

DRAINAGE REPORT

Prepared for:

Michael and Marti Mulhern

91 Bagdad Road

Durham, NH 03824

Tax Map 10 Lot 8-6

Prepared on:

December 9, 2020

Revised on:

February 15, 2021



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1. Project background

Michael and Marti Mulhern, the owners, have proposed a new residential development on their property in Durham and Madbury, NH. The property is located at 91 Bagdad Road, Durham, NH and identified on Durham Tax Map 10 as Lot 8-6. The subject parcel is 16 acres and the development will impact 4.5 acres.

2. Methodology

The watershed areas have been determined via inspection by our office and a topographical survey. 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 NRCC D Type 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 of fine-grained marine sediments and some well drained glacial till, the Hydrologic Soil Groups determined to be predominantly C and D. The soils on site have been identified by Highland Soil Services in accordance with SSSNNE Standards for a High Intensity Soil Pap and offsite soils in this analysis have been identified in accordance with the NRCS Web Soil Survey. For more detailed information, please see the Appendix E and F.

4. Pre-development conditions

The enclosed Pre-Development portion of the Drainage Plan (Appendix 1) 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 subject parcel is 15.9 acres. The property is mostly undeveloped, except for a walking path and a single-family home that is accessed by a shared driveway off Bagdad Road. The property slopes from Bagdad Road in the south down to the property line in the north. A narrow strip of property also extends to the east to N.H. Route 108. In the center of the property is a wetland that continues to the northern edge of the property.

Two unnamed tributaries run through the wetland in the center of the property and drain the majority of the parcel and discharge into Unnamed Tributary #1 (Unt1) in the northwest corner of the property. Prior to discharging, the two small tributaries combine, approximately at the location where the proposed crossing will be located. Approximately 20 acres drain into the central wetland area (2S)

Approximately 15 acres of the adjacent subdivision (1S), located west of the subject property, drains towards the northwest corner of the subject property. It is routed to a nearby wetland in the existing town right-of-way and routed downhill where it discharges into Unt1.

Multiple small catchment areas drain directly to the north of the property, when they discharge into Unt1 (Subcatchment 3S, 4S, and 5S). Subcatchment 7S (0.2 Acre) drains towards the eastern property line.

Two points of analysis have been selected for this site. The first (POA1) is located at the final discharge point of Unnamed Tributary #1 and the second (POA2) is located at the eastern property line, where subcatchment 6 discharges. The hydrologic analysis of the existing runoff conditions is provided in Appendix B.

5. Post-development conditions

The proposal includes the construction of 15 new residential units (7 single-family and 4 duplexes). A looped private access road will also be constructed to give access to the buildings. The road will start on the existing Gerrish Drive and connect to the cluster of houses. The road will have two wetland crossings.

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 17-044 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 1 is the offsite drainage from the existing Gerrish subdivision which drains to the first wetland crossing. Subcatchment 8 is the additional offsite drainage from the existing Gerrish subdivision which drains to the north of the proposed road, meeting up with the drainage from Subcatchment 1 after the wetland crossing. Subcatchment 2 is the area upgradient of the second wetland crossing. This includes the majority of the property south of the crossing, as well as some offsite area further upgradient. Subcatchments 3, 4 and 5 drain to the north and are relatively unchanged from the pre-development conditions. Subcatchment 6 drains towards the eastern property line. Subcatchment 7, 9 are the areas inside of the new loop. 7S is the catchment for the southern portion of the loop interior and 9S is the northern portion of the loop interior. Subcatchment 10 is the catchment area for the stormwater BMPs. Two points of analysis have been selected for this site. The first (POA1) is located at the final discharge point of Unnamed Tributary #1 and the second (POA2) is located at the eastern property line, where subcatchment 6 discharges. Subcatchment 11 is the proposed road in the R-O-W. The majority of this paved area is routed to a treatment swale before entering the existing wetlands.

The stormwater from the new development is mitigated using multiple BMP's. Due to the poor soils, a gravel wetland was selected as the main method of treating the runoff from this project. There are multiple sediment forebays and detention areas upstream of the gravel wetlands to improve sediment removal and give additional buffering of peak runoff flows during large storms.

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: Summary of peak flow at POA 1

Storm	Pre-Development (cfs)	Post-Development (cfs)	Difference
1-Inch	0.13	0.15	+0.02
2-Year (+15%)	38.75	35.99	-2.76
10-Year (+15%)	82.99	82.98	-0.01
25-Year (+15%)	120.67	120.36	-0.31

Table 2: Summary of discharge volume at POA 1

Storm	Pre-Development (cf)	Post-Development (cf)	Difference
1-Inch	4,846	5,272	+1,197
2-Year (+15%)	225,895	235,953	+10,058
10-Year (+15%)	466,928	482,027	+15,099
25-Year (+15%)	676,521	694,812	+18,291

The following tables quantify the peak rate of discharge and discharge volume leaving the parcel at POA 2 as shown on the Pre- and Post-Development Drainage Plan. The analysis has been modeled using the extreme rainfall quantities.

Table 3: Summary of peak flow at POA 2

Storm	Pre-Development (cfs)	Post-Development (cfs)	Difference
1-Inch	0.00	0.00	0.00
2-Year (+15%)	0.27	0.19	-0.08
10-Year (+15%)	0.75	0.43	-0.32
25-Year (+15%)	1.15	0.64	-0.51

Table 4: Summary of discharge volume at POA 2

Storm	Pre-Development (cf)	Post-Development (cf)	Difference
1-Inch	0	3	+3
2-Year (+15%)	1,006	634	-372
10-Year (+15%)	2,494	1,403	-1,091
25-Year (+15%)	3,887	2,090	-1,797

The peak rate of runoff is reduced or equal to the pre-development conditions during all the design storm events at POA 1 and 2, except a negligible increase at POA1 during the 1” storm event. The reduction in peak rate of discharge is attributed to storage in the detention basin and gravel wetlands which provides peak flow attenuation reduction. There is an increase in the runoff volume due to the limited infiltration capacity of the native soils. The spillway of the gravel wetland system has been designed for the 100-year storm (See Appendix C).

7. Stormwater treatment and pretreatment practices

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

8. Groundwater recharge

There are limited opportunities for infiltration due to the presence of fine-grained marine soils and a shallow ledge in many places. Due to this, drip edges will be installed near the proposed houses. The exact location and size of the drip strips will be determined in the field when earthworks are ongoing so that the most suitable areas are selected.

A factor of 0.25, 0.1 and 0.0 is applied to HSG B, C, and D soils, respectively that are replaced by impervious area. The required volume to be infiltrated for this project is as follows;

$$[9660 \text{ sf} \times 0.25 + 166 \text{ sf} \times 0.1] \frac{1'}{12"} = 203 \text{ cf}$$

9. Erosion & Sediment Control

Temporary and permanent practices are used to prevent and minimize erosion and sedimentation on site. The installation of Silt Sox 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 paved surfaces. The use of erosion and sediment controls and proper construction practices will minimize the impact of this project to downstream surface waters.

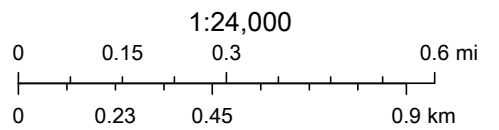
APPENDIX A

The National Map Advanced Viewer



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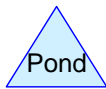
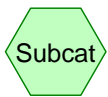
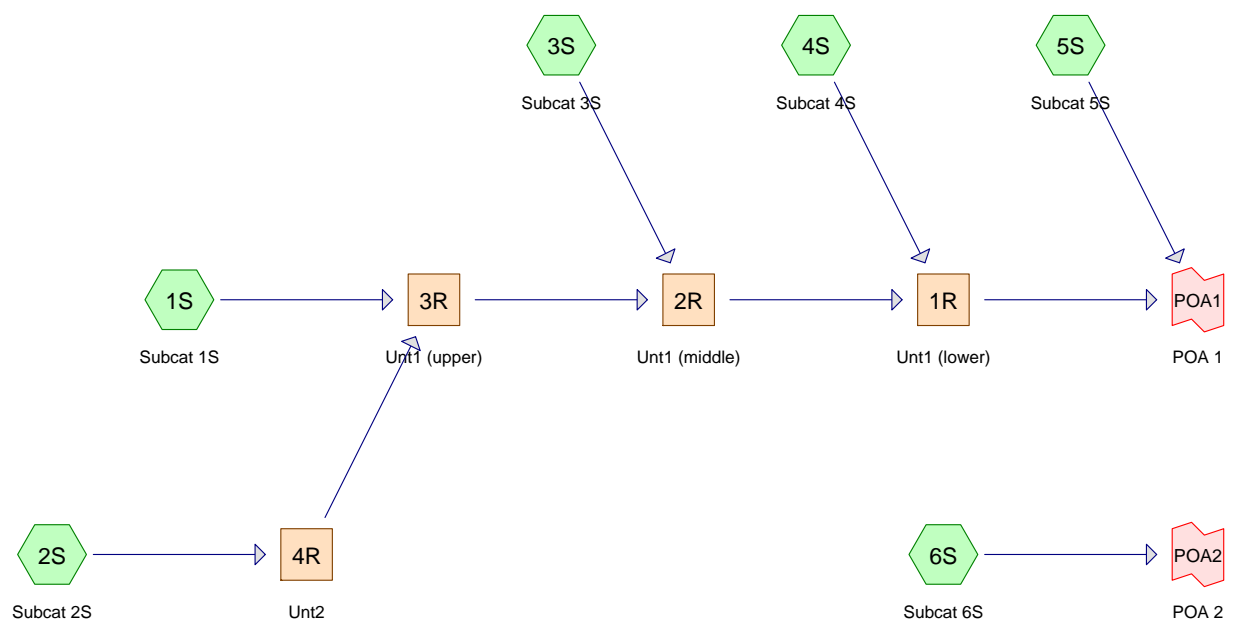
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APPENDIX B

APPENDIX C



Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
43,560	61	>75% Grass cover, Good, HSG B (2S)
300,780	74	>75% Grass cover, Good, HSG C (1S, 2S, 4S, 5S)
129,371	80	>75% Grass cover, Good, HSG D (1S, 2S, 5S)
14,033	98	Paved parking, HSG B (2S)
66,622	98	Paved parking, HSG C (1S, 2S, 5S)
31,313	98	Paved parking, HSG D (1S, 2S)
8,625	98	Roofs, HSG B (2S)
34,091	98	Roofs, HSG C (1S, 2S, 4S, 5S)
9,191	98	Roofs, HSG D (1S, 2S)
14,273	30	Woods, Good, HSG A (3S, 4S, 5S)
142,586	55	Woods, Good, HSG B (2S, 3S, 4S, 5S, 6S)
615,100	70	Woods, Good, HSG C (1S, 2S, 3S, 4S, 5S)
640,411	77	Woods, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S)
2,049,955	74	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
14,273	HSG A	3S, 4S, 5S
208,804	HSG B	2S, 3S, 4S, 5S, 6S
1,016,593	HSG C	1S, 2S, 3S, 4S, 5S
810,286	HSG D	1S, 2S, 3S, 4S, 5S, 6S
0	Other	
2,049,955		TOTAL AREA

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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	43,560	300,780	129,371	0	473,711	>75% Grass cover, Good	
0	14,033	66,622	31,313	0	111,968	Paved parking	
0	8,625	34,091	9,191	0	51,907	Roofs	
14,273	142,586	615,100	640,411	0	1,412,369	Woods, Good	
14,273	208,804	1,016,593	810,286	0	2,049,955	TOTAL AREA	

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NRCC 24-hr D 1" (NRCC D) Rainfall=1.00"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 2
 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: Subcat 1S	Runoff Area=665,784 sf 15.75% Impervious Runoff Depth=0.06" Flow Length=1,020' Tc=16.5 min CN=78 Runoff=0.14 cfs 3,237 cf
Subcatchment 2S: Subcat 2S	Runoff Area=910,846 sf 5.15% Impervious Runoff Depth=0.02" Flow Length=1,517' Tc=24.9 min CN=73 Runoff=0.04 cfs 1,299 cf
Subcatchment 3S: Subcat 3S	Runoff Area=129,283 sf 0.00% Impervious Runoff Depth=0.02" Flow Length=450' Tc=13.6 min CN=73 Runoff=0.01 cfs 184 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.958 ac 2.26% Impervious Runoff Depth=0.00" Flow Length=350' Tc=7.1 min CN=70 Runoff=0.00 cfs 49 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.576 ac 4.62% Impervious Runoff Depth=0.00" Flow Length=600' Tc=16.2 min CN=70 Runoff=0.00 cfs 77 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=64 Runoff=0.00 cfs 0 cf
Reach 1R: Unt1 (lower)	Avg. Flow Depth=0.01' Max Vel=0.92 fps Inflow=0.13 cfs 4,770 cf n=0.013 L=596.0' S=0.0070 '/ Capacity=858.75 cfs Outflow=0.13 cfs 4,770 cf
Reach 2R: Unt1 (middle)	Avg. Flow Depth=0.01' Max Vel=0.91 fps Inflow=0.13 cfs 4,720 cf n=0.013 L=594.0' S=0.0069 '/ Capacity=849.89 cfs Outflow=0.13 cfs 4,720 cf
Reach 3R: Unt1 (upper)	Avg. Flow Depth=0.01' Max Vel=1.03 fps Inflow=0.14 cfs 4,536 cf n=0.013 L=430.0' S=0.0088 '/ Capacity=961.66 cfs Outflow=0.13 cfs 4,536 cf
Reach 4R: Unt2	Avg. Flow Depth=0.04' Max Vel=1.19 fps Inflow=0.04 cfs 1,299 cf n=0.025 L=228.0' S=0.0539 '/ Capacity=209.49 cfs Outflow=0.04 cfs 1,299 cf
Link POA1: POA 1	Inflow=0.13 cfs 4,846 cf Primary=0.13 cfs 4,846 cf
Link POA2: POA 2	Inflow=0.00 cfs 0 cf Primary=0.00 cfs 0 cf

Total Runoff Area = 2,049,955 sf Runoff Volume = 4,846 cf Average Runoff Depth = 0.03"
92.01% Pervious = 1,886,080 sf 7.99% Impervious = 163,875 sf

19063 PreZL

NRCC 24-hr D 2-YR+15% (NRCC D) Rainfall=3.61"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 2
 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: Subcat 1S	Runoff Area=665,784 sf 15.75% Impervious Runoff Depth=1.58" Flow Length=1,020' Tc=16.5 min CN=78 Runoff=18.55 cfs 87,743 cf
Subcatchment 2S: Subcat 2S	Runoff Area=910,846 sf 5.15% Impervious Runoff Depth=1.25" Flow Length=1,517' Tc=24.9 min CN=73 Runoff=15.94 cfs 95,196 cf
Subcatchment 3S: Subcat 3S	Runoff Area=129,283 sf 0.00% Impervious Runoff Depth=1.25" Flow Length=450' Tc=13.6 min CN=73 Runoff=3.02 cfs 13,512 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.958 ac 2.26% Impervious Runoff Depth=1.08" Flow Length=350' Tc=7.1 min CN=70 Runoff=3.25 cfs 11,561 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.576 ac 4.62% Impervious Runoff Depth=1.08" Flow Length=600' Tc=16.2 min CN=70 Runoff=3.59 cfs 17,884 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=0.76" Tc=6.0 min CN=64 Runoff=0.27 cfs 1,006 cf
Reach 1R: Unt1 (lower)	Avg. Flow Depth=0.53' Max Vel=5.74 fps Inflow=35.77 cfs 208,011 cf n=0.013 L=596.0' S=0.0070 '/' Capacity=858.75 cfs Outflow=35.57 cfs 208,011 cf
Reach 2R: Unt1 (middle)	Avg. Flow Depth=0.53' Max Vel=5.65 fps Inflow=34.70 cfs 196,450 cf n=0.013 L=594.0' S=0.0069 '/' Capacity=849.89 cfs Outflow=34.50 cfs 196,450 cf
Reach 3R: Unt1 (upper)	Avg. Flow Depth=0.47' Max Vel=5.98 fps Inflow=32.32 cfs 182,938 cf n=0.013 L=430.0' S=0.0088 '/' Capacity=961.66 cfs Outflow=32.22 cfs 182,938 cf
Reach 4R: Unt2	Avg. Flow Depth=0.60' Max Vel=7.32 fps Inflow=15.94 cfs 95,196 cf n=0.025 L=228.0' S=0.0539 '/' Capacity=209.49 cfs Outflow=15.92 cfs 95,196 cf
Link POA1: POA 1	Inflow=38.75 cfs 225,895 cf Primary=38.75 cfs 225,895 cf
Link POA2: POA 2	Inflow=0.27 cfs 1,006 cf Primary=0.27 cfs 1,006 cf

