TSS Removal Calculations

INSTRUCTIONS:

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Non-automated: Mar. 4, 2008

Location: Great Road, Acton, MA

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Hooded Catchbasin	25%	1.00	0.25	0.75
Clay Basin (Conservative)	25%	0.75	0.19	0.56
Infiltration Basin	80%	0.56	0.45	0.11

Total TSS Removal = 89%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: The Meadows of Acton
Prepared By: BRE
Date: 3/29/2012

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

CDS ESTIMATED NET ANNUAL TSS REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

CONTECH® CONSTRUCTION PRODUCTS INC.

CDS TECHNOLOGIES

ACTON MEADOWS
ACTON, MA
for SYSTEM: WQU

Area	0.57	acres	CDS Model
Weighted C	0.90		2015-4
Tc	5	minutes	CDS Treatment Capacity
			1.4

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Removal Efficiency (%)	Incremental Removal (%)
0.02	10.2%	10.2%	0.01	0.01	100.0	10.2
0.04	9.6%	19.8%	0.02	0.02	100.0	9.6
0.06	9.4%	29.3%	0.03	0.03	100.0	9.4
0.08	7.7%	37.0%	0.04	0.04	100.0	7.7
0.10	8.6%	45.6%	0.05	0.05	99.6	8.5
0.12	6.3%	51.9%	0.06	0.06	99.3	6.3
0.14	4.7%	56.5%	0.07	0.07	98.9	4.6
0.16	4.6%	61.2%	0.08	0.08	98.6	4.6
0.18	3.5%	64.7%	0.09	0.09	98.2	3.5
0.20	4.3%	69.1%	0.10	0.10	97.9	4.3
0.25	8.0%	77.1%	0.13	0.13	97.0	7.8
0.30	5.6%	82.7%	0.15	0.15	96.2	5.4
0.35	4.4%	87.0%	0.18	0.18	95.3	4.2
0.40	2.5%	89.5%	0.21	0.21	94.4	2.4
0.45	2.5%	92.1%	0.23	0.23	93.5	2.4
0.50	1.4%	93.5%	0.26	0.26	92.7	1.3
0.75	5.0%	98.5%	0.38	0.38	88.3	4.5
1.00	1.0%	99.5%	0.51	0.51	84.0	0.9
1.50	0.0%	99.5%	0.77	0.77	75.3	0.0
2.00	0.0%	99.5%	1.03	1.03	66.6	0.0
3.00	0.5%	100.0%	1.54	1.40	49.0	0.2
						97.6

Removal Efficiency Adjustment[2] =	6.5%
Predicted % Annual Rainfall Treated =	93.5%
Predicted Net Annual Load Removal Efficiency =	**91.1%**

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Project:	**Acton Meadows**
Location:	***Acton, MA***
Prepared For:	**Ben Ewing (Stamski & McNary)**

Purpose: To calculate the first flush runoff flow rate (WQF) over a given site area. In this situation the WQV to be analyzed is the runoff produced by the first 1.0" of rainfall.

Reference:

United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Given:

Structure Name	A (acres)	A (miles^2)	Runoff Coefficient	Percent Imp. (%)*	t_c (min)	t_c (hr)
WQU	0.57	0.00089	0.9	100.00	5	0.083

* Assumes runoff coefficient of 0.3 for pervious areas and 0.9 for impervious areas.

Procedure: The Water Quality Flow (WQF) is calculated using the Water Quality Volume (WQV). This WQV, converted to watershed inches, is substituted for the runoff depth (Q) in the Natural Resources Conservation Service (formerly Soil Conservation Service), TR-55 Graphical Peak Discharge Method.

1. Compute WQV in watershed inches using the following equation:

$$WQV = P * R$$

where: WQV = water quality volume (watershed inches)
P = design precipitation (inches) = (1.0" for water quality storm)
R = volumetric runoff coefficient = 0.05 + 0.009(I)
I = percent impervious cover

Structure Name	Percent Imp. (%)	R	P (in)	WQV (in)	WQV (ac-ft)
WQU	100.00	0.950	1.0	0.950	0.0451

2. Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using Figure 2-1 from TR-55 (USDA, 1986):

$$CN = 1000 / [10+5P+10Q-10(Q^2+1.25QP)^{1/2}]$$

where: CN = Runoff Curve Number
P = design precipitation (inches) = (1.0" for water quality storm)
Q = runoff depth (watershed inches)

Structure Name	Q (in)	CN
WQU	0.950	99.57

3. Using computed CN, read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55; compute I_a/P, interpolating when appropriate.

