


Eastern Land Survey Associates, Inc.

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STORMWATER REPORT for 78 MOUNTAIN ROAD BURLINGTON, MASSACHUSETTS

MARCH 2023

Prepared by:
Clayton A. Morin, PE
Eastern Land Survey Associates Inc.
104 Lowell Street
Peabody, MA 01960



Clayton A. Morin

F 20233

104 LOWELL STREET
PEABODY, MASS. 01960

TELEPHONE: 978-531-8121

FAX: 978-531-5920



Purpose

The following report has been prepared to provide an estimate of runoff rate and volume increases which would result from the construction of a single family dwelling and driveway on the vacant lot at 78 Mountain Road in Burlington, Massachusetts. The anticipated effectiveness of the proposed best management practices is provided as well as an Operation and Maintenance Plan.

Existing Conditions

The site is located at the westerly end of Mountain Road in Burlington, Massachusetts and consists of 20,130 square feet of land. A single family dwelling is located east of the property and commercial property to the south and west. Most of the site is encumbered by a power easement. The site slopes from the southeast to the northwest and is tributary to a watercourse east of the subject property. That watercourse has an associated 200 foot riverfront, within which work is proposed. There is also an area of 100 foot buffer zone associated with bordering vegetated wetlands, also located east of the site. No new construction is proposed within that buffer zone.

The NCRS Web Soil Survey Database indicates the site to be underlain by Charlton-Hollis Rock Outcrop Complex Soils. Such soils are classified as Hydrologic Soil Group B & D. The soil type was verified by on site soil testing and evaluation by Alexander Parker, a Massachusetts Licensed Soil Evaluator on March 9, 2023. Five test holes were excavated and evaluated within the area of proposed construction. Sandy Loam soils were found in the C Horizon with Bedrock encountered at depths of 88 to 115 inches below existing grade.

Proposed Conditions

It is the applicant's proposal to construct a single family dwelling and driveway in the northeast portion of the site, as depicted upon the accompanying plan. The area of land disturbance associated with that activity is 4,500 square feet, all of which is in the riverfront area.

The new homes will be serviced by municipal water, gas and sewer services from Mountain Road. The areas of impervious coverage are as follows:

Proposed House:	1,250 square feet
Proposed Driveway and Walk	700 square feet
Proposed Deck and Steps	215 square feet
Total Impervious Coverage	2,165 square feet

Utilizing TR20 modeling, the runoff characteristics resulting from the conversion of the site from 13,300 SF of wooded area to 21,65 SF of impervious area and 11,135 SF of open space (without mitigation) would be as follows:

Rainfall Event	<u>Predevelopment</u>		<u>Post Development</u>	
	Runoff Rate (CFS)	Runoff Volume (CF)	Runoff Rate (CFS)	Runoff Volume (CF)
1 year	0	89	.10	377
2 year	.02	199	.19	620
10 year	.20	798	.52	1,584
100 year	.90	3,113	1.50	4,609

Three infiltration trenches/drip edges and one precast drywall are proposed to provide a reasonable volume of runoff control using stormwater storage and infiltration to minimize the increase in peak flow in the watercourse down stream of the discharge point for the runoff.

The results of the analysis of the proposed on site best management practices are as follows:

Rainfall Event	Increase Runoff Volume (CF)	Storage and Infiltration Volume (CF)	Post Development Runoff Volume Increase (CF)
1 year	288 cf	966 cf	0
2 year	421 cf	966 cf	0
10 year	796 cf	966 cf	0
100 year	1,496 cf	966 cf	530 cf

The proposed system is of sufficient capacity to satisfy the goals stated in the Burlington Wetland Regulations.

Computations of the runoff characteristics are provided in a subsequent section of this document. Please note that the runoff subcatchment areas were too small in the proposed condition to utilize a HydroCAD model to estimate stage/storage/discharge in each of the best management practices. Therefore, a volumetric analysis was used to provide an estimate of the effectiveness of the system.

A recommended Operation and Maintenance Plan is also included within this document.

RUNOFF CALCULATIONS

MOUNTAIN AVE. BURLINGTON

Prepared by Hewlett-Packard Company

HydroCAD® 10.00-25 s/n 06709 © 2019 HydroCAD Software Solutions LLC

NRCC 24-hr D 1-Year Rainfall=2.64"

Printed 3/21/2023

Summary for Subcatchment 2S: EXISTING CONDITION

Runoff = 0.00 cfs @ 13.10 hrs, Volume= 0.002 af, Depth> 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 1-Year Rainfall=2.64"

Area (sf)	CN	Description
13,300	55	Woods, Good, HSG B
13,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	100	0.1400	0.17		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.10"

MOUNTAIN AVE. BURLINGTON

Prepared by Hewlett-Packard Company

HydroCAD® 10.00-25 s/n 06709 © 2019 HydroCAD Software Solutions LLC

NRCC 24-hr D 100-Year Rainfall=8.62"

Printed 3/21/2023

Events for Subcatchment 2S: EXISTING CONDITION

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)	Volume (CF)
1-Year	2.64	0.00	0.002	0.08	89
2-Year	3.16	0.02	0.005	0.18	199
10-Year	4.77	0.20	0.018	0.72	798
100-Year	8.62	0.90	0.072	2.81	3,113

SAMPLE CALCULATION

$$\frac{0.08''}{12''/ft} \times 13,300 SF = 88.7, \text{ SAY } 89 CF$$

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Summary for Subcatchment 3S: PROPOSED CONDITION

