County of San Diego

Department of Environmental Health
Land and Water Quality Division

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Graywater Systems
Permitting Process and Design Criteria

INTRODUCTION

Properly installed graywater systems can provide a safe drought proof supply of irrigation water and impart the environmental benefit of conserving drinking water supplies. Graywater is untreated wastewater from bathroom sinks, baths/showers and clothes washers, but not from toilets, kitchen sinks or dishwashers. California regulations allow graywater to be used for subsurface landscape irrigation on the property where it is generated. Graywater must be discharged below the ground surface and cannot surface or create muddy areas. Due to the potential for high levels of bacteria in graywater, care must be taken when installing graywater systems to eliminate any potential human contact, especially for children.

On January 1, 2008, the San Diego Regional Water Quality Control Board (RWQCB) adopted conditional waivers of waste discharge requirements which included specific waiver conditions for graywater systems. These waiver conditions require that graywater systems be permitted by the city, county or local agency that has jurisdiction over their installation and that the graywater system must be designed and installed at a minimum according to the California Plumbing Code Graywater Standards. The County of San Diego Department of Environmental Health (DEH) is the Administrative Authority for the oversight and permitting of graywater systems in the unincorporated areas of San Diego County. Incorporated cities in San Diego County can enter into an agreement with DEH to regulate graywater systems within their jurisdiction or can implement a program of their own with approval from the RWQCB.

PURPOSE

Graywater systems are onsite wastewater treatment systems (OWTS) that dispose of untreated wastewater through the use of subsurface irrigation systems consisting of mini-trenches and subsurface drip irrigation systems. OWTS discharge pollutants to ground water and therefore are regulated by the California Water Code. Water Code Section 13282 allows the RWQCB to authorize a local public agency to issue permits for and to regulate OWTS "to ensure that systems are adequately designed, located, sized, spaced, constructed and maintained."

The rules for designing and installing a graywater system are described in Appendix G of the 2007 California Plumbing Code, Part 5, Title 24, of the California Code of Regulations. This policy has been developed to supplement Appendix G and to serve as guidance on how graywater systems are reviewed and permitted by DEH.

The objectives of this policy are:

- To assist the public on the design, installation, operation and maintenance of graywater systems.
- To ensure subsurface irrigation systems discharging graywater will not contaminate groundwater or create public health hazards.
- To explain the permitting procedures and inspection of graywater systems installed within San Diego County.

Persons seeking permits from DEH to install graywater systems should first review Appendix G of the CPC and Chapter 3, Division 8, Title 6 of the San Diego County Code of Regulatory Ordinances also known as the Onsite Wastewater System Ordinance. In addition, they may wish to read DEH's "Onsite Wastewater Treatment Systems Policy" and "Onsite Wastewater System Groundwater Separation Policy". These documents can be found at http://www.sdcounty.ca.gov/deh/water/lu_septic_systems.html along with our current fee schedule for graywater system design reviews and installation permits.

Additional information regarding the design, installation and maintenance of graywater systems can be found in a document called the "Graywater Guide" which was developed by the California Department of Water Resources and is available at http://www.owue.water.ca.gov/docs/graywater_guide_book.pdf. The "Graywater Guide" contains a Graywater Measures Checklist which can be used for plan check, site review and system installation inspection. This check list is very thorough and may be helpful throughout this process.

THE PERMIT PROCESS

APPLICATION SUBMITTAL

The property owner is responsible for all permits and ensuring that all contractors are adhering to applicable building codes. A graywater system plot plan must be submitted to DEH of the proposed graywater system. The plot plan must be drawn per the specifications set forth in Section G-4 of the CPC and submitted with the appropriate fees to DEH for the review of the proposed graywater system. A Graywater System Design Field Review fee is generally required although an over the counter plan review may be possible under certain conditions. Figures G-1 through G-5 of the CPC can be used in conjunction with the plot plan to detail the specifications of the project. This drawing should be prepared using a standard engineer's scale on 8.5"x11" or 11"X17" size paper. The size of a proposed graywater system is a function of the number of bedrooms in the dwelling, the fixtures connected to the system and the permeability of the soil on the site. The permeability of the soil will be determined from percolation testing data and/or conditions of approval from a recorded subdivision map, parcel map, boundary adjustment, or certificate of compliance.

Prior to submitting any fees or completing any work, it is recommended that the contractor or property owner contact DEH to determine what relative information is available for the subject property. At that time a determination will be made based on city/county requirements, lot size, depth to groundwater and percolation rates (if known) on the feasibility of installing a graywater system on the property and what additional information will be required. Property owners are encouraged to call or meet with DEH staff to discuss any concerns or questions and to prevent any unnecessary delays or costs when designing or installing a graywater system.

