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# STORMWATER REPORT AND CALCULATIONS

FOR

## A Proposed Common Driveway & Development of Lots 2, 3 & 4

Century Mill Road  
Bolton, Massachusetts 01740

Assessors Map 3D Parcel 32



September 20, 2018  
Rev. 4/23/21

**Prepared for:**  
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Northborough, Massachusetts 01532

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## I. Introduction

Lots 1-4 Century Mill Road is a proposed 4-lot common driveway with Lot 1 being the site of an existing single-family home. The total tract is 13-acres of level to rolling wooded upland and wetlands on Century Mill Road and Hudson Road with approximately 2.5 acres of the tract currently under active residential use on Lot 1. The remaining 10 acres are upland and wetland woodland with the centerline of Danforth Brook and an abandoned railroad bed along the western boundary, Century Mill Road along the southern boundary, an existing business (David Monteiro Contracting at 1 Century Mill Road) and dwelling (#185 Hudson Road) and frontage on Hudson Road along the eastern boundary and a large mostly undeveloped tract owned by the Boy Scouts of America. The site is proposed to be divided into four (4) lots, a backland lot to contain the existing dwelling on Lot 1, and three (3) new dwelling lots. The existing driveway location and alignment are proposed to be utilized and improved to meet the Town of Bolton Common Driveway standards to serve the lots and to mitigate drainage impacts.

Soils within the study area of the driveway are identified by the U.S. Natural Resource Conservation Service (NRCS) as Ridgebury Fine Sandy Loam, which is characterized by nearly level to gently sloping poorly drained soils in depressions and shallow drainageways of uplands that formed in compact glacial till. Major limitations of this soil group are related to wetness, slow permeability and stoniness. On site deep observation tests were performed in October of 2017 and showed estimated seasonal high groundwater in the vicinity of the driveway to be at approximately 60" in closest proximity to the driveway (DTH 1017-1 on Lot 3).

Topography is level to very gentle in the area of the driveway. Surface drainage is ultimately tributary to Danforth Brook; however, a portion of the site drains east and thence to a culvert under Century Mill Road to a Danforth Brook tributary to the east of the driveway entrance, and a portion of the site flows west Danforth Brook directly and thence under Century Mill Road.

The drainage study area evaluates the impacts of improving the existing driveway to a proposed common driveway and the impacts of tree clearing, grading and construction related to development of Lots 2, 3 & 4. Development of these lots and the change in surface cover from a compacted gravel driveway and woodland to less pervious surface covers of pavement and grass shoulders would increase the rate and volume of runoff from the site if unmitigated.

Increase in runoff is proposed to be mitigated by utilizing a Low Impact Development (LID) design Best Management Practices (BMP's) in the form of limiting site disturbance to the extent necessary for development, utilizing a porous asphalt paving for the drainage system which is comprised of a porous asphalt wearing surface over an engineered crushed stone bed reservoir beneath for attenuation and infiltration of driveway runoff. In addition, roof drywells are proposed for infiltration of roof runoff of Lots 2 and 4. Increases in the rate and volume of runoff will be managed with the selected BMP's. The hydrologic analysis was performed on the pre-development and post-development study areas for the 2-yr, 10-yr, 25-yr and 100-yr design storms.

## II. Methodology & References

### *Methodology:*

SCS TR-55 & SCS TR-20 utilizing HydroCAD (v 10.0) software.

### *References:*

A Guide to Hydrologic Analysis Using SCS Methods, Richard McCuen, copyright 1982, Prentice Hall, Inc.

Natural Resources Conservation Service (NRCS), Web Soil Survey

USGS Quadrangle Map, Hudson, Massachusetts, 1987

Rawls Infiltration Rates, Rawls Brakensiek and Saxton, 1982

### III. Results

The drainage study area was divided into three areas for the purpose of evaluating impacts of drainage to (1) the isolated depression at the rear of Lot 2; (2) wetland area east of Lots 2 & 4; and (3) the wetland area/pond west of the common. Under pre-development (existing) conditions these areas are modeled in HydroCAD software as:

Subcatchment 1S – Draining northerly to the rear of Lot 2

Subcatchment 2S – Draining to wetland area to the east of Lots 3 & 4

Subcatchment 3S – Draining to wetland/pond area to the west of the common driveway

Under post development conditions, the entirety of the driveway area including paving and 2-ft grass shoulders drain to the proposed subsurface stone reservoir beneath the porous asphalt wearing surface. The stone bed reservoir of the common driveway has been designed to attenuate a 100-yr design storm with no off-site discharge from that area for any of the design storms analyzed. Additionally, the roof drywell systems for Lot 2 and Lot 4 serve to decrease overall runoff rates and volumes from development of the lots further.

Comparison of the off-site rates and volumes of runoff under pre-development conditions to the off-site runoff to the same areas under post-development conditions illustrates the effectiveness of the proposed stormwater controls. The results in Table 1 show that runoff rates and volumes are effectively maintained or reduced by implementation of the proposed drainage improvements.

**TABLE 1****Pre-development & Post-development Runoff Rates and Volumes**

<b>2-YR DESIGN STORM</b>	<b>PRE-DEVELOPMENT</b>		<b>POST-DEVELOPMENT</b>	
<b>Design Area</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>
Lot 2 North (1S)/(50R)	0.00	94	0	23
To East Wetlands (2S)/(51R)	1.28	4,229	0.76	2638
To West Wetlands (3S)/(52R)	0.19	596	0	0

<b>10-YR DESIGN STORM</b>	<b>PRE-DEVELOPMENT</b>		<b>POST-DEVELOPMENT</b>	
<b>Design Area</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>
Lot 2 North (1S)/(50R)	0.13	1,395	0.09	796
To East Wetlands (2S)/(51R)	3.00	9,489	2.21	6,690
To West Wetlands (3S)/(52R)	0.34	1,098	0	0

<b>25-YR DESIGN STORM</b>	<b>PRE-DEVELOPMENT</b>		<b>POST-DEVELOPMENT</b>	
<b>Design Area</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>
Lot 2 North (1S)/(50R)	0.39	2,821	0.29	1,740
To East Wetlands (2S)/(51R)	4.17	13,146	3.25	9,684
To West Wetlands (3S)/(52R)	0.44	1,421	0	0

<b>100-YR DESIGN STORM</b>	<b>PRE-DEVELOPMENT</b>		<b>POST-DEVELOPMENT</b>	
<b>Design Area</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>	<b>Q (cfs)</b>	<b>V (cu-ft)</b>
Lot 2 North (1S)/(50R)	0.70	4,215	0.61	2,763
To East Wetlands (2S)/(51R)	5.12	16,171	4.13	12,230
To West Wetlands (3S)/(52R)	0.51	1,681	0	0

#### **IV. Conclusions**

The proposed porous asphalt driveway and roof drainage mitigation proposed adequately mitigate increases in both the rate and volume of runoff from proposed development to all potentially affected down gradient wetland resource areas and other off-site areas. Runoff rates and volumes to off-site areas will be maintained or marginally reduced for all design storms analyzed through implementation of drainage improvements following development of this common driveway and the lots served. All storm water controls have been sized to properly manage storm events up to and including the 100-year, 24-hour design storm. These results are achieved through implementation of proposed Low Impact Development (LID) design. The proposed common driveway has been designed in compliance with the Massachusetts Stormwater Management Policy and Standards.

## APPENDIX A

### DEP STORMWATER MANAGEMENT STANDARDS COMPLIANCE

**Standard 1:** No new untreated stormwater discharges; no erosion or scour to wetland resource areas proposed by construction activities.

**Standard 2:** Peak rate attention. Stormwater calculations performed for the, 2-yr, 10-yr, and 100-yr 24-hr design storms; no increase in peak rate runoff rates or volumes; no increase in off-site flooding during the 100-yr storm.

**Standard 3:** Recharge. Required recharge volume (HSG C) = Target Depth Factor, F x Total Post Development Impervious Area =  $0.25''/12''/\text{ft} \times 6,794 \text{ s.f.} = 142 \text{ cubic feet}$ . Storage volume of crushed stone reservoir = 2,853 cubic feet; standard met.

**Standard 4:** Water Quality. Required water quality volume is 1'' (critical areas – cold water fishery) of runoff over tributary area:

To Driveway Reservoir:  $8,660 \text{ s.f.} \times 1.0''/12''/\text{ft} = 722 \text{ cubic feet}$

Storage capacity of stone reservoir underlying porous asphalt = 2,853 cubic feet >> than 722 cubic feet min. req'd.

80% or greater TSS removal provided by porous asphalt BMP.

**Standard 5:** Land Uses With Higher Potential Pollutant Loads. (Not Applicable)

**Standard 6:** Critical Areas. Standard met. 1'' of runoff utilized for required recharge in Standard 3. 80% TSS Removal provided in selected BMP. Porous asphalt is a recommended BMP in critical areas.

**Standard 7:** Redevelopment and Other Projects Subject to the Standards to the maximum extent practicable. Not applicable, project complies with the Standards.

**Standard 8:** Construction Period Pollution Prevention and Erosion and Sedimentation Control. Provided on project plans.

**Standard 9:** Stormwater Operation & Maintenance Plan. Provided; included in this report.

**Standard 10:** Prohibition of Illicit Discharges:



## **Illicit Discharge Compliance Statement**

(1) Prohibition of Illicit Discharges.

(a) Prohibition. No person shall throw, drain, discharge, cause to be discharged, or allow others under their control to discharge into the storm sewer system or watercourse any materials other than stormwater, including but not limited to pollutants or waters containing pollutants.

(b) Exemptions. The following non-stormwater discharges are excluded from (a) above:

(1) waterline flushing or other potable water sources;

(2) landscape irrigation or lawn watering;

(3) diverted, natural riparian habitat and/or wetland flows;

(4) rising ground water, ground water infiltration to storm drains, and/or uncontaminated pumped groundwater;

(5) foundation or footing drains (not including active ground water dewatering systems) and crawl space pumps;

(6) air conditioning condensation;

(7) springs;

(8) other water sources determined by the Massachusetts Department of Environmental Protection, in writing, as not containing pollutants that cause or contribute to waterway degradation, including but not limited to a violation of applicable water quality standards and/or degradation of the biotic integrity of surface water bodies and their floodplains.

## POROUS PAVEMENT OPERATION AND MAINTENANCE PROTOCOL

### General Maintenance

The primary goal of porous pavement maintenance is to prevent the pavement surface and/or the underlying infiltration bed from being clogged with fine sediments. To keep the system clean throughout the year and prolong its lifespan, the pavement surface should be vacuumed biannually with a commercial cleaning unit. All inlet structures within or draining to the infiltration beds should also be cleaned out on a biannual basis.



Figure 1: Routine and adequate maintenance has allowed the porous asphalt parking lot at the Morris Arboretum to still be effective 20 years after installation.

Planted areas adjacent to porous pavement should be well maintained to prevent soil washout onto the pavement. If any washout does occur it should be cleaned off the pavement immediately to prevent further clogging of the pores. Furthermore, if any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once. Planted areas should be inspected on a semi-annual basis. All trash and other litter that is observed during these inspections should be removed.

Superficial dirt does not necessarily clog the pavement voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, trucks or other heavy vehicles should be prevented from tracking or spilling dirt onto the pavement. Furthermore, all construction or hazardous materials carriers should be prohibited from entering a porous pavement lot.

Descriptive signage is recommended to maintain institutional memory of porous pavement



Figure 2: Example of soil wash-on/dumping from unstabilized landscaping.

