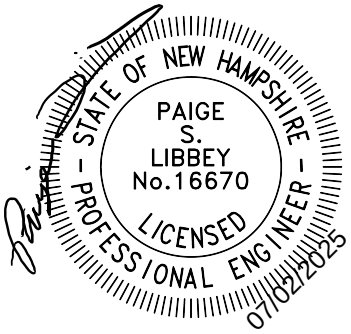
DRAINAGE ANALYSIS

EROSION AND SEDIMENT CONTROL PLAN

35 Madbury Road
Tax Map 106 / Lot 19
Durham, NH 03824

Prepared for:

DWS 35, LLC
288 Calef Highway
Lee, NH 03861



Prepared by:
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Stratham, NH 03885
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July 2, 2025
JBE Project No. 25073

1. EXECUTIVE SUMMARY

The purpose of this project is to construct a parking addition and associated driveway on Town of Durham Tax Map 106, Lot 19. The development will include the construction of the parking and driveway area with associated stormwater management practices. 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 – PEAK FLOW							
Analysis Point	1 Inch (cfs)		2 Year (cfs)		10 Year (cfs)		17 Year (cfs)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.35	0.33	2.94	2.85	5.36	5.21	6.06	5.90
Analysis Point #2	0.03	0.00	0.27	0.05	0.50	0.10	0.57	0.11

A summary of the existing and proposed conditions peak volumes of runoff is as follows:

	EXECUTIVE SUMMARY TABLE – VOLUME							
Analysis Point	1 Inch (cf)		2 Year (cf)		10 Year (cf)		17 Year (cf)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.039	0.036	0.296	0.292	0.552	0.554	0.628	0.632
Analysis Point #2	0.002	0.000	0.020	0.004	0.037	0.007	0.043	0.008

* A minor increase in the post-construction volume of runoff towards Analysis Point #1 throughout the 10-Year and 17-Year storm events is due to the proposed construction of the driveway and parking area. Infiltration in this location is limited due to a poor infiltration rate, however, stormwater discharged from the proposed development will be treated and will not negatively impact abutting property owners as the increase is only 0.004 C.F. at the most. Peak discharge is also decreased to this Analysis Point throughout all modeled storm events.

Section 15.5.3(c) in the Durham, NH Site Plan Regulations states “For sites meeting the definition of a redevelopment project and having more than 40% existing impervious surface coverage, stormwater shall be managed for water quality in accordance with the following technique: Implement other LID (Low impact development) techniques onsite to the maximum extent practicable to provide treatment for at least 50% of the entire site area”. Since the existing site is already developed and is over the 40% impervious threshold, this project qualifies to meet the aforementioned criteria listed within the regulation. The existing site contains no stormwater management practices and has an impervious area of ±8,339 S.F. requiring treatment under current regulations. The proposed site adds ±684 S.F. of impervious area and the proposed porous asphalt will capture and treat ±5,037 S.F. of the now ±9,023 S.F. needing treatment, providing treatment to over 50% of the required level stated in the regulation. The porous asphalt will also capture and treat ±1,400 S.F. of offsite impervious area, previously left untreated in the pre-construction condition. Therefore, the drainage design intent for this site is to effectively treat stormwater from at least 50% of impervious surfaces of the proposed site. This has been accomplished through the use of porous asphalt to treat runoff from impervious surfaces.

In addition, the potential for increased erosion and sedimentation is handled by way of a riprap outlet protection apron and silt fence. Abutting property owners will suffer minimal impact resultant from this development.


Madbury Rd
Davis Ct
Bagdad Rd
Strafford Ave
Madbury Rd
Dennison Rd
Brook Way
Garrison Ave
Rosemary Ln
Madbury Rd
Pettee Brook Lane
Google Earth
Image © 2025 Airbus
N
700 ft

TABLE OF CONTENTS

2. DRAINAGE ANALYSIS

3.1 INTRODUCTION

The purpose of this project is to construct a parking addition and associated driveway on Town of Durham Tax Map 106, Lot 19. The development will include the construction of the parking and driveway area with associated stormwater management practices.

3.2 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 1-inch, 2-year, 10-year, and 17-year storm events, corresponding to rainfall events of 1.00", 3.30", 5.29", 5.87" respectively. The 17-Year storm event was determined via interpolation between the published 10-Year and 25-Year rainfall events.

Existing topography and site features were obtained through on-ground topography completed by Jones & Beach Engineers. Existing soil conditions were derived from NRCS Web Soil Survey.

3.3 EXISTING CONDITIONS ANALYSIS

The study area consists of the subject property and upstream contributing area. The study area contains ±1.75 acres including offsite contributing areas. The existing site is currently developed and includes a dwelling utilized by one of the fraternities of the University of New Hampshire as well as a paved driveway and parking area. The surrounding area is mostly developed and contains other dwellings, paved surfaces, woods, and grass cover. The existing site contains a high point that traverses North to South, resulting in the Analysis Points as defined below.

The entirety of the soils for this site are described as Hydrological Soils "D".

Two (2) Analysis Points (AP) were defined for this project.

Analysis Point #1 (AP1) represents the Southwest corner of the subject lot. Runoff that reaches this point flows onto the abutting property. Subcatchment 100 represents the area that flows to this Analysis Point.

Analysis Point #2 (AP2) represents the Southeast corner of the subject. Runoff that reaches this point flows onto Madbury Road, where a network of catch basins is in place to capture and transport stormwater. Subcatchment 101 represents the area the flows to this Analysis Point.

3.4 PROPOSED CONDITIONS ANALYSIS

The proposed site will include the construction of the proposed parking area, driveway, and stormwater management practices.

The addition of the proposed impervious paved areas 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 effectively treat the subsequent stormwater runoff to the extent practicable and required under current regulations, the following Best Management Practices (BMP's) have been employed at the Analysis Points as follows:

Subcatchment 200 represents the area of land that flows directly to Analysis Point #1, similarly to Subcatchment 100 in the pre-construction model.

Subcatchment 201 represents the area of land that flows directly to Analysis Point #2, similarly to Subcatchment 101 in the pre-construction model.

Runoff from the southern portion of the roof and the majority of the proposed parking area and driveway, represented by Subcatchment 202, will be captured and treated via porous asphalt (Pond P1) before discharging via culvert and flowing overland (Reach 20R) to Analysis Point #1. Infiltration has also been modeled within the porous asphalt system. The infiltration rate was determined by attaining the lowest published Ksat value for the in-situ soil, 0.6 in/hr in this case, and applying a factor of safety of two to arrive at a Ksat value of 0.3 in/hr used in the model.

3.6 CONCLUSION

This 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. 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, porous asphalt, and a riprap outlet protection apron. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system.

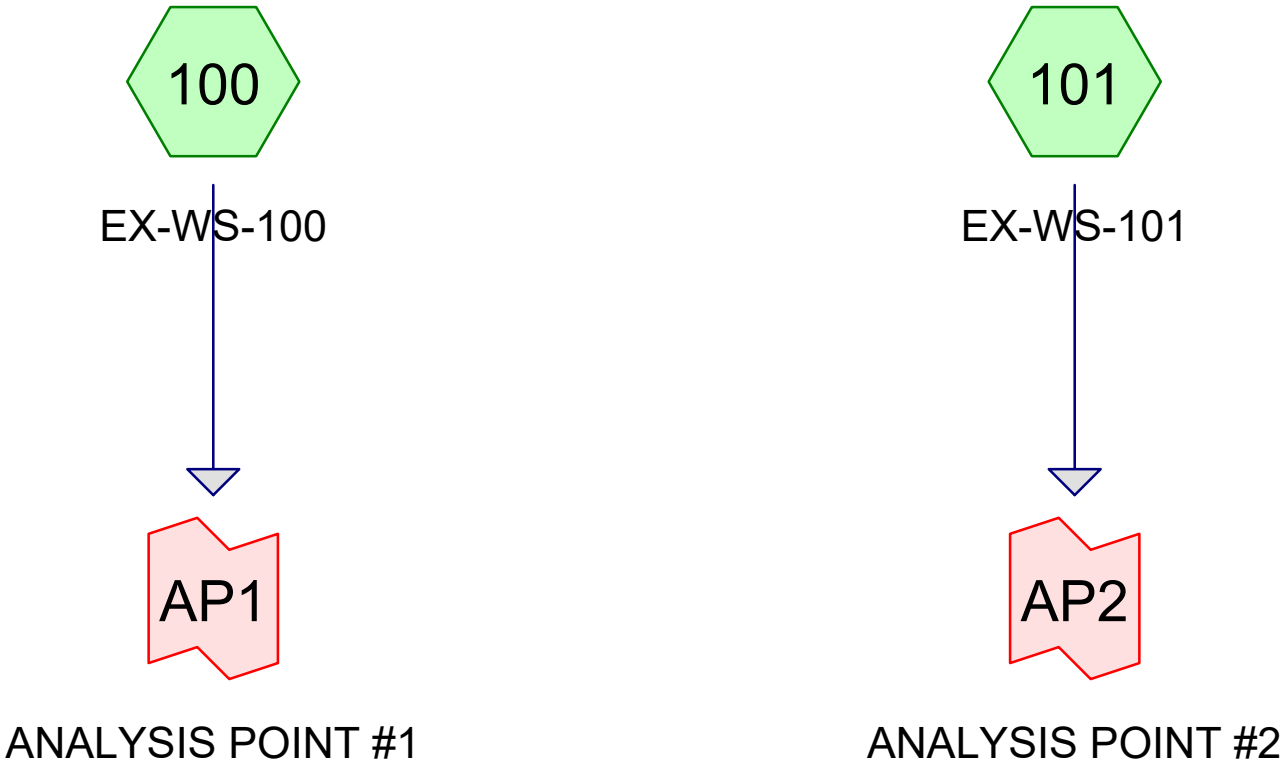
Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