Structure Name	I_a (in)	I_a/P
WQU	0.041	0.041

4. Compute the time of concentration (t_c) in hours and the drainage area in square miles. A minimum t_c of 0.167 hours (10 minutes) should be used.

Structure Name	t_c (hr)	A (miles^2)
WQU	0.167	0.00089

5. Read the unit peak discharge (q_u) from Exhibit 4-III in Chapter 4 of TR-55 for appropriate t_c for type III rainfall distribution.

Structure Name	t_c (hr)	I_a/P	q_u (csm/in)
WQU	0.167	0.041	650

6. Substituting WQV (watershed inches) for runoff depth (Q), compute the water quality flow (WQF) from the following equation:

$$WQF = (q_u)*(A)*(Q)$$

where: WQF = water quality flow (cfs)
q_u = unit peak discharge (cfs/mi^2/inch)
A = drainage area (mi^2)
Q = runoff depth (watershed inches)

Structure Name	q_u (csm/in)	A (miles^2)	Q (in)	WQF (cfs)
WQU	650	0.00089	0.950	0.55

Drywell Sizing Calculations

Drywell Sizing Calculations

SM-4810

Project: Great Road By: GD Date: 1/31/2012

Location: Acton MA Checked: Date:

Mitigation:

- 1 infiltration bed using Cultec Recharger 330XL Chambers with a 1'stone around the chamber.

- The drywell has been sized for a 100yr storm event.

Infilration Bed Sizing

Number of Cultec Units:	1	
Storage Volume per unit:	96.24	C.F. (Based on 1' of sand overdig)
Total Storage Volume	140	C.F.
Inf. Bed width:	6.33	Ft.
Inf. Bed length:	10.5	Ft.
Volume of Stone	43.3	C.F.
Inf. Bed area:	66	S.F.

Infiltration Volume Calculation

$$66 \text{ S.F.} \times \frac{1 \text{ in.}}{2 \text{ min.}} \times \frac{1 \text{ Ft.}}{12 \text{ in.}} \times \frac{60 \text{ Min.}}{1 \text{ Hr}} \times \frac{6 \text{ Hr}}{1 \text{ Storm}}$$

= 997 C.F.

Total Sotrage and Infiltration= 140 C.F. + 997 C.F. = 1,137 C.F.

Runoff Calculation

Roof Area:	1,770	S.F.
100 YR Storm event	6.4	in / 24 hr

Volume: $6.4 \text{ in.} \times \frac{1 \text{ Ft}}{12 \text{ in}} \times 1{,}770 \text{ S.F.} =$ 944 C.F.

Drywell Capicty	Vs.	Runoff
1,137	>	944
C.F.		C.F.

Soil Testing

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

ANTHONY J. RUGGIERO, JR.
Owner Name

263 - 265 GREAT ROAD
Street Address

Map/Lot #

ACTON
City

MA
State

01720
Zip Code

B. Site Information

1. (Check one) ☑ New Construction ☐ Upgrade ☐ Repair

2. Published Soil Survey Available? ☑ Yes ☐ No If yes: ONLINE (Year Published) _____ (Publication Scale) _____ (Soil Map Unit)

   HINCKLEY LOAMY SAND
   Soil Name

   Soil Limitations

3. Surficial Geological Report Available? ☑ Yes ☐ No If yes: _____ (Year Published) _____ (Publication Scale) _____ (Map Unit)

   SAND & GRAVEL
   Geologic Material

   Landform

4. Flood Rate Insurance Map

   Above the 500-year flood boundary? ☑ Yes ☐ No Within the 100-year flood boundary? ☐ Yes ☑ No