Total Runoff Area = 2,049,955 sf Runoff Volume = 226,902 cf Average Runoff Depth = 1.33"
92.01% Pervious = 1,886,080 sf 7.99% Impervious = 163,875 sf

19063 PreZL

NRCC 24-hr D 25-YR+15% (NRCC D) Rainfall=6.92"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 2
 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: Subcat 1S	Runoff Area=665,784 sf 15.75% Impervious Runoff Depth=4.40" Flow Length=1,020' Tc=16.5 min CN=78 Runoff=51.79 cfs 244,249 cf
Subcatchment 2S: Subcat 2S	Runoff Area=910,846 sf 5.15% Impervious Runoff Depth=3.87" Flow Length=1,517' Tc=24.9 min CN=73 Runoff=51.25 cfs 293,475 cf
Subcatchment 3S: Subcat 3S	Runoff Area=129,283 sf 0.00% Impervious Runoff Depth=3.87" Flow Length=450' Tc=13.6 min CN=73 Runoff=9.64 cfs 41,655 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.958 ac 2.26% Impervious Runoff Depth=3.55" Flow Length=350' Tc=7.1 min CN=70 Runoff=11.24 cfs 38,140 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.576 ac 4.62% Impervious Runoff Depth=3.55" Flow Length=600' Tc=16.2 min CN=70 Runoff=12.65 cfs 59,002 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=2.94" Tc=6.0 min CN=64 Runoff=1.19 cfs 3,887 cf
Reach 1R: Unt1 (lower)	Avg. Flow Depth=1.01' Max Vel=8.29 fps Inflow=109.32 cfs 617,519 cf n=0.013 L=596.0' S=0.0070 '/' Capacity=858.75 cfs Outflow=109.02 cfs 617,519 cf
Reach 2R: Unt1 (middle)	Avg. Flow Depth=0.99' Max Vel=8.13 fps Inflow=105.24 cfs 579,379 cf n=0.013 L=594.0' S=0.0069 '/' Capacity=849.89 cfs Outflow=104.93 cfs 579,379 cf
Reach 3R: Unt1 (upper)	Avg. Flow Depth=0.89' Max Vel=8.64 fps Inflow=97.34 cfs 537,724 cf n=0.013 L=430.0' S=0.0088 '/' Capacity=961.66 cfs Outflow=97.23 cfs 537,724 cf
Reach 4R: Unt2	Avg. Flow Depth=1.03' Max Vel=10.39 fps Inflow=51.25 cfs 293,475 cf n=0.025 L=228.0' S=0.0539 '/' Capacity=209.49 cfs Outflow=51.22 cfs 293,475 cf
Link POA1: POA 1	Inflow=120.67 cfs 676,521 cf Primary=120.67 cfs 676,521 cf
Link POA2: POA 2	Inflow=1.19 cfs 3,887 cf Primary=1.19 cfs 3,887 cf

Total Runoff Area = 2,049,955 sf Runoff Volume = 680,407 cf Average Runoff Depth = 3.98"
92.01% Pervious = 1,886,080 sf 7.99% Impervious = 163,875 sf

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NRCC 24-hr D 50-YR+15% (NRCC D) Rainfall=8.28"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points x 2
 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: Subcat 1S	Runoff Area=665,784 sf 15.75% Impervious Runoff Depth=5.65" Flow Length=1,020' Tc=16.5 min CN=78 Runoff=65.96 cfs 313,496 cf
Subcatchment 2S: Subcat 2S	Runoff Area=910,846 sf 5.15% Impervious Runoff Depth=5.06" Flow Length=1,517' Tc=24.9 min CN=73 Runoff=66.89 cfs 383,985 cf
Subcatchment 3S: Subcat 3S	Runoff Area=129,283 sf 0.00% Impervious Runoff Depth=5.06" Flow Length=450' Tc=13.6 min CN=73 Runoff=12.56 cfs 54,502 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.958 ac 2.26% Impervious Runoff Depth=4.71" Flow Length=350' Tc=7.1 min CN=70 Runoff=14.84 cfs 50,530 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.576 ac 4.62% Impervious Runoff Depth=4.71" Flow Length=600' Tc=16.2 min CN=70 Runoff=16.77 cfs 78,168 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.364 ac 0.00% Impervious Runoff Depth=4.01" Tc=6.0 min CN=64 Runoff=1.63 cfs 5,295 cf
Reach 1R: Unt1 (lower)	Avg. Flow Depth=1.17' Max Vel=8.98 fps Inflow=141.53 cfs 802,512 cf n=0.013 L=596.0' S=0.0070 '/' Capacity=858.75 cfs Outflow=141.19 cfs 802,512 cf
Reach 2R: Unt1 (middle)	Avg. Flow Depth=1.15' Max Vel=8.81 fps Inflow=136.07 cfs 751,983 cf n=0.013 L=594.0' S=0.0069 '/' Capacity=849.89 cfs Outflow=135.71 cfs 751,983 cf
Reach 3R: Unt1 (upper)	Avg. Flow Depth=1.03' Max Vel=9.36 fps Inflow=125.71 cfs 697,481 cf n=0.013 L=430.0' S=0.0088 '/' Capacity=961.66 cfs Outflow=125.59 cfs 697,481 cf
Reach 4R: Unt2	Avg. Flow Depth=1.17' Max Vel=11.24 fps Inflow=66.89 cfs 383,985 cf n=0.025 L=228.0' S=0.0539 '/' Capacity=209.49 cfs Outflow=66.87 cfs 383,985 cf
Link POA1: POA 1	Inflow=156.75 cfs 880,680 cf Primary=156.75 cfs 880,680 cf
Link POA2: POA 2	Inflow=1.63 cfs 5,295 cf Primary=1.63 cfs 5,295 cf
Total Runoff Area = 2,049,955 sf Runoff Volume = 885,975 cf Average Runoff Depth = 5.19"	
92.01% Pervious = 1,886,080 sf 7.99% Impervious = 163,875 sf	

Summary for Subcatchment 1S: Subcat 1S

Runoff = 36.75 cfs @ 12.25 hrs, Volume= 172,346 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

19063 PreZL

NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Area (sf)	CN	Description
2,788	74	>75% Grass cover, Good, HSG C
47,568	74	>75% Grass cover, Good, HSG C
30,797	74	>75% Grass cover, Good, HSG C
3,572	74	>75% Grass cover, Good, HSG C
3,945	74	>75% Grass cover, Good, HSG C
0	74	>75% Grass cover, Good, HSG C
13,799	74	>75% Grass cover, Good, HSG C
14,026	74	>75% Grass cover, Good, HSG C
21,562	74	>75% Grass cover, Good, HSG C
19,733	74	>75% Grass cover, Good, HSG C
5,924	74	>75% Grass cover, Good, HSG C
18,644	80	>75% Grass cover, Good, HSG D
25,700	80	>75% Grass cover, Good, HSG D
2,657	80	>75% Grass cover, Good, HSG D
2,744	80	>75% Grass cover, Good, HSG D
13,329	80	>75% Grass cover, Good, HSG D
19,737	80	>75% Grass cover, Good, HSG D
1,481	98	Paved parking, HSG C
2,309	98	Paved parking, HSG C
2,004	98	Paved parking, HSG C
1,307	98	Paved parking, HSG C
1,002	98	Paved parking, HSG C
1,786	98	Paved parking, HSG C
2,439	98	Paved parking, HSG C
915	98	Paved parking, HSG C
87	98	Paved parking, HSG C
436	98	Paved parking, HSG C
2,875	98	Paved parking, HSG C
2,396	98	Paved parking, HSG C
2,178	98	Paved parking, HSG D
2,222	98	Paved parking, HSG D
4,051	98	Paved parking, HSG D
3,398	98	Paved parking, HSG D
3,870	98	Paved parking, HSG D
24,786	98	Paved parking, HSG C
6,665	98	Paved parking, HSG C
11,500	98	Paved parking, HSG D
2,352	98	Paved parking, HSG D
1,655	98	Roofs, HSG C
1,307	98	Roofs, HSG C
2,526	98	Roofs, HSG C
1,220	98	Roofs, HSG C
3,049	98	Roofs, HSG C
1,176	98	Roofs, HSG C
2,047	98	Roofs, HSG C
1,045	98	Roofs, HSG C
2,439	98	Roofs, HSG C
1,830	98	Roofs, HSG C
3,049	98	Roofs, HSG D
174	98	Roofs, HSG D
1,655	98	Roofs, HSG D
44	98	Roofs, HSG D

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NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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1,568	98	Roofs, HSG D
566	70	Woods, Good, HSG C
915	70	Woods, Good, HSG C
4,748	70	Woods, Good, HSG C
13,504	70	Woods, Good, HSG C
4,312	70	Woods, Good, HSG C
4,966	70	Woods, Good, HSG C
36,765	70	Woods, Good, HSG C
131,464	70	Woods, Good, HSG C
21,649	77	Woods, Good, HSG D
7,710	77	Woods, Good, HSG D
9,365	77	Woods, Good, HSG D
47,960	77	Woods, Good, HSG D
5,793	77	Woods, Good, HSG D
1,220	77	Woods, Good, HSG D
2,265	77	Woods, Good, HSG D
21,214	77	Woods, Good, HSG D

665,784	78	Weighted Average
560,941		84.25% Pervious Area
104,843		15.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	20	0.0700	0.20		Sheet Flow, A-->B Grass: Short n= 0.150 P2= 3.14"
14.8	1,000	0.0260	1.13		Shallow Concentrated Flow, B-->C Short Grass Pasture Kv= 7.0 fps
16.5	1,020	Total			

Summary for Subcatchment 2S: Subcat 2S

Runoff = 34.95 cfs @ 12.36 hrs, Volume= 200,883 cf, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (sf)	CN	Description
43,560	61	>75% Grass cover, Good, HSG B
91,215	74	>75% Grass cover, Good, HSG C
44,997	80	>75% Grass cover, Good, HSG D
14,033	98	Paved parking, HSG B
7,623	98	Paved parking, HSG C
1,742	98	Paved parking, HSG D
8,625	98	Roofs, HSG B
12,197	98	Roofs, HSG C
2,701	98	Roofs, HSG D
95,484	55	Woods, Good, HSG B
213,008	70	Woods, Good, HSG C
375,661	77	Woods, Good, HSG D
910,846	73	Weighted Average
863,925		94.85% Pervious Area
46,921		5.15% Impervious Area

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NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0450	0.23		Sheet Flow, A-->B Grass: Short n= 0.150 P2= 3.14"
15.9	800	0.0280	0.84		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
1.8	617	0.0270	5.71	16.38	Trap/Vee/Rect Channel Flow, C-->D Bot.W=2.00' D=0.70' Z= 3.0 '/' Top.W=6.20' n= 0.025
24.9	1,517	Total			

Summary for Subcatchment 3S: Subcat 3S

Runoff = 6.59 cfs @ 12.22 hrs, Volume= 28,513 cf, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (sf)	CN	Description
4,004	30	Woods, Good, HSG A
11,848	55	Woods, Good, HSG B
12,110	70	Woods, Good, HSG C
101,321	77	Woods, Good, HSG D
129,283	73	Weighted Average
129,283		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.1200	0.16		Sheet Flow, A-->B Woods: Light underbrush n= 0.400 P2= 3.14"
3.0	350	0.1500	1.94		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
13.6	450	Total			

Summary for Subcatchment 4S: Subcat 4S

Runoff = 7.52 cfs @ 12.14 hrs, Volume= 25,594 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

19063 PreZL

NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Area (ac)	CN	Description
0.195	74	>75% Grass cover, Good, HSG C
0.067	98	Roofs, HSG C
0.154	30	Woods, Good, HSG A
0.190	55	Woods, Good, HSG B
1.580	70	Woods, Good, HSG C
0.772	77	Woods, Good, HSG D
2.958	70	Weighted Average
2.891		97.74% Pervious Area
0.067		2.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		Sheet Flow, A-->B Grass: Short n= 0.150 P2= 3.14"
1.9	250	0.2000	2.24		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
7.1	350	Total			

Summary for Subcatchment 5S: Subcat 5S

Runoff = 8.42 cfs @ 12.25 hrs, Volume= 39,593 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (ac)	CN	Description
0.858	74	>75% Grass cover, Good, HSG C
0.036	80	>75% Grass cover, Good, HSG D
0.195	98	Paved parking, HSG C
0.016	98	Roofs, HSG C
0.082	30	Woods, Good, HSG A
0.402	55	Woods, Good, HSG B
2.845	70	Woods, Good, HSG C
0.143	77	Woods, Good, HSG D
4.576	70	Weighted Average
4.365		95.38% Pervious Area
0.211		4.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1000	0.15		Sheet Flow, A-->B Woods: Light underbrush n= 0.400 P2= 3.14"
4.8	500	0.1200	1.73		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
16.2	600	Total			

Summary for Subcatchment 6S: Subcat 6S

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 2,494 cf, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (ac)	CN	Description
0.217	55	Woods, Good, HSG B
0.147	77	Woods, Good, HSG D
0.364	64	Weighted Average
0.364		100.00% Pervious Area

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

Summary for Reach 1R: Unt1 (lower)

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.02' @ 12.56 hrs

Inflow Area = 1,834,764 sf, 8.43% Impervious, Inflow Depth = 2.79" for 10-YR+15% (NRCC D) event
Inflow = 75.58 cfs @ 12.30 hrs, Volume= 427,335 cf
Outflow = 75.33 cfs @ 12.32 hrs, Volume= 427,335 cf, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.37 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 4.1 min

Peak Storage= 6,092 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.82'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 858.75 cfs

10.00' x 3.00' deep channel, n= 0.013 Corrugated PE, smooth interior
Side Slope Z-value= 3.0 ' / ' Top Width= 28.00'
Length= 596.0' Slope= 0.0070 ' / '
Inlet Invert= 14.10', Outlet Invert= 9.90'



Summary for Reach 2R: Unt1 (middle)

[62] Hint: Exceeded Reach 3R OUTLET depth by 0.09' @ 12.35 hrs

Inflow Area = 1,705,913 sf, 8.90% Impervious, Inflow Depth = 2.83" for 10-YR+15% (NRCC D) event
Inflow = 72.93 cfs @ 12.29 hrs, Volume= 401,742 cf
Outflow = 72.66 cfs @ 12.31 hrs, Volume= 401,742 cf, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.23 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.41 fps, Avg. Travel Time= 4.1 min

Peak Storage= 5,967 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 849.89 cfs

10.00' x 3.00' deep channel, n= 0.013 Corrugated PE, smooth interior
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 594.0' Slope= 0.0069 '/'
Inlet Invert= 18.20', Outlet Invert= 14.10'



Summary for Reach 3R: Unt1 (upper)