Nicholas Lorenz
Project Engineer

APPENDIX 3.7
DRAINAGE CALCUALTIONS

PRE-DEVELOPMENT CONDITIONS ANALYSIS

1-Inch 24-Hour Complete Analysis
2-Year 24-Hour Summary Analysis
10-Year 24-Hour Complete Analysis
17-Year 24-Hour Summary Analysis



Subcat Reach Pond Link

Routing Diagram for EXISTING
Prepared by Jones & Beach Engineers Inc, Printed 7/2/2025

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.586	80	>75% Grass cover, Good, HSG D (100, 101)
0.164	98	Gravel, HSG D (100)
0.015	98	Patio/Stairs, HSG D (100)
0.461	98	Pavement, HSG D (100, 101)
0.245	98	Roof, HSG D (100, 101)
0.009	98	Sidewalk, HSG D (100, 101)
0.000	98	Stairs, HSG D (101)
0.274	77	Woods, Good, HSG D (100, 101)
1.754	**89**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.754	HSG D	100, 101
0.000	Other	
1.754		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment100: EX-WS-100 Runoff Area=71,445 sf 51.45% Impervious Runoff Depth>0.28"
Flow Length=483' Tc=17.6 min CN=89 Runoff=0.35 cfs 0.039 af

Subcatchment101: EX-WS-101 Runoff Area=4,964 sf 44.56% Impervious Runoff Depth>0.25"
Flow Length=188' Tc=6.0 min CN=88 Runoff=0.03 cfs 0.002 af

Link AP1: ANALYSISPOINT #1 Inflow=0.35 cfs 0.039 af
Primary=0.35 cfs 0.039 af

Link AP2: ANALYSISPOINT #2 Inflow=0.03 cfs 0.002 af
Primary=0.03 cfs 0.002 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.041 af Average Runoff Depth = 0.28"
49.00% Pervious = 0.860 ac 51.00% Impervious = 0.895 ac

Summary for Subcatchment 100: EX-WS-100

Runoff = 0.35 cfs @ 12.27 hrs, Volume= 0.039 af, Depth> 0.28"
Routed to Link AP1 : ANALYSIS POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 INCH Rainfall=1.00"

	Area (sf)	CN	Description
	11,440	77	Woods, Good, HSG D
*	10,379	98	Roof, HSG D
*	267	98	Sidewalk, HSG D
*	640	98	Patio/Stairs, HSG D
*	18,321	98	Pavement, HSG D
*	7,149	98	Gravel, HSG D
	23,249	80	>75% Grass cover, Good, HSG D
	71,445	89	Weighted Average
	34,689		48.55% Pervious Area
	36,756		51.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0082	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.1	2	0.0082	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	23	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	19	0.0465	1.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0571	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0476	1.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	5	0.0476	1.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	2	0.0476	4.43		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	100	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0588	4.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	23	0.0435	4.23		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	13	0.0465	4.38		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	8	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	64	0.0143	1.93		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	13	0.0143	0.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.6	483	Total			

Summary for Subcatchment 101: EX-WS-101

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Depth> 0.25"
Routed to Link AP2 : ANALYSIS POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 INCH Rainfall=1.00"

	Area (sf)	CN	Description
*	310	98	Roof, HSG D
*	1,765	98	Pavement, HSG D
*	133	98	Sidewalk, HSG D
*	4	98	Stairs, HSG D
	482	77	Woods, Good, HSG D
	2,270	80	>75% Grass cover, Good, HSG D
	4,964	88	Weighted Average
	2,752		55.44% Pervious Area
	2,212		44.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3333	3.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.9	6	0.0251	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.5	37	0.0251	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.6	32	0.0122	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.1	16	0.0122	2.24		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	34	0.0122	0.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	4	0.0309	1.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	3	0.0309	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	13	0.0309	1.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	13	0.0309	0.88		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	5	0.0562	1.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.5	188	Total, Increased to minimum Tc = 6.0 min			

Summary for Link AP1: ANALYSIS POINT #1

Inflow Area = 1.640 ac, 51.45% Impervious, Inflow Depth > 0.28" for 1 INCH event
Inflow = 0.35 cfs @ 12.27 hrs, Volume= 0.039 af
Primary = 0.35 cfs @ 12.27 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

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

Summary for Link AP2: ANALYSIS POINT #2

Inflow Area = 0.114 ac, 44.56% Impervious, Inflow Depth > 0.25" for 1 INCH event
Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af
Primary = 0.03 cfs @ 12.10 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment100: EX-WS-100 Runoff Area=71,445 sf 51.45% Impervious Runoff Depth>2.17"
Flow Length=483' Tc=17.6 min CN=89 Runoff=2.94 cfs 0.296 af

Subcatchment101: EX-WS-101 Runoff Area=4,964 sf 44.56% Impervious Runoff Depth>2.09"
Flow Length=188' Tc=6.0 min CN=88 Runoff=0.27 cfs 0.020 af

Link AP1: ANALYSISPOINT #1 Inflow=2.94 cfs 0.296 af
Primary=2.94 cfs 0.296 af

Link AP2: ANALYSISPOINT #2 Inflow=0.27 cfs 0.020 af
Primary=0.27 cfs 0.020 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.316 af Average Runoff Depth = 2.16"
49.00% Pervious = 0.860 ac 51.00% Impervious = 0.895 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment100: EX-WS-100 Runoff Area=71,445 sf 51.45% Impervious Runoff Depth>4.04"
Flow Length=483' Tc=17.6 min CN=89 Runoff=5.36 cfs 0.552 af

Subcatchment101: EX-WS-101 Runoff Area=4,964 sf 44.56% Impervious Runoff Depth>3.94"
Flow Length=188' Tc=6.0 min CN=88 Runoff=0.50 cfs 0.037 af

Link AP1: ANALYSISPOINT #1 Inflow=5.36 cfs 0.552 af
Primary=5.36 cfs 0.552 af

Link AP2: ANALYSISPOINT #2 Inflow=0.50 cfs 0.037 af
Primary=0.50 cfs 0.037 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.590 af Average Runoff Depth = 4.03"
49.00% Pervious = 0.860 ac 51.00% Impervious = 0.895 ac

Summary for Subcatchment 100: EX-WS-100

Runoff = 5.36 cfs @ 12.24 hrs, Volume= 0.552 af, Depth> 4.04"
Routed to Link AP1 : ANALYSIS POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=5.29"

	Area (sf)	CN	Description
	11,440	77	Woods, Good, HSG D
*	10,379	98	Roof, HSG D
*	267	98	Sidewalk, HSG D
*	640	98	Patio/Stairs, HSG D
*	18,321	98	Pavement, HSG D
*	7,149	98	Gravel, HSG D
	23,249	80	>75% Grass cover, Good, HSG D
	71,445	89	Weighted Average
	34,689		48.55% Pervious Area
	36,756		51.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0082	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.1	2	0.0082	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	23	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	19	0.0465	1.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0571	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0476	1.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	5	0.0476	1.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	2	0.0476	4.43		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	100	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0588	4.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	23	0.0435	4.23		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	13	0.0465	4.38		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	8	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	64	0.0143	1.93		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	13	0.0143	0.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.6	483	Total			

Summary for Subcatchment 101: EX-WS-101

Runoff = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af, Depth> 3.94"
Routed to Link AP2 : ANALYSIS POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=5.29"

	Area (sf)	CN	Description
*	310	98	Roof, HSG D
*	1,765	98	Pavement, HSG D
*	133	98	Sidewalk, HSG D
*	4	98	Stairs, HSG D
	482	77	Woods, Good, HSG D
	2,270	80	>75% Grass cover, Good, HSG D
	4,964	88	Weighted Average
	2,752		55.44% Pervious Area
	2,212		44.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3333	3.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.9	6	0.0251	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.5	37	0.0251	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.6	32	0.0122	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.1	16	0.0122	2.24		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	34	0.0122	0.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	4	0.0309	1.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	3	0.0309	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	13	0.0309	1.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	13	0.0309	0.88		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	5	0.0562	1.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.5	188	Total, Increased to minimum Tc = 6.0 min			

Summary for Link AP1: ANALYSIS POINT #1

Inflow Area = 1.640 ac, 51.45% Impervious, Inflow Depth > 4.04" for 10 YEAR event
Inflow = 5.36 cfs @ 12.24 hrs, Volume= 0.552 af
Primary = 5.36 cfs @ 12.24 hrs, Volume= 0.552 af, Atten= 0%, Lag= 0.0 min

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

Summary for Link AP2: ANALYSIS POINT #2

Inflow Area = 0.114 ac, 44.56% Impervious, Inflow Depth > 3.94" for 10 YEAR event
Inflow = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af
Primary = 0.50 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment100: EX-WS-100 Runoff Area=71,445 sf 51.45% Impervious Runoff Depth>4.60"
Flow Length=483' Tc=17.6 min CN=89 Runoff=6.06 cfs 0.628 af

Subcatchment101: EX-WS-101 Runoff Area=4,964 sf 44.56% Impervious Runoff Depth>4.50"
Flow Length=188' Tc=6.0 min CN=88 Runoff=0.57 cfs 0.043 af

