Provision C.3.h – Stormwater Treatment System Operation & Maintenance and Inspections

Common Problems and Solutions

Private and Public Sites

February 1, 2017

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Senior Scientist, EOA Inc.

SAN MATEO COUNTYWIDE
Water Pollution Prevention Program
Clean Water. Healthy Community.

Presentation Overview

- Stormwater Control Measure (SCM) Types
- Municipal Regional Permit (MRP) Requirements
- Inspection
- Maintenance
- Resources
- Training

What are the Types of SCMs?

1. Vaults and Ponds
    a) Hydrodynamic Separators (e.g. CDS)
    b) Hi-Flow Rate Media Filters (Stormfilter)
    c) Tree Filter (Filterra)
    d) Sand Filter
    e) Detention Ponds
    f) Cisterns
2. Bioretention (LID)
    a) Standard Bioretention Area (Rain Garden)
    b) Flow Through Planter
    c) Stormwater Curb Extension
    d) Stormwater Sidewalk Planter
    e) Tree Filter (Underground bioretention)
    f) Green Roofs
3. Pervious Pavement

What MRP 2.0 requires for O&M Inspections:

1. Annually inspect at least 15% of installed SCMs
2. Inspect ALL installed SCMs at least once every five years
3. Contractor (3rd Party) inspections can count towards the inspections requirement if they meet certaom standards (annual, photos time-date stamped etc.)

O&M Inspection Preparation

1. Contact site manager/property owner
2. If previous inspections have generated maintenance issues you may want to ask that maintenance staff be on hand as well.
3. Bring inspection forms and clipboard
4. Bring digital camera or smart phone!
5. Inspect in rainy weather if possible
6. Personal safety equipment

Top 10 Items to Check:

1. Biotreatment Soil Condition and Trash
2. Plant Maintenance
3. Mulch, Rock and Netting
4. Standing Water - Mosquitos
5. Flow Spreading
6. Inlets and Overflows
7. Irrigation System
8. Conveyances
9. Erosion
10. Signage and Maintenance Records

1. Biotreatment Soil Mix

a) Remove trash
b) Check compaction with soil probe
c) Remove accumulated fine sediments
d) If more soil mix is needed, order from a supplier on the program list:

http://flowstobay.org/newdevelopment

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BIOTREATMENT SOIL MIX SUPPLIER LIST

Company	Contact Name	Phone	Address	City	Zip	E-mail
American Soil & Stone Products Inc.	Ryan Hoffman	510-292-3018	Richmond Annex, 2121 San Joaquin St., Bldg. A	Richmond	94804	ryan@americansoil.com
L.H. Voss Materials, Inc	Nyoka Corley	925-676-7910	5965 Dougherty Road	Dublin	94568	nyoka.corley@gmail.com
Lehigh Hanson Aggregates	Chris Stromberg	510-246-0393	4501 Tidewater Ave.	Oakland	94601	chris.stromberg@lehighhanson.com
Lyngso Garden Materials, Inc.	Paul Truyts	650-333-1044 650-364-1730 x131	19 Seaport Blvd.	Redwood City	94063	ptruyts@lyngsogarden.com
Marshall Brothers Enterprises, Inc.	Phillip Marshall	925-449-4020	P.O. Box 2188	Livermore	94551	phillip@mbenterprises.com
Pleasanton Trucking Inc.	Tom Bonnell	925-449-5400	P.O. Box 11462	Pleasanton	94588	pleasanton_trucking@yahoo.com
Redi-Gro Corporation	Sharon Yon	916-381-6063 800-654-4358	8909 Elder Creek Road	Sacramento	95828	redigropro@redi-gro.com
TMT Enterprises, Inc.	Matt Moore	408-432-9040	1996 Oakland Road	San Jose	95131	info@tmtenterprises.net