[62] Hint: Exceeded Reach 4R OUTLET depth by 0.02' @ 7.58 hrs

Inflow Area = 1,576,630 sf, 9.63% Impervious, Inflow Depth = 2.84" for 10-YR+15% (NRCC D) event
Inflow = 67.58 cfs @ 12.29 hrs, Volume= 373,229 cf
Outflow = 67.48 cfs @ 12.30 hrs, Volume= 373,229 cf, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.67 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.59 fps, Avg. Travel Time= 2.8 min

Peak Storage= 3,781 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.72'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 961.66 cfs

10.00' x 3.00' deep channel, n= 0.013 Corrugated PE, smooth interior
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 430.0' Slope= 0.0088 '/'
Inlet Invert= 22.00', Outlet Invert= 18.20'



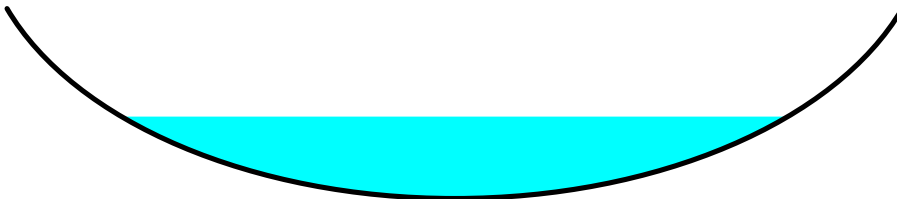
Summary for Reach 4R: Unt2

Inflow Area = 910,846 sf, 5.15% Impervious, Inflow Depth = 2.65" for 10-YR+15% (NRCC D) event
 Inflow = 34.95 cfs @ 12.36 hrs, Volume= 200,883 cf
 Outflow = 34.94 cfs @ 12.37 hrs, Volume= 200,883 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 2
 Max. Velocity= 9.27 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 3.79 fps, Avg. Travel Time= 1.0 min

Peak Storage= 860 cf @ 12.37 hrs
 Average Depth at Peak Storage= 0.86'
 Bank-Full Depth= 2.00' Flow Area= 13.3 sf, Capacity= 209.49 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
 Length= 228.0' Slope= 0.0539 '
 Inlet Invert= 34.30', Outlet Invert= 22.00'



Summary for Link POA1: POA 1

Inflow Area = 2,034,094 sf, 8.06% Impervious, Inflow Depth = 2.75" for 10-YR+15% (NRCC D) event
 Inflow = 82.99 cfs @ 12.31 hrs, Volume= 466,928 cf
 Primary = 82.99 cfs @ 12.31 hrs, Volume= 466,928 cf, Atten= 0%, Lag= 0.0 min

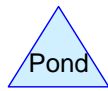
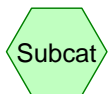
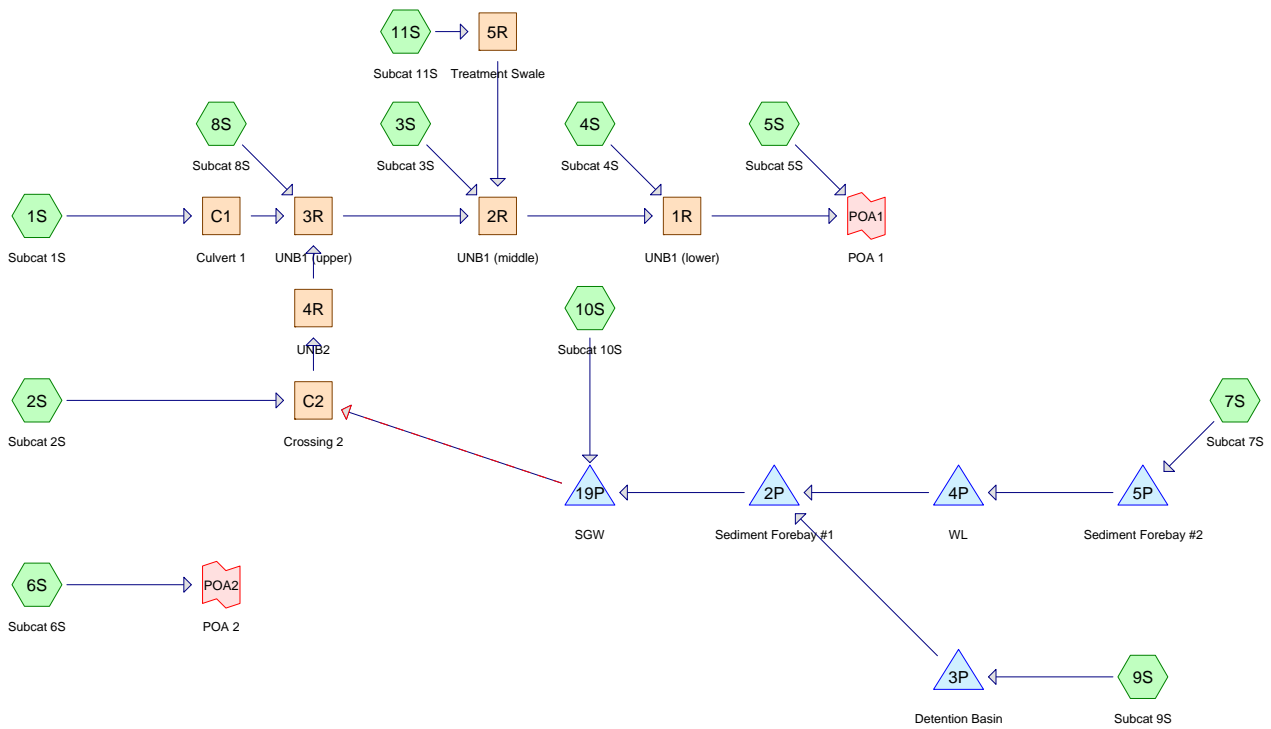
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA2: POA 2

Inflow Area = 15,861 sf, 0.00% Impervious, Inflow Depth = 1.89" for 10-YR+15% (NRCC D) event
 Inflow = 0.75 cfs @ 12.14 hrs, Volume= 2,494 cf
 Primary = 0.75 cfs @ 12.14 hrs, Volume= 2,494 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

APPENDIX D



Routing Diagram for 19063 PostZL
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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
64,136	61	>75% Grass cover, Good, HSG B (2S, 4S, 5S, 6S, 7S, 9S)
300,405	74	>75% Grass cover, Good, HSG C (1S, 2S, 4S, 5S, 8S)
253,669	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S)
19,703	98	Paved parking, HSG B (2S, 4S, 5S, 6S, 7S, 9S)
66,778	98	Paved parking, HSG C (1S, 2S, 5S, 8S)
59,531	98	Paved parking, HSG D (1S, 2S, 3S, 4S, 7S, 8S, 9S, 10S, 11S)
13,245	98	Roofs, HSG B (2S, 5S, 6S, 7S, 9S)
34,101	98	Roofs, HSG C (1S, 2S, 4S, 5S, 8S)
20,084	98	Roofs, HSG D (1S, 2S, 7S, 8S, 9S)
14,273	30	Woods, Good, HSG A (3S, 4S, 5S)
111,720	55	Woods, Good, HSG B (2S, 4S, 5S, 6S)
615,310	70	Woods, Good, HSG C (1S, 2S, 3S, 4S, 5S, 7S, 8S)
477,002	77	Woods, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S)
2,049,956	75	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
14,273	HSG A	3S, 4S, 5S
208,804	HSG B	2S, 4S, 5S, 6S, 7S, 9S
1,016,593	HSG C	1S, 2S, 3S, 4S, 5S, 7S, 8S
810,286	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0	Other	
2,049,956		TOTAL AREA

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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	64,136	300,405	253,669	0	618,210	>75% Grass cover, Good
0	19,703	66,778	59,531	0	146,012	Paved parking
0	13,245	34,101	20,084	0	67,430	Roofs
14,273	111,720	615,310	477,002	0	1,218,305	Woods, Good
14,273	208,804	1,016,593	810,286	0	2,049,956	TOTAL AREA

Sub
Num

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
 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: Subcat 1S	Runoff Area=10.720 ac 18.93% Impervious Runoff Depth=0.06" Flow Length=1,506' Tc=17.8 min CN=78 Runoff=0.09 cfs 2,271 cf
Subcatchment 2S: Subcat 2S	Runoff Area=18.899 ac 5.85% Impervious Runoff Depth=0.02" Flow Length=1,517' Tc=25.2 min CN=73 Runoff=0.03 cfs 1,174 cf
Subcatchment 3S: Subcat 3S	Runoff Area=1.859 ac 0.53% Impervious Runoff Depth=0.02" Flow Length=450' Tc=13.6 min CN=74 Runoff=0.00 cfs 157 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.905 ac 2.35% Impervious Runoff Depth=0.00" Flow Length=350' Tc=7.1 min CN=70 Runoff=0.00 cfs 49 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.547 ac 5.37% Impervious Runoff Depth=0.01" Flow Length=600' Tc=16.2 min CN=71 Runoff=0.01 cfs 130 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.162 ac 12.98% Impervious Runoff Depth=0.00" Tc=6.0 min CN=70 Runoff=0.00 cfs 3 cf
Subcatchment 7S: Subcat 7S	Runoff Area=66,309 sf 22.40% Impervious Runoff Depth=0.13" Tc=10.0 min CN=83 Runoff=0.12 cfs 730 cf
Subcatchment 8S: Subcat 8S	Runoff Area=193,279 sf 8.93% Impervious Runoff Depth=0.06" Tc=10.0 min CN=78 Runoff=0.04 cfs 940 cf
Subcatchment 9S: Subcat 9S	Runoff Area=61,773 sf 33.66% Impervious Runoff Depth=0.15" Tc=10.0 min CN=84 Runoff=0.14 cfs 782 cf
Subcatchment 10S: Subcat 10S	Runoff Area=16,281 sf 10.26% Impervious Runoff Depth=0.11" Tc=6.0 min CN=82 Runoff=0.03 cfs 155 cf
Subcatchment 11S: Subcat 11S	Runoff Area=9,473 sf 77.49% Impervious Runoff Depth=0.50" Tc=0.0 min CN=94 Runoff=0.14 cfs 398 cf
Reach 1R: UNB1 (lower)	Avg. Flow Depth=0.02' Max Vel=0.92 fps Inflow=0.15 cfs 5,142 cf n=0.013 L=596.0' S=0.0070 '/ Capacity=858.75 cfs Outflow=0.15 cfs 5,142 cf
Reach 2R: UNB1 (middle)	Avg. Flow Depth=0.02' Max Vel=0.91 fps Inflow=0.16 cfs 5,093 cf n=0.013 L=594.0' S=0.0069 '/ Capacity=849.89 cfs Outflow=0.15 cfs 5,093 cf
Reach 3R: UNB1 (upper)	Avg. Flow Depth=0.01' Max Vel=1.03 fps Inflow=0.14 cfs 4,539 cf n=0.013 L=430.0' S=0.0088 '/ Capacity=961.66 cfs Outflow=0.14 cfs 4,539 cf
Reach 4R: UNB2	Avg. Flow Depth=0.03' Max Vel=1.18 fps Inflow=0.04 cfs 1,329 cf n=0.025 L=228.0' S=0.0539 '/ Capacity=209.49 cfs Outflow=0.04 cfs 1,329 cf
Reach 5R: Treatment Swale	Avg. Flow Depth=0.07' Max Vel=0.16 fps Inflow=0.14 cfs 398 cf n=0.150 L=107.0' S=0.0100 '/ Capacity=9.14 cfs Outflow=0.09 cfs 398 cf

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Reach C1: Culvert 1Avg. Flow Depth=0.02' Max Vel=0.89 fps Inflow=0.09 cfs 2,271 cf
60.0" x 24.0" Box Pipe n=0.013 L=20.0' S=0.0100 '/ Capacity=91.34 cfs Outflow=0.09 cfs 2,271 cf**Reach C2: Crossing 2**Avg. Flow Depth=0.00' Max Vel=1.67 fps Inflow=0.04 cfs 1,329 cf
8.0" x 144.0" Ellipse Pipe w/ 72.0" inside fill n=0.030 L=20.0' S=0.0200 '/ Capacity=416.21 cfs Outflow=0.04 cfs 1,329 cf**Pond 2P: Sediment Forebay #1**Peak Elev=46.63' Storage=341 cf Inflow=0.01 cfs 341 cf
Outflow=0.00 cfs 0 cf**Pond 3P: Detention Basin**Peak Elev=46.61' Storage=464 cf Inflow=0.14 cfs 782 cf
18.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/ Outflow=0.01 cfs 318 cf**Pond 4P: WL**Peak Elev=51.33' Storage=117 cf Inflow=0.01 cfs 126 cf
18.0" Round Culvert n=0.013 L=44.0' S=0.0205 '/ Outflow=0.00 cfs 23 cf**Pond 5P: Sediment Forebay #2**Peak Elev=53.01' Storage=610 cf Inflow=0.12 cfs 730 cf
Outflow=0.01 cfs 126 cf**Pond 19P: SGW**Peak Elev=45.80' Storage=0 cf Inflow=0.03 cfs 155 cf
Primary=0.03 cfs 155 cf Secondary=0.00 cfs 0 cf Outflow=0.03 cfs 155 cf**Link POA1: POA 1**Inflow=0.15 cfs 5,272 cf
Primary=0.15 cfs 5,272 cf**Link POA2: POA 2**Inflow=0.00 cfs 3 cf
Primary=0.00 cfs 3 cf**Total Runoff Area = 2,049,956 sf Runoff Volume = 6,786 cf Average Runoff Depth = 0.04"**
89.59% Pervious = 1,836,515 sf 10.41% Impervious = 213,441 sf

19063 PostZL

NRCC 24-hr D 2-YR+15% (NRCC D) Rainfall=3.61"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
 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: Subcat 1S	Runoff Area=10.720 ac 18.93% Impervious Runoff Depth=1.58" Flow Length=1,506' Tc=17.8 min CN=78 Runoff=12.53 cfs 61,540 cf
Subcatchment 2S: Subcat 2S	Runoff Area=18.899 ac 5.85% Impervious Runoff Depth=1.25" Flow Length=1,517' Tc=25.2 min CN=73 Runoff=14.27 cfs 86,040 cf
Subcatchment 3S: Subcat 3S	Runoff Area=1.859 ac 0.53% Impervious Runoff Depth=1.32" Flow Length=450' Tc=13.6 min CN=74 Runoff=2.00 cfs 8,883 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.905 ac 2.35% Impervious Runoff Depth=1.08" Flow Length=350' Tc=7.1 min CN=70 Runoff=3.20 cfs 11,353 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.547 ac 5.37% Impervious Runoff Depth=1.13" Flow Length=600' Tc=16.2 min CN=71 Runoff=3.80 cfs 18,723 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.162 ac 12.98% Impervious Runoff Depth=1.08" Tc=6.0 min CN=70 Runoff=0.19 cfs 634 cf
Subcatchment 7S: Subcat 7S	Runoff Area=66,309 sf 22.40% Impervious Runoff Depth=1.95" Tc=10.0 min CN=83 Runoff=2.83 cfs 10,783 cf
Subcatchment 8S: Subcat 8S	Runoff Area=193,279 sf 8.93% Impervious Runoff Depth=1.58" Tc=10.0 min CN=78 Runoff=6.64 cfs 25,472 cf
Subcatchment 9S: Subcat 9S	Runoff Area=61,773 sf 33.66% Impervious Runoff Depth=2.03" Tc=10.0 min CN=84 Runoff=2.74 cfs 10,455 cf
Subcatchment 10S: Subcat 10S	Runoff Area=16,281 sf 10.26% Impervious Runoff Depth=1.87" Tc=6.0 min CN=82 Runoff=0.78 cfs 2,542 cf
Subcatchment 11S: Subcat 11S	Runoff Area=9,473 sf 77.49% Impervious Runoff Depth=2.94" Tc=0.0 min CN=94 Runoff=0.74 cfs 2,323 cf
Reach 1R: UNB1 (lower)	Avg. Flow Depth=0.51' Max Vel=5.59 fps Inflow=33.03 cfs 217,230 cf n=0.013 L=596.0' S=0.0070 '/ Capacity=858.75 cfs Outflow=32.86 cfs 217,230 cf
Reach 2R: UNB1 (middle)	Avg. Flow Depth=0.50' Max Vel=5.49 fps Inflow=31.95 cfs 205,877 cf n=0.013 L=594.0' S=0.0069 '/ Capacity=849.89 cfs Outflow=31.76 cfs 205,877 cf
Reach 3R: UNB1 (upper)	Avg. Flow Depth=0.45' Max Vel=5.84 fps Inflow=30.15 cfs 194,671 cf n=0.013 L=430.0' S=0.0088 '/ Capacity=961.66 cfs Outflow=30.07 cfs 194,671 cf
Reach 4R: UNB2	Avg. Flow Depth=0.59' Max Vel=7.29 fps Inflow=15.73 cfs 107,659 cf n=0.025 L=228.0' S=0.0539 '/ Capacity=209.49 cfs Outflow=15.72 cfs 107,659 cf
Reach 5R: Treatment Swale	Avg. Flow Depth=0.22' Max Vel=0.34 fps Inflow=0.74 cfs 2,323 cf n=0.150 L=107.0' S=0.0100 '/ Capacity=9.14 cfs Outflow=0.65 cfs 2,323 cf