Link AP1: ANALYSISPOINT #1 Inflow=6.06 cfs 0.628 af
Primary=6.06 cfs 0.628 af

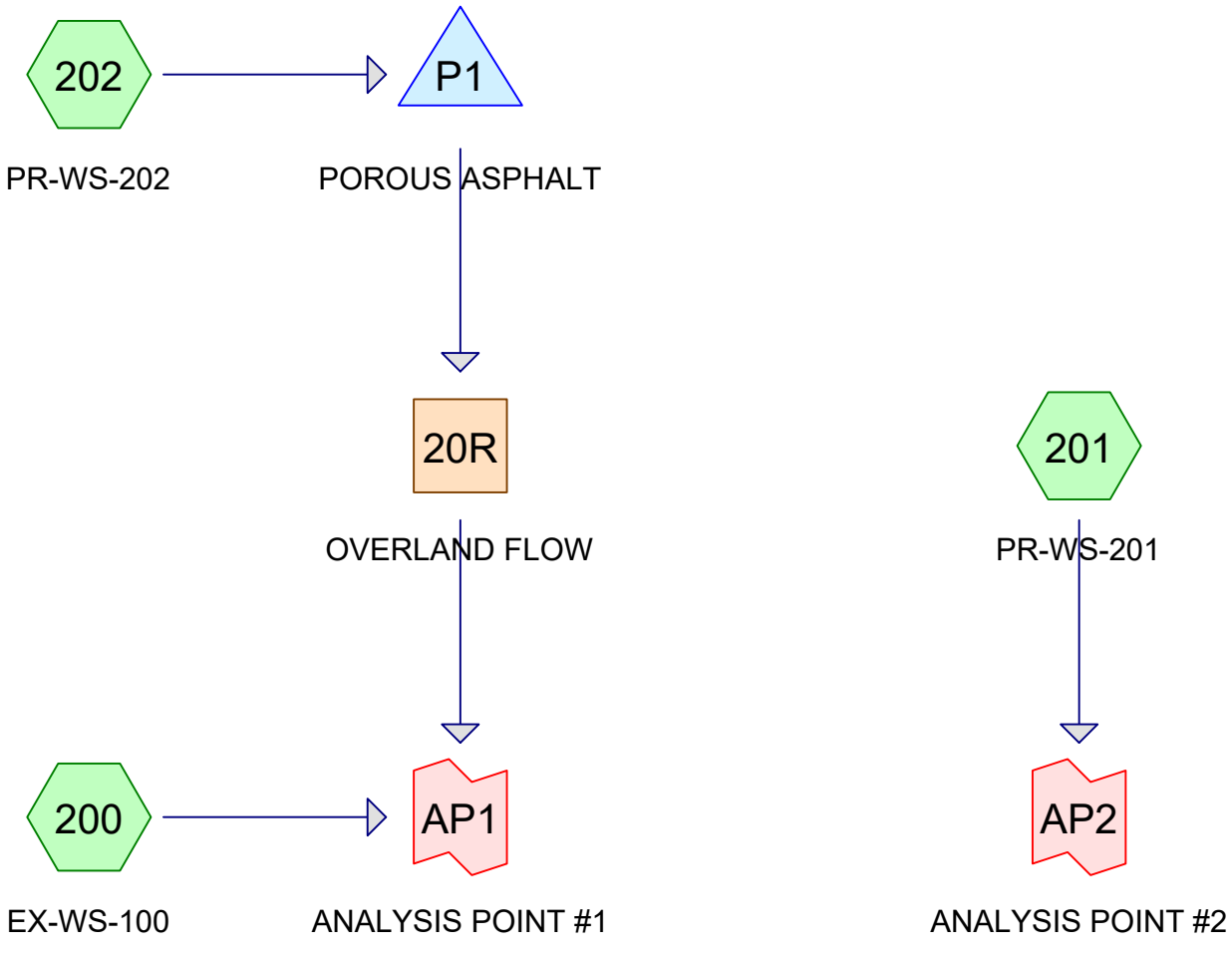
Link AP2: ANALYSISPOINT #2 Inflow=0.57 cfs 0.043 af
Primary=0.57 cfs 0.043 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.671 af Average Runoff Depth = 4.59"
49.00% Pervious = 0.860 ac 51.00% Impervious = 0.895 ac

APPENDIX 3.8
DRAINAGE CALCULATIONS

POST-DEVELOPMENT CONDITIONS ANALYSIS

1-Inch 24-Hour Complete Analysis
2-Year 24-Hour Summary Analysis
10-Year 24-Hour Complete Analysis
17-Year 24-Hour Summary Analysis
100-Year 24-Hour Pond Summary



Subcat Reach Pond Link

Routing Diagram for PROPOSED
Prepared by Jones & Beach Engineers Inc, Printed 7/2/2025

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.500	80	>75% Grass cover, Good, HSG D (200, 201, 202)
0.002	98	Concrete, HSG D (202)
0.164	98	Gravel, HSG D (200)
0.015	98	Patio/Stairs, HSG D (200, 202)
0.487	98	Pavement, HSG D (200, 201, 202)
0.084	98	Porous Asphalt, HSG D (202)
0.262	98	Roof, HSG D (200, 202)
0.240	77	Woods, Good, HSG D (200, 201)
1.754	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.754	HSG D	200, 201, 202
0.000	Other	
1.754		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment200: EX-WS-100 Runoff Area=66,466 sf 54.02% Impervious Runoff Depth>0.28"
Flow Length=483' Tc=17.6 min CN=89 Runoff=0.33 cfs 0.036 af

Subcatchment201: PR-WS-201 Runoff Area=973 sf 42.24% Impervious Runoff Depth>0.22"
Flow Length=154' Tc=6.0 min CN=87 Runoff=0.00 cfs 0.000 af

Subcatchment202: PR-WS-202 Runoff Area=8,975 sf 87.61% Impervious Runoff Depth>0.63"
Tc=6.0 min CN=96 Runoff=0.15 cfs 0.011 af

Reach 20R: OVERLAND FLOW Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=20.3' S=0.0163 '/' Capacity=10.08 cfs Outflow=0.00 cfs 0.000 af

Pond P1: POROUS ASPHALT Peak Elev=70.74' Storage=153 cf Inflow=0.15 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

Link AP1: ANALYSIS POINT #1 Inflow=0.33 cfs 0.036 af
Primary=0.33 cfs 0.036 af

Link AP2: ANALYSIS POINT #2 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.047 af Average Runoff Depth = 0.32"
42.19% Pervious = 0.740 ac 57.81% Impervious = 1.014 ac

Summary for Subcatchment 200: EX-WS-100

Runoff = 0.33 cfs @ 12.27 hrs, Volume= 0.036 af, Depth> 0.28"
Routed to Link AP1 : ANALYSIS POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 INCH Rainfall=1.00"

	Area (sf)	CN	Description
	10,404	77	Woods, Good, HSG D
*	9,221	98	Roof, HSG D
*	354	98	Patio/Stairs, HSG D
*	19,180	98	Pavement, HSG D
*	7,149	98	Gravel, HSG D
	20,158	80	>75% Grass cover, Good, HSG D
	66,466	89	Weighted Average
	30,562		45.98% Pervious Area
	35,904		54.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0082	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.1	2	0.0082	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	23	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	19	0.0465	1.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0571	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0476	1.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	5	0.0476	1.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	2	0.0476	4.43		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	100	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0588	4.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	23	0.0435	4.23		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	13	0.0465	4.38		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	8	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	64	0.0143	1.93		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	13	0.0143	0.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.6	483	Total			

Summary for Subcatchment 201: PR-WS-201

Runoff = 0.00 cfs @ 12.11 hrs, Volume= 0.000 af, Depth> 0.22"
Routed to Link AP2 : ANALYSIS POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 INCH Rainfall=1.00"

	Area (sf)	CN	Description
*	411	98	Pavement, HSG D
	497	80	>75% Grass cover, Good, HSG D
	65	77	Woods, Good, HSG D
	973	87	Weighted Average
	562		57.76% Pervious Area
	411		42.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3333	3.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.9	6	0.0251	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.5	37	0.0251	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.6	32	0.0122	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.1	16	0.0122	2.24		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	34	0.0122	0.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	4	0.0309	1.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	154	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 202: PR-WS-202

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth> 0.63"
Routed to Pond P1 : POROUS ASPHALT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 INCH Rainfall=1.00"

	Area (sf)	CN	Description
*	2,178	98	Roof, HSG D
*	286	98	Patio/Stairs, HSG D
	1,112	80	>75% Grass cover, Good, HSG D
*	3,658	98	Porous Asphalt, HSG D
*	100	98	Concrete, HSG D
*	1,641	98	Pavement, HSG D
	8,975	96	Weighted Average
	1,112		12.39% Pervious Area
	7,863		87.61% Impervious Area

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

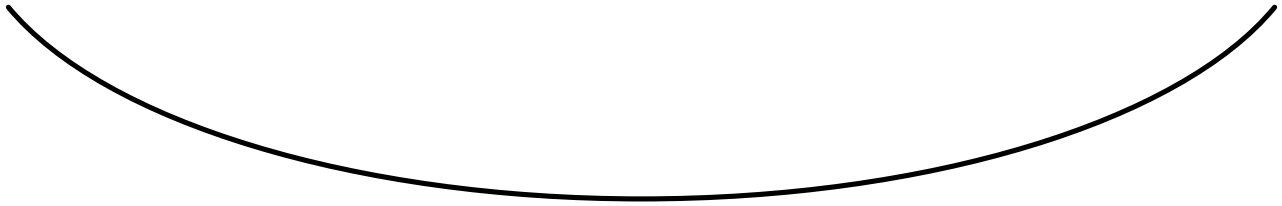
Summary for Reach 20R: OVERLAND FLOW

Inflow Area = 0.206 ac, 87.61% Impervious, Inflow Depth = 0.00" for 1 INCH 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
Routed to Link AP1 : ANALYSIS POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 3.3 sf, Capacity= 10.08 cfs

10.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 20.3' Slope= 0.0163 '/'
Inlet Invert= 70.70', Outlet Invert= 70.37'



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Summary for Pond P1: POROUS ASPHALT

Inflow Area = 0.206 ac, 87.61% Impervious, Inflow Depth > 0.63" for 1 INCH event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.03 cfs @ 12.52 hrs, Volume= 0.011 af, Atten= 79%, Lag= 26.0 min
Discarded = 0.03 cfs @ 12.52 hrs, Volume= 0.011 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 20R : OVERLAND FLOW

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 70.74' @ 12.52 hrs Surf.Area= 4,076 sf Storage= 153 cf
Flood Elev= 73.50' Surf.Area= 4,076 sf Storage= 2,463 cf

Plug-Flow detention time= 48.5 min calculated for 0.011 af (99% of inflow)
Center-of-Mass det. time= 43.7 min (857.3 - 813.6)

