Greywater Systems

October 21, 2020

Presented By:

Imagine a Day Without Water

October 21, 2020

Trivia Question
Trivia Prize!
Art Ludwig Book and Video Set

Question

What is the largest use of water in the US?

- Irrigation of agriculture
- Consumption at homes and businesses
- Generating electric power
How do we use our water?

Estimated Average US Household Water Usage

- Shower/Bath: 35%
- Toilet Flushing: 30%
- Laundry: 20%
- Kitchen/Drinking: 10%
- Cleaning: 5%
Why Greywater?

Our municipal water has a carbon footprint!

19% of all electricity used in CA is related to water.

Re-using water already used (& paid for) reduces the embodied energy per use.

What is Greywater?

Greywater comes from:

- Showers and baths
- Washing machines
- Bathroom sinks
Greywater is NOT...

Water from:
• Toilets
• Kitchen sink
• Dishwasher
• Washing certain items (like dirty diapers)

Cautions

Greywater could contain pathogens
(Washing clothing with blood, etc.)

Greywater may have chemicals in it
(Oil soaked clothing, etc.)

Ponding (standing water) can breed mosquitoes
Some benefits of using Greywater:

- Saves potable water (drinking, cleaning, bathing etc.)
- Conserves energy
- Reduces demand on septic systems and wastewater treatment plants
- Encourages plant friendly product choices
- Facilitates home-grown food production

What is your Greywater production?

1. Upgrading machine in the near future?
2. Number of laundry loads per day
3. Number of gallons of water per load?
   - Efficient models ≈ 15 gallons/load
   - Inefficient models ≈ 40 gallons/load

Formula:
\[(\text{Number of loads}) \times (\text{Gallons per load}) = \text{Greywater produced}\]
Reuse greywater for 16-40% reduction in total water use.

A sump basin collects greywater from the house.

A pump pushes water through a filter which removes particles.

Filter is automatically flushed (this requires special “backflow prevention” and permits are much more complicated).

Filtered greywater is distributed through drip irrigation tubing to plants.

Cost: $10,000 - $20,000
A Laundry to Landscape System

A Greywater system that requires no permit (some guidelines)

Inside Portion of System
From Washer Hose to a 3-Way Valve

Connecting the Washer Hose to the 3-Way Valve
Tips for connecting washer hose

• Select the right size barbed adaptor to fit the machine discharge hose (¾” or 1”)
• If it’s difficult to slip hose over barb, heat hose with hair dryer or hot water
• Secure with hose clamp

More tips

If unable to securely fasten washer hose to barb
• Use vinyl tubing to connect them
• Secure both ends with hose clamps

Photos by: Greywater Action
More 3-Way Valve Info

Valve must be:
- Accessible
- Above washing machine

- Washer hose always connects to middle port.
- Ensure water-tight connections

Photos by: Greywater Action

Other Examples
Strap the valve assembly

- Use 2-hole straps
- Add wood blocking if needed
- Strap so valve is secure

NOT recommended valve placement
3-way valve to sewer standpipe

Keep a loose fit at the sewer connection
3-way valve to Anti-Siphon part

Anti-siphon Component

- To prevent a siphon from forming and draining the machine when it tries to refill.
- Also referred to as: Autovent, AAV, In-line vent, etc.
Assembling the Anti-siphon part

- Auto-Vent (1 ½” threads)
- 1 ½” PVC Adaptor FPT x S
- Reducing bushing 1 ½” x 1” slip
- 1” PVC Pipe
- 1” PVC Tee

Photos by: Greywater Action

Anti-Siphon requirements

- Must be visible and accessible in case of leaks.
- Must be the highest point of the system.
- Must be placed on the landscape side of the 3-way valve.

Photo by: Greywater Action
Code Requirements

- 1” 3-way valve
- Label pipes with direction of water flow and: “Caution: Non-potable water, do not drink”
- Include operating manual
- No pump or potable water connected

What type of cleansers?

**Plant-friendly products (salt, boron & chlorine free):**
- Liquid laundry detergents
- Hydrogen Peroxide Bleach

**Ingredients to avoid:**
- Salt/sodium compounds – Common in powdered detergents, fabric & water softeners
- Boron/borates - Common in detergents and fabric softeners
- Chlorine bleach
Full system overview

Hardscape considerations

Photo by: Greywater Action

Under, around, cut or remove
Distribution Points / Irrigation Basins

Some definitions

- **Irrigation (Mulch) Basin**: Trench filled with mulch designed to hold daily Greywater production.
- **Mulch Shield**: A subsurface discharge area that protects pipes from dirt and plant roots.
Keep a downward slope

- Irrigate on higher side of plant.
- Leave a 1” open end somewhere in system!

More distribution point mulch shields

- Inverted 1 gallon plant container
- Small valve box
Inside the distribution point shield

Adjust flow to balance system

Adjust angle of tees

Ball valves can help balance flows but......
Irrigation Basins

• No Greywater should enter the storm drain!
• For clay soil, trench 1 sq ft (shovel deep) per 1 gallon of Greywater produced daily.
• Dig at the drip line (where branches end).
• Needs to be large enough to contain all the Greywater released in a day.

Irrigation Basin Size?

Example:
• 4 loads of laundry (on Sat) at 15 gallons per load = 60 gallons (in one day)
• 1 gallon needs 1 sq ft basin
• 60 gallons of Greywater in one day = 60 sq ft of basin needed to contain it
From PVC pipe to HDPE

High-density polyethylene (HDPE)

Caution: Non-potable water, do not drink.

This transition point will be used to flush system annually

Annual flushing of system

Disconnect HDPE from PVC.

Use a female hose adapter to connect garden hose and flush out system annually.
positioning the transition union: on vertical pipe gives best access—won’t get buried in soil!

Plant Selection

**Good choices**
- Trees
- Shrubs & Bushes
- Vines
- Perennials
- Large Annuals

**... and not so good**
- Lawns
- Root vegetables (not allowed)
- Established plants or plants that were never irrigated
- Small or potted plants
- Raised beds
Edibles in the ground?

- Tomatoes - OK
- Chard - OK
- Potatoes – No!
- Onions – No!
- Strawberries – No!
- Artichokes - OK

Fruit trees?
Setback Requirements

All discharge points (not the pipe) need to comply with setback requirements

- 1.5’ from property line
- 2’ from buildings
- 100’ from waterways and wells
- 5’ from septic tank
- 4’ from leach field
- 3’ above groundwater table

Sum it all up

Bury tubing
Check for leaks inside
Paint exposed pipe
Seal holes
Post advisory and directional signs
Post maintenance manual
Get Greywater friendly soap
Complying with the Code?

**System Check List**

- Have you installed the 3-Way Valve?
  - Is it visible and accessible?
  - Is it labeled appropriately?
- Have you posted a Maintenance Manual?
- Is the anti-siphon installed?
  - Is it on the landscape side of the system?
  - Is it the highest point of the system?
  - Is it visible & accessible in case of leaks?
- Is the Greywater discharging 2” below the surface?

Complying with the Code?

**System Check List (continued)**

- Will all Greywater be contained on site?
- All discharge points (not the pipe) comply with setback requirements
  - 1.5’ from property line
  - 2’ from buildings
  - 100’ from waterways and wells
  - 5’ from septic tank
  - 4’ from leach field
  - 3’ above groundwater table
Recommended Web Sites

greywateraction.org

oasisdesign.net

QUESTIONS ?
THANK YOU FOR WATCHING!

Tonight’s slides will be posted in Water-Wise Landscaping Workshops section of web site:

cityofnapa.org/water