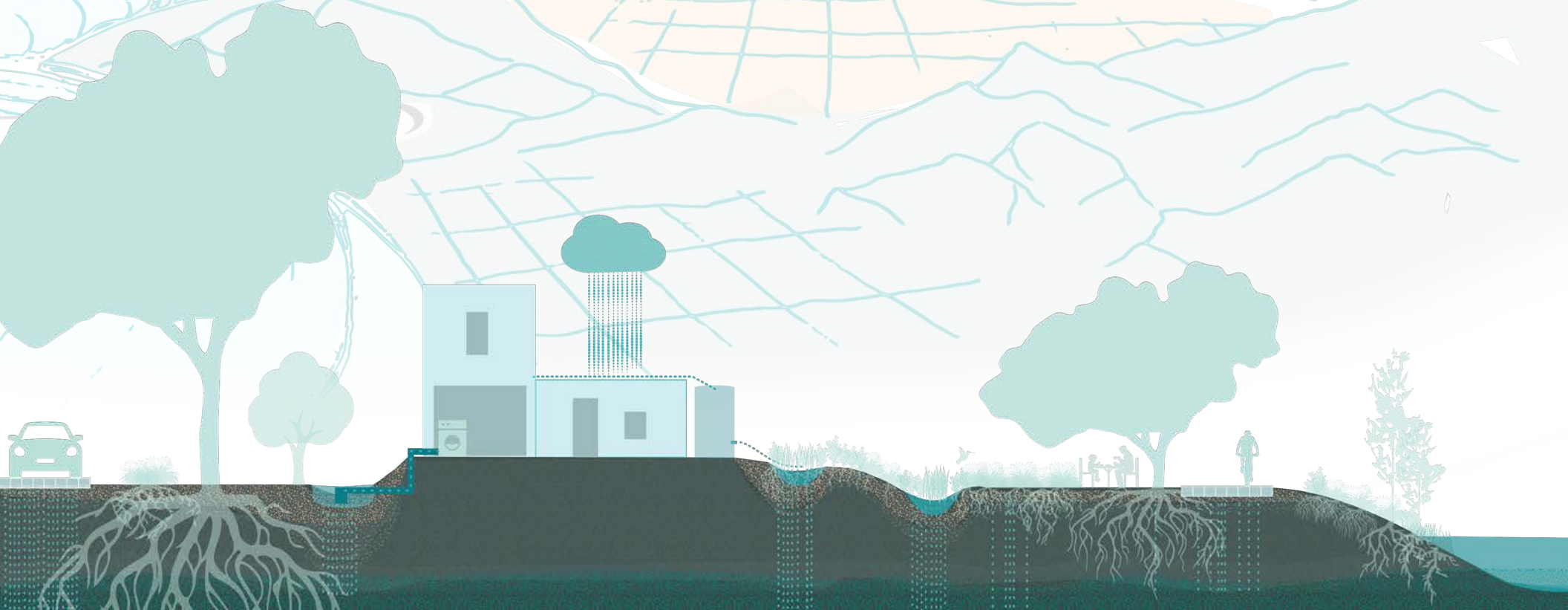
GREYWATER
LAUNDRY TO LANDSCAPE

how to **reuse water from your washing machine to irrigate your landscape** and **increase drought resilience**

for Inland Valleys in Ventura County



1 GREYWATER: LAUNDRY TO LANDSCAPE

What is greywater?
And how can it benefit your property?

INTRODUCTION

Have you ever thought about the waste that occurs through the disposal of water that isn't quite dirty, but isn't quite clean?