Volume	Invert	Avail.Storage	Storage Description
#1	70.49'	4,494 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	70.75'	7 cf	**4.0" Round Pipe Storage** L= 78.0'
		4,501 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.49	4,076	0.0	0	0
70.50	4,076	15.0	6	6
70.74	4,076	15.0	147	153
70.75	4,076	40.0	16	169
71.41	4,076	40.0	1,076	1,245
71.42	4,076	15.0	6	1,251
71.66	4,076	15.0	147	1,398
71.67	4,076	5.0	2	1,400
72.66	4,076	5.0	202	1,602
72.67	4,076	30.0	12	1,614
73.16	4,076	30.0	599	2,213
73.17	4,076	15.0	6	2,219
73.49	4,076	15.0	196	2,415
73.50	4,076	100.0	41	2,456
74.00	4,076	100.0	2,038	4,494

Device	Routing	Invert	Outlet Devices
#1	Primary	70.75'	**4.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.75' / 70.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	70.75'	**4.0" Vert. PERFORATED UNDERDRAIN #1** C= 0.600 Limited to weir flow at low heads
#3	Discarded	70.49'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 68.10' Phase-In= 0.10'

Discarded OutFlow Max=0.03 cfs @ 12.52 hrs HW=70.74' (Free Discharge)
↑—**3=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=70.49' TW=70.70' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)
↑—**2=PERFORATED UNDERDRAIN #1**(Controls 0.00 cfs)

Summary for Link AP1: ANALYSIS POINT #1

Inflow Area = 1.732 ac, 58.01% Impervious, Inflow Depth > 0.25" for 1 INCH event
Inflow = 0.33 cfs @ 12.27 hrs, Volume= 0.036 af
Primary = 0.33 cfs @ 12.27 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min

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

Summary for Link AP2: ANALYSIS POINT #2

Inflow Area = 0.022 ac, 42.24% Impervious, Inflow Depth > 0.22" for 1 INCH event
Inflow = 0.00 cfs @ 12.11 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 12.11 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment200: EX-WS-100 Runoff Area=66,466 sf 54.02% Impervious Runoff Depth>2.17"
Flow Length=483' Tc=17.6 min CN=89 Runoff=2.73 cfs 0.275 af

Subcatchment201: PR-WS-201 Runoff Area=973 sf 42.24% Impervious Runoff Depth>2.00"
Flow Length=154' Tc=6.0 min CN=87 Runoff=0.05 cfs 0.004 af

Subcatchment202: PR-WS-202 Runoff Area=8,975 sf 87.61% Impervious Runoff Depth>2.85"
Tc=6.0 min CN=96 Runoff=0.62 cfs 0.049 af

Reach 20R: OVERLAND FLOW Avg. Flow Depth=0.07' Max Vel=0.79 fps Inflow=0.13 cfs 0.017 af
n=0.030 L=20.3' S=0.0163 '/' Capacity=10.08 cfs Outflow=0.13 cfs 0.017 af

Pond P1: POROUS ASPHALT Peak Elev=71.10' Storage=748 cf Inflow=0.62 cfs 0.049 af
Discarded=0.04 cfs 0.032 af Primary=0.13 cfs 0.017 af Outflow=0.16 cfs 0.049 af

Link AP1: ANALYSIS POINT #1 Inflow=2.85 cfs 0.292 af
Primary=2.85 cfs 0.292 af

Link AP2: ANALYSIS POINT #2 Inflow=0.05 cfs 0.004 af
Primary=0.05 cfs 0.004 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.328 af Average Runoff Depth = 2.24"
42.19% Pervious = 0.740 ac 57.81% Impervious = 1.014 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment200: EX-WS-100 Runoff Area=66,466 sf 54.02% Impervious Runoff Depth>4.04"
Flow Length=483' Tc=17.6 min CN=89 Runoff=4.99 cfs 0.514 af

Subcatchment201: PR-WS-201 Runoff Area=973 sf 42.24% Impervious Runoff Depth>3.84"
Flow Length=154' Tc=6.0 min CN=87 Runoff=0.10 cfs 0.007 af

Subcatchment202: PR-WS-202 Runoff Area=8,975 sf 87.61% Impervious Runoff Depth>4.82"
Tc=6.0 min CN=96 Runoff=1.03 cfs 0.083 af

Reach 20R: OVERLAND FLOW Avg. Flow Depth=0.09' Max Vel=0.96 fps Inflow=0.24 cfs 0.040 af
n=0.030 L=20.3' S=0.0163 '/' Capacity=10.08 cfs Outflow=0.24 cfs 0.040 af

Pond P1: POROUS ASPHALT Peak Elev=71.44' Storage=1,271 cf Inflow=1.03 cfs 0.083 af
Discarded=0.04 cfs 0.042 af Primary=0.24 cfs 0.040 af Outflow=0.28 cfs 0.082 af

Link AP1: ANALYSIS POINT #1 Inflow=5.21 cfs 0.554 af
Primary=5.21 cfs 0.554 af

Link AP2: ANALYSIS POINT #2 Inflow=0.10 cfs 0.007 af
Primary=0.10 cfs 0.007 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.603 af Average Runoff Depth = 4.13"
42.19% Pervious = 0.740 ac 57.81% Impervious = 1.014 ac

Summary for Subcatchment 200: EX-WS-100

Runoff = 4.99 cfs @ 12.24 hrs, Volume= 0.514 af, Depth> 4.04"
Routed to Link AP1 : ANALYSIS POINT #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=5.29"

	Area (sf)	CN	Description
	10,404	77	Woods, Good, HSG D
*	9,221	98	Roof, HSG D
*	354	98	Patio/Stairs, HSG D
*	19,180	98	Pavement, HSG D
*	7,149	98	Gravel, HSG D
	20,158	80	>75% Grass cover, Good, HSG D
	66,466	89	Weighted Average
	30,562		45.98% Pervious Area
	35,904		54.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.8	100	0.0082	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.1	2	0.0082	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	23	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	19	0.0465	1.08		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0571	1.19		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	35	0.0476	1.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	5	0.0476	1.53		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.0	2	0.0476	4.43		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	100	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	17	0.0588	4.92		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	23	0.0435	4.23		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.0	13	0.0465	4.38		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	8	0.0465	1.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	12	0.0417	3.29		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.6	64	0.0143	1.93		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	13	0.0143	0.84		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
17.6	483	Total			

Summary for Subcatchment 201: PR-WS-201

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Depth> 3.84"
Routed to Link AP2 : ANALYSIS POINT #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=5.29"

	Area (sf)	CN	Description
*	411	98	Pavement, HSG D
	497	80	>75% Grass cover, Good, HSG D
	65	77	Woods, Good, HSG D
	973	87	Weighted Average
	562		57.76% Pervious Area
	411		42.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.3333	3.26		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.9	6	0.0251	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
0.5	37	0.0251	1.25		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.6	32	0.0122	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.30"
0.1	16	0.0122	2.24		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	34	0.0122	0.77		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	4	0.0309	1.23		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	154	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 202: PR-WS-202

Runoff = 1.03 cfs @ 12.09 hrs, Volume= 0.083 af, Depth> 4.82"
Routed to Pond P1 : POROUS ASPHALT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=5.29"

	Area (sf)	CN	Description
*	2,178	98	Roof, HSG D
*	286	98	Patio/Stairs, HSG D
	1,112	80	>75% Grass cover, Good, HSG D
*	3,658	98	Porous Asphalt, HSG D
*	100	98	Concrete, HSG D
*	1,641	98	Pavement, HSG D
	8,975	96	Weighted Average
	1,112		12.39% Pervious Area
	7,863		87.61% Impervious Area

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

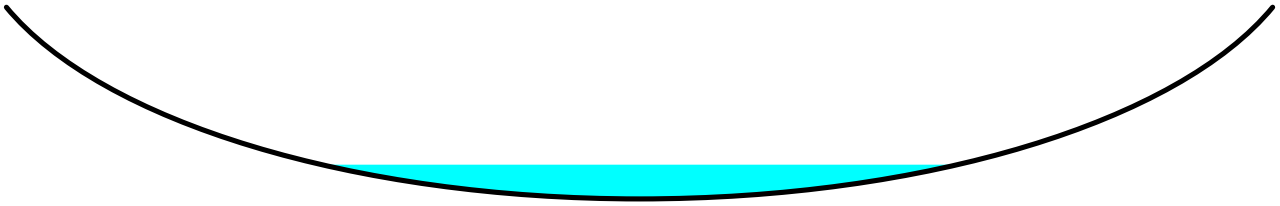
Summary for Reach 20R: OVERLAND FLOW

Inflow Area = 0.206 ac, 87.61% Impervious, Inflow Depth = 2.34" for 10 YEAR event
Inflow = 0.24 cfs @ 12.44 hrs, Volume= 0.040 af
Outflow = 0.24 cfs @ 12.44 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.2 min
Routed to Link AP1 : ANALYSIS POINT #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.96 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 0.50 fps, Avg. Travel Time= 0.7 min

Peak Storage= 5 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 4.22'
Bank-Full Depth= 0.50' Flow Area= 3.3 sf, Capacity= 10.08 cfs

10.00' x 0.50' deep Parabolic Channel, n= 0.030 Earth, grassed & winding
Length= 20.3' Slope= 0.0163 '/'
Inlet Invert= 70.70', Outlet Invert= 70.37'



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Summary for Pond P1: POROUS ASPHALT

Inflow Area = 0.206 ac, 87.61% Impervious, Inflow Depth > 4.82" for 10 YEAR event
Inflow = 1.03 cfs @ 12.09 hrs, Volume= 0.083 af
Outflow = 0.28 cfs @ 12.44 hrs, Volume= 0.082 af, Atten= 73%, Lag= 21.0 min
Discarded = 0.04 cfs @ 12.44 hrs, Volume= 0.042 af
Primary = 0.24 cfs @ 12.44 hrs, Volume= 0.040 af
Routed to Reach 20R : OVERLAND FLOW