### **Vacuuming**

FORESITE recommends vacuuming porous asphalt and concrete pavement with a vacuum sweeper on a biannual basis. Acceptable types of vacuum sweepers include the Elgin Whirlwind and the Allianz Model 650. Though much less effective than “pure” vacuum sweepers, regenerative air sweepers, such as the Tymco Model 210, Schwarze 348, Victory, and others, are sometimes used. These units contain a blower system that generates a high velocity air column, which forces the air against the pavement at an angle, creating a ‘peeling’ or ‘knifing’ effect. The high volume air blast loosens the debris from the pavement surface, then transports it across the width of the sweeping head and lifts it into the containment hopper via a suction tube. Thus, sediment and debris are loosened from the pavement and sucked into the unit. (Note: simple broom sweepers are not recommended for porous pavement maintenance.)

If the pavement surface has become significantly clogged such that routine vacuum sweeping does not restore permeability, then a more intensive level of treatment may be required. Recent studies have revealed the usefulness of washing porous pavements with clean, low pressure water, followed by immediate vacuuming. Combinations of washing and vacuuming techniques have proved effective in cleaning both organic clogging as well as sandy clogging. Research in Florida found that a “power head cone nozzle” that “concentrated the water in a narrowly rotating cone” worked best. (Note: if the pressure of

the washing nozzle is too great, contaminants may be driven further into the porous surface.) Maintenance crews are encouraged to determine the most effective strategy of cleaning their porous installations.



Figure 3: Photo of Elgin Whirlwind Vacuum Air Sweeper, example of effective vacuuming device

For smaller installations, such as sidewalks, plazas, or small parking lots, “walk behind” vacuum units may prove most effective. Though these units can be loud and somewhat messy to the operator due to the lack of dust suppression, they are also relatively easy to operate and inexpensive. Examples of acceptable “walk behind” units include the Billy Goat models, the 5700 industrial-strength Scrubber by Tennant, and the sidewalk class vacuum sweepers made by Nilfisk, Advance and Hako. If “walk behind” units are used, it is recommended that the scrub pressure be kept relatively low. The dirtiest areas may need to be power washed after scrubbing to get out the dirt that has been deeply ground in.

### **Winter Maintenance**

Winter maintenance for a porous parking lot may be necessary, but is usually less intensive than that required for a standard asphalt lot. By its very nature, a porous pavement system with subsurface aggregate bed has superior snow melting characteristics than does standard pavement. Therefore, ice and light snow accumulation are generally not as problematic. However, snow will accumulate during heavier storms. Abrasives such as sand or cinders should not be applied on or adjacent to the porous pavement. Snow plowing is necessary for significant snow accumulation, but should be done carefully (i.e. by setting the blade slightly higher than usual, about an inch). Standard road salt is acceptable for use as a deicer on porous pavement, although a non-toxic, organic deicer, applied either as a blended, magnesium chloride-based liquid product or as pretreated rock salt, is

recommended. Acceptable liquid deicers include Magic-O, Ice B' Gone, Ice Ban, and Geomelt, among others. Magic Salt is an example of an acceptable pretreated salt product. Other acceptable deicer alternatives to standard sodium chloride include calcium chloride, magnesium chloride, potassium chloride, urea, and calcium magnesium acetate. Follow supplier recommendations when applying deicers to pavement.



Figures 4 and 5: Neither the porous asphalt parking lot at the University of Rhode Island nor the one at the Ford Rouge Plant in Dearborn, Michigan have experienced significant snow accumulations on the pavement after multiple harsh winters.

## **Repairs**

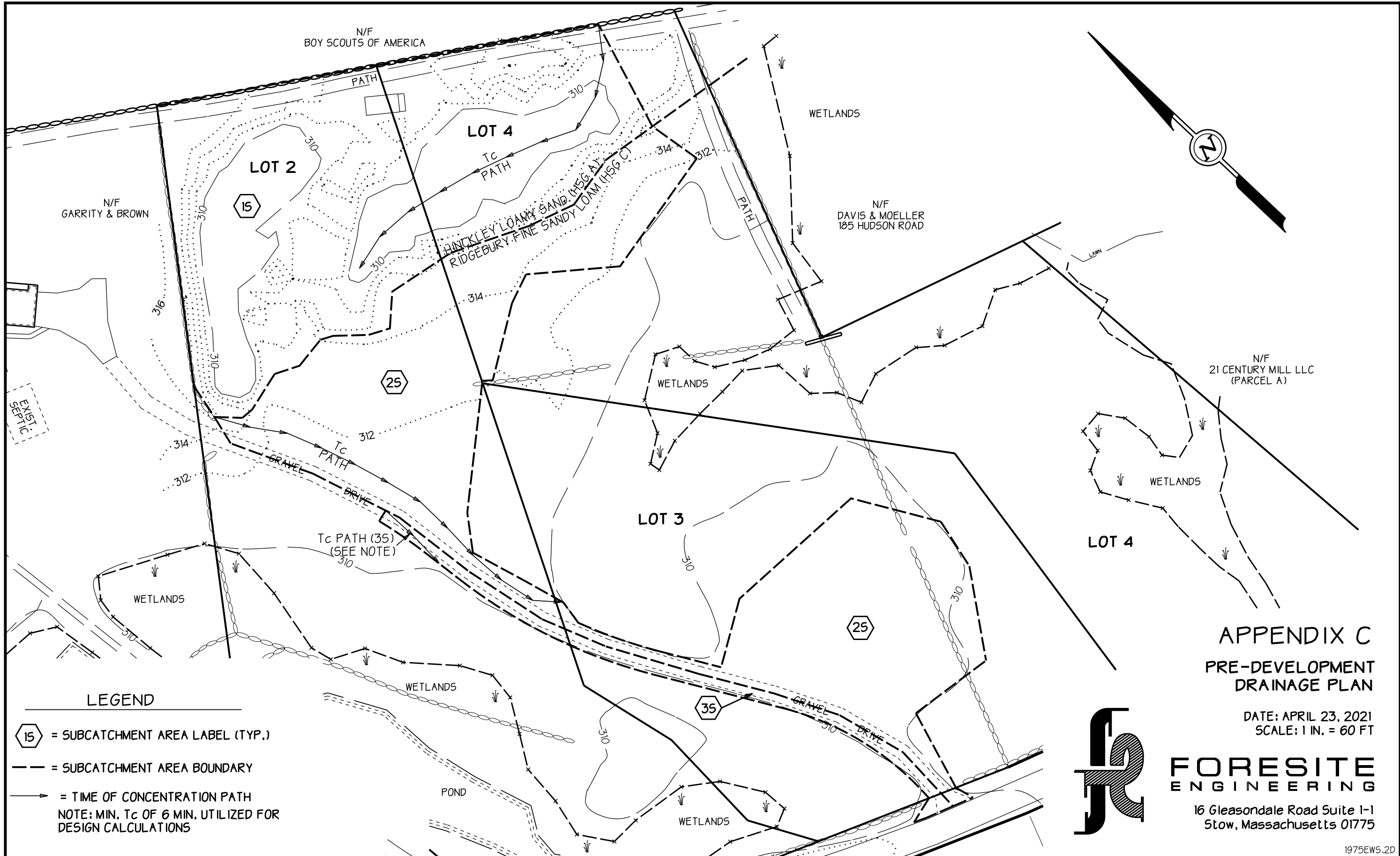
Potholes in the porous pavement are extremely unlikely, though settling might occur if a soft spot in the subgrade is not removed during construction. For damaged areas of less than 50 square feet, a declivity could be patched by any means suitable with standard pavement, with the loss of porosity of that area being insignificant. The declivity can also be filled with porous mix. If an area greater than 50 SF is in need of repair, approval of patch type must be sought from either the engineer or owner. Under no circumstance is the pavement surface to ever be seal coated. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.

With minimal maintenance, porous bituminous asphalt can function effectively for well over 20 years. However, in the event that maintenance of the porous pavement is neglected and it becomes clogged over time, the Owner shall vacuum the lot until the original permeability is restored. (If the original permeability of the lot cannot be restored, the pavement should be removed and replaced with a new porous mix.) Recent research has shown that one of the most effective ways of restoring porous pavement is applying a pressurized dose of a non-toxic detergent cleaning solution, allowing adequate soak time, and then vacuuming with a high performance unit (Elgin Whirlwind and the Allianz Model 650). Once again, it is important to note that high pressure washing may drive contaminants further into the porous surface and even into the underlying aggregate. It is therefore recommended that, prior to vacuum sweeping, a low performance pressure washer is used to get the solution to break the surface tension and reach into the pores.






Figure 6: Standard bituminous patch in porous asphalt parking lot. This lot was constructed with an unmodified porous mix (i.e. no polymer modification) and had rutted in the center of the aisle due to construction traffic.

- **Summary**
  - **Prevent Clogging of Pavement Surface with Sediment**
    - Vacuum pavement twice per year
    - Maintain planted areas adjacent to pavement
      - Immediately clean any soil deposited on pavement
    - Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface
    - Clean inlets draining to the subsurface bed twice per year
  - **Snow/Ice Removal**
    - Porous pavement systems generally perform better and require less treatment than standard pavements
    - **Do not apply abrasives such as sand or cinders on or adjacent to porous pavement**
    - Snow plowing is fine but should be done carefully (i.e. set the blade slightly higher than usual)
    - Salt application is acceptable, although more environmentally-benign deicers are preferable
  - **Repairs**
    - **Surface should never be seal-coated**
    - Inspect for pavement rutting/raveling on an annual basis (some minor ruts may occur in the porous pavement from stationary wheel rotation)
    - Damaged areas less than 50 square feet can be patched with porous or standard asphalt
    - Larger areas should be patched with an approved porous asphalt

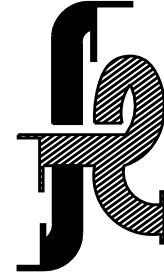


**LEGEND**

-  = SUBCATCHMENT AREA LABEL (TYP.)
-  = SUBCATCHMENT AREA BOUNDARY
-  = TIME OF CONCENTRATION PATH  
NOTE: MIN. Tc OF 6 MIN. UTILIZED FOR DESIGN CALCULATIONS