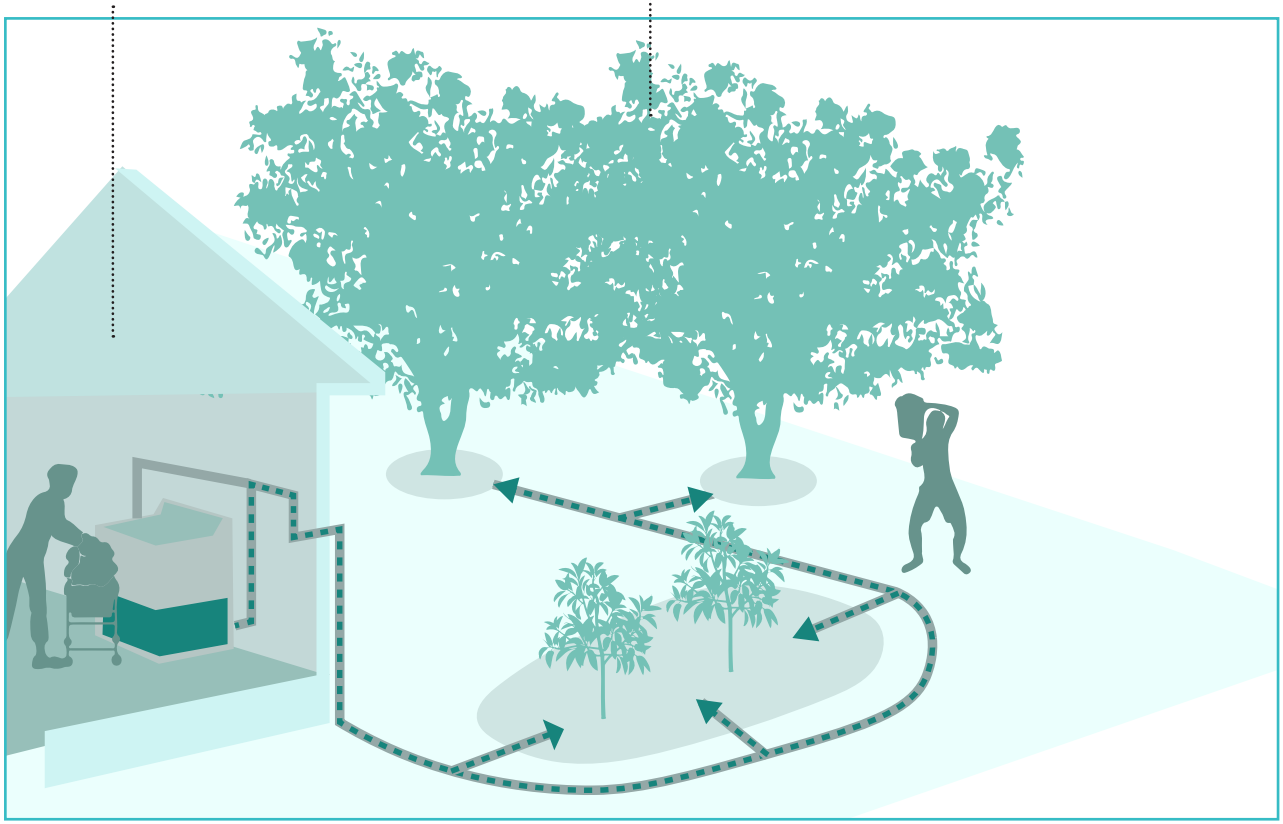
This is considered GREYWATER.

Greywater may not be clean enough to be potable, but it's clean enough to serve important functions around your property, such as irrigation. The water that is used to clean your laundry is a great example of this.

While you may not be able to drink it, the water that is used to clean your clothes could be redirected from the sewer to your landscape. Then, you could use it grow species that you otherwise couldn't in a water-resilient manner, such as many common fruit-bearing trees and shrubs!

These planting areas recieve enough water to be able to support plants that would otherwise be water-costly to grow. These plantings can promote food security where non-irrigated plants couldn't. Think fruit trees!

Water that is drained from your laundry is diverted into a greywater system.



This system carries the greywater into planting areas, *mulch basins*, where the excess water is discharged.

2 GREYWATER: LAUNDRY TO LANDSCAPE

How to build a greywater system and important system considerations

1. Evaluate L2L Feasibility

- Is your washing machine:
  a. Near an outside wall?
  OR
  b. Over a crawlspace?
- Is there a landscape area for greywater to irrigate that is:
  c. Within 50' of your washing machine?
  AND
  d. At or below the elevation of your washing machine?
  AND
  e. Outside of setbacks? Check local codes for healthy safety and setback info. Typical setbacks: Structures and Property lines - 2', Wells / Waterways - 100', Septic Tanks - 5'.

