



(Source: Innovex.ca)



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# Sourcing Local Compost & Soils for Stormwater Projects

from a Composter's Perspective

## CSWD Mission

To reduce and manage the solid waste generated within Chittenden County in an environmentally sound, efficient, effective, and economical manner.









We process ~15,000 tons of organics annually including:

- ~6,000 tons food residuals
- ~6,000 tons leaf & yard debris









Static aerated piles  
Temperatures up to 160°F













Lots of Compost!



## Universal Recycling Law TIMELINE

**JULY 1  
2014**

- Transfer stations must accept recyclables
- Food scrap generators of 884 tons/year (2 tons/week) must divert material to any certified facility within 20 miles

**JULY 1  
2015**

- Statewide unit based pricing takes effect, requiring residential trash charges be based on volume or weight
- Recyclables are banned from the landfill
- Transfer stations/bag-drop haulers must accept leaf and yard debris seasonally (April 1 - December 15)
- Haulers must offer residential recycling collection at no separate charge
- Public buildings must provide recycling containers alongside all trash containers in public spaces (exception for restrooms)
- Food scrap generators of 52 tons/year (1 ton/week) must divert material to any certified facility within 20 miles

**JULY 1  
2016**

- Leaf, yard, and clear wood debris are banned from the landfill
- Food scrap generators of 26 tons/year (1/2 ton/week) must divert material to any certified facility within 20 miles

**JULY 1  
2017**

- Transfer stations/bag-drop haulers must accept food scraps
- Food scrap generators of 13 tons/year (1/3 ton/week) must divert material to any certified facility within 20 miles

**JULY 1  
2020**

- Food scraps are banned from the landfill
- Haulers must offer food scrap collection



# Benefits of Compost



- ★ Supports healthy plant growth
- ★ Creates soil structure, resists compaction
- ★ Provides stormwater infiltration
- ★ Prevents erosion
- ★ Filters pollutants
- ★ Reduces need for landscape chemicals
- ★ Reduces need for watering



★ **REDUCED COSTS!**



# Possible Barriers to Compost Usage



QUALITY CONTROL



UPFRONT COST



LACK OF EXPERIENCE  
/ KNOWLEDGE



VAGUE  
SPECIFICATIONS







Soils shall consist of USDA sand to loamy sand classification and meet the following gradation:

USDA Size Fraction	Size (mm)	Percent
	0.05-2.0	65.4
	0.002-0.05	25.4
	<0.002	9.2
<b>Main Fractions</b>		
Sand		
Silt		
Clay		

- Clay content: 15-25% by weight
- Organic matter: 5-10% by weight
- Coarse Sand: 30-65% by weight
- Silt: 15-25% by weight
- Gravel content shall not exceed 5%
- Soluble Salt: < 2 dS/m
- Cation Exchange Capacity: 7-15 meq/100g
- Water Permeability: 1-2 inches maximum dry density
- pH: 6.0-6.5

**UMass Extension**  
Soil and Plant Nutrient Testing Laboratory  
201 Page Laboratory  
181 Hollowell Way  
Amherst, MA 01003  
Phone: (413) 545-2111  
e-mail: soiltest@umass.edu  
website: soiltest.umass.edu

**Soil Test Report**  
Sample Information:  
Sample ID: BTS3-0917

Prepared For:  
Dan Goodwin  
Green Mountain Compost  
1042 Redmond Road  
Williston, VT 05495

Order Number: 32706  
Lab Number: 5170905-121  
Area Sampled:  
Received: 9/5/2017  
Reported: 9/12/2017

dan@greenvmountaincompost.com  
802-660-4949

Analysis	Value Found	Optimum Range	Analysis	Value Found	Optimum Range
Soil pH (1:1, H2O)	7.0		Cation Exch. Capacity, meq/100g	16.5	
Modified Morgan extractable, ppm			Base Saturation, %	0.0	
Macronutrients			Calcium Base Saturation	85	50-80
Phosphorus (P)	20.6	4.14	Magnesium Base Saturation	11	10-30
Potassium (K)	249	100-160	Potassium Base Saturation	4	2.6-7.0
Calcium (Ca)	2790	1000-1500	Soapy Density, g/cc	0.98	
Magnesium (Mg)	229	50-120	Optional tests		
Sulfur (S)	32.8	>10	Soil Organic Matter (LOI), %	5.2	
Micronutrients *			Soluble Salts (1:2, dS/m)	0.30	<0.6
Boron (B)	0.7	0.1-0.5			
Manganese (Mn)	33.6	1.1-6.3			
Zinc (Zn)	1.5	1.6-7.6			
Copper (Cu)	0.2	0.3-0.6			
Iron (Fe)	16.0	2.7-0.4			
Aluminum (Al)	17	<75			
Lead (Pb)	0.5	<2			

Very Low    Low    Optimum    Above Optimum

Planting Soil Characteristics (Source MDE, 2000)

Parameter	Value
pH range	5.2 to 7.00
Organic matter	0%
Magnesium	35 lbs. per acre, minimum
Phosphorus (P205)	75 lbs. per acre, minimum
Potassium (K2O)	85 lbs. per acre, minimum
Soluble salts	500 ppm
Clay	10 to 25%
Silt	30 to 55%
Sand	35 to 60%

The "available phosphorus" for the soil must be less than 0.2% phosphorus.

