).



GZA used the following resources during data collection to supplement on-site observations:

- Natural Resource Conservation Service (NRCS) Web Soil Survey;¹ and
- New Hampshire Statewide Geographic Information System Clearinghouse (NH GRANIT)² LiDAR- Based Bare Earth Hillshade of the Site.

The Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. The WSS data was used to gather information prior to field work to use as a baseline of soil units that may be observed during field investigations. Use of the online resource NH GRANIT LiDAR- Based Bare Earth Hillshade of the project area provided imagery to assist in soil unit delineation, to identify changes in topography to help identify ideal locations to dig auger holes and test pits, and identify potential disturbed units.

The on-site investigation was conducted on February 24 and March 1, 2021 using a base plan with a 1:100 scale and 2-foot topography. In accordance with the Site-Specific Soil Mapping standards, the identified individual soil map units were correlated to the New Hampshire State-Wide Numerical Soils Legend maintained by the New Hampshire State office of the NRCS. Soil characteristics for each of the units comply with the Range in Characteristics described in the Official Series Descriptions for each map unit. The human disturbed soil map units were labelled in accordance with the "Site-Specific Soil Mapping Standards for New Hampshire and Vermont, Version 5.0" dated December 2017- *Disturbed Soil Mapping Unit Supplement for New Hampshire DES AoT Site Specific Soil Maps*. The disturbed soil map unit Denominators provide additional information on Drainage Class, Parent Material, Restrictive/Impervious Layers, Estimated Ksat, and Hydrologic Soil Group.

3.0 RESULTS

3.1 SITE DESCRIPTION

Based on field observations, a significant portion of the project site is underlain by a stratified drift aquifer and glaciofluvial deposits which is consistent with the WSS report. Snow cover was present during soil mapping field work at depths of less than 6 inches and some bare ground was present on Site. A large portion of the Site is mapped as sandy glaciofluvial deposits, organic deposits in the low-lying swales and human disturbed soils in the northern portion of the Site according to the WSS. The sandy glaciofluvial deposits are very broad with uniform smooth surfaces resulting in large soil map units greater than 10 acres in size. Based on field observations, these areas appear to be prior sand and gravel pits. The majority of the forested land soils were undisturbed based on field observations. There is a small area along the western portion of the Site that appears to have been filled and is primarily mapped as Soil Unit 199, which consisted of sandy fill material with stumps, woody debris and broken pieces of bedrock which were encountered during soil mapping. (see Figure 1 – Site-Specific Soil Map).

¹ www.websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

² <https://granitview.unh.edu/>



3.2 SOIL MAP UNIT DESCRIPTIONS

Individual soil map units are summarized in Table 1 – Soil Map Units below:

Soil ID	Soil Type
12	Hinckley (excessively drained)
34	Wareham (poorly drained)
199	Dumps, bark chips and organic matter
300	Udipsamments, nearly level (excessively drained)
313	Deerfield
350	Udipsamments, wet substratum (moderately well drained to somewhat poorly drained)
395	Chocorua (very poorly drained)

The individual soil map unit descriptions of the soils identified on the subject parcel and summarized in Table 1 are as follows.

12B - Hinckley (excessively drained), fine sandy loam, 3 to 8 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 3 percent and greater than 8 percent. These inclusions make up as much as 15 percent of the map unit.

12C - Hinckley (excessively drained), fine sandy loam, 8 to 15 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 8 percent and greater than 15 percent. These inclusions make up as much as 15 percent of the map unit.



12D - Hinckley (excessively drained), fine sandy loam, 15 to 25 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 15 percent and greater than 25 percent. These inclusions make up as much as 15 percent of the map unit.

12E - Hinckley (excessively drained), fine sandy loam, 25 to 50 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 25 percent. These inclusions make up as much as 15 percent of the map unit.

34A - Wareham (poorly drained) fine sandy loam, 0 to 3 percent slopes

This map unit consists of poorly drained soils that formed in sandy glaciofluvial deposits. It occurs in low lying areas within the mapping unit.

Typically, the surface layer is black fine sandy loam about 3 inches thick. The subsoil is light olive brown, grayish brown sand about 16 inches thick. The substratum, to a depth of 40 inches or more, is olive gray to dark gray gravelly sand and sand.

Included in this map unit maybe some very poorly drained Chocorua soils with slopes greater than 3 percent. These inclusions may make up to 20 percent of the map unit.

199B - Dumps, bark chips, and organic matter, 3 to 8 percent slopes

This map unit consists of loamy sand fill materials with stumps and woody debris. Undisturbed material is at a depth of more than 40 inches. There are no identifiable diagnostic horizons at a depth within 40 inches.

Included with this mapping are small areas of slopes less than 3 percent and greater than 8 percent. These inclusions make up as much as 10 percent of the map unit.



199D - Dumps, bark chips, and organic matter, 15 to 25 percent slopes

This map unit consists of loamy sand fill materials with stumps and woody debris. Undisturbed material is at a depth of more than 40 inches. There are no identifiable diagnostic horizons at a depth within 40 inches.

Included with this mapping are small areas of slopes less than 15 percent and greater than 25 percent. These inclusions make up as much as 10 percent of the map unit.

300B - Udipsamments, sandy, 3 to 8 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits excavated for the extraction of sand and gravel. Undisturbed material is typically at the surface. The soils range from fine sand, sand and their gravelly analogs.

Included with this mapping are small areas of slopes less than 3 and greater than 8 percent. These inclusions make up as much as 10 percent of the map unit.

313A -Deerfield loamy sand, 0 to 3 percent slopes

This map unit consists of moderately well drained soils that formed in sandy glaciofluvial deposits. It occurs at the rear of the property near Red Brook Road and adjacent to the Hinckley soils across the mapping area.

Typically, the surface layer is black, very dark brown to dark brown loamy fine sand about 4 inches thick. The subsoil is brown, strong brown, dark yellowish brown, yellowish brown to light olive brown fine sand and sand about 20 inches thick. The substratum, to a depth of 40 inches or more, is light brownish gray to light olive brown sand, and gravelly sand.

Included with this mapping are small areas of slopes greater than 3 percent. These inclusions make up as much as 15 percent of the map unit.

313B -Deerfield loamy sand, 3 to 8 percent slopes

This map unit consists of moderately well drained soils that formed in sandy glaciofluvial deposits. It occurs at the lower elevations adjacent to the Hinckley soils across the mapping area.

Typically, the surface layer is black, very dark brown to dark brown loamy fine sand about 4 inches thick. The subsoil is brown, strong brown, dark yellowish brown, yellowish brown to light olive brown fine sand and sand about 20 inches thick. The substratum, to a depth of 40 inches or more, is light brownish gray to light olive brown sand, and gravelly sand.

Included with this mapping are small areas of slopes less than 3 percent and greater than 8 percent. These inclusions make up as much as 15 percent of the map unit.



313C -Deerfield loamy sand, 8 to 15 percent slopes

This map unit consists of moderately well drained soils that formed in sandy glaciofluvial deposits. It occurs at the lower elevations adjacent to the Hinckley soils across the mapping area.

Typically, the surface layer is black, very dark brown to dark brown loamy fine sand about 4 inches thick. The subsoil is brown, strong brown, dark yellowish brown, yellowish brown to light olive brown fine sand and sand about 20 inches thick. The substratum, to a depth of 40 inches or more, is light brownish gray to light olive brown sand, and gravelly sand.

Included with this mapping are small areas of slopes less than 8 percent and greater than 15 percent; These inclusions make up as much as 15 percent of the map unit.

350A- Udipsamments, wet substratum 0 to 3 percent slopes

This map unit consists of moderately well drained to somewhat poorly drained soils that form in sandy glaciofluvial deposits excavated for the extraction of sand and gravel. Undisturbed material is typically at the surface. The soils range from fine sand, sand and their gravelly analogs.

Included in this map unit are small areas of slopes greater than 3 percent. These inclusions make up as much as 10 percent of the map unit.

350B- Udipsamments, wet substratum 3 to 8 percent slopes

This map unit consists of moderately well drained to somewhat poorly drained soils that formed in sandy glaciofluvial deposits excavated for the extraction of sand and gravel. Undisturbed material is typically at the surface. The soils range from fine sand, sand and their gravelly analogs.

Included with this mapping are small areas of slopes less than 3 and greater than 8 percent. These inclusions make up as much as 10 percent of the map unit.