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2. Plant Maintenance

a) Remove dead plants (replace with better choice if conditions have changed)

b) Remove excess plants - they fill in and often need thinning after 1 year

c) Remove weeds and invasive plants – do not use synthetic herbicides (check OMRI.org)

d) Leave some plants near inlets to slow water and filter trash

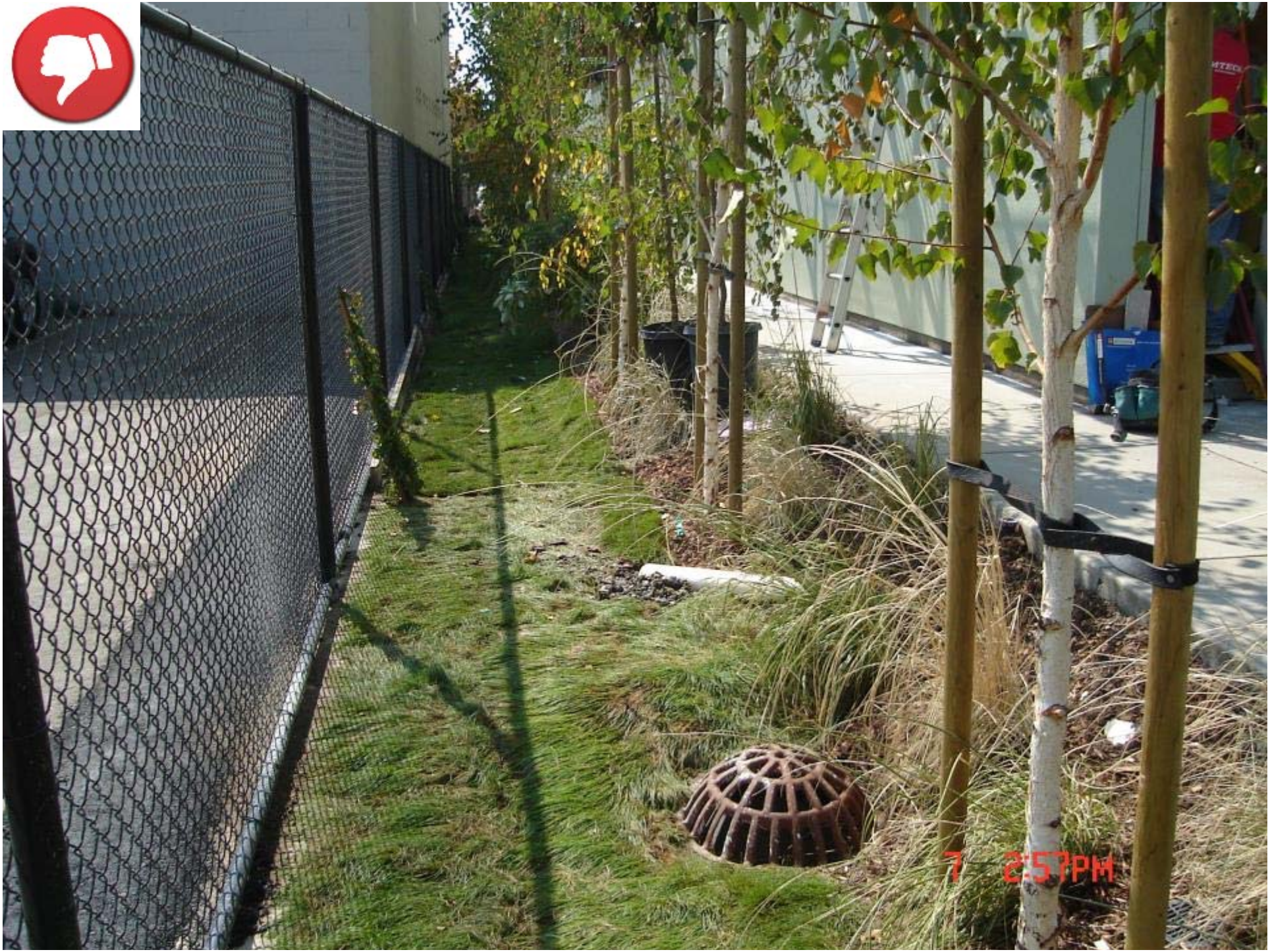
e) If needed, fertilize only with non-synthetic products like worm castings & compost (check for OMRI.org for product listing)

Plants:

a) Right Plant, Right Place
b) Use Appendix A (Plant List) in the C3 Tech. Guidance on the SMCWPPP Website: www.flowstobay.org/newdevelopment
c) Consider irrigation needs/availability
d) Choose to minimize pruning at maturity
e) Perennials like: Rushes, Sedges, Fescues, Bunch Grasses and Sedums.
f) No turf: The drought may return!
g) Avoid the use of invasive species - Check www.cal-ipc.org, the California Invasive Plant Council list.