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 71.44' @ 12.44 hrs Surf.Area= 4,076 sf Storage= 1,271 cf
Flood Elev= 73.50' Surf.Area= 4,076 sf Storage= 2,463 cf

Plug-Flow detention time= 79.1 min calculated for 0.082 af (99% of inflow)
Center-of-Mass det. time= 75.1 min (835.7 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1	70.49'	4,494 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	70.75'	7 cf	**4.0" Round Pipe Storage** L= 78.0'
		4,501 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
70.49	4,076	0.0	0	0
70.50	4,076	15.0	6	6
70.74	4,076	15.0	147	153
70.75	4,076	40.0	16	169
71.41	4,076	40.0	1,076	1,245
71.42	4,076	15.0	6	1,251
71.66	4,076	15.0	147	1,398
71.67	4,076	5.0	2	1,400
72.66	4,076	5.0	202	1,602
72.67	4,076	30.0	12	1,614
73.16	4,076	30.0	599	2,213
73.17	4,076	15.0	6	2,219
73.49	4,076	15.0	196	2,415
73.50	4,076	100.0	41	2,456
74.00	4,076	100.0	2,038	4,494

Device	Routing	Invert	Outlet Devices
#1	Primary	70.75'	**4.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 70.75' / 70.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.09 sf
#2	Device 1	70.75'	**4.0" Vert. PERFORATED UNDERDRAIN #1** C= 0.600 Limited to weir flow at low heads
#3	Discarded	70.49'	**0.300 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 68.10' Phase-In= 0.10'

Discarded OutFlow Max=0.04 cfs @ 12.44 hrs HW=71.44' (Free Discharge)
↑—**3=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.24 cfs @ 12.44 hrs HW=71.44' TW=70.79' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.24 cfs @ 2.75 fps)
↑—**2=PERFORATED UNDERDRAIN #1**(Passes 0.24 cfs of 0.30 cfs potential flow)

Summary for Link AP1: ANALYSIS POINT #1

Inflow Area = 1.732 ac, 58.01% Impervious, Inflow Depth > 3.84" for 10 YEAR event
Inflow = 5.21 cfs @ 12.24 hrs, Volume= 0.554 af
Primary = 5.21 cfs @ 12.24 hrs, Volume= 0.554 af, Atten= 0%, Lag= 0.0 min

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

Summary for Link AP2: ANALYSIS POINT #2

Inflow Area = 0.022 ac, 42.24% Impervious, Inflow Depth > 3.84" for 10 YEAR event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af
Primary = 0.10 cfs @ 12.09 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

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

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Subcatchment200: EX-WS-100 Runoff Area=66,466 sf 54.02% Impervious Runoff Depth>4.60"
Flow Length=483' Tc=17.6 min CN=89 Runoff=5.64 cfs 0.585 af

Subcatchment201: PR-WS-201 Runoff Area=973 sf 42.24% Impervious Runoff Depth>4.39"
Flow Length=154' Tc=6.0 min CN=87 Runoff=0.11 cfs 0.008 af

Subcatchment202: PR-WS-202 Runoff Area=8,975 sf 87.61% Impervious Runoff Depth>5.39"
Tc=6.0 min CN=96 Runoff=1.14 cfs 0.093 af

Reach 20R: OVERLAND FLOW Avg. Flow Depth=0.10' Max Vel=1.02 fps Inflow=0.29 cfs 0.048 af
n=0.030 L=20.3' S=0.0163 '/' Capacity=10.08 cfs Outflow=0.29 cfs 0.048 af

Pond P1: POROUS ASPHALT Peak Elev=71.68' Storage=1,408 cf Inflow=1.14 cfs 0.093 af
Discarded=0.04 cfs 0.044 af Primary=0.29 cfs 0.048 af Outflow=0.33 cfs 0.092 af

Link AP1: ANALYSIS POINT #1 Inflow=5.90 cfs 0.632 af
Primary=5.90 cfs 0.632 af

Link AP2: ANALYSIS POINT #2 Inflow=0.11 cfs 0.008 af
Primary=0.11 cfs 0.008 af

Total Runoff Area = 1.754 ac Runoff Volume = 0.685 af Average Runoff Depth = 4.69"
42.19% Pervious = 0.740 ac 57.81% Impervious = 1.014 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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

Pond P1: POROUS ASPHALT Peak Elev=72.93' Storage=1,944 cf Inflow=1.66 cfs 0.137 af
Discarded=0.06 cfs 0.053 af Primary=0.47 cfs 0.082 af Outflow=0.53 cfs 0.136 af

NOAA Atlas 14, Volume 10, Version 3
Location name: Durham, New Hampshire, USA*
Latitude: 43.1383°, Longitude: -70.9265°
Elevation: 77 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.300** (0.242-0.374)	**0.363** (0.293-0.452)	**0.466** (0.374-0.583)	**0.550** (0.439-0.692)	**0.667** (0.512-0.876)	**0.755** (0.566-1.01)	**0.847** (0.613-1.18)	**0.951** (0.647-1.35)	**1.10** (0.717-1.62)	**1.23** (0.776-1.84)
10-min	**0.425** (0.343-0.530)	**0.514** (0.415-0.641)	**0.659** (0.529-0.824)	**0.779** (0.622-0.980)	**0.944** (0.726-1.24)	**1.07** (0.801-1.43)	**1.20** (0.869-1.67)	**1.35** (0.917-1.91)	**1.56** (1.02-2.29)	**1.74** (1.10-2.60)
15-min	**0.500** (0.404-0.623)	**0.604** (0.488-0.754)	**0.774** (0.623-0.969)	**0.916** (0.732-1.15)	**1.11** (0.854-1.46)	**1.26** (0.943-1.69)	**1.41** (1.02-1.96)	**1.58** (1.08-2.25)	**1.84** (1.20-2.70)	**2.04** (1.29-3.06)
30-min	**0.668** (0.540-0.832)	**0.807** (0.651-1.01)	**1.04** (0.832-1.30)	**1.22** (0.977-1.54)	**1.48** (1.14-1.95)	**1.68** (1.26-2.26)	**1.88** (1.37-2.63)	**2.12** (1.44-3.02)	**2.48** (1.61-3.64)	**2.77** (1.75-4.15)
60-min	**0.835** (0.675-1.04)	**1.01** (0.815-1.26)	**1.30** (1.04-1.62)	**1.53** (1.22-1.93)	**1.86** (1.43-2.44)	**2.10** (1.58-2.83)	**2.36** (1.72-3.30)	**2.66** (1.81-3.78)	**3.12** (2.03-4.58)	**3.50** (2.21-5.24)
2-hr	**1.12** (0.911-1.39)	**1.36** (1.11-1.69)	**1.76** (1.42-2.19)	**2.09** (1.68-2.62)	**2.55** (1.97-3.34)	**2.88** (2.18-3.87)	**3.25** (2.38-4.54)	**3.69** (2.52-5.22)	**4.37** (2.85-6.38)	**4.94** (3.14-7.36)
3-hr	**1.32** (1.08-1.63)	**1.62** (1.32-2.00)	**2.10** (1.70-2.60)	**2.50** (2.01-3.11)	**3.05** (2.37-3.98)	**3.45** (2.62-4.62)	**3.89** (2.87-5.44)	**4.43** (3.03-6.24)	**5.26** (3.44-7.67)	**5.98** (3.80-8.88)
6-hr	**1.74** (1.43-2.14)	**2.14** (1.75-2.62)	**2.78** (2.28-3.43)	**3.32** (2.70-4.11)	**4.06** (3.18-5.28)	**4.61** (3.52-6.13)	**5.20** (3.85-7.22)	**5.93** (4.07-8.30)	**7.06** (4.63-10.2)	**8.04** (5.13-11.8)
12-hr	**2.22** (1.84-2.70)	**2.74** (2.26-3.34)	**3.59** (2.95-4.38)	**4.29** (3.50-5.27)	**5.25** (4.13-6.79)	**5.97** (4.59-7.89)	**6.74** (5.02-9.31)	**7.70** (5.30-10.7)	**9.18** (6.04-13.2)	**10.5** (6.69-15.3)
24-hr	**2.63** (2.19-3.18)	**3.30** (2.74-3.99)	**4.39** (3.63-5.33)	**5.29** (4.34-6.46)	**6.53** (5.17-8.40)	**7.44** (5.76-9.82)	**8.45** (6.35-11.6)	**9.72** (6.72-13.4)	**11.7** (7.73-16.8)	**13.5** (8.65-19.6)
2-day	**2.92** (2.44-3.50)	**3.74** (3.13-4.49)	**5.08** (4.23-6.13)	**6.20** (5.12-7.52)	**7.74** (6.18-9.93)	**8.85** (6.92-11.7)	**10.1** (7.68-14.0)	**11.8** (8.14-16.2)	**14.4** (9.55-20.5)	**16.9** (10.8-24.4)
3-day	**3.14** (2.64-3.76)	**4.02** (3.38-4.82)	**5.47** (4.57-6.57)	**6.67** (5.53-8.05)	**8.32** (6.66-10.6)	**9.51** (7.46-12.5)	**10.9** (8.29-15.0)	**12.6** (8.78-17.3)	**15.6** (10.3-22.1)	**18.2** (11.7-26.2)
4-day	**3.37** (2.84-4.02)	**4.29** (3.61-5.12)	**5.78** (4.84-6.92)	**7.02** (5.83-8.45)	**8.72** (7.00-11.1)	**9.96** (7.82-13.0)	**11.3** (8.67-15.6)	**13.2** (9.17-18.0)	**16.2** (10.8-22.9)	**18.9** (12.2-27.2)
7-day	**4.09** (3.47-4.85)	**5.05** (4.27-5.99)	**6.61** (5.57-7.88)	**7.91** (6.61-9.47)	**9.69** (7.81-12.3)	**11.0** (8.66-14.3)	**12.4** (9.51-16.9)	**14.3** (10.0-19.5)	**17.4** (11.6-24.4)	**20.1** (13.0-28.7)
10-day	**4.78** (4.06-5.65)	**5.77** (4.90-6.83)	**7.39** (6.24-8.77)	**8.73** (7.32-10.4)	**10.6** (8.54-13.3)	**11.9** (9.40-15.4)	**13.4** (10.2-18.1)	**15.3** (10.7-20.7)	**18.3** (12.2-25.6)	**20.9** (13.6-29.8)
20-day	**6.76** (5.78-7.93)	**7.86** (6.71-9.23)	**9.66** (8.21-11.4)	**11.2** (9.41-13.2)	**13.2** (10.7-16.3)	**14.7** (11.6-18.6)	**16.4** (12.4-21.5)	**18.2** (12.9-24.4)	**21.0** (14.1-29.1)	**23.2** (15.1-32.9)
30-day	**8.32** (7.14-9.72)	**9.51** (8.16-11.1)	**11.5** (9.79-13.5)	**13.1** (11.1-15.5)	**15.3** (12.4-18.8)	**17.0** (13.4-21.3)	**18.8** (14.1-24.3)	**20.6** (14.6-27.5)	**23.2** (15.6-32.0)	**25.1** (16.4-35.4)
45-day	**10.2** (8.78-11.9)	**11.5** (9.90-13.4)	**13.7** (11.7-16.0)	**15.4** (13.1-18.2)	**17.9** (14.5-21.8)	**19.8** (15.6-24.6)	**21.7** (16.3-27.7)	**23.5** (16.7-31.2)	**25.9** (17.5-35.5)	**27.6** (18.0-38.7)
60-day	**11.7** (10.1-13.6)	**13.1** (11.3-15.3)	**15.4** (13.3-18.0)	**17.4** (14.8-20.4)	**20.0** (16.2-24.2)	**22.1** (17.4-27.2)	**24.1** (18.0-30.5)	**25.9** (18.5-34.2)	**28.2** (19.1-38.6)	**29.7** (19.4-41.6)