395A - Chocorua muck, 0 to 3 percent slopes

This map unit consists of very poorly drained soils that formed in muck over sandy glaciofluvial deposits. The very poorly drained Chocorua soils have mucky surfaces 16 to 51 inches in depth over sands. It occurs in low lying areas within the mapping area.

Typically, the surface layer is black muck about 30 inches thick. The subsoil and substratum, to a depth of 40 inches or more, is light brownish gray, light olive gray to gray very fine sand, fine sand and sand.

Included with this mapping are small areas very poorly drained sandy alluvial deposits and very deep organic deposits, Catden soils, greater than 51 inches in depth. Poorly drained Wareham soils may also occur within the map unit especially near the edge of wet. Included with this mapping are small areas of slopes greater than 3 percent. These inclusions make up as much as 20 percent of the map unit.



3.3 HYDROLOGIC SOIL GROUP CORRELATION

In order to correlate the soil map units identified, as part of this soil survey, to the appropriate hydrologic soil group, we referenced the Society of Soil Scientists of Northern New England "Ksat Values for New Hampshire Soils, Special Publication No. 5, September 2009."³ Table 2 – Hydrologic Soil Group Correlation provides the correlation of the identified soil map units to the appropriate hydrologic soil group. Identification of correlating hydrologic soil group provides context for infiltration rates for stormwater management planning.

Soil ID	Soil Type	Hydrologic Soil Group
12	Hinckley (excessively drained)	A
34	Wareham (poorly drained)	D
199	Dumps, bark chips and organic matter	No Group
300	Udipsamments (excessively drained)	A
313	Deerfield (moderately well drained)	B
350	Udipsamments, web substratum (moderately well drained)	B/D
395	Chocorua (very poorly drained)	D

4.0 FINDINGS AND CONCLUSIONS

GZA has completed Site-Specific Soil Mapping of the Site in support of the proposed residential subdivision project permitting. The following is a summary of our findings and conclusions:

- The Site consists of a mix of primarily sandy glaciofluvial deposits, with areas of sandy alluvial deposits, organic deposits, and human disturbed soils.
- Based on field observations, a portion of the Site mapped as Soil Types 350 A and B - Udipsamments was previously used for sand and gravel operations. These sandy glaciofluvial deposits were observed to be broad with uniform smooth surfaces which resulted in large soil map units greater than 10 acres in size.
- Forested portions of the Site were observed to be generally undisturbed, with the exception of a small area along the western portion of the Site that appears to have been filled and is primarily mapped as Soil Unit 199 consisting of sandy fill material with stumps, woody debris and broken pieces of bedrock which was encountered during soil mapping.

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³ www.sssnne.org/publications.html



Figure 1 – Site Specific Soil Map



Appendix A - Natural Resource Limitations



USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Jones & Beach Engineers, Inc. ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.
5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.
6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.



NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.



Appendix B - Disturbed Soil Mapping Unit Supplement for DES AOT

Supplemental Symbols

The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

Symbol 1: Drainage Class

- a** - Excessively Drained
- b** - Somewhat Excessively Drained
- c** - Well Drained
- d** - Moderately Well Drained
- e** - Somewhat Poorly Drained
- f** - Poorly Drained
- g** - Very Poorly Drained
- h** - Not Determined

Symbol 2: Parent Material (of naturally formed soil only, if present)

- a** - No natural soil within 60"
- b** - Glaciofluvial Deposits (outwash/terraces of sand or sand and gravel)
- c** - Glacial Till Material (active ice)
- d** - Glaciolacustrine very fine sand and silt deposits (glacial lakes)
- e** - Loamy/sandy over Silt/Clay deposits
- f** - Marine Silt and Clay deposits (ocean waters)
- g** - Alluvial Deposits (floodplains)
- h** - Organic Materials-Fresh water Bogs, etc.
- j** - Organic Materials-Tidal Marsh

Symbol 3: Restrictive/Impervious Layers

- a** - None
- b** - Boulderly surface with more than 15% of the surface covered with boulders
- c** - Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as hard pan, platy structure or clayey texture with consistence of at least firm (i.e. more than 20 newtons). For other examples of soil characteristics that qualify for restrictive layers, see "Soil Manual for Site evaluations in NH" 2nd Ed., (page 3-17, figure 3-14)
- d** - Bedrock in the soil profile; 0-20 inches
- e** - Bedrock in the soil profile; 20-60 inches
- f** - Areas where depth to bedrock is so variable that a single soil type cannot be applied, will be mapped as a complex of soil types
- g** - Subject to Flooding
- h** - Man-made impervious surface including pavement, concrete, or built-up surfaces (i.e. buildings) with no morphological restrictive layer within control section

Symbol 4: Estimated Ksat* (most limiting layer excluding symbol 3h above).

- a** - High.
- b** - Moderate
- c** - Low
- d** - Not determined

*See "Guidelines for Ksat Class Placement" in Chapter 3 of the Soil Survey Manual, USDA

Symbol 5: Hydrologic Soil Group*

- a** - Group A
- b** - Group B
- c** - Group C
- d** - Group D
- e** - Not determined

*excluding man-made surface impervious/restrictive layers



Appendix C - Photo Log

PHOTO LOG
Main Street Site Development
Fremont, New Hampshire

Photos Taken: November 13, 2020



Photograph No. 1: View facing north at existing access to the Site from Main Street.



Photograph No. 2: View of the cleared area in the northern portion of the Site facing west.

PHOTO LOG
Main Street Site Development
Fremont, New Hampshire

Photos Taken: November 13, 2020



Photograph No. 3: Looking at a cleared portion of the Site facing south.



Photograph No. 4: View of a clearing in the northeastern portion of the Site facing southwest.

PHOTO LOG
Main Street Site Development
Fremont, New Hampshire

Photos Taken: November 13, 2020



Photograph No. 5: View of a forested wetland on Site facing east.

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GZA GeoEnvironmental, Inc.

JONES&BEACH ENGINEERS INC.

85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

SITE EVALUATION and INFILTRATION FEASIBILITY REPORT

**Liberty Lantern Estates
Tax Map 2, Lot 70
Main Street
Fremont, NH**

Prepared for:

**Haus Emily, LLC
56 Westville Road, Unit 4
Plaistow, NH 03865**

**12/09/2021
JBE Project No. 20724**

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- II. Existing Topography at the Location of the Practice(s)
- III. Test Pit/Boring Location(s)
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- V. Profile Descriptions
- VI. Soil Plans in the Area of the Proposed Practice(s)
- VII. Summary of Field Testing Data Used to Determine Infiltration Rate

I. Project Summary

The purpose of this project is to construct a residential townhouse development on Town of Fremont Tax Map 2, Lot 70. The proposed development will contain 13 residential units with associated parking, drainage, and utilities

Soil information for the site was gathered from a Site-Specific Soil Survey Report, prepared by GZA Geoenvironmental Inc., and on-site test pits. Soils were identified as;

<u>Symbol</u>	<u>Soil Taxonomic Name</u>	<u>Hydrologic Soil Group</u>
12	Hinckley	A
34	Wareham	D
199	Dumps, Bark Chips, and Organic Matter	N/A
300	Udipsamments	A
313	Deerfield	B
350	Udipsamments	B/D
395	Chocorua	D

III. Existing Topography at Test Pit/Boring Location(s)

The existing topography of the site is relatively flat in the location of the proposed development. There is a sloped area along the western property line as well as a smaller slope near the wetland boundary to the south.

III. Test Pit/Boring Location(s)

The majority of the soils for this site are described as Hydrological Soils "A". Therefore, three test pits, located throughout the proposed development, were selected to represent the site.

Test Pit #1: Test Pit #1 is located at the edge of the proposed roadway near unit #13.

Test Pit #5: Test Pit #5 is located in open space between proposed units #6 and #7

Test Pit #12 Test Pit #12 is located near the proposed gravel wetland to the rear of unit #10

V. Seasonal High Water Table (SHWT) and Bedrock Elevations

The following test pit data was collected on June 9, 2021.

