

STORMWATER FACILITIES OPERATION AND MAINTENANCE PLAN
for
Example Residential Subdivision Project

Whispering Pines Lane
Anytown, USA

February 21, 2018

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This example prepared by Dan Cloak Environmental Consulting
to assist users of the Contra Costa Clean Water Program's
Stormwater C.3 Guidebook

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1. Stormwater Control Plan for a Residential Subdivision Project
2. Stormwater Control Plan Exhibit
3. “As-Built” drawings
4. List and Contact Information for Property Owners

Acronyms and Abbreviations

C.3	Provision C.3 in the Municipal Regional Stormwater Permit issued by the California Regional Water Quality Control Board for the San Francisco Bay Region
IMP	Integrated Management Practice
O&M Plan	Operations and Maintenance Plan

This Stormwater Facilities Operation and Maintenance Plan was prepared using the template dated February 2018.

INSPECTION AND MAINTENANCE LOG

Facility Name
Address
Begin Date End Date

Date	BMP ID#	BMP Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken

Instructions: Record all inspections and maintenance for all treatment BMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary.

- BMP ID# — Always use ID# from the Operation and Maintenance Plan.
- Inspected by — Note all inspections and maintenance on this form.
- Cause for inspection — Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.
- Exceptions noted — Note any condition that requires correction or indicates a need for maintenance.
- Comments and actions taken — Describe any maintenance done and need for follow-up.

UPDATE TO DESIGNATION OF RESPONSIBLE INDIVIDUALS

** Use this form to update the plan when responsible individuals change. **	
Date Completed	
Facility Name	
Facility Address	
Designated Contact for Operation and Maintenance	
Name:	Title or Position:
Telephone:	Alternate Telephone:
Email:	
Off-Hours or Emergency Contact	
Name:	Title or Position:
Telephone:	Alternate Telephone:
Email:	
Corporate Officer (authorized to execute contracts with the City, Town, or County)	
Name:	Title or Position:
Address:	
Telephone:	Alternate Telephone:
Email:	

I. INTRODUCTION

This Stormwater Facilities Operation and Maintenance Plan (O&M Plan) addresses operation and maintenance of stormwater management facilities constructed as part of development of the Whispering Pines Lane subdivision site, Anytown.

The final, approved Stormwater Control Plan for the project is in Appendix A.

I.A. Background

This O&M Plan is for bioretention facilities constructed along with the subdivision's street, sidewalks, and utilities in 2017. Construction of these facilities was required by Provision C.3 in the Municipal Regional Stormwater Permit issued by the California Regional Water Quality Control Board for the San Francisco Bay Region. Provision C.3. also requires Anytown, USA to verify ongoing operation and maintenance of the facilities.

I.B. Associated Agreements

This O&M Plan is referenced in an O&M Agreement between the property owners and Anytown. The agreement grants Anytown access to the parcels containing the bioretention facilities to conduct inspections and, if needed, to perform maintenance on the facilities at the property owners' expense. The agreement also grants access for inspections to the Contra Costa Mosquito and Vector Control District (CCMVCD).

As provided in the O&M Agreement, this O&M Plan may be modified, but only with the review and consent of Anytown's Public Works Director. The official O&M Plan is the version which is on file at the Anytown Department of Public Works. Any modifications made to the O&M Plan with the consent of the Public Works Director must be filed with Anytown.

I.C. Funding for and Organization of Facility Operation and Maintenance

The subdivision has two bioretention facilities, each located on a separate parcel.

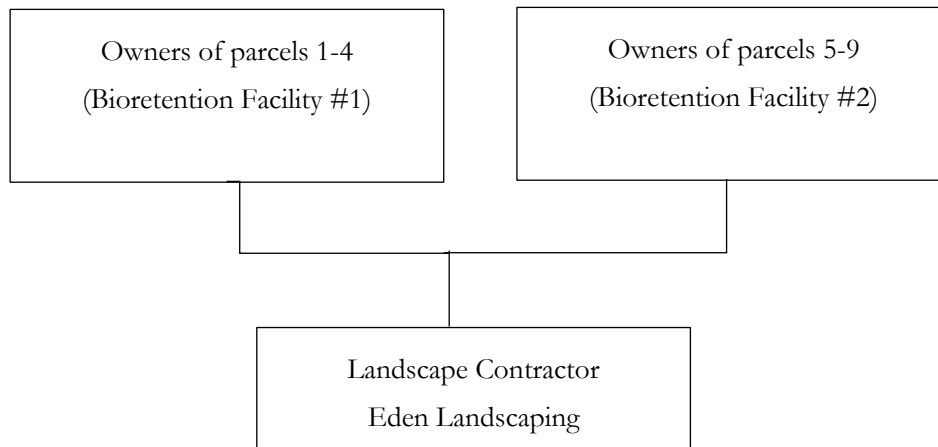
Owners of subdivision parcels 1, 2, 3, and 4 (12051, 12053, 12055 and 12057 Whispering Pines Lane, respectively) jointly own the parcel on which Bioretention Facility 1 is located, and are jointly and equally responsible for the maintenance of that facility, subject to provisions in the subdivision map and the Codes, Covenants, and Restrictions (CC&Rs) recorded against the subdivision. By default, the owner of subdivision parcel 1 (12051 Whispering Pines Lane) is the person who maintains the Bioretention Facility 1 by default if the other owners cannot agree on another person.