19063 PostZL

NRCC 24-hr D 2-YR+15% (NRCC D) Rainfall=3.61"

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Reach C1: Culvert 1Avg. Flow Depth=0.43' Max Vel=5.85 fps Inflow=12.53 cfs 61,540 cf
60.0" x 24.0" Box Pipe n=0.013 L=20.0' S=0.0100 '/' Capacity=91.34 cfs Outflow=12.54 cfs 61,540 cf**Reach C2: Crossing 2**Avg. Flow Depth=0.45' Max Vel=3.88 fps Inflow=15.73 cfs 107,659 cf
x 144.0" Ellipse Pipe w/ 72.0" inside fill n=0.030 L=20.0' S=0.0200 '/' Capacity=416.21 cfs Outflow=15.73 cfs 107,659 cf**Pond 2P: Sediment Forebay #1**Peak Elev=47.66' Storage=1,207 cf Inflow=4.51 cfs 19,678 cf
Outflow=4.19 cfs 19,077 cf**Pond 3P: Detention Basin**Peak Elev=47.67' Storage=1,707 cf Inflow=2.74 cfs 10,455 cf
18.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=2.23 cfs 9,600 cf**Pond 4P: WL**Peak Elev=52.01' Storage=860 cf Inflow=2.77 cfs 10,179 cf
18.0" Round Culvert n=0.013 L=44.0' S=0.0205 '/' Outflow=2.35 cfs 10,076 cf**Pond 5P: Sediment Forebay #2**Peak Elev=53.28' Storage=865 cf Inflow=2.83 cfs 10,783 cf
Outflow=2.77 cfs 10,179 cf**Pond 19P: SGW**Peak Elev=47.65' Storage=5,383 cf Inflow=4.61 cfs 21,619 cf
Primary=0.81 cfs 19,516 cf Secondary=1.11 cfs 2,103 cf Outflow=1.92 cfs 21,619 cf**Link POA1: POA 1**Inflow=36.25 cfs 235,953 cf
Primary=36.25 cfs 235,953 cf**Link POA2: POA 2**Inflow=0.19 cfs 634 cf
Primary=0.19 cfs 634 cf**Total Runoff Area = 2,049,956 sf Runoff Volume = 238,748 cf Average Runoff Depth = 1.40"**
89.59% Pervious = 1,836,515 sf 10.41% Impervious = 213,441 sf

19063 PostZL

NRCC 24-hr D 25-YR+15% (NRCC D) Rainfall=6.92"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
 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: Subcat 1S	Runoff Area=10.720 ac 18.93% Impervious Runoff Depth=4.40" Flow Length=1,506' Tc=17.8 min CN=78 Runoff=35.05 cfs 171,308 cf
Subcatchment 2S: Subcat 2S	Runoff Area=18.899 ac 5.85% Impervious Runoff Depth=3.87" Flow Length=1,517' Tc=25.2 min CN=73 Runoff=46.11 cfs 265,248 cf
Subcatchment 3S: Subcat 3S	Runoff Area=1.859 ac 0.53% Impervious Runoff Depth=3.97" Flow Length=450' Tc=13.6 min CN=74 Runoff=6.20 cfs 26,807 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.905 ac 2.35% Impervious Runoff Depth=3.55" Flow Length=350' Tc=7.1 min CN=70 Runoff=11.04 cfs 37,454 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.547 ac 5.37% Impervious Runoff Depth=3.66" Flow Length=600' Tc=16.2 min CN=71 Runoff=12.95 cfs 60,348 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.162 ac 12.98% Impervious Runoff Depth=3.55" Tc=6.0 min CN=70 Runoff=0.64 cfs 2,090 cf
Subcatchment 7S: Subcat 7S	Runoff Area=66,309 sf 22.40% Impervious Runoff Depth=4.95" Tc=10.0 min CN=83 Runoff=6.98 cfs 27,365 cf
Subcatchment 8S: Subcat 8S	Runoff Area=193,279 sf 8.93% Impervious Runoff Depth=4.40" Tc=10.0 min CN=78 Runoff=18.41 cfs 70,906 cf
Subcatchment 9S: Subcat 9S	Runoff Area=61,773 sf 33.66% Impervious Runoff Depth=5.06" Tc=10.0 min CN=84 Runoff=6.62 cfs 26,068 cf
Subcatchment 10S: Subcat 10S	Runoff Area=16,281 sf 10.26% Impervious Runoff Depth=4.84" Tc=6.0 min CN=82 Runoff=1.96 cfs 6,568 cf
Subcatchment 11S: Subcat 11S	Runoff Area=9,473 sf 77.49% Impervious Runoff Depth=6.21" Tc=0.0 min CN=94 Runoff=1.48 cfs 4,901 cf
Reach 1R: UNB1 (lower)	Avg. Flow Depth=1.01' Max Vel=8.29 fps Inflow=109.18 cfs 634,464 cf n=0.013 L=596.0' S=0.0070 '/ Capacity=858.75 cfs Outflow=108.95 cfs 634,464 cf
Reach 2R: UNB1 (middle)	Avg. Flow Depth=0.99' Max Vel=8.13 fps Inflow=105.01 cfs 597,010 cf n=0.013 L=594.0' S=0.0069 '/ Capacity=849.89 cfs Outflow=104.75 cfs 597,010 cf
Reach 3R: UNB1 (upper)	Avg. Flow Depth=0.90' Max Vel=8.70 fps Inflow=99.47 cfs 565,302 cf n=0.013 L=430.0' S=0.0088 '/ Capacity=961.66 cfs Outflow=99.36 cfs 565,302 cf
Reach 4R: UNB2	Avg. Flow Depth=1.08' Max Vel=10.70 fps Inflow=56.55 cfs 323,087 cf n=0.025 L=228.0' S=0.0539 '/ Capacity=209.49 cfs Outflow=56.52 cfs 323,087 cf
Reach 5R: Treatment Swale	Avg. Flow Depth=0.34' Max Vel=0.45 fps Inflow=1.48 cfs 4,901 cf n=0.150 L=107.0' S=0.0100 '/ Capacity=9.14 cfs Outflow=1.38 cfs 4,901 cf

19063 PostZL

NRCC 24-hr D 25-YR+15% (NRCC D) Rainfall=6.92"

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Reach C1: Culvert 1Avg. Flow Depth=0.84' Max Vel=8.37 fps Inflow=35.05 cfs 171,308 cf
60.0" x 24.0" Box Pipe n=0.013 L=20.0' S=0.0100 '/' Capacity=91.34 cfs Outflow=35.03 cfs 171,308 cf**Reach C2: Crossing 2**Avg. Flow Depth=1.02' Max Vel=6.17 fps Inflow=56.55 cfs 323,087 cf
x 144.0" Ellipse Pipe w/ 72.0" inside fill n=0.030 L=20.0' S=0.0200 '/' Capacity=416.21 cfs Outflow=56.55 cfs 323,087 cf**Pond 2P: Sediment Forebay #1**Peak Elev=48.23' Storage=1,891 cf Inflow=10.72 cfs 51,871 cf
Outflow=10.53 cfs 51,270 cf**Pond 3P: Detention Basin**Peak Elev=48.56' Storage=3,245 cf Inflow=6.62 cfs 26,068 cf
18.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=5.00 cfs 25,213 cf**Pond 4P: WL**Peak Elev=52.51' Storage=1,928 cf Inflow=6.91 cfs 26,761 cf
18.0" Round Culvert n=0.013 L=44.0' S=0.0205 '/' Outflow=5.74 cfs 26,658 cf**Pond 5P: Sediment Forebay #2**Peak Elev=53.48' Storage=1,092 cf Inflow=6.98 cfs 27,365 cf
Outflow=6.91 cfs 26,761 cf**Pond 19P: SGW**Peak Elev=48.10' Storage=7,319 cf Inflow=11.36 cfs 57,838 cf
Primary=0.88 cfs 33,466 cf Secondary=10.09 cfs 24,373 cf Outflow=10.97 cfs 57,839 cf**Link POA1: POA 1**Inflow=121.10 cfs 694,812 cf
Primary=121.10 cfs 694,812 cf**Link POA2: POA 2**Inflow=0.64 cfs 2,090 cf
Primary=0.64 cfs 2,090 cf**Total Runoff Area = 2,049,956 sf Runoff Volume = 699,064 cf Average Runoff Depth = 4.09"**
89.59% Pervious = 1,836,515 sf 10.41% Impervious = 213,441 sf

19063 PostZL

NRCC 24-hr D 50-YR+15% (NRCC D) Rainfall=8.28"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
 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: Subcat 1S	Runoff Area=10.720 ac 18.93% Impervious Runoff Depth=5.65" Flow Length=1,506' Tc=17.8 min CN=78 Runoff=44.65 cfs 219,876 cf
Subcatchment 2S: Subcat 2S	Runoff Area=18.899 ac 5.85% Impervious Runoff Depth=5.06" Flow Length=1,517' Tc=25.2 min CN=73 Runoff=60.23 cfs 347,053 cf
Subcatchment 3S: Subcat 3S	Runoff Area=1.859 ac 0.53% Impervious Runoff Depth=5.18" Flow Length=450' Tc=13.6 min CN=74 Runoff=8.03 cfs 34,934 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.905 ac 2.35% Impervious Runoff Depth=4.71" Flow Length=350' Tc=7.1 min CN=70 Runoff=14.58 cfs 49,621 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.547 ac 5.37% Impervious Runoff Depth=4.82" Flow Length=600' Tc=16.2 min CN=71 Runoff=17.07 cfs 79,612 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.162 ac 12.98% Impervious Runoff Depth=4.71" Tc=6.0 min CN=70 Runoff=0.85 cfs 2,769 cf
Subcatchment 7S: Subcat 7S	Runoff Area=66,309 sf 22.40% Impervious Runoff Depth=6.25" Tc=10.0 min CN=83 Runoff=8.70 cfs 34,509 cf
Subcatchment 8S: Subcat 8S	Runoff Area=193,279 sf 8.93% Impervious Runoff Depth=5.65" Tc=10.0 min CN=78 Runoff=23.42 cfs 91,009 cf
Subcatchment 9S: Subcat 9S	Runoff Area=61,773 sf 33.66% Impervious Runoff Depth=6.36" Tc=10.0 min CN=84 Runoff=8.22 cfs 32,762 cf
Subcatchment 10S: Subcat 10S	Runoff Area=16,281 sf 10.26% Impervious Runoff Depth=6.13" Tc=6.0 min CN=82 Runoff=2.45 cfs 8,311 cf
Subcatchment 11S: Subcat 11S	Runoff Area=9,473 sf 77.49% Impervious Runoff Depth=7.56" Tc=0.0 min CN=94 Runoff=1.78 cfs 5,968 cf
Reach 1R: UNB1 (lower)	Avg. Flow Depth=1.16' Max Vel=8.96 fps Inflow=140.40 cfs 821,881 cf n=0.013 L=596.0' S=0.0070 '/ Capacity=858.75 cfs Outflow=140.15 cfs 821,881 cf
Reach 2R: UNB1 (middle)	Avg. Flow Depth=1.14' Max Vel=8.78 fps Inflow=134.79 cfs 772,259 cf n=0.013 L=594.0' S=0.0069 '/ Capacity=849.89 cfs Outflow=134.52 cfs 772,259 cf
Reach 3R: UNB1 (upper)	Avg. Flow Depth=1.03' Max Vel=9.41 fps Inflow=127.62 cfs 731,357 cf n=0.013 L=430.0' S=0.0088 '/ Capacity=961.66 cfs Outflow=127.50 cfs 731,357 cf
Reach 4R: UNB2	Avg. Flow Depth=1.22' Max Vel=11.54 fps Inflow=73.14 cfs 420,472 cf n=0.025 L=228.0' S=0.0539 '/ Capacity=209.49 cfs Outflow=73.10 cfs 420,472 cf
Reach 5R: Treatment Swale	Avg. Flow Depth=0.38' Max Vel=0.48 fps Inflow=1.78 cfs 5,968 cf n=0.150 L=107.0' S=0.0100 '/ Capacity=9.14 cfs Outflow=1.68 cfs 5,968 cf

19063 PostZL

NRCC 24-hr D 50-YR+15% (NRCC D) Rainfall=8.28"

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Reach C1: Culvert 1Avg. Flow Depth=0.98' Max Vel=9.07 fps Inflow=44.65 cfs 219,876 cf
60.0" x 24.0" Box Pipe n=0.013 L=20.0' S=0.0100 '/' Capacity=91.34 cfs Outflow=44.64 cfs 219,876 cf**Reach C2: Crossing 2**Avg. Flow Depth=1.21' Max Vel=6.74 fps Inflow=73.15 cfs 420,472 cf
x 144.0" Ellipse Pipe w/ 72.0" inside fill n=0.030 L=20.0' S=0.0200 '/' Capacity=416.21 cfs Outflow=73.14 cfs 420,472 cf**Pond 2P: Sediment Forebay #1**Peak Elev=48.35' Storage=2,062 cf Inflow=12.97 cfs 65,709 cf
Outflow=12.78 cfs 65,107 cf**Pond 3P: Detention Basin**Peak Elev=48.84' Storage=3,848 cf Inflow=8.22 cfs 32,762 cf
18.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=6.04 cfs 31,907 cf**Pond 4P: WL**Peak Elev=52.71' Storage=2,442 cf Inflow=8.62 cfs 33,905 cf
18.0" Round Culvert n=0.013 L=44.0' S=0.0205 '/' Outflow=6.95 cfs 33,802 cf**Pond 5P: Sediment Forebay #2**Peak Elev=53.55' Storage=1,171 cf Inflow=8.70 cfs 34,509 cf
Outflow=8.62 cfs 33,905 cf**Pond 19P: SGW**Peak Elev=48.20' Storage=7,744 cf Inflow=13.78 cfs 73,419 cf
Primary=0.89 cfs 38,691 cf Secondary=12.47 cfs 34,728 cf Outflow=13.36 cfs 73,419 cf**Link POA1: POA 1**Inflow=156.27 cfs 901,492 cf
Primary=156.27 cfs 901,492 cf**Link POA2: POA 2**Inflow=0.85 cfs 2,769 cf
Primary=0.85 cfs 2,769 cf**Total Runoff Area = 2,049,956 sf Runoff Volume = 906,425 cf Average Runoff Depth = 5.31"**
89.59% Pervious = 1,836,515 sf 10.41% Impervious = 213,441 sf

