



GRAYWATER CURRICULUM

CLASS TWO

Graywater Codes and Regulations

Class 2 Objectives

- 1. Graywater Code**
- 2. Graywater history**
- 3. Permitting requirements**
- 4. Graywater systems and terms**



CA Graywater History

- 1992 - CA writes 1st graywater code, but treated it as a waste product/sewage (disposal code)
- 1992 - 2009 Almost zero compliance rate - code out of line with intent (irrigation source) and practical nature of graywater systems
- 2009 - 2010 DHCD (Department of Housing and Community Development) writes new code
- 2013 Plumbing Code acknowledges Alternative Water Sources

Graywater is viewed as a resource!



2013 CPC Highlights

California Plumbing Code (CPC) Chapter 16: Alternate Water Sources for Nonpotable Applications

- Alternative Water Sources designation established
- Location of irrigation zones (Table 1602.4)
- Water quality standards developed for indoor use of alternative water sources (1601.7)
- Commercial, Industrial and Institutional graywater system discharge procedure (1602.8.2)
- Easement/ Right of Way allows graywater to discharge to an adjoining lot (1602.4)
- On-site treated nonpotable graywater systems (1604.0)



Common Concerns of Regulators

Contamination of potable water

- Backflow prevention and/or air gap

Neighbor issues - runoff into neighbor's yard

- Litigation, odor complaints

Pooling, ponding

- Mosquitoes, exposure

Graywater entering storm drains

- Illegal, watershed pollution

Home infrastructure

- Ratio of liquids to solids to keep wastewater moving

Code Compliance

- **Historical low code compliance rates in California**
- **People deterred by perception of impractical code requirements**
- **Few professionals installing graywater systems**
- **Development of graywater code in recent years facilitates professional installation**
- **Opportunity for landscape and plumbing industries**

Three Types of Graywater System

1. Clothes Washer System (1602.1.1)

- Doesn't alter drainage plumbing
- Follows 12 guidelines
- Doesn't need permit

2. Simple System (1602.1.2)

- Up to 250 gallons/day or less
- Any amount of fixtures
- Needs permit

3. Complex System (1602.1.3)

- Over 250 gallons/day, any amount of fixtures, designed by a person who demonstrates competence, needs permit



Clothes Washer System 1602.1.1

1. **Notification** of installation of the system to Enforcing Agency (county or city permitting department, environmental health, public works, etc)
2. User can easily **redirect flow** to sewer
3. **No potable water** connection
4. The graywater shall be **contained on the site** where it is generated
5. Graywater shall be directed to and **contained within an irrigation or disposal field**
6. **Ponding or runoff is prohibited** and shall be considered a nuisance
7. **At least two (2) inches of mulch, rock, soil, or a solid shield** covers the release point



Clothes Washer System 1602.1

8. **Minimize contact** with humans and domestic pets.
9. Water used for **diaper washing** and similarly soiled or infectious garments shall be **diverted** to the building sewer.
10. Graywater **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 gray water 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.

Activity 1

What section of the code addresses these concerns?

- Location of Graywater Systems (Setbacks)
- Estimating Graywater Discharge
- Potential Contact with Pathogens

Location of Graywater Systems (Table 1602.4)

Min. Horizontal Distance From:	Irrigation Field (feet)
Building structures	2
Property line adjoining private property	1.5 (drip/mulch basin) or 5
Water supply wells	100
Streams and lakes	100
Sewage pits or cesspools	5
Sewage disposal field	4
Septic tank	5
Onsite domestic water service line	0
Pressurized public water main	10

Activity 2:

Gray Water Systems – General 1602.1(C)

Find a partner.

Gray water shall not be used in spray irrigation, allowed to pond or runoff and shall not be discharged directly into or reach any storm sewer system or any surface body of water.

Partner 1: Explain these concepts in plain English

Partner 2: Explain why this is important

Definitions

California Plumbing Code Chapter 2: Definitions

- Irrigation Field and Disposal Field
 - An intended destination which includes drip irrigation system, mulch basin, etc
- Mulch Basin
 - Type of irrigation or disposal field made up of organic waste (straw, wood chips, etc), sufficient area to prevent ponding or runoff
- Treated Graywater
 - Non-potable water collected and treated on site
- Additional terms found in Chapter 2

Activity 3: Clothes Washer Scenarios

Read scenarios, determine if scenario is allowed, cite applicable section of code.