The **plot plan** shall contain the following information:

- Site address
- Tax assessor's parcel number
- Owner's name, mailing address, and phone number
- Contractor's name, mailing address, and phone number, if applicable
- Vicinity map, scale, north arrow, Thomas Bros. Map coordinates
- Property lines and lot dimensions
- All existing or proposed structures and paved areas
- Number of existing or proposed bedrooms and fixtures that will be connected to the graywater system
- Direction and approximate slope of ground surface through the use of topography lines
- Location of the existing or proposed OWTS along with the expansion area or building sewer connecting the structure to public sewer
- Existing or proposed grading showing all cut and fills along with all existing or proposed retaining walls. Include energy dissipaters for pad drainage
- All known, recorded easements on or within 20 feet of lot boundaries (open-space, utility, road, waterline, etc.)
- Location of proposed graywater system, including all system components and subsurface dispersal lines
- Identify source of potable water
- Location of all public waterlines on or within 20 feet of property and signed water line statement
- Location of all wells on or within 100 feet of property
- The location of all deep borings or percolation test holes, if required
- Details of construction including a description of the proposed installation methods and materials.

In addition to the plot plan, it is required to submit details of construction necessary to assure compliance with the regulations set forth in Appendix G of the CPC, together with a full description of the complete installation, including installation methods, construction and materials. A log of soil formations and groundwater levels may be required with a statement of the water absorption characteristics of the soil in the proposed irrigation area as determined by the percolation test or other data as available.

DETERMINATION OF SOIL TYPE, PERCOLATION AND GROUNDWATER LEVEL

Qualified professionals knowledgeable about soils and their water absorption characteristics may be required to evaluate the soils in the proposed location of the dispersal area of the graywater system. The type and permeability of the soil in which the mini-trench or subsurface irrigation system is to be installed is critical for the proper functioning of the graywater system. Graywater systems are limited to soils with a percolation rate of 60 minutes per inch or less. Percolation testing is required for all sites at the proposed installation depth of the graywater system unless adequate information is known about the soil conditions in the area proposed for the installation of the subsurface disposal system. Examples of where percolation testing may be waived are on those sites approved for the installation of OWTS with the graywater system being proposed to be installed in similar soils. Even though graywater systems are allowed in fill soil, there are some risks and the property owner should be made aware that fill soil does not have the same characteristics as natural soil. Compacted fill soil usually does not percolate well and therefore the installation of a graywater system in compacted fill will require percolation testing in all cases.

If a percolation test is needed, the applicant must submit results of a percolation test performed by a California registered civil engineer, registered geologist or registered environmental health specialist certified to perform percolation testing in San Diego County. The number of test holes should be based on the soil conditions in the area of the proposed disposal system. Testing must be performed to the standards set forth in the County of San Diego's "Percolation Test Procedure Policy" which can be found on our website at http://www.sdcounty.ca.gov/deh/water/lu_septic_systems.html.

Depth to groundwater may also limit the installation of a graywater system, as a five foot minimum separation must be maintained between the highest level of groundwater and the lowest level of the graywater dispersal system. In areas where groundwater is seasonal, a greater separation may be required. To determine the groundwater levels, the applicant or qualified professional must follow the procedures outlined in the "Onsite Wastewater System Groundwater Policy."

OFFICE REVIEW

At the time of the design submittal, the area specialist or duty specialist will complete an office review of the graywater system plan. The submittal shall include percolation data and/or soil type information along with groundwater data relevant to the location of the proposed graywater system and the plot plan.

During the office review, all relevant information will be reviewed to ensure the system can be installed meeting all state and local guidelines. A field review will be required by DEH any time a graywater system is proposed for a property where no OWTS design information is on file for that site. If acceptable OWTS information is on file, the application submittal information meets the regulatory requirements, and the graywater system is proposed to be installed in similar soils as the existing OWTS, then an over–the-counter review can be conducted and the field review can be waived.

FIELD REVIEW

The field review, if required, for a proposed graywater system will be conducted in the same manner as an OWTS layout review with the main point being to determine if there are any soil, groundwater or setback concerns which could result in the improper discharge of graywater. The field review will ensure that the proposed graywater system can be installed as per the plot plan provided by the applicant. The following items specific to graywater systems should be verified:

1. The graywater tank location will allow for draining or overflow by gravity to the sewer or septic system.
2. The irrigation/disposal field can be installed in an area that is suitable and will meet the minimum size and setback requirements per the CPC. For setbacks, please refer to Table G-1 of the CPC.
3. If a pump system is used, the elevations between the pump and highest point of discharge must be verified to ensure the proposed pump will be adequate to lift the graywater to the point of discharge.

Upon completion of the review, the applicant will be notified in writing of any required corrections to the graywater system design or need to provide additional information such as percolation testing or groundwater evaluation. If the office and field review show an acceptable design for the proposed installation of a graywater system, the design will be approved and that approval will be valid for up to one year.