## Challenges:

- What's spec'd vs. what's available
- Confusion around terminology, lab testing methods, and context



## From 2017 VT Stormwater Manual 4.3.1.4 “Biorention Treatment”

*Soils shall consist of USDA sand to loamy sand classification and meet the following gradation: sand 85- 88%, silt 8-12%, clay 0-2%, and organic matter in the form of compost 3-5%.*

What's  
specified vs.  
what's  
locally  
available

<u>USDA Size Fraction</u>		
<u>Main Fractions</u>	<u>Size (mm)</u>	<u>Percent</u>
Sand	0.05-2.0	65.4
Silt	0.002-0.05	25.4
Clay	<0.002	9.2



Terminology,  
testing,  
context

From 2017 VT Stormwater Manual  
4.3.1.4 “Biorention Treatment”

*The designer shall identify on the plan sheet that a soil phosphorus test using the Morgan Method, or approved equivalent, is required for practices with underdrains, to ensure that bioretention soil media will not leach phosphorus. The “available phosphorus” for the soil must be less than 0.2% phosphorus.*

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**PHOSPHORUS**





Soil and Plant Nutrient Testing Laboratory  
 203 Paige Laboratory  
 161 Holdsworth Way  
 University of Massachusetts  
 Amherst, MA 01003  
 Phone: (413) 545-2311  
 e-mail: soiltest@umass.edu  
 website: soiltest.umass.edu

### Soil Test Report

Prepared For:  
 Dan Goossen  
 Green Mountain Compost  
 1042 Redmond Road  
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Sample Information:  
 Sample ID: BTS3-0917

Order Number: 32706  
 Lab Number: 5170905-121  
 Area Sampled:  
 Received: 9/5/2017  
 Reported: 9/12/2017

### Results

Analysis	Value Found	Optimum Range	Analysis	Value Found	Optimum Range
Soil pH (1:1, H2O)	7.6		Cation Exch. Capacity, meq/100g	16.5	
Modified Morgan extractable, ppm			Exch. Acidity, meq/100g	0.0	
Macronutrients			Base Saturation, %		
Phosphorus (P)	20.6	4-14	Calcium Base Saturation	85	50-80
Potassium (K)	249	100-160	Magnesium Base Saturation	11	10-30
Calcium (Ca)	2790	1000-1500	Potassium Base Saturation	4	2.0-7.0
Magnesium (Mg)	228	50-120	Scoop Density, g/cc	0.98	
Sulfur (S)	32.8	>10	Optional tests		
Micronutrients *			Soil Organic Matter (LOI), %	5.2	
Boron (B)	0.7	0.1-0.5	Soluble Salts (1:2), dS/m	0.30	<0.6
Manganese (Mn)	33.6	1.1-6.3			
Zinc (Zn)	1.5	1.0-7.6			
Copper (Cu)	0.2	0.3-0.6			
Iron (Fe)	16.0	2.7-9.4			
Aluminum (Al)	17	<75			
Lead (Pb)	0.5	<22			

\* Micronutrient deficiencies rarely occur in New England soils; therefore, an Optimum Range has never been defined. Values provided represent the normal range found in soils and are for reference only.

### Soil Test Interpretation

Nutrient	Very Low	Low	Optimum	Above Optimum
Phosphorus (P):				
Potassium (K):				
Calcium (Ca):				
Magnesium (Mg):				

### Results

Analysis	Value Found	Optimum Range
Soil pH (1:1, H2O)	7.6	
Modified Morgan extractable, ppm		
Macronutrients		
Phosphorus (P)	20.6	4-14

# From bid packet for 2018 local city government bid project:

What's specified vs. what's locally available

## “Horticultural Soil”

- Clay content: 15-25% by weight
- Organic matter: 5-10% by weight
- Coarse Sand: 30-65% by weight
- Silt: 15-25% by weight
- Gravel content shall not exceed 10% by weight
- Soluble Salt: < 2 dS/m
- Cation Exchange Capacity: 7-15
- Water Permeability: 1-2 inches per hour when compacted to 85% of maximum dry density
- pH: 6.0-6.5

## “Bioretention Soil”

Planting Soil Characteristics (Source MDE, 2000)

Parameter	Value
PH range	5.2 to 7.00
Organic matter	0%
Magnesium	35 lbs. per acre, minimum
Phosphorus (P2O5)	75 lbs. per acre, minimum
Potassium (K2O)	85 lbs. per acre, minimum
Soluble salts	500 ppm
Clay	10 to 25%
Silt	30 to 55%
Sand	35 to 60%







**Questions?**