

DRAINAGE REPORT

Prepared for:

KAPPA DELTA
25 MADBURY ROAD
DURHAM, NH 03824
TAX MAP 2, LOT 12-2

Rev. 2

Prepared on:

December 26, 2018



5 Railroad Street • P.O. Box 359
Newmarket, NH 03857
Phone: (603) 659-4979
Email: mjs@mjs-engineering.com

Table of Contents

1. Project Background / Purpose.....	1
2. Methodology	1
3. Soils	1
4. Pre-Development Conditions	1
5. Post-Development Conditions	2
6. Comparison of Pre- and Post-Development Conditions	2
7. Stormwater Treatment and Pretreatment Practices	5
8. WQV Calculations.....	5
9. Erosion & Sediment Control.....	5
10. Conclusion	6

<u>Appendix Number</u>	<u>Description</u>
A	Pre- and Post-Development Drainage Plan
B	Pre-Development Drainage Analysis
C	Post-Development Drainage Analysis
D	Cornell Extreme Precipitation Table
E	Ksat Table for Soils

1. Project Background / Purpose

Alpha Sigma House Corp. of Kappa Delta Sorority is the owner of 25 Madbury Road (Lot 12-2). The proposal is construct an addition to the existing building on Lot 12-2. The 25 Madbury Road property is located in the central business zone. The proposed addition will increase the footprint of the building approximately 1900 sq feet with additional proposed impacts for an ADA entrance in the front of the the property and new patio at the rear entrance of the building. Stormwater management will be done through the use of underground storage chambers beneath the patio.

2. Methodology

The watershed areas have been determined via inspection by our office and a topographical survey of the site. This analysis utilizes HydroCAD modeling software which models the runoff based on the SCS TR-20 method and the time of concentration based on the SCS TR-55 method. This analysis compares the runoff rates for the 1-inch, 2, 10, and 25-year USDA/SCS Type III 24-hour extreme storm events. The rainfall data used in the model is referenced from the Cornell extreme precipitation rainfall table found in Appendix D of this report.

3. Soils

The soils on site consist mostly of very rocky fine sandy loam and fine sandy loam with Hydrologic Soil Groups determined to be C. The soils in this analysis have been identified in accordance with the NRCS Web Soil Survey. The soils in the area of the development are more typical of a HcB soil.

Soil Types

Label	Description	HSG:
HcB	Hollis-Charlton Fine Sandy Loam 3-8% Slopes	C
HdB	Hollis-Charlton Very Rocky Fine Sandy Loams 3-8% Slopes	C

4. Pre-Development Conditions

The enclosed Pre-Development portion of the Drainage Plan (Appendix A) depicts the contributing runoff area of the property. The watershed areas have been determined via inspection by our office as well as a topographical survey. The watershed boundary only encompasses areas that are directly impacted by the development of the site.

The new construction is proposed on the north of the existing building on lot 12-2. The proposed project area slopes away from the existing building towards the abutting lots (12-0, 12-3 and 12-1) and Madbury Road. A point of analysis (POA 1) has been identified in order to conduct the drainage analysis. POA 1 is located in the northwest corner of the lot where stormwater naturally flows towards the nearby stream. Additionally, some of the existing gutters collecting roof runoff are drained toward POA 1. In addition to the POA 1 there are two subcatchments draining off the property. Subcatchment 3 drains to the property lot line shared with lot 12-0. Subcatchment 4 drains to Madbury Road.

The project area has been divided into four subcatchments. Subcatchment 1 is the footprint of the existing building that is collected by gutters and routed to the rear of the lot by drainage pipes. Subcatchment 2 is the area between the existing building and the western lot line. This area includes an existing paved patio and a number of trees. Both Subcatchment 1 and 2 drain to POA 1. Subcatchment 3 is the area to the north of the existing building with drains into the lot 12-0. Subcatchment 4 is the area to the east of the existing building up to Madbury Road.

The hydrologic analysis of the existing runoff conditions is provided in Appendix B.

5. Post-Development Conditions

The proposal includes the construction of an addition to an existing building on the lot, as well as an ADA front entrance and a rear patio.

The location of the POA used in the Pre-Development Analysis has been maintained for the Post-Development Analysis. The hydrologic evaluation of the proposed runoff conditions is provided in the enclosed 18-067 POST HydroCAD™ output (Appendix C). The subcatchment areas have changed to reflect the proposed grading of the site. The overall outer boundary has been maintained. The cover types are the same as in the Pre-Development.

Subcatchment 1S is collected by the proposed StormTech subsurface stormwater storage chambers. The subsurface storage chambers are designed to mitigate the effects of the increased impervious coverage on the lot by buffering the peak flow and allowing for infiltration.

The design infiltration rate for the bioretention system was determined per the NHDES Alteration of Terrain rules. The saturated hydraulic conductivity (Ksat) for the limiting layer of the Hollis-Charlton soil series is taken as 0.6 inches per hour. A 50% multiplier is applied in accordance with NHDES (Appendix E). The resultant design infiltration rate is 0.30 in/hr.

Subcatchment 2 comprises the remaining area draining to POA1 not captured in the subsurface chambers which drains to POA1 of the surface.

Subcatchment 3 comprises the area to the north of the building which runoff is. Due to the increased footprint of the building and the roof runoff being routed to POA1, the area of subcatchment 3 draining to the neighboring lot has been decreased.

Subcatchment 4 comprises the area draining to Madbury Road. Subcatchment 4 has remained the same as in the pre-development conditions with a small increase of impervious area for the ADA walkway.

The hydrologic analysis of the proposed runoff conditions is provided in Appendix C.

6. Comparison of Pre- and Post-Development Conditions

The following tables quantify the peak rate of discharge and discharge volume leaving the parcel at POA 1 as shown on the Pre- and Post-Development Drainage Plan. The analysis has been modeled using the extreme rainfall quantities.

Table 1: Peak Rate of Runoff at POA 1 Summary Table

<u>Storm</u>	<u>Pre-Development (cfs)</u>	<u>Post-Development (cfs)</u>	<u>Difference</u>
1-Inch	0.02	0.05	+0.03
2-Year	0.19	0.19	0.00
10-Year	0.34	0.28	-0.06
25-Year	0.46	0.46	0.00

Table 2: Discharge Runoff Volume at POA 1 Summary Table

<u>Storm</u>	<u>Pre-Development (cf)</u>	<u>Post-Development (cf)</u>	<u>Difference</u>
1-Inch	99	136	+37
2-Year	633	841	+208
10-Year	1133	1493	+360
25-Year	1548	2015	+467

The peak runoff rate increases for a 1-inch storm, stays the same for the 2- and 25-year storms and decreases for the 10-year storm. The reduction in peak rate of discharge is attributed to the underground stormwater storage, which provides peak flow attenuation and volume reduction. There is an increase in the runoff volume due to the limited infiltration capacity of the native soils and the increased area draining to POA 1. The outlet manifold of the ungerground stormwater storage system has been designed for a 100-year storm with 24-hour duration (See Appendix C).

The following tables quantify the peak rate of discharge and discharge volume leaving the parcel at Subcatchment 3 as shown on the Pre- and Post-Development Drainage Plan. The analysis has been modeled using the extreme rainfall quantities.

Table 3: Peak Rate of Runoff at Subcatchment 3 Summary Table

<u>Storm</u>	<u>Pre-Development (cfs)</u>	<u>Post-Development (cfs)</u>	<u>Difference</u>
1-Inch	0.00	0.00	0.00
2-Year	0.07	0.05	-0.02
10-Year	0.16	0.12	-0.04
25-Year	0.23	0.17	-0.06

Table 4: Discharge Runoff Volume at Subcatchment 3 Summary Table

<u>Storm</u>	<u>Pre-Development (cf)</u>	<u>Post-Development (cf)</u>	<u>Difference</u>
1-Inch	5	7	+2
2-Year	226	171	-55
10-Year	493	360	-133
25-Year	729	525	-204

The peak runoff rate stays the same or decreases for all design storms. The reduction in peak rate of discharge is attributed to the decreased area draining to Subcatchment 3. There is a decrease in the runoff volume despite the increased impervious area due to decreased overall area draining to Subcatchment 3.

The following tables quantify the peak rate of discharge and discharge volume leaving the parcel at Subcatchment 4 as shown on the Pre- and Post-Development Drainage Plan. The analysis has been modeled using the extreme rainfall quantities.

Table 5: Peak Rate of Runoff at Subcatchment 4 Summary Table

<u>Storm</u>	<u>Pre-Development (cfs)</u>	<u>Post-Development (cfs)</u>	<u>Difference</u>
1-Inch	0.00	0.00	0.00
2-Year	0.06	0.07	+0.01
10-Year	0.13	0.13	0.00
25-Year	0.18	0.19	+0.01

Table 6: Discharge Runoff Volume at Subcatchment 4 Summary Table

<u>Storm</u>	<u>Pre-Development (cf)</u>	<u>Post-Development (cf)</u>	<u>Difference</u>
1-Inch	13	13	0
2-Year	207	207	0
10-Year	410	410	0
25-Year	583	582	-1

The peak runoff rate and volume discharged from Subcatchment 4 remains the same for all design storms.

7. Stormwater Treatment and Pretreatment Practices

Stormwater pre-treatment will be provided by sediment forebays. Stormwater treatment will be provided by a retention system.

8. WQV Calculations

A factor of 0.4 is applied to HSG C soils that are replaced by impervious area. The required volume to be infiltrated for this project is as follows;

Proposed impervious area: 3032 sf (HSG C Soil)
 $3032 \text{ sf} \times 0.4 \times (1'/12'') = 101 \text{ cf}$

Storm	Volume Infiltrated (cf)
1 inch	0
2 Year	0
10 Year	0
25 Year	0

As shown in Table 7, the underground storage system does not allow for appreciable infiltration. This is a result of the limited capacity of only 0.3 inch/hour of the native soil for infiltration.

9. Erosion & Sediment Control

Temporary and permanent practices are used to prevent and minimize erosion and sedimentation on site. The installation of Silt Soxx™ at the perimeter of construction areas will provide sediment retention during the construction phase of the development. Erosion control matting is proposed on all spillways to prevent erosion prior to the establishment of permanent vegetation.

10. Conclusion

The enclosed comparative hydrologic model provides sufficient evidence that the stormwater design will mitigate the typical increase in peak rate of stormwater discharge resulting from the proposed development of the site. Stormwater treatment practices will provide treatment of runoff from proposed impervious surfaces. The use of erosion and sediment controls and proper construction practices will minimize the impact of this project to downstream surface waters.

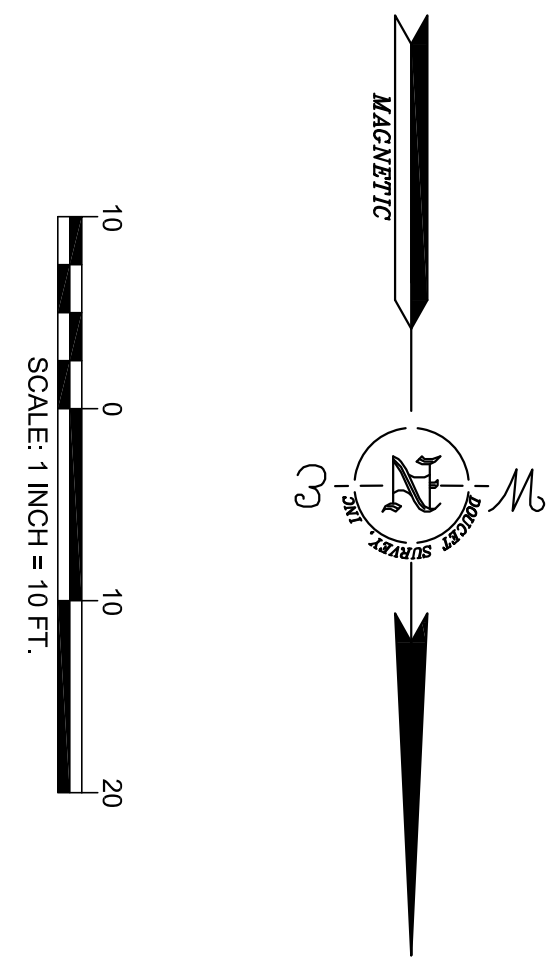
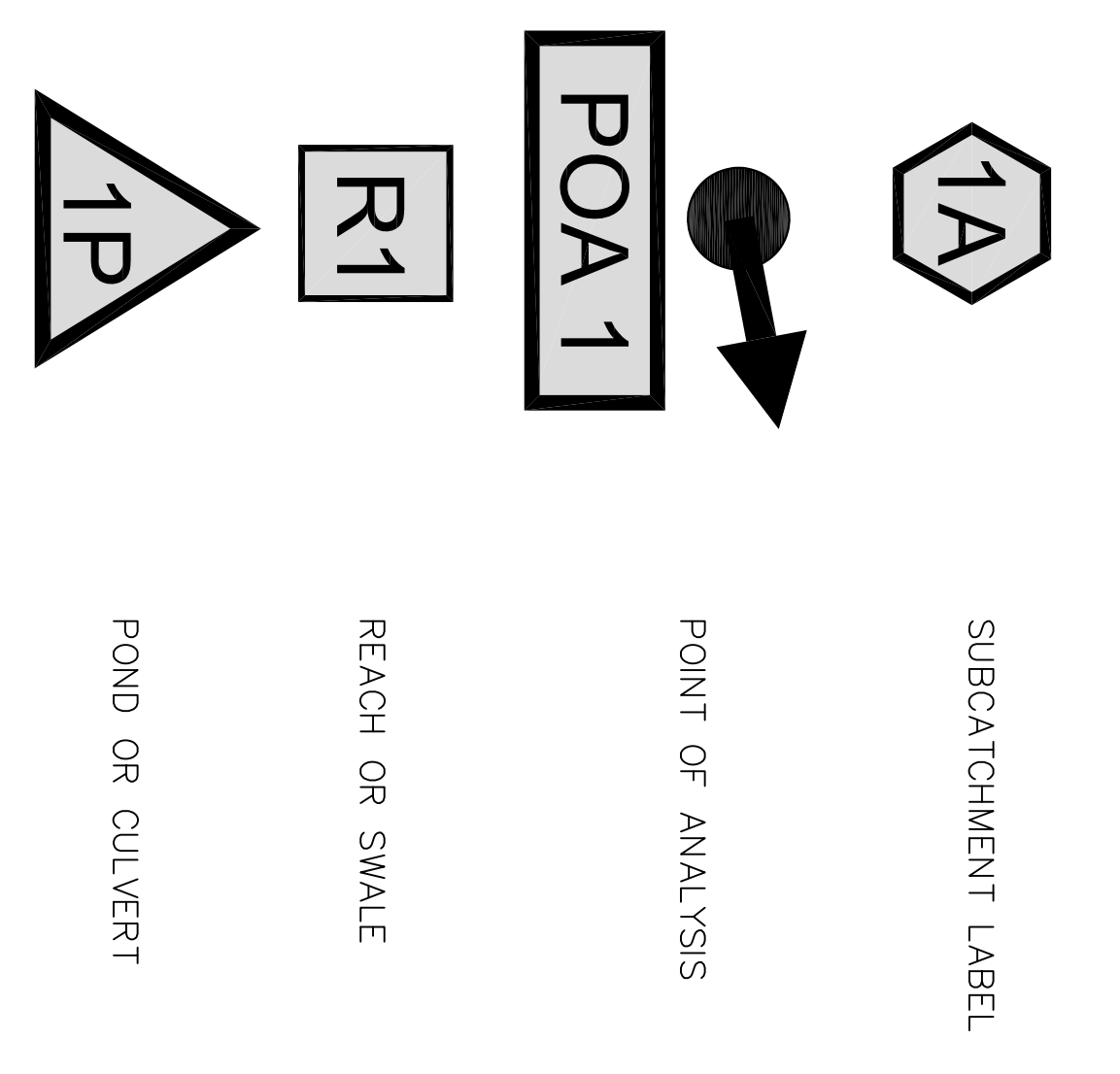
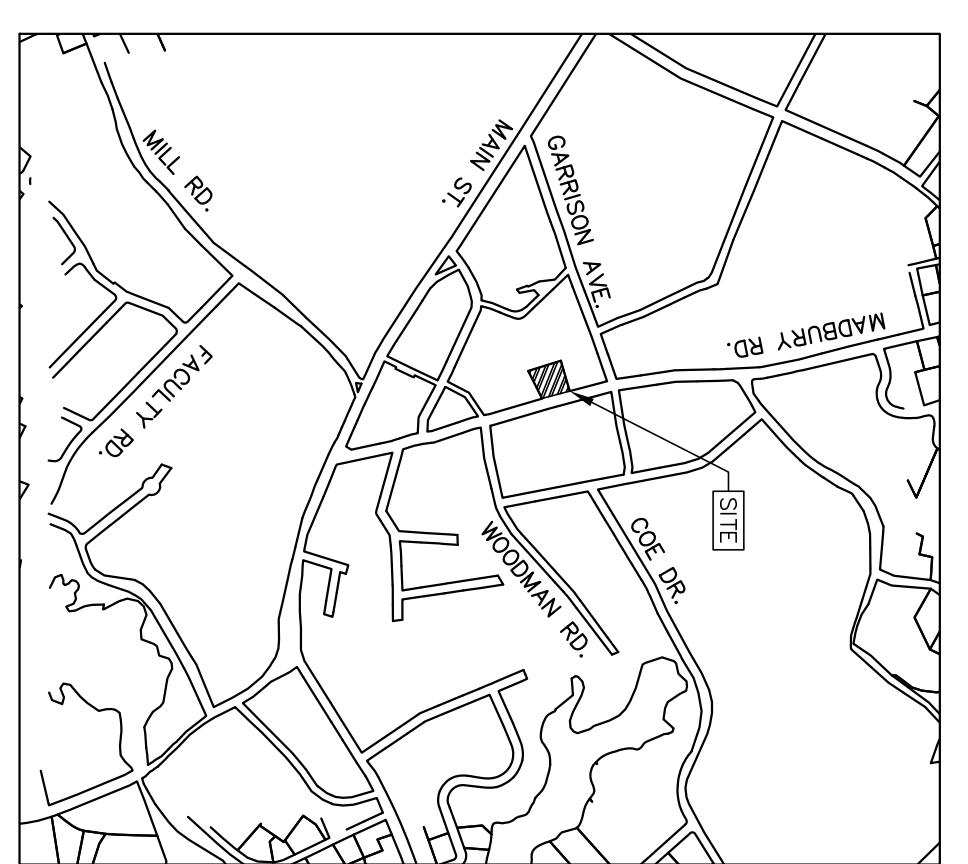
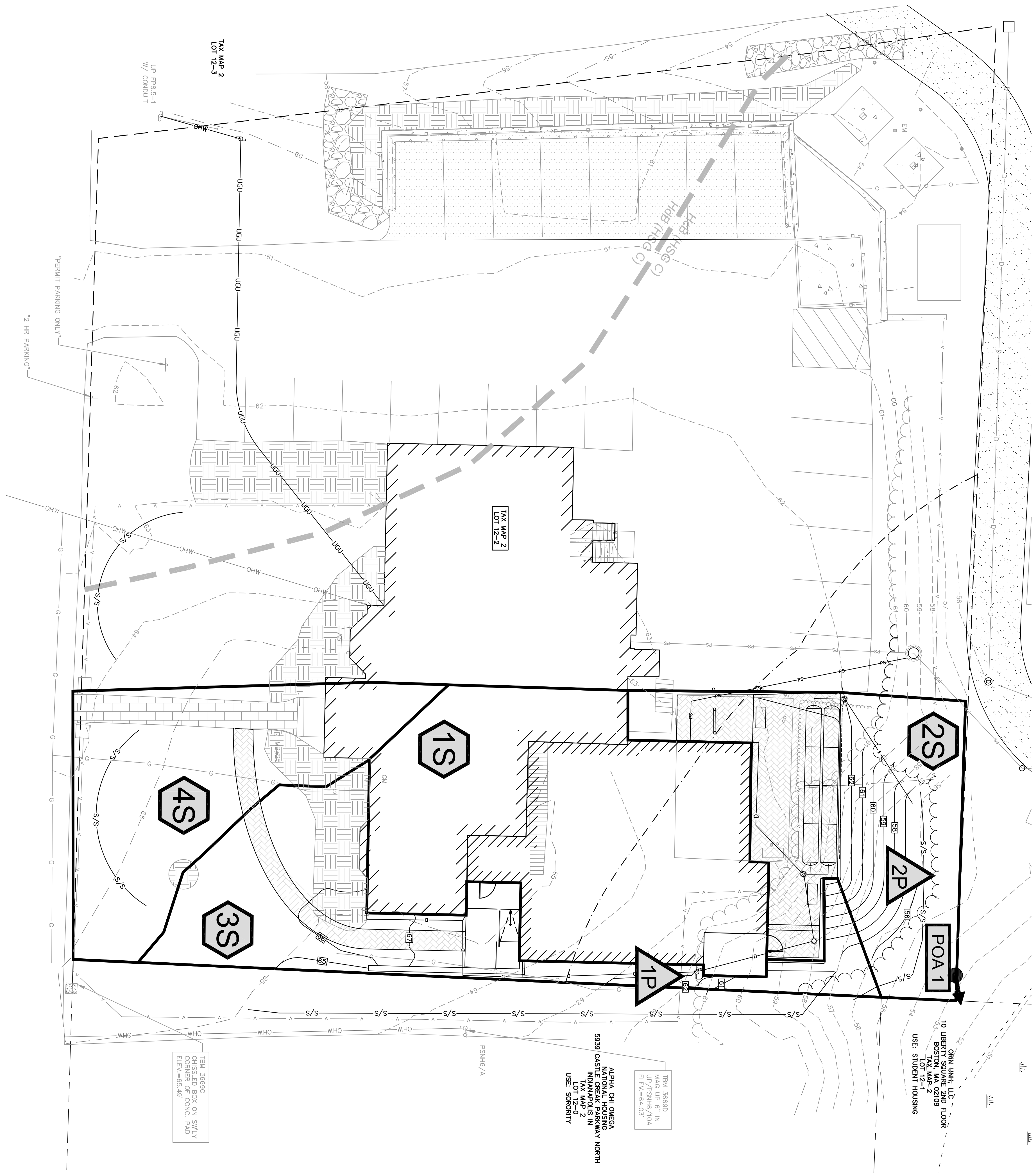
APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E



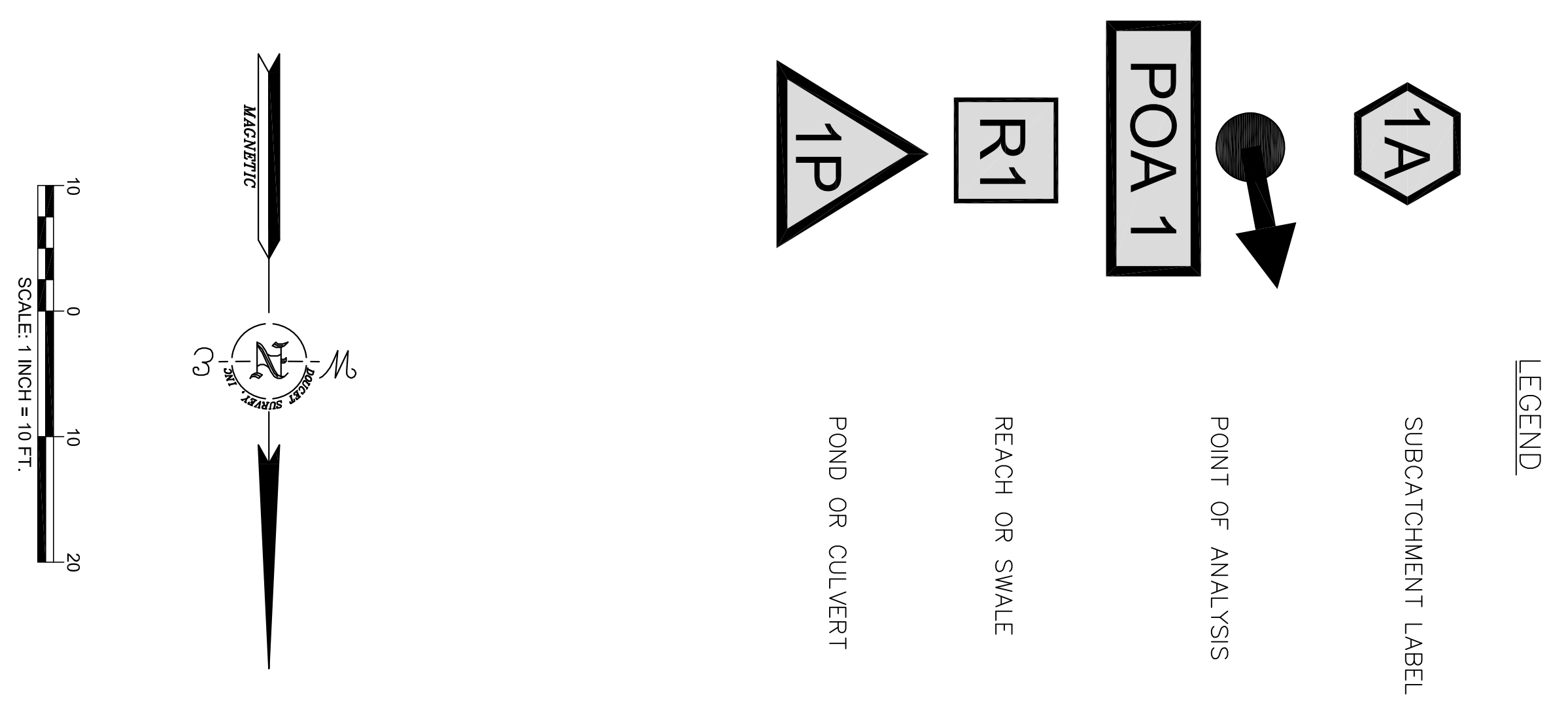
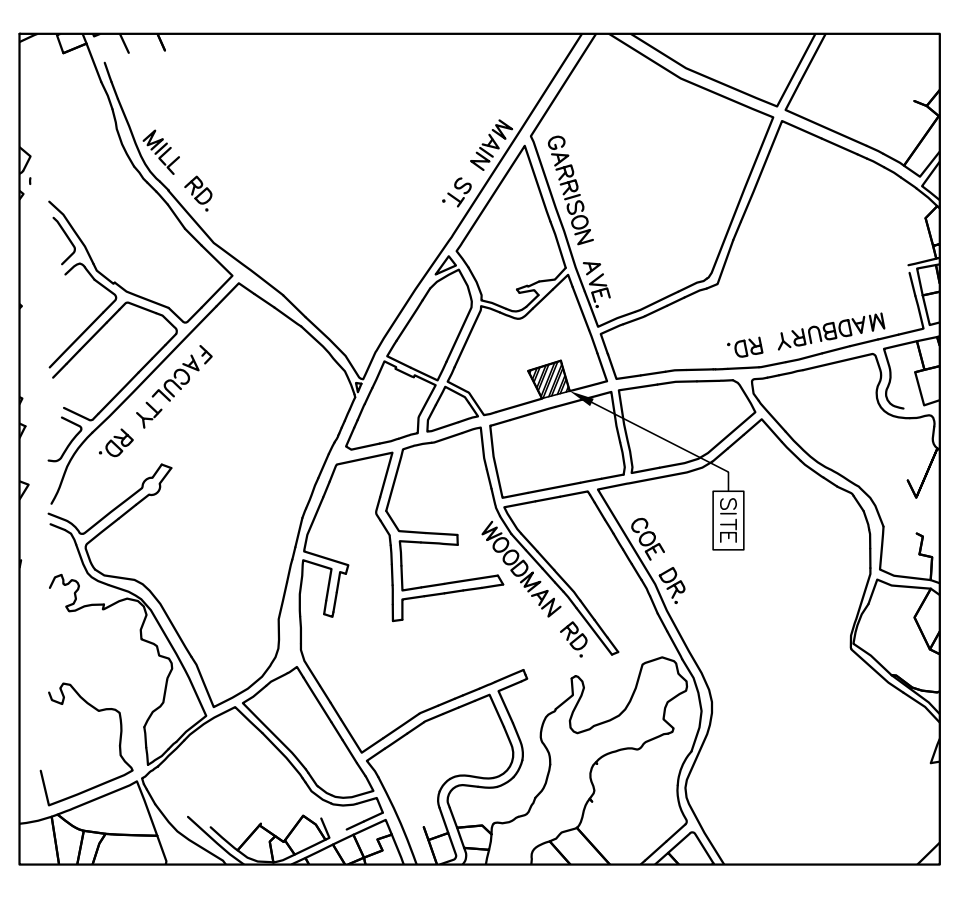
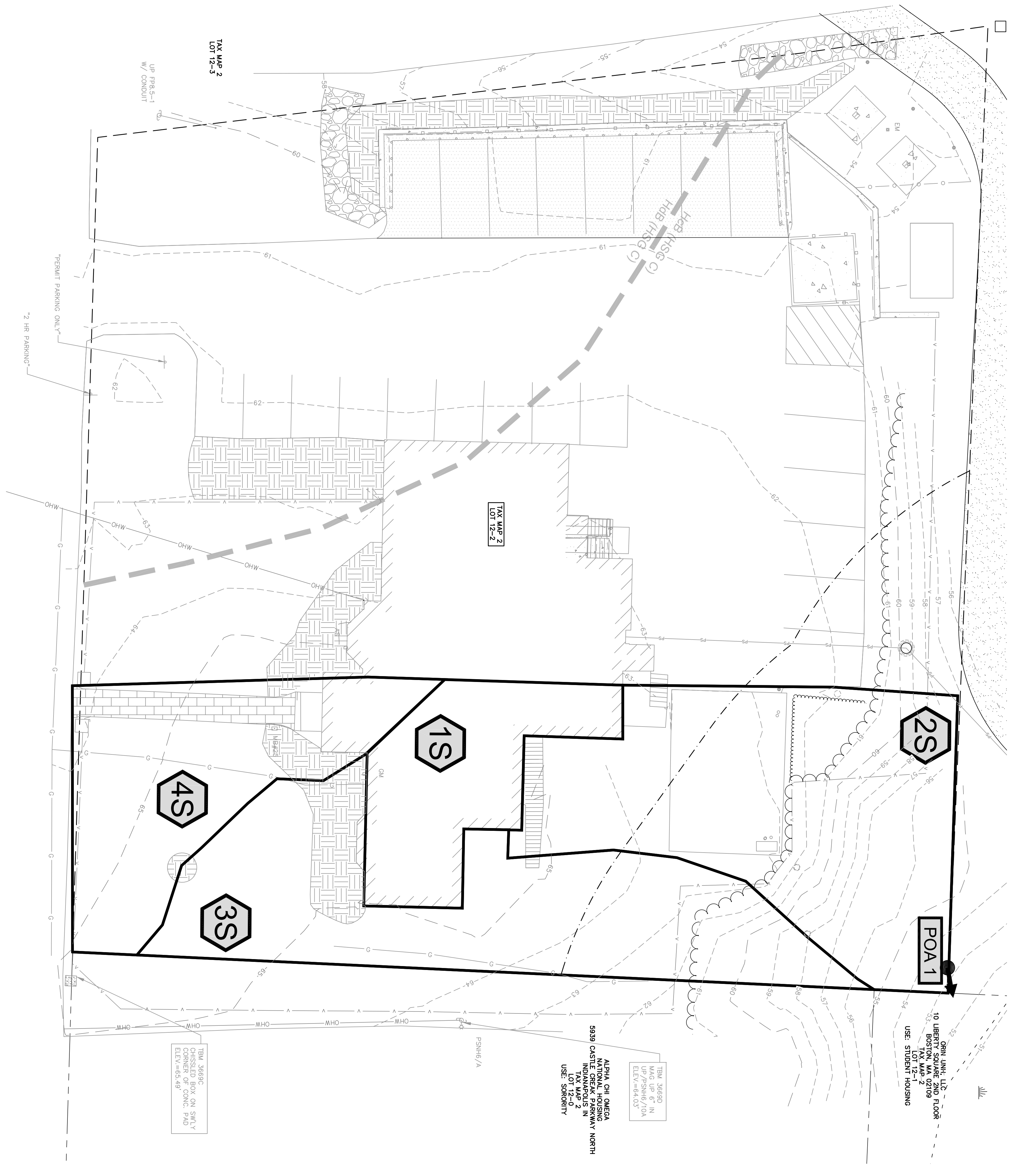
TBM 35660
 CHISEN BOX ON SWLY
 CORNER OF CONC. PAD
 ELEV.=65.49'