19063 PostZL

NRCC 24-hr D 100-YR+15% (NRCC D) Rainfall=9.91"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
 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: Subcat 1S	Runoff Area=10.720 ac 18.93% Impervious Runoff Depth=7.18" Flow Length=1,506' Tc=17.8 min CN=78 Runoff=56.21 cfs 279,368 cf
Subcatchment 2S: Subcat 2S	Runoff Area=18.899 ac 5.85% Impervious Runoff Depth=6.53" Flow Length=1,517' Tc=25.2 min CN=73 Runoff=77.40 cfs 448,300 cf
Subcatchment 3S: Subcat 3S	Runoff Area=1.859 ac 0.53% Impervious Runoff Depth=6.66" Flow Length=450' Tc=13.6 min CN=74 Runoff=10.26 cfs 44,972 cf
Subcatchment 4S: Subcat 4S	Runoff Area=2.905 ac 2.35% Impervious Runoff Depth=6.14" Flow Length=350' Tc=7.1 min CN=70 Runoff=18.90 cfs 64,787 cf
Subcatchment 5S: Subcat 5S	Runoff Area=4.547 ac 5.37% Impervious Runoff Depth=6.27" Flow Length=600' Tc=16.2 min CN=71 Runoff=22.10 cfs 103,566 cf
Subcatchment 6S: Subcat 6S	Runoff Area=0.162 ac 12.98% Impervious Runoff Depth=6.14" Tc=6.0 min CN=70 Runoff=1.10 cfs 3,616 cf
Subcatchment 7S: Subcat 7S	Runoff Area=66,309 sf 22.40% Impervious Runoff Depth=7.82" Tc=10.0 min CN=83 Runoff=10.76 cfs 43,186 cf
Subcatchment 8S: Subcat 8S	Runoff Area=193,279 sf 8.93% Impervious Runoff Depth=7.18" Tc=10.0 min CN=78 Runoff=29.44 cfs 115,633 cf
Subcatchment 9S: Subcat 9S	Runoff Area=61,773 sf 33.66% Impervious Runoff Depth=7.94" Tc=10.0 min CN=84 Runoff=10.13 cfs 40,881 cf
Subcatchment 10S: Subcat 10S	Runoff Area=16,281 sf 10.26% Impervious Runoff Depth=7.69" Tc=6.0 min CN=82 Runoff=3.03 cfs 10,432 cf
Subcatchment 11S: Subcat 11S	Runoff Area=9,473 sf 77.49% Impervious Runoff Depth=9.18" Tc=0.0 min CN=94 Runoff=2.14 cfs 7,249 cf
Reach 1R: UNB1 (lower)	Avg. Flow Depth=1.32' Max Vel=9.63 fps Inflow=177.88 cfs 1,052,645 cf n=0.013 L=596.0' S=0.0070 '/ Capacity=858.75 cfs Outflow=177.61 cfs 1,052,645 cf
Reach 2R: UNB1 (middle)	Avg. Flow Depth=1.30' Max Vel=9.44 fps Inflow=170.50 cfs 987,858 cf n=0.013 L=594.0' S=0.0069 '/ Capacity=849.89 cfs Outflow=170.20 cfs 987,858 cf
Reach 3R: UNB1 (upper)	Avg. Flow Depth=1.18' Max Vel=10.12 fps Inflow=161.33 cfs 935,637 cf n=0.013 L=430.0' S=0.0088 '/ Capacity=961.66 cfs Outflow=161.20 cfs 935,637 cf
Reach 4R: UNB2	Avg. Flow Depth=1.36' Max Vel=12.39 fps Inflow=92.95 cfs 540,636 cf n=0.025 L=228.0' S=0.0539 '/ Capacity=209.49 cfs Outflow=92.90 cfs 540,636 cf
Reach 5R: Treatment Swale	Avg. Flow Depth=0.43' Max Vel=0.51 fps Inflow=2.14 cfs 7,249 cf n=0.150 L=107.0' S=0.0100 '/ Capacity=9.14 cfs Outflow=2.03 cfs 7,249 cf

19063 PostZL

NRCC 24-hr D 100-YR+15% (NRCC D) Rainfall=9.91"

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Reach C1: Culvert 1Avg. Flow Depth=1.15' Max Vel=9.76 fps Inflow=56.21 cfs 279,368 cf
60.0" x 24.0" Box Pipe n=0.013 L=20.0' S=0.0100 '/' Capacity=91.34 cfs Outflow=56.20 cfs 279,368 cf**Reach C2: Crossing 2**Avg. Flow Depth=1.43' Max Vel=7.30 fps Inflow=92.95 cfs 540,635 cf
x 144.0" Ellipse Pipe w/ 72.0" inside fill n=0.030 L=20.0' S=0.0200 '/' Capacity=416.21 cfs Outflow=92.95 cfs 540,636 cf**Pond 2P: Sediment Forebay #1**Peak Elev=48.48' Storage=2,239 cf Inflow=15.26 cfs 82,505 cf
Outflow=15.09 cfs 81,904 cf**Pond 3P: Detention Basin**Peak Elev=49.18' Storage=4,634 cf Inflow=10.13 cfs 40,881 cf
18.0" Round Culvert n=0.013 L=50.0' S=0.0100 '/' Outflow=7.18 cfs 40,026 cf**Pond 4P: WL**Peak Elev=52.95' Storage=3,193 cf Inflow=10.64 cfs 42,582 cf
18.0" Round Culvert n=0.013 L=44.0' S=0.0205 '/' Outflow=8.09 cfs 42,479 cf**Pond 5P: Sediment Forebay #2**Peak Elev=53.62' Storage=1,265 cf Inflow=10.76 cfs 43,186 cf
Outflow=10.64 cfs 42,582 cf**Pond 19P: SGW**Peak Elev=48.29' Storage=8,173 cf Inflow=16.27 cfs 92,335 cf
Primary=0.91 cfs 44,143 cf Secondary=14.98 cfs 48,192 cf Outflow=15.89 cfs 92,336 cf**Link POA1: POA 1**Inflow=198.60 cfs 1,156,212 cf
Primary=198.60 cfs 1,156,212 cf**Link POA2: POA 2**Inflow=1.10 cfs 3,616 cf
Primary=1.10 cfs 3,616 cf**Total Runoff Area = 2,049,956 sf Runoff Volume = 1,161,991 cf Average Runoff Depth = 6.80"**
89.59% Pervious = 1,836,515 sf 10.41% Impervious = 213,441 sf

Summary for Subcatchment 1S: Subcat 1S

Runoff = 24.39 cfs @ 12.27 hrs, Volume= 120,878 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (ac)	CN	Description
3.343	74	>75% Grass cover, Good, HSG C
1.116	80	>75% Grass cover, Good, HSG D
1.088	98	Paved parking, HSG C
0.515	98	Paved parking, HSG D
0.349	98	Roofs, HSG C
0.078	98	Roofs, HSG D
3.574	70	Woods, Good, HSG C
0.658	77	Woods, Good, HSG D
10.720	78	Weighted Average
8.691		81.07% Pervious Area
2.029		18.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	20	0.0700	0.20		Sheet Flow, A-->B Grass: Short n= 0.150 P2= 3.14"
16.1	1,000	0.0220	1.04		Shallow Concentrated Flow, B-->C Short Grass Pasture Kv= 7.0 fps
0.7	486	0.0494	11.09	44.37	Parabolic Channel, C-->D W=4.00' D=1.50' Area=4.0 sf Perim=5.2' n= 0.025
18.5	1,506	Total			

Summary for Subcatchment 2S: Subcat 2S

Runoff = 31.41 cfs @ 12.35 hrs, Volume= 181,562 cf, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Area (ac)	CN	Description
1.000	61	>75% Grass cover, Good, HSG B
2.094	74	>75% Grass cover, Good, HSG C
1.285	80	>75% Grass cover, Good, HSG D
0.321	98	Paved parking, HSG B
0.175	98	Paved parking, HSG C
0.046	98	Paved parking, HSG D
0.198	98	Roofs, HSG B
0.280	98	Roofs, HSG C
0.086	98	Roofs, HSG D
2.187	55	Woods, Good, HSG B
4.889	70	Woods, Good, HSG C
6.338	77	Woods, Good, HSG D
18.899	73	Weighted Average
17.793		94.15% Pervious Area
1.106		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	100	0.0450	0.23		Sheet Flow, A-->B Grass: Short n= 0.150 P2= 3.14"
16.2	800	0.0270	0.82		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
1.8	617	0.0270	5.71	16.38	Trap/Vee/Rect Channel Flow, C-->D Bot.W=2.00' D=0.70' Z= 3.0 '/' Top.W=6.20' n= 0.025
25.2	1,517	Total			

Summary for Subcatchment 3S: Subcat 3S

Runoff = 4.27 cfs @ 12.22 hrs, Volume= 18,465 cf, Depth= 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (ac)	CN	Description
0.248	80	>75% Grass cover, Good, HSG D
0.010	98	Paved parking, HSG D
0.092	30	Woods, Good, HSG A
0.278	70	Woods, Good, HSG C
1.231	77	Woods, Good, HSG D
1.859	74	Weighted Average
1.849		99.47% Pervious Area
0.010		0.53% Impervious Area

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NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.1200	0.16		Sheet Flow, A-->B Woods: Light underbrush n= 0.400 P2= 3.14"
3.0	350	0.1500	1.94		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
13.6	450	Total			

Summary for Subcatchment 4S: Subcat 4S

Runoff = 7.45 cfs @ 12.14 hrs, Volume= 25,133 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (ac)	CN	Description
0.057	61	>75% Grass cover, Good, HSG B
0.195	74	>75% Grass cover, Good, HSG C
0.058	80	>75% Grass cover, Good, HSG D
0.001	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.067	98	Roofs, HSG C
0.154	30	Woods, Good, HSG A
0.086	55	Woods, Good, HSG B
1.580	70	Woods, Good, HSG C
0.707	77	Woods, Good, HSG D
2.905	70	Weighted Average
2.837		97.65% Pervious Area
0.068		2.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	100	0.1100	0.33		Sheet Flow, A-->B Grass: Short n= 0.150 P2= 3.14"
1.9	250	0.2000	2.24		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
6.9	350	Total			

Summary for Subcatchment 5S: Subcat 5S

Runoff = 8.69 cfs @ 12.25 hrs, Volume= 40,771 cf, Depth= 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Area (ac)	CN	Description
0.085	61	>75% Grass cover, Good, HSG B
0.858	74	>75% Grass cover, Good, HSG C
0.036	80	>75% Grass cover, Good, HSG D
0.007	98	Paved parking, HSG B
0.195	98	Paved parking, HSG C
0.026	98	Roofs, HSG B
0.016	98	Roofs, HSG C
0.082	30	Woods, Good, HSG A
0.254	55	Woods, Good, HSG B
2.845	70	Woods, Good, HSG C
0.143	77	Woods, Good, HSG D
4.547	71	Weighted Average
4.303		94.63% Pervious Area
0.244		5.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.1000	0.15		Sheet Flow, A-->B Woods: Light underbrush n= 0.400 P2= 3.14"
4.8	500	0.1200	1.73		Shallow Concentrated Flow, B-->C Woodland Kv= 5.0 fps
16.2	600	Total			

Summary for Subcatchment 6S: Subcat 6S

Runoff = 0.43 cfs @ 12.13 hrs, Volume= 1,403 cf, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (ac)	CN	Description
0.053	61	>75% Grass cover, Good, HSG B
0.021	80	>75% Grass cover, Good, HSG D
0.008	98	Paved parking, HSG B
0.013	98	Roofs, HSG B
0.038	55	Woods, Good, HSG B
0.029	77	Woods, Good, HSG D
0.162	70	Weighted Average
0.141		87.02% Pervious Area
0.021		12.98% Impervious Area

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

Summary for Subcatchment 7S: Subcat 7S

Runoff = 5.14 cfs @ 12.17 hrs, Volume= 19,855 cf, Depth= 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (sf)	CN	Description
4,591	61	>75% Grass cover, Good, HSG B
45,695	80	>75% Grass cover, Good, HSG D
1,215	98	Paved parking, HSG B
8,926	98	Paved parking, HSG D
1,132	98	Roofs, HSG B
3,579	98	Roofs, HSG D
67	70	Woods, Good, HSG C
1,104	77	Woods, Good, HSG D
66,309	83	Weighted Average
51,456		77.60% Pervious Area
14,853		22.40% Impervious Area

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

Summary for Subcatchment 8S: Subcat 8S

Runoff = 13.10 cfs @ 12.17 hrs, Volume= 50,033 cf, Depth= 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (sf)	CN	Description
17,711	74	>75% Grass cover, Good, HSG C
37,323	80	>75% Grass cover, Good, HSG D
3,275	98	Paved parking, HSG C
7,792	98	Paved parking, HSG D
3,097	98	Roofs, HSG C
3,102	98	Roofs, HSG D
41,730	70	Woods, Good, HSG C
79,249	77	Woods, Good, HSG D
193,279	78	Weighted Average
176,013		91.07% Pervious Area
17,266		8.93% Impervious Area

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

Summary for Subcatchment 9S: Subcat 9S

Runoff = 4.90 cfs @ 12.17 hrs, Volume= 19,015 cf, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (sf)	CN	Description
7,504	61	>75% Grass cover, Good, HSG B
33,476	80	>75% Grass cover, Good, HSG D
3,804	98	Paved parking, HSG B
8,940	98	Paved parking, HSG D
1,773	98	Roofs, HSG B
6,276	98	Roofs, HSG D
61,773	84	Weighted Average
40,980		66.34% Pervious Area
20,793		33.66% Impervious Area

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

Summary for Subcatchment 10S: Subcat 10S

Runoff = 1.44 cfs @ 12.13 hrs, Volume= 4,740 cf, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

Area (sf)	CN	Description
14,610	80	>75% Grass cover, Good, HSG D
1,670	98	Paved parking, HSG D
16,281	82	Weighted Average
14,610		89.74% Pervious Area
1,670		10.26% Impervious Area

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

Summary for Subcatchment 11S: Subcat 11S

Runoff = 1.04 cfs @ 12.13 hrs, Volume= 3,759 cf, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Area (ac)	CN	Description
0.049	80	>75% Grass cover, Good, HSG D
0.169	98	Paved parking, HSG D
0.217	94	Weighted Average
0.049		22.51% Pervious Area
0.169		77.49% Impervious Area

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

Summary for Reach 1R: UNB1 (lower)

[62] Hint: Exceeded Reach 2R OUTLET depth by 0.02' @ 12.55 hrs

Inflow Area = 1,844,827 sf, 10.94% Impervious, Inflow Depth = 2.87" for 10-YR+15% (NRCC D) event
 Inflow = 75.28 cfs @ 12.30 hrs, Volume= 441,256 cf
 Outflow = 75.09 cfs @ 12.32 hrs, Volume= 441,256 cf, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Max. Velocity= 7.36 fps, Min. Travel Time= 1.3 min
 Avg. Velocity = 1.85 fps, Avg. Travel Time= 5.4 min

Peak Storage= 6,079 cf @ 12.32 hrs
 Average Depth at Peak Storage= 0.82'
 Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 858.75 cfs

10.00' x 3.00' deep channel, n= 0.013 Corrugated PE, smooth interior
 Side Slope Z-value= 3.0 '/' Top Width= 28.00'
 Length= 596.0' Slope= 0.0070 '/'
 Inlet Invert= 14.10', Outlet Invert= 9.90'



Summary for Reach 2R: UNB1 (middle)

