May 21, 2013

BIOFILTRATION AND RAIN GARDEN MEDIA CERTIFICATION GUIDANCE

This document provides guidance for complying with the biofiltration media criteria in section 1.6.7.C.4.A of the Environmental Criteria Manual (ECM). The criteria also apply to rain gardens, described in section 1.6.7.H of the ECM. The criteria require the use of an appropriate filtration media that will provide stormwater treatment and support plant growth. In addition, certification of the media is required.

The biofiltration media should be a mixture of sand and other ingredients. Recognizing the difficulty in determining the correct types and proportions of various ingredients, the City has tested various media in order to characterize physical and chemical properties. The recommendations below reflect the test results and research conducted by the City and other stormwater professionals.

Creating Biofiltration Mixture

The following mixture (% by volume) should create an appropriate biofiltration media, subject to specific characteristics of the topsoil, which may exhibit considerable variability:

- 70-80% concrete sand and/or screened decomposed granite sand
- 20-30% screened bulk topsoil (chocolate loam is also acceptable)
- The source materials must be free of stones, trash, and other undesirable material, and should not contain weeds or weed seeds.
- The ingredients must be well-mixed to create a homogenous media.

A commercially available fill material that should not be used is typically marketed as "sandy loam." This product is often referred to by landscapers as "red death", which refers to the color of the material, and is an infertile fill material that has poor drainage characteristics. It will not be approved as topsoil.

Some shrinkage of the media is to be expected after installation, in the range of 5-15%. As a general recommendation, about 20 inches of media should be installed to achieve the required depth of 18 inches. Wetting of the media at the time of installation is needed in order to determine actual shrinkage and amount of "make-up" material needed.

Certification

Certification will require the submittal of a formal report to the City of Austin that contains the following elements:

A. Signed statement provided by the engineer or his/her designee (e.g., contractor, soil supplier) that:
   - A laboratory analysis has been conducted by of the actual mixture being proposed, and has been verified as meeting the specifications below. The date of the laboratory analysis must be no more than six months prior to the date of installation of the biofiltration media. A copy of the laboratory results must be provided.

- No “sandy loam” fill material (aka “red death”) is included in the mixture

B. Laboratory analysis results documenting that the mixture meets the following specifications:

- Particle size distribution and textural analysis:
  - Sand content of 70 – 90%
  - Clay content of 3 – 10%
  - Silt + clay content < 27%
- Percent Organic Matter (by weight) of 0.5 – 5.0%

A saturated hydraulic conductivity of $k \geq 2.0$ in/hr can be presumed if the organic matter and texture analysis criteria are verified.

A sample certification document is provided below.

John Doe Consulting Engineers

October 25, 2007

City of Austin Watershed Protection and Development Review Department
P.O. Box 1088
Austin, TX 78767

RE: Water Quality Pond Biofiltration Media for Sunny Farms Subdivision, Phase II, Section V

To Whom It May Concern,

As the engineer for the subject project I certify that the biofiltration media has been tested by a laboratory using approved procedures (identified as MIX8 in lab results provided below) and meets the following criteria as noted:

Biofiltration Media Characteristics			
Parameter	**Results***	Criteria	**Criteria Met?***
Percent Sand	**82.3%**	70 – 90%	**YES**
Percent Clay	**5.8%**	3 – 10%	**YES**
Percent Silt + Clay	**17.7%**	< 27%	**YES**
Percent Organic Matter	**2.5**	0 – 5.0%	**YES**
Is there compost in the media mixture?	**NO**	None allowed	**NO**
Is any "Red Death" included in media mixture?	**NO**	None allowed	**YES**
Is the mixture free of trash, stones, weeds, or other undesirable material?	**YES**	None allowed	**YES**
Is the media well-mixed and homogenous?	**YES**	Must be homogenous	**YES**

Testing and Installation Dates	
Date of Reported Laboratory Data (earliest)*	**8/29/2007**
Date of Media Installation*	**12/13/2007**
Time between Dates (days)*	**106**
Criteria for Maximum Time Between Dates (days)	180
Is Criteria Met?*	**YES**