ALPHA CHI OMEGA
 NATIONAL HOUSING
 5939 CASSETT RD
 INDIANAPOLIS IN
 TAX MAP 2
 LPO 12-3
 USE: STUDENT HOUSING

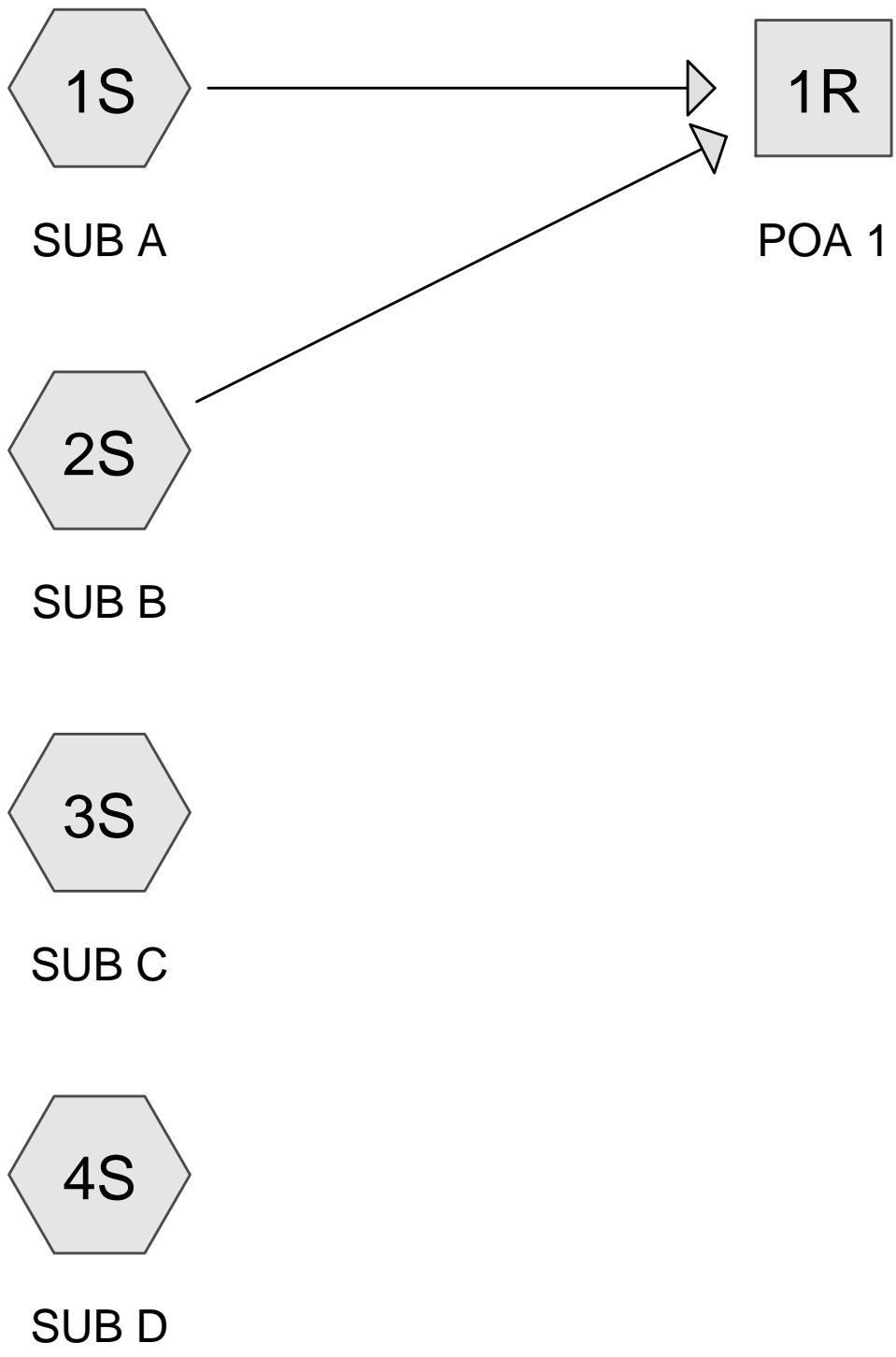
TBM 35660
 UP PDS#1/3A
 ELEV.=64.03'

OPEN UNK. LID
 10 LIBERTY SQUARE 2ND FLOOR
 BOSTON, MA 02109
 TAX MAP 2
 USE: STUDENT HOUSING

POST	JOB: 18-067	<p>MJS ENGINEERING, P.C. CIVIL • STRUCTURAL • ENVIRONMENTAL 5 RAILROAD ST., P.O. BOX 359 NEWHAMPTON, NH 03857 PHONE: (603) 659-4979, FAX: (603) 659-4627 E-MAIL: MJS@MJS-ENGINEERING.COM</p>	<p>SITE PLAN prepared for KAPPA DELTA TAX MAP 2, LOT 12-2 25 MADBURY ROAD DURHAM, NH</p>	DATE: 10/22/18 SCALE: 1" = 10' DESIGNED BY: MJS DRAWN BY: MCS APPROVED BY: MJS DWG FILE: 18-067 Civil N.dwg	SEAL	2. STORMWATER DRAINAGE REVISION	12/18/18	MCS
						1. DESIGN REVISION	11/29/18	MCS
						0. INITIAL SUBMISSION TO DURHAM ZONING BOARD	10/24/18	MCS
						NO. REVISIONS	DATE	INT.



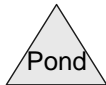
PRE	JOB: 18-067	<p>MJS ENGINEERING, P.C. CIVIL • STRUCTURAL • ENVIRONMENTAL 5 RAILROAD ST., P.O. BOX 359 NEWHAMPTON, NH 03857 PHONE: (603) 659-4979, FAX: (603) 659-4627 E-MAIL: MJS@MJS-ENGINEERING.COM</p>	<p>SITE PLAN prepared for KAPPA DELTA TAX MAP 2, LOT 12-2 25 MADBURY ROAD DURHAM, NH</p>	<p>DATE: 10/22/18 SCALE: 1" = 10' DESIGNED BY: MJS DRAWN BY: MCS APPROVED BY: MJS DWG FILE: 18-067 Civil N.dwg</p>	<p>SEAL</p>	<p>2. STORMWATER DRAINAGE REVISION 12/18/18 MCS</p>
						<p>1. DESIGN REVISION 11/29/18 MCS</p>
<p>0. INITIAL SUBMISSION TO DURHAM ZONING BOARD 10/24/18 MCS</p>						
<p>NO. REVISIONS DATE INT.</p>						



Subcat



Reach



Pond



Link

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
909	79	50-75% Grass cover, Fair, HSG C (2S)
3,773	74	>75% Grass cover, Good, HSG C (3S, 4S)
2,425	98	Roofs, HSG C (1S, 2S, 4S)
5	98	Unconnected pavement, HSG C (3S)
1,764	70	Woods, Good, HSG C (2S, 3S)
8,876	80	TOTAL AREA

18-067 PRE

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
8,876	HSG C	1S, 2S, 3S, 4S
0	HSG D	
0	Other	
8,876		TOTAL AREA

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	909	0	0	909	50-75% Grass cover, Fair
0	0	3,773	0	0	3,773	>75% Grass cover, Good
0	0	2,425	0	0	2,425	Roofs
0	0	5	0	0	5	Unconnected pavement
0	0	1,764	0	0	1,764	Woods, Good
0	0	8,876	0	0	8,876	TOTAL AREA

Sub
Nun

18-067 PRE

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Printed 11/29/2018

Page 5

Time span=1.00-32.00 hrs, dt=0.05 hrs, 621 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB A Runoff Area=1,168 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.02 cfs 77 cf

Subcatchment 2S: SUB B Runoff Area=3,123 sf 25.39% Impervious Runoff Depth=0.08"
Tc=6.0 min CN=80 Runoff=0.00 cfs 22 cf

Subcatchment 3S: SUB C Runoff Area=2,740 sf 0.18% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=74 Runoff=0.00 cfs 5 cf

Subcatchment 4S: SUB D Runoff Area=1,845 sf 25.15% Impervious Runoff Depth=0.08"
Tc=6.0 min CN=80 Runoff=0.00 cfs 13 cf

Reach 1R: POA 1 Inflow=0.02 cfs 99 cf
Outflow=0.02 cfs 99 cf

Total Runoff Area = 8,876 sf Runoff Volume = 117 cf Average Runoff Depth = 0.16"
72.62% Pervious = 6,446 sf 27.38% Impervious = 2,430 sf

Summary for Subcatchment 1S: SUB A

Runoff = 0.02 cfs @ 12.09 hrs, Volume= 77 cf, Depth= 0.79"

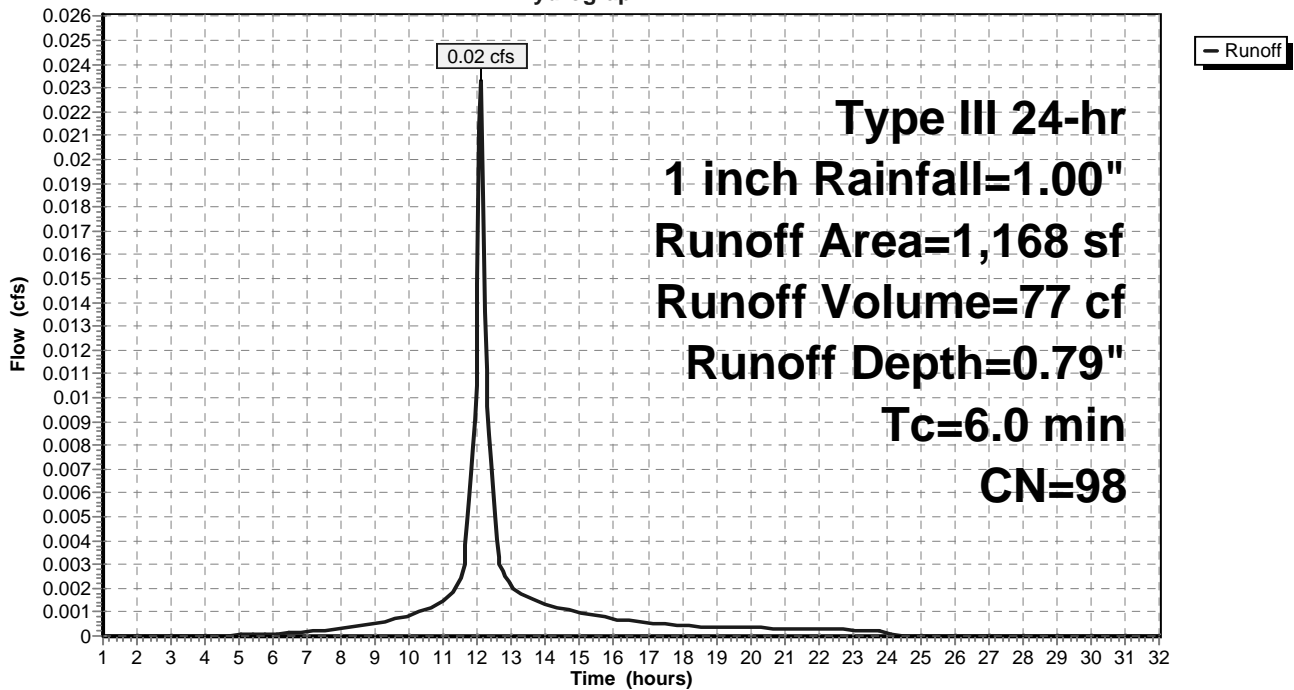
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
1,168	98	Roofs, HSG C
1,168		100.00% Impervious Area

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

Subcatchment 1S: SUB A

Hydrograph



Summary for Subcatchment 2S: SUB B

Runoff = 0.00 cfs @ 12.32 hrs, Volume= 22 cf, Depth= 0.08"

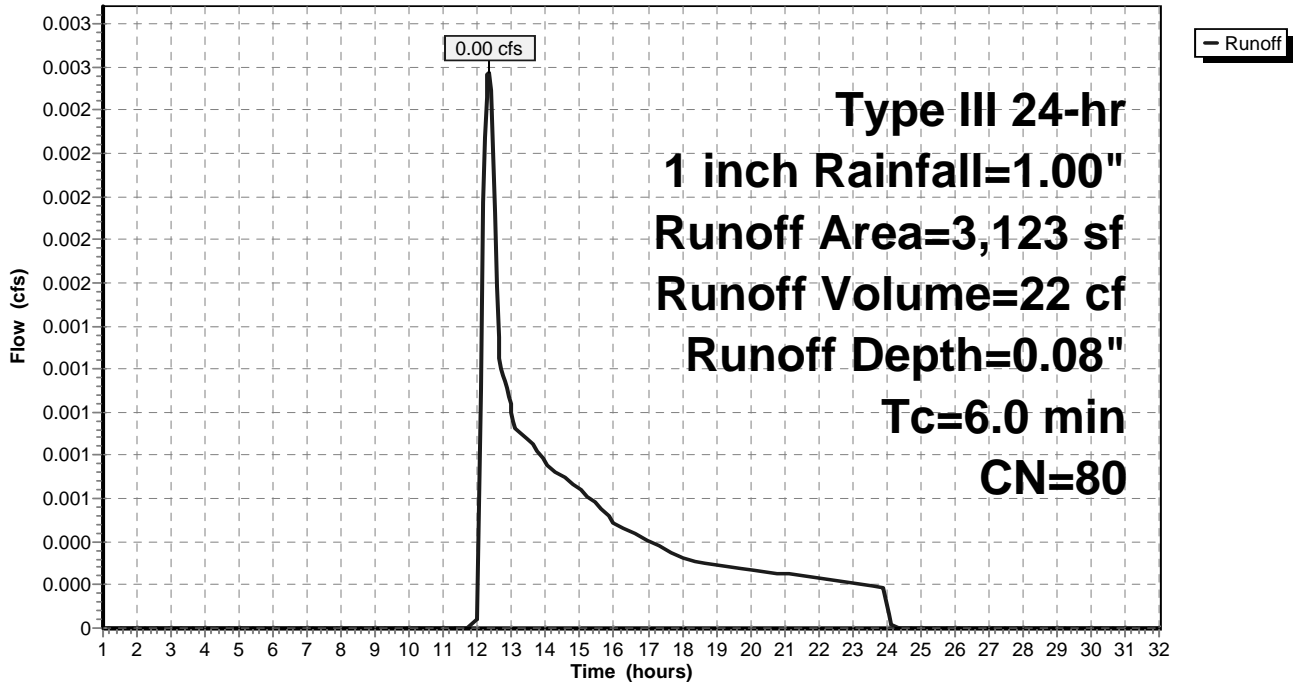
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
793	98	Roofs, HSG C
909	79	50-75% Grass cover, Fair, HSG C
1,421	70	Woods, Good, HSG C
3,123	80	Weighted Average
2,330		74.61% Pervious Area
793		25.39% Impervious Area

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

Subcatchment 2S: SUB B

Hydrograph



Summary for Subcatchment 3S: SUB C

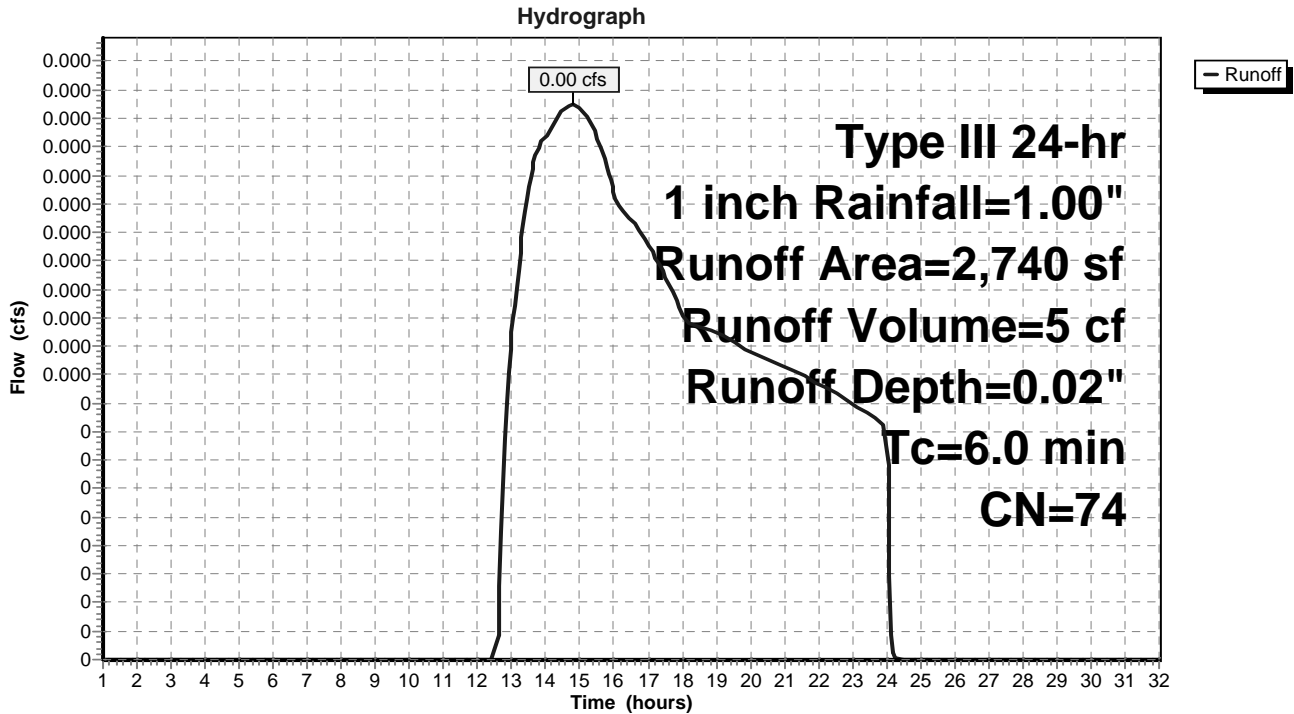
Runoff = 0.00 cfs @ 14.78 hrs, Volume= 5 cf, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
5	98	Unconnected pavement, HSG C
2,392	74	>75% Grass cover, Good, HSG C
343	70	Woods, Good, HSG C
2,740	74	Weighted Average
2,735		99.82% Pervious Area
5		0.18% Impervious Area
5		100.00% Unconnected

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

Subcatchment 3S: SUB C



Summary for Subcatchment 4S: SUB D

Runoff = 0.00 cfs @ 12.32 hrs, Volume= 13 cf, Depth= 0.08"

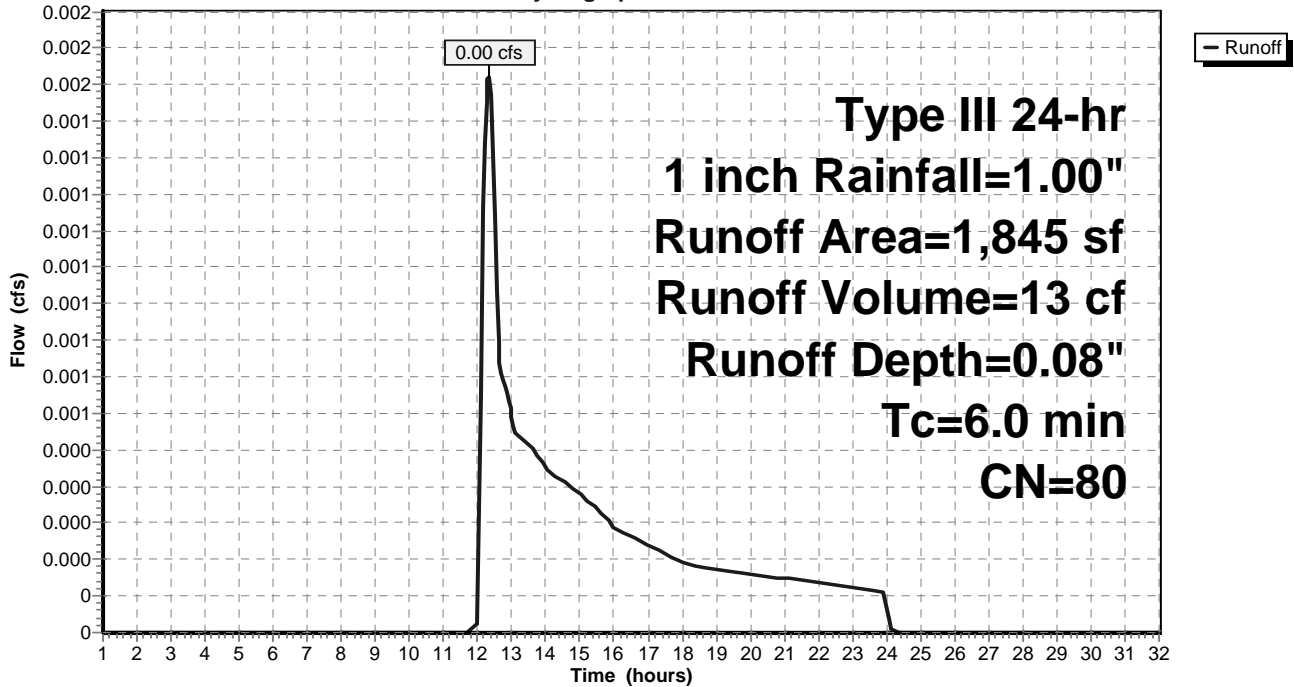
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description
464	98	Roofs, HSG C
1,381	74	>75% Grass cover, Good, HSG C
1,845	80	Weighted Average
1,381		74.85% Pervious Area
464		25.15% Impervious Area

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

Subcatchment 4S: SUB D

Hydrograph



Summary for Reach 1R: POA 1

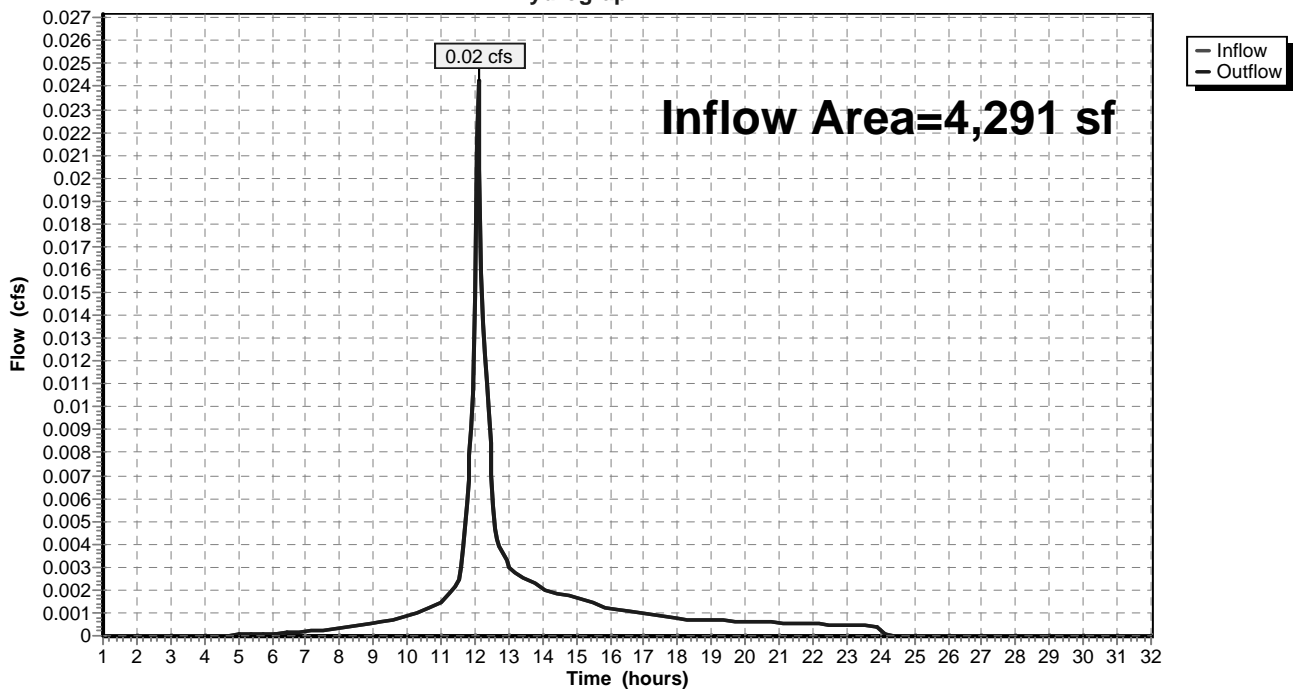
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4,291 sf, 45.70% Impervious, Inflow Depth = 0.28" for 1 inch event
Inflow = 0.02 cfs @ 12.10 hrs, Volume= 99 cf
Outflow = 0.02 cfs @ 12.10 hrs, Volume= 99 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs / 3

Reach 1R: POA 1

Hydrograph



18-067 PRE

Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Prepared by MJS Engineering, PC

Printed 11/29/2018

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 11

Time span=1.00-32.00 hrs, dt=0.05 hrs, 621 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB A Runoff Area=1,168 sf 100.00% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=98 Runoff=0.08 cfs 282 cf

Subcatchment 2S: SUB B Runoff Area=3,123 sf 25.39% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=80 Runoff=0.11 cfs 351 cf

Subcatchment 3S: SUB C Runoff Area=2,740 sf 0.18% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=74 Runoff=0.07 cfs 226 cf

Subcatchment 4S: SUB D Runoff Area=1,845 sf 25.15% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=80 Runoff=0.06 cfs 207 cf

Reach 1R: POA 1 Inflow=0.19 cfs 633 cf
Outflow=0.19 cfs 633 cf

Total Runoff Area = 8,876 sf Runoff Volume = 1,067 cf Average Runoff Depth = 1.44"
72.62% Pervious = 6,446 sf 27.38% Impervious = 2,430 sf

Summary for Subcatchment 1S: SUB A

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 282 cf, Depth= 2.90"

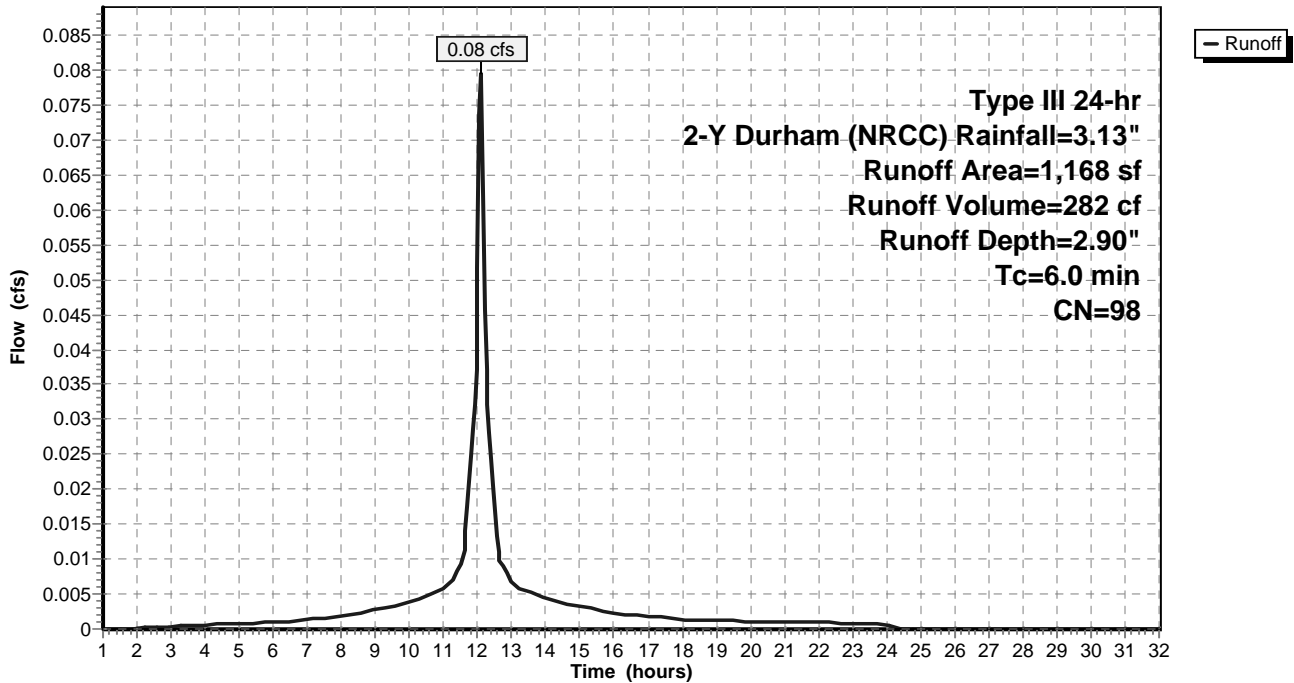
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Description
1,168	98	Roofs, HSG C
1,168		100.00% Impervious Area

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

Subcatchment 1S: SUB A

Hydrograph



Summary for Subcatchment 2S: SUB B

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 351 cf, Depth= 1.35"

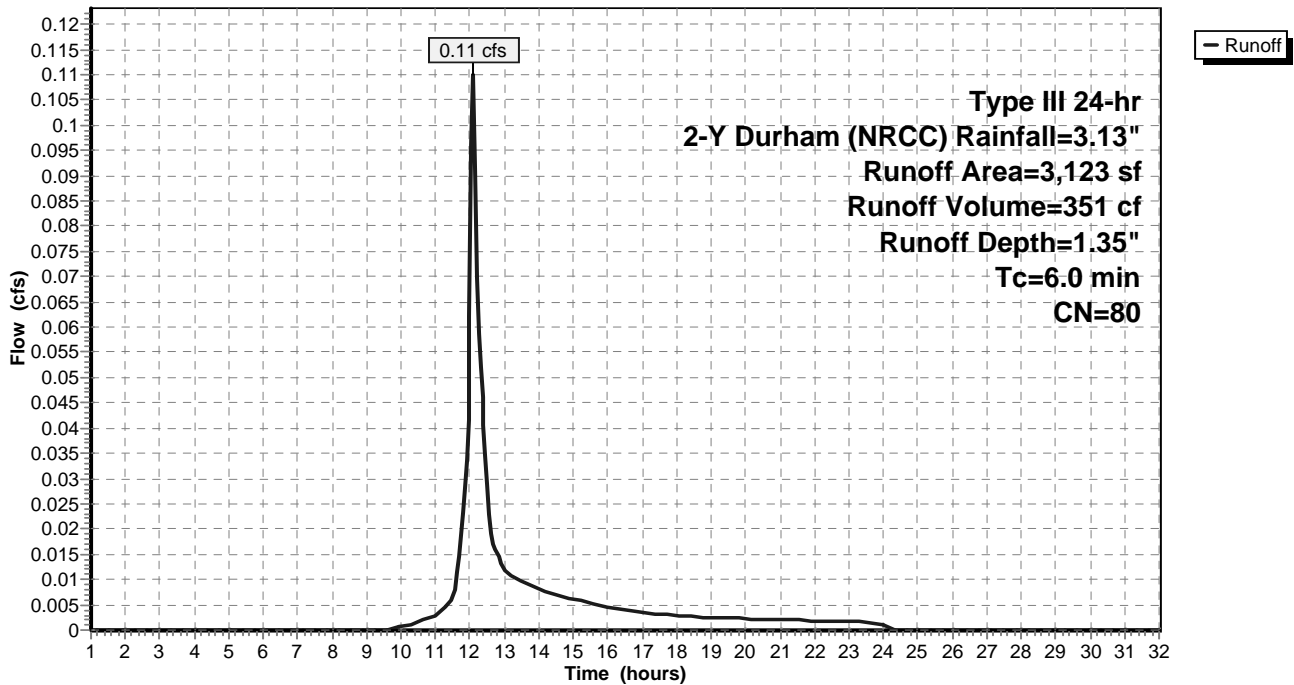
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Description
793	98	Roofs, HSG C
909	79	50-75% Grass cover, Fair, HSG C
1,421	70	Woods, Good, HSG C
3,123	80	Weighted Average
2,330		74.61% Pervious Area
793		25.39% Impervious Area