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

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

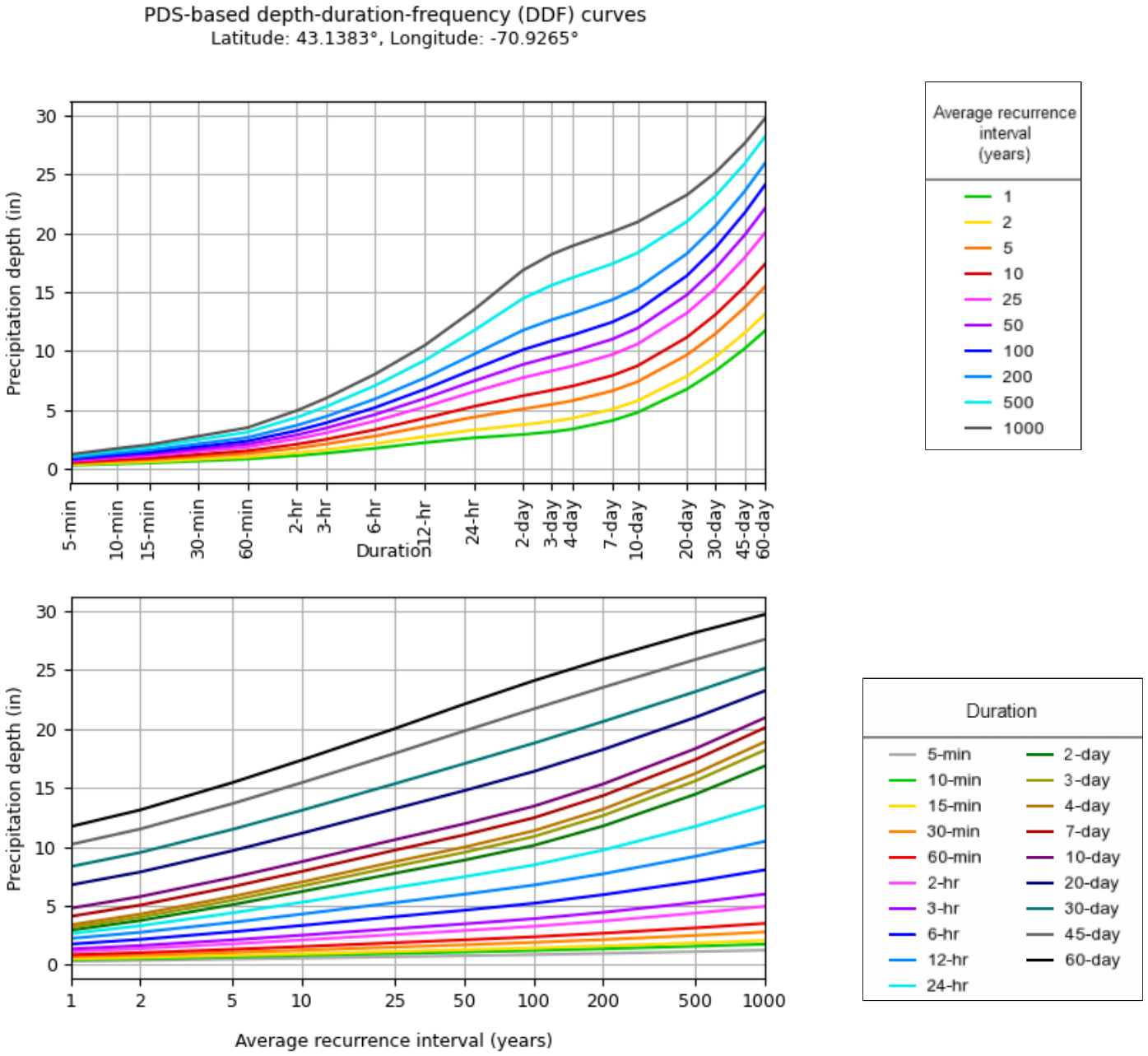
Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

APPENDIX 4

EXTREME PRECIPITATION TABLE



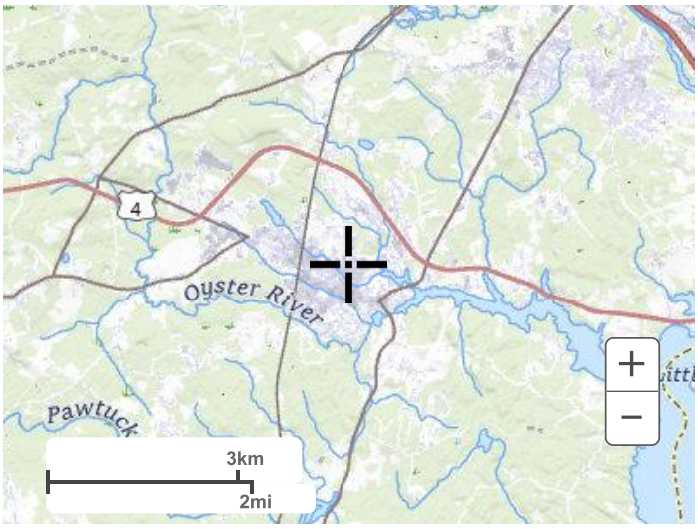
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Wed Jun 25 15:48:17 2025

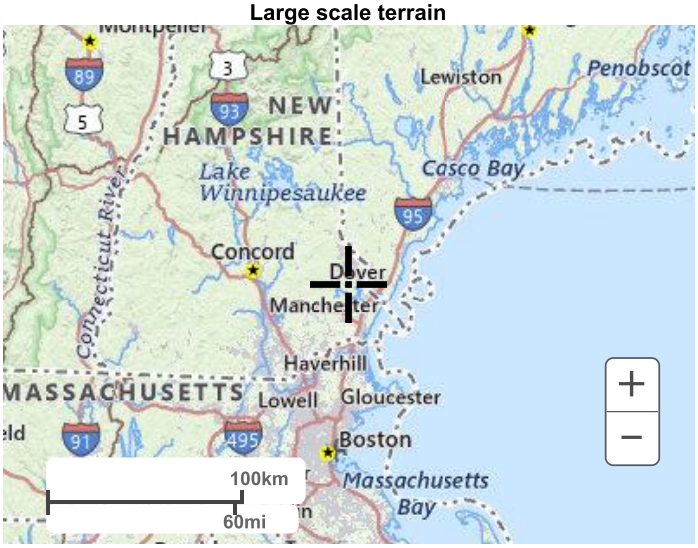
Back to Top

Maps & aerials

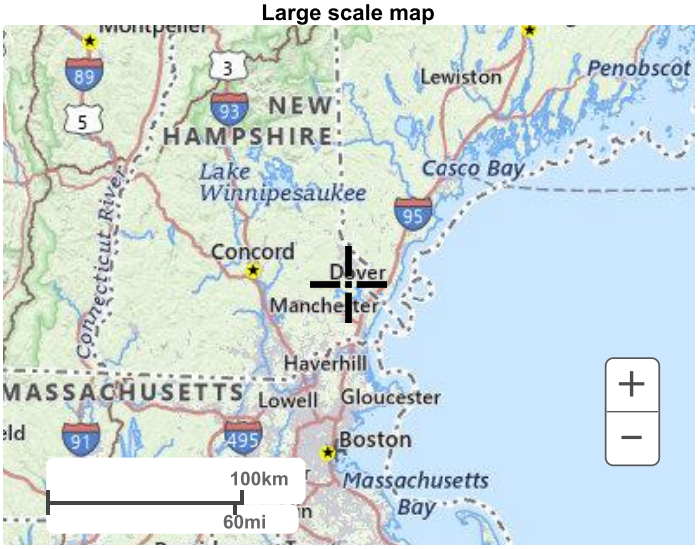
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX 5

WEB SOIL SURVEY

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,570 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

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

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 25, Sep 3, 2024

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	0.6	2.3%
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	18.8	71.1%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	7.0	26.6%
Totals for Area of Interest		**26.4**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