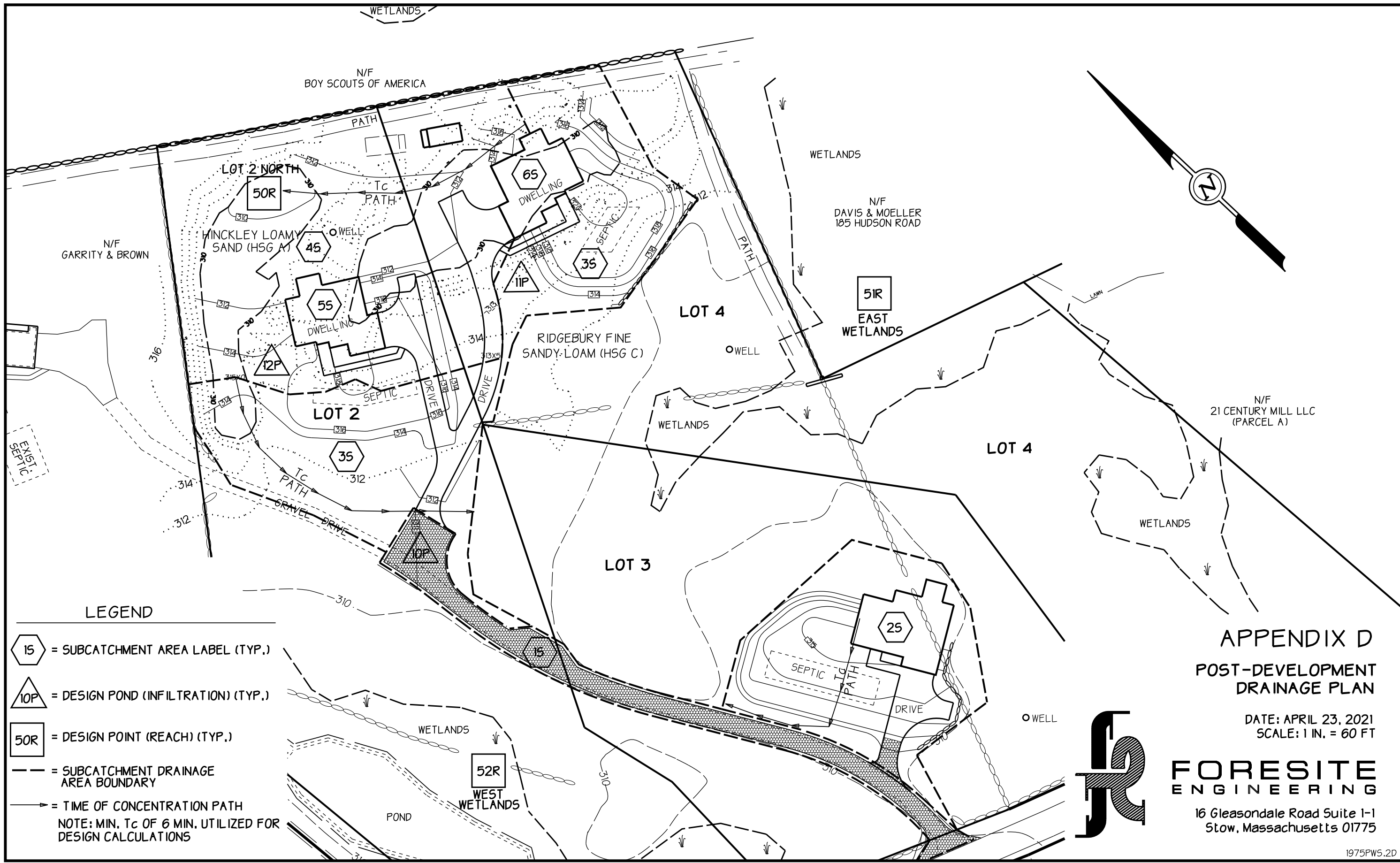
**APPENDIX C  
PRE-DEVELOPMENT  
DRAINAGE PLAN**

DATE: APRIL 23, 2021  
SCALE: 1 IN. = 60 FT








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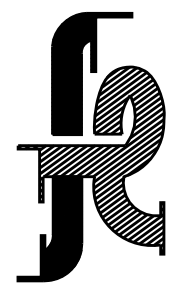


**LEGEND**

-  = SUBCATCHMENT AREA LABEL (TYP.)
-  = DESIGN POND (INFILTRATION) (TYP.)
-  = DESIGN POINT (REACH) (TYP.)
-  = SUBCATCHMENT DRAINAGE AREA BOUNDARY
-  = TIME OF CONCENTRATION PATH  
NOTE: MIN. T<sub>c</sub> OF 6 MIN. UTILIZED FOR DESIGN CALCULATIONS

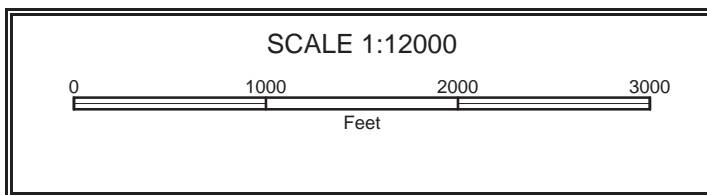
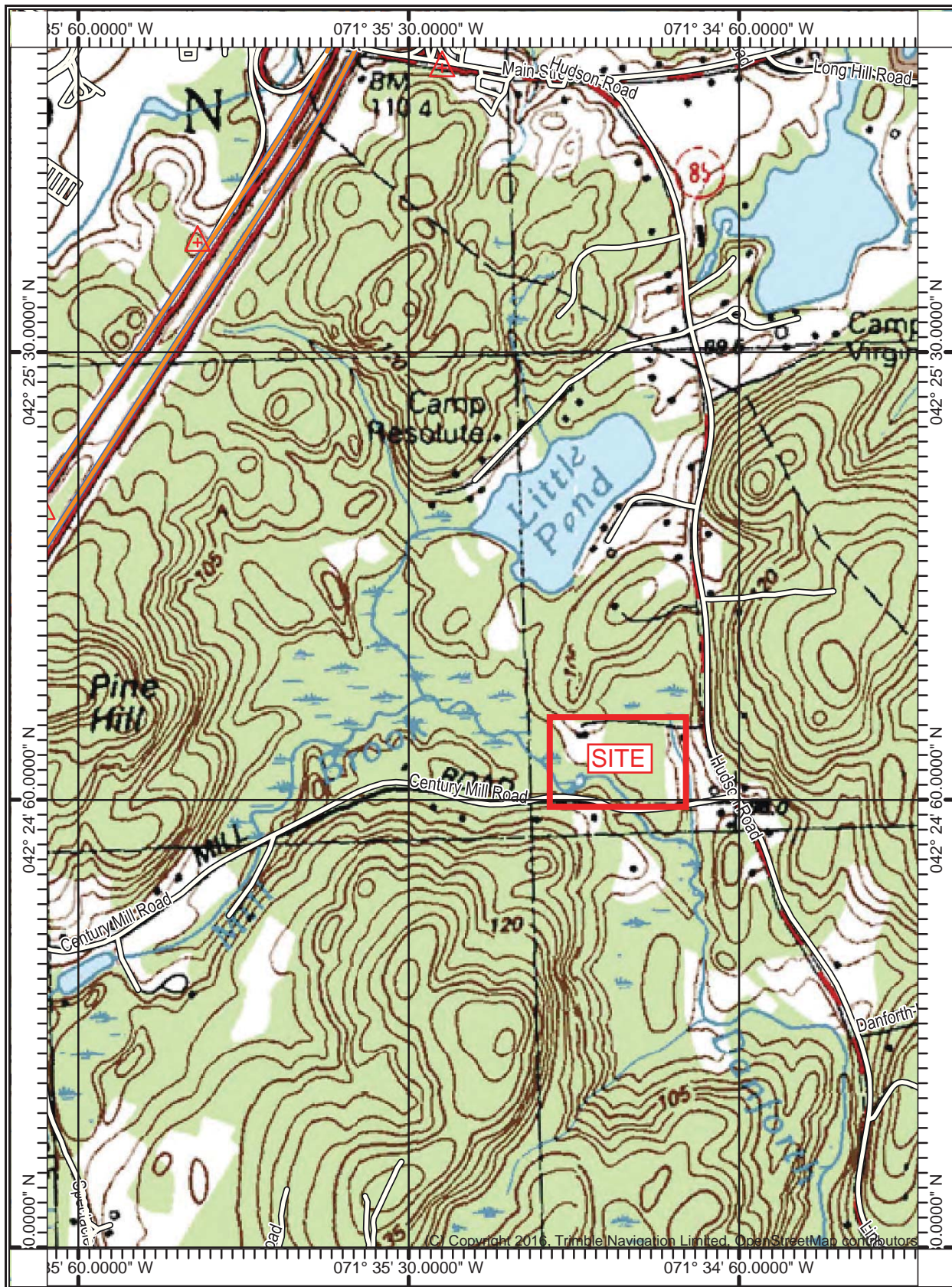
**APPENDIX D  
POST-DEVELOPMENT  
DRAINAGE PLAN**

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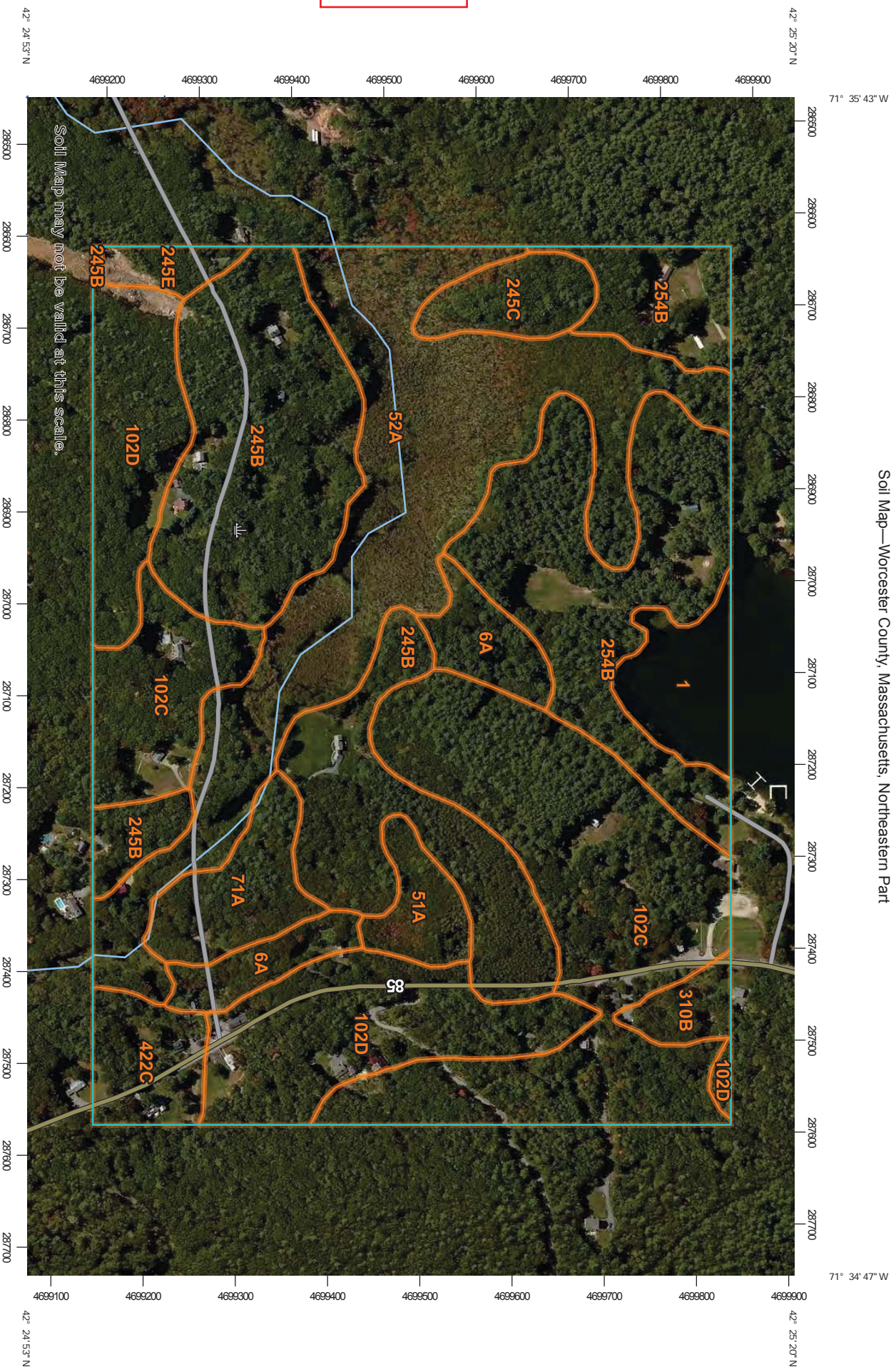
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APPENDIX E



APPENDIX F

Soil Map—Worcester County, Massachusetts, Northeastern Part



Soil Map may not be valid at this scale.