TP 1: Existing Surface Elevation of TP = 199.00'
SHWT = 193.16'
Bedrock = N/A
Deepest Elevation of TP = 192.83'

TP 5: Existing Surface Elevation of TP = 200.00'
SHWT = 192.66'
Bedrock = N/A
Deepest Elevation of TP = 192.66'

TP 10: Existing Surface Elevation of TP = 197.00
SHWT = 192.00'
Bedrock = N/A
Deepest Elevation of TP = 191.33'

VI. Profile Descriptions

Test Pit No. 1

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
^0-10	10YR3/4 Dark yellowish brown, gravelly sandy loam, granular, friable (fill)
^10-20	10YR4/4 Dark yellowish brown, gravelly loamy sand, granular, friable (fill)
20-36	2.5Y5/4 Light olive brown, cobbly gravelly coarse sand, single grain, loose
36-74	2.5Y6/3 Light yellowish brown, cobbly gravelly coarse sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	36	inches	Observed Water Table @	72	inches
Restrictive @	None	inches	Roots @	18	inches
Refusal @	None	inches			
Percolation Rate =	2	Minutes / Inch @ 30			

Test Pit No. 5

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-18	10YR4/4 Dark yellowish brown, loamy sand, granular, friable
18-36	10YR5/4 Yellowish brown, sand, single grain, loose
36-88	2.5Y6/3 Light yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	36	inches	Observed Water Table @	88	inches
Restrictive @	none	inches	Roots @	18	inches
Refusal @	none	inches			
Percolation Rate =	2	Minutes / Inch @ 28			

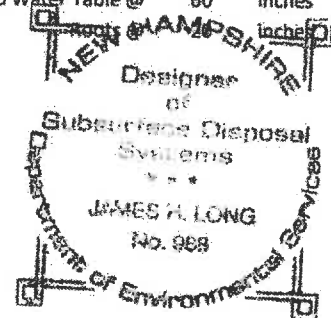
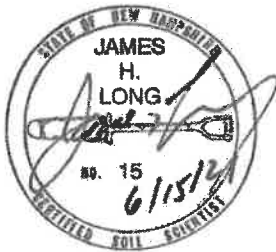
Test Pit No. 12

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
0-8	10YR4/4 Dark yellowish brown, gravelly loamy sand, granular, friable (fill)
8-30	2.5Y5/4 Light olive brown, cobbly gravelly sand, single grain, loose
30-68	2.5Y4/3 Olive brown, cobbly gravelly sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @ 30 inches
Restrictive @ none inches
Refusal @ none inches
Percolation Rate = 2 Minutes / Inch @ 28

Observed Water Table @ 60 inches



VII. Soil Plans in the Area of the Proposed Practice(s)

See attached Grading & Drainage Detail Plans.

VIII. Summary of Field Testing Data Used to Determine Infiltration Rate

The infiltration rate was determined using the Default Values method described in Env-Wq 1504.13.

Test Pit #1: TP #1 is located within what would be described in the Soil Series survey as Udipsamments soils.

Using the Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No. 5, September 2009, the infiltration rate is 6 in/hr.

After applying a factor of safety of 2, the design rate is 3 in/hr.

Test Pit #5: TP #5 is located within what would be described in the Soil Series survey as Udipsamments soils.

Using the Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No. 5, September 2009, the infiltration rate is 6 in/hr.

After applying a factor of safety of 2, the design rate is 3 in/hr.

Test Pit #13: TP #13 is located within what would be described in the Soil Series survey as Udipsamments soils.

Using the Ksat Values for New Hampshire Soils, Society of Soil Scientist of Northern New England, Special Publication No. 5, September 2009, the infiltration rate is 6 in/hr.

After applying a factor of safety of 2, the design rate is 3 in/hr.



TEST PIT EVALUATION REPORT
Main Street, Tax Map 2, Lot 7
Fremont, New Hampshire

File No. 04.0191168.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lawrence Miner **Date:** 6/9/21

Test Pit No. 1 **NOTES:** Existing sand and gravel pit.

Depth (Inches)	Description
^0-10	10YR3/4 Dark yellowish brown, gravelly sandy loam, granular, friable (fill)
^10-20	10YR4/4 Dark yellowish brown, gravelly loamy sand, granular, friable (fill)
20-36	2.5Y5/4 Light olive brown, cobbly gravelly course sand, single grain, loose
36-74	2.5Y6/3 Light yellowish brown, cobbly gravelly coarse sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
Estimated Seasonal High Water Table @	36 inches
Restrictive @	None inches
Refusal @	None inches
Percolation Rate =	2 Minutes / Inch @ 30
Observed Water Table @	72 inches
Roots @	18 inches

Test Pit No. 2 **NOTES:** Some large boulders, and an existing sand and gravel pit.

Depth (inches)	Description
^0-10	10YR3/4 Dark yellowish brown, gravelly loamy sand, granular, friable (fill)
10-32	2.5Y5/4 Light olive brown, cobbly gravelly course sand, single grain, loose
32-74	2.5Y6/3 Light yellowish brown, cobbly gravelly course sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
Estimated Seasonal High Water Table @	32 inches
Restrictive @	None inches
Refusal @	None inches
Percolation Rate =	2 Minutes / Inch @ 32
Observed Water Table @	72 inches
Roots @	32 inches





TEST PIT EVALUATION REPORT
Main Street, Tax Map 2, Lot 7
Fremont, New Hampshire

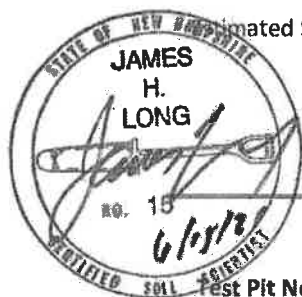
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Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lawrence Miner **Date:** 6/9/21

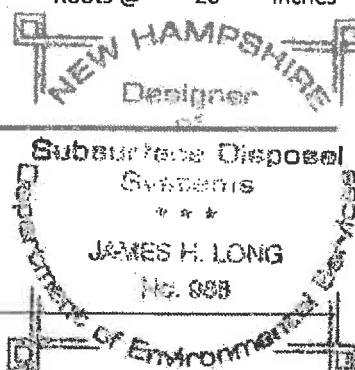
Test Pit No. 3

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
^0-7	10YR3/3 Dark brown, fine loamy sand, granular, friable (fill)
7-14	10YR4/4 Dark yellowish brown, gravelly loamy sand, granular, friable
14-32	10YR4/4 Dark Yellowish brown, cobbly gravelly course sand, single grain, loose
32-72	2.5Y6/3 Light yellowish brown, cobbly gravelly course sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features



Estimated Seasonal High Water Table @ 32 inches **Observed Water Table @** 70 inches
Restrictive @ none inches
Refusal @ none inches
Percolation Rate = 2 Minutes / Inch @ 28



Test Pit No. 4

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
^0-18	10YR3/3 Dark brown, fine loamy sand, granular, friable (fill)
18-20	10YR3/2 Very dark grayish brown, loamy fine sand, granular, friable
20-32	7.5YR4/4 Brown, gravelly loamy sand, granular, friable
32-46	2.5Y6/3 Light yellowish brown, gravelly loamy sand, granular, friable, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
46-88	5Y6/3 Pale olive, fine sand, granular, friable, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @ 32 inches **Observed Water Table @** 84 inches
Restrictive @ none inches **Roots @** 32 inches
Refusal @ none inches
Percolation Rate = 2 Minutes / Inch @ 30



TEST PIT EVALUATION REPORT
Main Street, Tax Map 2, Lot 7
Fremont, New Hampshire

File No. 04.0191168.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lawrence Miner **Date:** 6/9/21

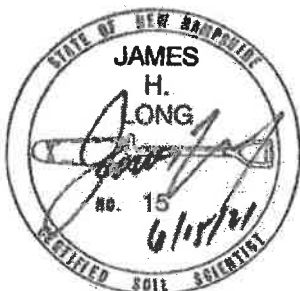
Test Pit No. 5 **NOTES:** Existing sand and gravel pit.

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-18	10YR4/4 Dark yellowish brown, loamy sand, granular, friable
18-36	10YR5/4 Yellowish brown, sand, single grain, loose
36-88	2.5Y6/3 Light yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
Estimated Seasonal High Water Table @ 36 inches Observed Water Table @ 88 inches	
Restrictive @ none inches Roots @ 18 inches	
Refusal @ none inches	
Percolation Rate = 2 Minutes / Inch @ 28	

Test Pit No. 6 **NOTES:** Existing sand and gravel pit.