APPENDIX 6

TEST PIT LOG

TEST PITS
FOR
35 MADBURY ROAD
DURHAM, NEW HAMPSHIRE
JUNE 19, 2025
JBE Project No. 25073

Performed by: Anthony Jones, Jones & Beach Engineers, Inc., SSD #1900

Test Pit #1

0"- 14"	10YR 5/6	yellowish brown sand granular, very friable many roots
14" – 36"	10YR 4/4	dark yellowish brown fine sandy loam single grain, very friable common roots
36" – 42"	2.5Y 5/2	grayish brown Loamy fine sand platey, very friable

SHWT = 36"
Roots: 36"
No H_2O observed
No Refusal observed

Test Pit #2

0"- 16"	10YR 5/6	yellowish brown fine sandy loam granular, friable many roots
16" – 40"	10YR 4/4	dark yellowish brown fine sandy loam granular, friable common roots
40" – 48"	2.5Y 5/3	light olive brown Loamy fine sand platey, very friable common roots

SHWT = 40"
Roots: 40"
No H_2O observed
No Refusal observed

APPENDIX 7

BMP WORKSHEETS

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.08)

Type/Node Name: **POROUS ASPHALT (POND P1)**

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

		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.08(a).	
0.21	ac	A = Area draining to the practice	
0.18	ac	A_I = Impervious area draining to the practice	
0.86	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.82	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.17	ac-in	WQV= 1" x Rv x A	
626	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
157	cf	25% x WQV (check calc for sediment forebay volume)	
470	cf	75% x WQV (check calc for surface sand filter volume)	
N/A		Method of Pretreatment? (not required for clean or roof runoff)	
	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
73.01	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.54	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
0.64	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
71.67	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
70.75	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
68.10	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
68.10	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
0.92	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
3.57	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
3.57	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
72.74	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
73.50	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification	
	:1	Pond side slopes	**≥ 3:1**
Sheet		Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
ASPHALT		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
0.1	acres	A_{SA} = Surface area of the pervious pavement	
2.6	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
12.0	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet	D1	Note what sheet in the plan set contains the filter course spec.	

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

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

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

Designer's Notes:

Stage-Area-Storage for Pond P1: POROUS ASPHALT

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
70.49	4,076	0
70.54	4,076	31
70.59	4,076	61
70.64	4,076	92
70.69	4,076	122
70.74	4,076	153
70.79	4,093	235
70.84	4,099	317
70.89	**4,102**	400
70.94	**4,102**	483
70.99	4,099	566
71.04	4,093	648
71.09	4,076	730
71.14	4,076	812
71.19	4,076	893
71.24	4,076	975
71.29	4,076	1,056
71.34	4,076	1,138
71.39	4,076	1,219
71.44	4,076	1,270
71.49	4,076	1,301
71.54	4,076	1,332
71.59	4,076	1,362
71.64	4,076	1,393
71.69	4,076	1,411
71.74	4,076	1,421
71.79	4,076	1,431
71.84	4,076	1,442
71.89	4,076	1,452
71.94	4,076	1,462
71.99	4,076	1,472
72.04	4,076	1,482
72.09	4,076	1,493
72.14	4,076	1,503
72.19	4,076	1,513
72.24	4,076	1,523
72.29	4,076	1,533
72.34	4,076	1,543
72.39	4,076	1,554
72.44	4,076	1,564
72.49	4,076	1,574
72.54	4,076	1,584
72.59	4,076	1,594
72.64	4,076	1,605
72.69	4,076	1,645
72.74	4,076	1,706
72.79	4,076	1,768
72.84	4,076	1,829
72.89	4,076	1,890
72.94	4,076	1,951
72.99	4,076	2,012
73.04	4,076	2,073
73.09	4,076	2,134
73.14	4,076	2,196
73.19	4,076	2,238
73.24	4,076	2,269
73.29	4,076	2,300
73.34	4,076	2,330
73.39	4,076	2,361
73.44	4,076	2,391
73.49	4,076	2,422
73.54	4,076	2,626
73.59	4,076	2,829
73.64	4,076	3,033
73.69	4,076	3,237
73.74	4,076	3,441
73.79	4,076	3,645
73.84	4,076	3,848
73.89	4,076	4,052
73.94	4,076	4,256
73.99	4,076	**4,460**

WQV REQUIRED = 626 C.F.

BOTTOM OF FILTER COURSE = 71.67

STORAGE @ 71.67 = 1,407 C.F.

1,407 C.F. + 626 C.F. = 2,033 C.F.

WQV ELEVATION = 73.01

Stage-Discharge for Pond P1: POROUS ASPHALT

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
70.49	0.00	0.00	0.00
70.54	0.01	0.01	0.00
70.59	0.03	0.03	0.00
70.64	0.03	0.03	0.00
70.69	0.03	0.03	0.00
70.74	0.03	0.03	0.00
70.79	0.03	0.03	0.00
70.84	0.04	0.03	0.01
70.89	0.06	0.03	0.03
70.94	0.08	0.03	0.05
70.99	0.11	0.03	0.07
71.04	0.13	0.04	0.10
71.09	0.16	0.04	0.12
71.14	0.18	0.04	0.15
71.19	0.19	0.04	0.16
71.24	0.21	0.04	0.18
71.29	0.23	0.04	0.20
71.34	0.25	0.04	0.21
71.39	0.27	0.04	0.23
71.44	0.28	0.04	0.24
71.49	0.29	0.04	0.25
71.54	0.30	0.04	0.26
71.59	0.31	0.04	0.27
71.64	0.32	0.04	0.28
71.69	0.33	0.04	0.29
71.74	0.34	0.04	0.30
71.79	0.35	0.04	0.31
71.84	0.36	0.04	0.32
71.89	0.37	0.05	0.33
71.94	0.38	0.05	0.34
71.99	0.39	0.05	0.34
72.04	0.40	0.05	0.35
72.09	0.41	0.05	0.36
72.14	0.42	0.05	0.37
72.19	0.42	0.05	0.37
72.24	0.43	0.05	0.38
72.29	0.44	0.05	0.39
72.34	0.45	0.05	0.40
72.39	0.45	0.05	0.40
72.44	0.46	0.05	0.41
72.49	0.47	0.05	0.42
72.54	0.48	0.05	0.42
72.59	0.48	0.05	0.43
72.64	0.49	0.05	0.44
72.69	0.50	0.05	0.44
72.74	0.50	0.06	0.45
72.79	0.51	0.06	0.45
72.84	0.52	0.06	0.46
72.89	0.52	0.06	0.47
72.94	0.53	0.06	0.47
72.99	0.54	0.06	0.48
73.04	0.54	0.06	0.48
73.09	0.55	0.06	0.49
73.14	0.55	0.06	0.49
73.19	0.56	0.06	0.50
73.24	0.57	0.06	0.51
73.29	0.57	0.06	0.51
73.34	0.58	0.06	0.52
73.39	0.58	0.06	0.52
73.44	0.59	0.06	0.53
73.49	0.60	0.06	0.53
73.54	0.60	0.06	0.54
73.59	0.61	0.07	0.54
73.64	0.61	0.07	0.55
73.69	0.62	0.07	0.55
73.74	0.62	0.07	0.56
73.79	0.63	0.07	0.56
73.84	0.64	0.07	0.57
73.89	0.64	0.07	0.57
73.94	0.65	0.07	0.58
73.99	**0.65**	**0.07**	**0.58**

WQV ELEVATION = 73.01

DISHCHARGE @ 73.04
= 0.54 C.F.S.

APPENDIX 8

RIP RAP CALCULATIONS

RIP RAP CALCULATIONS

35 Madbury Road
Durham, NH

Jones & Beach Engineers, Inc.
P.O. Box 219
Stratham, NH 03885
2-Jul-25

Rip Rap equations were obtained from the *Stormwater Management and Erosion Control Handbook for Urban and Developing Areas in New Hampshire.*
Aprons are sized for the 25-Year storm event.

TAILWATER < HALF THE D_o

$L_a = (1.8 \times Q) / D_0^{3/2} + (7 \times D_o)$
$W = L_a + (3 \times D_o)$ or defined channel width
$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)

TAILWATER > HALF THE D_o

$L_a = (3.0 \times Q) / D_0^{3/2} + (7 \times D_o)$
$W = (0.4 \times L_a) + (3 \times D_o)$ or defined channel width
$d_{50} = (0.02 \times Q^{4/3}) / (T_w \times D_0)$

Culvert or Catch Basin (Sta. No.)	Tailwater (Feet) T_w	Discharge (C.F.S.) Q	Diameter of Pipe D_o	Length of Rip Rap L_a (feet)	Width of Rip Rap W (feet)	d_{50}-Median Stone Rip Rap d50 (feet)
4" HDPE	0.33	0.44	0.33	9.3	5	0.06

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d_{50} Size =	0.25	Feet	3	Inches
% of Weight Smaller		Size of Stone (Inches)		
Than the Given d_{50} Size		From		To
100%		5		6
85%		4		5
50%		3		5
15%		1		2

Table 7-24 -- Recommended Rip Rap Gradation Ranges				
d_{50} Size =	0.5	Feet	6	Inches
% of Weight Smaller		Size of Stone (Inches)		
Than the Given d_{50} Size		From		To
100%		9		12
85%		8		11
50%		6		9
15%		2		3

APPENDIX 9

STORMWATER OPERATIONS & MAINTENANCE MANUAL

JONES & BEACH ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

35 Madbury Road
Tax Map 106 / Lot 19
Durham, NH 03824

Prepared for:

DWS 35, LLC
288 Calef Highway
Lee, NH 03861

July 2, 2025
JBE Project No. 25073

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The property owner, 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 property owner shall keep receipts and records of all maintenance companies hired throughout the year.

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. Parking Lot and Roadway
    b. Culverts
    c. Vegetation and Landscaping
    d. Riprap Outlet Protection Apron
    e. Porous Pavement

2. Maintenance of permanent measures shall follow the following schedule:

    a. Normal winter roadway and parking lot maintenance including plowing and snow removal. Road and parking lot sweeping at the end of every winter, preferably at the start of the spring rain season.

    b. **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.

    c. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately. **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.

d. Rock riprap should be **inspected annually** and after every major storm event 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.

e. Porous Asphalt Parking Lots:

The following recommendations will help assure that the pavement is maintained to preserve its hydrologic effectiveness.