71° 35' 43" W

N

Map Scale: 1:5,860 if printed on A landscape (11" x 8.5") sheet.

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

71° 34' 47" W

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	4.4	2.7%
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	5.5	3.3%
51A	Swansea muck, 0 to 1 percent slopes	2.8	1.7%
52A	Freetown muck, 0 to 1 percent slopes	30.7	18.7%
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	4.9	3.0%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	33.1	20.1%
102D	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	19.5	11.9%
245B	Hinckley loamy sand, 3 to 8 percent slopes	30.4	18.5%
245C	Hinckley loamy sand, 8 to 15 percent slopes	3.4	2.1%
245E	Hinckley loamy sand, 25 to 35 percent slopes	1.6	1.0%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	21.9	13.3%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	1.8	1.1%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	4.1	2.5%
<b>Totals for Area of Interest</b>		<b>164.0</b>	<b>100.0%</b>

Table D.13.1 Hydrologic Soil Properties Classified by Soil Texture\*

Texture Class	Effective Water Capacity ( $C_w$ ) (inch per inch)	Minimum Infiltration Rate ( $f$ ) (inches per hour)	Hydrologic Soil Grouping
Sand	0.35	8.27	A
Loamy Sand	0.31	2.41	A
Sandy Loam	0.25	1.02	A
Loam	0.19	0.52	B
Silt Loam	0.17	0.27	B
Sandy Clay Loam	0.14	0.17	C
Clay Loam	0.14	0.09	D
Silty Clay Loam	0.11	0.06	D
Sandy Clay	0.09	0.05	D
Silty Clay	0.09	0.04	D
Clay	0.08	0.02	D

\* Source: Rawls, Brakensiek and Saxton, 1982

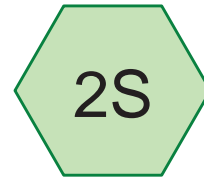
Based on the soil textural classes and the corresponding minimum infiltration rates, a restriction is established to eliminate unsuitable soil conditions. Soil textures with minimum infiltration rates less than 0.52 inches per hour are not suitable for usage of infiltration practices. These include soils that have a 30 percent clay content, making these soils susceptible to frost heaving and structurally unstable, in addition to having a poor capacity to percolate runoff. Soil textures that are recommended for infiltration systems include those soils with infiltration rates of 0.52 inches per hour or greater, which include loam, sandy loam, loamy sand, and sand.



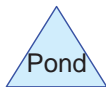
LOT 2 NORTH



TO WEST WETLANDS



TO EAST WETLANDS



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**Rainfall Events Listing (selected events)**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.23	2
2	10-yr	Type III 24-hr		Default	24.00	1	5.01	2
3	25-yr	Type III 24-hr		Default	24.00	1	6.12	2
4	100-yr	Type III 24-hr		Default	24.00	1	7.00	2

**1975\_PRE\_04-21**

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Page 3

**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
4,432	96	Gravel surface, HSG C (2S, 3S)
47,302	73	Woods, Fair, HSG C (2S, 3S)
47,324	43	Woods/grass comb., Fair, HSG A (1S)
<b>99,058</b>	<b>60</b>	<b>TOTAL AREA</b>



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Page 4

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
47,324	HSG A	1S
0	HSG B	
51,734	HSG C	2S, 3S
0	HSG D	
0	Other	
<b>99,058</b>		<b>TOTAL AREA</b>

**1975\_PRE\_04-21**

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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	0	4,432	0	0	4,432	Gravel surface
0	0	47,302	0	0	47,302	Woods, Fair
47,324	0	0	0	0	47,324	Woods/grass comb., Fair
<b>47,324</b>	<b>0</b>	<b>51,734</b>	<b>0</b>	<b>0</b>	<b>99,058</b>	<b>TOTAL AREA</b>

Sub  
Num

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 2-yr Rainfall=3.23"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: LOT 2 NORTH**

Runoff Area=47,324 sf 0.00% Impervious Runoff Depth>0.02"  
Flow Length=250' Tc=15.4 min CN=43 Runoff=0.00 cfs 94 cf

**Subcatchment 2S: TO EAST WETLANDS**

Runoff Area=48,049 sf 0.00% Impervious Runoff Depth>1.06"  
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=74 Runoff=1.28 cfs 4,229 cf

**Subcatchment 3S: TO WEST WETLANDS**

Runoff Area=3,685 sf 0.00% Impervious Runoff Depth>1.94"  
Flow Length=30' Slope=0.0200 '/' Tc=6.0 min CN=87 Runoff=0.19 cfs 596 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 4,918 cf Average Runoff Depth = 0.60"**  
**100.00% Pervious = 99,058 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment 1S: LOT 2 NORTH**

Runoff = 0.00 cfs @ 17.17 hrs, Volume= 94 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
47,324	43	Woods/grass comb., Fair, HSG A
47,324		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	25	0.0100	0.04		<b>Sheet Flow, Overland</b> Woods: Light underbrush n= 0.400 P2= 3.20"
6.1	225	0.0150	0.61		<b>Shallow Concentrated Flow, Overland</b> Woodland Kv= 5.0 fps
15.4	250	Total			

**Summary for Subcatchment 2S: TO EAST WETLANDS**

Runoff = 1.28 cfs @ 12.10 hrs, Volume= 4,229 cf, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
45,833	73	Woods, Fair, HSG C
48,049	74	Weighted Average
48,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, SHEET FLOW</b> Smooth surfaces n= 0.011 P2= 3.20"
0.9	40	0.0200	0.71		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.1	50	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 3S: TO WEST WETLANDS**

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 596 cf, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

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Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
1,469	73	Woods, Fair, HSG C
3,685	87	Weighted Average
3,685		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, TR-55 Sheet Flow</b> Smooth surfaces n= 0.011 P2= 3.20"
0.5	20	0.0200	0.71		<b>Shallow Concentrated Flow, Overland flow</b> Woodland Kv= 5.0 fps
0.7	30	Total, Increased to minimum Tc = 6.0 min			

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 10-yr Rainfall=5.01"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: LOT 2 NORTH**

Runoff Area=47,324 sf 0.00% Impervious Runoff Depth>0.35"  
Flow Length=250' Tc=15.4 min CN=43 Runoff=0.13 cfs 1,395 cf

**Subcatchment 2S: TO EAST WETLANDS**

Runoff Area=48,049 sf 0.00% Impervious Runoff Depth>2.37"  
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=74 Runoff=3.00 cfs 9,489 cf

**Subcatchment 3S: TO WEST WETLANDS**

Runoff Area=3,685 sf 0.00% Impervious Runoff Depth>3.57"  
Flow Length=30' Slope=0.0200 '/' Tc=6.0 min CN=87 Runoff=0.34 cfs 1,098 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 11,982 cf Average Runoff Depth = 1.45"**  
**100.00% Pervious = 99,058 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment 1S: LOT 2 NORTH**

Runoff = 0.13 cfs @ 12.50 hrs, Volume= 1,395 cf, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

Area (sf)	CN	Description
47,324	43	Woods/grass comb., Fair, HSG A
47,324		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	25	0.0100	0.04		<b>Sheet Flow, Overland</b> Woods: Light underbrush n= 0.400 P2= 3.20"
6.1	225	0.0150	0.61		<b>Shallow Concentrated Flow, Overland</b> Woodland Kv= 5.0 fps
15.4	250	Total			

**Summary for Subcatchment 2S: TO EAST WETLANDS**

Runoff = 3.00 cfs @ 12.09 hrs, Volume= 9,489 cf, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
45,833	73	Woods, Fair, HSG C
48,049	74	Weighted Average
48,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, SHEET FLOW</b> Smooth surfaces n= 0.011 P2= 3.20"
0.9	40	0.0200	0.71		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.1	50	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 3S: TO WEST WETLANDS**

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 1,098 cf, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

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Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
1,469	73	Woods, Fair, HSG C
3,685	87	Weighted Average
3,685		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, TR-55 Sheet Flow</b> Smooth surfaces n= 0.011 P2= 3.20"
0.5	20	0.0200	0.71		<b>Shallow Concentrated Flow, Overland flow</b> Woodland Kv= 5.0 fps
0.7	30	Total, Increased to minimum Tc = 6.0 min			



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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 25-yr Rainfall=6.12"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: LOT 2 NORTH**

Runoff Area=47,324 sf 0.00% Impervious Runoff Depth>0.72"  
Flow Length=250' Tc=15.4 min CN=43 Runoff=0.39 cfs 2,821 cf

**Subcatchment 2S: TO EAST WETLANDS**

Runoff Area=48,049 sf 0.00% Impervious Runoff Depth>3.28"  
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=74 Runoff=4.17 cfs 13,146 cf

**Subcatchment 3S: TO WEST WETLANDS**

Runoff Area=3,685 sf 0.00% Impervious Runoff Depth>4.63"  
Flow Length=30' Slope=0.0200 '/' Tc=6.0 min CN=87 Runoff=0.44 cfs 1,421 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 17,388 cf Average Runoff Depth = 2.11"**  
**100.00% Pervious = 99,058 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment 1S: LOT 2 NORTH**

Runoff = 0.39 cfs @ 12.37 hrs, Volume= 2,821 cf, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

Area (sf)	CN	Description
47,324	43	Woods/grass comb., Fair, HSG A
47,324		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	25	0.0100	0.04		<b>Sheet Flow, Overland</b> Woods: Light underbrush n= 0.400 P2= 3.20"
6.1	225	0.0150	0.61		<b>Shallow Concentrated Flow, Overland</b> Woodland Kv= 5.0 fps
15.4	250	Total			

**Summary for Subcatchment 2S: TO EAST WETLANDS**

Runoff = 4.17 cfs @ 12.09 hrs, Volume= 13,146 cf, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
45,833	73	Woods, Fair, HSG C
48,049	74	Weighted Average
48,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, SHEET FLOW</b> Smooth surfaces n= 0.011 P2= 3.20"
0.9	40	0.0200	0.71		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.1	50	Total, Increased to minimum Tc = 6.0 min			

**Summary for Subcatchment 3S: TO WEST WETLANDS**

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 1,421 cf, Depth> 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

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Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
1,469	73	Woods, Fair, HSG C
3,685	87	Weighted Average
3,685		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, TR-55 Sheet Flow</b> Smooth surfaces n= 0.011 P2= 3.20"
0.5	20	0.0200	0.71		<b>Shallow Concentrated Flow, Overland flow</b> Woodland Kv= 5.0 fps
0.7	30	Total, Increased to minimum Tc = 6.0 min			

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 100-yr Rainfall=7.00"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: LOT 2 NORTH**

Runoff Area=47,324 sf 0.00% Impervious Runoff Depth>1.07"  
Flow Length=250' Tc=15.4 min CN=43 Runoff=0.70 cfs 4,215 cf

**Subcatchment 2S: TO EAST WETLANDS**

Runoff Area=48,049 sf 0.00% Impervious Runoff Depth>4.04"  
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=74 Runoff=5.12 cfs 16,171 cf

**Subcatchment 3S: TO WEST WETLANDS**

Runoff Area=3,685 sf 0.00% Impervious Runoff Depth>5.48"  
Flow Length=30' Slope=0.0200 '/' Tc=6.0 min CN=87 Runoff=0.51 cfs 1,681 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 22,067 cf Average Runoff Depth = 2.67"**  
**100.00% Pervious = 99,058 sf 0.00% Impervious = 0 sf**