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-16	7.5YR4/6 Strong brown, gravelly loamy fine sand, granular, friable
16-36	7.5YR4/4 Brown, cobbly gravelly loamy sand, granular, friable
36-84	10YR6/4 Light yellowish brown, cobbly gravelly coarse sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @ 36 inches Observed Water Table @ 84 inches
Restrictive @ none inches
Refusal @ none inches
Percolation Rate = 2 Minutes / Inch @ 32





TEST PIT EVALUATION REPORT
Main Street, Tax Map 2, Lot 7
Fremont, New Hampshire

File No. 04.0191168.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lawrence Miner **Date:** 6/9/21

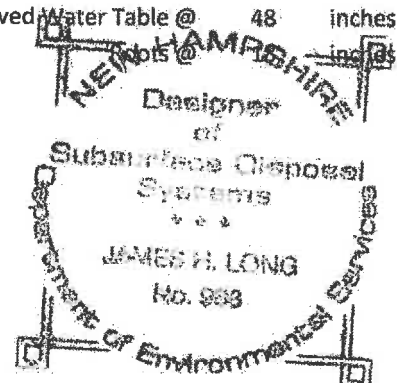
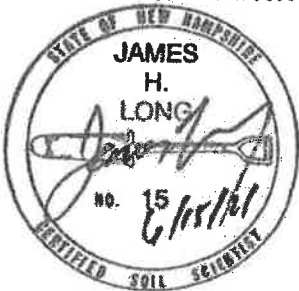
Test Pit No. 7 **NOTES:** Existing sand and gravel pit.

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-24	10YR5/4 Yellowish brown, gravelly sand, single grain, loose
24-48	10YR5/4 Yellowish brown, cobbly gravelly coarse sand, single grain, loose
48-88	10YR5/3 Brown, cobbly gravelly sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
Estimated Seasonal High Water Table @ 48 inches Observed Water Table @ 88 inches	
Restrictive @ none inches Roots @ 20 inches	
Refusal @ none inches	
Percolation Rate = 2 Minutes / Inch @ 28	

Test Pit No. 8 **NOTES:**

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-18	10YR5/4 Yellowish brown, sand, single grain, loose
18-28	2.5Y5/4 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
28-60	2.5Y4/3 Olive brown, cobbly gravelly coarse sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @ 18 inches Observed Water Table @ 48 inches
Restrictive @ none inches Roots @ 18 inches
Refusal @ none inches
Percolation Rate = 4 Minutes / Inch @ 30





TEST PIT EVALUATION REPORT
Main Street, Tax Map 2, Lot 7
Fremont, New Hampshire

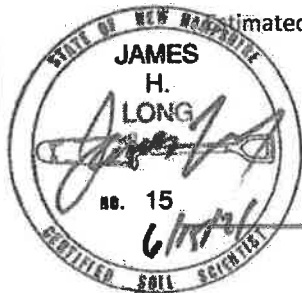
File No. 04.0191168.00

Evaluated by: James H. Long, CSS Designer: 988 Witnessed by: Lawrence Miner Date: 6/9/21

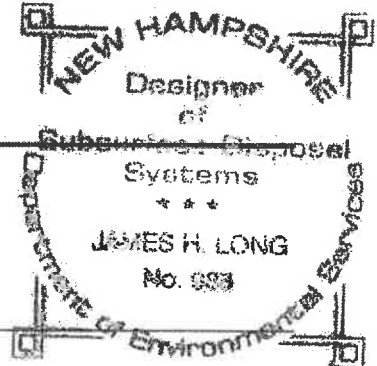
Test Pit No. 9

NOTES: Very cobbly and some small boulders, and existing sand and gravel pit.

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-18	10YR5/4 Yellowish brown, sand, single grain, loose
18-30	2.5Y5/4 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
30-60	2.5Y4/3 Olive brown, cobbly gravelly coarse sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features



Estimated Seasonal High Water Table @ 18 inches Observed Water Table @ 48 inches
Restrictive @ none inches Roots @ 20 inches
Refusal @ none inches
Percolation Rate = 4 Minutes / Inch @ 24



Test Pit No. 10

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
^0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
6-20	2.5Y5/4 Light olive brown, cobbly gravelly sand, single grain, loose
20-36	2.5Y6/3 Light yellowish brown, cobbly gravelly sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features, with
36-64	2.5Y6/3 Light yellowish brown, cobbly gravelly coarse sand, single grain, loose 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @ 20 inches Observed Water Table @ 52 inches
Restrictive @ none inches Roots @ 20 inches
Refusal @ none inches
Percolation Rate = 4 Minutes / Inch @ 28



TEST PIT EVALUATION REPORT
Main Street, Tax Map 2, Lot 7
Fremont, New Hampshire

File No. 04.0191168.00

Evaluated by: James H. Long, CSS Designer: 988 Witnessed by: Lawrence Miner Date: 6/9/21

Test Pit No. 11

NOTES: Existing sand and gravel pit.

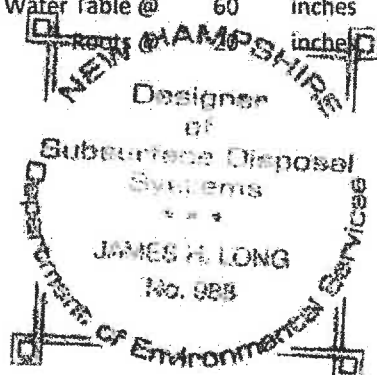
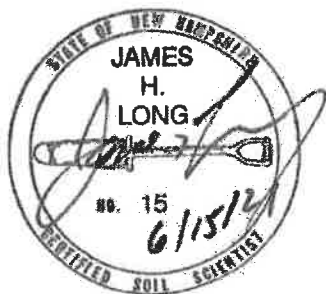
Depth (inches)	Description		
0-22	2.5Y4/4 Olive brown, gravelly loamy sand, granular, friable (fill)		
22-36	10YR5/4 Yellowish brown, cobbly gravelly sand, single grain, loose		
36-72	2.5Y5/3 Light olive brown, cobbly gravelly sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features		
Estimated Seasonal High Water Table @	36 inches	Observed Water Table @	72 inches
Restrictive @	None inches	Roots @	20 inches
Refusal @	None inches		
Percolation Rate =	2 Minutes / Inch @ 30		

Test Pit No. 12

NOTES: Existing sand and gravel pit.

Depth (inches)	Description
^0-8	10YR4/4 Dark yellowish brown, gravelly loamy sand, granular, friable (fill)
8-30	2.5Y5/4 Light olive brown, cobbly gravelly sand, single grain, loose
30-68	2.5Y4/3 Olive brown, cobbly gravelly sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	30	inches	Observed Water Table @	60	inches
Restrictive @	none	inches			
Refusal @	none	inches			
Percolation Rate =	2	Minutes / Inch @ 28			



STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

Prepared for:

**Main Street Townhomes
Tax Map 2, Lot 70
Main Street
Fremont, NH**

**9/10/2021
Rev. #1: 12/9/2021
JBE Project No. 20724**

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. Haus Emily LLC, future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The owner shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form.

B. General Inspection and Maintenance Requirements

1. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:
 - a. Catch basins and drain manholes
 - b. Culverts
 - c. Swales & Plunge Pools
 - d. Vegetation and landscaping
 - e. Parking lots and roadways
 - f. Riprap inlet and outlet protection aprons
 - g. Roof drains
 - h. Drip Edge
 - i. Forebay
 - j. Gravel Wetland
2. Maintenance of permanent measures shall follow the following schedule:
 - a. Normal winter roadway and parking lot maintenance including plowing and snow removal.
 - b. Road and parking lot sweeping at the end of every winter, preferably at the start of the spring rain season.
 - c. **Inspection** of culvert inlets and outlets at least **once per month** during the rainy season (March to November). Any debris is to be removed and disposed of properly by residents or contractor.
 - d. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately.
 - e. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to

ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.

- f. **Annual inspection** of catch basins and drain manholes to determine if they need to be cleaned. Catch basins are to be cleaned if the depth of deposits is greater than one-half the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a catch basin significantly exceeds the one-half depth standard during the inspection, then it should be cleaned more frequently. If woody debris or trash accumulates in a catch basin, then it should be cleaned on a weekly basis. Manholes should be cleaned of any material upon inspection. Catch basins and manholes can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials should be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet should also be removed.
- g. Permanent stone check dams should be **inspected annually** in order to ensure that they are in good condition. Any sediment accumulated behind them shall be removed if it is deeper than six inches.
- h. Rock riprap should be **inspected annually** in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water should be kept clear of obstructions, debris, and sediment deposits.
- i. **Roof Drains:**

Roof drains should be **inspected annually**, preferably in the fall after leaf drop. Drains should be kept clear, and any debris that may clog a drain such as tennis balls, baseballs, beverage cans, etc. should be removed during each inspection. Every drain should have a clean "leaf" grate present to prevent clogging of the drainpipes. A roof inspection in the late fall should also include the removal of leaves. Outfalls should be inspected to assure a clear drainage path.