[62] Hint: Exceeded Reach 3R OUTLET depth by 0.08' @ 12.39 hrs

Inflow Area = 1,718,292 sf, 11.58% Impervious, Inflow Depth = 2.91" for 10-YR+15% (NRCC D) event
 Inflow = 72.71 cfs @ 12.30 hrs, Volume= 416,122 cf
 Outflow = 72.50 cfs @ 12.31 hrs, Volume= 416,122 cf, Atten= 0%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Max. Velocity= 7.23 fps, Min. Travel Time= 1.4 min
 Avg. Velocity = 1.81 fps, Avg. Travel Time= 5.5 min

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Peak Storage= 5,958 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 849.89 cfs

10.00' x 3.00' deep channel, n= 0.013 Corrugated PE, smooth interior
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 594.0' Slope= 0.0069 '/'
Inlet Invert= 18.20', Outlet Invert= 14.10'



Summary for Reach 3R: UNB1 (upper)

[61] Hint: Exceeded Reach 4R outlet invert by 0.73' @ 12.31 hrs

Inflow Area =	1,627,841 sf,	11.74% Impervious,	Inflow Depth = 2.90"	for 10-YR+15% (NRCC D) event
Inflow =	68.85 cfs @ 12.30 hrs,	Volume=	393,897 cf	
Outflow =	68.75 cfs @ 12.31 hrs,	Volume=	393,897 cf,	Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.72 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 2.07 fps, Avg. Travel Time= 3.5 min

Peak Storage= 3,828 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 3.00' Flow Area= 57.0 sf, Capacity= 961.66 cfs

10.00' x 3.00' deep channel, n= 0.013 Corrugated PE, smooth interior
Side Slope Z-value= 3.0 '/' Top Width= 28.00'
Length= 430.0' Slope= 0.0088 '/'
Inlet Invert= 22.00', Outlet Invert= 18.20'



Summary for Reach 4R: UNB2

Inflow Area =	967,603 sf,	8.84% Impervious,	Inflow Depth = 2.77"	for 10-YR+15% (NRCC D) event
Inflow =	38.85 cfs @ 12.35 hrs,	Volume=	222,987 cf	
Outflow =	38.82 cfs @ 12.35 hrs,	Volume=	222,987 cf,	Atten= 0%, Lag= 0.2 min

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NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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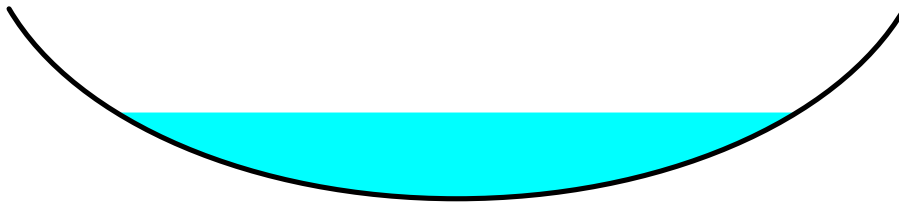
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Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 9.56 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.93 fps, Avg. Travel Time= 1.3 min

Peak Storage= 925 cf @ 12.35 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 2.00' Flow Area= 13.3 sf, Capacity= 209.49 cfs

10.00' x 2.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 228.0' Slope= 0.0539 '/'
Inlet Invert= 34.30', Outlet Invert= 22.00'



Summary for Reach 5R: Treatment Swale

Inflow Area =	9,473 sf, 77.49% Impervious,	Inflow Depth = 4.76"	for 10-YR+15% (NRCC D) event
Inflow =	1.04 cfs @ 12.13 hrs,	Volume=	3,759 cf
Outflow =	0.92 cfs @ 12.16 hrs,	Volume=	3,759 cf, Atten= 12%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 0.39 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.10 fps, Avg. Travel Time= 18.4 min

Peak Storage= 253 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 1.00' Flow Area= 11.0 sf, Capacity= 9.14 cfs

8.00' x 1.00' deep channel, n= 0.150
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 107.0' Slope= 0.0100 '/'
Inlet Invert= 44.40', Outlet Invert= 43.33'



‡

Summary for Reach C1: Culvert 1

[52] Hint: Inlet/Outlet conditions not evaluated

[65] Warning: Inlet elevation not specified

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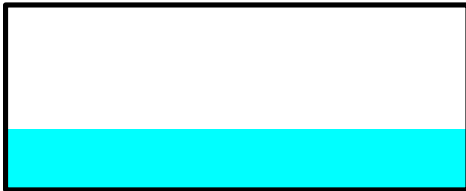
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Inflow Area = 466,959 sf, 18.93% Impervious, Inflow Depth = 3.11" for 10-YR+15% (NRCC D) event
Inflow = 24.39 cfs @ 12.27 hrs, Volume= 120,878 cf
Outflow = 24.38 cfs @ 12.27 hrs, Volume= 120,878 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 7.40 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 0.1 min

Peak Storage= 66 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.66'
Bank-Full Depth= 2.00' Flow Area= 10.0 sf, Capacity= 91.34 cfs

60.0" W x 24.0" H Box Pipe
n= 0.013
Length= 20.0' Slope= 0.0100 '/
Inlet Invert= 0.00', Outlet Invert= -0.20'



Summary for Reach C2: Crossing 2

[52] Hint: Inlet/Outlet conditions not evaluated

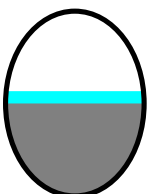
[65] Warning: Inlet elevation not specified

Inflow Area = 967,603 sf, 8.84% Impervious, Inflow Depth = 2.77" for 10-YR+15% (NRCC D) event
Inflow = 38.85 cfs @ 12.35 hrs, Volume= 222,987 cf
Outflow = 38.85 cfs @ 12.35 hrs, Volume= 222,987 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.40 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.90 fps, Avg. Travel Time= 0.2 min

Peak Storage= 144 cf @ 12.35 hrs
Average Depth at Peak Storage= 6.80' above invert (0.80' above fill)
Bank-Full Depth= 12.00' above invert (6.00' above fill) Flow Area= 42.4 sf, Capacity= 416.21 cfs

108.0" W x 144.0" H Ellipse Pipe w/ 72.0" inside fill
n= 0.030 Earth, grassed & winding
Length= 20.0' Slope= 0.0200 '/
Inlet Invert= 0.00', Outlet Invert= -0.40'



Summary for Pond 2P: Sediment Forebay #1

[80] Warning: Exceeded Pond 3P by 0.04' @ 9.93 hrs (0.33 cfs 535 cf)

Inflow Area = 128,082 sf, 27.83% Impervious, Inflow Depth = 3.49" for 10-YR+15% (NRCC D) event
 Inflow = 7.86 cfs @ 12.23 hrs, Volume= 37,299 cf
 Outflow = 7.58 cfs @ 12.26 hrs, Volume= 36,684 cf, Atten= 3%, Lag= 1.3 min
 Primary = 7.58 cfs @ 12.26 hrs, Volume= 36,684 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 48.06' @ 12.28 hrs Surf.Area= 1,321 sf Storage= 1,733 cf

Plug-Flow detention time= 22.9 min calculated for 36,684 cf (98% of inflow)
 Center-of-Mass det. time= 12.3 min (872.6 - 860.3)

Volume	Invert	Avail.Storage	Storage Description			
#1	46.00'	3,156 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
46.00	437	86.0	0	0	437	
48.00	1,300	159.0	1,660	1,660	1,881	
49.00	1,699	174.0	1,495	3,156	2,312	

Device	Routing	Invert	Outlet Devices									
#1	Primary	47.00'	6.0' long x 5.0' breadth Broad-Crested Rectangular Weir									
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00									
			2.50 3.00 3.50 4.00 4.50 5.00 5.50									
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65									
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88									

Primary OutFlow Max=7.60 cfs @ 12.26 hrs HW=48.05' TW=47.96' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 7.60 cfs @ 1.21 fps)

Summary for Pond 3P: Detention Basin

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=4)

Inflow Area = 61,773 sf, 33.66% Impervious, Inflow Depth = 3.69" for 10-YR+15% (NRCC D) event
 Inflow = 4.90 cfs @ 12.17 hrs, Volume= 19,015 cf
 Outflow = 3.68 cfs @ 12.21 hrs, Volume= 18,152 cf, Atten= 25%, Lag= 2.5 min
 Primary = 3.68 cfs @ 12.21 hrs, Volume= 18,153 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 48.22' @ 12.26 hrs Surf.Area= 1,842 sf Storage= 2,642 cf

Plug-Flow detention time= 62.7 min calculated for 18,152 cf (95% of inflow)
 Center-of-Mass det. time= 36.2 min (864.4 - 828.2)

19063 PostZL

NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	7,117 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
46.00	641	100.0	0	0	641
50.00	3,253	214.0	7,117	7,117	3,558

Device	Routing	Invert	Outlet Devices
#1	Primary	46.50'	18.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.50' / 46.00' S= 0.0100 '/ Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.64 cfs @ 12.21 hrs HW=48.19' TW=48.01' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 3.64 cfs @ 2.06 fps)

Summary for Pond 4P: WL

Inflow Area = 66,309 sf, 22.40% Impervious, Inflow Depth = 3.48" for 10-YR+15% (NRCC D) event
 Inflow = 5.07 cfs @ 12.19 hrs, Volume= 19,251 cf
 Outflow = 4.24 cfs @ 12.25 hrs, Volume= 19,146 cf, Atten= 16%, Lag= 3.6 min
 Primary = 4.24 cfs @ 12.25 hrs, Volume= 19,146 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 52.30' @ 12.25 hrs Surf.Area= 2,247 sf Storage= 1,493 cf

Plug-Flow detention time= 13.2 min calculated for 19,142 cf (99% of inflow)
 Center-of-Mass det. time= 10.0 min (856.4 - 846.4)

Volume	Invert	Avail.Storage	Storage Description
#1	51.00'	3,446 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
51.00	200	60.0	0	0	200
52.00	1,850	174.0	886	886	2,326
53.00	3,342	231.0	2,560	3,446	4,174

Device	Routing	Invert	Outlet Devices
#1	Primary	51.30'	18.0" Round Culvert L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 51.30' / 50.40' S= 0.0205 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.24 cfs @ 12.25 hrs HW=52.30' TW=48.04' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 4.24 cfs @ 3.40 fps)

19063 PostZL

NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Summary for Pond 5P: Sediment Forebay #2

Inflow Area = 66,309 sf, 22.40% Impervious, Inflow Depth = 3.59" for 10-YR+15% (NRCC D) event
 Inflow = 5.14 cfs @ 12.17 hrs, Volume= 19,855 cf
 Outflow = 5.07 cfs @ 12.19 hrs, Volume= 19,251 cf, Atten= 1%, Lag= 0.9 min
 Primary = 5.07 cfs @ 12.19 hrs, Volume= 19,251 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 53.40' @ 12.19 hrs Surf.Area= 1,113 sf Storage= 999 cf

Plug-Flow detention time= 32.5 min calculated for 19,251 cf (97% of inflow)
 Center-of-Mass det. time= 14.5 min (846.4 - 831.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	52.00'	1,792 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
52.00	378	84.0	0	0	378	
54.00	1,546	168.0	1,792	1,792	2,081	

Device	Routing	Invert	Outlet Devices											
#1	Primary	53.00'	8.0' long x 5.0' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00											
			2.50 3.00 3.50 4.00 4.50 5.00 5.50											
			Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65											
			2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88											

Primary OutFlow Max=5.06 cfs @ 12.19 hrs HW=53.40' TW=52.23' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 5.06 cfs @ 1.58 fps)

Summary for Pond 19P: SGW

[44] Hint: Outlet device #3 is below defined storage

Inflow Area = 144,362 sf, 25.85% Impervious, Inflow Depth = 3.44" for 10-YR+15% (NRCC D) event
 Inflow = 8.20 cfs @ 12.25 hrs, Volume= 41,424 cf
 Outflow = 7.72 cfs @ 12.30 hrs, Volume= 41,425 cf, Atten= 6%, Lag= 3.4 min
 Primary = 0.86 cfs @ 12.30 hrs, Volume= 27,611 cf
 Secondary = 6.86 cfs @ 12.30 hrs, Volume= 13,815 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
 Peak Elev= 47.98' @ 12.30 hrs Surf.Area= 7,680 sf Storage= 7,004 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 114.2 min (982.1 - 868.0)

19063 PostZL

NRCC 24-hr D 10-YR+15% (NRCC D) Rainfall=5.46"

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Volume	Invert	Avail.Storage	Storage Description
#1	45.70'	1,911 cf	Cell #1 (Irregular) Listed below (Recalc)
#2	45.70'	2,064 cf	Cell #2 (Irregular) Listed below (Recalc)
#3	47.20'	8,095 cf	+46.8 (Irregular) Listed below (Recalc)
		12,070 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.70	1,003	123.2	0	0	1,003
46.80	1,401	142.1	1,316	1,316	1,428
47.20	1,576	149.6	595	1,911	1,611

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
45.70	1,089	130.8	0	0	1,089
46.80	1,510	149.7	1,423	1,423	1,538
47.20	1,694	157.2	640	2,064	1,731

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
47.20	3,404	310.3	0	0	3,404
48.00	4,441	354.0	3,129	3,129	5,729
49.00	5,511	370.0	4,966	8,095	6,720

Device	Routing	Invert	Outlet Devices
#1	Secondary	47.50'	8.0' long x 4.0' breadth Emergency spillway Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.76 2.79 2.88 3.07 3.32
#2	Primary	45.00'	6.0" Round Culvert L= 44.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.00' / 44.56' S= 0.0100 '/ Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 0.20 sf
#3	Device 2	45.00'	2.0" Vert. 2" Ø oriface C= 0.600
#4	Device 2	47.20'	2.0' long Outlet control wier 2 End Contraction(s)
#5	Device 2	47.20'	24.0" Horiz. 24" Ø high flow by-pass C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.86 cfs @ 12.30 hrs HW=47.98' TW=6.79' (Dynamic Tailwater)

- ↑ 2=Culvert (Barrel Controls 0.86 cfs @ 4.39 fps)
- ↑ 3=2" Ø oriface (Passes < 0.18 cfs potential flow)
- ↑ 4=Outlet control wier (Passes < 4.13 cfs potential flow)
- ↑ 5=24" Ø high flow by-pass (Passes < 13.34 cfs potential flow)

Secondary OutFlow Max=6.86 cfs @ 12.30 hrs HW=47.98' TW=6.79' (Dynamic Tailwater)

- ↑ 1=Emergency spillway (Weir Controls 6.86 cfs @ 1.80 fps)

Summary for Link POA1: POA 1

Inflow Area = 2,042,894 sf, 10.40% Impervious, Inflow Depth = 2.83" for 10-YR+15% (NRCC D) event
Inflow = 82.98 cfs @ 12.31 hrs, Volume= 482,027 cf
Primary = 82.98 cfs @ 12.31 hrs, Volume= 482,027 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Summary for Link POA2: POA 2

Inflow Area = 7,062 sf, 12.98% Impervious, Inflow Depth = 2.38" for 10-YR+15% (NRCC D) event
Inflow = 0.43 cfs @ 12.13 hrs, Volume= 1,403 cf
Primary = 0.43 cfs @ 12.13 hrs, Volume= 1,403 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