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

Subcatchment 2S: SUB B

Hydrograph



Summary for Subcatchment 3S: SUB C

Runoff = 0.07 cfs @ 12.10 hrs, Volume= 226 cf, Depth= 0.99"

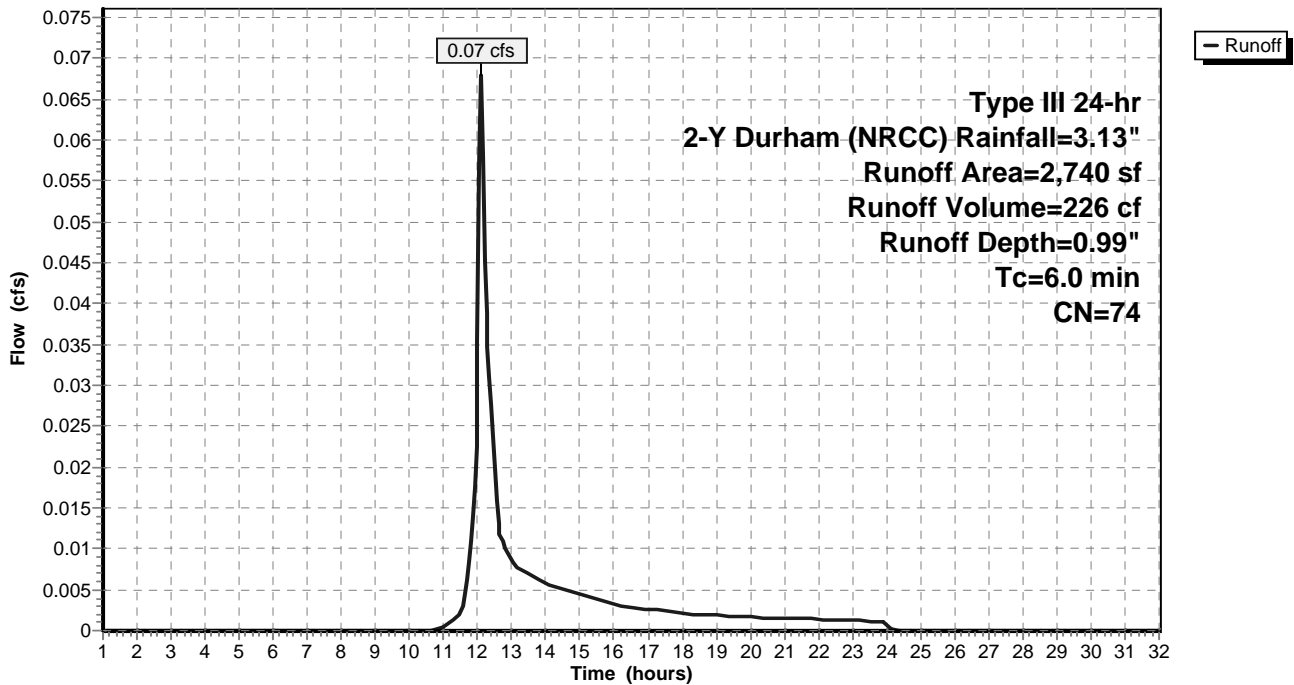
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Description
5	98	Unconnected pavement, HSG C
2,392	74	>75% Grass cover, Good, HSG C
343	70	Woods, Good, HSG C
2,740	74	Weighted Average
2,735		99.82% Pervious Area
5		0.18% Impervious Area
5		100.00% Unconnected

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

Subcatchment 3S: SUB C

Hydrograph



Summary for Subcatchment 4S: SUB D

Runoff = 0.06 cfs @ 12.10 hrs, Volume= 207 cf, Depth= 1.35"

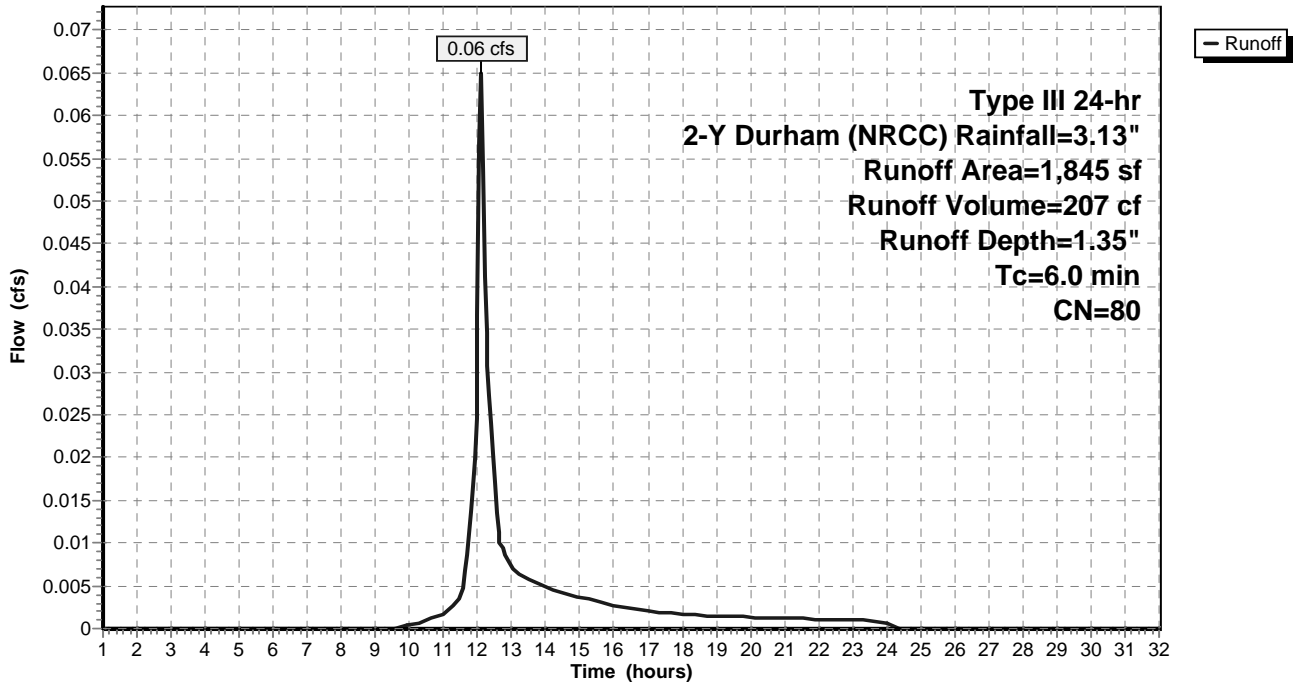
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Description
464	98	Roofs, HSG C
1,381	74	>75% Grass cover, Good, HSG C
1,845	80	Weighted Average
1,381		74.85% Pervious Area
464		25.15% Impervious Area

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

Subcatchment 4S: SUB D

Hydrograph



Summary for Reach 1R: POA 1

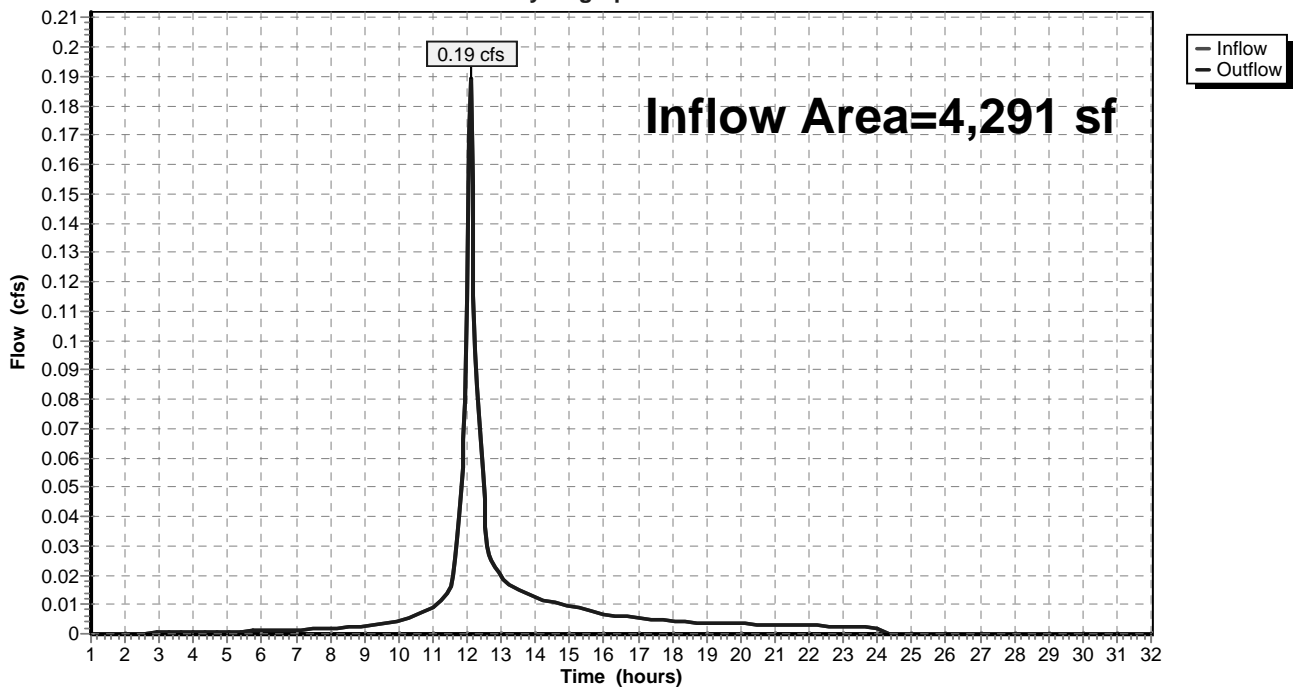
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4,291 sf, 45.70% Impervious, Inflow Depth = 1.77" for 2-Y Durham (NRCC) event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 633 cf
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 633 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs / 3

Reach 1R: POA 1

Hydrograph



18-067 PRE

Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Prepared by MJS Engineering, PC

Printed 11/29/2018

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 17

Time span=1.00-32.00 hrs, dt=0.05 hrs, 621 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB A Runoff Area=1,168 sf 100.00% Impervious Runoff Depth>4.50"
Tc=6.0 min CN=98 Runoff=0.12 cfs 438 cf

Subcatchment 2S: SUB B Runoff Area=3,123 sf 25.39% Impervious Runoff Depth=2.67"
Tc=6.0 min CN=80 Runoff=0.22 cfs 694 cf

Subcatchment 3S: SUB C Runoff Area=2,740 sf 0.18% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=74 Runoff=0.16 cfs 493 cf

Subcatchment 4S: SUB D Runoff Area=1,845 sf 25.15% Impervious Runoff Depth=2.67"
Tc=6.0 min CN=80 Runoff=0.13 cfs 410 cf

Reach 1R: POA 1 Inflow=0.34 cfs 1,133 cf
Outflow=0.34 cfs 1,133 cf

Total Runoff Area = 8,876 sf Runoff Volume = 2,036 cf Average Runoff Depth = 2.75"
72.62% Pervious = 6,446 sf 27.38% Impervious = 2,430 sf

Summary for Subcatchment 1S: SUB A

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 438 cf, Depth> 4.50"

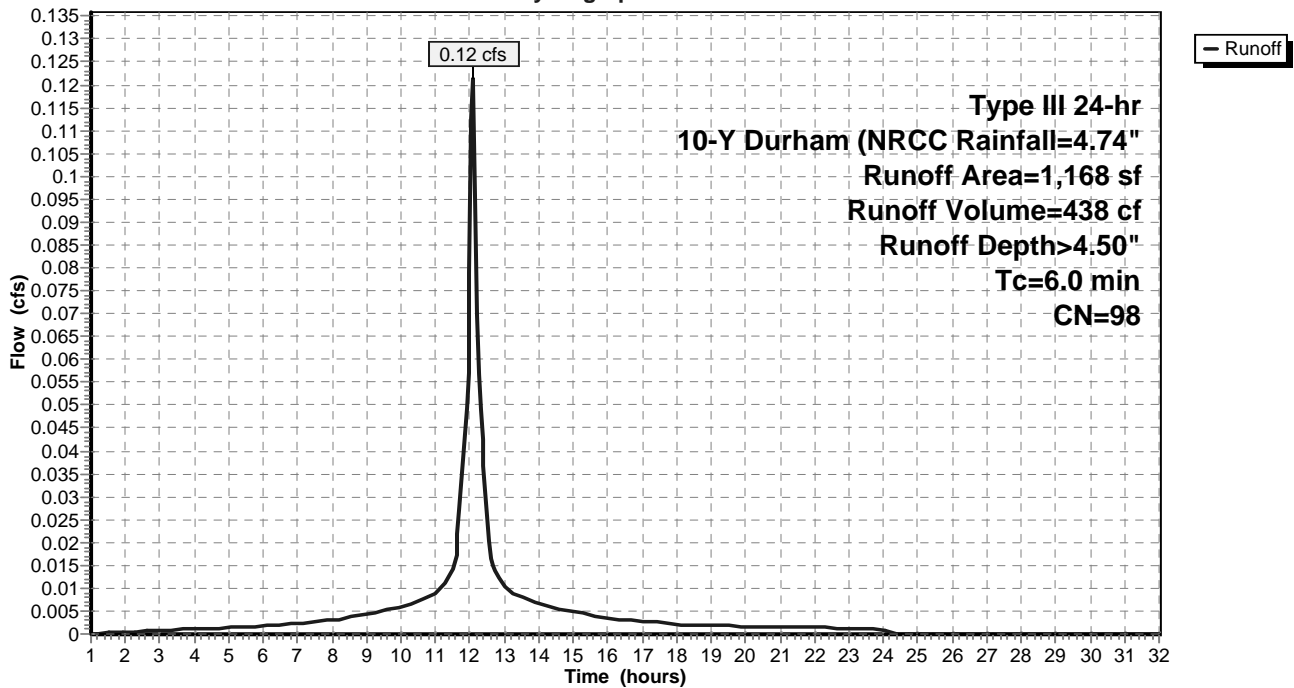
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Description
1,168	98	Roofs, HSG C
1,168		100.00% Impervious Area

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

Subcatchment 1S: SUB A

Hydrograph



Summary for Subcatchment 2S: SUB B

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 694 cf, Depth= 2.67"

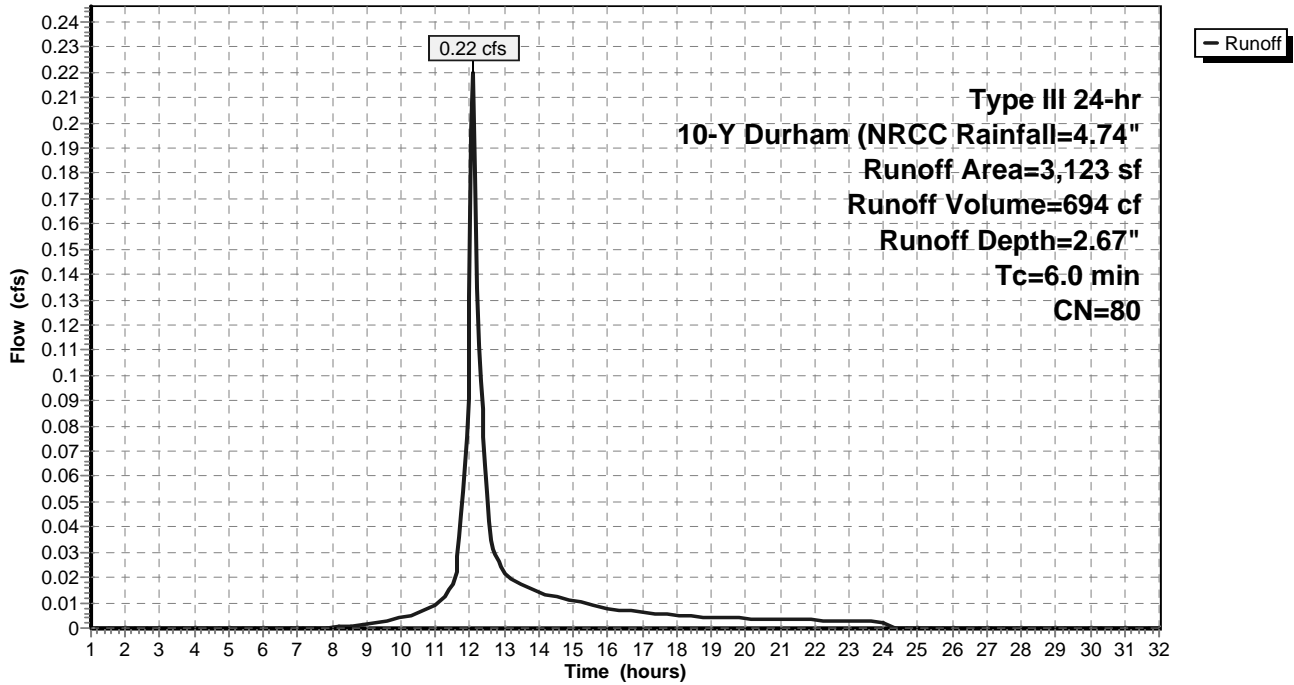
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Description
793	98	Roofs, HSG C
909	79	50-75% Grass cover, Fair, HSG C
1,421	70	Woods, Good, HSG C
3,123	80	Weighted Average
2,330		74.61% Pervious Area
793		25.39% Impervious Area

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

Subcatchment 2S: SUB B

Hydrograph



Summary for Subcatchment 3S: SUB C

Runoff = 0.16 cfs @ 12.10 hrs, Volume= 493 cf, Depth= 2.16"

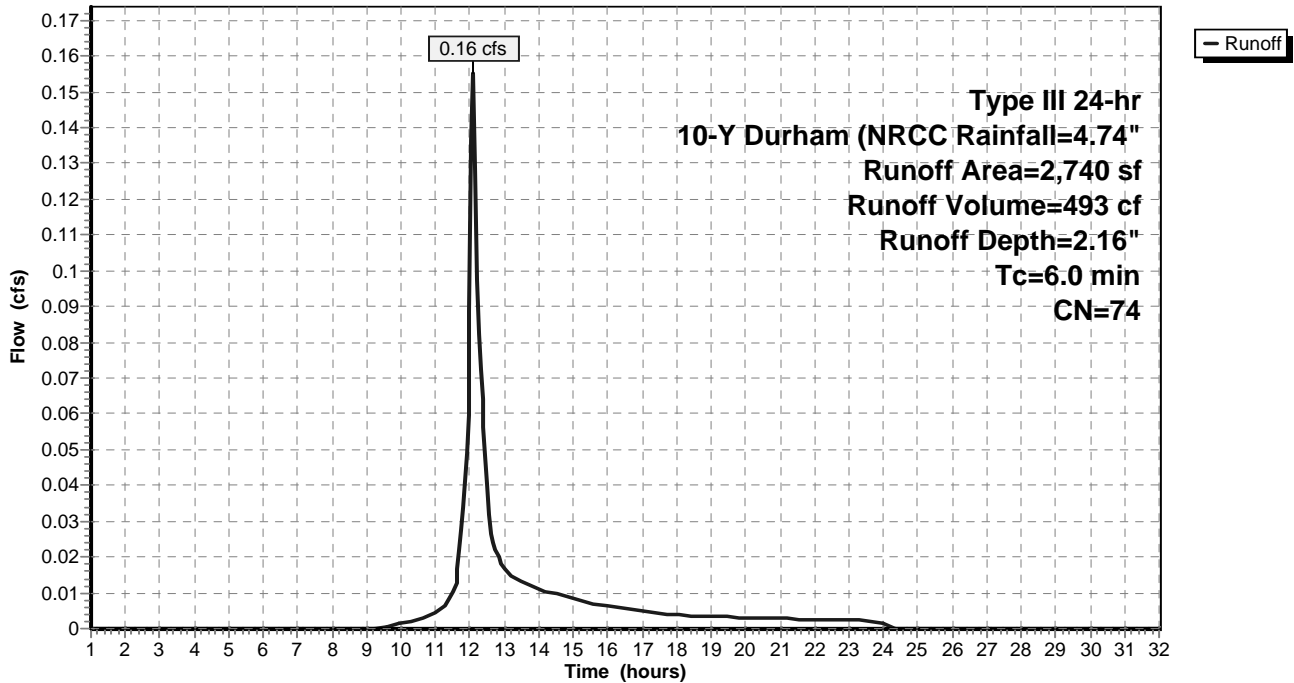
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Description
5	98	Unconnected pavement, HSG C
2,392	74	>75% Grass cover, Good, HSG C
343	70	Woods, Good, HSG C
2,740	74	Weighted Average
2,735		99.82% Pervious Area
5		0.18% Impervious Area
5		100.00% Unconnected

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

Subcatchment 3S: SUB C

Hydrograph



Summary for Subcatchment 4S: SUB D

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 410 cf, Depth= 2.67"

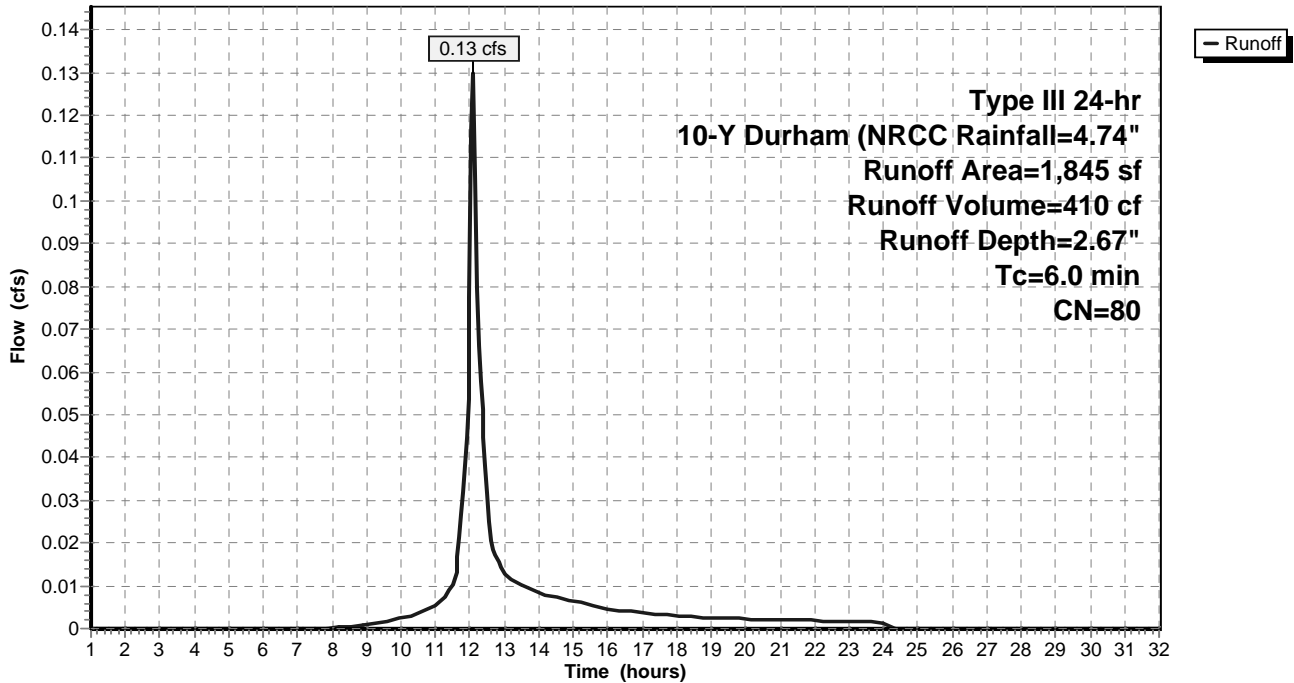
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Description
464	98	Roofs, HSG C
1,381	74	>75% Grass cover, Good, HSG C
1,845	80	Weighted Average
1,381		74.85% Pervious Area
464		25.15% Impervious Area

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

Subcatchment 4S: SUB D

Hydrograph



Summary for Reach 1R: POA 1

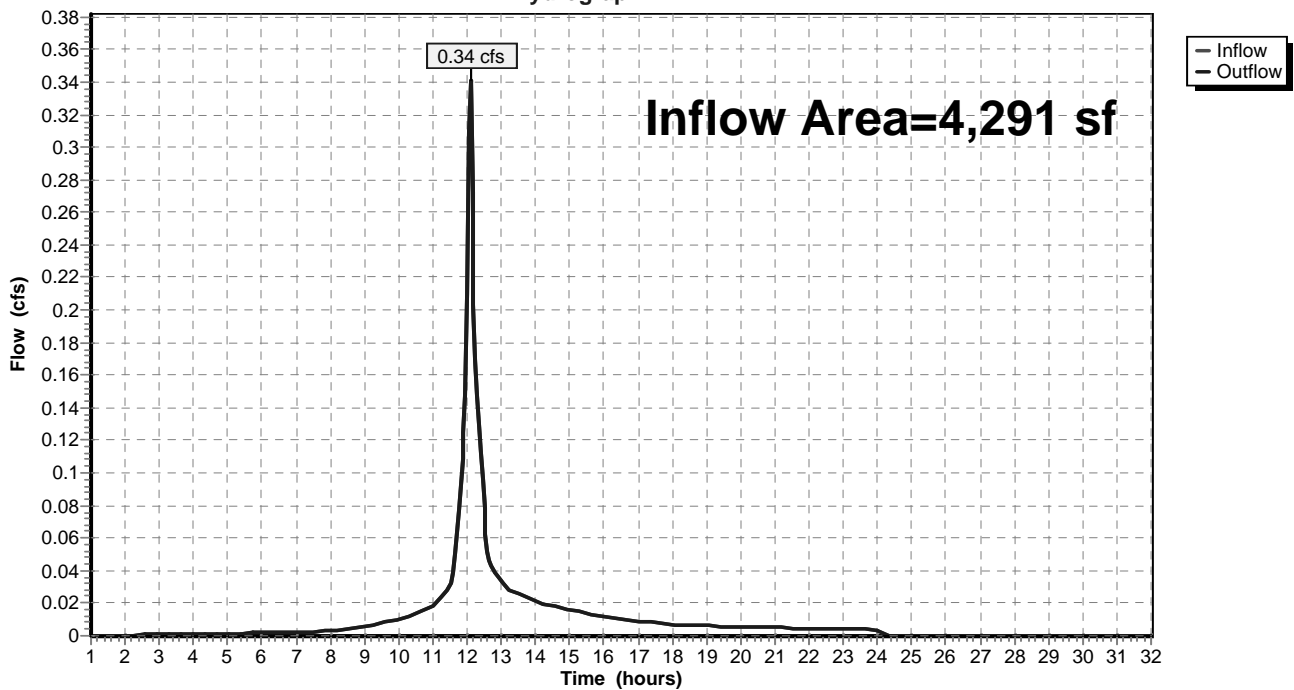
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4,291 sf, 45.70% Impervious, Inflow Depth > 3.17" for 10-Y Durham (NRCC event)
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 1,133 cf
Outflow = 0.34 cfs @ 12.09 hrs, Volume= 1,133 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs / 3

Reach 1R: POA 1

Hydrograph



18-067 PRE

Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Prepared by MJS Engineering, PC

Printed 11/29/2018

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 23

Time span=1.00-32.00 hrs, dt=0.05 hrs, 621 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUB A Runoff Area=1,168 sf 100.00% Impervious Runoff Depth>5.77"
Tc=6.0 min CN=98 Runoff=0.15 cfs 562 cf

Subcatchment 2S: SUB B Runoff Area=3,123 sf 25.39% Impervious Runoff Depth=3.79"
Tc=6.0 min CN=80 Runoff=0.31 cfs 986 cf

Subcatchment 3S: SUB C Runoff Area=2,740 sf 0.18% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=74 Runoff=0.23 cfs 729 cf

Subcatchment 4S: SUB D Runoff Area=1,845 sf 25.15% Impervious Runoff Depth=3.79"
Tc=6.0 min CN=80 Runoff=0.18 cfs 583 cf

Reach 1R: POA 1 Inflow=0.46 cfs 1,548 cf
Outflow=0.46 cfs 1,548 cf

Total Runoff Area = 8,876 sf Runoff Volume = 2,860 cf Average Runoff Depth = 3.87"
72.62% Pervious = 6,446 sf 27.38% Impervious = 2,430 sf

Summary for Subcatchment 1S: SUB A

Runoff = 0.15 cfs @ 12.09 hrs, Volume= 562 cf, Depth> 5.77"

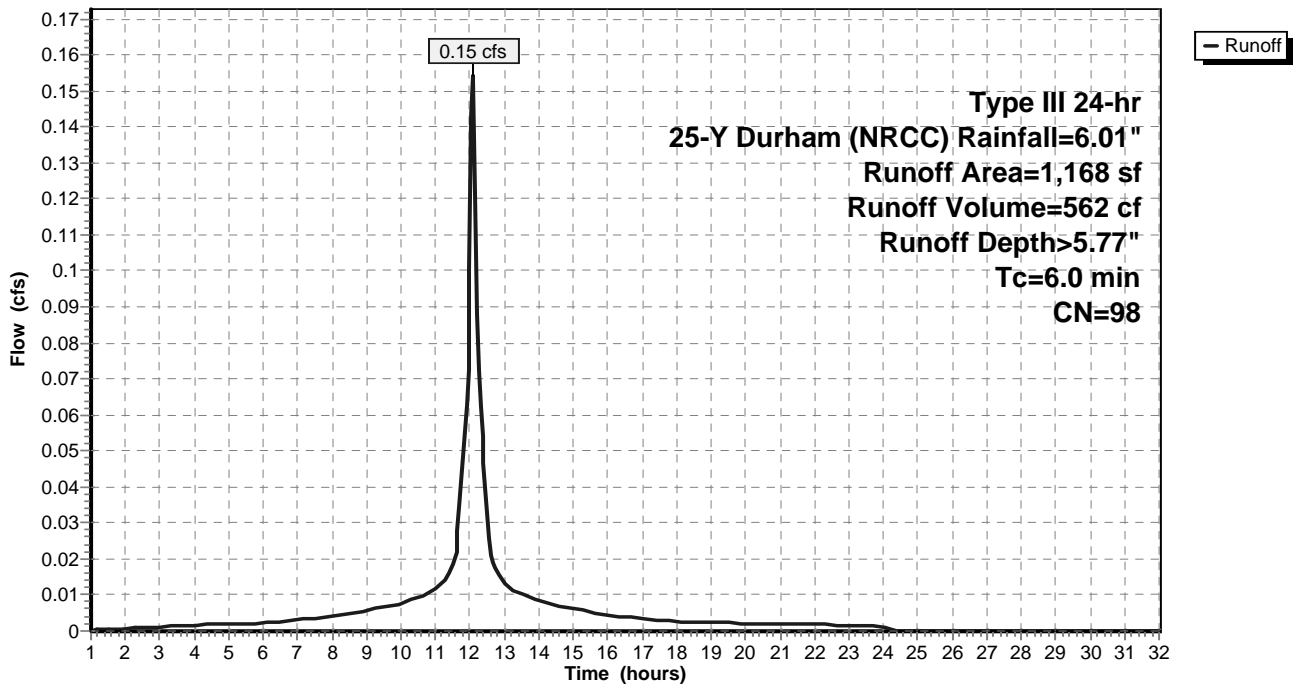
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Description
1,168	98	Roofs, HSG C
1,168		100.00% Impervious Area