- k. **House Roof Drip Edges:**

The following recommendations will help assure that the roof drip edges are maintained to preserve its effectiveness.

In the spring and fall, visually inspect the area around the edges and repair any erosion. Use small stones to stabilize erosion along drainage paths. Inspect stone area to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should

be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in stone areas, and/or any debris removed from the void spaces between the stones. Also inspect the roof collection and piping (if any) and clean and repair as necessary.

WHAT TO LOOK FOR:

Although improper roof drainage can best be observed immediately after a rain storm, most impacted drainage conditions will leave "tell-tale" indications even after standing water has evaporated:

1. Accumulated Debris. Debris frequently accumulates in ponding areas. Because water eventually evaporates from impacted areas, a concentric pattern of debris or dirt is a good indication of a ponding condition.
2. Visible Sagging or Deflection.
3. Discoloration of Curbs and Walls. The discoloration may be due to a build-up of snow or ice, or it may be an indication that water may "back up" during very severe rain storms.

1. Forebays:

Sediment should be removed from the sedimentation chamber (forebay) when it accumulates to a depth of more than 12 inches (30 cm) or 10 percent of the pretreatment volume. The sedimentation forebay should be cleaned of vegetation if persistent standing water and wetland vegetation becomes dominant. The cleaning interval is once every year. A dry sedimentation forebay is the optimal condition while in practice this condition is rarely achieved. The sedimentation chamber, forebay, and treatment cell outlet devices should be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however this equipment should not track on the wetland surface. Revegetation of disturbed areas as necessary. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

j. Gravel Wetlands:

First Year Post-Construction: inspection frequency should be after every major storm in the first year following construction.

- Inspect to be certain system drains within 24-72 hrs (within the design period, but also not so quickly as to minimize stormwater treatment).
- Watering plants as necessary during the first growing season.
- Re-vegetating poorly established areas as necessary.
- Treating diseased vegetation as necessary.
- Quarterly inspection of soil and repairing eroded areas, especially on slopes.
- Checking inlets, outlets, and overflow spillway for blockage, structural integrity, and evidence of erosion.

Post-Construction: inspection frequency should be at least every 6 months thereafter, as per USEPA good house-keeping requirements. Inspection frequency can be reduced to annual following 2 years of monitoring that indicates the rate of sediment accumulation is less than the cleaning criteria listed below. Inspections should focus on:

- Checking the filter surface for dense, complete, root mat establishment across the wetland surface. Thorough revegetation with grasses, forbs, and shrubs is necessary. Unlike bioretention, where mulch is commonly used, complete surface coverage with vegetation is needed.
- Checking the gravel wetland surface for standing water or other evidence of riser clogging, such as discolored or accumulated sediments.
- Checking the sedimentation chamber or forebay for sediment accumulation, trash, and debris.
- Inspect to be certain the sedimentation forebay drains within 24 to 72 hrs.
- Checking inlets, outlets, and overflow spillway for blockage, structural integrity, and evidence of erosion.
- Removal of decaying vegetation, litter, and debris.
- Mow grass areas periodically so that grass does not exceed 4" in height.

Cleaning Criteria for all Sedimentation Forebays: Sediment should be removed from the sedimentation chamber (forebay) when it accumulates to a depth of more than 12 inches (30 cm) or 10 percent of the pretreatment volume. The sedimentation forebay should be cleaned of vegetation if persistent standing water and wetland vegetation becomes dominant. The cleaning interval is once every year. A dry sedimentation forebay is the optimal condition while in practice this condition is rarely achieved. The sedimentation chamber, forebay, and treatment cell outlet devices should be cleaned when drawdown times exceed 60 to 72 hours. Materials can be removed with heavy construction equipment; however this equipment should not track on the wetland surface. Revegetation of disturbed areas as necessary. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

Cleaning Criteria for Gravel Wetland Treatment Cells: Sediment should be removed from the gravel wetland surface when it accumulates to a depth of several inches (>10 cm) across the wetland surface. Materials should be removed with rakes rather than heavy construction equipment to avoid compaction of the gravel wetland surface. Heavy equipment could be used if the system is designed with dimensions that allow equipment to be located outside the gravel wetland, while a backhoe shovel reaches inside the gravel wetland to remove sediment. Removed sediments should be dewatered (if necessary) and disposed of in an acceptable manner.

Draining and Flushing Gravel Wetland Treatment Cells: For maintenance it may be necessary to drain or flush the treatment cells. The optional drains will permit simpler maintenance of the system if needed. The drains need to be closed during standard operation. Flushing of the risers and horizontal subdrains is most effective with the entire system drained. Flushed water and sediment should be collected and properly disposed.

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746
F#: (603) 772-0227

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

Signature

Print Name

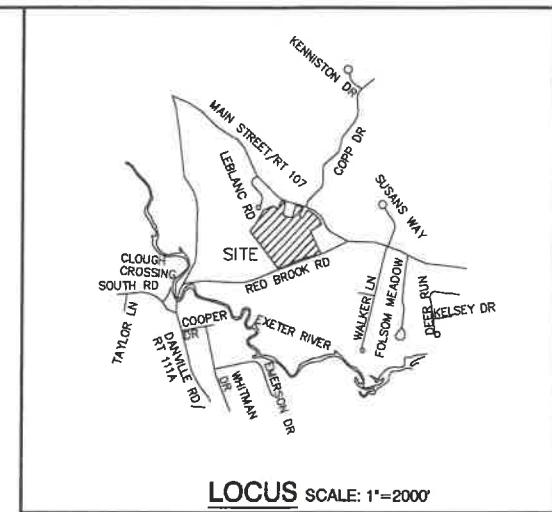
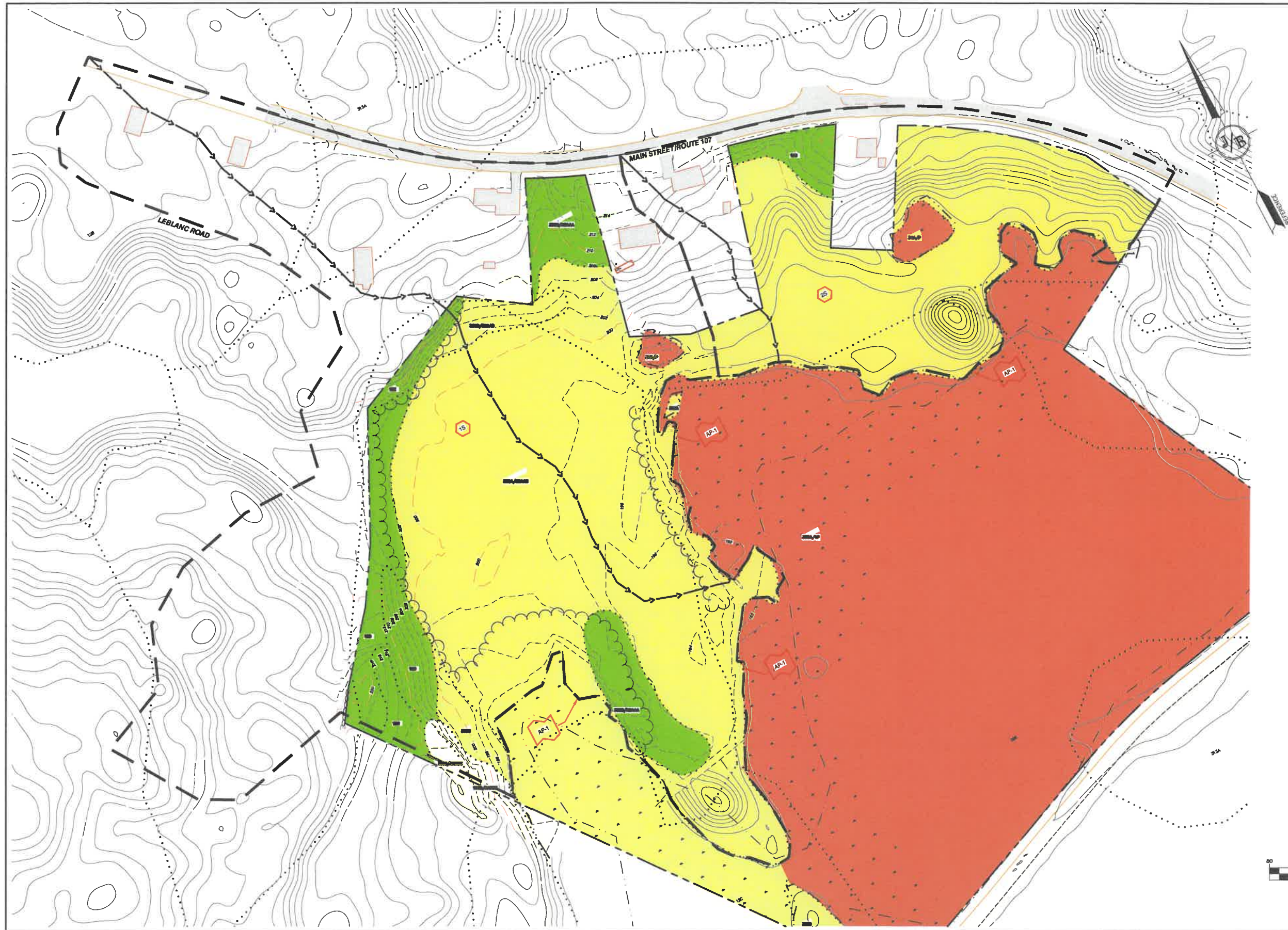
Title