2. Landscape Planning

- **Identify existing or new plants to irrigate with greywater.** Best plant types include:
  a. Medium water use trees, shrubs, perennials, vines, etc.
  b. If growing food, edible portions not in direct contact with soil (no leafy green or root vegetables).
- **Match the amount of greywater that you use (supply) with the water needs of your plants (demand).** Supply varies by occupancy but generally:
  a. Front-loading washing machines irrigate 4-8 plants;
  b. Top loaders irrigate up to 15 plants.
- **Perform a percolation test:** https://greywateraction.org/how-do-percolation-test/

3. L2L Build It!

- **Locate existing utilities and obstacles before digging:** Dial 811 for Dig Alert.
- **Install Ansi-Approved 3-way diverter valve:** This will switch greywater back to sewer/ septic as needed. Locate in accessible place and clearly label orientation.
- **Install Air-Admittance valve above fill-line of washer:** This valve prevents siphoning of the water.
- **Drill pipe passage through wall or crawlspace to landscape:** Try to avoid drilling through concrete or foundations unless it is the only route available.
- **Use 1" diameter HDPE or Blu-lock irrigation tubing as main-line conveyance piping:** All piping should slope at 2%.
- **Greywater must be distributed 2" below the surface:** Dispense water into mulch basins to avoid human contact with non-potable greywater.
- **Install a mulch shield or valve box:** Locate at end of open pipe within mulch basins to reduce erosion and direct greywater to plant roots.

Example greywater mulch basin (Source: https://www.storey.com/article/kitchen-greywater-water-conservation/)

Example greywater mulch basin (Source: https://www.milkwood.net/2012/02/29/diy-mulch-pit-greywater-system/)

DO

- DO think about the plants that you would like to grow, but may not have the water allowance to.
- DO ensure that you plan mulch basins to be at least 10 feet from a building foundation, as it will precipitate groundwater infiltration.
- DO post signs educating your neighbors that you are irrigating your landscape with recycled water!

DO NOT

- DO NOT attempt to install a greywater system yourself if you cannot: call a professional for help.
- DO NOT use laundry detergents that are high in environmentally harmful chemicals such as phosphorus. Ensure that your detergent is greywater-system friendly.