Runoff = 0.10 cfs @ 12.15 hrs, Volume= 0.009 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 1-Year Rainfall=2.64"

Area (sf)	CN	Description
* 2,165	98	IMPERVIOUS
11,135	61	>75% Grass cover, Good, HSG B
13,300	67	Weighted Average
11,135		83.72% Pervious Area
2,165		16.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	100	0.1400	0.25		Sheet Flow, Grass: Dense n= 0.240 P2= 3.10"

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NRCC 24-hr D 100-Year Rainfall=8.62"

Prepared by Hewlett-Packard Company

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Events for Subcatchment 3S: PROPOSED CONDITION

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)	VOLUME (CCF)
1-Year	2.64	0.10	0.009	0.34	377
2-Year	3.16	0.19	0.014	0.56	620
10-Year	4.77	0.52	0.037	1.43	1,584
100-Year	8.62	1.50	0.106	4.16	4,609

WATER QUALITY VOLUMES

STORAGE VOLUMES IN INFILTRATION BEST MANAGEMENT PRACTICES

VOID RATIO IN STONE = 0.40

1. DRIP EDGE #1 L=20' W=4' D=3'

$$V = 20 \times 4 \times 3 \times 0.4 = 96 \text{ CF}$$

2. DRIP EDGE #2 L=32' W=3' D=3'

$$V = 32 \times 3 \times 3 \times 0.4 = 115 \text{ CF}$$

3. DRIP EDGE #3 L=36' W=3' D=3.5'

$$V = 36 \times 3 \times 3.5 = 151 \text{ CF}$$

4. LEACH CHAMBER

CHAMBER = 80 CF

STONE = (210 CF - 80 CF) \times 0.4 = 52 CF

TOTAL = 132 CF \times 2 CHAMBERS = 264 CF

TOTAL STORAGE VOLUME = 96 CF + 115 CF + 151 CF + 264 CF
= 626 CF

EXFILTRATION VOLUMES

PER THE RAINFALL CURVE, 80% OF THE RAINFALL OCCURS OVER A 12 HOUR PERIOD.

SANDY LOAM SOILS - RAWLS RATE = 1.02"/HR

TOTAL BOTTOM AREA = 334 SF

EXFILTRATION VOLUME = 334 \times 1.02 \times $\frac{12 \text{ HR}}{12" / \text{FT}}$ = 340 CF

TOTAL COMBINED STORAGE + EXFILTRATION V = 966 CF

EASTERN LAND SURVEY ASSOCIATES, INC.

Christopher R. Mello PLS
 104 Lowell Street
 PEABODY, MA 01960
 (978) 531-8121

JOB 78 MOUNTAIN ROAD BURLINGTON

SHEET NO. 2 OF 2

CALCULATED BY LM DATE 3/23

CHECKED BY [Signature] DATE *

SCALE _____

TABLE OF RUNOFF CHANGES
 78 MOUNTAIN AVENUE BURLINGTON, MA.

RAINFALL EVENT	PREDEVELOPMENT RUNOFF (CF)	POSTDEVELOPMENT RUNOFF (CF)	INCREASE (CF)	MULTIPLICATION	INCREASE (CF)	POTENTIAL INCREASE (CF)
1 YEAR	89	377	288	966	966	-0-
2 YEAR	199	620	421	966	966	-0-
10 YEAR	798	1584	796	966	966	-0-
100 YEAR	3113	4609	1496	966	966	530

IT IS ANTICIPATED THAT SITE RUNOFF RATES WILL NOT INCREASE DURING THE 1, 2 OR 10 YEAR STORMS AND MINIMALLY IN THE 100 YEAR STORM.

OPERATION AND MAINTENANCE PLAN

**Operation and Management Plan
for
78 Mountain Road
Burlington, Massachusetts**

Stormwater Management System Owner:	K&B Gillis Family Trust or its heirs assigns
Party Responsible for the Plan:	Homeowner
Schedule for Plan Implementation:	See attached Stormwater O&M Schedule
Plan Showing all Stormwater BMPs	Site Development Permit Plan 78 Mountain Road Burlington
Estimated Budget:	\$400/year, unless done by Homeowner (not including sediment removal)
Log Form	See attached

Summary of Operation and Maintenance Plan

The various requirement for inspection and maintenance shall take effect once all disturbed areas have been permanently stabilized, all construction has been completed and erosion control barriers have been removed.

The infiltration systems are each to have one inspection port brought to finish grade. The homeowner can inspect the ports to be certain that there is no accumulation of sediment nor long-term standing water (i.e. more than 12 hours after a major storm event).

The area around the overflow outlets should also be inspected for any evidence of regular discharge or erosion. Any eroded areas should be repaired as necessary. Sediment removal from the chamber in the underground system should be done by a qualified maintenance firm.

Stormwater Management Operation and Maintenance Schedule

Property: _____

Date: _____

BMP	Frequency	Date Performed	Comments	Cleaning/Repair Needed? Yes/No	Date of Cleaning/Repair	Performed By
<u>Subsurface Infiltration System</u> Inspect for proper functioning	After every major storm during first three months and twice per year thereafter.					
Roof Drain Overflows Inspect for proper functioning	Clean any accumulated sediment around outlet. Regular overflows are indicative of problems with the infiltration basin.					