   Within the 500-year flood boundary? ☐ Yes ☑ No Within a velocity zone? ☐ Yes ☑ No

5. Wetland Area: National Wetland Inventory Map — Map Unit: UPLANDS — Name: _____

   Wetlands Conservancy Program Map — Map Unit: UPLANDS — Name: _____

6. Current Water Resource Conditions (USGS): 8/2011 (Month/Year) Range: ☑ Above Normal ☐ Normal ☐ Below Normal

7. Other references reviewed: _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program

263-265 GREAT RD
Site Address or Map/Lot Number

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 8/30/11 (Date) 4:30 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

   Deep Hole Number TP-1 Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones: / — Slope (%): 0-5%

   Vegetation: GRASS — Landform: _____ — Position on landscape (attach sheet): _____

3. Distances from: Open Water Body >100' (feet) Drainage Way >100' (feet) Possible Wet Area >100' (feet)

   Property Line >10' (feet) Drinking Water Well >100' (feet) Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☑

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

   If Yes: Depth Weeping from Pit / Depth Standing Water in Hole /

   Estimated Depth to High Groundwater: 144" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program

263-265 GREAT RD
Site Address or Map/Lot Number

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole A: Deep Hole Number: TP-1

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-9"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
9-20"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	—	MASSIVE	FRIABLE	
20-144"	C	2.5Y 5/3	144"	HIGH & LOW CHROM	>5%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 6/30/11 (Date) 9:45 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

Deep Hole Number TP-2 Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones: — Slope (%): 0-5%

Vegetation: GRASS — Landform: _____ — Position on landscape (attach sheet): _____

3. Distances from: Open Water Body >100' feet Drainage Way >100' feet Possible Wet Area >100' feet

Property Line >10' feet Drinking Water Well >100' feet Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☑

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 144" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

Deep Observation Hole A: Deep Hole Number: TP-2

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
8-18"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	—	MASSIVE	FRIABLE	
18-144"	C	2.5Y 5/3	144"	HIGH & LOW CHROMA	>5%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 4/30/11 (Date) 9:00 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

Deep Hole Number TP-3 Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones — Slope (%) 0-5%

Vegetation GRASS — Landform _____ — Position on landscape (attach sheet)

3. Distances from: Open Water Body >100' feet Drainage Way >100' feet Possible Wet Area >100' feet

Property Line >10' feet Drinking Water Well >100' feet Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☑

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: >144" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

Deep Observation Hole A: Deep Hole Number: TP-3

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-11"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
11-21"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	1	MASSIVE	FRIABLE	
21-144"	C	2.5Y 5/3	—	—	—	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT Rd
Site Address or Map/Lot Number

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 8/30/11 (Date) 9:20 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

Deep Hole Number TP-4 Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones: — — Slope (%): 0-5%

Vegetation: GRASS — Landform: _____ — Position on landscape (attach sheet): _____

3. Distances from: Open Water Body 710' (feet) Drainage Way 710' (feet) Possible Wet Area 710' (feet)
Property Line 710' (feet) Drinking Water Well 710' (feet) Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☑

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

If Yes: Depth Weeping from Pit — Depth Standing Water in Hole —

Estimated Depth to High Groundwater: 130" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT Rd
Site Address or Map/Lot Number

Deep Observation Hole A: Deep Hole Number: TP-4

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles) Depth	Color	Percent	Soil Texture (USDA)	Coarse Fragments % by Volume Gravel	Cobbles & Stones	Soil Structure	Soil Consistence (Moist)	Other
0-8"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
8-18"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	—	MASSIVE	FRIABLE	
18-144"	C	2.5Y 5/3	130"	HIGH & LOW CHROMA	>5%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program

263-265 GREAT RD
Site Address or Map/Lot Number

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review

(minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 8/30/11 (Date) 9:40 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

   Deep Hole Number TP-5 Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — (Surface Stones) — 0-5% (Slope (%))

   GRASS (Vegetation) — (Landform) — (Position on landscape (attach sheet))