System 1:

Carla's graywater is distributed through a 1" tube, every 4 feet there is a tee placed in the line and graywater discharges into a mulch basin.

System 2:

The washing machine hose is attached to a 1" pipe that runs outside. The pipe discharges the graywater into a pit of mulch touching the property line.

System 3:

A co-housing community installed a washing machine that uses over 300 gpd.

System Requirements 1602.2

Discharge (1602.2.1)

- Permitted to a subsurface/subsoil irrigation system/disposal field
- Residential occupancies can discharge to a mulch basin

Surge Capacity (1602.2.2)

- Designed system must accommodate peak flow rates and discharge all water on a daily basis
- A surge tank is required for systems that can't discharge the total amount by gravity drainage

System Requirements 1602.2

Diversion (1602.2.3)

- Must occur downstream of traps and vent connections
- The diverter valve must be readily accessible and indicate flow direction

Backwater Valves (1602.2.4)

- Install at the point of connection to the building sewer system for locations that are subject to backflow

Permitting Graywater Systems

- **For simple and/or complex graywater systems, local permitting agencies generally require drawings and specs (1602.7). Code states the following *may* be required:**
 - Plot plan details
 - Holding tank details
 - Soil absorption qualities from percolation test
 - Site Surface water locations
- **Operations and Maintenance Manual (1601.6)**
- **System Design may require a licensed professional for complex systems (1601.2)**

Permitting Graywater Systems

- **It is important to check the permitting requirements in the jurisdiction in which the graywater system is being installed**
- **Usually at least two separate permits are required for a graywater system**
 - Building or plumbing permit to modify existing plumbing
 - Environmental Health Services (EHS) permit for system components located outside the house
 - Electrical permit may be required

Drawings and Specifications 1602.7

- **Plot Plan (to scale)**

- Lot lines / slope
- Retaining walls / drainage channels / paved areas / structures
- Water supply lines / plumbing fixtures
- Water and sewer system (private and/or public)
- Location of proposed gray water system



- **Soil / groundwater**

- Absence of groundwater can be proven by digging a 3 ft. test hole (ideally below the depth of the mulch basin)
- Conduct a soil test and contact local enforcement agency for requirements

Operations and Maintenance Manual

1601.6

- **Required info:**

- Diagram(s) of the system and location of components
- Instructions on operating the system
- Details on start-up, shut-down, and deactivation
- Applicable testing, inspection and maintenance
- Contact info of installer/designer and component manufacturer
- Directions that the O&M manual needs to remain with the building for the life of the structure

- **Other helpful info:**

- What kinds of soaps to use
- A picture of the tubing before it is buried

Maintenance and Inspection 1601.5

- All systems and components shall be inspected and maintained per manufacture's recommendations and/or as required by the Enforcing Agency
- If no recommendations are made follow Table 1601.5
- 1601.5.1 Maintenance Responsibility
 - Property owner is responsible for maintenance

Identification

- Graywater distribution piping upstream of any connection to an irrigation field or valve shall be identified with the words

**“CAUTION: NONPOTABLE GRAY WATER,
DO NOT DRINK”**

- Markings intervals must be every 5 ft. or less



Groundwater Level 1602.10.3

- Graywater can not discharge into groundwater without a minimum 3 foot separation of soil
- Graywater must be diverted to septic/sewer in areas with seasonally high groundwater
- For questionable locations a test hole 3 ft. below the deepest irrigation or disposal point can be used
 - If there is no water in it then the water table is far enough away

Protecting Public Water Supply 1602.3

- **Graywater systems cannot be cross connected with potable water**
- **Cross connection is potentially dangerous if city water pressure drops and non-potable water is sucked into system**
- **Protected by:**
 - Air gap
 - Reduced pressure back flow device “RP valve”
 - Proper labeling of graywater system



Water Quality Protection

- **Graywater is NOT allowed to pond, pool, surface, or enter storm drains (1602.2.2)**
 - It should never runoff the site
- **Setbacks from creeks surface water, drainage ditches (Table 1602.4)**
- **Storm water is rainwater runoff water from gutters, roofs, landscapes, streets and sidewalks.**



Take home activity

- 1. Review California Plumbing Code Chapter 16: Alternate Water Sources for Nonpotable Applications**
- 2. Answer assigned Chapter 16 questions.**