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

Subcatchment 1S: SUB A

Hydrograph



Summary for Subcatchment 2S: SUB B

Runoff = 0.31 cfs @ 12.09 hrs, Volume= 986 cf, Depth= 3.79"

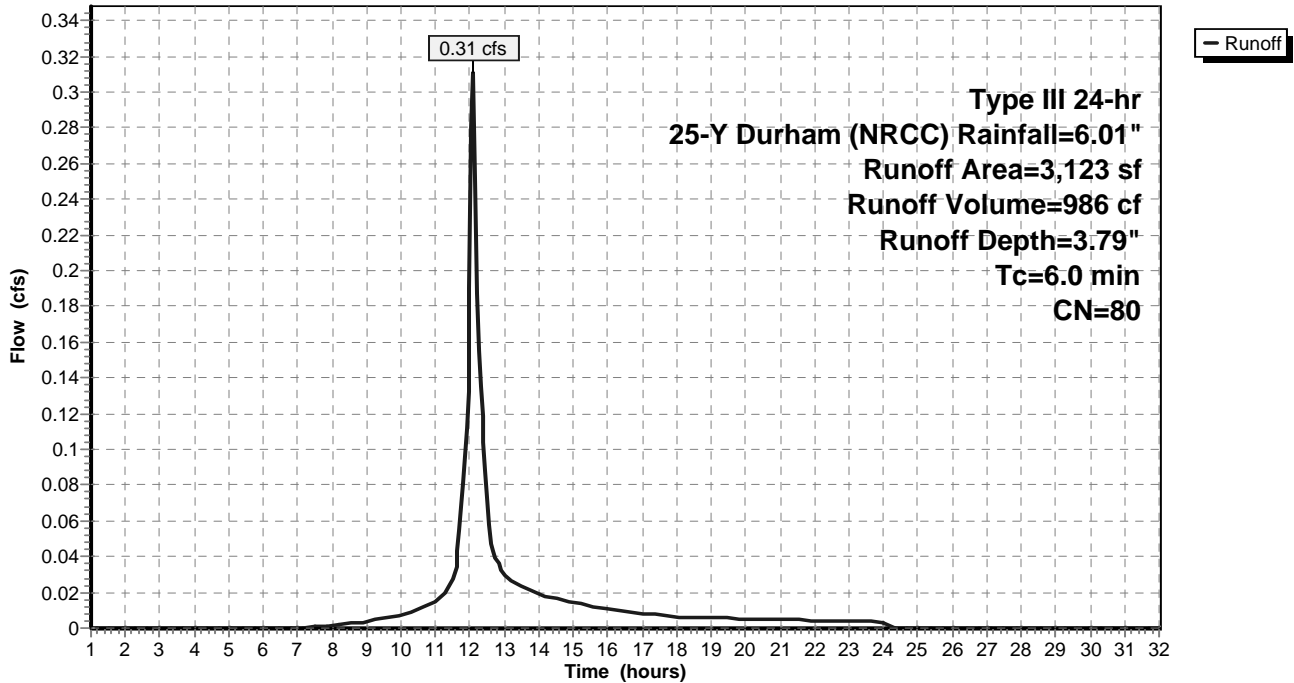
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Description
793	98	Roofs, HSG C
909	79	50-75% Grass cover, Fair, HSG C
1,421	70	Woods, Good, HSG C
3,123	80	Weighted Average
2,330		74.61% Pervious Area
793		25.39% Impervious Area

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

Subcatchment 2S: SUB B

Hydrograph



Summary for Subcatchment 3S: SUB C

Runoff = 0.23 cfs @ 12.09 hrs, Volume= 729 cf, Depth= 3.19"

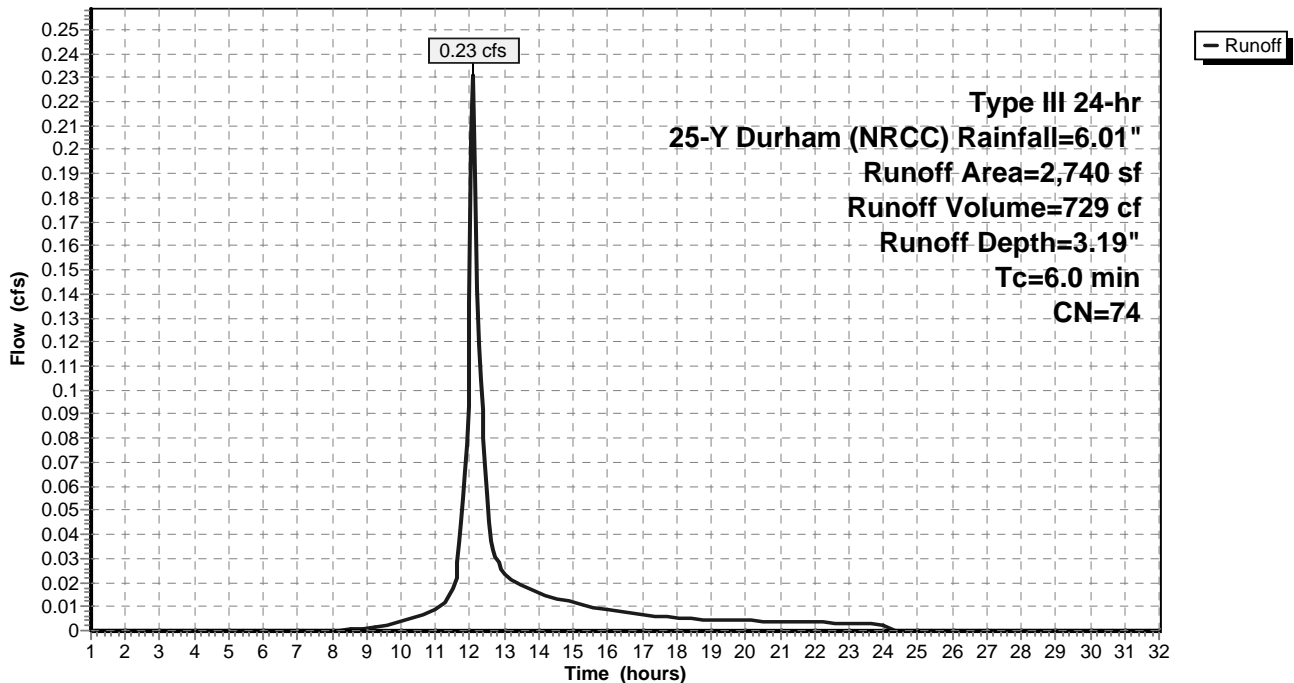
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Description
5	98	Unconnected pavement, HSG C
2,392	74	>75% Grass cover, Good, HSG C
343	70	Woods, Good, HSG C
2,740	74	Weighted Average
2,735		99.82% Pervious Area
5		0.18% Impervious Area
5		100.00% Unconnected

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

Subcatchment 3S: SUB C

Hydrograph



Summary for Subcatchment 4S: SUB D

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 583 cf, Depth= 3.79"

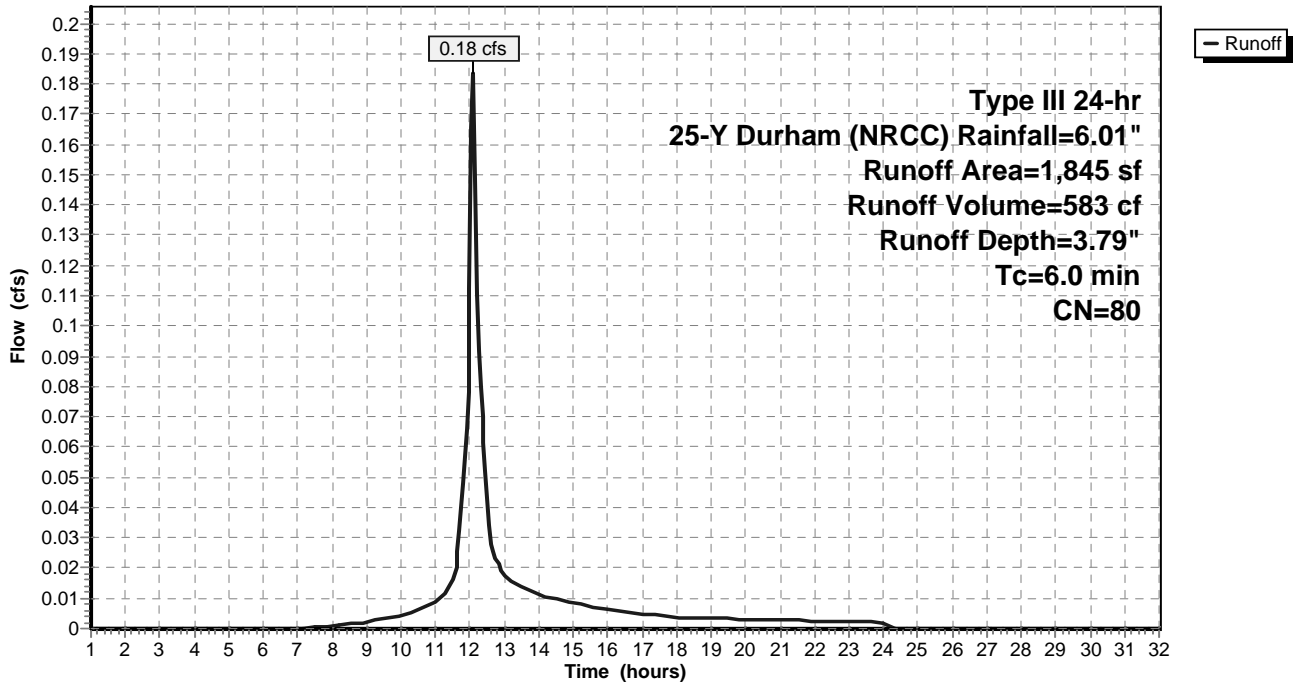
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Description
464	98	Roofs, HSG C
1,381	74	>75% Grass cover, Good, HSG C
1,845	80	Weighted Average
1,381		74.85% Pervious Area
464		25.15% Impervious Area

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

Subcatchment 4S: SUB D

Hydrograph

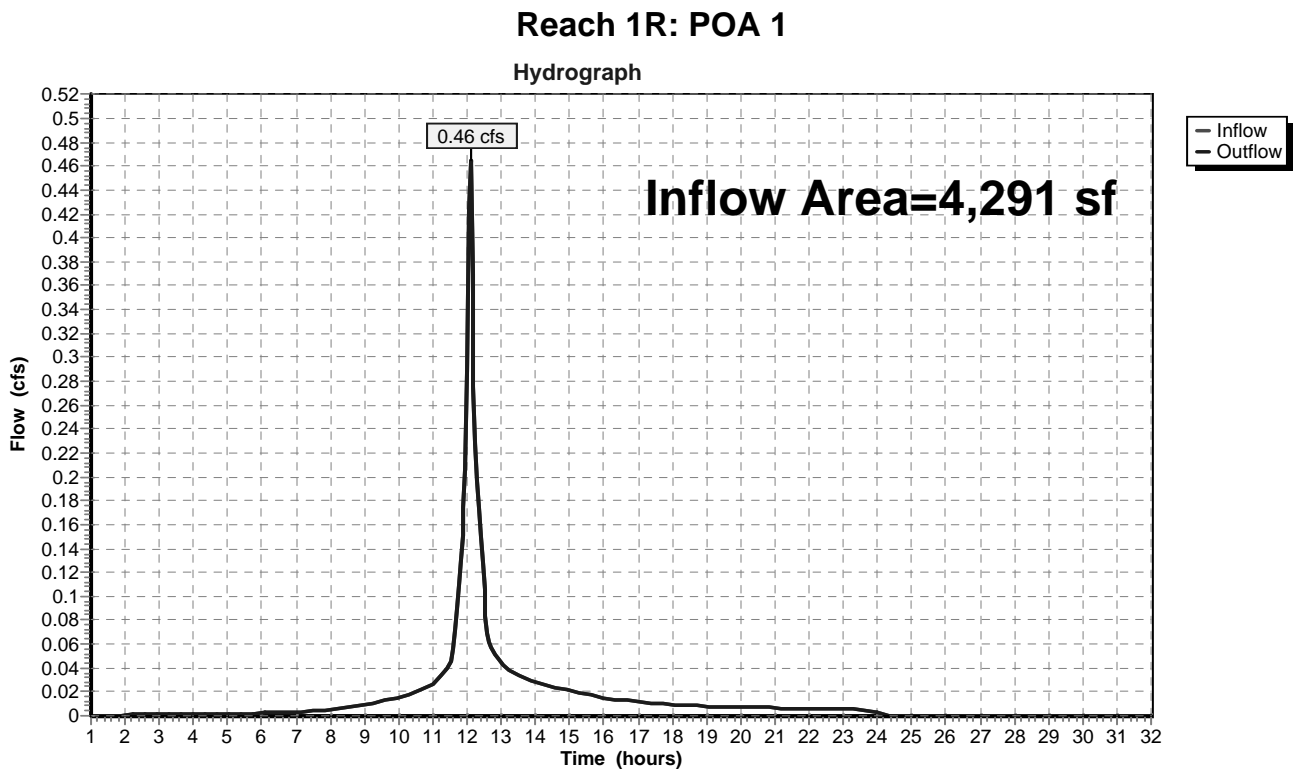


Summary for Reach 1R: POA 1

[40] Hint: Not Described (Outflow=Inflow)

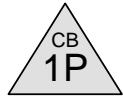
Inflow Area = 4,291 sf, 45.70% Impervious, Inflow Depth > 4.33" for 25-Y Durham (NRCC) event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 1,548 cf
Outflow = 0.46 cfs @ 12.09 hrs, Volume= 1,548 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.05 hrs / 3

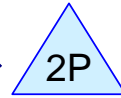




SUBCATCHMENT 1



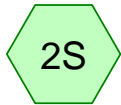
DRAINAGE PIPE



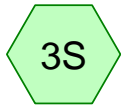
StormTech 310



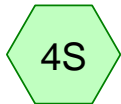
POA 1



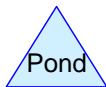
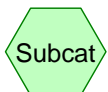
SUBCATCHMENT 2



SUBCATCHMENT 3



SUBCATCHMENT 4



Routing Diagram for 18-067 POSTH, Revised 11-28-18
Prepared by MJS Engineering, PC, Printed 1/2/2019
HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

18-067 POSTH

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
3,855	74	>75% Grass cover, Good, HSG C (2S, 3S, 4S)
3,531	98	Roofs, HSG C (1S, 4S)
54	98	Unconnected pavement, HSG B (4S)
1,093	98	Unconnected pavement, HSG C (2S, 3S)
343	73	Woods, Fair, HSG C (2S)
8,876	87	TOTAL AREA

18-067 POSTH

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 3

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
54	HSG B	4S
8,822	HSG C	1S, 2S, 3S, 4S
0	HSG D	
0	Other	
8,876		TOTAL AREA

18-067 POSTH

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 4

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	0	3,855	0	0	3,855	>75% Grass cover, Good	
0	0	3,531	0	0	3,531	Roofs	
0	54	1,093	0	0	1,147	Unconnected pavement	
0	0	343	0	0	343	Woods, Fair	
0	54	8,822	0	0	8,876	TOTAL AREA	

18-067 POSTH

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 5

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	65.00	60.15	280.0	0.0173	0.010	8.0	0.0	0.0
2	2P	58.92	58.72	20.0	0.0100	0.010	4.0	0.0	0.0
3	2P	60.15	59.90	10.0	0.0250	0.010	6.0	0.0	0.0

18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 6

Time span=1.00-32.00 hrs, dt=0.01 hrs, 3101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=3,067 sf 100.00% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=98 Runoff=0.06 cfs 202 cf

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=2,107 sf 33.55% Impervious Runoff Depth=0.11"
Tc=6.0 min CN=82 Runoff=0.00 cfs 20 cf

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=1,858 sf 20.78% Impervious Runoff Depth=0.04"
Tc=6.0 min UI Adjusted CN=76 Runoff=0.00 cfs 6 cf

Subcatchment 4S: SUBCATCHMENT4 Runoff Area=1,844 sf 28.09% Impervious Runoff Depth=0.08"
Tc=6.0 min UI Adjusted CN=80 Runoff=0.00 cfs 13 cf

Reach 1R: POA 1 Inflow=0.05 cfs 136 cf
Outflow=0.05 cfs 136 cf

Pond 1P: DRAINAGE PIPE Peak Elev=65.13' Inflow=0.06 cfs 202 cf
8.0" Round Culvert n=0.010 L=280.0' S=0.0173 '/' Outflow=0.06 cfs 202 cf

Pond 2P: StormTech 310 Peak Elev=59.09' Storage=19 cf Inflow=0.06 cfs 202 cf
Discarded=0.00 cfs 87 cf Primary=0.05 cfs 116 cf Outflow=0.05 cfs 202 cf

Total Runoff Area = 8,876 sf Runoff Volume = 241 cf Average Runoff Depth = 0.33"
47.30% Pervious = 4,198 sf 52.70% Impervious = 4,678 sf

18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 7

Summary for Subcatchment 1S: SUBCATCHMENT 1

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 202 cf, Depth= 0.79"

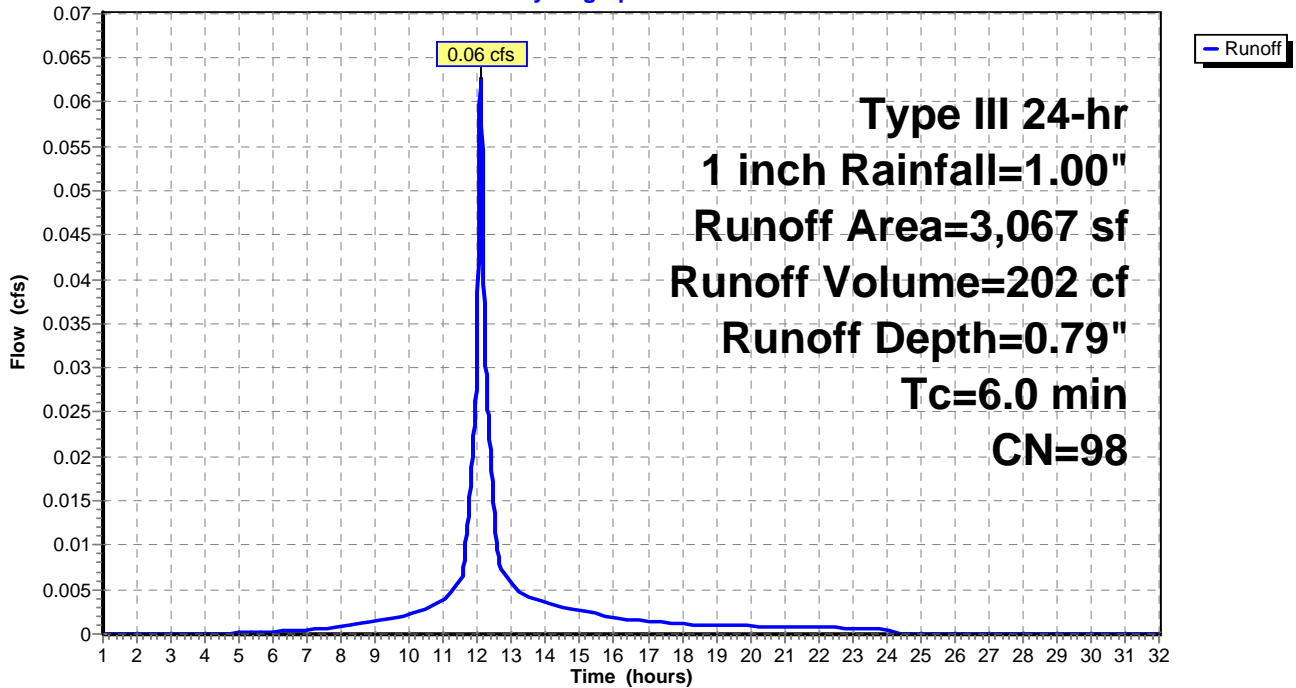
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description	Land Use
3,067	98	Roofs, HSG C	Roofs
3,067	98	100.00% Impervious Area	

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

Subcatchment 1S: SUBCATCHMENT 1

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 8

Summary for Subcatchment 2S: SUBCATCHMENT 2

Runoff = 0.00 cfs @ 12.14 hrs, Volume= 20 cf, Depth= 0.11"

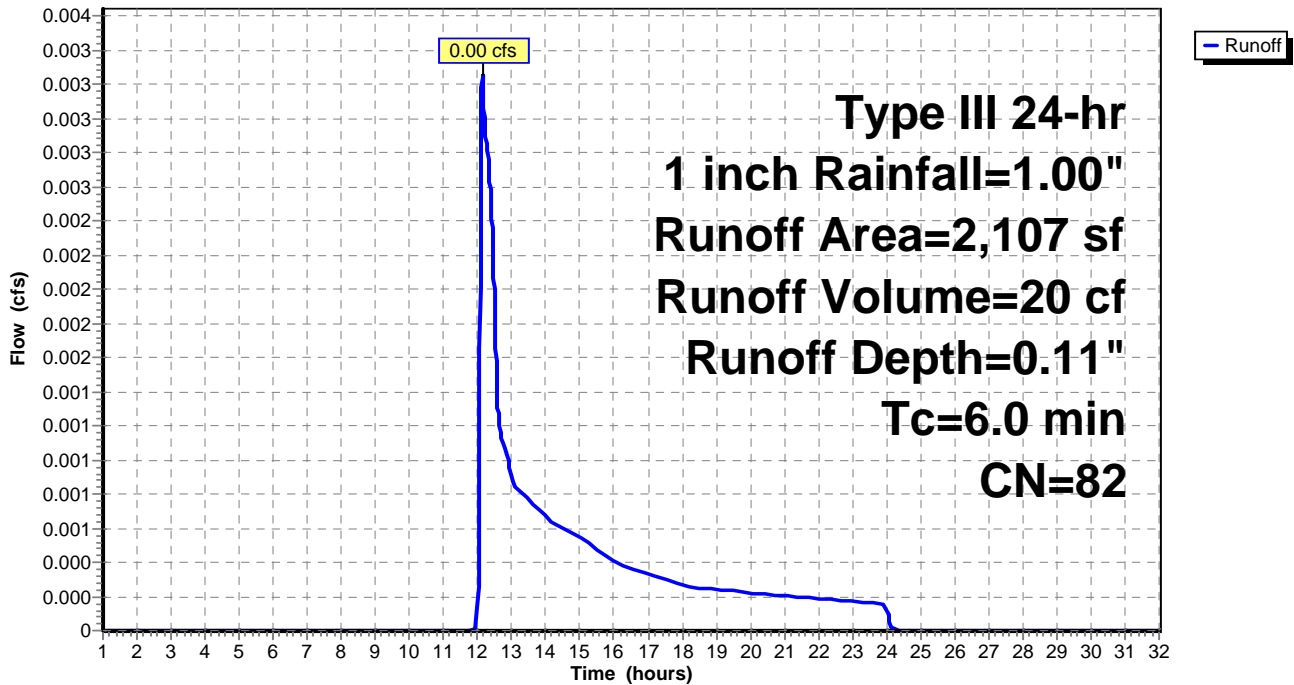
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Description	Land Use
1,057	74	>75% Grass cover, Good, HSG C	Open Space
343	73	Woods, Fair, HSG C	Open Water
707	98	Unconnected pavement, HSG C	Pavement
2,107	82	Weighted Average	
1,400	74	66.45% Pervious Area	
707	98	33.55% Impervious Area	
707		100.00% Unconnected	

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

Subcatchment 2S: SUBCATCHMENT 2

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 9

Summary for Subcatchment 3S: SUBCATCHMENT 3

Runoff = 0.00 cfs @ 12.49 hrs, Volume= 6 cf, Depth= 0.04"

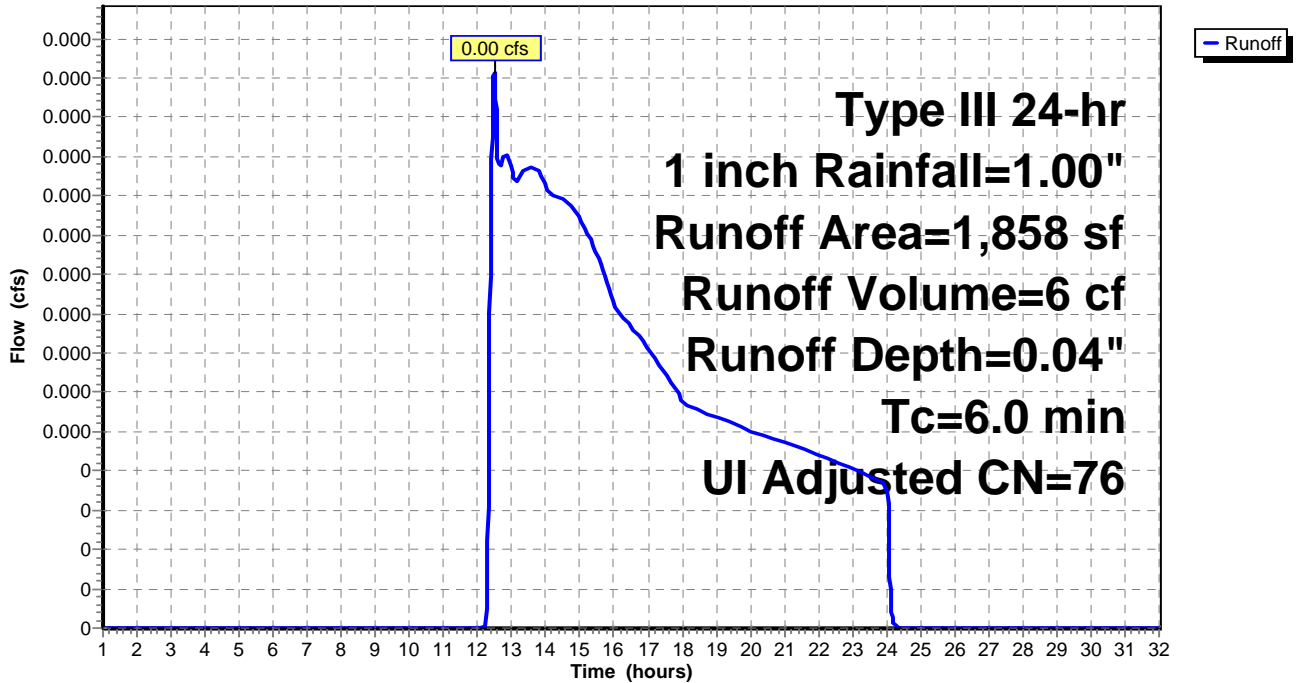
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Adj	Description	Land Use
386	98		Unconnected pavement, HSG C	Pavement
1,472	74		>75% Grass cover, Good, HSG C	Open Space
1,858	79	76	Weighted Average, UI Adjusted	
1,472	74	74	79.22% Pervious Area	
386	98	98	20.78% Impervious Area	
386			100.00% Unconnected	

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

Subcatchment 3S: SUBCATCHMENT 3

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 10

Summary for Subcatchment 4S: SUBCATCHMENT 4

Runoff = 0.00 cfs @ 12.32 hrs, Volume= 13 cf, Depth= 0.08"

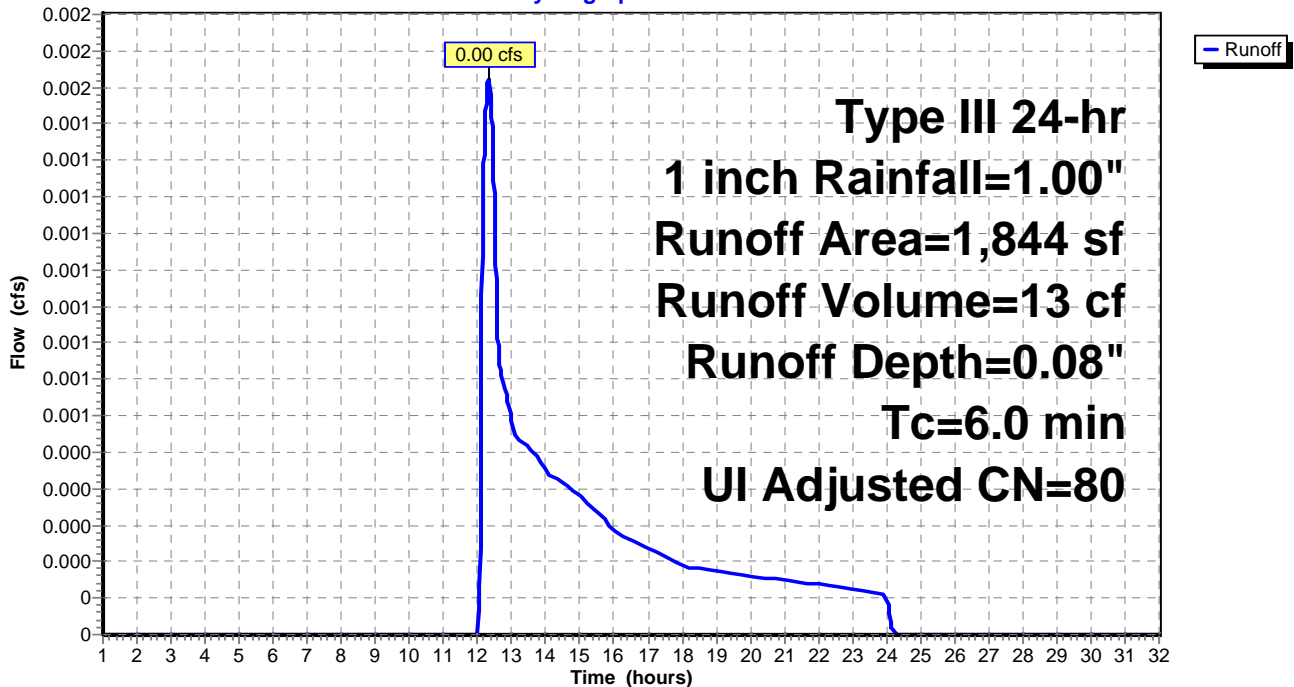
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 inch Rainfall=1.00"

Area (sf)	CN	Adj	Description	Land Use
1,326	74		>75% Grass cover, Good, HSG C	Open Space
464	98		Roofs, HSG C	Roofs
54	98		Unconnected pavement, HSG B	Pavement
1,844	81	80	Weighted Average, UI Adjusted	
1,326	74	74	71.91% Pervious Area	
518	98	98	28.09% Impervious Area	
54			10.42% Unconnected	