Blue Fescue
(Festuca glauca)
7 2:56PM

Remove the turf and replace with rock mulch in the flow line with wood mulch and shade plants in the other areas.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These trees, shrubs and vines have now matured and are blocking the light to the turf. So turf was not a good choice to begin with. Wood mulch is all that is necessary.


Gray Rush
(Juncus P.)


28 3:11PM


Orange Sedge
(Carex testacea)


NO DUMPING!
DRAINS TO BAY


NO DUMPING!
DRAINS TO BAY


NO DUMPING!
DRAINS TO BAY

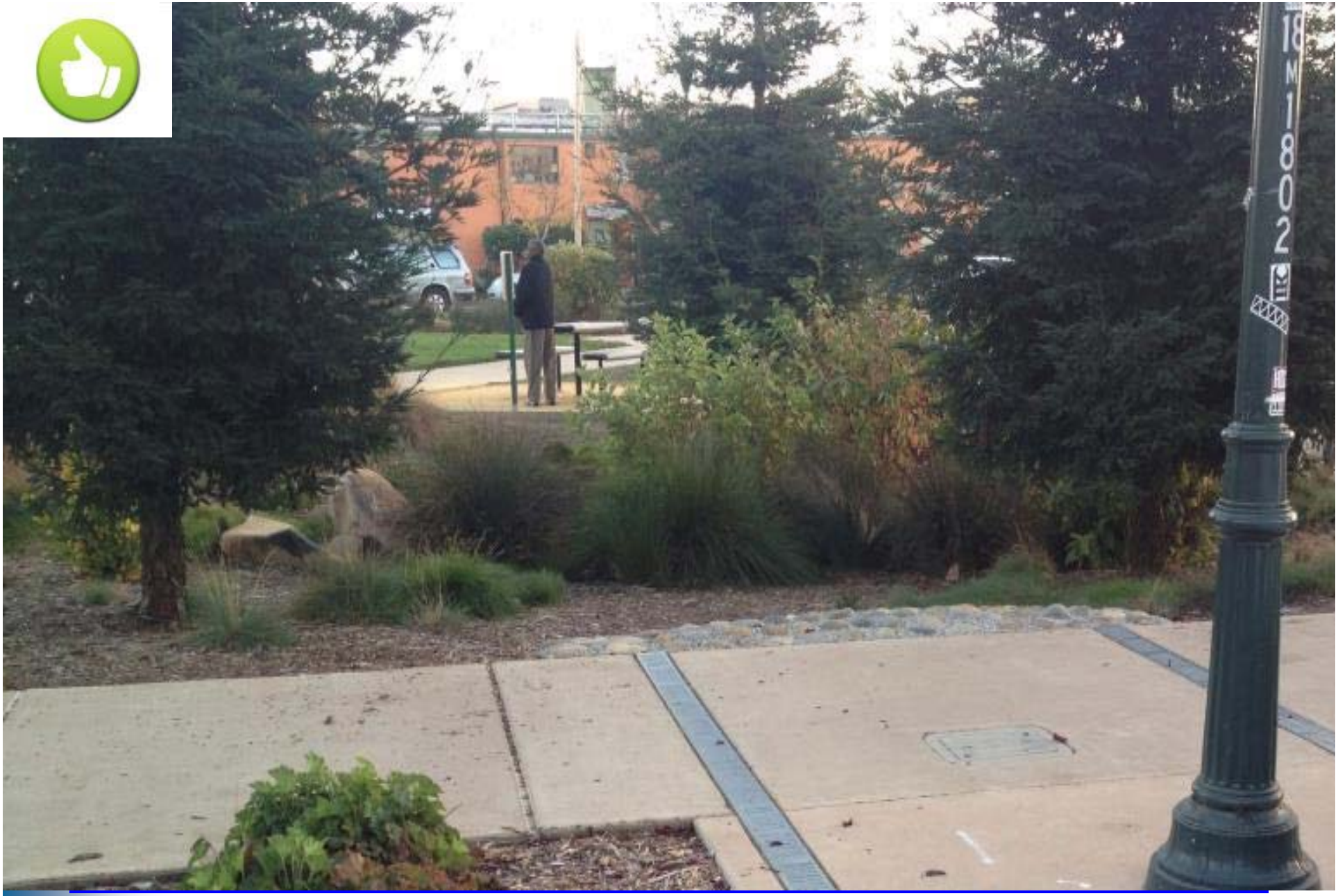

NO DUMPING!
DRAINS TO BAY


Mexican
Feather Grass


Sedums

3. Mulch (wood, rock or netting)

a) Use 3” of composted arbor mulch, gravel, cobble or jute netting depending on design
b) Needs to be replenished annually
c) Cover all bare soil areas except within 12” of tree trunks
d) May need a screen on the overflow – look for “Bathtub ring”
e) Remove weeds and then replenish mulch
f) Mulch supplier spec/list being developed



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Gray Rush
(Juncus P.)

Three months later the plants have grown in and become established, but an application of rock or wood mulch might still be beneficial.

4. Standing Water -> Mosquitos

a) Out of sight, out of mind
b) Neglected sites
c) Change in ownership
d) Vault maintenance

Access Cover Not In Place

Locking Mechanism Not Working

Media Vaults: Maintenance Indicators

Slides courtesy of Gordon Clem

Pacific Stormwater Solutions