ADDITIONAL RESOURCES

Laundry Safe Supplies

Perform a Greywater Percolation Test

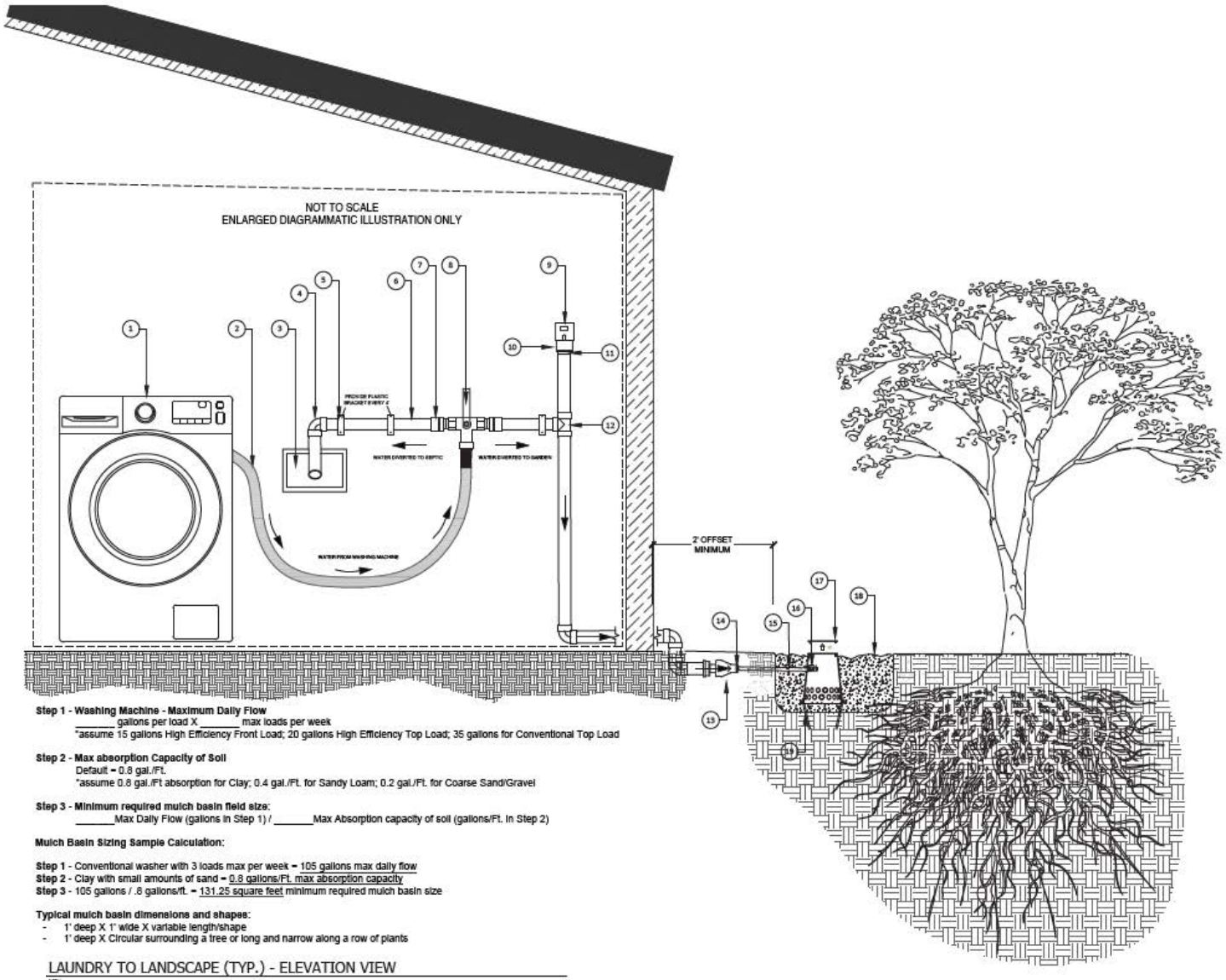
Sonoma County Greywater Codes

Incorporating Greywater into a Holistic Landscape:
Sonoma-Marin Saving Water Partnership

3 GREYWATER: LAUNDRY TO LANDSCAPE

Greywater system construction details

and greywater system notes



Step 1 - Washing Machine - Maximum Daily Flow
_____ gallons per load X _____ max loads per week
*assume 15 gallons High Efficiency Front Load; 20 gallons High Efficiency Top Load; 35 gallons for Conventional Top Load

Step 2 - Max absorption Capacity of Soil
Default = 0.8 gal./Ft.
*assume 0.8 gal./Ft absorption for Clay; 0.4 gal./Ft. for Sandy Loam; 0.2 gal./Ft. for Coarse Sand/Gravel

Step 3 - Minimum required mulch basin field size:
_____Max Daily Flow (gallons in Step 1) / _____Max Absorption capacity of soil (gallons/Ft. in Step 2)

Mulch Basin Sizing Sample Calculation:

Step 1 - Conventional washer with 3 loads max per week = 105 gallons max daily flow
Step 2 - Clay with small amounts of sand = 0.8 gallons/Ft. max absorption capacity
Step 3 - 105 gallons / .8 gallons/ft. = 131.25 square feet minimum required mulch basin size

Typical mulch basin dimensions and shapes:
- 1' deep X 1' wide X variable length/shape
- 1' deep X Circular surrounding a tree or long and narrow along a row of plants

LAUNDRY TO LANDSCAPE (TYP.) - ELEVATION VIEW
NTS

General Notes:

A. The drawings are diagrammatic in nature and are created to represent the concepts as associated with on-site water reuse and storm water management / basin installations. For all site dimensions and exact relative locations, field condition as-builts should be requested from the property owner.

B. Typical front loading washing machine is able to distribute water up to eight locations. A typical top loading washing machine is able to distribute water up to twelve locations (depending on the site conditions).

C. All irrigation points to be 2 inches below the surface in mulch basins.

D. The end of main line should be fully open with no plug / or valve.

E. Verify minimum horizontal offsets for graywater (per CPC 2016) + local county codes for the following:
- Building Structures
- Property Line
- Water Supply Wells
- Septic Tank

F. Laundry to Landscape (L2L) system must be equipped with accessible three way diverter valve with sign that indicates operation, so washing machine discharge water can be diverted to septic/sewer during rain events or if soil reaches a high level of saturation.

G. Products with bleach, salt, alcohol or other industrial chemicals are not recommended for use in these graywater systems.