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

Subcatchment 4S: SUBCATCHMENT 4

Hydrograph



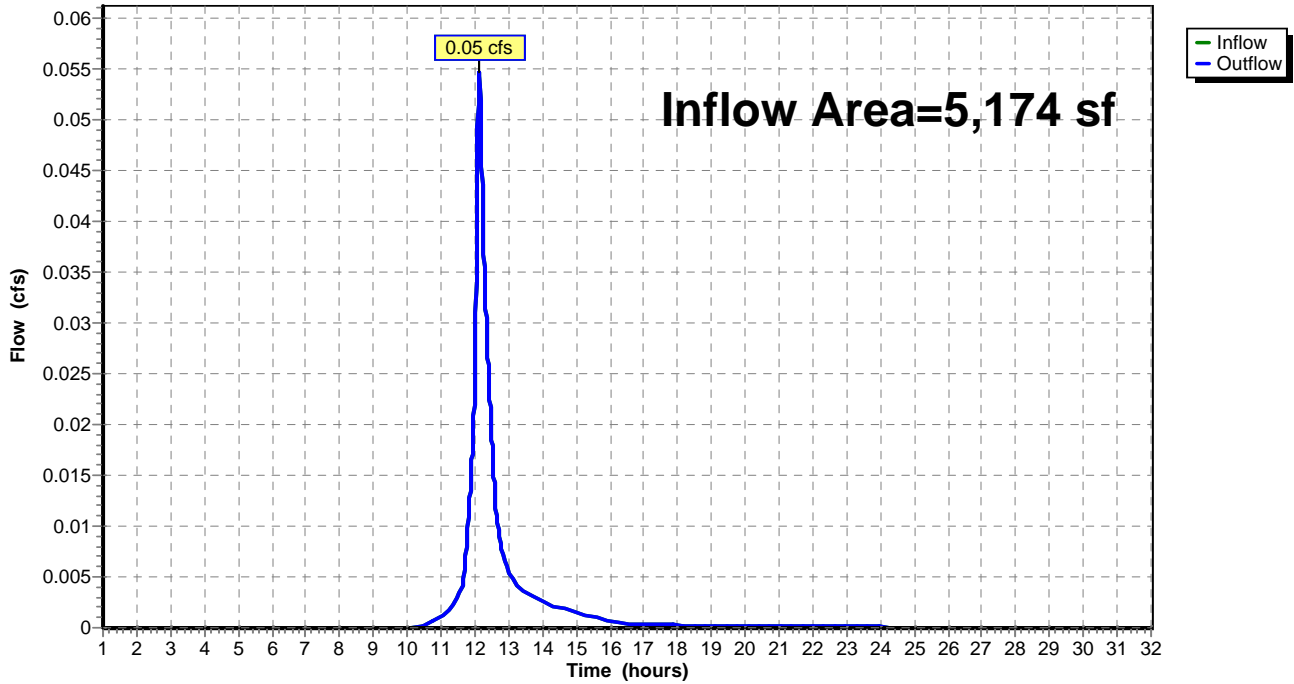
Summary for Reach 1R: POA 1

Inflow Area = 5,174 sf, 72.94% Impervious, Inflow Depth = 0.31" for 1 inch event
Inflow = 0.05 cfs @ 12.13 hrs, Volume= 136 cf
Outflow = 0.05 cfs @ 12.13 hrs, Volume= 136 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3

Reach 1R: POA 1

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 12

Summary for Pond 1P: DRAINAGE PIPE

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth = 0.79" for 1 inch event
 Inflow = 0.06 cfs @ 12.08 hrs, Volume= 202 cf
 Outflow = 0.06 cfs @ 12.08 hrs, Volume= 202 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.06 cfs @ 12.08 hrs, Volume= 202 cf

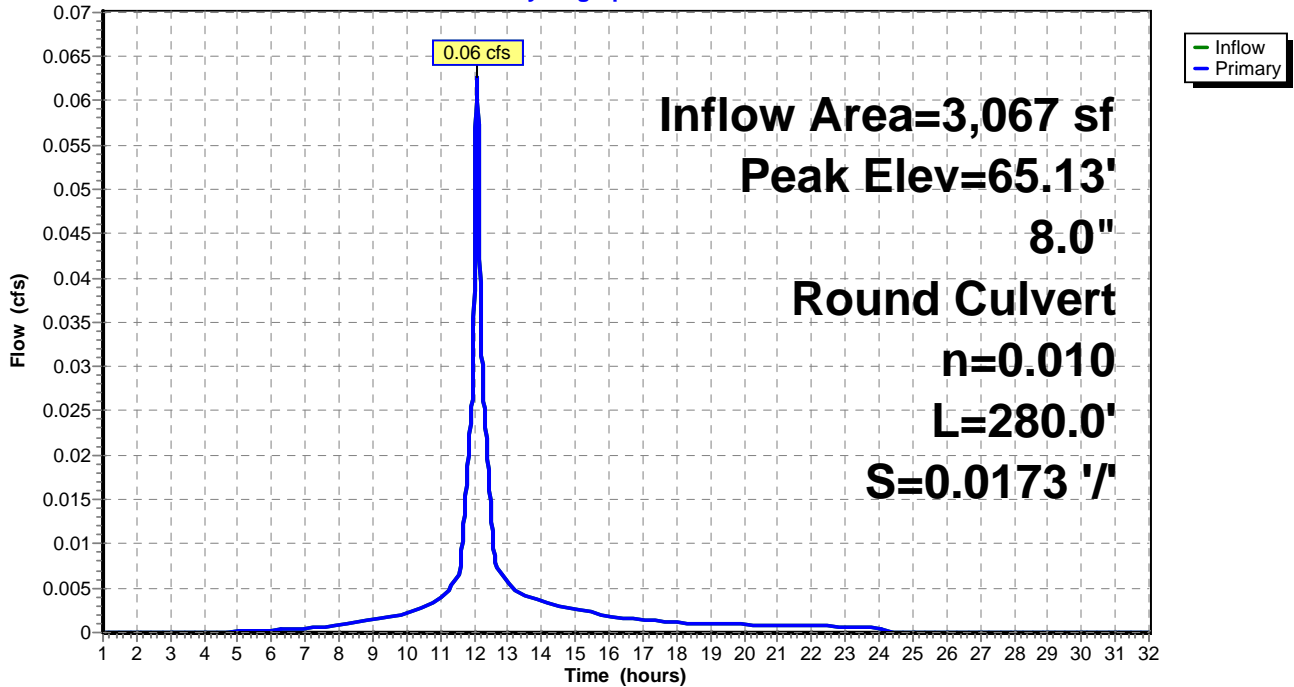
Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 65.13' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	8.0" Round Culvert L= 280.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.00' / 60.15' S= 0.0173 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.06 cfs @ 12.08 hrs HW=65.13' TW=59.08' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.06 cfs @ 1.25 fps)

Pond 1P: DRAINAGE PIPE

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 1 inch Rainfall=1.00"

Revised 11-28-18 Printed 1/2/2019

Page 13

Summary for Pond 2P: StormTech 310

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth = 0.79" for 1 inch event
 Inflow = 0.06 cfs @ 12.08 hrs, Volume= 202 cf
 Outflow = 0.05 cfs @ 12.13 hrs, Volume= 202 cf, Atten= 15%, Lag= 3.0 min
 Discarded = 0.00 cfs @ 11.12 hrs, Volume= 87 cf
 Primary = 0.05 cfs @ 12.13 hrs, Volume= 116 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 59.09' @ 12.13 hrs Surf.Area= 279 sf Storage= 19 cf
 Flood Elev= 58.50' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 8.2 min (796.1 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.92'	241 cf	8.67'W x 32.18'L x 2.58'H Field A 720 cf Overall - 118 cf Embedded = 603 cf x 40.0% Voids
#2A	59.67'	118 cf	ADS_StormTech SC-310 +Cap x 8 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		359 cf	Total Available Storage

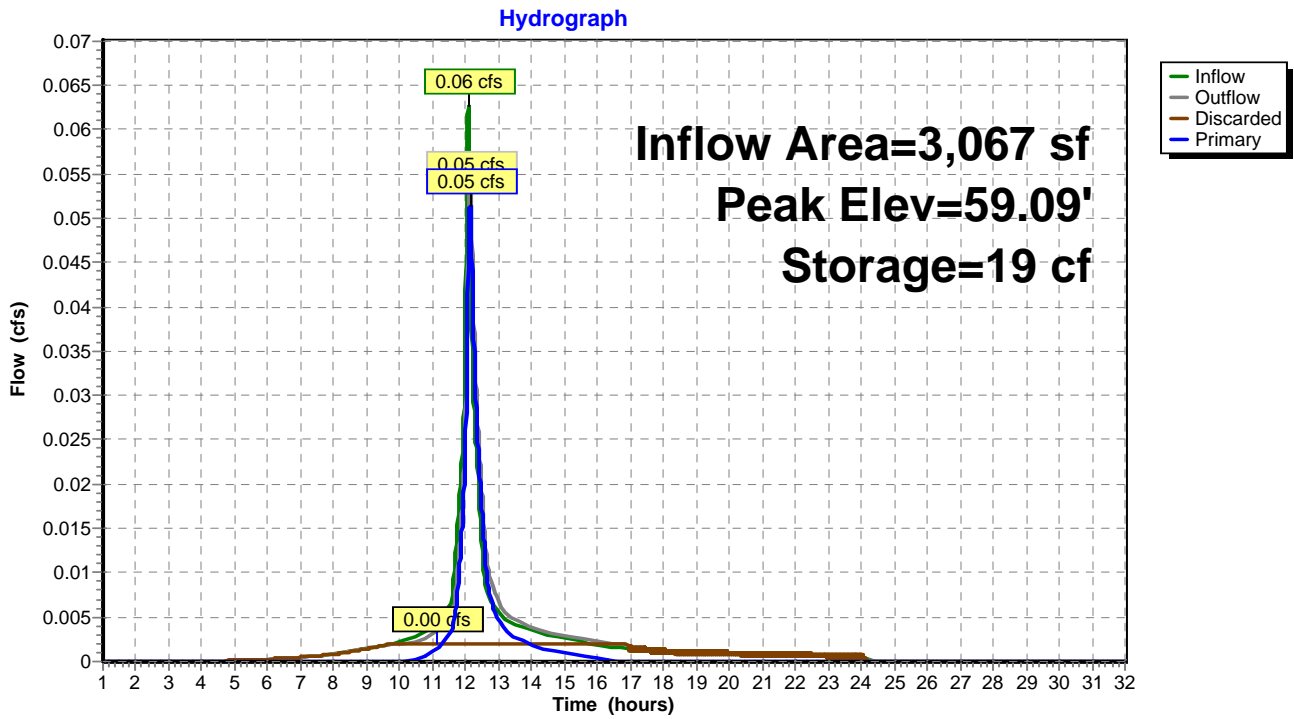
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	58.92'	4.0" Round Underdrain L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.92' / 58.72' S= 0.0100 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Primary	60.15'	6.0" Round Culvert X 2.00 L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.15' / 59.90' S= 0.0250 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 1	58.92'	0.2" Vert. 1/4" Perf X 120.00 C= 0.600
#4	Discarded	58.92'	0.300 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 11.12 hrs HW=58.95' (Free Discharge)
 ↳4=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.05 cfs @ 12.13 hrs HW=59.09' TW=0.00' (Dynamic Tailwater)
 ↳1=Underdrain (Passes 0.05 cfs of 0.05 cfs potential flow)
 ↳3=1/4" Perf (Orifice Controls 0.05 cfs @ 1.96 fps)
 ↳2=Culvert (Controls 0.00 cfs)

Pond 2P: StormTech 310



18-067 POSTH

Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 15

Time span=1.00-32.00 hrs, dt=0.01 hrs, 3101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=3,067 sf 100.00% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=98 Runoff=0.21 cfs 741 cf

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=2,107 sf 33.55% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=82 Runoff=0.08 cfs 260 cf

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=1,858 sf 20.78% Impervious Runoff Depth=1.10"
Tc=6.0 min UI Adjusted CN=76 Runoff=0.05 cfs 171 cf

Subcatchment 4S: SUBCATCHMENT4 Runoff Area=1,844 sf 28.09% Impervious Runoff Depth=1.35"
Tc=6.0 min UI Adjusted CN=80 Runoff=0.07 cfs 207 cf

Reach 1R: POA 1 Inflow=0.19 cfs 854 cf
Outflow=0.19 cfs 854 cf

Pond 1P: DRAINAGE PIPE Peak Elev=65.26' Inflow=0.21 cfs 741 cf
8.0" Round Culvert n=0.010 L=280.0' S=0.0173 '/ Outflow=0.21 cfs 741 cf

Pond 2P: StormTech 310 Peak Elev=59.72' Storage=92 cf Inflow=0.21 cfs 741 cf
Discarded=0.00 cfs 147 cf Primary=0.11 cfs 593 cf Outflow=0.11 cfs 741 cf

Total Runoff Area = 8,876 sf Runoff Volume = 1,379 cf Average Runoff Depth = 1.86"
47.30% Pervious = 4,198 sf 52.70% Impervious = 4,678 sf

Summary for Subcatchment 1S: SUBCATCHMENT 1

Runoff = 0.21 cfs @ 12.08 hrs, Volume= 741 cf, Depth= 2.90"

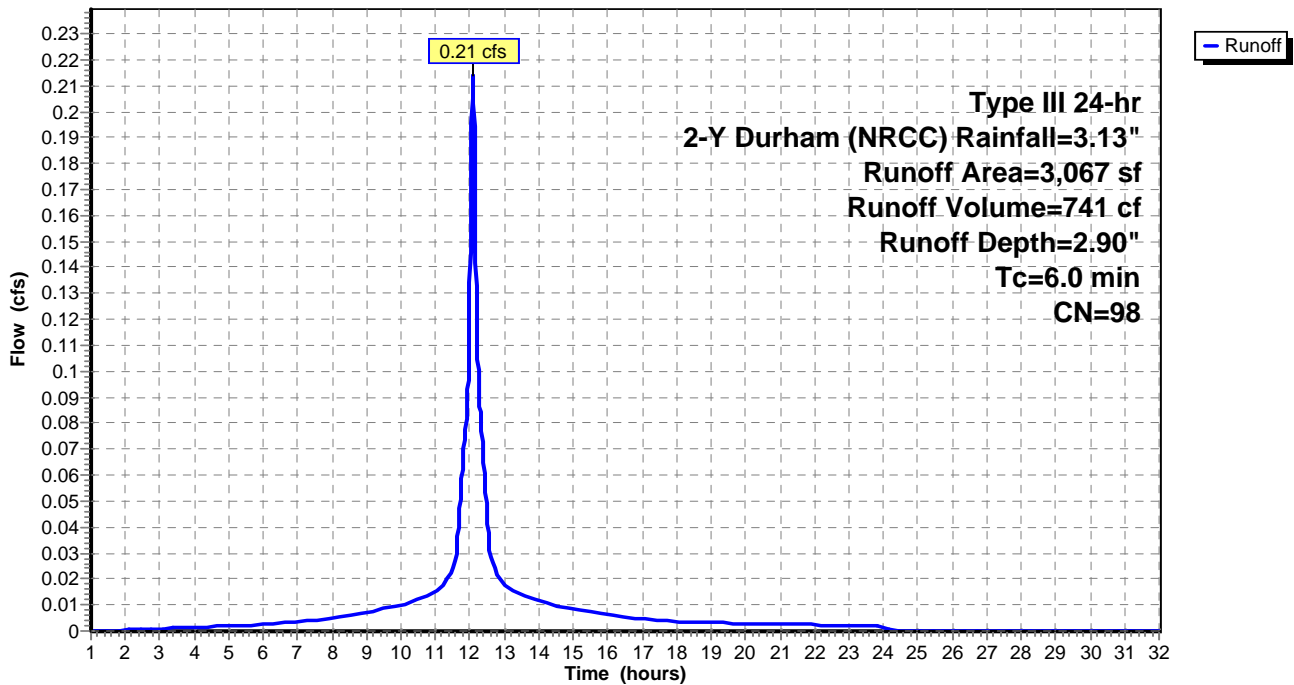
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Description	Land Use
3,067	98	Roofs, HSG C	Roofs
3,067	98	100.00% Impervious Area	

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

Subcatchment 1S: SUBCATCHMENT 1

Hydrograph



Summary for Subcatchment 2S: SUBCATCHMENT 2

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 260 cf, Depth= 1.48"

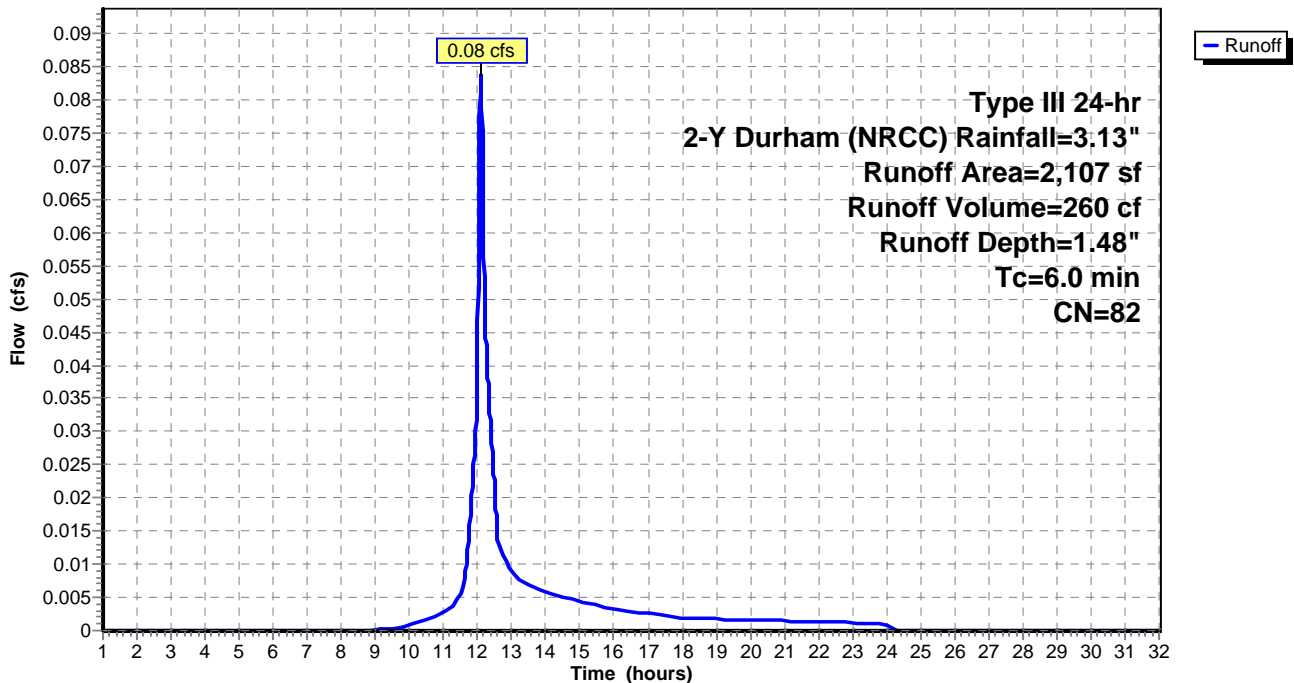
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Description	Land Use
1,057	74	>75% Grass cover, Good, HSG C	Open Space
343	73	Woods, Fair, HSG C	Open Water
707	98	Unconnected pavement, HSG C	Pavement
2,107	82	Weighted Average	
1,400	74	66.45% Pervious Area	
707	98	33.55% Impervious Area	
707		100.00% Unconnected	

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

Subcatchment 2S: SUBCATCHMENT 2

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Revised 11-28-18 Printed 1/2/2019

Page 18

Summary for Subcatchment 3S: SUBCATCHMENT 3

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 171 cf, Depth= 1.10"

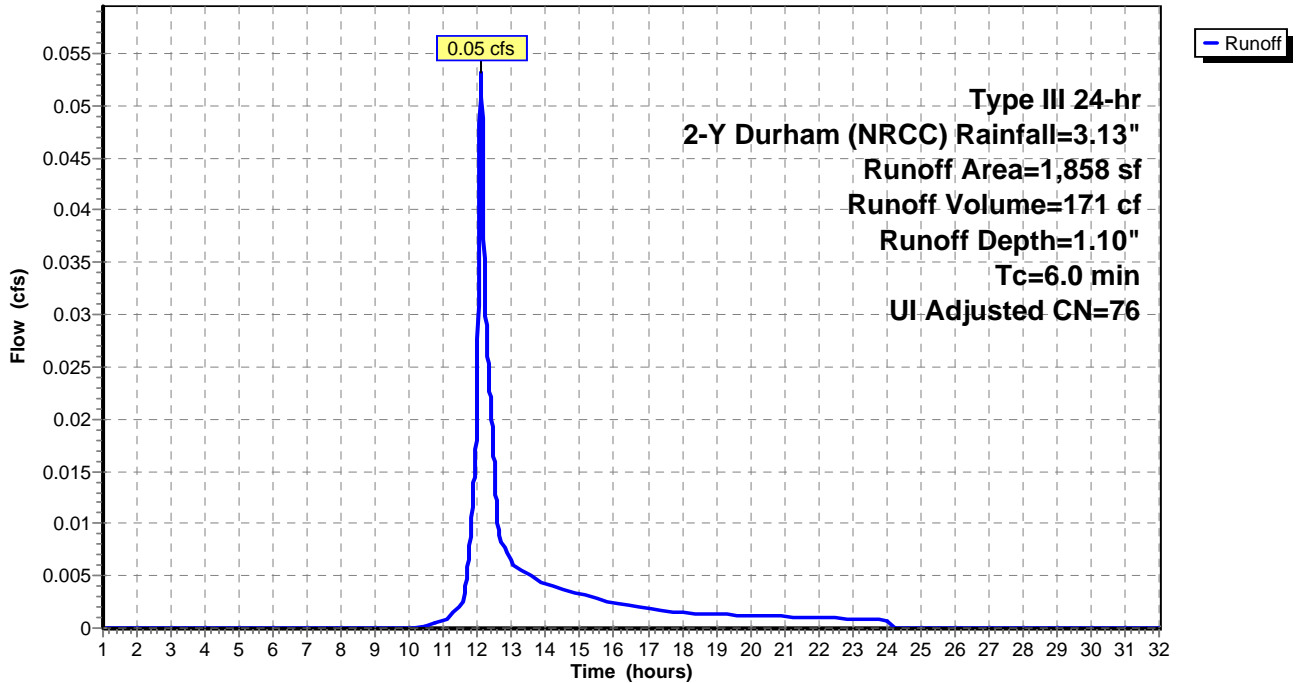
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Adj	Description	Land Use
386	98		Unconnected pavement, HSG C	Pavement
1,472	74		>75% Grass cover, Good, HSG C	Open Space
1,858	79	76	Weighted Average, UI Adjusted	
1,472	74	74	79.22% Pervious Area	
386	98	98	20.78% Impervious Area	
386			100.00% Unconnected	

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

Subcatchment 3S: SUBCATCHMENT 3

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Revised 11-28-18 Printed 1/2/2019

Page 19

Summary for Subcatchment 4S: SUBCATCHMENT 4

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 207 cf, Depth= 1.35"

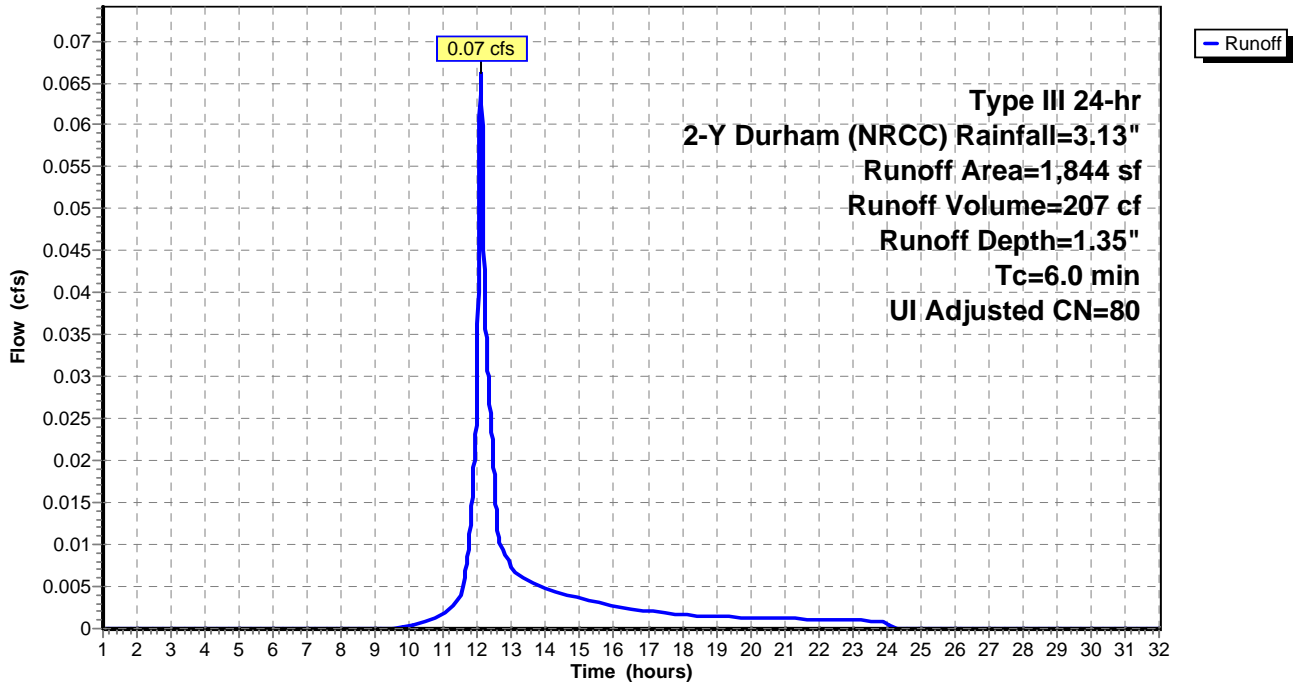
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Area (sf)	CN	Adj	Description	Land Use
1,326	74		>75% Grass cover, Good, HSG C	Open Space
464	98		Roofs, HSG C	Roofs
54	98		Unconnected pavement, HSG B	Pavement
1,844	81	80	Weighted Average, UI Adjusted	
1,326	74	74	71.91% Pervious Area	
518	98	98	28.09% Impervious Area	
54			10.42% Unconnected	

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

Subcatchment 4S: SUBCATCHMENT 4

Hydrograph



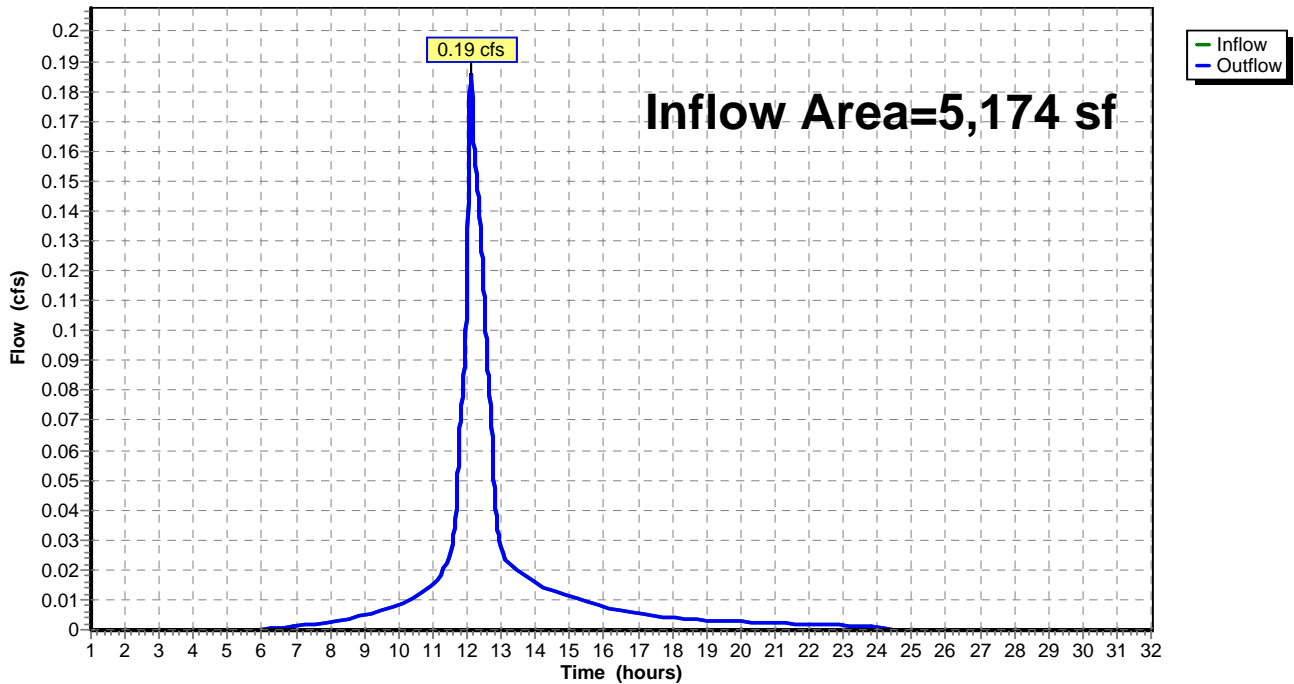
Summary for Reach 1R: POA 1

Inflow Area = 5,174 sf, 72.94% Impervious, Inflow Depth = 1.98" for 2-Y Durham (NRCC) event
Inflow = 0.19 cfs @ 12.11 hrs, Volume= 854 cf
Outflow = 0.19 cfs @ 12.11 hrs, Volume= 854 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3

Reach 1R: POA 1

Hydrograph



Summary for Pond 1P: DRAINAGE PIPE

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth = 2.90" for 2-Y Durham (NRCC) event
 Inflow = 0.21 cfs @ 12.08 hrs, Volume= 741 cf
 Outflow = 0.21 cfs @ 12.08 hrs, Volume= 741 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.21 cfs @ 12.08 hrs, Volume= 741 cf

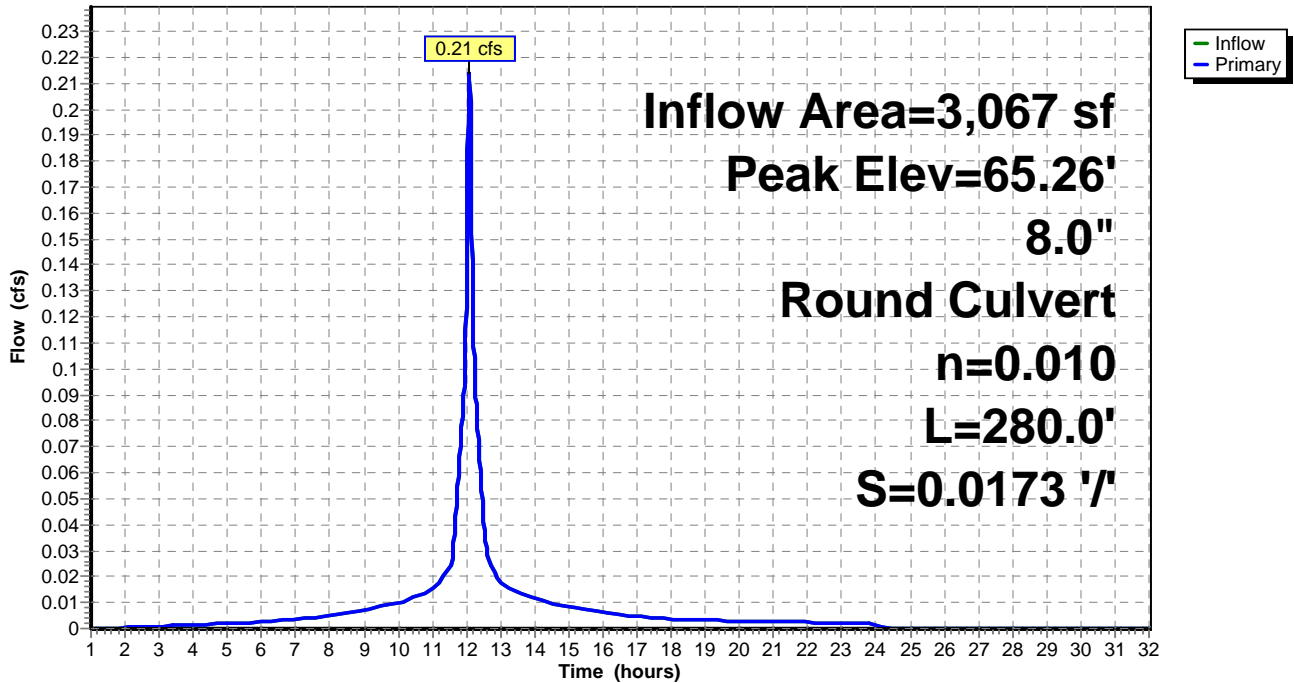
Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 65.26' @ 12.08 hrs