Date

Annual Operations and Maintenance Report

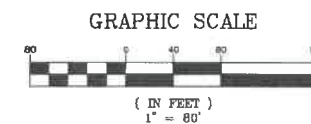
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Construction Activity	Date of Inspection	Who Inspected	Findings of Inspector
Catch basins and drain manholes			
Culverts			
Swales & Plunge Pools			
Vegetation and landscaping			
Parking lots and roadways			
Roof Drains			



LEGEND

- HYDROLOGIC SOIL GROUP 'A'
- HYDROLOGIC SOIL GROUP 'B'
- HYDROLOGIC SOIL GROUP 'C'
- HYDROLOGIC SOIL GROUP 'D'
- IMPERVIOUS
- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- SITE SPECIFIC SOILS



PROJECT PARCEL
TOWN OF FREMONT
TAX MAP 3, BLOCK 37, LOT 3

OWNER
TIMOTHY AND GERALDINE PALMER
706 MAIN STREET
FREMONT, NH 03044
BK 5673, PG 0101

APPLICANT
HAUS EMILY, LLC
56 WESTVILLE RD, UNIT 4
PLAISTOW, NH 03895

TOTAL LOT AREA
1,322,917 SQ. FT.
30.37 ACRES

Design: BWG | Draft: DFP | Date: 12/20/21
Checked: BWG | Scale: AS SHOWN | Project No.: 20724
Drawing Name: 20724-WATERSHED.dwg
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

REV.	DATE	REVISION	BY
2	12/08/21	REVISED PER PB REVIEW	BWG
1	11/22/21	REVISED PER TECHNICAL REVIEW	BWG
0	10/6/21	ISSUED FOR REVIEW	BWG

Designed and Produced in NH
J/B Jones & Beach Engineers, Inc.
85 Portsmouth Ave. PO Box 219 Stratham, NH 03885
Civil Engineering Services
603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING WATERSHED PLAN
Project: MAIN STREET TOWNHOMES
MAIN STREET, FREMONT, NH
Owner of Record: HAUS EMILY, LLC
56 WESTVILLE ROAD, UNIT 4, PLAISTOW, NH 03895

DRAWING No.
S1
SHEET 1 OF 2
JBE PROJECT NO. 20724

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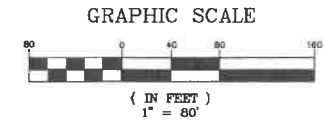
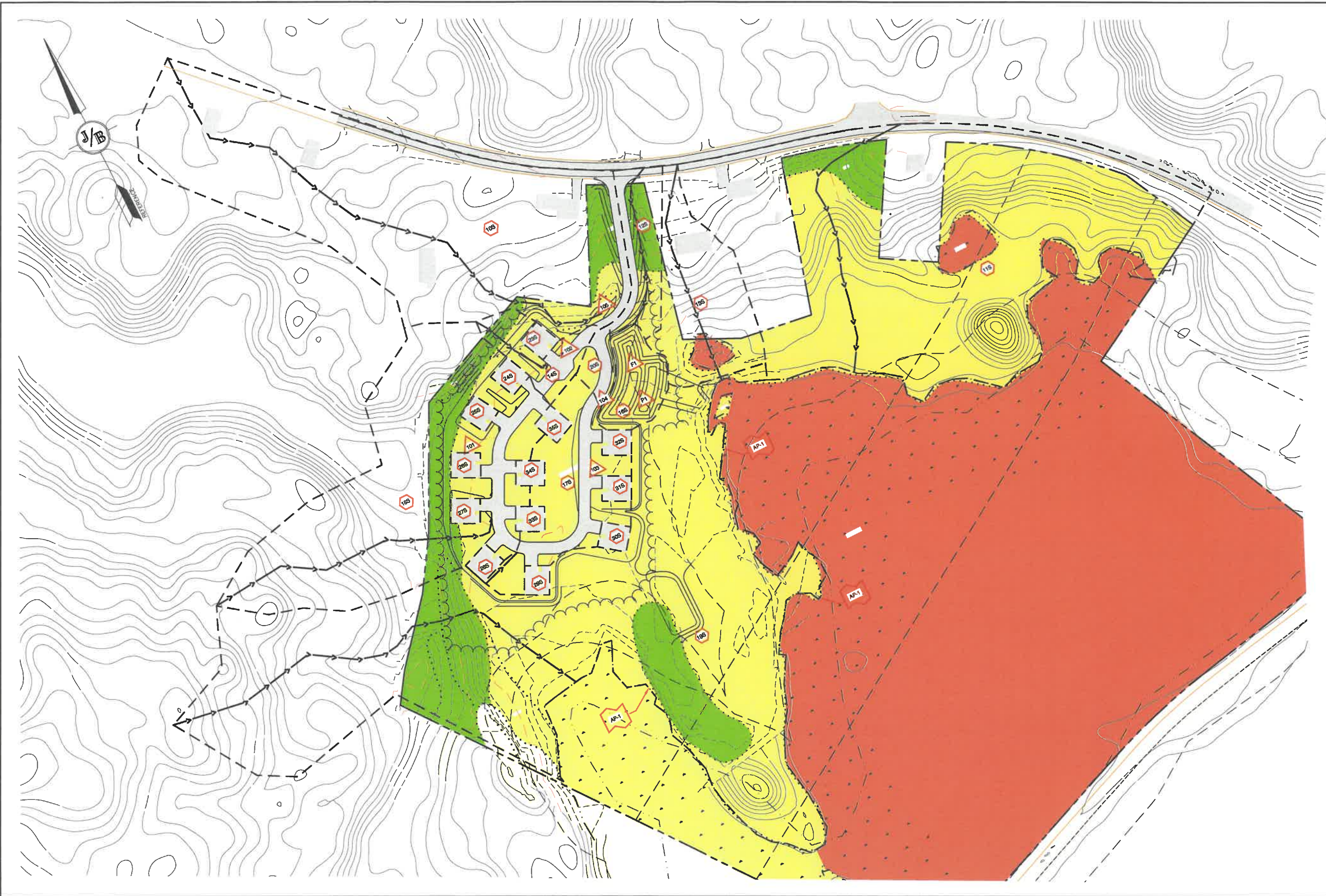
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Project:	MAIN STREET TOWNHOMES MAIN STREET, FREMONT, NH
Owner of Record:	HAUS EMILY, LLC 56 WESTVILLE ROAD, UNIT 4, PLAISTOW, NH 03885