APPENDIX E

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	70.909 degrees West
Latitude	43.149 degrees North
Elevation	0 feet
Date/Time	Tue, 17 Dec 2019 11:01:15 -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	2.85	1yr	2.31	2.74	3.14	3.86	4.44	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	3.14	3.48	2yr	2.78	3.35	3.84	4.57	5.21	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	4.46	5yr	3.52	4.29	4.90	5.79	6.55	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	4.75	5.38	10yr	4.20	5.18	5.90	6.92	7.79	10yr
25yr	0.46	0.74	0.94	1.29	1.72	2.26	25yr	1.48	2.09	2.69	3.52	4.61	6.02	6.91	25yr	5.32	6.65	7.53	8.76	9.81	25yr
50yr	0.51	0.83	1.06	1.48	1.99	2.66	50yr	1.72	2.46	3.17	4.18	5.50	7.20	8.35	50yr	6.37	8.03	9.07	10.48	11.68	50yr
100yr	0.58	0.93	1.20	1.70	2.31	3.11	100yr	1.99	2.89	3.74	4.95	6.54	8.62	10.10	100yr	7.63	9.71	10.92	12.54	13.92	100yr
200yr	0.64	1.04	1.35	1.94	2.69	3.66	200yr	2.32	3.40	4.41	5.89	7.81	10.32	12.21	200yr	9.13	11.74	13.15	15.02	16.59	200yr
500yr	0.75	1.24	1.61	2.34	3.28	4.52	500yr	2.83	4.21	5.48	7.37	9.85	13.11	15.70	500yr	11.60	15.10	16.83	19.06	20.94	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	1.57	2.04	2.50	1yr	1.80	2.40	2.92	3.29	4.02	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.18	2yr	0.86	1.16	1.37	1.83	2.36	3.04	3.39	2yr	2.69	3.26	3.74	4.46	5.05	2yr
5yr	0.35	0.54	0.67	0.92	1.16	1.40	5yr	1.01	1.37	1.61	2.15	2.78	3.72	4.13	5yr	3.29	3.97	4.59	5.42	6.13	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.60	10yr	1.14	1.56	1.82	2.45	3.13	4.28	4.80	10yr	3.79	4.62	5.33	6.28	7.05	10yr
25yr	0.44	0.67	0.83	1.18	1.55	1.91	25yr	1.34	1.87	2.11	2.85	3.66	5.01	5.84	25yr	4.44	5.61	6.51	7.63	8.51	25yr
50yr	0.48	0.73	0.91	1.31	1.77	2.19	50yr	1.52	2.14	2.36	3.21	4.12	5.74	6.76	50yr	5.08	6.50	7.59	8.84	9.80	50yr
100yr	0.54	0.81	1.02	1.47	2.02	2.51	100yr	1.74	2.45	2.64	3.59	4.60	6.57	7.82	100yr	5.81	7.52	8.84	10.25	11.25	100yr
200yr	0.60	0.90	1.14	1.65	2.30	2.87	200yr	1.99	2.80	2.94	4.02	5.14	7.51	9.05	200yr	6.65	8.71	10.31	11.88	12.95	200yr
500yr	0.70	1.04	1.34	1.94	2.76	3.45	500yr	2.38	3.37	3.41	4.66	5.98	8.93	10.98	500yr	7.90	10.55	12.63	14.46	15.54	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	2.22	2.84	3.04	1yr	2.52	2.92	3.38	4.18	4.78	1yr
2yr	0.33	0.51	0.62	0.84	1.04	1.25	2yr	0.90	1.22	1.48	1.95	2.51	3.26	3.58	2yr	2.89	3.45	3.95	4.71	5.40	2yr
5yr	0.39	0.60	0.75	1.03	1.31	1.58	5yr	1.13	1.55	1.85	2.50	3.20	4.23	4.78	5yr	3.74	4.60	5.23	6.17	6.94	5yr
10yr	0.46	0.70	0.87	1.21	1.57	1.92	10yr	1.35	1.88	2.23	3.05	3.85	5.21	5.96	10yr	4.61	5.73	6.51	7.57	8.46	10yr
25yr	0.55	0.84	1.05	1.49	1.97	2.47	25yr	1.70	2.42	2.87	3.96	4.94	7.04	7.98	25yr	6.23	7.68	8.65	9.95	11.02	25yr
50yr	0.64	0.97	1.21	1.74	2.34	2.99	50yr	2.02	2.92	3.48	4.83	5.99	8.71	9.98	50yr	7.71	9.59	10.75	12.23	13.48	50yr
100yr	0.74	1.12	1.40	2.03	2.78	3.61	100yr	2.40	3.53	4.23	5.91	7.28	10.77	12.47	100yr	9.53	11.99	13.33	15.05	16.49	100yr
200yr	0.86	1.29	1.64	2.37	3.31	4.38	200yr	2.85	4.28	5.14	7.24	8.83	13.37	15.61	200yr	11.83	15.01	16.55	18.51	20.21	200yr
500yr	1.05	1.56	2.01	2.91	4.14	5.62	500yr	3.58	5.49	6.63	9.47	11.42	17.82	20.99	500yr	15.77	20.18	22.03	24.37	26.46	500yr



APPENDIX F

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



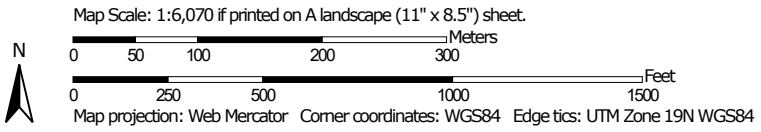
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APPENDIX G

Custom Soil Resource Report Soil Map




Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

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

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

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

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	53.3	32.7%
EaA	Elmwood fine sandy loam, 0 to 3 percent slopes	0.7	0.5%
GsB	Gloucester very stony fine sandy loam, 3 to 8 percent slopes	3.6	2.2%
GsD	Gloucester very stony fine sandy loam, 15 to 25 percent slopes	3.0	1.9%
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	2.3	1.4%
HdB	Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes	20.9	12.8%
HdC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	33.4	20.5%
LrA	Leicester-Ridgebury fine sandy loams, 0 to 3 percent slopes, very stony	3.5	2.2%
MI	Mixed alluvial land, wet	3.6	2.2%
ScA	Scantic silt loam, 0 to 3 percent slopes	12.6	7.7%
ScB	Scantic silt loam, 3 to 8 percent slopes	5.8	3.6%
SfC	Suffield silt loam, 8 to 15 percent slopes	8.5	5.2%
SwA	Swanton fine sandy loam, 0 to 3 percent slopes	1.8	1.1%
WfB	Windsor loamy fine sand, clay subsoil variant, 0 to 8 percent slopes	2.7	1.7%
WfC	Windsor loamy fine sand, clay subsoil variant, 8 to 15 percent slopes	7.4	4.5%
Totals for Area of Interest		163.2	100.0%

Map Unit Descriptions

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

SOIL REPORT

May 14, 2018

Mulhern
93 Bagdad Rd., Durham NH

Location: In Durham NH - 93 Bagdad Rd; Map 10 Lot 8-6: +/-14 acres
In Madbury NH – 121 Route 108; Map 9 Lot 32: +/-2 acres

The property is nearly bounded on the north by the Durham/Madbury town line and a small unnamed stream, on the east by backyards of properties on Route 108, on the south by a 500-foot long right-of-way to Bagdad Road, and on the east by backyards of properties on Ambler Way.

Landscape: A few knolls on the eastern half of the lot slope to the north and west to a wetland parallel to the westerly property line. A stream cuts across the NW corner in Madbury

Wetlands: A large wetland parallels the westerly property line and varies in width from about 25' in the NW corner just south of the stream to nearly 150' at its widest point. The wetland is classified as Palustrine Forested (PFO).

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

Soils: Soils consist of moderately well drained glacial till on a few knolls at the highest elevations but dominated by moderately well drained silty marine sediments over most of the remainder of the property. Poorly drained silty to clayey marine sediments occupy the wetlands with a narrow band of somewhat poorly drained soil around the perimeter. Several bedrock outcrops were observed and located, but they drop off quickly leaving few areas of soils with bedrock at depths less than 40"

Purpose: The high intensity soil map was prepared for a proposed residential subdivision with city water and on-site subsurface wastewater disposal.

Methodology: The soil map was prepared in accordance with the Standards for a High Intensity Soil Map, New Hampshire, December 2017 by the Society of Soil Scientists of Northern New England and standards established by the National Cooperative Soil Survey. The soil survey was prepared by Michael Mariano, NH Certified Soil Scientist #076.

A plan provided by Trittech Engineering, Dover NH at 1" = 100' with 2' contours was used as a base map. Existing monumentation, survey transects, and topographic features were used as control. Pits were dug by an excavator to classify soils at the series level. Pits were located by Trittech Engineering.

Soil boundaries were observed throughout their length and their placement corresponds to changes in soil properties or landform. Boundary line placement is accurate within 20 feet. The

Highland Soil Services
75 Prospect St., Somersworth NH 03878

692-4457

identification of soils is based on the connotative legend used for high intensity soil maps in NH (see attachment).

Map unit purity:

- Map units contain 75 percent or more of pedons that fit within the range of the taxon that provides the name for the map unit, or are in similar taxa.
- No one dissimilar soil is greater than the named taxa
- Individual dissimilar inclusions are less than 2,000 square feet in area. Dissimilar inclusions may total no more than 25% per map unit delineation in the aggregate, if not continuous.

Drainage Classes: (slope designation and high intensity classifier not included. Soil series name added for those familiar with that nomenclature)

Very Poorly Drained: There are no very poorly drained soils mapped on this property. Small areas less than 2,000 square feet that may be present are treated as inclusions in poorly drained mapping units.

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

553 These soils are found in the wetlands and adjacent to the stream in the NW corner (Scitico)

Somewhat Poorly Drained: Water is removed slowly enough to keep the soil wet for significant periods of time, but not the entire year. A seasonal high water table ranges from 7-15 inches in depth from October to May, but may recede to over 30 inches in depth during the summer. These soils may be classified as hydric soils in depressions. Subsurface wastewater disposal is not permitted in somewhat poorly drained soil in Durham.

453 These soils occupy narrow bands at the toe slopes just above poorly drained soils. (Boxford somewhat poorly drained)

Moderately Well Drained: Water is removed from the soil somewhat slowly. There is a seasonal high water table at 15-40 inches from November through May. The 353 soils contain a hardpan in the subsoil. There are few limitations that can't be overcome. In Durham, subsurface wastewater disposal is permitted only in areas where the depth to the hardpan or to the water table is greater than 24".

353 These are the dominant soils on the landscape and occupy most of the land between the poorly drained wetlands and the glacial till on the highest knolls. Mapping units include small areas with similar soils that are somewhat poorly drained. (Boxford)

321 These soils occupy the few knolls on the property. Subsurface wastewater disposal is permitted where the depth to the seasonal water table is greater than 24". (Sutton)

324 This is a soil shallow to bedrock. The only area large enough to be separated into a mapping unit is a flat table between outcrops at the center east of the property. (Hollis)

Well Drained: Water is removed from the soil readily but not rapidly and the soil does not have a water table at less than 40 inches of the surface throughout the year. Subsurface wastewater disposal is allowed, but individual test pits at each disposal area are required

221 This soil is limited to the top of the small knoll near the center of the property above elevation 66. (Charlton)

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

Soil Map Legend

See attachment.

This map product is within the technical standards of the National Cooperative Soil Survey and produced in accordance with the Society of Soil Scientists of Northern New England Publication *Standards for a High Intensity Soil Map, New Hampshire*. It was produced by a professional soil scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a map that accompanies this report.

KEY TO SOIL TYPES

This key is used in determining soil types that are utilized in high intensity soil surveys. The soil types are defined as soils having the same soil characteristics of drainage class, parent material, restrictive features, and slope; and are designated by a five-part symbol, the parts being A, B, C, D and E.

SYMBOL: A Drainage Class

- 1- Excessively drained
- 2- Well drained
- 3- Moderately well drained
- 4- Somewhat poorly drained
- 5- Poorly drained
- 6- Very poorly drained
- 7- Not determinable (to be used only with Symbol B-6)

SYMBOL: B Parent Material

- 1- Glaciofluvial Deposits (outwash/terraces of sand or sand and gravel).
- 2- Glacial Till Material (active ice)
Marine or Glaciolacustrine Deposits (3, 4 or 5)
- 3- Very fine sand and silt deposits (glacial lakes)
- 4- Loamy/sandy over silt/clay deposits
- 5- Silt and clay deposits (ocean waters)
- 6- Excavated, Regraded or Human Transported Material (see Connotative Soil Legend)
- 7- Alluvial Deposits (flood plains)
- 8- Organic Materials - Fresh Water Wetlands
- 9- Organic Materials - Tidal Wetlands

SYMBOL: C Restrictive Features (if more than one applies, list the most restrictive)

- 1- None
- 2- Bouldery, with more than 15% of the surface covered with boulders (larger than 24 inches in diameter).
- 3- Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface - such as "hard pan", densic material, platy structure or clayey texture with consistence of at least firm, i.e. more than 20 newtons. For other examples of soil characteristics that qualify for restrictive layer, see Soil Manual for Site Evaluations in New Hampshire, 2nd Ed., page 3-17, figure 3-14.
(continued)
- 4- Bedrock present in the soil profile 0-20 inches below the mineral soil

surface (Bedrock is either a lithic or paralithic contact - See *User Note: Soil Taxonomy*. Paralithic references bedrock that can be removed by an excavator, backhoe or by hand shovel with difficulty. Bedrock fractures are spaced more than 4 inches.

- 5- Subject to flooding.
- 6- Does not meet fill standards (see addendum - Standards for Human Transported Material) (only to be used with Symbol B-6).
- 7- Bedrock present in the soil profile 20 to 40 inches below the mineral soil surface. (Bedrock is either lithic or paralithic contact; see *Soil Taxonomy*).
- 8- Areas where depth to bedrock is so variable that a single soil type cannot be applied, will be mapped as a complex of soil types and will have a symbol C of 8.

SYMBOL: D Slope Class

- B- 0% to 8%
- C- 8% to 15%
- D- 15% to 25%
- E- 25% to 35%
- F- 35%+

SYMBOL: E -High Intensity Soil Map Identifier - H. (see addendum)

Boxford Silt Loam
3 to >25 Percent Slopes

High Intensity Map Symbol: 353, moderately well drained
453, somewhat poorly drained

Setting

Parent Material: Silty marine sediments
Landform: Convex plains, broad drainageways
Position on Landscape: Uplands at lower elevations or in drainageways
Slope Range: 3 to >25 percent

Composition and Soil Characteristics

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

Inclusions within Mapping Unit

Similar: Scitico silt loam – poorly drained
Contrasting: None

Use and Management

With improvements and engineering practices, this soil is fairly well suited to development. Slow permeability and a seasonal high water table are the limiting factors. Position on the landscape allows engineering practices to overcome the limitations. Subsurface wastewater disposal is permitted. See Test Pit 6 for a typical description.

Charlton Fine Sandy Loam
3-8 Percent Slopes

High Intensity Map Symbol: 221, well drained

Setting

Parent Material: Glacial till
Landform: Glaciated uplands
Position on Landscape: Ridgetops and upper side slopes
Slope Range: 3 to 8 percent

Composition and Soil Characteristics

Drainage Class: Well drained; seasonal high water table at >40 inches.
Hydrologic Group: A
Surface Runoff: Slow
Permeability: Rapid
Depth to Bedrock: > 40 inches
Hydric conditions: No

Inclusions within Mapping Unit

Similar: Sutton – moderately well drained
Contrasting: None

Use and Management

This soil is well suited to development. There are few limitations. See test pit 5 for a typical description

Hollis Fine Sandy Loam
0 - 8 Percent Slopes

High Intensity Map Symbol: 324, moderately well drained

Setting

Parent Material: Glacial till
Landform: Glaciated uplands
Position on Landscape: bedrock controlled ridges
Slope Range: 0 to 8 percent

Composition and Soil Characteristics

Drainage Class: Moderately well drained; usually no seasonal water table above bedrock
Hydrologic Group: D
Surface Runoff: Moderate
Permeability: Moderate
Depth to Bedrock: 0 to 20 inches
Hydric conditions: No

Inclusions within Mapping Unit

Similar: Tunbridge - > 20" to bedrock
Contrasting: Boxford – silty marine sediments
Sutton – Bedrock at >40"

Use and Management

This soil is poorly to most development. Depth to bedrock is the limiting factor. See test pit 17 for a typical description

Scitico Silt Loam
0-8 Percent Slopes

High Intensity Map Symbol: 553, poorly drained

Setting

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

Composition and Soil Characteristics

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

Inclusions within Mapping Unit

Similar: Boxford - somewhat poorly drained
Contrasting: None

Use and Management

This soil is poorly suited to development. Areas mapped as Scitico are classified as wetlands and permitting is required for any activity in those wetlands. Wetness is the limiting factor with a water table at or near the surface during most months of the year. Subsurface wastewater disposal is not permitted. See test pit 3 for a typical description

Sutton Fine Sandy Loam
3 - >25 Percent Slopes

High Intensity Map Symbol: 321, moderately well drained

Setting

Parent Material: Glacial till
Landform: Glaciated uplands
Position on Landscape: Ridgetops and upper side slopes
Slope Range: 3 to >25 percent

Composition and Soil Characteristics

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

Inclusions within Mapping Unit

Similar: Charlton – well drained
Contrasting: Boxford – silty marine sediments
Tunbridge – Bedrock at <40”

Use and Management

This soil is well suited to development. A seasonal high water table is present during seasonally wet periods. See test pit 12 for a typical description.