H. 1" SCH 40 PVC will slope downward at 2 degrees or 1/4" per foot.

I. All graywater conveyance lines shall be marked "Non Potable, Do not Drink".

J. Laundry to Landscape (L2L) graywater systems are exempt from permitting per CPC 2016.
- Water is coming directly from washing machine.
- No existing house plumbing has been altered

K. All devices will be ASNI/NSF approved. All devices to be accompanied with reference and maintenance instructions per maintenance and monitoring plan.

L. Client will be provided with a maintenance manual for the system.

M. Auto Vent must be higher than fill line of washing machine.

N. All existing tanks, piping, and electrical work will be avoided and protected when necessary throughout construction.

O. 811 - know what's below - call before you dig

Sheet Notes:

1. Front loading washing machine (TYP.)
2. Washing machine drain hose
3. Standpipe to sewage provision
4. 1" PVC 90 elbow
5. Mounting brackets (4' Spacing)
6. 1" PVC Pipe
7. 1" PVC Male Barbed X Female Slip Adapter
8. 3-Way diverter valve
9. Auto Vent (minimum size 1.5") - To prevent potential siphon in the system *Optional - Install outside if laundry room is not well ventilated or too warm.
10. 1.5" Threaded Adapter
11. 1.5 to 1" Bushing
12. 1" PVC Tee
13. 1" PVC Check Valve - To prevent the back-flow of laundry water
14. 1" to 1/2" barbed fitting to 1/2" poly line
15. 1/2" poly line
16. 1/2" Drain valve -
17. 6" Round irrigation valve box w/ lid for each mulch basin
18. Mulch Basin - Irrigating trees, shurbs or ground cover
19. Landscape pins to secure irrigation box into place

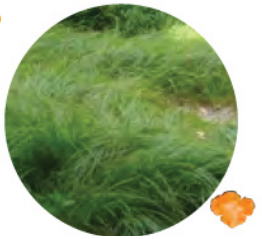
4 GREYWATER: LAUNDRY TO LANDSCAPE

GREYWATER PLANTS

Plants to be irrigated by greywater systems

SUN/SHADE
- full sun
- partial sun / shade
- full shade

OTHER CONSIDERATIONS
- edible
- native

TREES	SHRUBS	PERRENIALS	GRASSES	VINES
 *Acer macrophyllum* **Big Leaf Maple**	 *Acca sellowiana* **Pineapple Guava**	 *Achillea mellifolium* **Yarrow**	 *Calamagrostis foliosa* **Mendocino Reed Grass**	 *Actinidia argata* **Hardy Kiwi**
 *Citrus spp.* **Citrus tree**	 *Diospyros kaki* **Persimmon**	 *Anemopsis californica* **Yerba Mansa**	 *Carex barbare* **Basket Sedge**	 *Humulus lupulus* **Hops Vine**
 *Ficus carica* **Common fig**	 *Punica granatum* **Pomegranate**	 *Cynara scolymus* **Artichoke**	 *Carex praegracilis* **California Field Sege**	 *Lathyrus odoratus* **Sweet Pea Vine**

5 GREYWATER: LAUNDRY TO LANDSCAPE

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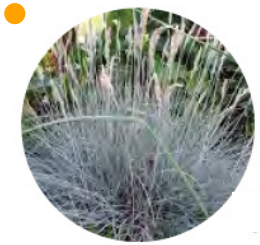
TREES	SHRUBS	PERRENIALS	GRASSES	VINES
 *Platanus racemos* **Sycamore**	 *Rubus ursinus* **California Blackberry**	 *Iris douglasiana* **Douglas Iris**	 *Juncus textilis* **Basket Rush**	 *Selenicereus undatus* **Dragon Fruit Vine**
 *Morus alba x rubra* **Pakistan Mulberry**	 *Rosa californica* **California Wild Rose**	 *Heuchera spp.* **Coral Bells**	 *Juncus patens* **California Gray Rush**	 *Physalis ixocarpa* **Tamatillo Vine**
 *Junglan californica* **California Black Walnut**	 *Ribes aureum* **Golden Currant**	 *Dicentra formosa* **Pacific Bleeding Heart**	 *Festuca glauca* **Blue Fescue**	 *Passiflora edulis* **Passionfuit Vine**