***** ***CERTIFYING INDIVIDUAL MUST FILL IN THESE CELLS***

Sincerely,

John W. Doe

John W. Doe. P.E.
John Doe Consulting Engineers
P. O. Box XXX
Austin, TX
Phone: 512-555-0000

Place Engineer's Seal Here

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121
www.midwestlabs.com

Report Number
07-243-2033

REPORT OF ANALYSIS
For: (21215) CITY OF AUSTIN
(512)974-1882

Date Reported: 08/31/07
Date Received: 08/27/07

Mail to: CITY OF AUSTIN
TOM FRANK
PO BOX 1088
AUSTIN TX 78767

SOIL ANALYSIS

Lab number: 1333326 Sample ID: MIX8

Analysis	Level Found	Units	Detection Limit	Method	Analyst-Date	Verified-Date

Respectfully Submitted

Heather Ramig/Sue Ann Seitz/Rob Ferris
Prem Arora/Client Services

Midwest Laboratories, Inc.

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Particle Size Distribution Report

Project:

Report No.: 07-243-2033

Client: CITY OF AUSTIN

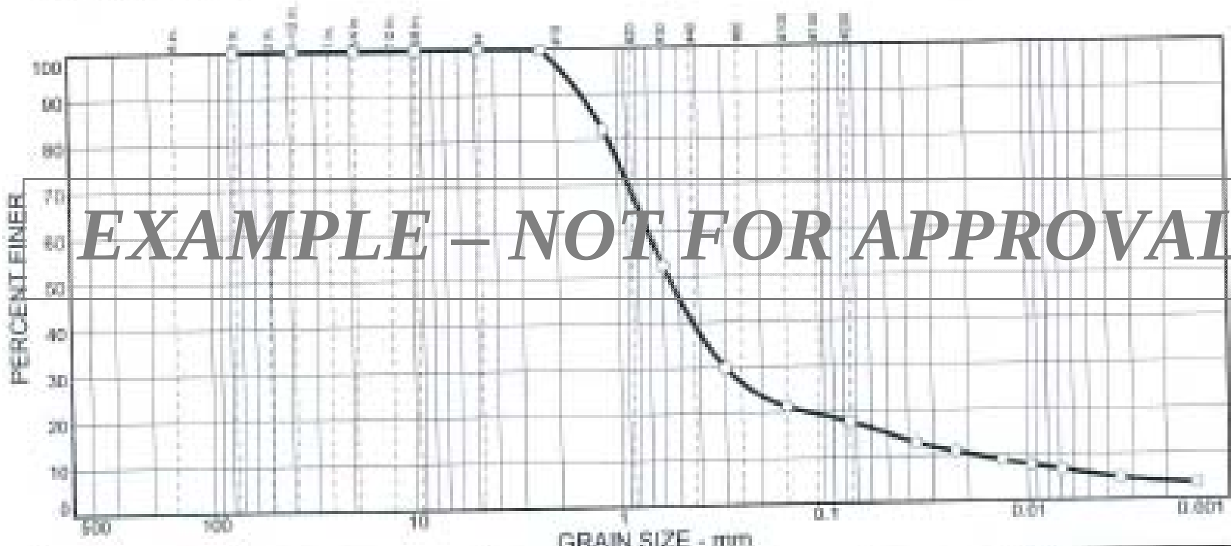
Date: 08/31/2007

Sample No: 1333326

Source of Sample:

Elev./Depth:

Location: MIX8



EXAMPLE – NOT FOR APPROVAL

% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	3.5	57.1	21.7	11.9	5.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
1.5 in.	100.0		
.75 in.	100.0		
.375 in.	100.0		
#4	100.0		
#8	99.8		
#16	82.2		
#30	52.4		
#50	29.9		
#100	21.2		
#200	17.7		

* (no specification provided)