3. Distances from: Open Water Body >100' (feet) Drainage Way >100' (feet) Possible Wet Area >100' (feet)

   Property Line >10' (feet) Drinking Water Well >100' (feet) Other _____

4. Parent Material: OUT-WASH Unsuitable Materials Present: Yes ☐ No ☑

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☑

   If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

   Estimated Depth to High Groundwater: 112" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program

263-265 GREAT RD
Site Address or Map/Lot Number

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole A: Deep Hole Number: TP-5

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-15"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
15-26"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	1	MASSIVE	FRIABLE	
26-144"	C	2.5Y 5/3	112"	HIGH & low CHROMA	>5%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program

263-265 GREAT RD
Site Address or Map/Lot Number

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed disposal area)*

Deep Observation Hole A: 8/2/11 (Date) 10:00 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

   Deep Hole Number TP-6 Ground Elevation at Surface of Hole _____

   Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones ✓ — Slope (%) 0-5%

   Vegetation GRASS — Landform _____ — Position on landscape (attach sheet) _____

3. Distances from: Open Water Body 7100' feet — Drainage Way 7100' feet — Possible Wet Area 7100' feet

   Property Line 710' feet — Drinking Water Well 7100' feet — Other _____

4. Parent Material: OUTWASH — Unsuitable Materials Present: Yes ☐ No ☑

   If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☑ No ☐

   If Yes: Depth Weeping from Pit 100" — Depth Standing Water in Hole ✓

   Estimated Depth to High Groundwater: 48" (inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program

263-265 GREAT RD
Site Address or Map/Lot Number

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Deep Observation Hole A: Deep Hole Number: TP-6

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10"	A	10YR 5/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
10-20"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	—	MASSIVE	FRIABLE	
20-120"	C	2.5Y 5/3	48"	HIGH & LOW CHROMA	75%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 6/30/11 (Date) 10:20 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

Deep Hole Number TP-7 Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones — 0-5% Slope (%)

GRASS Vegetation — Landform — Position on landscape (attach sheet)

3. Distances from: Open Water Body >100' feet Drainage Way >100' feet Possible Wet Area >100' feet

Property Line >10' feet Drinking Water Well >100' feet Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☑

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☑ No ☐

If Yes: Depth Weeping from Pit 94" Depth Standing Water in Hole 94"

Estimated Depth to High Groundwater: 50" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

Deep Observation Hole A: Deep Hole Number: TP-7

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-14"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
14-29"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	—	MASSIVE	FRIABLE	
29-120"	C	2.5Y 5/3	50"	HIGH & LOW CHROM	>5%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 4/30/11 (Date) 10:45 (Time) SUNNY (Weather)

1. Deep Observation Hole Logs

Deep Hole Number TP-8 Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: FIELD (e.g. woodland, agricultural field, vacant lot, etc.) — Surface Stones — 0-5% Slope (%)

GRASS Vegetation — Landform — Position on landscape (attach sheet)

3. Distances from: Open Water Body >100' feet Drainage Way >100' feet Possible Wet Area >75' feet

Property Line >10' feet Drinking Water Well >100' feet Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☑

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☑ No ☐

If Yes: Depth Weeping from Pit 60" Depth Standing Water in Hole 66"

Estimated Depth to High Groundwater: 34" (Inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREAT RD
Site Address or Map/Lot Number

Deep Observation Hole A: Deep Hole Number: TP-8

Depth (In.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-10"	A	10YR 3/2	—	—	—	SANDY LOAM	—	—	MASSIVE	FRIABLE	
10-21"	B	10YR 4/6	—	—	—	LOAMY SAND	5%	—	MASSIVE	FRIABLE	
21-84"	C	2.5Y 5/3	34"	HIGH & LOW CHROMA	>5%	SAND	5%	—	SINGLE GRAIN	LOOSE	

Additional Notes _____

Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A. Site Information

Owner Name: GREAT LO

Street Address or Lot #:

City/Town: ACTON | State: MA | Zip Code: 01720

Contact Person (if different from Owner): | Telephone Number:

B. Test Results

Date	8/30/11	8/30/11
Time	9:00	9:15
Observation Hole #	PT-A	PT-B
Depth of Perc	52"	50"
Start Pre-Soak	9:30	9:45
End Pre-Soak	075	075
Time at 12"	9:32:25	9:43:15
Time at 9"	9:32:45	9:
Time at 6"	9:33:17	9:44:25
Time (9"-6")	28 SEC	15 SEC
Rate (Min./Inch)	<2 MPI	<2 MPI
Test Passed:	☒	☒
Test Failed:	☐	☐

Test Performed By: STAMSKI AND McNARY, INC. (BENJAMIN EWING)

Witnessed By: ACTON BOARD OF HEALTH (

Comments:

Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A. Site Information

Owner Name

Street Address or Lot #

City/Town | State | Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date / Time	Date / Time
	8/30/11	8/30/11
Observation Hole #	PT-C	PT-D
Depth of Perc	63"	42"
Start Pre-Soak	9:55	10:05
End Pre-Soak	075	075
Time at 12"		10:07:00
Time at 9"		10:07:08
Time at 6"		10:07:26
Time (9"-6")		16 SEC
Rate (Min./Inch)	<2 MI	<2 MI
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☒ Test Failed: ☐

Test Performed By: STAMSKI AND McNARY, INC (BENJAMIN EWING)

Witnessed By: ACTON BOARD OF HEALTH

Comments:

Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

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Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A. Site Information

Owner Name

Street Address or Lot #

City/Town | State | Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date / Time	Date / Time
	8/30/11 10:30	
Observation Hole #	PT-E	
Depth of Perc	60"	
Start Pre-Soak	10:38	
End Pre-Soak	UTS	
Time at 12"	10:41:05	
Time at 9"	10:41:55	
Time at 6"	10:43:10	
Time (9"-6")	1:15	
Rate (Min./Inch)	<2 MPI 25 SEC/IN	
	Test Passed: ☒ Test Failed: ☐	Test Passed: ☐ Test Failed: ☐

Test Performed By: STAMSKI AND MINAHY, INC (BENJAMIN EWING)

Witnessed By: ACTON BOARD OF HEALTH

Comments:

Commonwealth of Massachusetts
City/Town of
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A. Site Information

Owner Name

Street Address or Lot #

City/Town | State | Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
Observation Hole #	PT-F			
Depth of Perc	48"			
Start Pre-Soak				
End Pre-Soak				
Time at 12"	11:40			
Time at 9"	11:41			
Time at 6"	11:42			
Time (9"-6")	1 MIN			
Rate (Min./Inch)	<2 MPI 75SEC			
	Test Passed: ☐ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Test Performed By:

Witnessed By:

Comments:

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

☐ Depth observed standing water in observation hole	A. * inches	B. * inches
☐ Depth weeping from side of observation hole	A. * inches	B. * inches
☐ Depth to soil redoximorphic features (mottles)	A. * inches	B. * inches
☐ Groundwater adjustment (USGS methodology)	A. * inches	B. * inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material

   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?

   ☑ Yes ☐ No

   b. If yes, at what depth was it observed? Upper boundary: * inches Lower boundary: * inches

* SEE SOIL LOGS

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	Date: 8/30/11
Typed or Printed Name of Soil Evaluator / License #: EVAN STIDHAM - #17686	Date of Soil Evaluator Exam: JULY 2008
Name of Board of Health Witness: JUSTIN SNAIR	Board of Health: ACTON