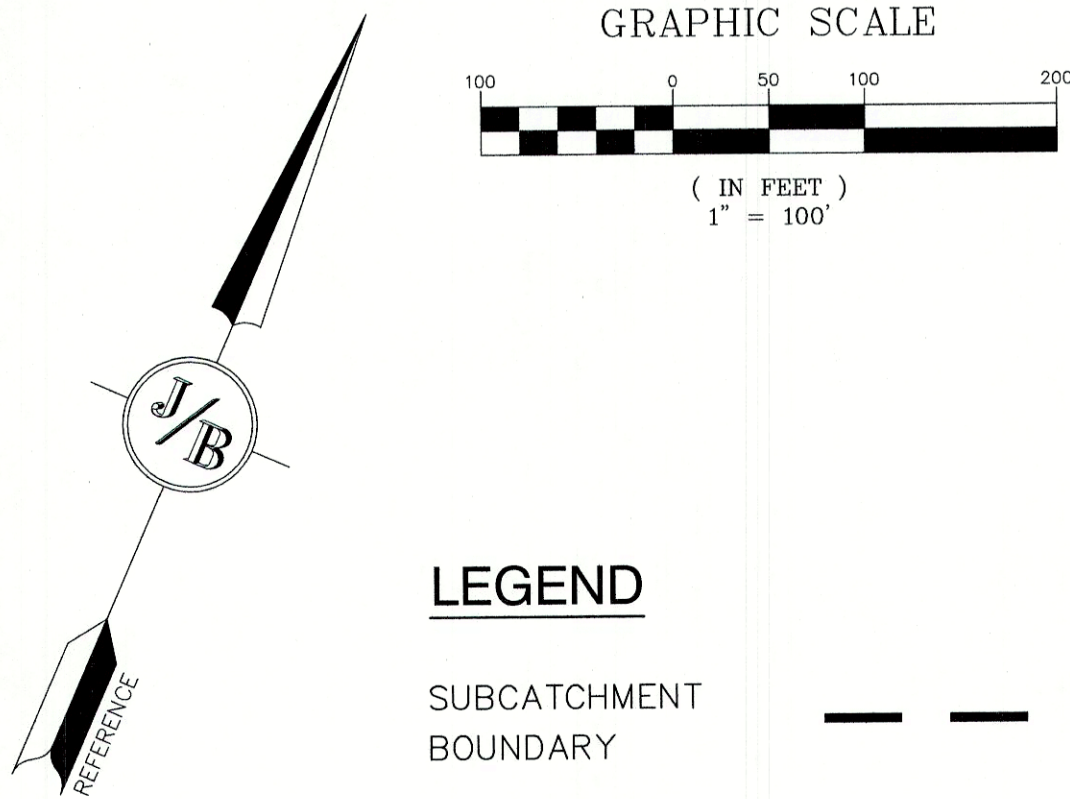
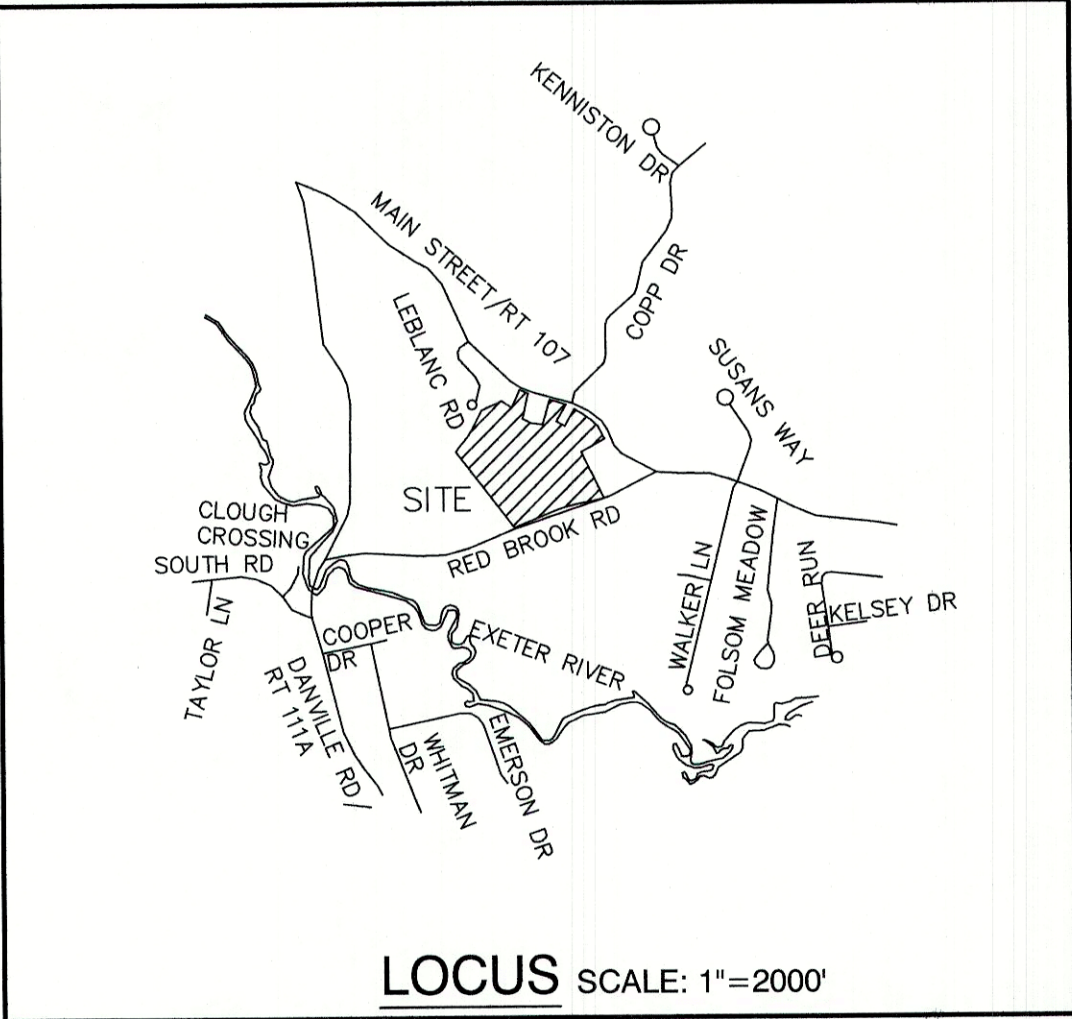
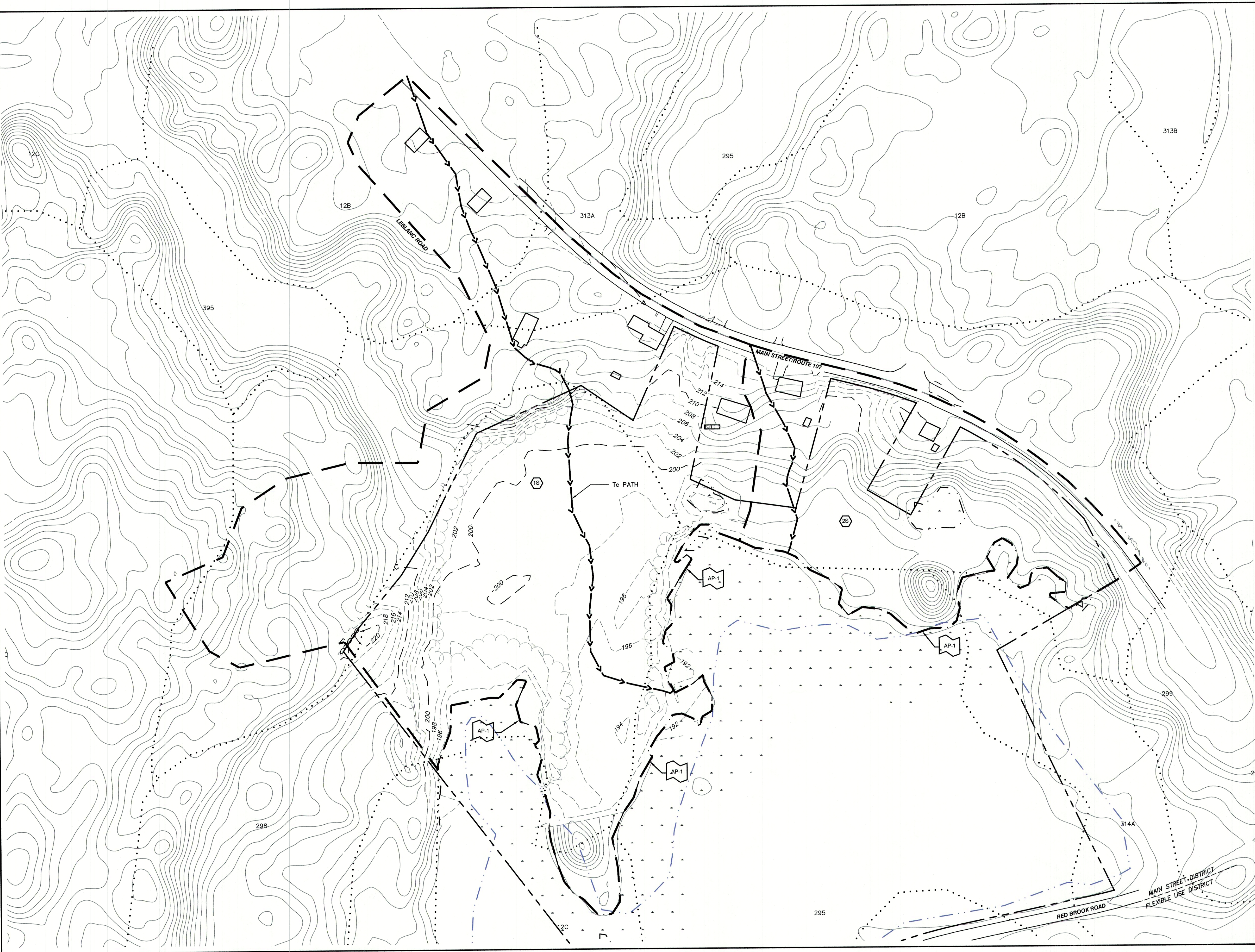
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SHEET 1 OF 2 JBE PROJECT NO. 20724