Soil Description

% Sand = 82.3%   % Stc = 17.7%

Atterberg Limits

PL=   LL=   PI=

Coefficients

D_{85}= 1.28 D_{60}= 0.711 D_{50}= 0.367

D_{30}= 0.301 D_{15}= 0.0500 D_{10}= 0.0183

C_u= 38.82 C_c= 6.98

Classification

USCS=   AASHTO=

Remarks

Figure

MJS 8-3[illegible]

REPORT NUMBER
07-239-0064
REPORT DATE
Aug 29, 2007
ACCOUNT
21215
RECEIVED DATE
Aug 27, 2007

Midwest Laboratories, Inc.
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CITY OF AUSTIN
TOM FRANK
PO BOX 1088
AUSTIN TX 78767

IDENTIFICATION
TOM FRANKE
CITY OF AUSTIN
PO BOX 1088
AUSTIN TX 78767

OM = 2.59

SOIL ANALYSIS REPORT

LAB NUMBER *077*	SAMPLE IDENTIFICATION	ORGANIC MATTER	PHOSPHORUS			POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	pH		CATION EXCHANGE CAPACITY C.E.C.	PERCENT BASE SATURATION (COMPUTED)				
													% K	% Mg	% Ca	% H	% Na
							Mg	Ca	Na	SOIL pH 1:1	BUFFER INDEX	meq/100g					
		percent RATE	ppm RATE	ppm RATE	ppm RATE	lbs RATE	ppm RATE	ppm RATE	ppm RATE								
61362	MIX 4	1.8 L	2 VL	17 L	7 L	145 H	145 M	2314 VH		7.7		13.2	2.8	9.2	88.0	0.0	
61363	MIX 5	2.3 L	1 VL	2 VL		271 VH	120 L	2302 VH		7.4		13.2	5.3	7.6	87.1	0.0	
61364	MIX 6	2.4 L	8 L	13 L	108 VH	508 VH	140 M	1910 VH		7.9		11.2	4.8	10.4	84.8	0.0	
61365	MIX 7	2.0 L	7 VL	157 VH	55 VH	141 H	144 M	1939 VH		7.9		11.3	3.2	10.6	86.2	0.0	
61366	MIX 8	2.5 L	3 VL	157 VH	92 VH	192 VH	171 H	2071 VH		7.8		12.3	4.0	11.6	84.4	0.0	
61367	MIX 9	2.1 L	4 VL	23 M	78 VH	196 VH	152 M	2031 VH		7.9		11.9	4.2	10.6	85.2	0.0	
61368	MIX 10	3.4 M	11 L	140 VH	88 VH	212 M	182 H	1976 VH		7.8		11.7	2.5	13.0	84.5	0.0	
61369	MIX 11	2.2 L	3 VL	27 M	69 VH	223 M	166 H	1953 VH		7.8		11.5	2.7	12.0	85.3	0.0	
61370	MIX 12	2.2 L	3 VL	27 M	107 VH	228 VH	139 M	1868 VH		7.9		11.1	5.3	10.4	84.3	0.0	
61371	MIX 13	2.0 L	5 VL	48 H	100 VH	195 VH	137 M	1837 VH		7.8		10.8	4.6	10.6	84.8	0.0	

LAB NUMBER *077*	NITRATE-N (FIA)									SULFUR S	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	SOLUBLE SALTS
	SURFACE			SUBSOIL 1			SUBSOIL 2									
	ppm	lbs/A	depth in	ppm	lbs/A	depth in	ppm	lbs/A	depth in	Total lbs/A							
										ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	mmhos/cm RATE
61362			0-6													
61363			0-6													
61364			0-6													
61365			0-6													
61366			0-6													
61367			0-6													
61368			0-6													
61369			0-6													
61370			0-6													
61371			0-6													

REV.12/03

The sample listed as SALGDT was insufficient for the salt density.

The above analytical results apply only to the samples(s) submitted. Samples are retained a maximum of 30 days.