Owners of subdivision parcels 5, 6, 7, 8, and 9 (12060, 12058, 12056, 12054, and 12052 Whispering Pines Lane, respectively) jointly own the parcel on which Bioretention Facility 2 is located, and are jointly and equally responsible for the maintenance of that facility, subject to provisions in the subdivision map and the Codes, Covenants, and Restrictions (CC&Rs) recorded against the subdivision. By default, the owner of subdivision parcel 9 (12052 Whispering Pines Lane) is the person who maintains Bioretention Facility 2 by default if the other owners cannot agree on another person.

The owners of both facilities (comprising all the residential property owners within the Whispering Pines Lane subdivision) will contract with one licensed landscape contractor to conduct the maintenance on both facilities. The costs of the landscape contractor's services will be shared equally among the nine residential property owners.

Responsibilities for stormwater facilities operation and maintenance are organized as shown in Figure 1.

Figure 1. Organization of Facility Operation and Maintenance



I.D. Site Description

The 3-acre site is nearly flat, but slopes slightly toward Arterial Road. Soils are silty clays typical of the area (Hydrologic Soil Group “D”).

Development in 2017 included some grading and fill to slightly raise elevations at the south end of the site, construction of Whispering Pines Lane and associated gutters and sidewalks, and construction of the two bioretention facilities, which front on Arterial Road. The bioretention facilities receive drainage from the gutters on Whispering Pines Lane. Overflows and underdrain discharges are routed to a municipal storm drain in Arterial Road. See the Stormwater Control Plan Exhibit.

On each of the nine residential lots, the front, side, and backyards are graded gently concave to retain runoff from smaller storms. Higher flows, as may occur during major storms, drain overland and out to Whispering Pines Lane.

Rear roofs are made to drain, via roof leaders, into the self-retaining backyards.

The front roofs and driveways drain to Whispering Pines Lane, and from there to the two bioretention facilities.

The bioretention facilities are designed to detain and treat runoff within the facility, and also to release stored runoff through flow-control orifices on the underdrains (hydromodification management).

II. DESIGNATION AND TRAINING OF RESPONSIBLE INDIVIDUALS

II.A. Designated Contact for Operation and Maintenance

S. Eden
Eden Landscaping
456 Xanadu Lane
Anytown, USA
123-456-7890 s.eden@edenland.com

II.B. Off-Hours or Emergency Contact

S. Eden
 Eden Landscaping
 456 Xanadu Lane
 Anytown, USA
 123-456-7890 s.eden@edenland.com

II.C. Owners

See the attached list and contact information of property owners.

II.D. Initial Training of Responsible Individuals

Following completion of their construction, the bioretention facilities will be maintained by the contractor for two years, except for routine policing for trash, which will be done by the property owners. During this 2-year period, the owners' landscape maintenance crew will coordinate to meet with the contractor's personnel on-site during maintenance. At these times, the contractor's personnel will demonstrate proper maintenance procedures.

II.E. Ongoing Training of Responsible Individuals

The maintenance activity directions in Section VII below are incorporated into Eden Landscaping's work orders for work at the site. These directions have been reviewed by all current employees. All new employees are trained in special requirements for each site at which they work.

The main training messages for use at Whispering Pines Lane are:

- No synthetic pesticides or fertilizers are to be used.
- No soil amendments are to be added, except aged compost mulch.
- The top of soil elevation is to be maintained at 12 inches below the overflow top of grate elevation.

III. FACILITIES TO BE MAINTAINED

III.A. Facility Descriptions

Runoff from front roofs, driveways, and from the sidewalks and roadway of Whispering Pines Lane, is routed to two bioretention facilities. See the Stormwater Control Plan Exhibit, noting particularly the location of the high point on the gutter-line of Whispering Pines Lane, between Lots 4 and 5.

Bioretention Facility #1 is located near the northwest corner of the site, along Arterial Road.

Bioretention Facility #2 is located near the northeast corner

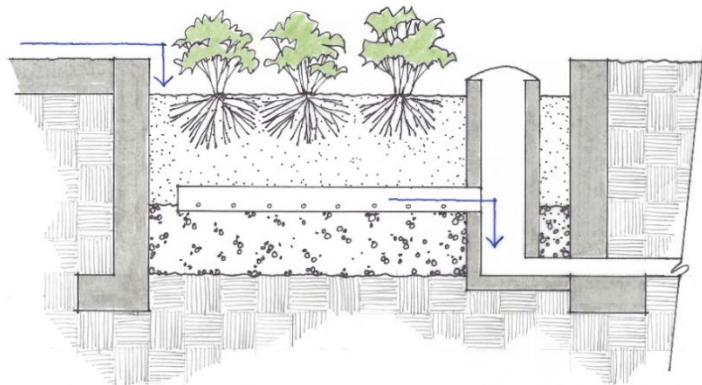


Figure 2. Bioretention Cross-Section (schematic)

of the site, also along Arterial Road.

