

EVERETT M.
BROOKS
COMPANY

PROJECT ADDRESS: 79 Shornecliffe Road
Newton, MA

PROJECT NO.: 24226

SHEET: 1

OF: 9

CALCULATIONS BY: ES

DATE: 5/14/14

CHECKED BY: MSK

DATE: 5/14/14

DRAINAGE CALCULATIONS

RATIONAL METHOD $Q = ciA$
RAINFALL INTENSITY (i) FROM U.S. WEATHER BUREAU T.P. 40
RUNOFF COEFFICIENTS (c): 0.30 GRASS
0.45 WOODS
0.90 IMPERVIOUS

EXISTING CONDITIONS

AREA = 0.47 ACRES
 $T_c = 7$ MINUTES $i(100) = 8.8$ IN/HR

$$c = \frac{(0.14)(0.90) + (0.13)(0.45) + (0.20)(0.30)}{(0.47)} = 0.52$$

$$Q(100) = (0.52)(8.8 \text{ IN/HR})(0.47 \text{ AC}) = \underline{2.15 \text{ CFS}}$$

PROPOSED CONDITIONS (UNDETAINED)

AREA = 0.47 ACRES
 $T_c = 7$ MINUTES $i(100) = 8.8$ IN/HR

$$c = \frac{(0.16)(0.90) + (0.06)(0.45) + (0.25)(0.30)}{(0.47)} = 0.52$$

$$Q(100) = (0.52)(8.8 \text{ IN/HR})(0.47 \text{ AC}) = \underline{2.15 \text{ CFS}}$$

PROPOSED CONDITIONS (DETAINED)

AREA = 0.39 ACRES
 $T_c = 7$ MINUTES $i(100) = 8.8$ IN/HR

$$c = \frac{(0.09)(0.90) + (0.06)(0.45) + (0.24)(0.30)}{(0.39)} = 0.46$$

$$Q(100) = (0.46)(8.8 \text{ IN/HR})(0.39 \text{ AC}) = \underline{1.58 \text{ CFS}}$$

PEAK FLOW DECREASE = 0.57 CFS

Note: See Plan entitled "Site Plan of Land in Newton, MA, 79 Shornecliffe Road."

RECEIVED
NEWTON CITY CLERK
2014 MAY 15 AM 11:37
DAVID A. OLSON, OMC
NEWTON, MA 02459



5/14/14

 ***** Q-CADD: TR_20 *****

 PROJECT ID: 79 SHORNECLIFFE COMPUTED BY: ES DATE: PAGE: 2

WATERSHED: CATCH BASIN

INPUT DATA

 FREQUENCY: 5.00 years
 24-HR.SCS TYPE III RAINDFALL: 3.95 inches
 AREA: 0.08 acres
 LENGTH: 84.00 feet
 SLOPE: 8.600 percent
 CURVE NUMBER: 82.00 *
 IMPERVIOUS AREA: 0.05 acres
 HYD. LENGTH IMPROVED: 0.00 feet
 POND/ SWAMP FACTOR: 1.00 *

(PONDS/ SAMPS NO CORRECTION)

COMPUTED DATA

 LAG CORR. (IMPERV. SURF.) 0.679 *
 LAG CORR. (HYD.LEN.MOD.): 1.000 *
 WATERSHED LAG: 0.010 hours
 TIME OF CONCENTRATION: 0.016 hours
 RUNOFF DEPTH: 1.878 inches
 RUNOFF VOLUME: 0.013 acre-feet
 TIME OF PEAK: 12.100 hours
 PEAK FLOW: 0.17 c.f.s.

***** Q-CADD: TR 20 *****

PROJECT ID: 79 SHORNECLIFFE COMPUTED BY: ES DATE: PAGE: 3

WATERSHED: PART REAR ROOF RUNOFF

INPUT DATA

FREQUENCY:	5.00	years
24-HR.SCS TYPE III RAINFALL:	3.95	inches
AREA:	0.01	acres
LENGTH:	50.00	feet
SLOPE:	25.00	percent
CURVE NUMBER:	98.00	*
IMPERVIOUS AREA:	0.01	acres
HYD. LENGTH IMPROVED:	0.00	feet
POND/ SWAMP FACTOR:	1.00	*

(PONDS/ SAMPS NO CORRECTION)

COMPUTED DATA

LAG CORR. (IMPERV. SURF.)	0.866	*
LAG CORR. (HYD.LEN.MOD.):	1.000	*
WATERSHED LAG:	0.002	hours
TIME OF CONCENTRATION:	0.004	hours
RUNOFF DEPTH:	2.008	inches
RUNOFF VOLUME:	0.002	acre-feet
TIME OF PEAK:	12.100	hours
PEAK FLOW:	0.02	c.f.s.

EVERETT M.
BROOKS
COMPANY

PROJECT ADDRESS: 79 Shornecliffe Road
Newton, MA

PROJECT NO.: 24226

SHEET: 4

OF:

CALCULATIONS BY: ES

DATE: 5/14/14

CHECKED BY: MSK

DATE:

LEACHING GALLEY DESIGN #1

(SIZED FOR 5-YR STORM)

PROVIDE FIVE (5) LEACHNG GALLEYS 4' X 4' X 2.0' DEEP, WITH 4.0' STONE ON THE SIDES OF THE GALLEYS AND 6" OF STONE BENEATH THE ENTIRE SYSTEM.

