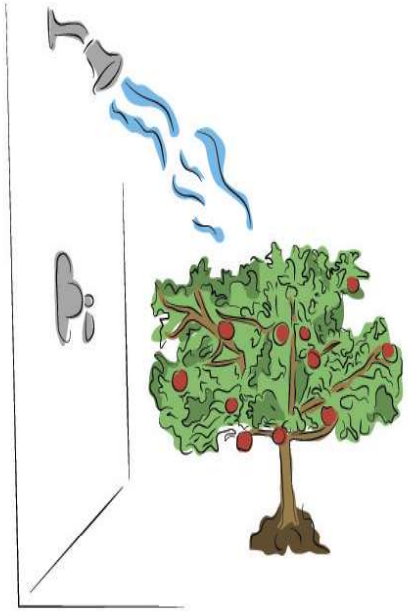
Appendix E: Operation and Maintenance Manual Template

See *www.portolavalley.net* for links to pdf versions of the template.



PORTOLA VALLEY
greywaterdesignmanual
for OUTDOOR IRRIGATION

Sample Operation and Maintenance Manual for Simple Greywater Systems

Congratulations on your new greywater system! This manual will help you maintain a well-functioning, water-saving greywater irrigation system. This manual is to remain with the building throughout the life of the system. Upon change of ownership or occupancy, the new owner or tenant must be notified that the structure contains a greywater system. A map showing the location of all greywater system components is attached to this manual.

Laundry-to-Landscape Greywater System

Insert the calculations you used to design your system here:

My washing machine uses _____ gallons per load.

My household does _____ loads of laundry per day.

My household does _____ loads of laundry per week.

This system was designed to accommodate _____ gallons per day.

Simple Branched-Drain Greywater System

Estimated greywater flow (permitted systems calculation) _____

Soil type _____

Minimum size of irrigation or infiltration area required _____

Actual size of irrigation or infiltration area _____

Estimated greywater flow (irrigation calculations) _____

1. How do I turn my greywater system off?

To turn your greywater system off, turn the handle of the 3-way valve to direct the water towards the sewer or septic system. If your branched-drain system uses a valve actuator, then push the button in your bathroom. The first few times you do this, check to make sure the system is turning off and that your 3-way valve is labeled correctly.

These are common times you'll need to turn off your system:

- During the rainy season if the soil is saturated and you risk greywater pooling or runoff.
- When washing dirty diapers.
- When washing anything with chemicals, such as oily rags.
- Anytime you notice that the water isn't draining well and you see pooling or runoff in the landscape.
- If you think your plants are receiving too much water.
- Anytime you use products that are harmful to plants (like bleach, harsh cleaners, or hair dyes).

2. What products can I use in my greywater system?

It is important to use plant-friendly products when reusing your greywater. All products should be biodegradable and non-toxic. In addition, they should be free of salt (sodium) and boron (borax), two common ingredients that are non-toxic to people but are harmful to plants and/or the soil.

Chlorine bleach is harmful to plants and should be diverted, along with any other harmful products, to the sewer or septic system (by switching the 3-way valve). Hydrogen peroxide bleaches are less harmful and can be used instead of chlorine.

Another consideration with cleaning and personal care products, such as shampoos and conditioners, is their effect on the pH of the water. While many soaps do not change the water's pH, some do. In general, liquid soaps do not affect the pH, while bar soaps make the water alkaline (opposite of acidic). Certain acid-loving plants might not be happy

with alkaline water. If you're uncertain if the pH is being affected, use the greywater to irrigate plants that are not acid-loving. Acid-loving plants include ferns, azaleas, camellias, rhododendrons, and blueberries.

For information about products that independent groups have found to be free of ingredients that may harm plants, see websites such as *http://greywateraction.org/content/greywater-friendly-products* and *http://www.harvestingrainwater.com/greywater-harvesting/greywater-compatible-soaps-and-detergents/*. You can also find out what's in your products at *http://cosmeticdatabase.org*. In a shower, shampoo is fairly diluted so it is not as important as detergents in the washing machine.

3. How do I maintain my greywater system?

The main thing you'll need to do to maintain your greywater system is periodically check on the mulch basins (the mulch layer the greywater flows into) and make sure the greywater is draining properly. If you notice any pooling or runoff, dig out the mulch basin and put in new mulch (wood chips or bark). Mulch usually needs to be replaced every one or two years.

At the beginning of the irrigation season, check to ensure that greywater is flowing out of the outlets evenly. If you notice uneven distribution, check the outlets for clogs, and manually remove any debris. If you notice that many of the outlets are clogged, you need to flush the system. For branched-drain systems, there could be some settling of the system over time, which could result in uneven distribution out of the outlets. You can readjust the slope of the double-ell (twin 90) flow splitters to even out the flow.