Device #1	Routing	Invert	Outlet Devices
	Primary	65.00'	8.0" Round Culvert L= 280.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.00' / 60.15' S= 0.0173 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.21 cfs @ 12.08 hrs HW=65.26' TW=59.52' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.21 cfs @ 1.72 fps)

Pond 1P: DRAINAGE PIPE

Hydrograph



18-067 POSTH

Prepared by MJS Engineering, PC

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Type III 24-hr 2-Y Durham (NRCC) Rainfall=3.13"

Revised 11-28-18 Printed 1/2/2019

Page 22

Summary for Pond 2P: StormTech 310

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth = 2.90" for 2-Y Durham (NRCC) event
 Inflow = 0.21 cfs @ 12.08 hrs, Volume= 741 cf
 Outflow = 0.11 cfs @ 12.21 hrs, Volume= 741 cf, Atten= 47%, Lag= 7.6 min
 Discarded = 0.00 cfs @ 7.10 hrs, Volume= 147 cf
 Primary = 0.11 cfs @ 12.21 hrs, Volume= 593 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 59.72' @ 12.21 hrs Surf.Area= 279 sf Storage= 92 cf
 Flood Elev= 58.50' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 10.9 min (767.8 - 756.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.92'	241 cf	8.67'W x 32.18'L x 2.58'H Field A 720 cf Overall - 118 cf Embedded = 603 cf x 40.0% Voids
#2A	59.67'	118 cf	ADS_StormTech SC-310 +Cap x 8 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		359 cf	Total Available Storage

Storage Group A created with Chamber Wizard

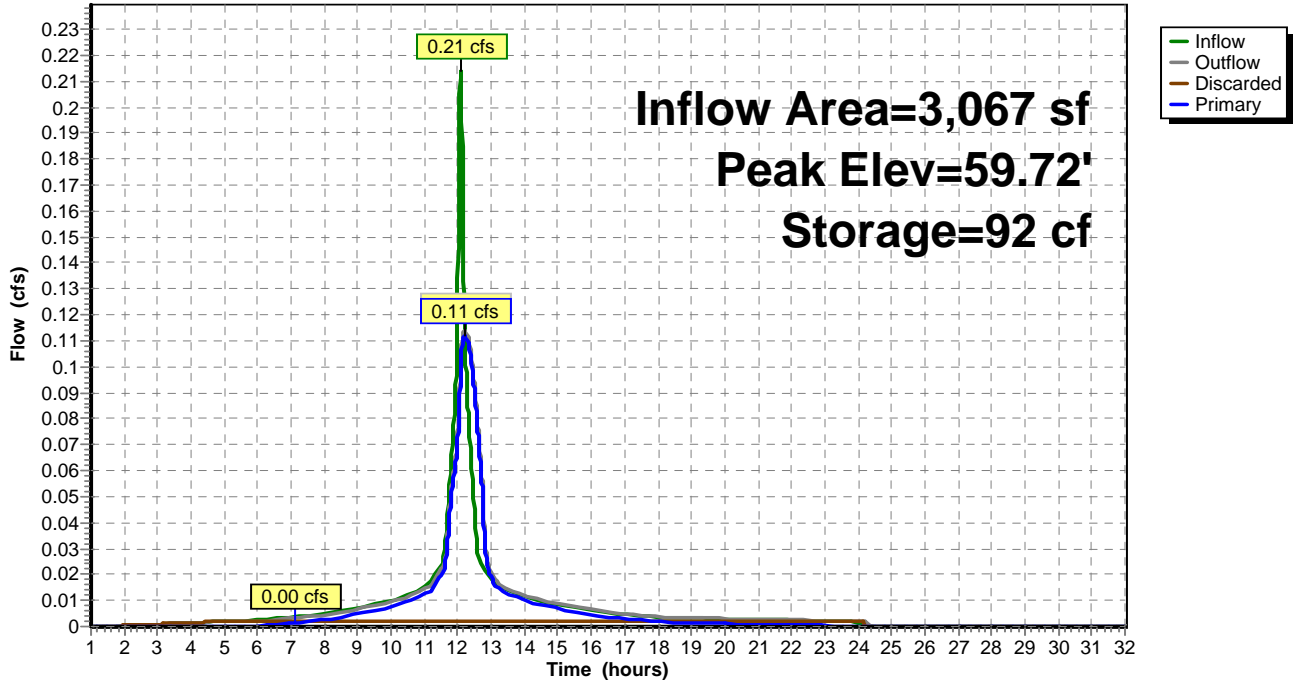
Device	Routing	Invert	Outlet Devices
#1	Primary	58.92'	4.0" Round Underdrain L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.92' / 58.72' S= 0.0100 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Primary	60.15'	6.0" Round Culvert X 2.00 L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.15' / 59.90' S= 0.0250 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 1	58.92'	0.2" Vert. 1/4" Perf X 120.00 C= 0.600
#4	Discarded	58.92'	0.300 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 7.10 hrs HW=58.95' (Free Discharge)
 ↳4=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.11 cfs @ 12.21 hrs HW=59.72' TW=0.00' (Dynamic Tailwater)
 ↳1=Underdrain (Passes 0.11 cfs of 0.26 cfs potential flow)
 ↳3=1/4" Perf (Orifice Controls 0.11 cfs @ 4.27 fps)
 ↳2=Culvert (Controls 0.00 cfs)

Pond 2P: StormTech 310

Hydrograph



18-067 POSTH*Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"*

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 24

Time span=1.00-32.00 hrs, dt=0.01 hrs, 3101 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=3,067 sf 100.00% Impervious Runoff Depth>4.50"
 Tc=6.0 min CN=98 Runoff=0.33 cfs 1,151 cf

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=2,107 sf 33.55% Impervious Runoff Depth=2.85"
 Tc=6.0 min CN=82 Runoff=0.16 cfs 500 cf

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=1,858 sf 20.78% Impervious Runoff Depth=2.32"
 Tc=6.0 min UI Adjusted CN=76 Runoff=0.12 cfs 360 cf

Subcatchment 4S: SUBCATCHMENT4 Runoff Area=1,844 sf 28.09% Impervious Runoff Depth=2.67"
 Tc=6.0 min UI Adjusted CN=80 Runoff=0.13 cfs 410 cf

Reach 1R: POA 1 Inflow=0.28 cfs 1,493 cf
 Outflow=0.28 cfs 1,493 cf

Pond 1P: DRAINAGE PIPE Peak Elev=65.32' Inflow=0.33 cfs 1,151 cf
 8.0" Round Culvert n=0.010 L=280.0' S=0.0173 '/ Outflow=0.33 cfs 1,151 cf

Pond 2P: StormTech 310 Peak Elev=60.15' Storage=175 cf Inflow=0.33 cfs 1,151 cf
 Discarded=0.00 cfs 158 cf Primary=0.14 cfs 993 cf Outflow=0.14 cfs 1,151 cf

Total Runoff Area = 8,876 sf Runoff Volume = 2,421 cf Average Runoff Depth = 3.27"
47.30% Pervious = 4,198 sf 52.70% Impervious = 4,678 sf

Summary for Subcatchment 1S: SUBCATCHMENT 1

Runoff = 0.33 cfs @ 12.08 hrs, Volume= 1,151 cf, Depth> 4.50"

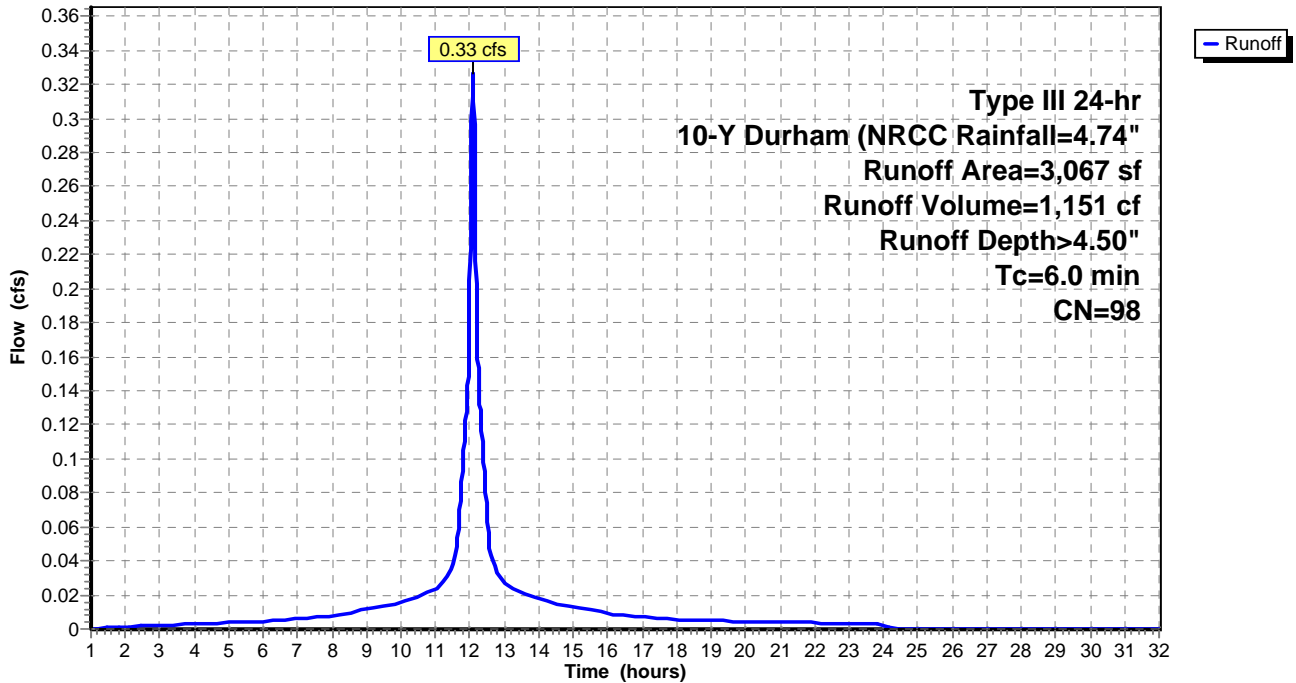
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Description	Land Use
3,067	98	Roofs, HSG C	Roofs
3,067	98	100.00% Impervious Area	

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

Subcatchment 1S: SUBCATCHMENT 1

Hydrograph



Summary for Subcatchment 2S: SUBCATCHMENT 2

Runoff = 0.16 cfs @ 12.09 hrs, Volume= 500 cf, Depth= 2.85"

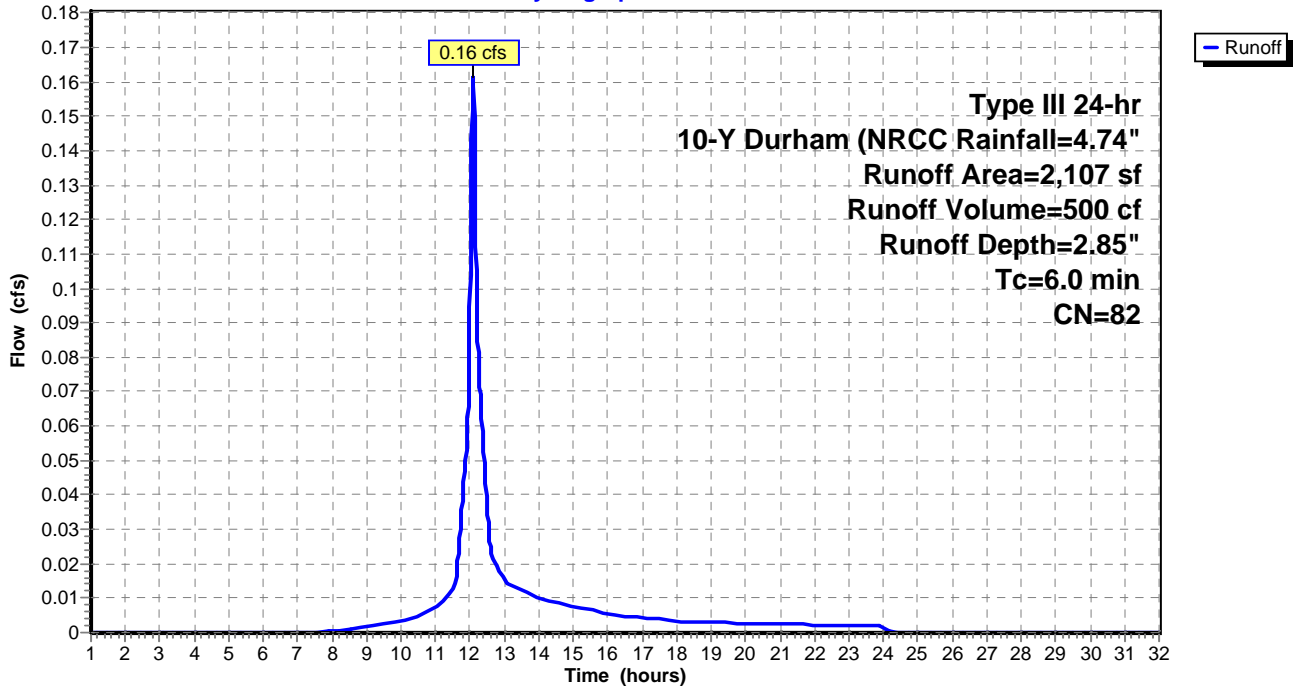
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Description	Land Use
1,057	74	>75% Grass cover, Good, HSG C	Open Space
343	73	Woods, Fair, HSG C	Open Water
707	98	Unconnected pavement, HSG C	Pavement
2,107	82	Weighted Average	
1,400	74	66.45% Pervious Area	
707	98	33.55% Impervious Area	
707		100.00% Unconnected	

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

Subcatchment 2S: SUBCATCHMENT 2

Hydrograph



Summary for Subcatchment 3S: SUBCATCHMENT 3

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 360 cf, Depth= 2.32"

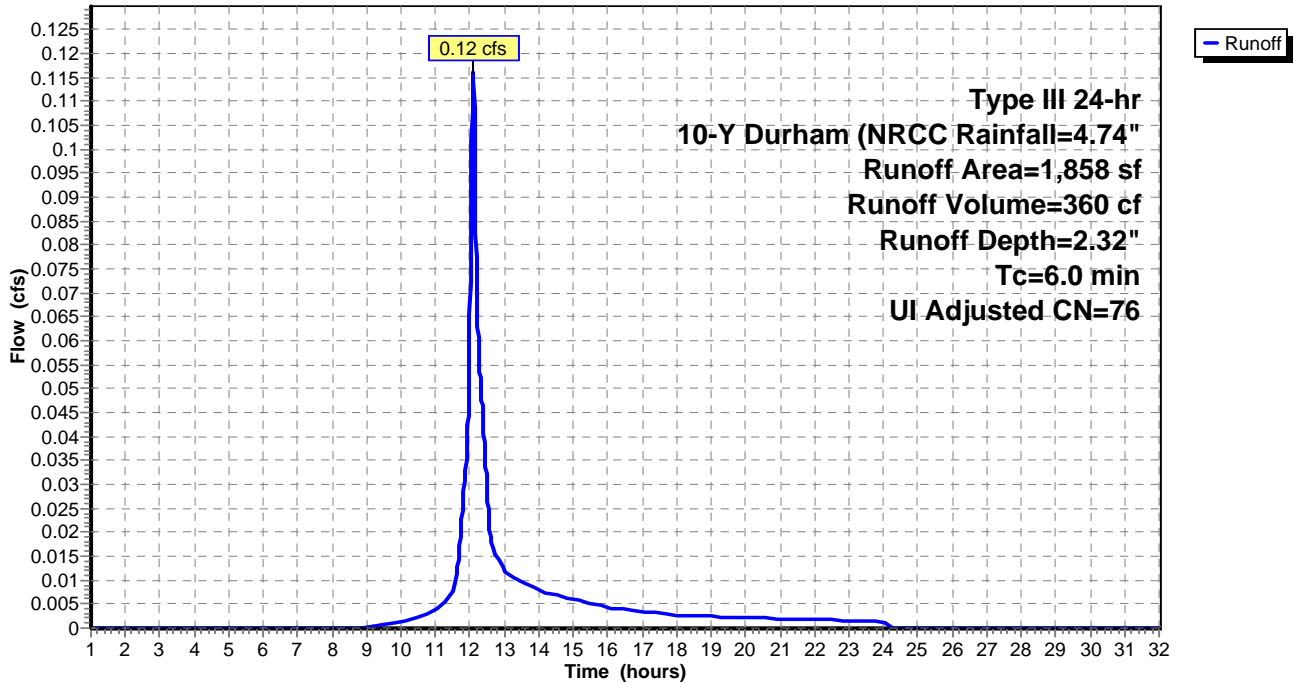
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Adj	Description	Land Use
386	98		Unconnected pavement, HSG C	Pavement
1,472	74		>75% Grass cover, Good, HSG C	Open Space
1,858	79	76	Weighted Average, UI Adjusted	
1,472	74	74	79.22% Pervious Area	
386	98	98	20.78% Impervious Area	
386			100.00% Unconnected	

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

Subcatchment 3S: SUBCATCHMENT 3

Hydrograph



Summary for Subcatchment 4S: SUBCATCHMENT 4

Runoff = 0.13 cfs @ 12.09 hrs, Volume= 410 cf, Depth= 2.67"

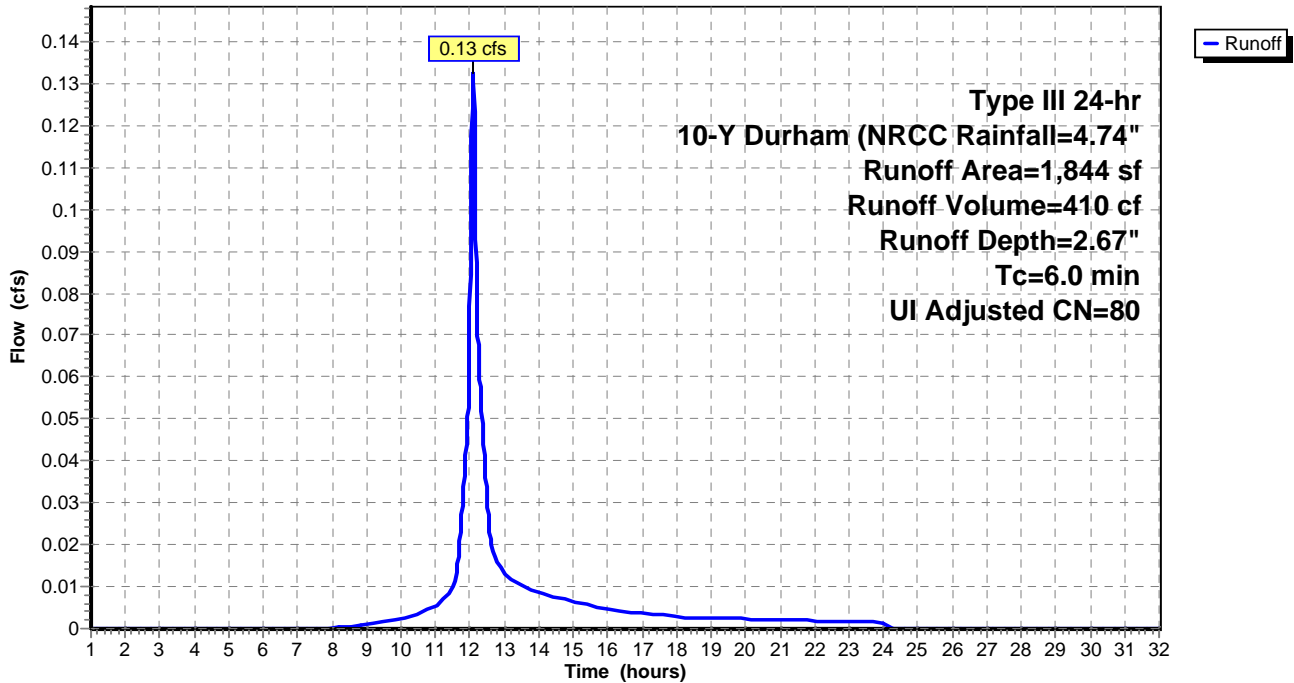
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-Y Durham (NRCC Rainfall=4.74"

Area (sf)	CN	Adj	Description	Land Use
1,326	74		>75% Grass cover, Good, HSG C	Open Space
464	98		Roofs, HSG C	Roofs
54	98		Unconnected pavement, HSG B	Pavement
1,844	81	80	Weighted Average, UI Adjusted	
1,326	74	74	71.91% Pervious Area	
518	98	98	28.09% Impervious Area	
54			10.42% Unconnected	

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

Subcatchment 4S: SUBCATCHMENT 4

Hydrograph



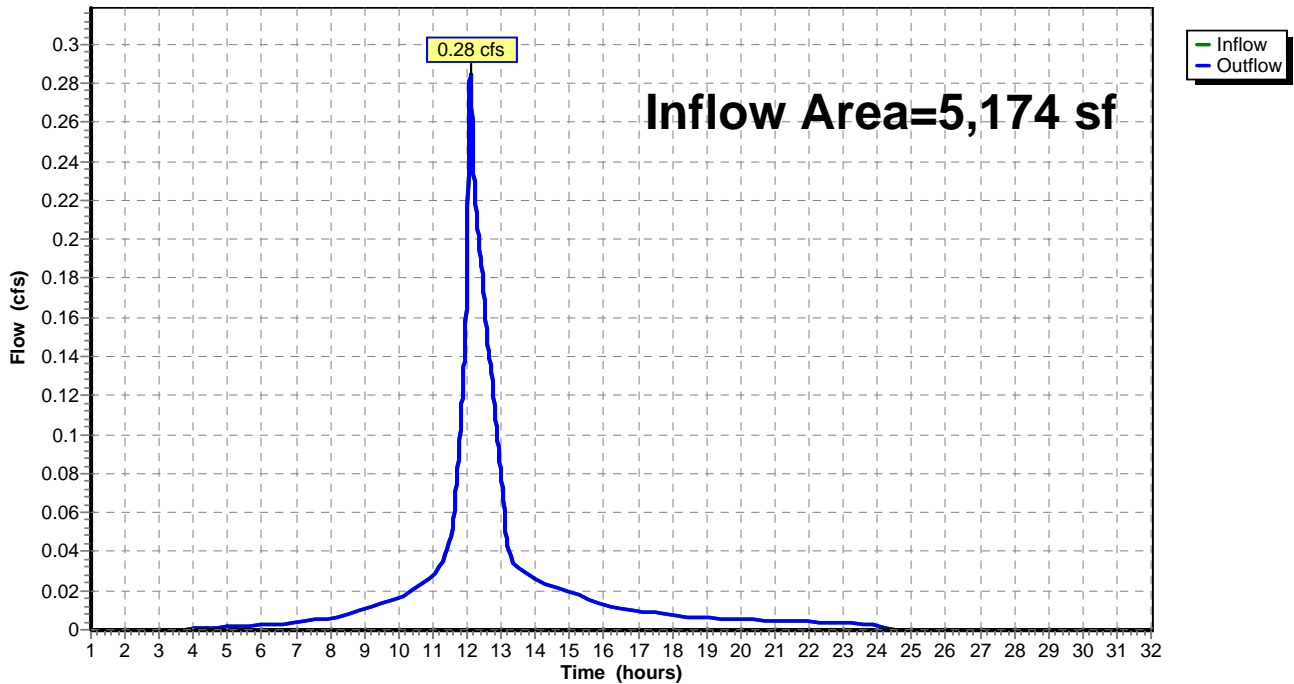
Summary for Reach 1R: POA 1

Inflow Area = 5,174 sf, 72.94% Impervious, Inflow Depth = 3.46" for 10-Y Durham (NRCC event)
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 1,493 cf
Outflow = 0.28 cfs @ 12.10 hrs, Volume= 1,493 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3

Reach 1R: POA 1

Hydrograph



Summary for Pond 1P: DRAINAGE PIPE

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth > 4.50" for 10-Y Durham (NRCC event)
 Inflow = 0.33 cfs @ 12.08 hrs, Volume= 1,151 cf
 Outflow = 0.33 cfs @ 12.08 hrs, Volume= 1,151 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.33 cfs @ 12.08 hrs, Volume= 1,151 cf

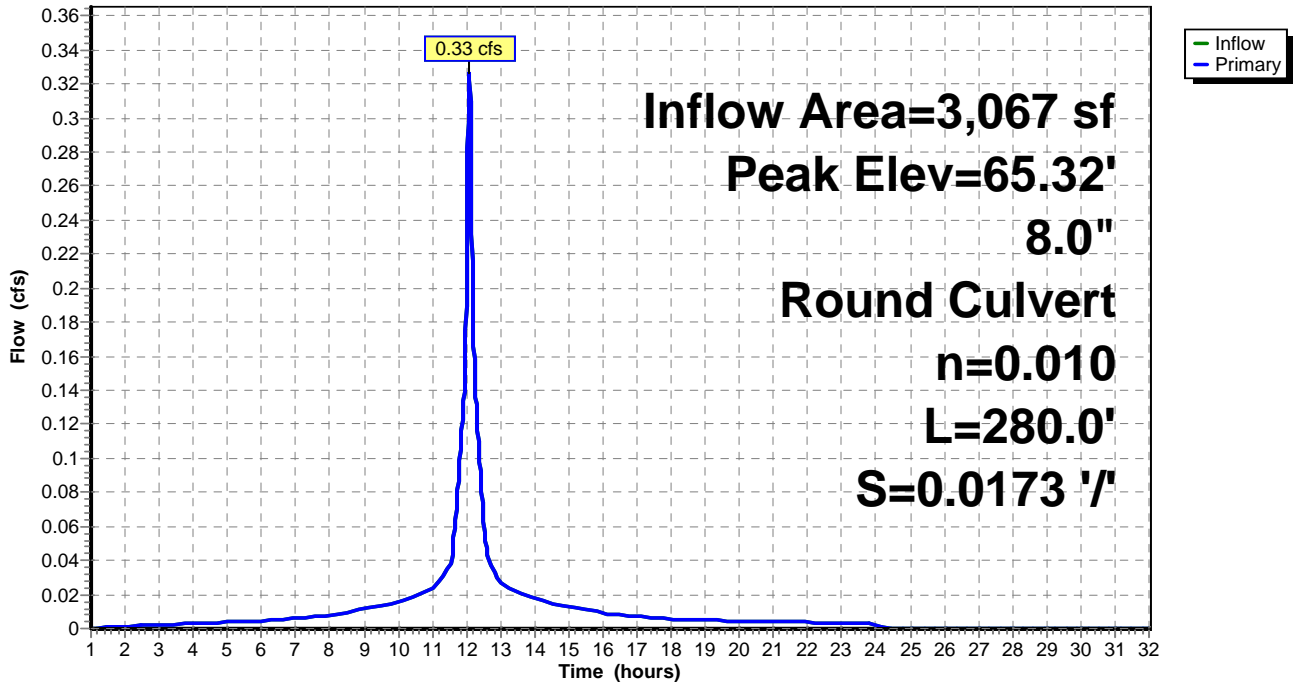
Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 65.32' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	65.00'	8.0" Round Culvert L= 280.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.00' / 60.15' S= 0.0173 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.33 cfs @ 12.08 hrs HW=65.32' TW=59.85' (Dynamic Tailwater)
 ↳ **1=Culvert** (Inlet Controls 0.33 cfs @ 1.94 fps)

Pond 1P: DRAINAGE PIPE

Hydrograph



Summary for Pond 2P: StormTech 310

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth > 4.50" for 10-Y Durham (NRCC event)
 Inflow = 0.33 cfs @ 12.08 hrs, Volume= 1,151 cf
 Outflow = 0.14 cfs @ 12.27 hrs, Volume= 1,151 cf, Atten= 57%, Lag= 10.9 min
 Discarded = 0.00 cfs @ 4.81 hrs, Volume= 158 cf
 Primary = 0.14 cfs @ 12.27 hrs, Volume= 993 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 60.15' @ 12.27 hrs Surf.Area= 279 sf Storage= 175 cf
 Flood Elev= 58.50' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= 12.7 min calculated for 1,151 cf (100% of inflow)
 Center-of-Mass det. time= 12.7 min (761.6 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.92'	241 cf	8.67'W x 32.18'L x 2.58'H Field A 720 cf Overall - 118 cf Embedded = 603 cf x 40.0% Voids
#2A	59.67'	118 cf	ADS_StormTech SC-310 +Cap x 8 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		359 cf	Total Available Storage

Storage Group A created with Chamber Wizard

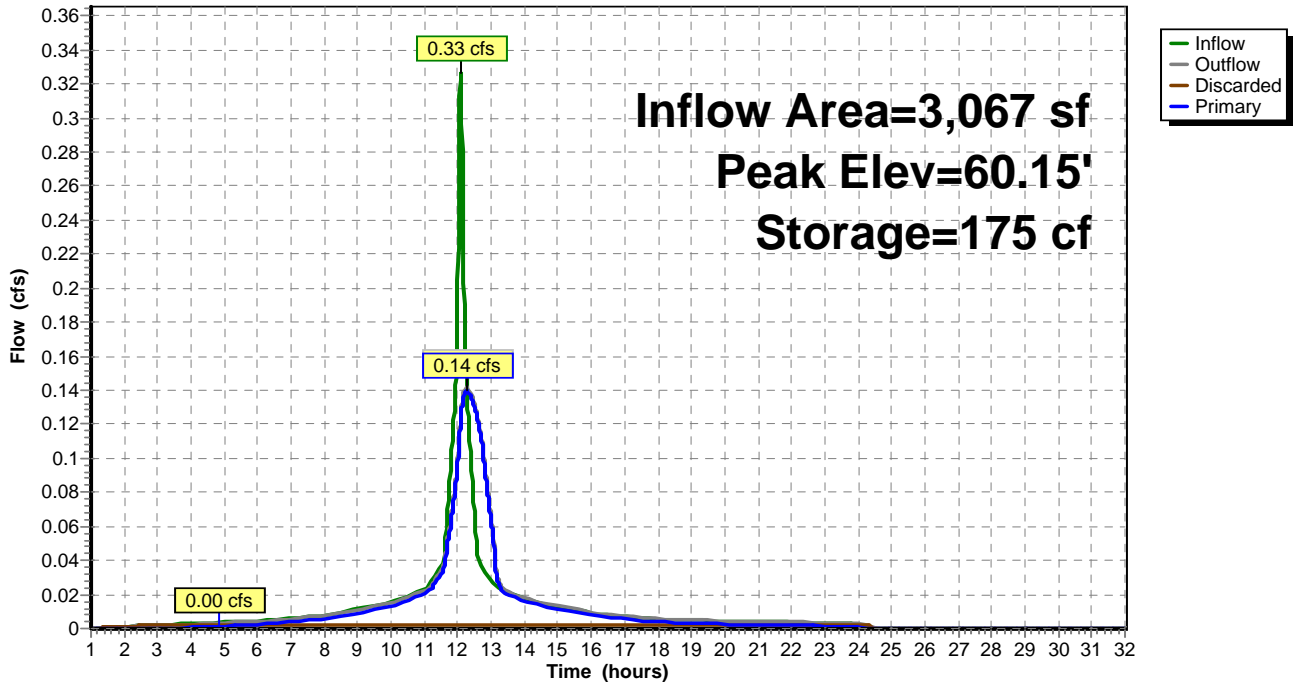
Device	Routing	Invert	Outlet Devices
#1	Primary	58.92'	4.0" Round Underdrain L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.92' / 58.72' S= 0.0100 1/1" Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Primary	60.15'	6.0" Round Culvert X 2.00 L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.15' / 59.90' S= 0.0250 1/1" Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 1	58.92'	0.2" Vert. 1/4" Perf X 120.00 C= 0.600
#4	Discarded	58.92'	0.300 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 4.81 hrs HW=58.95' (Free Discharge)
 ↳ **4=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.14 cfs @ 12.27 hrs HW=60.15' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Underdrain** (Passes 0.14 cfs of 0.34 cfs potential flow)
 ↳ ↳ **3=1/4" Perf** (Orifice Controls 0.14 cfs @ 5.33 fps)
 ↳ ↳ **2=Culvert** (Inlet Controls 0.00 cfs @ 0.18 fps)