Winter maintenance:

- Sanding for winter traction is prohibited. Deicing is permitted (NaCl, $MgCl_2$, or equivalent). Reduced salt application is possible and can be a cost savings for winter maintenance. Nontoxic, organic deicers, applied either as blended, magnesium chloride-based liquid products or as pretreated salt, are preferable.
- Plowing is allowed, blade should be set approximately 1" above road surface. Ice and light snow accumulation are generally not as problematic as for standard asphalt. Snow will accumulate during heavier storms and should be plowed. (more than usual, about an inch).

Routine maintenance:

- Asphalt seal coating is absolutely forbidden. Surface seal coating is not reversible.
- The pavement surface should be vacuumed 2 or 3 times per year, and at any additional times sediment is spilled, eroded, or tracked onto the surface.
- Planted areas adjacent to pervious pavement should be well maintained to prevent soil washout onto the pavement. If any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once.
- Immediately clean any soil deposited on pavement. Superficial dirt does not necessarily clog the pavement voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, trucks or other heavy vehicles should be prevented from tracking or spilling dirt onto the pavement.
- Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface. Contractor to laydown tarps, plywood

or removable item and take care not to track material onto unprotected pavement.

- Repairs: potholes of less than 50 square feet can be patched by any means suitable with standard pavement or a pervious mix is preferred. For areas greater than 50 sq. ft. is in need of repair, approval of patch type should be sought from a qualified engineer. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.
- Written and verbal communication to the porous pavement's future owner should make clear the pavement's special purpose and special maintenance requirements such as those listed here.
- A permanent sign should be added at the entrance and end of the porous asphalt area to inform residents and maintenance staff of the special nature and purpose of the pavement, and its special maintenance requirements.

Signage should read as follows:

POROUS ASPHALT PAVEMENT
FOR STORM WATER MANAGEMENT

MAINTENANCE REQUIREMENTS:

PLOW WITH SLIGHTLY RAISED BLADE ONLY
SANDING OF SURFACE PROHIBITED
DEICING PERMITTED (NaC1, $MgC1_2$ OR EQUIVALENT)
SEAL-COATING PROHIBITED
CLEANING BY PRESSURIZED AIR OR WATER PROHIBITED
DRY VACUUM SEMIANNUALLY

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

The Condominium Association, 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 Association shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. The annual report and certification shall be submitted with three copies to the Town Planner by December 31st of each year.

Construction Activity	**Date of Inspection**	**Who Inspected**	**Findings of Inspector**
Parking Lot and Roadway			
Culverts			
Vegetation and Landscaping			
Rip Rap Outlet Protection Apron			

Porous Pavement			

Regular Inspection and Maintenance Guidance for Porous Pavements

Regular inspection and maintenance is critical to the effective operation of porous pavement. It is the responsibility of the owner to maintain the pavement in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including the occurrence of large storm events, seasonal changes, and traffic conditions.

Inspection Activities

Visual inspections are an integral part of system maintenance. This includes monitoring pavement to ensure water drainage, debris accumulation, and surface deterioration.

ACTIVITY	FREQUENCY
Check for standing water on the surface of the pavement after a precipitation event. If standing water remains within 30 minutes after rainfall had ended, cleaning of porous pavement is recommended.	2 to 4 times per year, more frequently for high use sites or sites with higher potential for run-on
Vacuum sweeper shall be used regularly to remove sediment and organic debris on the pavement surface. The sweeper may be fitted with water jets.	
Pavement vacuuming should occur during spring cleanup following the last snow event to remove accumulated debris, at minimum.	
Pavement vacuuming should occur during fall cleanup to remove dead leaves, at minimum	
Power washing can be an effective tool for cleaning clogged areas. This should occur at mid pressure typically less the 500 psi and at an angle of 30 degrees or less.	
Check for debris accumulating on pavement, especially debris buildup in winter. For loose debris, a power/leaf blower or gutter broom can be used to remove leaves and trash.	
Check for damage to porous pavements from non-design loads. Damaged areas may be repaired by use of infrared heating and rerolling of pavement. Typical costs may be 2,000/ day for approximately 500 ft of trench.	

Maintenance Activities

Routine preventative cleaning is more effective than corrective cleaning.

Activity	Frequency
Controlling run-on and debris tracking is key to extending the life of porous surfaces. Erosion and sedimentation control of adjacent areas is crucial. Vacuuming adjacent non porous asphalt can be effective at minimizing run-on.	Whenever vacuuming adjacent porous pavements
Repairs may be needed from cuts of utilities. Repairs can be made using standard (non-porous) asphalt for most damages. Repairs using standard asphalt should not exceed 15% of total area.	As needed
Do not store materials such as sand/salt, mulch, soil, yard waste, and other stock piles on porous surfaces.	
Stockpiled snow areas on porous pavements will require additional maintenance and vacuuming. Stockpiling on snow on porous pavements is not recommended and will lead to premature clogging.	

Damage can occur to porous pavement from non-design loads. Precautions such as clearance bars, signage, tight turning radius, high curbs, and video surveillance may be required where there is a risk of non-design loads.	
Posting of signage is recommended indicating presence of porous pavement. Signage should display limitation of design load (i.e. passenger vehicles only, light truck traffic, etc. as per pavement durability rating.)	

CHECKLIST FOR INSPECTION OF POROUS PAVEMENTS

Location: Inspector:

Date: Time: Site Conditions:

Date Since Last Rain Event:

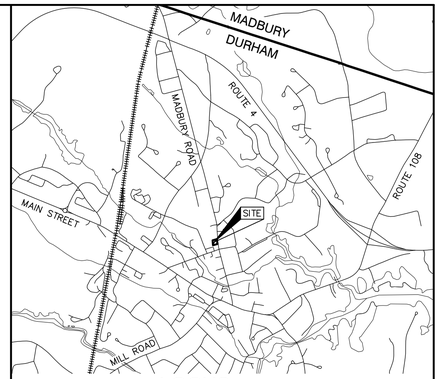
Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Salt / Deicing *Note complete winter maintenance guidance is available at UNHSC		
Use salt only for ice management	**S U**	
Vacuum sweeper shall be used	**S U**	
2. Debris Cleanup (2-4 times a year minimum, Spring & Fall)		
Clean porous pavement to remove sediment and organic debris on the pavement surface via vacuum street sweeper.	**S U**	
Adjacent non porous pavement vacuumed	**S U**	
Clean catch basin (if available)	**S U**	
3. Controlling Run-On (2-4 times a year)		
Adjacent vegetated areas show no signs of erosion and run-on to porous pavement	**S U**	
4. Outlet / Catch Basin Inspection (if available) (2 times a year, After large storm events)		
No evidence of blockage	**S U**	
Good condition, no need for cleaning/repair	**S U**	
5. Poorly Drainage Pavement (2-4 times a year)		
Pavement has been pressure washed and vacuumed	**S U**	
6. Pavement Condition (2-4 times a year minimum, Spring & Fall)		
No evidence of deterioration	**S U**	
No cuts from utilities visible	**S U**	
No evidence of improper design load applied	**S U**	
7. Signage / Stockpiling (As Needed)		
Proper signage posted indicating usage for traffic load	**S U**	
No stockpiling of materials and no seal coating	**S U**	

Corrective Action Needed	Due Date
1.	
2.	

2/2011, University of New Hampshire Stormwater Center

APPENDIX 10

WATERSHED PLANS



LOCUS SCALE: 1"=2000'

APPROX

LEGEND

SUBCATCHMENT BOUNDARY

SUBCATCHMENT (X)

REACH (X)

POND (X)

TC PATH

SOIL LEGEND

SYMBOL	NAME	HSG
HcB	HOLLIS–CHARLTON FINE SANDY LOAMS	D

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

PROJECT PARCEL
TOWN OF DURHAM, NH
TAX MAP 106, LOT 19

APPLICANT/OWNER
DWS 35, LLC
288 CALEF HIGHWAY
LEE, NH 03861

TOTAL LOT AREA
±18,060 SQ. FT.
±0.42 ACRES

Design: NJL	Draft: NJL	Date: 06/25/2025
Checked: PSL	Scale: AS SHOWN	Project No.: 25073
Drawing Name: 25073-WATERSHED.dwg		

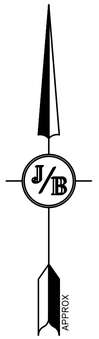
STATE OF NEW HAMPSHIRE · PAIGE S. LIBBEY No.16670 · LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
0	07/02/25	ISSUED FOR REVIEW	NJL

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING WATERSHED PLAN
Project:	35 MADBURY ROAD DURHAM, NH
Owner of Record:	DWS 35, LLC 288 CALEF HIGHWAY, LEE, NH 03861

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 25073



LEGEND

SUBCATCHMENT BOUNDARY

SUBCATCHMENT (X)

REACH (X)

POND (X)

TC PATH

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 feet

PROJECT PARCEL
TOWN OF DURHAM, NH
TAX MAP 106, LOT 19

APPLICANT/OWNER
DWS 35, LLC
288 CALEF HIGHWAY
LEE, NH 03861

TOTAL LOT AREA
±18,060 SQ. FT.
±0.42 ACRES

Design: NJL	Draft: NJL	Date: 06/25/2025
Checked: PSL	Scale: AS SHOWN	Project No.: 25073
Drawing Name: 25073-WATERSHED.dwg		

STATE OF NEW HAMPSHIRE – PAIGE S. LIBBEY No.16670 – LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION	BY
0	07/02/25	ISSUED FOR REVIEW	NJL

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	PROPOSED WATERSHED PLAN
Project:	35 MADBURY ROAD DURHAM, NH
Owner of Record:	DWS 35, LLC 288 CALEF HIGHWAY, LEE, NH 03861

DRAWING No.
W2
SHEET 2 OF 2
JBE PROJECT NO. 25073