To flush a Laundry-to-Landscape System system, open any partially closed ball valves, making sure the end of each line is open. Pull the tubing off the PVC connection point and insert the barbed 1-inch female hose thread adapter. Attach a garden hose to the hose connection and turn the hose on high to flush particles out of the system. ***Any time you attach a garden hose to temporarily flush the system, make sure you have an anti-siphon valve or vacuum breaker on the hose bibb!*** When you are finished, be sure to readjust the ball valves for an even flow of greywater. To flush a Branched-Drain Greywater system, insert a garden hose into a cleanout and force water through the system. If there is a blockage, you can insert a “snake” to push out a clog.

A basic operation and maintenance checklist for laundry-to-landscape systems is provided in Table E-1.

Table E-1 *Greywater Systems: Operation and Maintenance Checklist*

Component	*Inspection Schedule*	*O&M Activity*	*Action Needed*
General Greywater Systems with subsurface outlets			
Mulch basins	Annual	Check to see if mulch has decomposed and water is pooling under graywater outlets.	Remove decomposed mulch and add new mulch.
Laundry-to-Landscape Systems			
3-way valve	Annual	Check for leaks at washer hose and that label is in place	If leaking, tighten hose clamp. Replace label, if needed.
Auto vent	Annual	Check for leaks from auto vent	If leaking, replace auto vent.
Piping and Tubing	If you notice water in an unusual place	Check for leaks	If piping or tubing is damaged, cut out the damaged sectin adn reconnect with a 1-inch barbed coupling
	Annual	Check for even distribution from outlets	Unclog hair or link built up in the outlets. Open ball valves, check for clogs. If needed, flush the system with a hose: temporarily disconnect the tubing from the PVC fitting, attach the garden hose by barb fitting, adn connect the hose to the system.
Simple Branched-Drain Systems			
Outlets	Annual	Check if flow is even	Check for clogs in flow splitters, flush with garden hose, readjust slope of ells and piping.
Valves	Annual	Ensure it turns fully	Unscrew faceplate and clear out any debris.

4. What are the 12 guidelines to follow to comply with the greywater code?

Under the 2010 California Plumbing Code (California Code of Regulations, Title 24, Part 5, Chapter 16A), washing machine systems in one- or two-unit residential buildings do not require a permit as long as the installer follows the 12 minimum requirements outlined in the code: Branched drain greywater systems may require a permit.

1. If required, notification has been provided to the Enforcing Agency regarding the proposed location and installation of a greywater irrigation or disposal system. *Note: A city, county, or other local government may, after a public hearing and enactment of an ordinance or resolution, further restrict or prohibit the use of greywater systems.*

2. The design shall allow the user to direct the flow to the irrigation or disposal field or the building sewer. The direction control of the greywater shall be clearly labeled and readily accessible to the user.

3. The installation, change, alteration or repair of the laundry system does not include a potable water connection or a pump and does not affect other building, plumbing, electrical or mechanical components including structural features, egress, fire-life safety, sanitation, potable water supply piping or accessibility. The installation of a branched drain greywater system shall not be connected to any potable water system without an air gap or other physical device which prevents backflow.

4. The greywater shall be contained on the site where it is generated. No greywater system or part thereof shall be located on any lot other than the lot that is the site of the building or structure that discharges the greywater, nor shall any greywater system or part thereof be located at any point having less than the minimum distances indicated in Table 16A-1.

5. Greywater shall be directed to and contained within an irrigation or disposal field. Greywater shall not be used in spray irrigation, nor to irrigate root crops or edible parts of food crops that touch the soil.

6. Ponding or runoff is prohibited and shall be considered a nuisance. Greywater shall not be discharged directly into or reach any storm sewer system or any surface body of water.

7. Greywater may be released above the ground surface provided at least two (2) inches (51 mm) of mulch, rock, or soil, or a solid shield covers the release point to minimize the possibility of human contact. Other methods which provide equivalent separation are also acceptable.

8. Greywater systems shall be designed to minimize contact with humans and domestic pets, except as required to maintain the greywater system.

9. Water used to wash diapers or similarly soiled or infectious garments or other prohibited contents shall not be used and shall be diverted by the user to the building sewer.

10. Greywater shall not contain hazardous chemicals derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of waste solutions from home photo labs or similar hobbyist or home occupational activities.

11. Exemption from construction permit requirements of this code shall not be deemed to grant authorization for any greywater system to be installed in a manner that violates other provisions of this code or any other laws or ordinances of the Enforcing Agency.