CAPACITY

$$Q = \frac{A(1+n)}{60(12PR)}$$

Q = OUTFLOW (CFS)

A = EFFECTIVE LEACHING AREA (S.F.)

n = POROSITY OF SOIL

PR = PERCOLATION RATE (MPI)

AREA

SIDEWALL	=	(28)(2.5)(2)+(12)(2.5)(2)	=	200 S.F.
BOTTOM	=	(28)(12)	=	336 S.F.
			=	536 S.F.

VOLUME

LINER	=	(20)(4)(2.0)	=	160 C.F.
STONE	=	[(28)(12)(2.5)-160]*(0.4)	=	272 C.F.
			=	432 C.F.

CAPACITY

$$Q = \frac{536(1.3)}{60(12(60))} = 0.0161 \text{ C.F.S.}$$

Note: See Plan entitled "Site Plan of Land in Newton, MA, 79 Shornecliffe Road."

***** Q-CADD: TR_20 *****

PROJECT ID: 79 SHORNECLIFFE COMPUTED BY: ES DATE: PAGE: 5

DETENTION BASIN FILE NAME: GALL#1

Point (#)	Stage (feet)	Storage (cu. Ft.)	Discharge (cfs)
01	0.00	0.0	0.00
02	2.50	432.0	0.02

WATERSHED: PART FRONT ROOF RUNOFF

INPUT DATA

FREQUENCY:	100.00	years
24-HR.SCS TYPE III RAINDFALL:	7.00	inches
AREA:	0.02	acres
LENGTH:	50.00	feet
SLOPE:	25.00	percent
CURVE NUMBER:	98.00	*
IMPERVIOUS AREA:	0.02	acres
HYD. LENGTH IMPROVED:	0.00	feet
POND/ SWAMP FACTOR:	1.00	*

(PONDS/ SAMPS NO CORRECTION)

COMPUTED DATA

LAG CORR. (IMPERV. SURF.)	0.866	*
LAG CORR. (HYD.LEN.MOD.):	1.000	*
WATERSHED LAG:	0.002	hours
TIME OF CONCENTRATION:	0.004	hours
RUNOFF DEPTH:	3.654	inches
RUNOFF VOLUME:	0.005	acre-feet
TIME OF PEAK:	12.100	hours
PEAK FLOW:	0.06	c.f.s.

 ***** Q-CADD: TR_20 *****

 PROJECT ID: 79 SHORNECLIFFE COMPUTED BY: ES DATE: PAGE: 7

WATERSHED: SIDE PATIO

INPUT DATA

 FREQUENCY: 100.00 years
 24-HR.SCS TYPE III RAINFALL: 7.00 inches
 AREA: 0.01 acres
 LENGTH: 10.00 feet
 SLOPE: 1.00 percent
 CURVE NUMBER: 98.00 *
 IMPERVIOUS AREA: 0.01 acres
 HYD. LENGTH IMPROVED: 0.00 feet
 POND/ SWAMP FACTOR: 1.00 *

(PONDS/ SAMPS NO CORRECTION)

COMPUTED DATA

 LAG CORR. (IMPERV. SURF.) 0.866 *
 LAG CORR. (HYD.LEN.MOD.): 1.000 *
 WATERSHED LAG: 0.003 hours
 TIME OF CONCENTRATION: 0.005 hours
 RUNOFF DEPTH: 3.961 inches
 RUNOFF VOLUME: 0.003 acre-feet
 TIME OF PEAK: 12.100 hours
 PEAK FLOW: 0.03 c.f.s.

**EVERETT M.
BROOKS
COMPANY**

PROJECT ADDRESS: 79 Shorncliffe Road
Newton, MA

PROJECT NO.: 24226

SHEET: 8 OF:

CALCULATIONS BY: ES DATE: 5/14/14

CHECKED BY: MSK DATE:

LEACHING GALLEY DESIGN #3

(SIZED FOR 100-YR STORM)

PROVIDE THREE (3) LEACHING GALLEYS 4' X 4' X 2.0' DEEP, WITH 3.0' STONE ON THE SIDES OF THE GALLEYS AND 6" OF STONE BENEATH THE ENTIRE SYSTEM.

CAPACITY

$$Q = \frac{A(1+n)}{60(12PR)}$$

Q = OUTFLOW (CFS)
A = EFFECTIVE LEACHING AREA (S.F.)
n = POROSITY OF SOIL
PR = PERCOLATION RATE (MPI)

AREA

SIDEWALL	=	(18)(2.5)(2)+(10)(2.5)(2)	=	140 S.F.
BOTTOM	=	(18)(10)	=	<u>180 S.F.</u>
				320 S.F.

VOLUME

LINER	=	(12)(4)(2.0)	=	96 C.F.
STONE	=	[(18)(10)(2.5)-96]*(0.4)	=	<u>142 C.F.</u>
				238 C.F.

CAPACITY

$$Q = \frac{320(1.3)}{60(12(60))} = 0.0096 \text{ C. F. S.}$$

Note: See Plan entitled "Site Plan of Land in Newton, MA, 79 Shorncliffe Road."

***** Q-CADD: TR_20 *****

PROJECT ID: 79 SHORNECLIFFE COMPUTED BY: ES DATE: PAGE: 9

DETENTION BASIN FILE NAME: GALL#3

Point (#)	Stage (feet)	Storage (cu. Ft.)	Discharge (cfs)
01	0.00	0.0	0.00
02	2.50	238.0	0.01