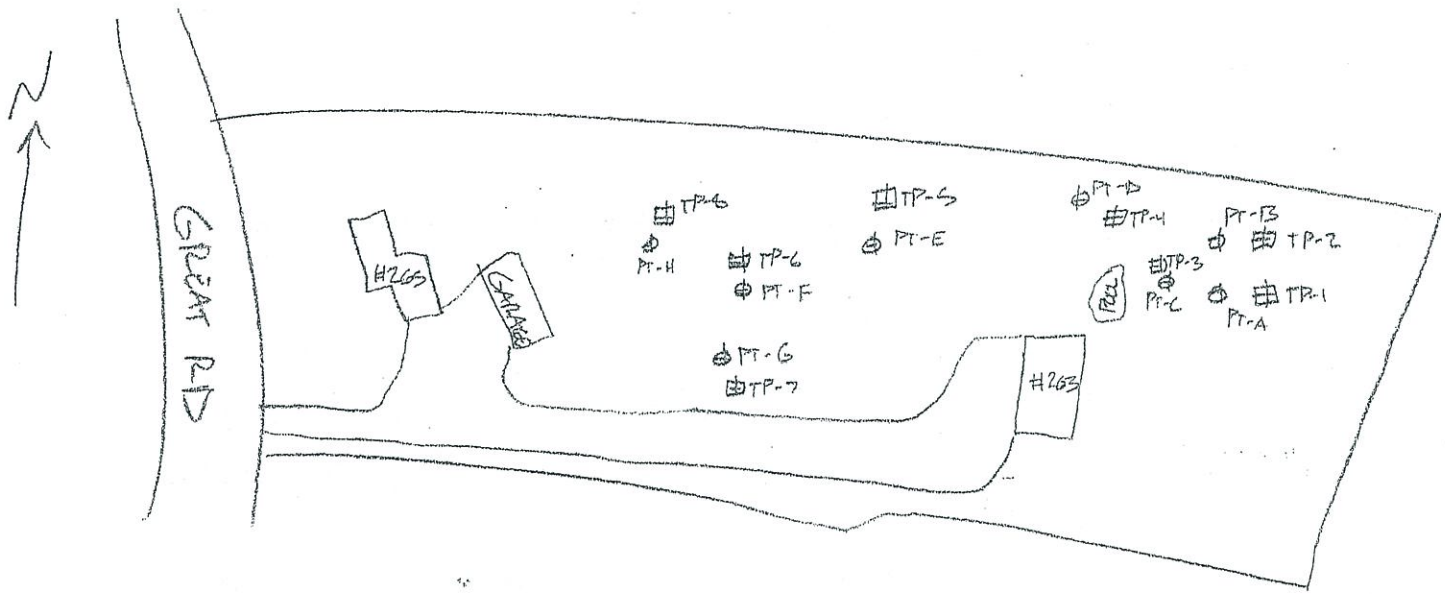
Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Field Diagrams

Use this sheet for field diagrams:



Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

Site Address or Map/Lot Number

C. On-Site Review (minimum of two holes required at every proposed disposal area)

Deep Observation Hole A: 2/29/12 (Date) 9:30 (Time) CLOUDY (Weather)

1. Deep Observation Hole Logs

Deep Hole Number _____ Ground Elevation at Surface of Hole _____

Location (Identify on Plan) _____

2. Land Use: _____ (e.g. woodland, agricultural field, vacant lot, etc.) Surface Stones _____ Slope (%) _____

Vegetation _____ Landform _____ Position on landscape (attach sheet) _____

3. Distances from: Open Water Body _____ feet Drainage Way _____ feet Possible Wet Area _____ feet

Property Line _____ feet Drinking Water Well _____ feet Other _____

4. Parent Material: OUTWASH Unsuitable Materials Present: Yes ☐ No ☐

If Yes: Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock ☐

5. Groundwater Observed: Yes ☐ No ☒

If Yes: Depth Weeping from Pit _____ Depth Standing Water in Hole _____

Estimated Depth to High Groundwater: 72" (inches) _____ (elevation)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wastewater Permitting Program
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

263-265 GREATER

Site Address or Map/Lot Number

Deep Observation Hole A: Deep Hole Number: TP-A1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles) Depth	Color	Percent	Soil Texture (USDA)	Coarse Fragments % by Volume Gravel	Cobbles & Stones	Soil Structure	Soil Consistence (Moist)	Other
0-12"	A	10 YR 3/2	—	—	—	LOAMY SAND	—	—	MASSIVE	FRIABLE	
12"-24"	B	10YR 5/6	—	—	—	LOAMY SAND	—	—	MASSIVE	FRIABLE	
24"-48"	C1	2.5Y 5/6	—	—	—	COARSE SAND	15%	—	SG	LOOSE	
48"-10'	C2	2.5Y 6/4	72"	7.5YR 5/8	5%	FINE SAND	—	—	SG	LOOSE	

Additional Notes _____