**Summary for Subcatchment 1S: LOT 2 NORTH**

Runoff = 0.70 cfs @ 12.29 hrs, Volume= 4,215 cf, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
47,324	43	Woods/grass comb., Fair, HSG A
47,324		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	25	0.0100	0.04		<b>Sheet Flow, Overland</b> Woods: Light underbrush n= 0.400 P2= 3.20"
6.1	225	0.0150	0.61		<b>Shallow Concentrated Flow, Overland</b> Woodland Kv= 5.0 fps
15.4	250	Total			

**Summary for Subcatchment 2S: TO EAST WETLANDS**

Runoff = 5.12 cfs @ 12.09 hrs, Volume= 16,171 cf, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
45,833	73	Woods, Fair, HSG C
48,049	74	Weighted Average
48,049		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, SHEET FLOW</b> Smooth surfaces n= 0.011 P2= 3.20"
0.9	40	0.0200	0.71		<b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
1.1	50	Total, Increased to minimum Tc = 6.0 min			

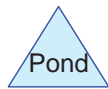
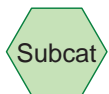
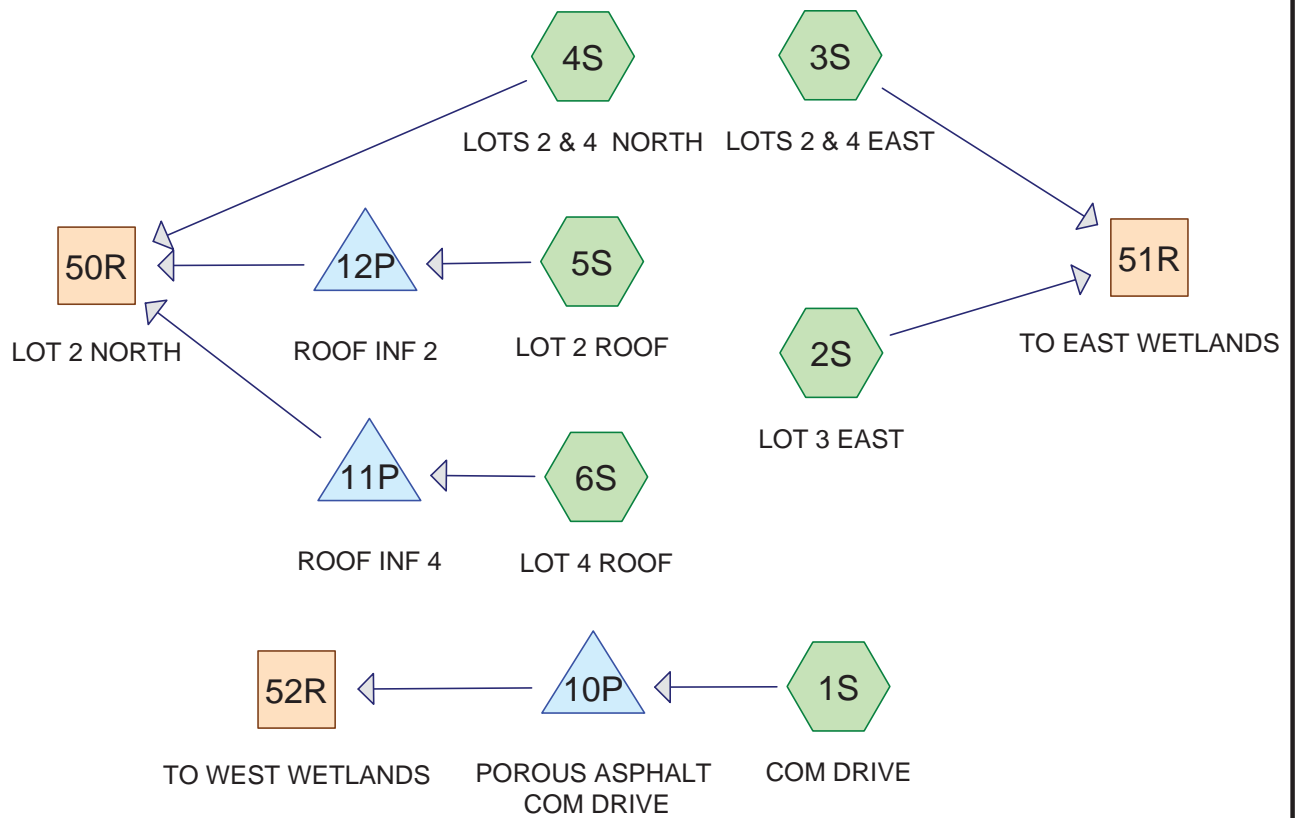
**Summary for Subcatchment 3S: TO WEST WETLANDS**

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,681 cf, Depth> 5.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
2,216	96	Gravel surface, HSG C
1,469	73	Woods, Fair, HSG C
3,685	87	Weighted Average
3,685		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	10	0.0200	0.87		<b>Sheet Flow, TR-55 Sheet Flow</b> Smooth surfaces n= 0.011 P2= 3.20"
0.5	20	0.0200	0.71		<b>Shallow Concentrated Flow, Overland flow</b> Woodland Kv= 5.0 fps
0.7	30	Total, Increased to minimum Tc = 6.0 min			



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**Rainfall Events Listing (selected events)**

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.23	2
2	10-yr	Type III 24-hr		Default	24.00	1	5.01	2
3	25-yr	Type III 24-hr		Default	24.00	1	6.12	2
4	100-yr	Type III 24-hr		Default	24.00	1	7.00	2



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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
45,064	39	>75% Grass cover, Good, HSG A (3S, 4S)
31,625	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S)
6,794	98	Paved parking, HSG C (1S)
5,000	98	Roof impervious, HSG A (5S, 6S)
4,259	98	Unconnected pavement, HSG A (4S)
6,316	98	Unconnected roofs, HSG C (2S, 3S)
<b>99,058</b>	<b>63</b>	<b>TOTAL AREA</b>

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**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
54,323	HSG A	3S, 4S, 5S, 6S
0	HSG B	
44,735	HSG C	1S, 2S, 3S
0	HSG D	
0	Other	
<b>99,058</b>		<b>TOTAL AREA</b>

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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
45,064	0	31,625	0	0	76,689	>75% Grass cover, Good	
0	0	6,794	0	0	6,794	Paved parking	
5,000	0	0	0	0	5,000	Roof impervous	
4,259	0	0	0	0	4,259	Unconnected pavement	
0	0	6,316	0	0	6,316	Unconnected roofs	
<b>54,323</b>	<b>0</b>	<b>44,735</b>	<b>0</b>	<b>0</b>	<b>99,058</b>	<b>TOTAL AREA</b>	

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 2-yr Rainfall=3.23"

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Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: COM DRIVE** Runoff Area=8,660 sf 78.45% Impervious Runoff Depth>2.34"  
Tc=0.1 min CN=93 Runoff=0.68 cfs 1,689 cf

**Subcatchment 2S: LOT 3 EAST** Runoff Area=18,146 sf 21.55% Impervious Runoff Depth>1.13"  
Flow Length=150' Slope=0.0500 '/ Tc=3.5 min UI Adjusted CN=77 Runoff=0.64 cfs 1,714 cf

**Subcatchment 3S: LOTS 2 & 4 EAST** Runoff Area=30,381 sf 7.92% Impervious Runoff Depth>0.37"  
Flow Length=225' Slope=0.0200 '/ Tc=6.6 min UI Adjusted CN=60 Runoff=0.20 cfs 925 cf

**Subcatchment 4S: LOTS 2 & 4 NORTH** Runoff Area=36,871 sf 11.55% Impervious Runoff Depth>0.01"  
Flow Length=275' Slope=0.0200 '/ Tc=7.4 min UI Adjusted CN=42 Runoff=0.00 cfs 23 cf

**Subcatchment 5S: LOT 2 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>2.80"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.22 cfs 583 cf

**Subcatchment 6S: LOT 4 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>2.80"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.22 cfs 583 cf

**Reach 50R: LOT 2 NORTH** Inflow=0.00 cfs 23 cf  
Outflow=0.00 cfs 23 cf

**Reach 51R: TO EAST WETLANDS** Inflow=0.76 cfs 2,638 cf  
Outflow=0.76 cfs 2,638 cf

**Reach 52R: TO WEST WETLANDS** Inflow=0.00 cfs 0 cf  
Outflow=0.00 cfs 0 cf

**Pond 10P: POROUS ASPHALT COM DRIVE** Peak Elev=308.92' Storage=896 cf Inflow=0.68 cfs 1,689 cf  
Discarded=0.03 cfs 1,049 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 1,049 cf

**Pond 11P: ROOF INF 4** Peak Elev=311.73' Storage=104 cf Inflow=0.22 cfs 583 cf  
Discarded=0.05 cfs 583 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 583 cf

**Pond 12P: ROOF INF 2** Peak Elev=312.18' Storage=141 cf Inflow=0.22 cfs 583 cf  
Discarded=0.04 cfs 583 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 583 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 5,517 cf Average Runoff Depth = 0.67"**  
**77.42% Pervious = 76,689 sf 22.58% Impervious = 22,369 sf**

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**Summary for Subcatchment 1S: COM DRIVE**

Runoff = 0.68 cfs @ 12.00 hrs, Volume= 1,689 cf, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
6,794	98	Paved parking, HSG C
1,866	74	>75% Grass cover, Good, HSG C
8,660	93	Weighted Average
1,866		21.55% Pervious Area
6,794		78.45% Impervious Area

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

**Summary for Subcatchment 2S: LOT 3 EAST**

Runoff = 0.64 cfs @ 12.06 hrs, Volume= 1,714 cf, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Adj	Description
3,910	98		Unconnected roofs, HSG C
14,236	74		>75% Grass cover, Good, HSG C
18,146	79	77	Weighted Average, UI Adjusted
14,236			78.45% Pervious Area
3,910			21.55% Impervious Area
3,910			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	25	0.0500	0.19		<b>Sheet Flow, Overland Sheet</b> Grass: Short n= 0.150 P2= 3.20"
1.3	125	0.0500	1.57		<b>Shallow Concentrated Flow, Overland Conc.</b> Short Grass Pasture Kv= 7.0 fps
3.5	150	Total			

**Summary for Subcatchment 3S: LOTS 2 & 4 EAST**

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 925 cf, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

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Area (sf)	CN	Adj	Description
2,406	98		Unconnected roofs, HSG C
12,452	39		>75% Grass cover, Good, HSG A
15,523	74		>75% Grass cover, Good, HSG C
30,381	62	60	Weighted Average, UI Adjusted
27,975			92.08% Pervious Area
2,406			7.92% Impervious Area
2,406			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland grass</b> Grass: Short n= 0.150 P2= 3.20"
3.4	200	0.0200	0.99		<b>Shallow Concentrated Flow, Overland grass</b> Short Grass Pasture Kv= 7.0 fps
6.6	225	Total			

**Summary for Subcatchment 4S: LOTS 2 & 4 NORTH**

Runoff = 0.00 cfs @ 19.99 hrs, Volume= 23 cf, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Adj	Description
4,259	98		Unconnected pavement, HSG A
32,612	39		>75% Grass cover, Good, HSG A
36,871	46	42	Weighted Average, UI Adjusted
32,612			88.45% Pervious Area
4,259			11.55% Impervious Area
4,259			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland sheet</b> Grass: Short n= 0.150 P2= 3.20"
4.2	250	0.0200	0.99		<b>Shallow Concentrated Flow, Overland conc.</b> Short Grass Pasture Kv= 7.0 fps
7.4	275	Total			