The facilities are planted to visually accentuate the entryway to the subdivision.

Each of the facilities includes the following features:

- Surrounded by a concrete curb. The curb is at a consistent elevation all the way around the perimeter. Adjacent to pavement, curbs are thickened. A plastic cutoff wall separates the facilities from the pavement in these areas.
- Built flat and level to specified elevations for each layer:
 - Bottom of Gravel Layer (BGL)
 - Top of Gravel Layer (TGL)
 - Top of Soil Layer (TSL)
- An overflow structure, with the overflow grate set at a specified elevation. There is a 12-inch-deep reservoir between top of soil elevation and overflow grate elevation. A pipe draining the bottom of this overflow structure is connected to the onsite drainage system, which connects to the municipal storm drain at a drop inlet in Main Street near the northeast corner of the site. Inside the overflow structure, the underdrain pipe protrudes slightly through the wall. This pipe is threaded and equipped with a cap. The cap includes a hole drilled to the following specification:
 - Bioretention Facility #1: Orifice diameter = 0.89".
 - Bioretention Facility #2: Orifice diameter = 0.97".
- A bottommost layer of Class 2 permeable, Caltrans specification 68-2.02F(3). Depths are as follows:
 - Bioretention Facility #1: 33.5 in.
 - Bioretention Facility #2: 32.5 in.
- Planting medium comprising sand/compost mix meeting the specifications approved by the Regional Water Quality Control Board in April 2016.
- A 4" dia. PVC SDR 35 perforated pipe underdrain, installed with the invert at the top of the Class 2 permeable layer with holes facing down, and connected to the overflow structure at that same elevation.
- Plantings selected for water conservation
- Mulch, 2-3 inches.
- Irrigation system on a separate zone, with drip emitters and “smart” irrigation controllers

IV. MAINTENANCE ACTIVITIES

IV.A. General Maintenance Rules

At no time will synthetic pesticides or fertilizers be applied, nor will any soil amendments, other than aged compost mulch or sand/compost mix, be introduced. The top of soil surface will be maintained at or near the design elevation throughout. Irrigation systems will be maintained to conserve water while maintaining plant health.

Although it is unlikely to be needed, if plants are not thriving compost tea may be applied at a recommended rate of 5 gallons mixed with 15 gallons of water per acre, up to once per year between March and June. Compost tea will not be applied when temperatures are below 50°F or above 90°F or when rain is forecast within the next 48 hours.

The following may be applied for pest control if needed:

- Beneficial nematodes
- Safer® products
- Neem oil

Plants were selected for the each bioretention facility to ensure thriving vegetation, minimize water use, and achieve aesthetic objectives. Replacement plants should be consistent with the project planting plan, or selected by a landscape professional experienced with bioretention facilities.

IV.B. Maintenance Schedule

The three bioretention facilities will be maintained on the following schedule at a minimum:

IV.B.1. Routine Activities

Residential property owners will examine the facilities weekly for visible trash, and trash will be removed. Any graffiti, vandalism, or other damage will be noted and addressed within 48 hours.

Eden Landscaping will weed the bioretention facilities by hand approximately monthly. At this time, plants will be inspected for health and the irrigation system will be turned on manually and checked for any leaks or broken lines, misdirected spray patterns etc. Any dead plants will be replaced.

IV.B.2. Following Significant Rain Events

A significant rain event is one that produces approximately a half-inch or more rainfall in a 24-hour period. Within 24 hours after each such event, Eden Landscaping will conduct the following:

- The surface of the facility will be observed to confirm there is no ponding.
- Inlets will be inspected, and any accumulations of trash or debris will be removed. Any erosion at inlets should be restored to grade.
- The surface of the mulch layer will be inspected for movement of material. Mulch will be replaced and raked smooth if needed.
- Outlet structure will be inspected for any obstructions to assure that mulch is not washed out.

IV.B.3. Prior to the Start of the Rainy Season

In September or each year, Eden Landscaping will conduct a “walk through” of Whispering Pines Lane to confirm there have been no changes to site drainage. Facility inlets and outlets will be inspected to confirm there is no accumulation of debris that would block flow. Stormwater should drain freely into the bioretention facilities. If not previously addressed during monthly maintenance, any growth and spread of plantings that blocks inlets or the movement of runoff across the surface of the facility will be cut back or removed.

On each bioretention facility, the grate will be removed from the overflow structure and the orifice caps on the underdrain will be visually inspected for blockage. If necessary, the caps can be unscrewed, cleaned, and replaced.

IV.B.4. Annually During Winter

Once, in December – February of each year, vegetation will be cut back as needed, debris removed, and plants and mulch replaced as needed. The concrete work will be inspected for damage. The elevation of the top of soil and mulch layer will be confirmed to be consistent with the 12-inch reservoir depth.