PERMIT TO CONSTRUCT

Upon approval of the graywater system design, an installation permit as required in Section G-3 of the CPC can be issued by DEH upon payment of the Graywater System Installation Inspection fee and can be completed over the counter. This permit will be valid for up to one year from the date of issuance.

SYSTEM INSPECTION

DEH will inspect the graywater system installation to ensure the approved design was followed with respect to materials, sizing and location. The graywater system, which includes tanks, piping, valves and all appurtenances along with the subsurface dispersal field, must be left open and visible for inspection and approval by DEH. No portion of the graywater system can be backfilled without authorization from DEH.

The graywater system inspection will be similar to an OWTS inspection with the main focus being the surge tank installation and mini leach line or subsurface drip locations to determine if there are any conditions which could result in an improper discharge of graywater. All specifications per Appendix G of the CPC shall be required which include the following;

1. All system components shall be per the approved plan with respect to size, number and locations..
2. The three-way valve shall be installed in a location that is readily accessible to allow diversion of the graywater to the building sewer or septic tank.
3. The surge tank, piping and other materials are to meet a nationally recognized testing standard, such as IAPMO, NSF, AWWA or ASTM.
4. The surge tank shall be installed on dry, level, well-compacted soil if in a drywell or on a level, 3-inch concrete slab or equivalent, if above ground.
5. The surge tank shall be anchored against overturning.
6. The surge tank shall have the rated capacity permanently marked on the unit along with **"GRAYWATER IRRIGATION SYSTEM, DANGER - UNSAFE WATER"**.
7. The surge tank lid shall be gasketed and locking.
8. The surge tank shall be filled with water for water-tightness testing.
9. The tank shall be properly vented as per Chapter 5 of the CPC which requires venting through roof or 10 foot above grade with a screened opening.
10. The surge tank shall have an overflow pipe and emergency drain pipe that drains to and is permanently connected to the building sewer or septic tank. The diameter shall not be less than the diameter of the inlet pipe.
11. A backwater valve shall be installed on the sewer line to prevent backflow of sewage into the surge tank.
12. All graywater piping shall be marked or have a continuous tape stating **"DANGER - UNSAFE WATER".**
13. The supply lines shall be water tight and glued, ABS or PVC with schedule 40 fittings.
14. Pump systems shall be pressure tested at 40 psi from the tank to the point of irrigation, emitter or trench to ensure water tightness.
15. A maintenance manual shall be provided by the contractor or installer of the graywater system.
16. Any connection to a potable water system for make up water requires an air gap or the installation of an approved backflow prevention device. In addition, an approved backflow prevention device shall be installed at the public water meter if required by the local water purveyor.

For mini-leach line systems:

1. The leach pipe shall be a minimum of 3" perforated pipe HDPE, PE, ABS or PVC.
2. Clean stone, gravel or similar filter material graded ¾ inch to 2.5 inch shall be used and shall be covered with straw, untreated building paper or other approved material to prevent closure of voids with earth backfill.
3. The trench width, depth, lengths and amount of rock shall be as specified on the approved plot plan.
4. Each irrigation zone shall have the required length of trench to accommodate the entire wastewater flow per day with valves as needed to rotate the distribution of graywater between irrigation zones.

For subsurface drip irrigation:

1. The location, type, length or number and spacing of drip emitters for the drip field shall be as specified on the approved plot plan.
2. Each irrigation zone shall include the required number of emitters to accommodate the entire wastewater flow per day with valves as needed to rotate the distribution of graywater between irrigation zones.
3. Supply lines shall be of PVC class 200, with schedule 40 fittings, drip lines Poly or flexible PVC.
4. The filter shall be per plan with a minimum 140 mesh (115) micron) filter with a capacity of 25 gallons per minute.
5. An automatic flush valve/vacuum breaker shall be installed in each irrigation zone.
6. The backwash line shall be connected to the sewer or septic system.
7. A pressure reducer shall be installed where pressure at the discharge side of the pump exceeds 20 psi to maintain pressure no greater than 20 psi.
8. All other items such as valves, switches, timers, and controls are installed as per plan.

Upon inspection of the graywater system, a written inspection report will be provided to the property owner. If approved, the report will provide the details on the installation and give approval for the graywater system to be covered. If the inspection is disapproved, the required corrections will be listed along with any requirements to obtain a reinspection permit. DEH will notify the local building department when the DEH permit inspection has been completed.

AUTHORITY

California Plumbing Code, Title 24, Part 5, California Code of Regulations, Appendix G, “Graywater Systems” (CPC) which addresses the permitting, construction, inspection and specifications for graywater systems for subsurface landscape irrigation.

San Diego County Code Title 6, Division 8, Chapter 3, Section 68.301 et al, known as the Septic Tank Ordinance which addresses the permitting, construction, inspection and specifications for onsite wastewater treatment systems.

San Diego County Code Title 9, Division 4, Chapter 1 which adopts the California Plumbing Code as the San Diego County Plumbing Code.