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San Jose Office  
February 17, 2011  
Report 11-041-0056

L.H. Voss Materials, Inc.  
2445 Del Vista Monte  
Concord, CA 94520

Attn: Butch

RE: Lennox Blend Filter Mix

### Background

The sample received February 10, 2011 was identified as representing a soil mix for use in bioswale applications.

### Analytical Results and Comments

The reaction of the soil is slightly alkaline at a pH of 7.1, which is favorable for most plants. Salinity (ECe), sodium and boron are safely low. The sodium adsorption ratio (SAR) shows sodium adequately balanced by soluble calcium and magnesium. No major changes in chemistry occurred between this analysis and the previous July analysis (report #10-197-0056).

The texture of the soil is now sand according to the USDA Soil Classification system. There is significant material that is greater than 2mm, which designates the soil as "gravelly" with 18.3% gravel dry weight. The amount of gravel is less than the previous analysis. The organic matter content is moderately low at 2.9% dry weight. An additional 2-3 cu. yd. per 1000 sq. ft. incorporated to a depth of 6 inches, can be applied prior to planting. The additional organic matter would also help to improve the water holding capacity and decrease irrigation frequency for plant establishment. The measured percolation rate is 5.34 inches per hour, which falls within the commonly suggested 5-10 inches per hour range for bioswale mixes.

In terms of soil fertility, calcium is low and is much lower than the previously analyzed sample. Gypsum applied prior to planting at a rate of 25 lbs of per 1000 sq. ft. to a depth of 6 inches would improve the calcium level. This could also be bulk blended at 1 1/3 lbs per cu. yd. of mix. Nitrogen is moderately low. Phosphorus is fair. Micronutrients, copper, zinc, iron, and manganese are all abundant but not problematically so. The remaining nutrients are adequate. Modest nitrogen fertilization supplied via organic 1or slow release fertilizer is recommended.

Meagan Hynes, Ph.D.  
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## SOIL ANALYSIS

Send To : L.H. Voss Materials, Inc. 2445 Del Vista Monte Concord CA 94520	Project : Lennox Blend Filter Mix	Report No : <b>11-041-0056</b> Cust No : 00420 Date Printed : 02/17/2011 Date Received : 02/10/2011 Page : 1 of 1 Lab Number : 27384
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Sample Id : **Lennox Blend Filter Mix**

### SATURATION EXTRACT - PLANT SUITABILITY

Test	Result	Effect on Plant Growth				
		Negligible	Sensitive Crops Restricted	Many Crops Restricted	Only Tolerant Crops Satisfactory	Few Crops Survive
Salinity (ECe)	2.6 dS/m					
Sodium Adsorption Ratio (SAR) *	3.16					
Boron (B)	0.76 ppm					
Sodium (Na)	8.5 meq/L					
Chloride (Cl)						
Carbonate (CO3)						
Bicarbonate (HCO3)						
Fluoride (F)						

\* Structure and water infiltration of mineral soils potentially adversely affected at SAR values higher than 6.

Test	Result	Strongly Acidic	Moderately Acidic	Slightly Acidic	Neutral	Slightly Alkaline	Moderately Alkaline	Strongly Alkaline	Qualitative Lime
pH	7.1 s.u.								None

### EXTRACTABLE NUTRIENTS

Test	Result	Sufficiency Factor	SOIL TEST RATINGS					NO3-N
			Very Low	Low	Medium	Optimum	Very High	
Available-N	17 ppm	0.6						10 ppm
Phosphorus (P) - Olsen	11 ppm	0.6						NH4-N
Potassium (K)	266 ppm	4.8						7 ppm
Potassium - sat. ext.	7.0 meq/L							Total Exchangeable Cations(TEC)
Calcium (Ca)	89 ppm	0.3						17 meq/kg
Calcium - sat. ext.	7.0 meq/L							
Magnesium (Mg)	131 ppm	2.8						
Magnesium - sat. ext.	7.4 meq/L							
Copper (Cu)	1.2 ppm	5.2						
Zinc (Zn)	7 ppm	8.0						
Manganese (Mn)	11 ppm	5.7						
Iron (Fe)	19 ppm	2.3						
Boron (B) - sat. ext.	0.76 ppm	2.5						
Sulfate - sat. ext.	9.7 meq/L	3.2						
Exch Aluminum								

Cu, Zn, Mn and Fe were analyzed by DTPA extract.

### PARTICLE SIZE ANALYSIS

Half Sat	Organic Matter	Weight Percent of Sample Passing 2mm Screen							USDA Soil Classification
		Gravel		Sand			Silt	Clay	
		Coarse 5-12	Fine 2-5	Very Coarse 1-2	Coarse 0.5-1	Med. to Very Fine 0.05-0.5	.002-.05	0-.002	
14 %	2.9 %	8.9 %	9.4 %	34.5 %	37.3 %	17.8 %	6.2 %	4.1 %	Sand
		Gravelly							

Graphical interpretation is a general guide. Optimum levels will vary by crop and objectives.

PERCOLATION RATE					
Client Name	L.H. Voss Materials, Inc.				
Report Number					
Lab Number	65824				
Lennox Blend Filter Mix					
Cylinder Area in cm <sup>2</sup>	21.4				
Height of Soil Column in cm	9.9				
Hydraulic Head in cm	17				
Time Collected in min	39				
Volume Collected in ml	324.036				
K sat in/hr @ temp	5.340952174				