Santa Rosa, CA

www.pacstorm.com

707-738-9411

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Maintenance Needed (1st Indicator)

- Sediment >4" on vault floor

Maintenance Not Needed

- Sediment <4” on vault floor

Maintenance Needed (2nd Indicator)

- Sediment more than 1/4" on top of cartridges

Maintenance not Needed (2nd Indicator)

- Sediment is less than 1/4" on top of cartridges

Maintenance Needed (3rd Indicator)

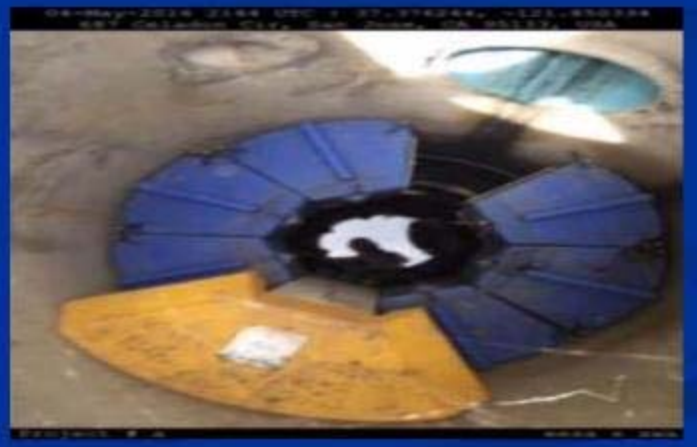
- Static Water >4" in Cartridge Bay

Maintenance Not Needed

- Static Water <4” in Cartridge Bay

Filter Maintenance

- As needed based on inspection . Refer to manufacturers O&M
- Remove & replace cartridges or media packs
  - Clean sediments from vault bottom/remove scum line
  - Inspect vault
  - Install fresh cartridges/packs
  - Properly dispose of spent media and sediment



Maintenance Indicators

- Pronounced or measurable scum line (1/4" thick) present above top cap

5. Flow Spreaders

Flow spreaders maximize the treatment capacity and can help with undersized and/or long and narrow systems, but they can get dislodged and clogged.


Blue Fescue
Berkeley Sedge


(510) 450-1410

6. Inlets and Overflows

a) Flow splitters can be installed incorrectly
b) Weirs can be adjusted
c) Pumps need maintenance
d) Handover from construction to maintenance needs to be checked.
e) Remove leaf blockages

Curbcut not working correctly

Not enough fall from street to system.

The landscape needs re-grading and a wider curb cut.