Pond 2P: StormTech 310

Hydrograph



18-067 POSTH

Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Prepared by MJS Engineering, PC

Revised 11-28-18 Printed 1/2/2019

HydroCAD® 10.00-19 s/n 08064 © 2016 HydroCAD Software Solutions LLC

Page 33

Time span=1.00-32.00 hrs, dt=0.01 hrs, 3101 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=3,067 sf 100.00% Impervious Runoff Depth>5.77"
 Tc=6.0 min CN=98 Runoff=0.41 cfs 1,475 cf

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=2,107 sf 33.55% Impervious Runoff Depth=4.00"
 Tc=6.0 min CN=82 Runoff=0.22 cfs 702 cf

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=1,858 sf 20.78% Impervious Runoff Depth=3.39"
 Tc=6.0 min UI Adjusted CN=76 Runoff=0.17 cfs 525 cf

Subcatchment 4S: SUBCATCHMENT4 Runoff Area=1,844 sf 28.09% Impervious Runoff Depth=3.79"
 Tc=6.0 min UI Adjusted CN=80 Runoff=0.19 cfs 582 cf

Reach 1R: POA 1 Inflow=0.46 cfs 2,015 cf
 Outflow=0.46 cfs 2,015 cf

Pond 1P: DRAINAGE PIPE Peak Elev=65.37' Inflow=0.41 cfs 1,475 cf
 8.0" Round Culvert n=0.010 L=280.0' S=0.0173 '/ Outflow=0.41 cfs 1,475 cf

Pond 2P: StormTech 310 Peak Elev=60.33' Storage=205 cf Inflow=0.41 cfs 1,475 cf
 Discarded=0.00 cfs 162 cf Primary=0.29 cfs 1,313 cf Outflow=0.29 cfs 1,475 cf

Total Runoff Area = 8,876 sf Runoff Volume = 3,284 cf Average Runoff Depth = 4.44"
47.30% Pervious = 4,198 sf 52.70% Impervious = 4,678 sf

Summary for Subcatchment 1S: SUBCATCHMENT 1

Runoff = 0.41 cfs @ 12.08 hrs, Volume= 1,475 cf, Depth> 5.77"

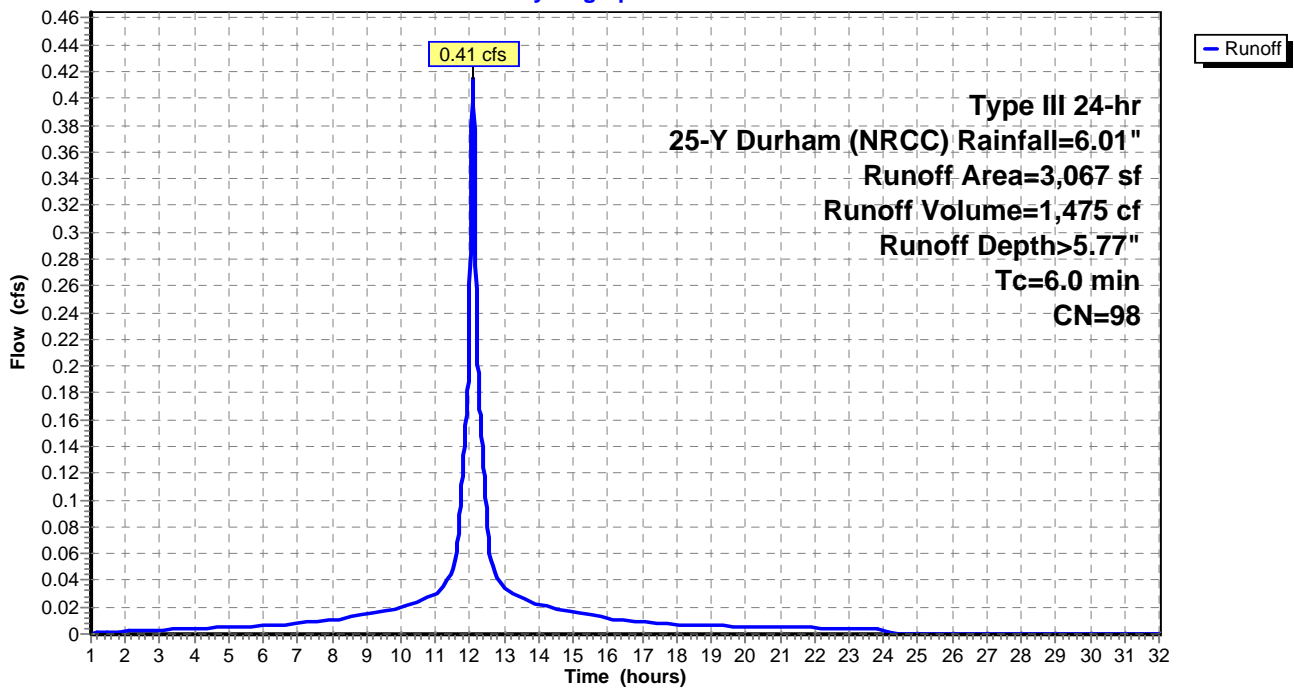
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Description	Land Use
3,067	98	Roofs, HSG C	Roofs
3,067	98	100.00% Impervious Area	

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

Subcatchment 1S: SUBCATCHMENT 1

Hydrograph



Summary for Subcatchment 2S: SUBCATCHMENT 2

Runoff = 0.22 cfs @ 12.09 hrs, Volume= 702 cf, Depth= 4.00"

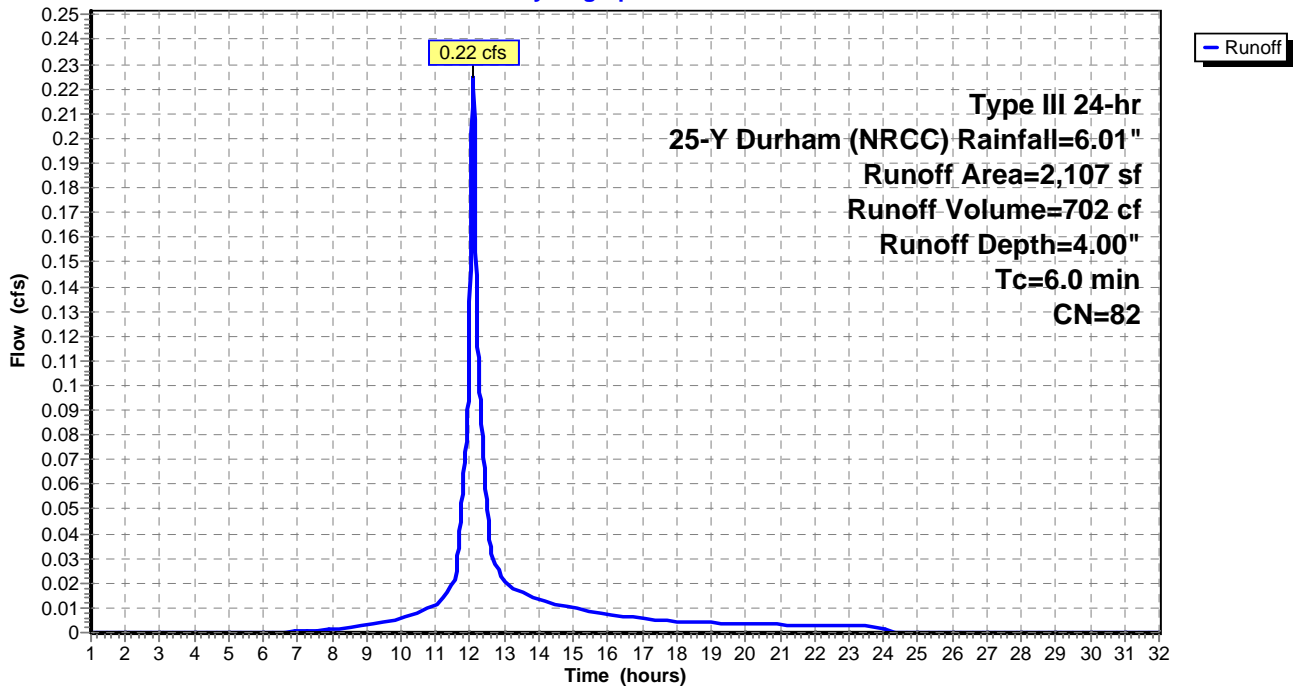
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Description	Land Use
1,057	74	>75% Grass cover, Good, HSG C	Open Space
343	73	Woods, Fair, HSG C	Open Water
707	98	Unconnected pavement, HSG C	Pavement
2,107	82	Weighted Average	
1,400	74	66.45% Pervious Area	
707	98	33.55% Impervious Area	
707		100.00% Unconnected	

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

Subcatchment 2S: SUBCATCHMENT 2

Hydrograph



Summary for Subcatchment 3S: SUBCATCHMENT 3

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 525 cf, Depth= 3.39"

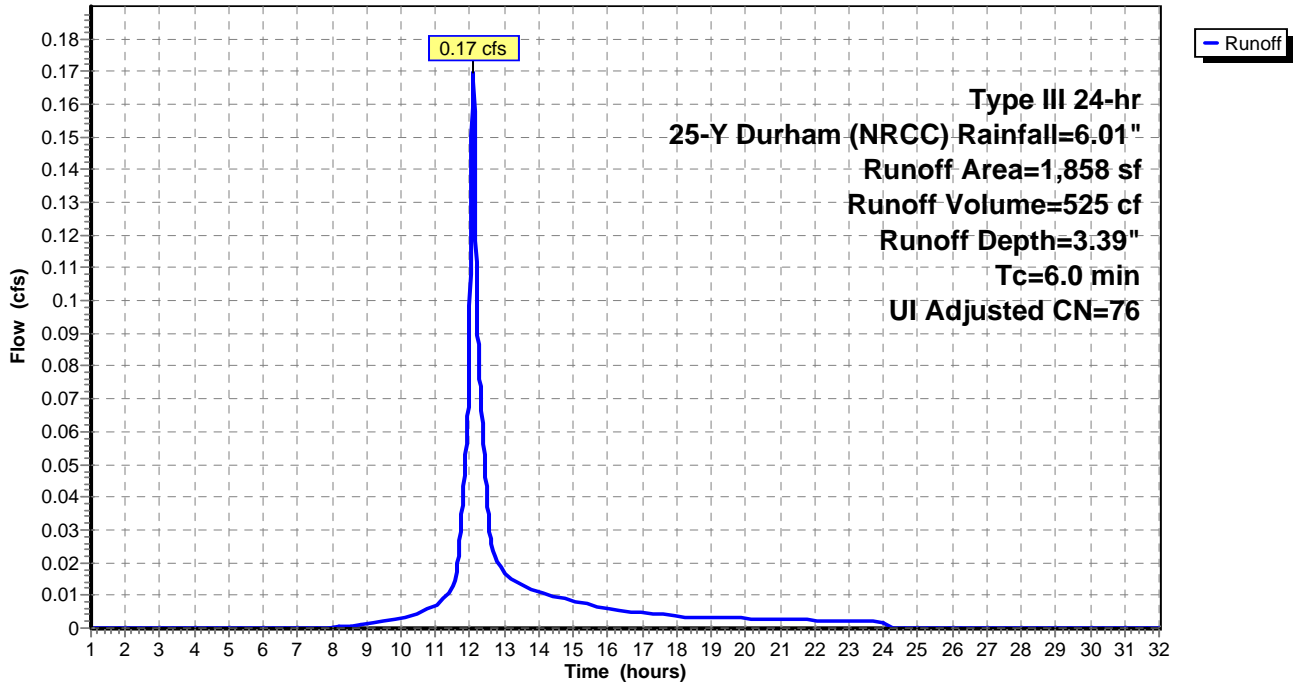
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Adj	Description	Land Use
386	98		Unconnected pavement, HSG C	Pavement
1,472	74		>75% Grass cover, Good, HSG C	Open Space
1,858	79	76	Weighted Average, UI Adjusted	
1,472	74	74	79.22% Pervious Area	
386	98	98	20.78% Impervious Area	
386			100.00% Unconnected	

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

Subcatchment 3S: SUBCATCHMENT 3

Hydrograph



Summary for Subcatchment 4S: SUBCATCHMENT 4

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 582 cf, Depth= 3.79"

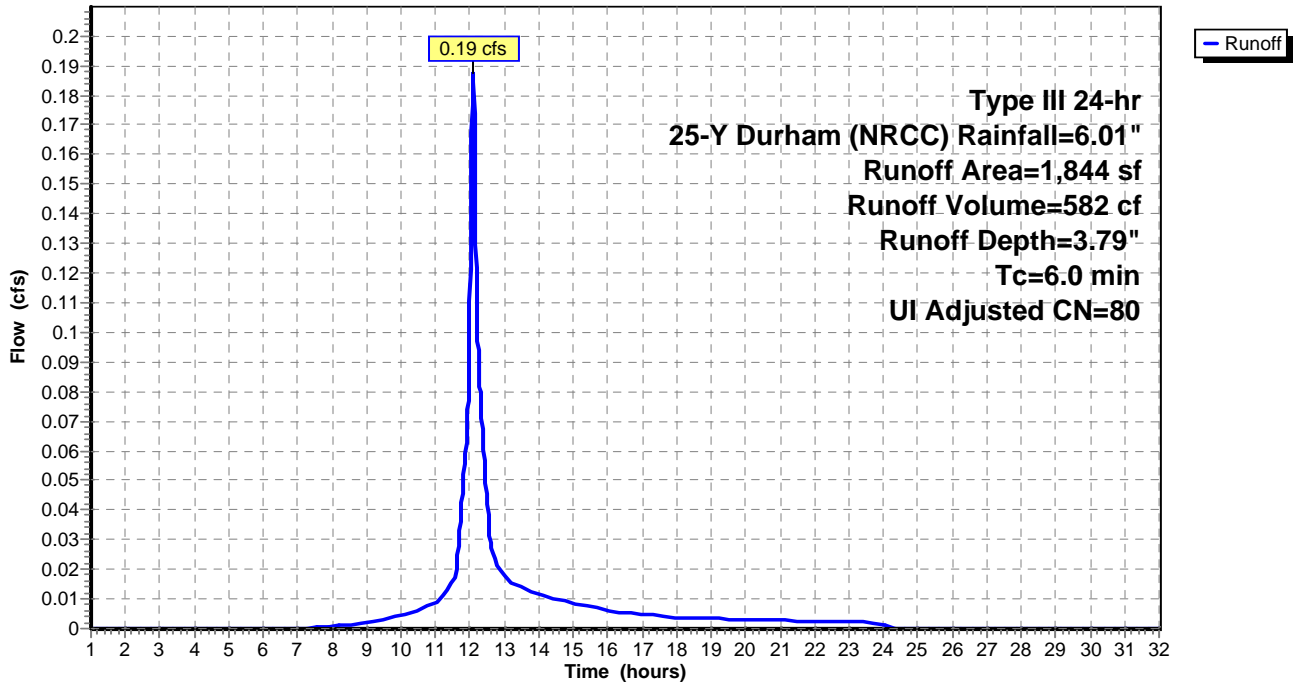
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-Y Durham (NRCC) Rainfall=6.01"

Area (sf)	CN	Adj	Description	Land Use
1,326	74		>75% Grass cover, Good, HSG C	Open Space
464	98		Roofs, HSG C	Roofs
54	98		Unconnected pavement, HSG B	Pavement
1,844	81	80	Weighted Average, UI Adjusted	
1,326	74	74	71.91% Pervious Area	
518	98	98	28.09% Impervious Area	
54			10.42% Unconnected	

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

Subcatchment 4S: SUBCATCHMENT 4

Hydrograph



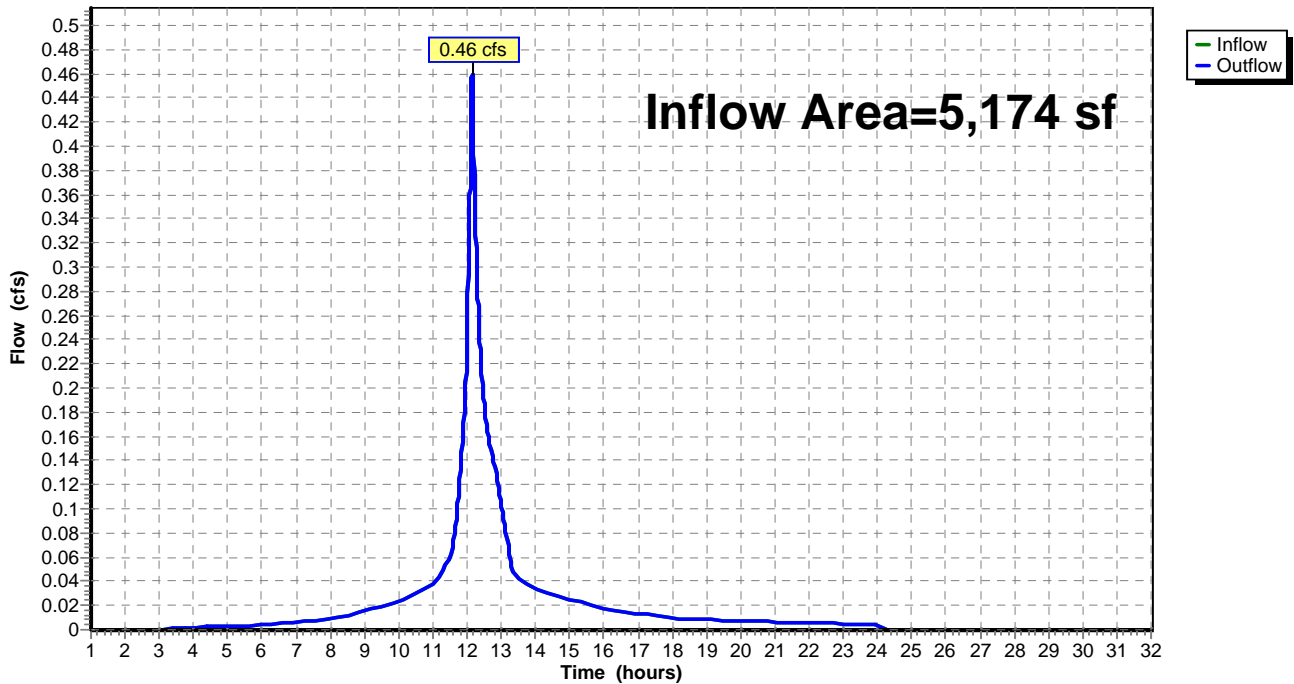
Summary for Reach 1R: POA 1

Inflow Area = 5,174 sf, 72.94% Impervious, Inflow Depth = 4.67" for 25-Y Durham (NRCC) event
Inflow = 0.46 cfs @ 12.15 hrs, Volume= 2,015 cf
Outflow = 0.46 cfs @ 12.15 hrs, Volume= 2,015 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3

Reach 1R: POA 1

Hydrograph



Summary for Pond 1P: DRAINAGE PIPE

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth > 5.77" for 25-Y Durham (NRCC) event
 Inflow = 0.41 cfs @ 12.08 hrs, Volume= 1,475 cf
 Outflow = 0.41 cfs @ 12.08 hrs, Volume= 1,475 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.41 cfs @ 12.08 hrs, Volume= 1,475 cf

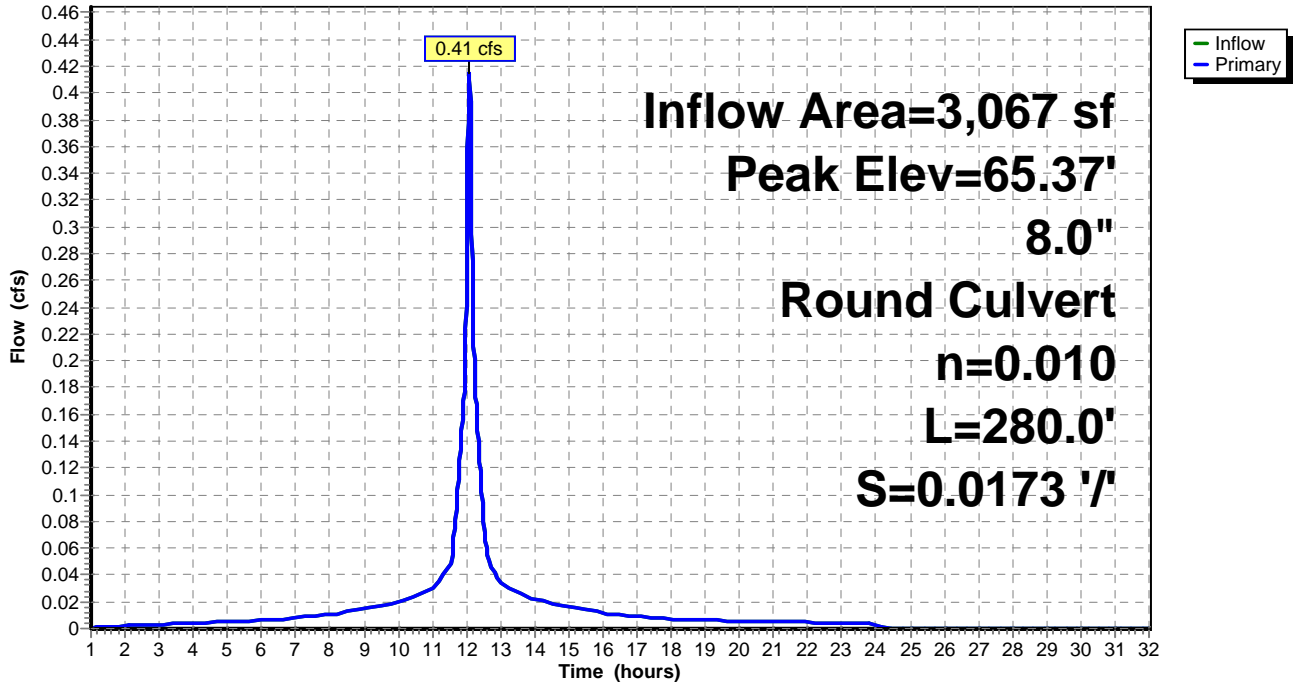
Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 65.37' @ 12.08 hrs

Device #1	Routing	Invert	Outlet Devices
	Primary	65.00'	8.0" Round Culvert L= 280.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.00' / 60.15' S= 0.0173 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.41 cfs @ 12.08 hrs HW=65.37' TW=60.09' (Dynamic Tailwater)
 ←1=Culvert (Inlet Controls 0.41 cfs @ 2.07 fps)

Pond 1P: DRAINAGE PIPE

Hydrograph



Summary for Pond 2P: StormTech 310

Inflow Area = 3,067 sf, 100.00% Impervious, Inflow Depth > 5.77" for 25-Y Durham (NRCC) event
 Inflow = 0.41 cfs @ 12.08 hrs, Volume= 1,475 cf
 Outflow = 0.29 cfs @ 12.16 hrs, Volume= 1,475 cf, Atten= 30%, Lag= 4.7 min
 Discarded = 0.00 cfs @ 3.57 hrs, Volume= 162 cf
 Primary = 0.29 cfs @ 12.16 hrs, Volume= 1,313 cf

Routing by Dyn-Stor-Ind method, Time Span= 1.00-32.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 60.33' @ 12.16 hrs Surf.Area= 279 sf Storage= 205 cf
 Flood Elev= 58.50' Surf.Area= 0 sf Storage= 0 cf

Plug-Flow detention time= 12.3 min calculated for 1,475 cf (100% of inflow)
 Center-of-Mass det. time= 12.3 min (757.5 - 745.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.92'	241 cf	8.67'W x 32.18'L x 2.58'H Field A 720 cf Overall - 118 cf Embedded = 603 cf x 40.0% Voids
#2A	59.67'	118 cf	ADS_StormTech SC-310 +Cap x 8 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 2 Rows of 4 Chambers
		359 cf	Total Available Storage

Storage Group A created with Chamber Wizard

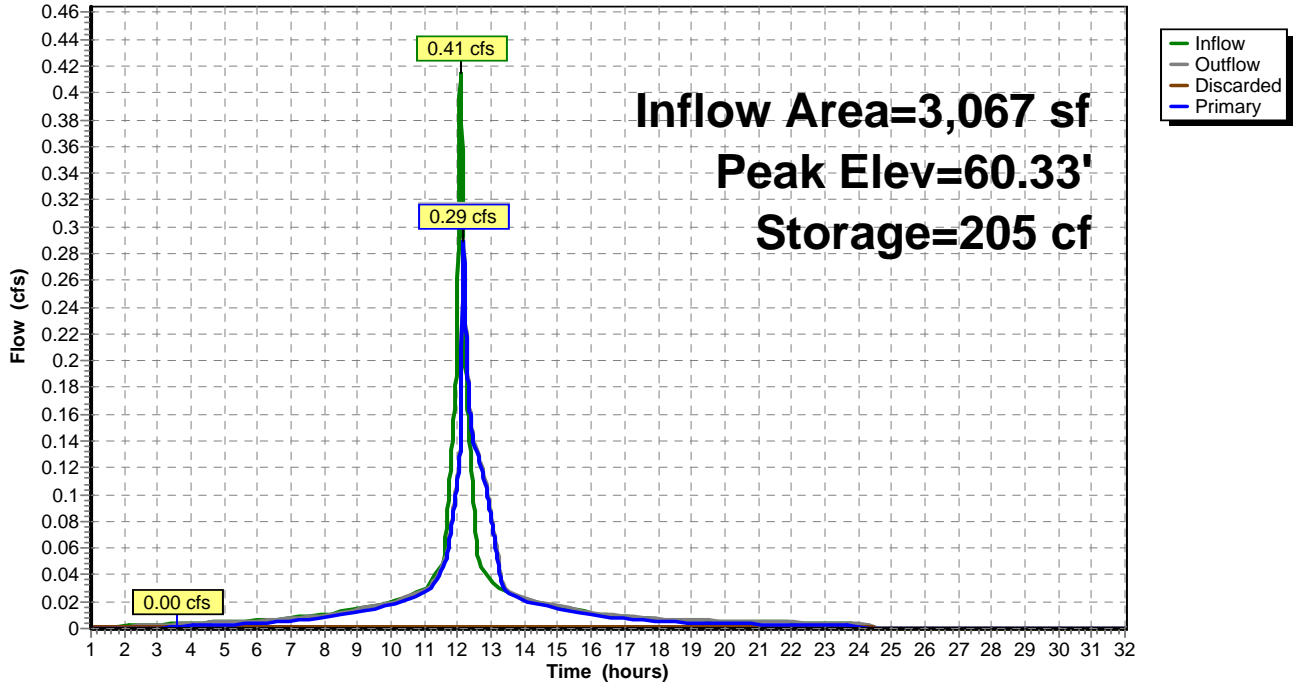
Device	Routing	Invert	Outlet Devices
#1	Primary	58.92'	4.0" Round Underdrain L= 20.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 58.92' / 58.72' S= 0.0100 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Primary	60.15'	6.0" Round Culvert X 2.00 L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 60.15' / 59.90' S= 0.0250 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#3	Device 1	58.92'	0.2" Vert. 1/4" Perf X 120.00 C= 0.600
#4	Discarded	58.92'	0.300 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.00 cfs @ 3.57 hrs HW=58.95' (Free Discharge)
 ↳4=Exfiltration (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.29 cfs @ 12.16 hrs HW=60.33' TW=0.00' (Dynamic Tailwater)
 ↳1=Underdrain (Passes 0.15 cfs of 0.37 cfs potential flow)
 ↳↳3=1/4" Perf (Orifice Controls 0.15 cfs @ 5.69 fps)
 ↳↳2=Culvert (Inlet Controls 0.14 cfs @ 1.13 fps)

Pond 2P: StormTech 310

Hydrograph



Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.926 degrees West
Latitude	43.137 degrees North
Elevation	0 feet
Date/Time	Mon, 26 Nov 2018 10:39:33 -0500