**Summary for Subcatchment 5S: LOT 2 ROOF**

Runoff = 0.22 cfs @ 12.00 hrs, Volume= 583 cf, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

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Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Subcatchment 6S: LOT 4 ROOF**

Runoff = 0.22 cfs @ 12.00 hrs, Volume= 583 cf, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2-yr Rainfall=3.23"

Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Reach 50R: LOT 2 NORTH**

Inflow Area = 41,871 sf, 22.11% Impervious, Inflow Depth > 0.01" for 2-yr event  
Inflow = 0.00 cfs @ 19.99 hrs, Volume= 23 cf  
Outflow = 0.00 cfs @ 19.99 hrs, Volume= 23 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 51R: TO EAST WETLANDS**

Inflow Area = 48,527 sf, 13.02% Impervious, Inflow Depth > 0.65" for 2-yr event  
Inflow = 0.76 cfs @ 12.07 hrs, Volume= 2,638 cf  
Outflow = 0.76 cfs @ 12.07 hrs, Volume= 2,638 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 52R: TO WEST WETLANDS**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth = 0.00" for 2-yr event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Pond 10P: POROUS ASPHALT COM DRIVE**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth > 2.34" for 2-yr event  
 Inflow = 0.68 cfs @ 12.00 hrs, Volume= 1,689 cf  
 Outflow = 0.03 cfs @ 10.88 hrs, Volume= 1,049 cf, Atten= 96%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 10.88 hrs, Volume= 1,049 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Peak Elev= 308.92' @ 14.47 hrs Surf.Area= 6,794 sf Storage= 896 cf

Plug-Flow detention time= 184.2 min calculated for 1,049 cf (62% of inflow)  
 Center-of-Mass det. time= 109.9 min ( 867.1 - 757.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	308.54'	3,472 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 9,919 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.54	6,794	0	0
309.00	6,794	3,125	3,125
309.50	6,794	3,397	6,522
310.00	6,794	3,397	9,919

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.54'	<b>0.170 in/hr Exfiltration over Horizontal area</b>
#2	Primary	309.99'	<b>10.0' long (Profile 1) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

**Discarded OutFlow** Max=0.03 cfs @ 10.88 hrs HW=308.55' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=308.54' (Free Discharge)  
 ↳2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 11P: ROOF INF 4**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 2.80" for 2-yr event  
 Inflow = 0.22 cfs @ 12.00 hrs, Volume= 583 cf  
 Outflow = 0.05 cfs @ 11.72 hrs, Volume= 583 cf, Atten= 76%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.72 hrs, Volume= 583 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs



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Peak Elev= 311.73' @ 12.31 hrs Surf.Area= 274 sf Storage= 104 cf

Plug-Flow detention time= 9.7 min calculated for 583 cf (100% of inflow)

Center-of-Mass det. time= 9.5 min ( 743.4 - 733.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	253 cf	<b>11.17'W x 24.50'L x 3.54'H Field A</b> 969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#2A	311.50'	335 cf	<b>Cultec R-330XLHD x 6</b> Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		589 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.05 cfs @ 11.72 hrs HW=311.04' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=311.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**Summary for Pond 12P: ROOF INF 2**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 2.80" for 2-yr event  
 Inflow = 0.22 cfs @ 12.00 hrs, Volume= 583 cf  
 Outflow = 0.04 cfs @ 11.62 hrs, Volume= 583 cf, Atten= 83%, Lag= 0.0 min  
 Discarded = 0.04 cfs @ 11.62 hrs, Volume= 583 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 312.18' @ 12.41 hrs Surf.Area= 195 sf Storage= 141 cf

Plug-Flow detention time= 20.2 min calculated for 583 cf (100% of inflow)

Center-of-Mass det. time= 20.0 min ( 753.9 - 733.9 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	184 cf	<b>11.17'W x 17.50'L x 3.54'H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	311.50'	231 cf	<b>Cultec R-330XLHD x 4</b> Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard

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Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.04 cfs @ 11.62 hrs HW=311.04' (Free Discharge)

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

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=311.00' (Free Discharge)

↳ **2=Orifice/Grate** ( Controls 0.00 cfs)

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 10-yr Rainfall=5.01"

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Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: COM DRIVE** Runoff Area=8,660 sf 78.45% Impervious Runoff Depth>3.98"  
Tc=0.1 min CN=93 Runoff=1.12 cfs 2,870 cf

**Subcatchment 2S: LOT 3 EAST** Runoff Area=18,146 sf 21.55% Impervious Runoff Depth>2.45"  
Flow Length=150' Slope=0.0500 '/ Tc=3.5 min UI Adjusted CN=77 Runoff=1.41 cfs 3,704 cf

**Subcatchment 3S: LOTS 2 & 4 EAST** Runoff Area=30,381 sf 7.92% Impervious Runoff Depth>1.18"  
Flow Length=225' Slope=0.0200 '/ Tc=6.6 min UI Adjusted CN=60 Runoff=0.94 cfs 2,986 cf

**Subcatchment 4S: LOTS 2 & 4 NORTH** Runoff Area=36,871 sf 11.55% Impervious Runoff Depth>0.26"  
Flow Length=275' Slope=0.0200 '/ Tc=7.4 min UI Adjusted CN=42 Runoff=0.09 cfs 796 cf

**Subcatchment 5S: LOT 2 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>4.43"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.34 cfs 922 cf

**Subcatchment 6S: LOT 4 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>4.43"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.34 cfs 922 cf

**Reach 50R: LOT 2 NORTH** Inflow=0.09 cfs 796 cf  
Outflow=0.09 cfs 796 cf

**Reach 51R: TO EAST WETLANDS** Inflow=2.21 cfs 6,690 cf  
Outflow=2.21 cfs 6,690 cf

**Reach 52R: TO WEST WETLANDS** Inflow=0.00 cfs 0 cf  
Outflow=0.00 cfs 0 cf

**Pond 10P: POROUS ASPHALT COM DRIVE** Peak Elev=309.30' Storage=1,810 cf Inflow=1.12 cfs 2,870 cf  
Discarded=0.03 cfs 1,194 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 1,194 cf

**Pond 11P: ROOF INF 4** Peak Elev=312.36' Storage=239 cf Inflow=0.34 cfs 922 cf  
Discarded=0.05 cfs 922 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 922 cf

**Pond 12P: ROOF INF 2** Peak Elev=313.21' Storage=287 cf Inflow=0.34 cfs 922 cf  
Discarded=0.04 cfs 922 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 922 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 12,200 cf Average Runoff Depth = 1.48"**  
**77.42% Pervious = 76,689 sf 22.58% Impervious = 22,369 sf**

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LOTS 2,3 &amp; 4 CENTURY MILL RD BOLTON

Type III 24-hr 10-yr Rainfall=5.01"

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**Summary for Subcatchment 1S: COM DRIVE**

Runoff = 1.12 cfs @ 12.00 hrs, Volume= 2,870 cf, Depth&gt; 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

Area (sf)	CN	Description
6,794	98	Paved parking, HSG C
1,866	74	>75% Grass cover, Good, HSG C
8,660	93	Weighted Average
1,866		21.55% Pervious Area
6,794		78.45% Impervious Area

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

**Summary for Subcatchment 2S: LOT 3 EAST**

Runoff = 1.41 cfs @ 12.05 hrs, Volume= 3,704 cf, Depth&gt; 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

Area (sf)	CN	Adj	Description
3,910	98		Unconnected roofs, HSG C
14,236	74		>75% Grass cover, Good, HSG C
18,146	79	77	Weighted Average, UI Adjusted
14,236			78.45% Pervious Area
3,910			21.55% Impervious Area
3,910			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	25	0.0500	0.19		<b>Sheet Flow, Overland Sheet</b> Grass: Short n= 0.150 P2= 3.20"
1.3	125	0.0500	1.57		<b>Shallow Concentrated Flow, Overland Conc.</b> Short Grass Pasture Kv= 7.0 fps
3.5	150	Total			

**Summary for Subcatchment 3S: LOTS 2 & 4 EAST**

Runoff = 0.94 cfs @ 12.11 hrs, Volume= 2,986 cf, Depth&gt; 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

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Area (sf)	CN	Adj	Description
2,406	98		Unconnected roofs, HSG C
12,452	39		>75% Grass cover, Good, HSG A
15,523	74		>75% Grass cover, Good, HSG C
30,381	62	60	Weighted Average, UI Adjusted
27,975			92.08% Pervious Area
2,406			7.92% Impervious Area
2,406			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland grass</b> Grass: Short n= 0.150 P2= 3.20"
3.4	200	0.0200	0.99		<b>Shallow Concentrated Flow, Overland grass</b> Short Grass Pasture Kv= 7.0 fps
6.6	225	Total			

**Summary for Subcatchment 4S: LOTS 2 & 4 NORTH**

Runoff = 0.09 cfs @ 12.40 hrs, Volume= 796 cf, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

Area (sf)	CN	Adj	Description
4,259	98		Unconnected pavement, HSG A
32,612	39		>75% Grass cover, Good, HSG A
36,871	46	42	Weighted Average, UI Adjusted
32,612			88.45% Pervious Area
4,259			11.55% Impervious Area
4,259			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland sheet</b> Grass: Short n= 0.150 P2= 3.20"
4.2	250	0.0200	0.99		<b>Shallow Concentrated Flow, Overland conc.</b> Short Grass Pasture Kv= 7.0 fps
7.4	275	Total			

**Summary for Subcatchment 5S: LOT 2 ROOF**

Runoff = 0.34 cfs @ 12.00 hrs, Volume= 922 cf, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 10-yr Rainfall=5.01"

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Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Subcatchment 6S: LOT 4 ROOF**

Runoff = 0.34 cfs @ 12.00 hrs, Volume= 922 cf, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 10-yr Rainfall=5.01"

Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Reach 50R: LOT 2 NORTH**

Inflow Area = 41,871 sf, 22.11% Impervious, Inflow Depth > 0.23" for 10-yr event  
Inflow = 0.09 cfs @ 12.40 hrs, Volume= 796 cf  
Outflow = 0.09 cfs @ 12.40 hrs, Volume= 796 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 51R: TO EAST WETLANDS**

Inflow Area = 48,527 sf, 13.02% Impervious, Inflow Depth > 1.65" for 10-yr event  
Inflow = 2.21 cfs @ 12.07 hrs, Volume= 6,690 cf  
Outflow = 2.21 cfs @ 12.07 hrs, Volume= 6,690 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 52R: TO WEST WETLANDS**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth = 0.00" for 10-yr event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Pond 10P: POROUS ASPHALT COM DRIVE**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth > 3.98" for 10-yr event  
 Inflow = 1.12 cfs @ 12.00 hrs, Volume= 2,870 cf  
 Outflow = 0.03 cfs @ 9.45 hrs, Volume= 1,194 cf, Atten= 98%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 9.45 hrs, Volume= 1,194 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Peak Elev= 309.30' @ 15.89 hrs Surf.Area= 6,794 sf Storage= 1,810 cf

Plug-Flow detention time= 178.6 min calculated for 1,194 cf (42% of inflow)  
 Center-of-Mass det. time= 76.6 min ( 823.3 - 746.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	308.54'	3,472 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 9,919 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.54	6,794	0	0
309.00	6,794	3,125	3,125
309.50	6,794	3,397	6,522
310.00	6,794	3,397	9,919