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7. Irrigation System

a) Lack of mulch can expose lines.
b) Vandalism
c) Kids!
d) Don’t grade side slopes too steeply

8. Conveyances

a) Trench Drain width and length
b) Valley gutters
c) Manhole sealing
d) Pipe blockages
e) Pumps need to be tested annually


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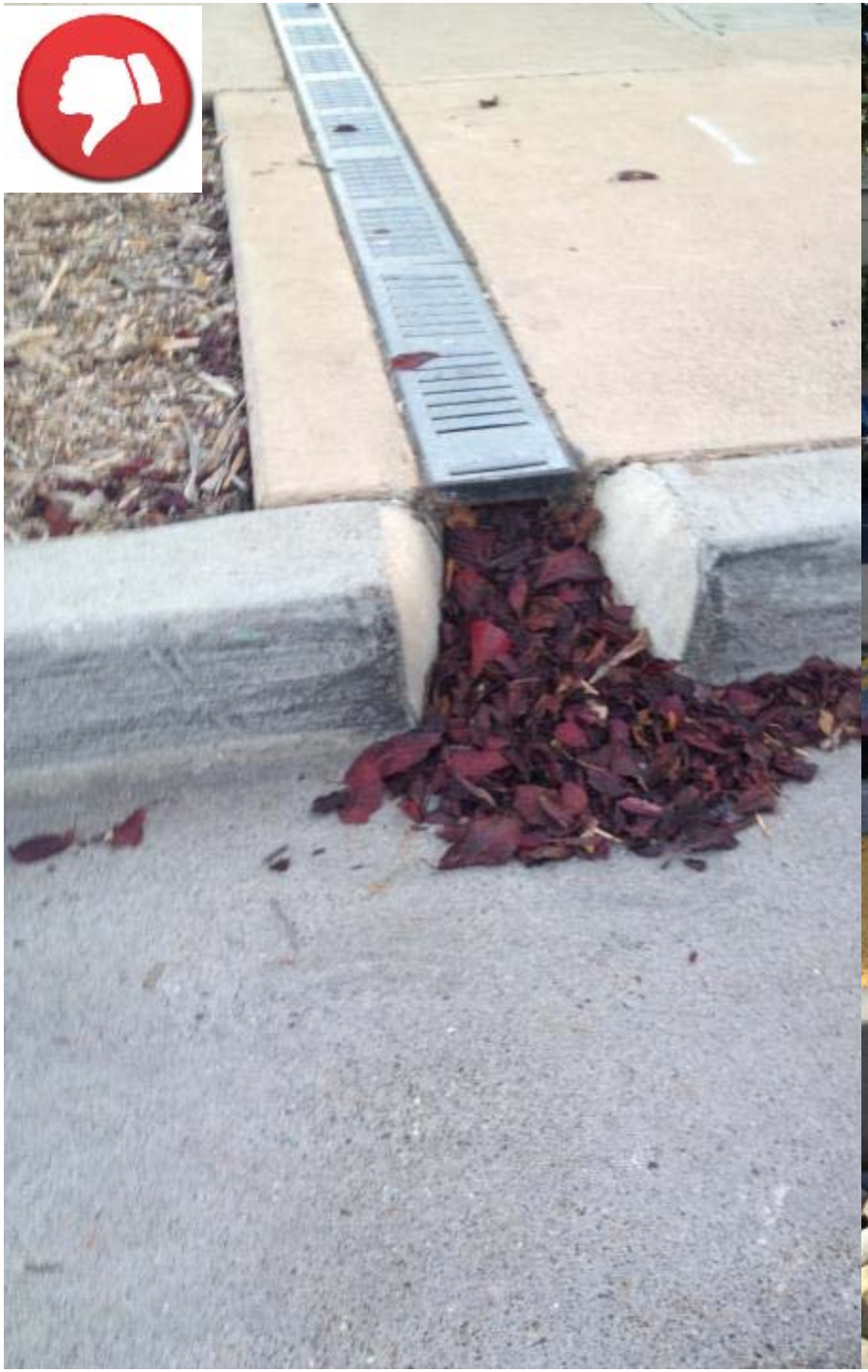

9. Erosion

a) Use splash blocks, rock, flow spreaders and mulch to prevent erosion
b) Compacted soils
c) Excessive Hardscape Features
d) Large outlet pipes (recommend a maximum of 6”)


Cape Rush

10. Signage and Maintenance Manuals

a) Identifying system
b) Identifying Intent
c) Identifying Maintenance BMPs
d) Contact Info
e) Check Maintenance Records wand O&M Agreements

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BAY-FRIENDLY
LANDSCAPING
& GARDENING
On-Site Stormwater Treatment
Cleans water before it flows to the bay

Bioswales

Help Us Help the Environment

Definition:
A bioswale or vegetated swale is a form of bioretention used to partially treat water quality, attenuated flooding potential and convey storm water away from critical infra-structure.