LEGEND

HYDROLOGIC SOIL GROUP 'A'	[Green Box]
HYDROLOGIC SOIL GROUP 'B'	[Yellow Box]
HYDROLOGIC SOIL GROUP 'C'	[Orange Box]
HYDROLOGIC SOIL GROUP 'D'	[Red Box]
IMPERVIOUS	[Grey Box]
SUBCATCHMENT BOUNDARY	[Dashed Line]
SUBCATCHMENT	[Red X in Circle]
REACH	[Red X in Square]
POND	[Red X in Triangle]
TC PATH	[Arrow]
WETLANDS	[Dotted Line]
SITE SPECIFIC SOILS	[Dotted Line]

PROJECT PARCEL TOWN OF FREMONT TAX MAP 3, BLOCK 37, LOT 3
OWNER TIMOTHY AND GERALDINE PALMER 706 MAIN STREET FREEMONT, NH 03044 BK 5673, PG 0101
APPLICANT HAUS EMILY, LLC 56 WESTVILLE RD, UNIT 4 PLAISTOW, NH 03895
TOTAL LOT AREA 1,322,917 SQ. FT. 30.37 ACRES



LEGEND

- SUBCATCHMENT
BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- FLOW ARROW

PROJECT PARCEL TOWN OF FREMONT TAX MAP 3, BLOCK 37, LOT 3
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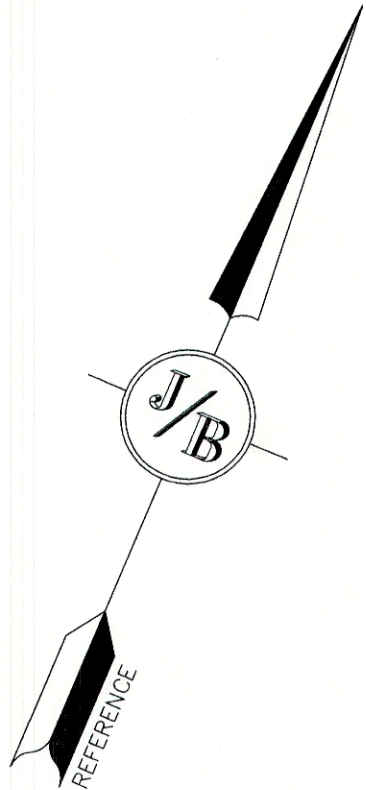
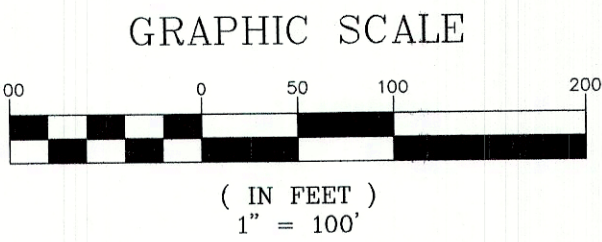
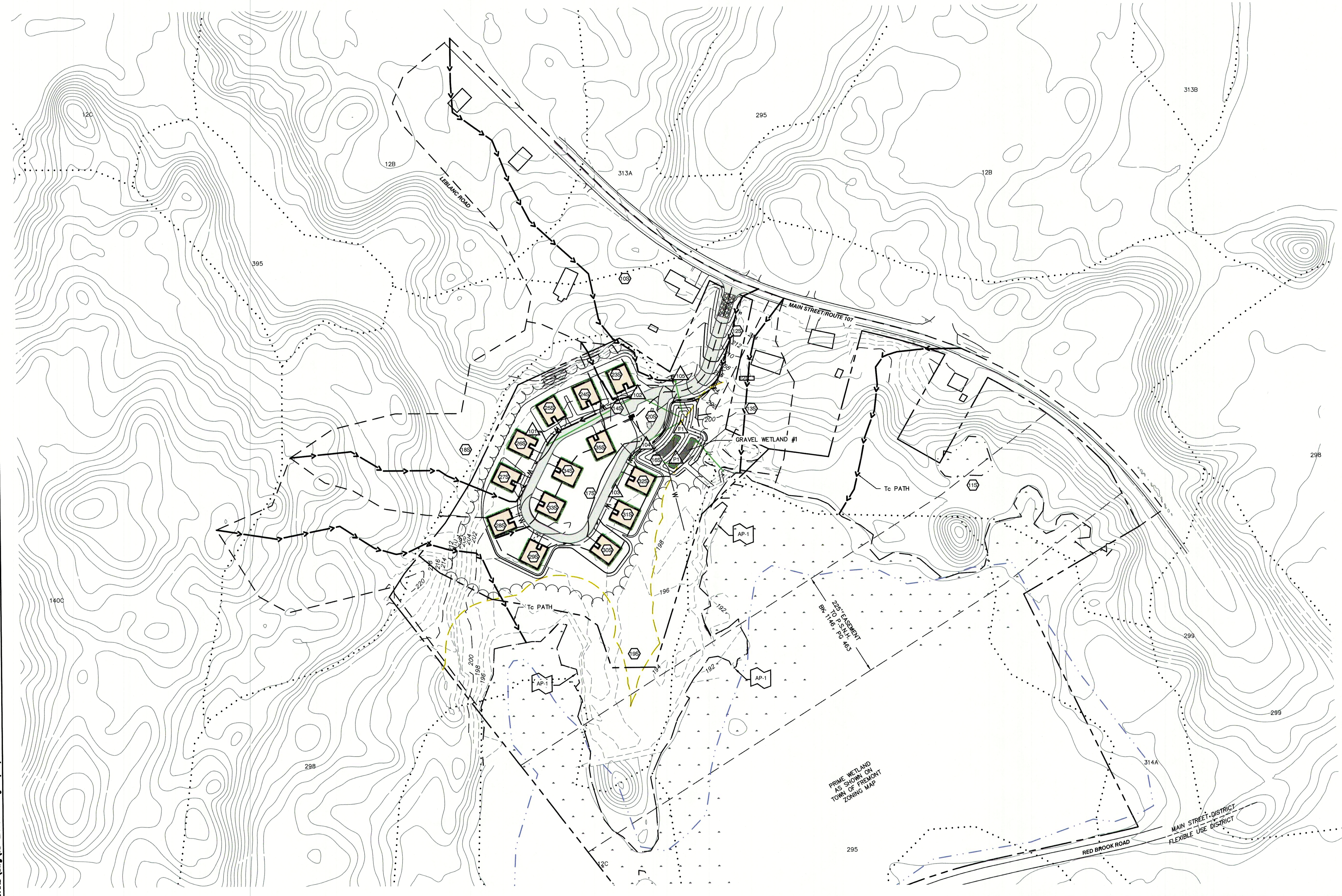
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Project:	MAIN STREET TOWNHOMES MAIN STREET, FREMONT, NH
Owner of Record:	HAUS EMILY, LLC 56 WESTVILLE ROAD, UNIT 4, PLAISTOW, NH 03865

DRAWING No.
W1
SHEET 1 OF 2 JBE PROJECT NO. 20724

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LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
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TOWN OF FREMONT
TAX MAP 3, BLOCK 37, LOT 3

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W2

SHEET 1 OF 2
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