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 1

- 00 – 06” Dark brown (10YR4/3) sandy loam; weak fine granular structure; moist, friable.
06 – 13” Strong brown (7.5Y5/8) sandy loam; weak medium granular structure; moist, friable.
13 – 24” Yellowish brown (10YR5/6) loamy sand; moderate medium granular structure; moist, friable
24 – 48” Olive brown (2.5Y5/3) loamy sand; moderate medium granular structure; moist, friable.

Series: Charlton
Estimated seasonal high water table: None to 48”
Observed water: none
Restrictive layer: None
Soil Hydrologic Group: A

Test Pit 2

- 00 – 04” Dark brown (10YR4/3) sandy loam; weak fine granular structure; moist, friable.
04 – 16” Yellowish brown (10YR5/6) sandy loam; weak medium granular structure; moist, friable.
16 – 37” Light olive brown (2.5Y5/4) loamy sand; moderate medium granular structure; moist, friable
37 – 54” Olive brown (2.5Y5/3) loamy sand; few redox features in 10YR6/1 and 10YR5/6; moderate medium granular structure; moist, friable.

Series: Sutton
Estimated seasonal high water table 37”
Observed water: None
Restrictive layer: none
Soil Hydrologic Group: A

Test Pit Descriptions

Durham NH

Mulhern – Bagdad Rd

May 12, 2018

Test pits described on 02-15-18 & 04-09-18

Test Pit 3

- 00 – 06” Dark brownish gray (10YR4/2) very fine sandy loam; weak fine granular structure; moist, friable.
- 06 – 20” Light olive brown (2.5Y5/4) silt loam; many redox features in 10YR6/1 and 7.5YR5/8; massive structure; moist, friable.
- 20” + Olive gray (2.5Y5/2) silty clay loam; many redox features in 10YR6/1 and 10YR4/4; strong medium subangular blocky structure; moist, friable.

Series: Scitico

Estimated seasonal high water table: 0”

Observed water: 12”

Restrictive layer: 20”

Soil Hydrologic Group: D

Test Pit 4

- 00 – 06” Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
- 06 – 17” Light olive brown (2.5Y5/4) fine sandy loam; weak fine granular structure; moist, friable.
- 17 – 32” Light olive brown (2.5Y5/4) loamy sand; few fine redox features in 10YR6/1 and 7.5YR5/8; weak medium granular structure; moist, friable.
- 32 – 48” Yellowish brown (10YR5/6) sandy loam; many medium redox features in 10YR6/1 and 7.5YR5/8; moderate medium granular structure; moist, friable.

Series: Sutton

Estimated seasonal high water table: 17”

Observed water: none

Restrictive layer: none

Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 5

- 00 – 05” Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
05 – 15” Strong brown (7.5Y5/8) sandy loam; weak medium granular structure; moist, friable.
15 – 34” Yellowish brown (10YR5/6) sandy loam; moderate medium granular structure; moist, friable
34 – 50” Light olive brown (2.5Y5/6) loamy sand; moderate medium granular structure; moist, friable.

Series: Charlton
Estimated seasonal high water table: None to 50”
Observed water: none
Restrictive layer: None
Soil Hydrologic Group: A

Test Pit 6

- 00 – 05” Dark brown (10YR4/4) very fine sandy loam; weak fine granular structure; moist, friable.
05 – 11” Dark brown (10YR4/4) very fine sandy loam; massive structure; moist, friable.
11 – 18” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
18 – 25” Light olive brown (2.5Y5/4) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.
25 – 50” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 18”
Observed water: none
Restrictive layer: 18”
Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 7

- 00 – 06” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
- 06 – 21” Light olive brown (2.5Y5/6) silt loam; massive structure; moist, friable.
- 21 – 33” Light olive brown (2.5Y5/6) very fine sandy loam; few redox features in 10YR6/1 and 10YR5/6); massive structure; moist, friable.
- 33 – 48” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 21”
Observed water: none
Restrictive layer: 21”
Soil Hydrologic Group: D

Test Pit 8

- 00 – 05” Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
- 05 – 15” Yellowish brown (10YR5/6) fine sandy loam; weak fine granular structure; moist, friable.
- 15 – 26” Light olive brown (2.5Y5/4) fine sandy loam; moderate medium granular structure; moist, friable.
- 26 – 45” Light olive brown (2.5Y5/4) fine sandy loam; common fine and medium redox features in 10YR6/1 and 10YR5/6); moderate medium granular structure; moist, friable.
- @45” Bedrock

Series: Sutton
Estimated seasonal high water table: 26”
Observed water: none
Restrictive layer: none
Bedrock at 45”
Soil Hydrologic Group: C

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 9

- 00 – 05” Dark brownish gray (10YR4/2) silt loam; weak fine granular structure; wet, slightly sticky, slightly plastic
- 05 – 09” Olive gray (2.5Y5/2) silt loam; massive structure; wet, slightly sticky, slightly plastic
- 09 – 18” Light olive brown (2.5Y5/4) silt loam; many redox features in 10YR6/1 and 10YR4/4; strong medium subangular blocky structure; moist, friable.
- 18 – 36” Olive gray (2.5Y5/2) silty clay loam; strong medium subangular blocky structure; moist, very firm

Series: Scitico

Estimated seasonal high water table: 0”

Observed water: 14”

Restrictive layer: 18”

Soil Hydrologic Group: D

Test Pit 10

- 00 – 04” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
- 04 – 08” Strong brown (7.5YR5/8) silt loam; massive structure; moist, friable.
- 08 – 17” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
- 17 – 24” Light olive brown (2.5Y5/4) silt loam; common fine and medium redox features in 10YR6/1 and 10YR5/6; massive structure; moist, friable.
- 24 – 42” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.

Series: Boxford

Estimated seasonal high water table: 17”

Observed water: none

Restrictive layer: 24”

Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 11

- 00 – 06” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
- 06 – 11” Yellowish brown (10YR5/6) silt loam; massive structure; moist, friable.
- 11 – 20” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
- 20 – 48” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 20”
Observed water: none
Restrictive layer: 20”
Soil Hydrologic Group: D

Test Pit 12

- 00 – 06” Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
- 06 – 15” Strong brown (7.5YR5/6) fine sandy loam; weak fine granular structure; moist, friable.
- 15 – 32” Light olive brown (2.5Y5/4) sandy loam; moderate medium granular structure; moist, friable.
- 32 – 60” Light olive brown (2.5Y5/4) loamy sand; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); moderate medium granular structure; moist, friable.
- @50” Bedrock

Series: Sutton
Estimated seasonal high water table: 32”
Observed water: none
Restrictive layer: none
Bedrock at 50”
Soil Hydrologic Group: B

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 13

00 – 06” Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
06 – 12” Strong brown (7.5YR5/8) fine sandy loam; weak fine granular structure; moist, friable.
12 – 30” Light olive brown (2.5Y5/4) sandy loam; moderate medium granular structure; moist, friable.
30 – 38” Light olive brown (2.5Y5/4) loamy sand; moderate medium granular structure; moist, friable.
@38” Refusal - boulder

Series: Sutton (depth not reached for Charlton classification)
Estimated seasonal high water table: none
Observed water: none
Restrictive layer: none
Refusla at 38”
Soil Hydrologic Group: C

Test Pit 14

00 – 04” Dark brown (10YR4/4) fine sandy loam; weak fine granular structure; moist, friable.
04 – 12” Yellowish brown (10YR5/6) fine sandy loam; weak fine granular structure; moist, friable.
12 – 18” Light olive brown (2.5Y5/4) very fine sandy loam; massive structure; moist, friable.
18 – 42” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 18”
Observed water: none
Restrictive layer: 18”
Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 15

- 00 – 06” Dark brown (10YR4/4) fine sandy loam; weak fine granular structure; moist, friable.
06 – 16” Yellowish brown (10YR5/6) silt loam; weak fine granular structure; moist, friable.
16 – 21” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
21 – 42” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8); strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 18”
Observed water: none
Restrictive layer: 18”
Soil Hydrologic Group: D

Test Pit 16

- 00 – 09” Dark brown (10YR4/3) sandy loam; weak fine granular structure; moist, friable.
09 – 15” Yellowish brown (10YR5/6) fine sandy loam; weak fine granular structure; moist, friable.
15 – 36” Light olive brown (2.5Y5/4) sandy loam; moderate medium granular structure; moist, friable.
36 – 42” Light olive brown (2.5Y5/4) sandy loam; common fine and medium redox features in 10YR6/1 and 10YR5/6); moderate medium granular structure; moist, friable.
@42” Refusal – small machine; assumed boulders

Series: Sutton
Estimated seasonal high water table: 36”
Observed water: none
Restrictive layer: none
Refusal at 42”
Soil Hydrologic Group: C

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 17

00 – 06” Dark Brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable

At 6” Bedrock

Series: Hollis
Estimated seasonal high water table: none
Observed water: none
Restrictive layer: none
Bedrock at 6”
Soil Hydrologic Group: D

Test Pit 18

- 00 – 03” Dark brown (10YR4/4) very fine sandy loam; weak fine granular structure; moist, friable.
- 03 – 12” Light olive brown (2.5Y5/6) very fine sandy loam; massive structure; moist, friable.
- 12 – 18” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
- 18 – 32” Light olive brown (2.5Y5/4) silty clay loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8; strong medium subangular blocky structure; moist, firm.
- 32 – 50” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 7.5YR5/8; strong medium subangular blocky structure; moist, very firm.

Series: Boxford
Estimated seasonal high water table: 18”
Observed water: none
Restrictive layer: 18”
Soil Hydrologic Group: D

Test Pit 19

There is no test pit 19; number skipped in field

Test Pit Descriptions

Durham NH

Mulhern – Bagdad Rd

May 12, 2018

Test pits described on 02-15-18 & 04-09-18

Test Pit 20

- 00 – 06” Dark brown (10YR4/4) very fine sandy loam; weak fine granular structure; moist, friable.
- 06 – 11” Light olive brown (2.5Y5/6) very fine sandy loam; massive structure; moist, friable.
- 11 – 26” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
- 26 – 35” Light olive brown (2.5Y5/4) silt loam; few fine redox features in 10YR6/1; moderate medium subangular blocky structure; moist, friable.
- 35 – 54” Light olive brown (2.5Y5/6) silty clay loam; common fine and medium redox features in 7.5YR5/8; strong medium subangular blocky structure; moist, very firm.

Series: Boxford

Estimated seasonal high water table: 26”

Observed water: none

Restrictive layer: 35”

Soil Hydrologic Group: C

Test Pit 21

- 00 – 04” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
- 04 – 16” Olive brown (2.5Y5/3) silt loam; massive structure; moist, friable.
- 16 – 22” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
- 22 – 32” Light olive brown (2.5Y5/4) silt loam; few fine redox features in 10YR6/1 and 7.5YR5/8; moderate medium subangular blocky structure; moist, friable.
- 32 – 50” Light olive brown (2.5Y5/6) silty clay loam; common fine and medium redox features in 7.5YR5/8; strong medium subangular blocky structure; moist, very firm.

Series: Boxford

Estimated seasonal high water table: 22”

Observed water: none

Restrictive layer: 32”

Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 22

- 00 – 07” Dark brown (10YR4/3) sandy loam; weak fine granular structure; moist, friable.
07 – 19” Yellowish brown (10YR5/6) fine sandy loam; weak fine granular structure; moist, friable.
19 – 24” Yellowish brown (10YR5/6) sandy loam; moderate medium granular structure; moist, friable.
24 – 32” Light olive brown (2.5Y5/4) sandy loam; moderate medium granular structure; moist, friable.
32 – 50” Light olive brown (2.5Y5/4) loamy sand; strong medium platy structure; moist, firm.

Series: Scituate
Estimated seasonal high water table: 32”
Observed water: none
Restrictive layer: 32”
Soil Hydrologic Group: C

Test Pit 23

- 00 – 06” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
06 – 12” Yellowish brown (10YR5/6) silt loam; massive structure; moist, friable.
12 – 17” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
17 – 42” Olive gray (2.5Y5/2) silty clay loam; common fine and medium redox features in 7.5YR5/8; strong medium subangular blocky structure; moist, very firm.

Series: Boxford
Estimated seasonal high water table: 17”
Observed water: none
Restrictive layer: 17”
Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 24

- 00 – 03” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
- 03 – 17” Yellowish brown (10YR5/6) silt loam; massive structure; moist, friable.
- 17 – 30” Light olive brown (2.5Y5/4) silt loam; few redox features in 10YR6/1; strong medium subangular blocky structure; moist, very firm
- 30 – 42” Light olive brown (2.5Y5/4) silt loam; many fine and medium redox features in 7.5YR5/8 and 10YR6/1; strong medium subangular blocky structure; moist, very firm.

Series: Boxford
Estimated seasonal high water table: 17”
Observed water: none
Restrictive layer: 17”
Soil Hydrologic Group: D

Test Pit 25

- 00 – 05” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
- 05 – 20” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
- 20 – 42” Olive gray (2.5Y5/2) silty clay loam; few fine and medium redox depletions in 10YR6/1; strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 20”
Observed water: none
Restrictive layer: 20”
Soil Hydrologic Group: D

Test Pit Descriptions

Durham NH
Mulhern – Bagdad Rd
May 12, 2018
Test pits described on 02-15-18 & 04-09-18

Test Pit 26

- 00 – 05” Dark brown (10YR4/4) silt loam; weak fine granular structure; moist, friable.
02 – 17” Light olive brown (2.5Y5/4) silt loam; massive structure; moist, friable.
17 – 42” Olive gray (2.5Y5/2) silty clay loam; few fine and medium redox depletions in 10YR6/1; strong medium subangular blocky structure; moist, firm.

Series: Boxford
Estimated seasonal high water table: 20”
Observed water: none
Restrictive layer: 20”
Soil Hydrologic Group: D

Test Pit 27

- 00 – 07” Dark brown (10YR4/3) fine sandy loam; weak fine granular structure; moist, friable.
07 – 15” Yellowish brown (10YR5/6) fine sandy loam; weak medium granular structure; moist, friable.
15 – 25” Light olive brown (2.5Y5/4) fine sandy loam; few redox features in 10YR6/1; moderate medium granular structure; moist, friable
25 – 32” Light olive brown (2.5Y5/4) fine sandy loam; few fine and medium redox features in 7.5YR5/8 and 10YR6/1; moderate medium granular structure; moist, friable.
32 – 48” Light olive brown (2.5Y5/4) silt loam; common fine and medium redox features in 10YR6/1 and 7.5YR5/8; strong medium subangular blocky structure; moist, firm

Series: Boxford
Estimated seasonal high water table: 25”
Observed water: none
Restrictive layer: 32”
Soil Hydrologic Group: D