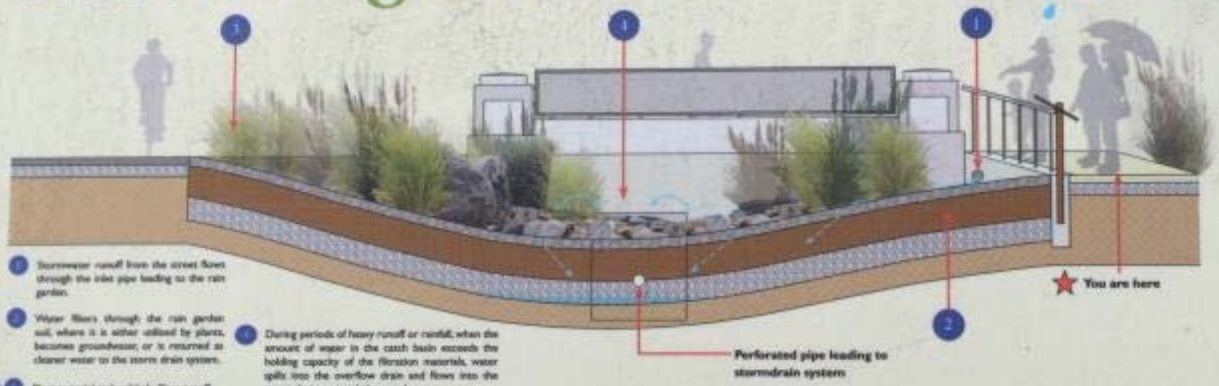
Objective:
The function of these open-channel (broad) drainage ways is to convey storm water runoff. They are often used as an alternate to, or an enhancement of, traditional storm water piping. Bioswales are often integrated into parking lot and road medians and parallel to roadways to infiltrate and treat a portion of the storm water volume, filtering it before it goes back into the environment.

Please Stay Out of the Swales


SAFEWAY
WATER QUALITY
ENHANCEMENT AREA.
UNEVEN SURFACE.
PLEASE USE
PATH.

THE CITY OF EL CERRITO

cleaning *water runoff* *with* rain gardens



1. Stormwater runoff from the street flows through the inlet pipe leading to the rain garden.
2. Water filters through the rain garden soil, where it is either utilized by plants, becomes groundwater, or is returned as cleaner water to the storm drain system.
3. Plant material and soil help filter runoff.
4. During periods of heavy runoff or rainfall, when the amount of water in the catch basin exceeds the holding capacity of the filtration materials, water spills into the overflow drain and flows into the storm drain system below grade.

How Do Rain Gardens Work?

The rocky swale before you is a rain garden, an example of "green infrastructure" and one of the ways El Cerrito is working to build a more sustainable city. This hard-working garden acts like a giant sponge, absorbing and filtering stormwater runoff during storms.

When it rains, stormwater races off our streets picking up grease, grime, and grit that flows into storm drains, creeks, and San Francisco Bay. When a rain garden is built, runoff is directed to a basin where plants and soil organisms filter the pollutants before the cleaner storm water becomes groundwater or returns to the storm drain system. Plants native to California are used in the rain garden to help filter pollutants, as well as provide food and shelter to birds, butterflies and beneficial insects.

Visit other nearby rain gardens at El Cerrito City Hall, along San Pablo Avenue and at the city's Recycling + Environmental Resource Center.

¿Cómo Funcionan los Jardines de Lluvia (*Rain Gardens*)?

El surco rocoso ante usted es un jardín de lluvia, un ejemplo de "infraestructura verde" y una de las maneras en que El Cerrito está trabajando para construir una ciudad más sustentable. Este esforzado jardín actúa como una esponja gigante, absorbiendo y filtrando el derrame de agua de lluvia durante las tormentas.