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	0.65	0.81	1.03	1yr	0.70	0.98	1.20	1.55	2.00	2.61	2.84	1yr	2.31	2.73	3.13	3.85	4.43	1yr
2yr	0.32	0.49	0.61	0.81	1.01	1.29	2yr	0.88	1.17	1.50	1.91	2.44	3.13	3.47	2yr	2.77	3.34	3.84	4.57	5.20	2yr
5yr	0.37	0.57	0.72	0.96	1.23	1.58	5yr	1.06	1.44	1.85	2.38	3.07	3.97	4.45	5yr	3.51	4.28	4.89	5.78	6.54	5yr
10yr	0.40	0.63	0.80	1.09	1.42	1.84	10yr	1.22	1.69	2.18	2.82	3.66	4.74	5.37	10yr	4.20	5.17	5.88	6.91	7.78	10yr
25yr	0.46	0.74	0.94	1.29	1.72	2.27	25yr	1.48	2.09	2.69	3.52	4.61	6.01	6.90	25yr	5.32	6.63	7.51	8.75	9.80	25yr
50yr	0.51	0.83	1.06	1.48	1.99	2.66	50yr	1.72	2.46	3.17	4.18	5.49	7.19	8.34	50yr	6.37	8.02	9.04	10.47	11.68	50yr
100yr	0.58	0.93	1.20	1.70	2.31	3.12	100yr	2.00	2.89	3.74	4.96	6.54	8.62	10.08	100yr	7.62	9.69	10.88	12.54	13.92	100yr
200yr	0.64	1.04	1.35	1.94	2.69	3.66	200yr	2.32	3.40	4.42	5.89	7.81	10.32	12.19	200yr	9.13	11.72	13.10	15.02	16.60	200yr
500yr	0.75	1.24	1.61	2.34	3.28	4.52	500yr	2.83	4.21	5.48	7.38	9.86	13.11	15.67	500yr	11.60	15.07	16.75	19.07	20.97	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.90	1yr	0.64	0.88	0.91	1.26	1.55	2.00	2.51	1yr	1.77	2.42	2.94	3.28	4.03	1yr
2yr	0.32	0.49	0.60	0.81	1.00	1.18	2yr	0.86	1.16	1.37	1.83	2.36	3.04	3.38	2yr	2.69	3.25	3.73	4.45	5.05	2yr
5yr	0.35	0.54	0.67	0.92	1.17	1.40	5yr	1.01	1.37	1.62	2.15	2.78	3.71	4.13	5yr	3.29	3.97	4.58	5.42	6.13	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.60	10yr	1.14	1.57	1.82	2.45	3.14	4.29	4.81	10yr	3.79	4.62	5.33	6.29	7.06	10yr
25yr	0.44	0.67	0.83	1.19	1.56	1.91	25yr	1.35	1.87	2.11	2.85	3.67	5.06	5.86	25yr	4.48	5.63	6.53	7.66	8.53	25yr
50yr	0.48	0.74	0.92	1.32	1.77	2.19	50yr	1.53	2.14	2.36	3.21	4.13	5.81	6.79	50yr	5.14	6.53	7.62	8.88	9.83	50yr
100yr	0.54	0.82	1.02	1.48	2.03	2.51	100yr	1.75	2.46	2.64	3.60	4.62	6.66	7.87	100yr	5.89	7.56	8.89	10.30	11.29	100yr
200yr	0.60	0.91	1.15	1.66	2.32	2.87	200yr	2.00	2.81	2.94	4.03	5.17	7.63	9.12	200yr	6.75	8.77	10.39	11.96	13.01	200yr
500yr	0.70	1.05	1.35	1.96	2.79	3.46	500yr	2.40	3.39	3.42	4.67	6.02	9.10	11.08	500yr	8.05	10.65	12.76	14.58	15.61	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	1yr	0.75	1.05	1.24	1.74	2.21	2.82	3.02	1yr	2.50	2.91	3.36	4.16	4.76	1yr
2yr	0.33	0.51	0.62	0.84	1.04	1.25	2yr	0.90	1.22	1.48	1.95	2.50	3.24	3.57	2yr	2.87	3.43	3.94	4.70	5.38	2yr
5yr	0.39	0.60	0.75	1.03	1.31	1.58	5yr	1.13	1.54	1.85	2.49	3.19	4.22	4.76	5yr	3.73	4.58	5.21	6.15	6.92	5yr
10yr	0.46	0.70	0.87	1.21	1.57	1.92	10yr	1.35	1.88	2.23	3.04	3.84	5.20	5.93	10yr	4.60	5.70	6.47	7.54	8.43	10yr
25yr	0.55	0.84	1.05	1.49	1.97	2.47	25yr	1.70	2.42	2.87	3.95	4.92	6.98	7.93	25yr	6.18	7.63	8.57	9.91	10.98	25yr
50yr	0.64	0.97	1.21	1.74	2.34	2.98	50yr	2.02	2.92	3.48	4.81	5.96	8.63	9.90	50yr	7.64	9.52	10.63	12.17	13.43	50yr
100yr	0.74	1.12	1.40	2.03	2.78	3.60	100yr	2.40	3.52	4.22	5.89	7.24	10.67	12.36	100yr	9.45	11.89	13.15	14.98	16.43	100yr
200yr	0.86	1.29	1.63	2.37	3.30	4.37	200yr	2.85	4.27	5.12	7.21	8.77	13.24	15.46	200yr	11.72	14.87	16.29	18.41	20.13	200yr
500yr	1.04	1.55	2.00	2.90	4.13	5.61	500yr	3.56	5.48	6.61	9.43	11.32	17.65	20.76	500yr	15.62	19.97	21.62	24.23	26.35	500yr

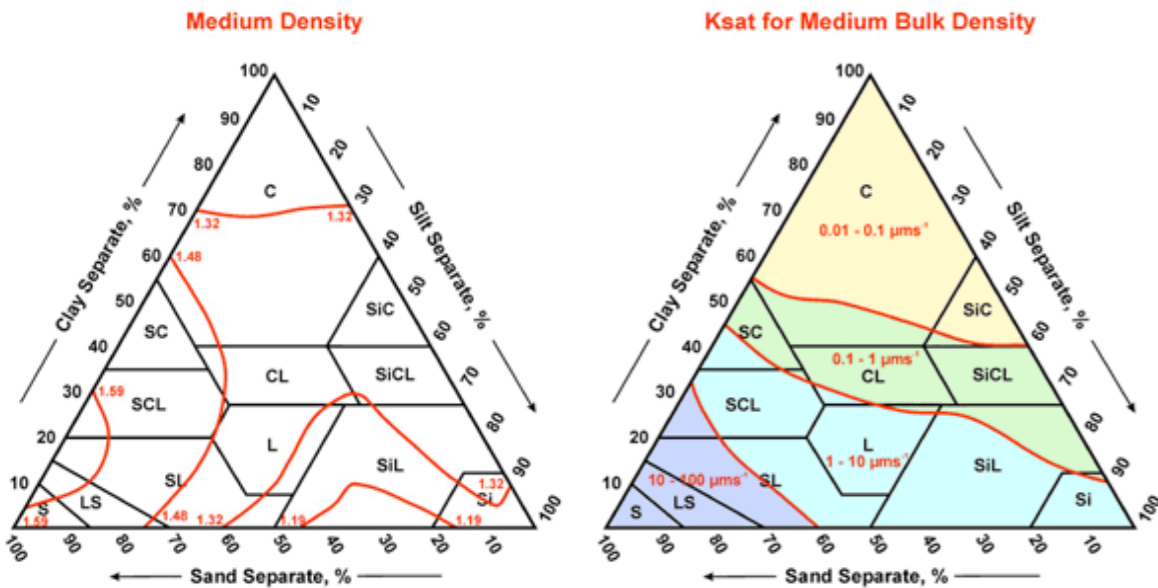


K_{sat} VALUES

FOR

NEW HAMPSHIRE SOILS

(Including Hydrologic and DES Soil Lot Sizing Groups)



From: Guide for Estimating Ksat from Soil Properties (Exhibit 618-9). (<http://soils.usda.gov/technical/handbook/contents/part618ex.html>)

Sponsored by the Society of Soil Scientists of Northern New England
 SSSNNE Special Publication No. 5
 September, 2009

K_{sat} VALUES FOR NEW HAMPSHIRE SOILS

ABOUT THE SOCIETY OF SOIL SCIENTISTS OF NORTHERN NEW ENGLAND

The Society of Soil Scientists of Northern New England (SSSNNE) is a non-profit professional organization of soil scientists, both in the private and public sectors, which is dedicated to the advancement of soil science. The Society fosters the profession of soil classification, mapping and interpretation, and encourages the dissemination of information concerning soil science. With the intent of contributing to the general human welfare, the Society seeks to educate the public on the wise use of soils and the associated natural resources.

INTRODUCTION

The publication “K_{sat} Values for New Hampshire Soils” is designed to assist soil scientists, engineers, and other professionals by assembling tables of existing data for all soil series currently on the state soil legend with regard to K_{sat} values and hydrologic groupings (Hyd.Grp.). The need for this information has become more important since the adoption by the New Hampshire Department of Environmental Services of the revised Alteration of Terrain rules for stormwater management. Additional information has been provided for each soil series with regard to landform, temperature regime (Temp.), soil textures, NHDES Soil Lot Size Groupings (Group), whether the soil is a Spodosol (Spodosol?) and other information which will be valuable to a variety of soil information users.

The data for each soil series has been sorted 3 ways for ease of searching:

Table A-Sorted by Numerical Legend

Table B-Sorted by Soil Series Name

Table C-Sorted by NHDES Soil Group for Establishing Lot Size

The report represents cumulative efforts by private soil scientists and NHDES staff with assistance from the USDA Natural Resource Conservation Service.

Comments or inquires on the information in this publication may be directed to the Board of Directors at the following address:

**Society of Soil Scientists
of Northern New England
PO Box 76
Durham, NH 03824**

SATURATED HYDRAULIC CONDUCTIVITY (K_{SAT})

K_{sat} refers to the ease with which pores in a saturated soil transmit water. The estimates presented here are expressed in terms of inches per hour (NRCS official data presents K_{sat} in both micrometers per second and inches per hour). K_{sat} values are based on soil characteristics observed in the field, particularly structure, consistence, porosity, and texture. (USDA NRCS, Web Soil Survey)

Saturated flow occurs when the soil water pressure is positive; that is, when the soil matric potential is zero (satiated wet condition). In most soils this situation takes place when about 95 percent of the total pore space is filled with water. The remaining 5 percent is filled with entrapped air. Saturated hydraulic conductivity cannot be used to describe water movement under unsaturated conditions. (Soil Survey Manual, 1993)

It is commonly known that soil features (and thus data) for a certain soil series name may be slightly different from one county soil survey to the next and the range in characteristics (via the Typical Pedon) may be slightly different. For example – a Marlow soil (series) in Carroll County may have a higher sand content in its B horizon as opposed to a Marlow soil (series) in Coos County; resulting in a slightly different K_{sat} range for the B horizon.

The K_{sat} data for this publication was obtained from the USDA-NRCS Soil Data Mart using the Typical Pedon from the county that best reflected the soil and/or had the most acres of that soil. This data is presented in B and C horizons only as it is assumed that the topsoil (A or A_p horizon) will be removed in typical construction practices.

References:

Web Soil Survey. *Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>.*

Soil Data Mart. <http://soildatamart.nrcs.usda.gov/>.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.*

HYDROLOGIC SOIL GROUPS

Hydrologic group is a group of soils having the same runoff potential under similar storm and cover conditions.

Hydrologic groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning stormwater management, watershed protection, and flood-prevention projects and for planning or designing structures for the use, control, and disposal of water.

Classifications assigned to soils were based on the use of rainfall-runoff data from small watersheds and infiltrometer plots. From these data, relationships between soil properties and hydrologic groups were established. Assignment of soils to hydrologic groups is based on the relationship between soil properties and hydrologic groups. Wetness characteristics, permeability after prolonged wetting, and depth to very slowly permeable layers are properties that assist in estimating hydrologic groups. Minimum annual steady ponded infiltration rate for a bare ground surface determines the hydrologic soil groups.

Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. (The influence of ground cover is treated independently, not in hydrologic soil groups.).

The soils in the United States are placed into four groups, A, B, C, and D, and three dual classes, *A/D*, *B/D*, and *C/D*. In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

Group A- Saturated hydraulic conductivity is very high or in the upper half of high and internal free water occurrence is very deep. Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group A are as follows. The saturated hydraulic conductivity of all soil layers exceeds 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer are in group A if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 10 micrometers per second (1.42 inches per hour).

Group B- Saturated hydraulic conductivity is in the lower half of high or in the upper half of moderately high and free water occurrence is deep or very deep. Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group B are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] ranges from 10.0 micrometers per second (1.42 inches per hour) to 40.0 micrometers per second (5.67 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a water impermeable layer or water table are in group B if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 4.0 micrometers per second (0.57 inches per hour) but is less than 10.0 micrometers per second (1.42 inches per hour).

Group C- Saturated hydraulic conductivity is in the lower half of moderately high or in the upper half of moderately low and internal free water occurrence is deeper than shallow. Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. The limits on the diagnostic physical characteristics of group C are as follows. The saturated hydraulic conductivity in the least transmissive layer between the surface and 50 centimeters [20 inches] is between 1.0 micrometers per second (0.14 inches per hour) and 10.0 micrometers per second (1.42 inches per hour). The depth to any water impermeable layer is greater than 50 centimeters [20 inches]. The depth to the water table is greater than 60 centimeters [24 inches]. Soils that are deeper than 100 centimeters [40 inches] to a restriction or water table are in group C if the saturated hydraulic conductivity of all soil layers within 100 centimeters [40 inches] of the surface exceeds 0.40 micrometers per second (0.06 inches per hour) but is less than 4.0 micrometers per second (0.57 inches per hour).

Group D- Saturated hydraulic conductivity is below the upper half of moderately low, and/or internal free water occurrence is shallow or very shallow and transitory through permanent. Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water impermeable layer less than 50 centimeters [20 inches] and all soils with a water table within 60 centimeters [24 inches] of the surface are in this group, although some may have a dual classification, as described in the next section, if they can be adequately drained. The limits on the physical diagnostic characteristics of group D are as follows. For soils with a water impermeable layer at a depth between 50 centimeters and 100 centimeters [20 and 40 inches], the saturated hydraulic conductivity in the least transmissive soil layer is less than or equal to 1.0 micrometers per second (0.14 inches per hour). For soils that are deeper than 100 centimeters [40 inches] to a restriction or water table, the saturated hydraulic

conductivity of all soil layers within 100 centimeters [40 inches] of the surface is less than or equal to 0.40 micrometers per second (0.06 inches per hour).

Dual hydrologic soil groups-Certain wet soils are placed in group D based solely on the presence of a water table within 60 centimeters [24 inches] of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, then they are assigned to dual hydrologic soil groups (*A/D*, *B/D*, and *C/D*) based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the undrained condition. For the purpose of hydrologic soil group, adequately drained means that the seasonal high water table is kept at least 60 centimeters [24 inches] below the surface in a soil where it would be higher in a natural state.

References:

National Engineering Handbook, Natural Resource Conservation Service, U.S. Department of Agriculture.

Soil Data Mart. <http://soildatamart.nrcs.usda.gov/>.

Soil Survey Manual. *Soil Survey Division Staff. 1993. Soil survey manual. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 18.*

TABLE A

NUMERICAL LEGEND

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravely sand	no	loamy cap
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravely coarse sand
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravely surface
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravely sand	no	
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Madawaska, aquatic	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravely sandy loam in Cd
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrodept
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Chichester	442	0.6	2.0	2.00	6.0	B	3	Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over loam
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravely sandy loam in Cd
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Ricker	674	2.0	6.0	2.00	6.0	A	4	Organic over bedrock (up to 4" of mineral)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep



no longer recognized
organic materials

TABLE B
SOIL SERIES

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Abenaki	501	0.6	2.0	6.00	99.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Au Gres	516					B	5	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bangor	572	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	0.6	2.0	0.06	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryc	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bernardston	330	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Binghamville	534	0.2	2.0	0.06	0.2	D	5	Terraces and glacial lake plains	mesic	silty	no	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Bucksport	895					D	6	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Cabot	589	0.6	2.0	0.06	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Caesar	526	20.0	100.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	coarse sand	no	
Canaan	663	2.0	20.0	2.00	20.0	C	4	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Cardigan	357	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chichester	442	0.6	2.0	2.00	6.0	B		Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Chocorua	395			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Cohas	505	0.6	2.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Colonel	927	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Croghan	613	20.0	100.0	20.00	100.0	B	3	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	0.6	2.0	0.60	2.0	C	3	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Dutchess	366	0.6	2.0	0.60	2.0	B	2	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Gilmanton	478	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Glebe	671	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Glover	NA	0.6	2.0	0.60	2	D	4	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Grange	433	0.6	2.0	0.60	2.0	C	5	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	0.6	2.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Hoosic	510	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Houghtonville	795	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Howland	566	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Ipswich	397					D	6	Tidal Flat	mesic	hemic/sapric	no	deep organic
Kearsarge	359	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Kinsman	614	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Leicester	514	0.6	6.0	0.60	20.0	C	5	Loose till, loamy textures	mesic	loamy	no	
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Machias	520	2.0	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Madawaska, aquifer	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Mashpee	315	6.0	20.0	6.00	20.0	B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Matunuck	797			20.00	100.0	D	6	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	0.6	2.0	0.60	2.0	D	6	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Metacomet	458	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	6.0	100.0	6.00	100.0	B	3	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Monarda	569	0.2	2.0	0.02	0.2	D	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Moosilauke	414	6.0	20.0	6.00	20.0	C	5	Loose till, sandy textures	frigid	sandy	no	

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Mundal	610	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Natchaug	496			0.20	2.0	D	6	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Newfields	444	0.6	2.0	0.60	2.0	B	3	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	0.6	2.0	0.60	2.0	C	3	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	0.6	6.0	6.00	20.0	B	3	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Ossipee	495			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497			20.00	100.0	D	6	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Peacham	549	0.6	2.0	0.00	0.2	D	6	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over loam
Pemi	633	0.6	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	
Pennichuck	460	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Pillsbury	646	0.6	2.0	0.06	0.2	C	5	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314					B	5	Outwash and Stream Terraces	mesic	sandy	yes	
Pittstown	334	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	0.6	2.0	0.06	0.6	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Pondicherry	992			6.00	20.0	D	6	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Raynham	533	0.2	2.0	0.06	0.2	C	5	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	0.6	2.0	6.00	100.0	D	5	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Redstone	665	2.0	6.0	6.00	20.0	A	1	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Ricker	674	2.0	6.0	2.00	6.0	A	4	Organic over bedrock (up to 4" of mineral)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Ridgebury	656	0.6	6.0	0.00	0.2	C	5	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	0.2	2.0	0.06	0.6	C	5	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Saddleback	673	0.6	2.0	0.60	2.0	C/D	4	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Salmon	630	0.6	2.0	0.60	2.0	B	2	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Scio	531	0.6	2.0	0.60	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Scituate	448	0.6	2.0	0.06	0.2	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Shaker	439	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Sheepscoot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Squamscott	538	6.0	20.0	0.06	0.6	C	5	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stetson	523	0.6	6.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Stissing	340	0.6	2.0	0.06	0.2	C	5	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Suffield	536	0.6	2.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrodept
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Surplus	669	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Swanton	438	2.0	6.0	0.00	0.2	C	5	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Timakwa	393			6.00	100.0	D	6	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Walpole	546	2.0	6.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Westbrook	597			0.00	2.0	D	6	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Wonsqueak	995			0.20	2.0	D	6	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep

 no longer recognized
 organic materials

TABLE C

NHDES SOIL GROUPINGS

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Adams	36	1	6.0	20.0	20.00	99.0	A	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Caesar	526	1	20.0	100.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	coarse sand	no	
Champlain	35	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	gravelly sand	no	
Colton	22	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Colton, gravelly	21	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Gloucester	11	1	6.0	20.0	6.00	20.0	A	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hermon	55	1	2.0	20.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Hinckley	12	1	6.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Hoosic	510	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	slate, loamy cap
Masardis	23	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Merrimac	10	1	2.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Quonset	310	1	2.0	20.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Redstone	665	1	2.0	6.0	6.00	20.0	A	Weathered Bedrock Till	frigid	fragmental	yes	loamy cap
Success	154	1	2.0	6.0	6.00	20.0	A	Sandy Till	frigid	sandy-skeletal	yes	cemented
Suncook	2	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Suncook	402	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	mesic	sandy	no	frequent flooding
Sunday	102	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Sunday	202	1	6.0	20.0	6.00	20.0	A	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Warwick	210	1	2.0	6.0	20.00	100.0	A	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Windsor	26	1	6.0	20.0	6.00	20.0	A	Outwash and Stream Terraces	mesic	sandy	no	
Abenaki	501	2	0.6	2.0	6.00	99.0	B	Outwash and Stream Terraces	frigid	loamy over sandy-skeletal	no	loamy over gravelly
Agawam	24	2	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Allagash	127	2	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Bangor	572	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam
Berkshire	72	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Bice	226	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	no	sandy loam
Canton	42	2	2.0	6.0	6.00	20.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Charlton	62	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Dutchess	366	2	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	very channery
Fryeburg	208	2	0.6	2.0	2.00	6.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Groveton	27	2	0.6	2.0	0.60	6.0	B	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Hadley	8	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Hadley	108	2	0.6	2.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Hartland	31	2	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Haven	410	2	0.6	2.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Houghtonville	795	2	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	cobbly fine sandy loam
Lombard	259	2	0.6	6.0	2.00	20.0	C/D	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Monadnock	142	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Occum	1	2	0.6	2.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Ondawa	101	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Ondawa	201	2	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Salmon	630	2	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Stetson	523	2	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	loamy over gravelly
Unadilla	30	2	0.6	2.0	2.00	20.0	B	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Chichester	442	2	0.6	2.0	2.00	6.0	B	Loose till, sandy textures	frigid	loamy over sandy	no	loamy over loamy sand
Acton	146	3	2.0	20.0	2.00	20.0	B	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Becket	56	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Belgrade	532	3	0.6	2.0	0.06	2.0	B	Terraces and glacial lake plains	mesic	silty	no	strata of fine sand
Bernardston	330	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Boxford	32	3	0.1	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	silty clay loam

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Buckland	237	3	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Buxton	232	3	0.1	0.6	0.00	0.2	C	Silt and Clay Deposits	frigid	fine	no	silty clay
Canterbury	166	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Chatfield Var.	289	3	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Chesuncook	126	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Colonel	927	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	loam in Cd
Croghan	613	3	20.0	100.0	20.00	100.0	B	Outwash and Stream Terraces	frigid	sandy	yes	single grain in C
Dartmouth	132	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Deerfield	313	3	6.0	20.0	20.00	100.0	B	Outwash and Stream Terraces	mesic	sandy	no	single grain in C
Dixfield	378	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Dixmont	578	3	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy	yes	silt loam, platy in C
Duane	413	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	cemented (ortstein)
Eldridge	38	3	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Elmridge	238	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Elmwood	338	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	
Finch	116	3					C	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Gilmanton	478	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	no	fine sandy loam in Cd
Henniker	46	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Hitchcock	130	3	0.6	2.0	0.06	0.6	B	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Howland	566	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	silt loam, platy in Cd
Lanesboro	228	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Lovewell	307	3	0.6	2.0	0.60	2.0	B	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Machias	520	3	2.0	6.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy or sandy-skeletal	yes	strata sand/gravel in C
Madawaska	28	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Madawaska, aquet	48	3	0.6	2.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Marlow	76	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Melrose	37	3	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Metacomet	458	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Metallak	404	3	6.0	100.0	6.00	100.0	B	Flood Plain (Bottom Land)	frigid	loamy over sandy	no	sandy or sandy-skeletal
Millis	39	3					C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Montauk	44	3	0.6	6.0	0.06	0.6	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Mundal	610	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	gravelly sandy loam in Cd
Newfields	444	3	0.6	2.0	0.60	2.0	B	Loose till, sandy textures	mesic	loamy over sandy	no	sandy or sandy-skeletal
Nicholville	632	3	0.6	2.0	0.60	2.0	C	Terraces and glacial lake plains	frigid	silty	yes	very fine sandy loam
Ninigret	513	3	0.6	6.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	loamy over sandy	no	sandy or sandy-skeletal
Paxton	66	3	0.6	2.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Peru	78	3	0.6	2.0	0.06	0.6	C	Firm, platy, loamy till	frigid	loamy	yes	
Pittstown	334	3	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	channery silt loam in Cd
Plaisted	563	3	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Podunk	104	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Poocham	230	3	0.6	2.0	0.20	2.0	B	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Pootatuck	4	3	0.6	6.0	6.00	20.0	B	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Scio	531	3	0.6	2.0	0.60	2.0	B	Terraces and glacial lake plains	mesic	silty	no	gravelly sand in 2C
Scituate	448	3	0.6	2.0	0.06	0.2	C	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Sheepscot	14	3	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Sisk	667	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	sandy loam in Cd
Skerry	558	3	0.6	2.0	0.06	0.6	C	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Sudbury	118	3	2.0	6.0	2.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Suffield	536	3	0.6	2.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	silty over clayey	no	deep to clay C
Sunapee	168	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	
Sunapee var	269	3	0.6	2.0	0.60	6.0	B	Loose till, loamy textures	frigid	loamy	yes	frigid dystrodept
Surplus	669	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	cryic	loamy	yes	mwd, sandy loam in Cd
Sutton	68	3	0.6	6.0	0.60	6.0	B	Loose till, loamy textures	mesic	loamy	no	
Telos	123	3	0.6	2.0	0.02	0.2	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd

Sorted by DES Soil Group for Establishing Lot Size
K_{sat} B and C horizons
SSSNNE pub no. 5

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Waumbeck	58	3	2.0	20.0	6.00	20.0	B	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Winooski	103	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Woodbridge	29	3	0.6	2.0	0.00	0.6	C	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Winooski	9	3	0.6	6.0	0.60	6.0	B	Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Canaan	663	4	2.0	20.0	2.00	20.0	C	Weathered Bedrock Till	frigid	loamy-skeletal	yes	less than 20 in. deep
Cardigan	357	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	20 to 40 in. deep
Chatfield	89	4	0.6	6.0	0.60	6.0	B	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Elliottsville	128	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Glebe	671	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	cryic	loamy	yes	20 to 40 in. deep
Glover	NA	4	0.6	2.0	0.60	2	D	Friable till, silty, schist & phyllite	frigid	loamy	no	less than 20 in. deep
Hogback	91	4	2.0	6.0	2.00	6.0	C	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Hollis	86	4	0.6	6.0	0.60	6.0	C/D	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Kearsarge	359	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy	no	less than 20 in. deep
Lyman	92	4	2.0	6.0	2.00	6.0	A/D	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Macomber	252	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Millsite	251	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Monson	133	4	0.6	2.0	0.60	2.0	D	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Pennichuck	460	4	0.6	2.0	0.60	2.0	B	Friable till, silty, schist & phyllite	mesic	loamy-skeletal	no	20 to 40 in. deep
Rawsonville	98	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Ricker	674	4	2.0	6.0	2.00	6.0	A	rganic over bedrock (up to 4" of miner)	cryic	fibric to hemic	no	well drained, less than 20 in. deep
Saddleback	673	4	0.6	2.0	0.60	2.0	C/D	Loose till, bedrock	cryic	loamy	yes	less than 20 in. deep
Shapleigh	136	4					C/D	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Thorndike	84	4	0.6	2.0	0.60	2.0	C/D	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Tunbridge	99	4	0.6	6.0	0.60	6.0	C	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Winnecook	88	4	0.6	2.0	0.60	2.0	C	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Woodstock	93	4	2.0	6.0	2.00	6.0	C/D	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Au Gres	516	5					B	Outwash and Stream Terraces	frigid	sandy	yes	single grain, loose
Bemis	224	5	0.6	0.2	0.00	0.2	C	Firm, platy, loamy till	cryic	loamy	no	
Binghamville	534	5	0.2	2.0	0.06	0.2	D	Terraces and glacial lake plains	mesic	silty	no	
Brayton	240	5	0.6	2.0	0.06	0.6	C	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Cabot	589	5	0.6	2.0	0.06	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Charles	209	5	0.6	100.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	silty	no	
Cohas	505	5	0.6	2.0	0.60	100.0	C	Flood Plain (Bottom Land)	frigid	co. loamy over sandy (skeletal)	no	
Grange	433	5	0.6	2.0	0.60	2.0	C	Outwash and Stream Terraces	frigid	co. loamy over sandy (skeletal)	no	
Kinsman	614	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Leicester	514	5	0.6	6.0	0.60	20.0	C	Loose till, loamy textures	mesic	loamy	no	
Lim	3	5	0.6	2.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Limerick	109	5	0.6	2.0	0.60	2.0	C	Flood Plain (Bottom Land)	mesic	silty	no	
Lyme	246	5	0.6	6.0	0.60	6.0	C	Loose till, sandy textures	frigid	loamy	no	
Mashpee	315	5	6.0	20.0	6.00	20.0	B	Outwash and Stream Terraces	mesic	sandy	yes	
Monarda	569	5	0.2	2.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Moosilauke	414	5	6.0	20.0	6.00	20.0	C	Loose till, sandy textures	frigid	sandy	no	
Naumburg	214	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	frigid	sandy	yes	
Pemi	633	5	0.6	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	
Pillsbury	646	5	0.6	2.0	0.06	0.2	C	Firm, platy, loamy till	frigid	silty	no	
Pipestone	314	5					B	Outwash and Stream Terraces	mesic	sandy	yes	
Raynham	533	5	0.2	2.0	0.06	0.2	C	Terraces and glacial lake plains	mesic	silty	no	
Raypol	540	5	0.6	2.0	6.00	100.0	D	Outwash and Stream Terraces	mesic	co. loamy over sandy (skeletal)	no	
Ridgebury	656	5	0.6	6.0	0.00	0.2	C	Firm, platy, loamy till	mesic	loamy	no	
Rippowam	5	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	mesic	loamy	no	
Roundabout	333	5	0.2	2.0	0.06	0.6	C	Terraces and glacial lake plains	frigid	silty	no	silt loam in the C
Rumney	105	5	0.6	6.0	6.00	20.0	C	Flood Plain (Bottom Land)	frigid	loamy	no	

Sorted by DES Soil Group for Establishing Lot Size
K_{sat} B and C horizons
SSSNNE pub no. 5

Soil Series	number	NHDES Soil Group	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Saugatuck	16	5	0.06	0.2	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Scantic	233	5	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	
Scitico	33	5	0.0	0.2	0.00	0.2	C	Silt and Clay Deposits	mesic	fine	no	
Shaker	439	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	mesic	co. loamy over clayey	no	
Squamscott	538	5	6.0	20.0	0.06	0.6	C	Sandy/loamy over silt/clay	mesic	sandy over loamy	yes	
Stissing	340	5	0.6	2.0	0.06	0.2	C	Firm, platy, silty till, schist & phyllite	mesic	loamy	no	
Swanton	438	5	2.0	6.0	0.00	0.2	C	Sandy/loamy over silt/clay	frigid	co. loamy over clayey	no	
Walpole	546	5	2.0	6.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Wareham	34	5	6.0	20.0	6.00	20.0	C	Outwash and Stream Terraces	mesic	sandy	no	
Biddeford	234	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	frigid	fine	no	organic over clay
Bucksport	895	6					D	Organic Materials - Freshwater	frigid	sapric	no	deep organic
Burnham	131	6	0.2	6.0	0.02	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over silt
Catden	296	6					A/D	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Chocorua	395	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Greenwood	295	6					A/D	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Ipswich	397	6					D	Tidal Flat	mesic	hemic/sapric	no	deep organic
Matunuck	797	6			20.00	100.0	D	Tidal Flat	mesic	sandy	no	organic over sand
Maybid	134	6	0.0	0.2	0.00	0.2	D	Silt and Clay Deposits	mesic	fine	no	silt over clay
Meadowsedge	894	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Medomak	406	6	0.6	2.0	0.60	2.0	D	Flood Plain (Bottom Land)	frigid	silty	no	organic over silt
Natchaug	496	6			0.20	2.0	D	Organic Materials - Freshwater	mesic	loamy	no	organic over loam
Ossipee	495	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam
Pawcatuck	497	6			20.00	100.0	D	Tidal Flat	mesic	sandy or sandy-skeletal	no	organic over sand
Peacham	549	6	0.6	2.0	0.00	0.2	D	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	organic over loam
Pondicherry	992	6			6.00	20.0	D	Organic Materials - Freshwater	frigid	sandy or sandy-skeletal	no	organic over sand
Saco	6	6	0.6	2.0	6.00	20.0	D	Flood Plain (Bottom Land)	mesic	silty	no	strata
Scarboro	115	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Searsport	15	6	6.0	20.0	6.00	20.0	D	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Timakwa	393	6			6.00	100.0	D	Organic Materials - Freshwater	mesic	sandy or sandy-skeletal	no	organic over sand
Vassalboro	150	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Waskish	195	6					D	Organic Materials - Freshwater	frigid	peat	no	deep organic
Westbrook	597	6			0.00	2.0	D	Tidal Flat	mesic	loamy	no	organic over loam
Whitman	49	6	0.0	0.2	0.00	0.2	D	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Wonsqueak	995	6			0.20	2.0	D	Organic Materials - Freshwater	frigid	loamy	no	organic over loam

no longer recognized organic materials denotes break between Soil Group

ORDER FORM

**Ksat VALUES
FOR
NEW HAMPSHIRE SOILS
(Including Hydrologic and Soil Lot Sizing Groups)**

SSSNNE Publication #5

DATE _____

Mail Copy of Publication #5 to:

Name _____

Address _____

City _____ State _____ Zip _____

Quantity of Publications _____ @ \$8.00 = Total Order: \$ _____

Amount Enclosed: \$ _____

Enclose check or money order for the full amount payable to:

**Society of Soil Scientists of Northern New England
PO Box 76
Durham, NH 03824**

Please allow 4 weeks for delivery.