12. An operation and maintenance manual shall be provided. Directions shall indicate the manual is to remain with the building throughout the life of the system and indicate that upon change of ownership or occupancy, the new owner or tenant shall be notified the structure contains a greywater system.

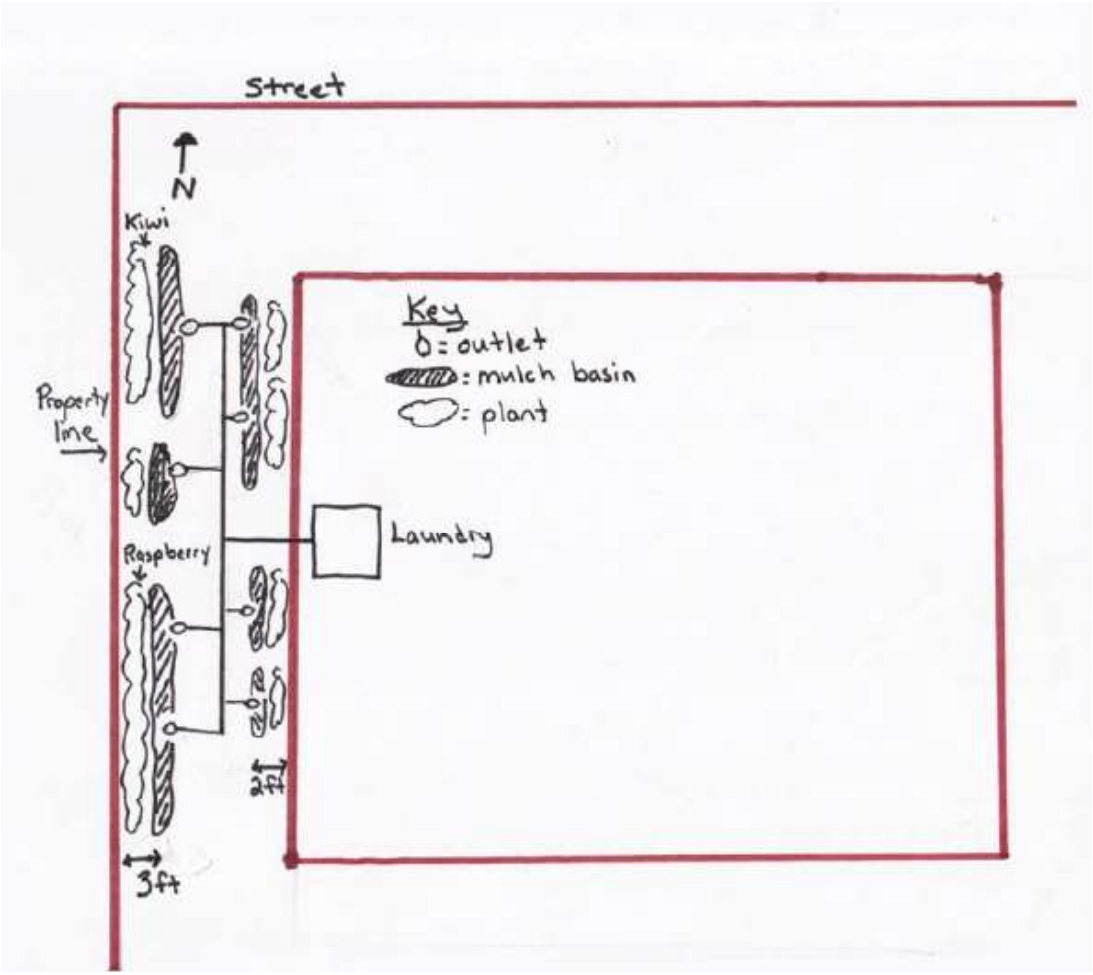
Creating a Simple Plot Plan

Sketch the layout of your laundry to landscape greywater system and attach it to your O&M manual. Guidelines for the sketch are listed below, and grid paper is provided on the next page. Attach photos of irrigation tubing taken after installation but before the tubing is covered with soil. Together, the sketch and photos will provide a good record of your system for future reference.

Guidelines for your sketch:

- Put in landmarks for reference, for example, the side of your home, sidewalk, fences, and street.
- Indicate where the pipe exits your home.
- Show the pipe, tubing, and mulch shields.
- Add setbacks between the system and your home, property lines, and other structures.
- Add a rough scale, for example, 1 inch =10 feet.
- Add a north (or other direction) arrow.

This sketch is for your own use, so it can be as simple or detailed as you like. An example is shown at right.



Sketch: Laura Allen.

Address: _____ Date: _____

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