Cuando llueve, el agua de lluvia corre por nuestras calles recogiendo grasa, suciedad, y arenisca que fluye en los drenajes pluviales, los arroyos y la Bahía de San Francisco. Cuando se construye un jardín de lluvia, el derrame de agua de lluvia es dirigido a una cuenca donde las plantas y los organismos de la tierra filtran los contaminantes antes de que el agua de lluvia más limpia se convierta en agua subterránea o vuelva al sistema de drenaje pluvial. Las plantas nativas de California son usadas en el jardín de lluvia para ayudar a filtrar los contaminantes, así como para proporcionar alimento y cobijo a las aves, mariposas e insectos beneficiosos.

Visite otros jardines de lluvia cercanos en *El Cerrito City Hall* (Ayuntamiento/Presidencia Municipal de El Cerrito), más delante de *San Pablo Avenue* y en el *Recycling + Environmental Resource Center* (Centro de Reciclaje + Recursos Medioambientales) de la ciudad.

雨水花園如何工作?

在你面前的岩石窪地就是一座雨水花園，這是一個「綠色基礎設施」的案例，也是埃爾塞里托（El Cerrito）努力建設一個更加可持續的城市的途徑之一。這座辛勤工作的花園就像一塊巨大的海綿，吸收和過濾暴風雨期間的強勁水流。

下雨的時候，雨水沖刷地面，攜帶油脂、污垢和砂礫，然後流入雨水渠、小溪和三藩市灣。建造雨水花園後，徑流被引導至一片窪地，這裡的植物和土壤生物會過濾污染物，然後將清潔的雨水變成地下水或返回至雨水渠系統。在雨水花園內種植的加州本土植物，幫助了過濾污染物，同時為鳥類、蝴蝶和益蟲提供食物和住所。

請來參觀在埃爾塞里托市政廳旁、沿著聖保羅大道（San Pablo Avenue）和在回收及環境資源中心（Recycling+Environmental Resource Center）的雨水花園。

EL CERRITO green community


Public Works Agency
Alameda County
WELCOME TO THE
STANLEY BOULEVARD
BAY-FRIENDLY STREETSCAPE
Bay-Friendly is a holistic approach to gardening and landscaping that works in harmony with the natural conditions of the San Francisco Bay Watershed. Bay-Friendly practices foster soil health, conserve water, and other valuable resources while reducing waste and preventing pollution.
Below are the 7 Bay-Friendly principles and project features.
Landscape Locally
Nurture Soil
Less to the Landfill
Protect Water & Air Quality
Conserve Energy
Create Wildlife Habitat
Conserve Water
LANDSCAPE LOCALLY
NURTURE THE SOIL
WILDLIFE HABITAT
LESS TO THE LANDFILL
CONSERVE WATER
CONSERVE ENERGY
WATER & AIR QUALITY
TO SERVE AND PRESERVE