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.54'	<b>0.170 in/hr Exfiltration over Horizontal area</b>
#2	Primary	309.99'	<b>10.0' long (Profile 1) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

**Discarded OutFlow** Max=0.03 cfs @ 9.45 hrs HW=308.55' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=308.54' (Free Discharge)  
 ↳2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 11P: ROOF INF 4**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 4.43" for 10-yr event  
 Inflow = 0.34 cfs @ 12.00 hrs, Volume= 922 cf  
 Outflow = 0.05 cfs @ 11.60 hrs, Volume= 922 cf, Atten= 85%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.60 hrs, Volume= 922 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

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Peak Elev= 312.36' @ 12.43 hrs Surf.Area= 274 sf Storage= 239 cf

Plug-Flow detention time= 25.1 min calculated for 921 cf (100% of inflow)

Center-of-Mass det. time= 24.9 min ( 755.5 - 730.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	253 cf	<b>11.17'W x 24.50'L x 3.54'H Field A</b> 969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#2A	311.50'	335 cf	<b>Cultec R-330XLHD x 6 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		589 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.05 cfs @ 11.60 hrs HW=311.04' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=311.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**Summary for Pond 12P: ROOF INF 2**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 4.43" for 10-yr event  
 Inflow = 0.34 cfs @ 12.00 hrs, Volume= 922 cf  
 Outflow = 0.04 cfs @ 11.53 hrs, Volume= 922 cf, Atten= 89%, Lag= 0.0 min  
 Discarded = 0.04 cfs @ 11.53 hrs, Volume= 922 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 313.21' @ 12.49 hrs Surf.Area= 195 sf Storage= 287 cf

Plug-Flow detention time= 48.2 min calculated for 922 cf (100% of inflow)

Center-of-Mass det. time= 48.1 min ( 778.7 - 730.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	184 cf	<b>11.17'W x 17.50'L x 3.54'H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	311.50'	231 cf	<b>Cultec R-330XLHD x 4 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard



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Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.04 cfs @ 11.53 hrs HW=311.04' (Free Discharge)

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

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=311.00' (Free Discharge)

↳ **2=Orifice/Grate** ( Controls 0.00 cfs)

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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 25-yr Rainfall=6.12"

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Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: COM DRIVE** Runoff Area=8,660 sf 78.45% Impervious Runoff Depth>5.00"  
Tc=0.1 min CN=93 Runoff=1.40 cfs 3,609 cf

**Subcatchment 2S: LOT 3 EAST** Runoff Area=18,146 sf 21.55% Impervious Runoff Depth>3.35"  
Flow Length=150' Slope=0.0500 '/ Tc=3.5 min UI Adjusted CN=77 Runoff=1.92 cfs 5,067 cf

**Subcatchment 3S: LOTS 2 & 4 EAST** Runoff Area=30,381 sf 7.92% Impervious Runoff Depth>1.82"  
Flow Length=225' Slope=0.0200 '/ Tc=6.6 min UI Adjusted CN=60 Runoff=1.52 cfs 4,617 cf

**Subcatchment 4S: LOTS 2 & 4 NORTH** Runoff Area=36,871 sf 11.55% Impervious Runoff Depth>0.56"  
Flow Length=275' Slope=0.0200 '/ Tc=7.4 min UI Adjusted CN=42 Runoff=0.29 cfs 1,732 cf

**Subcatchment 5S: LOT 2 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>5.44"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.42 cfs 1,132 cf

**Subcatchment 6S: LOT 4 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>5.44"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.42 cfs 1,132 cf

**Reach 50R: LOT 2 NORTH** Inflow=0.29 cfs 1,740 cf  
Outflow=0.29 cfs 1,740 cf

**Reach 51R: TO EAST WETLANDS** Inflow=3.25 cfs 9,684 cf  
Outflow=3.25 cfs 9,684 cf

**Reach 52R: TO WEST WETLANDS** Inflow=0.00 cfs 0 cf  
Outflow=0.00 cfs 0 cf

**Pond 10P: POROUS ASPHALT COM DRIVE** Peak Elev=309.56' Storage=2,436 cf Inflow=1.40 cfs 3,609 cf  
Discarded=0.03 cfs 1,256 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 1,256 cf

**Pond 11P: ROOF INF 4** Peak Elev=312.80' Storage=329 cf Inflow=0.42 cfs 1,132 cf  
Discarded=0.05 cfs 1,132 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 1,132 cf

**Pond 12P: ROOF INF 2** Peak Elev=314.07' Storage=379 cf Inflow=0.42 cfs 1,132 cf  
Discarded=0.04 cfs 1,124 cf Primary=0.01 cfs 8 cf Outflow=0.05 cfs 1,132 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 17,290 cf Average Runoff Depth = 2.09"**  
**77.42% Pervious = 76,689 sf 22.58% Impervious = 22,369 sf**

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LOTS 2,3 &amp; 4 CENTURY MILL RD BOLTON

Type III 24-hr 25-yr Rainfall=6.12"

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**Summary for Subcatchment 1S: COM DRIVE**

Runoff = 1.40 cfs @ 12.00 hrs, Volume= 3,609 cf, Depth&gt; 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

Area (sf)	CN	Description
6,794	98	Paved parking, HSG C
1,866	74	>75% Grass cover, Good, HSG C
8,660	93	Weighted Average
1,866		21.55% Pervious Area
6,794		78.45% Impervious Area

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

**Summary for Subcatchment 2S: LOT 3 EAST**

Runoff = 1.92 cfs @ 12.05 hrs, Volume= 5,067 cf, Depth&gt; 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

Area (sf)	CN	Adj	Description
3,910	98		Unconnected roofs, HSG C
14,236	74		>75% Grass cover, Good, HSG C
18,146	79	77	Weighted Average, UI Adjusted
14,236			78.45% Pervious Area
3,910			21.55% Impervious Area
3,910			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	25	0.0500	0.19		<b>Sheet Flow, Overland Sheet</b> Grass: Short n= 0.150 P2= 3.20"
1.3	125	0.0500	1.57		<b>Shallow Concentrated Flow, Overland Conc.</b> Short Grass Pasture Kv= 7.0 fps
3.5	150	Total			

**Summary for Subcatchment 3S: LOTS 2 & 4 EAST**

Runoff = 1.52 cfs @ 12.10 hrs, Volume= 4,617 cf, Depth&gt; 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

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Area (sf)	CN	Adj	Description
2,406	98		Unconnected roofs, HSG C
12,452	39		>75% Grass cover, Good, HSG A
15,523	74		>75% Grass cover, Good, HSG C
30,381	62	60	Weighted Average, UI Adjusted
27,975			92.08% Pervious Area
2,406			7.92% Impervious Area
2,406			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland grass</b> Grass: Short n= 0.150 P2= 3.20"
3.4	200	0.0200	0.99		<b>Shallow Concentrated Flow, Overland grass</b> Short Grass Pasture Kv= 7.0 fps
6.6	225	Total			

**Summary for Subcatchment 4S: LOTS 2 & 4 NORTH**

Runoff = 0.29 cfs @ 12.18 hrs, Volume= 1,732 cf, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

Area (sf)	CN	Adj	Description
4,259	98		Unconnected pavement, HSG A
32,612	39		>75% Grass cover, Good, HSG A
36,871	46	42	Weighted Average, UI Adjusted
32,612			88.45% Pervious Area
4,259			11.55% Impervious Area
4,259			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland sheet</b> Grass: Short n= 0.150 P2= 3.20"
4.2	250	0.0200	0.99		<b>Shallow Concentrated Flow, Overland conc.</b> Short Grass Pasture Kv= 7.0 fps
7.4	275	Total			

**Summary for Subcatchment 5S: LOT 2 ROOF**

Runoff = 0.42 cfs @ 12.00 hrs, Volume= 1,132 cf, Depth> 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

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Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Subcatchment 6S: LOT 4 ROOF**

Runoff = 0.42 cfs @ 12.00 hrs, Volume= 1,132 cf, Depth> 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-yr Rainfall=6.12"

Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Reach 50R: LOT 2 NORTH**

Inflow Area = 41,871 sf, 22.11% Impervious, Inflow Depth > 0.50" for 25-yr event  
Inflow = 0.29 cfs @ 12.18 hrs, Volume= 1,740 cf  
Outflow = 0.29 cfs @ 12.18 hrs, Volume= 1,740 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 51R: TO EAST WETLANDS**

Inflow Area = 48,527 sf, 13.02% Impervious, Inflow Depth > 2.39" for 25-yr event  
Inflow = 3.25 cfs @ 12.07 hrs, Volume= 9,684 cf  
Outflow = 3.25 cfs @ 12.07 hrs, Volume= 9,684 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 52R: TO WEST WETLANDS**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth = 0.00" for 25-yr event  
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf  
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Pond 10P: POROUS ASPHALT COM DRIVE**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth > 5.00" for 25-yr event  
 Inflow = 1.40 cfs @ 12.00 hrs, Volume= 3,609 cf  
 Outflow = 0.03 cfs @ 8.78 hrs, Volume= 1,256 cf, Atten= 98%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 8.78 hrs, Volume= 1,256 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Peak Elev= 309.56' @ 16.78 hrs Surf.Area= 6,794 sf Storage= 2,436 cf

Plug-Flow detention time= 181.6 min calculated for 1,255 cf (35% of inflow)  
 Center-of-Mass det. time= 62.4 min ( 805.3 - 742.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	308.54'	3,472 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 9,919 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.54	6,794	0	0
309.00	6,794	3,125	3,125
309.50	6,794	3,397	6,522
310.00	6,794	3,397	9,919

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.54'	<b>0.170 in/hr Exfiltration over Horizontal area</b>
#2	Primary	309.99'	<b>10.0' long (Profile 1) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

**Discarded OutFlow** Max=0.03 cfs @ 8.78 hrs HW=308.55' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=308.54' (Free Discharge)  
 ↳2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 11P: ROOF INF 4**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 5.44" for 25-yr event  
 Inflow = 0.42 cfs @ 12.00 hrs, Volume= 1,132 cf  
 Outflow = 0.05 cfs @ 11.56 hrs, Volume= 1,132 cf, Atten= 88%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.56 hrs, Volume= 1,132 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

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Peak Elev= 312.80' @ 12.47 hrs Surf.Area= 274 sf Storage= 329 cf

Plug-Flow detention time= 37.3 min calculated for 1,131 cf (100% of inflow)

Center-of-Mass det. time= 37.1 min ( 766.7 - 729.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	253 cf	<b>11.17'W x 24.50'L x 3.54'H Field A</b> 969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#2A	311.50'	335 cf	<b>Cultec R-330XLHD x 6 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		589 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.05 cfs @ 11.56 hrs HW=311.04' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=311.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**Summary for Pond 12P: ROOF INF 2**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 5.44" for 25-yr event  
 Inflow = 0.42 cfs @ 12.00 hrs, Volume= 1,132 cf  
 Outflow = 0.05 cfs @ 12.47 hrs, Volume= 1,132 cf, Atten= 88%, Lag= 28.4 min  
 Discarded = 0.04 cfs @ 11.39 hrs, Volume= 1,124 cf  
 Primary = 0.01 cfs @ 12.47 hrs, Volume= 8 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 314.07' @ 12.47 hrs Surf.Area= 195 sf Storage= 379 cf

Plug-Flow detention time= 67.6 min calculated for 1,132 cf (100% of inflow)

Center-of-Mass det. time= 67.4 min ( 797.1 - 729.7 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	184 cf	<b>11.17'W x 17.50'L x 3.54'H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	311.50'	231 cf	<b>Cultec R-330XLHD x 4 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard

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Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.04 cfs @ 11.39 hrs HW=311.04' (Free Discharge)

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

**Primary OutFlow** Max=0.01 cfs @ 12.47 hrs HW=314.07' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 0.91 fps)



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LOTS 2,3 & 4 CENTURY MILL RD BOLTON

Type III 24-hr 100-yr Rainfall=7.00"

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Time span=5.00-20.00 hrs, dt=0.01 hrs, 1501 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: COM DRIVE** Runoff Area=8,660 sf 78.45% Impervious Runoff Depth>5.81"  
Tc=0.1 min CN=93 Runoff=1.61 cfs 4,195 cf

**Subcatchment 2S: LOT 3 EAST** Runoff Area=18,146 sf 21.55% Impervious Runoff Depth>4.09"  
Flow Length=150' Slope=0.0500 '/ Tc=3.5 min UI Adjusted CN=77 Runoff=2.33 cfs 6,188 cf

**Subcatchment 3S: LOTS 2 & 4 EAST** Runoff Area=30,381 sf 7.92% Impervious Runoff Depth>2.39"  
Flow Length=225' Slope=0.0200 '/ Tc=6.6 min UI Adjusted CN=60 Runoff=2.02 cfs 6,042 cf

**Subcatchment 4S: LOTS 2 & 4 NORTH** Runoff Area=36,871 sf 11.55% Impervious Runoff Depth>0.87"  
Flow Length=275' Slope=0.0200 '/ Tc=7.4 min UI Adjusted CN=42 Runoff=0.60 cfs 2,672 cf

**Subcatchment 5S: LOT 2 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>6.23"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.48 cfs 1,299 cf

**Subcatchment 6S: LOT 4 ROOF** Runoff Area=2,500 sf 100.00% Impervious Runoff Depth>6.23"  
Flow Length=12' Slope=1.0000 '/ Tc=0.0 min CN=98 Runoff=0.48 cfs 1,299 cf

**Reach 50R: LOT 2 NORTH** Inflow=0.61 cfs 2,763 cf  
Outflow=0.61 cfs 2,763 cf

**Reach 51R: TO EAST WETLANDS** Inflow=4.13 cfs 12,230 cf  
Outflow=4.13 cfs 12,230 cf

**Reach 52R: TO WEST WETLANDS** Inflow=0.00 cfs 0 cf  
Outflow=0.00 cfs 0 cf

**Pond 10P: POROUS ASPHALT COM DRIVE** Peak Elev=309.78' Storage=2,953 cf Inflow=1.61 cfs 4,195 cf  
Discarded=0.03 cfs 1,295 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 1,295 cf

**Pond 11P: ROOF INF 4** Peak Elev=313.18' Storage=402 cf Inflow=0.48 cfs 1,299 cf  
Discarded=0.05 cfs 1,298 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 1,298 cf

**Pond 12P: ROOF INF 2** Peak Elev=314.22' Storage=390 cf Inflow=0.48 cfs 1,299 cf  
Discarded=0.04 cfs 1,207 cf Primary=0.10 cfs 91 cf Outflow=0.14 cfs 1,298 cf

**Total Runoff Area = 99,058 sf Runoff Volume = 21,695 cf Average Runoff Depth = 2.63"**  
**77.42% Pervious = 76,689 sf 22.58% Impervious = 22,369 sf**

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LOTS 2,3 &amp; 4 CENTURY MILL RD BOLTON

Type III 24-hr 100-yr Rainfall=7.00"

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**Summary for Subcatchment 1S: COM DRIVE**

Runoff = 1.61 cfs @ 12.00 hrs, Volume= 4,195 cf, Depth&gt; 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
6,794	98	Paved parking, HSG C
1,866	74	>75% Grass cover, Good, HSG C
8,660	93	Weighted Average
1,866		21.55% Pervious Area
6,794		78.45% Impervious Area

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

**Summary for Subcatchment 2S: LOT 3 EAST**

Runoff = 2.33 cfs @ 12.05 hrs, Volume= 6,188 cf, Depth&gt; 4.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Adj	Description
3,910	98		Unconnected roofs, HSG C
14,236	74		>75% Grass cover, Good, HSG C
18,146	79	77	Weighted Average, UI Adjusted
14,236			78.45% Pervious Area
3,910			21.55% Impervious Area
3,910			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	25	0.0500	0.19		<b>Sheet Flow, Overland Sheet</b> Grass: Short n= 0.150 P2= 3.20"
1.3	125	0.0500	1.57		<b>Shallow Concentrated Flow, Overland Conc.</b> Short Grass Pasture Kv= 7.0 fps
3.5	150	Total			

**Summary for Subcatchment 3S: LOTS 2 & 4 EAST**

Runoff = 2.02 cfs @ 12.10 hrs, Volume= 6,042 cf, Depth&gt; 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

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Area (sf)	CN	Adj	Description
2,406	98		Unconnected roofs, HSG C
12,452	39		>75% Grass cover, Good, HSG A
15,523	74		>75% Grass cover, Good, HSG C
30,381	62	60	Weighted Average, UI Adjusted
27,975			92.08% Pervious Area
2,406			7.92% Impervious Area
2,406			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland grass</b> Grass: Short n= 0.150 P2= 3.20"
3.4	200	0.0200	0.99		<b>Shallow Concentrated Flow, Overland grass</b> Short Grass Pasture Kv= 7.0 fps
6.6	225	Total			

**Summary for Subcatchment 4S: LOTS 2 & 4 NORTH**

Runoff = 0.60 cfs @ 12.14 hrs, Volume= 2,672 cf, Depth> 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Adj	Description
4,259	98		Unconnected pavement, HSG A
32,612	39		>75% Grass cover, Good, HSG A
36,871	46	42	Weighted Average, UI Adjusted
32,612			88.45% Pervious Area
4,259			11.55% Impervious Area
4,259			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.2	25	0.0200	0.13		<b>Sheet Flow, Overland sheet</b> Grass: Short n= 0.150 P2= 3.20"
4.2	250	0.0200	0.99		<b>Shallow Concentrated Flow, Overland conc.</b> Short Grass Pasture Kv= 7.0 fps
7.4	275	Total			

**Summary for Subcatchment 5S: LOT 2 ROOF**

Runoff = 0.48 cfs @ 12.00 hrs, Volume= 1,299 cf, Depth> 6.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

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Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Subcatchment 6S: LOT 4 ROOF**

Runoff = 0.48 cfs @ 12.00 hrs, Volume= 1,299 cf, Depth> 6.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type III 24-hr 100-yr Rainfall=7.00"

Area (sf)	CN	Description
* 2,500	98	Roof impervious, HSG A
2,500		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0	12	1.0000	20.30		<b>Shallow Concentrated Flow, Sh. Conc. Upland Flow (roof)</b> Paved Kv= 20.3 fps

**Summary for Reach 50R: LOT 2 NORTH**

Inflow Area = 41,871 sf, 22.11% Impervious, Inflow Depth > 0.79" for 100-yr event  
 Inflow = 0.61 cfs @ 12.21 hrs, Volume= 2,763 cf  
 Outflow = 0.61 cfs @ 12.21 hrs, Volume= 2,763 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 51R: TO EAST WETLANDS**

Inflow Area = 48,527 sf, 13.02% Impervious, Inflow Depth > 3.02" for 100-yr event  
 Inflow = 4.13 cfs @ 12.07 hrs, Volume= 12,230 cf  
 Outflow = 4.13 cfs @ 12.07 hrs, Volume= 12,230 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Reach 52R: TO WEST WETLANDS**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth = 0.00" for 100-yr event  
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf  
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

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Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

**Summary for Pond 10P: POROUS ASPHALT COM DRIVE**

Inflow Area = 8,660 sf, 78.45% Impervious, Inflow Depth > 5.81" for 100-yr event  
 Inflow = 1.61 cfs @ 12.00 hrs, Volume= 4,195 cf  
 Outflow = 0.03 cfs @ 8.36 hrs, Volume= 1,295 cf, Atten= 98%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 8.36 hrs, Volume= 1,295 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Peak Elev= 309.78' @ 17.35 hrs Surf.Area= 6,794 sf Storage= 2,953 cf

Plug-Flow detention time= 186.2 min calculated for 1,295 cf (31% of inflow)  
 Center-of-Mass det. time= 53.2 min ( 793.9 - 740.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	308.54'	3,472 cf	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) 9,919 cf Overall x 35.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
308.54	6,794	0	0
309.00	6,794	3,125	3,125
309.50	6,794	3,397	6,522
310.00	6,794	3,397	9,919

Device	Routing	Invert	Outlet Devices
#1	Discarded	308.54'	<b>0.170 in/hr Exfiltration over Horizontal area</b>
#2	Primary	309.99'	<b>10.0' long (Profile 1) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

**Discarded OutFlow** Max=0.03 cfs @ 8.36 hrs HW=308.55' (Free Discharge)  
 ↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=308.54' (Free Discharge)  
 ↳2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 11P: ROOF INF 4**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 6.23" for 100-yr event  
 Inflow = 0.48 cfs @ 12.00 hrs, Volume= 1,299 cf  
 Outflow = 0.05 cfs @ 11.53 hrs, Volume= 1,298 cf, Atten= 89%, Lag= 0.0 min  
 Discarded = 0.05 cfs @ 11.53 hrs, Volume= 1,298 cf  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

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Peak Elev= 313.18' @ 12.49 hrs Surf.Area= 274 sf Storage= 402 cf

Plug-Flow detention time= 48.1 min calculated for 1,298 cf (100% of inflow)

Center-of-Mass det. time= 47.9 min ( 777.0 - 729.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	253 cf	<b>11.17'W x 24.50'L x 3.54'H Field A</b> 969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#2A	311.50'	335 cf	<b>Cultec R-330XLHD x 6 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		589 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.05 cfs @ 11.53 hrs HW=311.04' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=311.00' (Free Discharge)

↑**2=Orifice/Grate** ( Controls 0.00 cfs)

**Summary for Pond 12P: ROOF INF 2**

Inflow Area = 2,500 sf, 100.00% Impervious, Inflow Depth > 6.23" for 100-yr event  
 Inflow = 0.48 cfs @ 12.00 hrs, Volume= 1,299 cf  
 Outflow = 0.14 cfs @ 12.25 hrs, Volume= 1,298 cf, Atten= 72%, Lag= 15.2 min  
 Discarded = 0.04 cfs @ 11.25 hrs, Volume= 1,207 cf  
 Primary = 0.10 cfs @ 12.25 hrs, Volume= 91 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Peak Elev= 314.22' @ 12.25 hrs Surf.Area= 195 sf Storage= 390 cf

Plug-Flow detention time= 65.1 min calculated for 1,298 cf (100% of inflow)

Center-of-Mass det. time= 64.9 min ( 794.0 - 729.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	311.00'	184 cf	<b>11.17'W x 17.50'L x 3.54'H Field A</b> 692 cf Overall - 231 cf Embedded = 461 cf x 40.0% Voids
#2A	311.50'	231 cf	<b>Cultec R-330XLHD x 4 Inside #1</b> Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 2 rows
		415 cf	Total Available Storage

Storage Group A created with Chamber Wizard

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Device	Routing	Invert	Outlet Devices
#1	Discarded	311.00'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	314.00'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.04 cfs @ 11.25 hrs HW=311.04' (Free Discharge)

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

**Primary OutFlow** Max=0.10 cfs @ 12.25 hrs HW=314.22' (Free Discharge)

↳ **2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.60 fps)