NO DUMPING
DRAINS TO BAY

COUNTYWIDE
ion Prevention Program
mmunity.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AND 6,569,321
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OR REPLACED ONLY
BY AUTHORIZED
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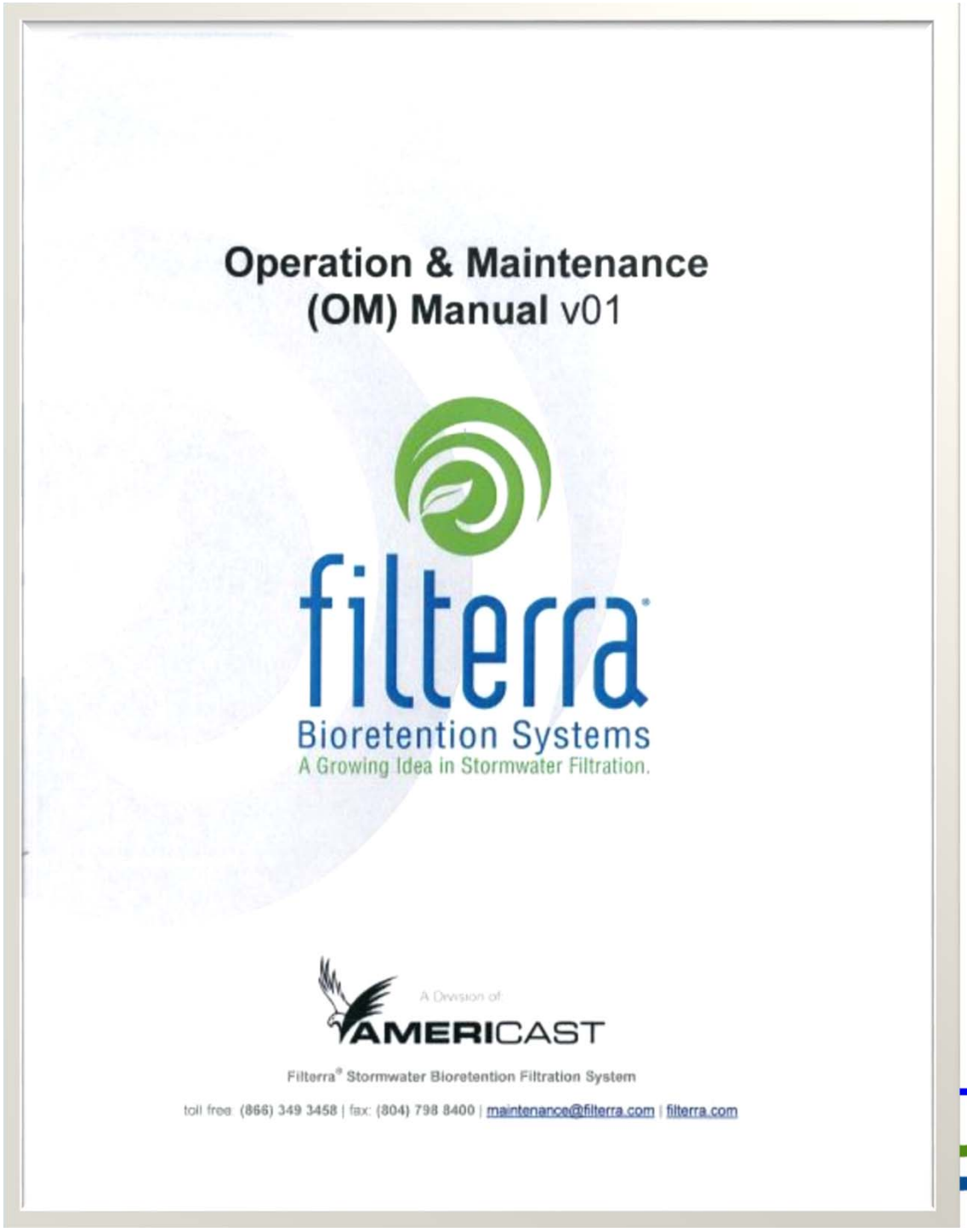

Recommends 2/year maintenance and after every storm event with over 1” of rain.

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Resources:

SMCWPPP New Development Subcommittee webpage:

www.flowstobay.org/newdevelopment

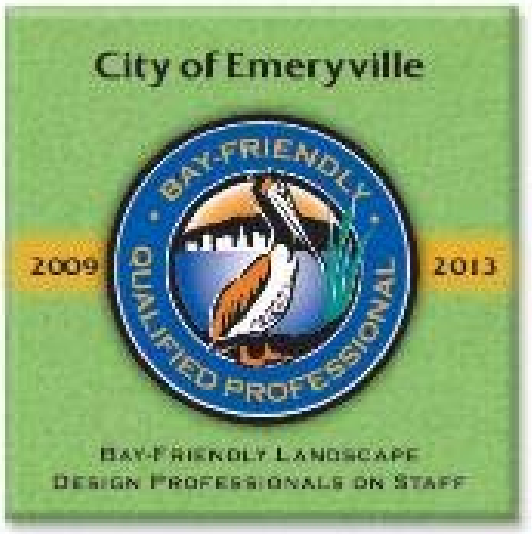
Additional Training:

ReScape California

(formerly the Bay-Friendly Landscaping & Gardening Coalition)

Bay-Friendly Qualified Professional

www.rescapeca.org



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