

**BOARD OF ENVIRONMENTAL HEALTH  
RULES AND REGULATION**

**RULES AND REGULATIONS GOVERNING  
GRAYWATER TREATMENT WORKS**

DRAFT

Approvals

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Chair, Board of Environmental Health

Adopted

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Executive Director, Dept of Environmental Health

Date of Executive Director's Signature: \_\_\_\_\_

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Attorney for the City & County of Denver

## Table of Contents

Section 1.0	Introduction
1.1	Title
1.2	Authority
1.3	Scope and Purpose
1.4	Applicability
1.5	Enforcement and Oversight
1.6	Severability
1.7	Materials Incorporated by Reference
Section 2.0	Definitions
Section 3.0	Graywater Use Categories
3.1	Category A: Single family, subsurface irrigation
3.2	Category B: Non-single family, subsurface irrigation, 2,000 gallons per day (gpd) or less
3.3	Category C: Single family, indoor toilet and urinal flushing, subsurface irrigation
3.4	Category D: Non-single family, indoor toilet and urinal flushing, subsurface irrigation
3.5	Other Uses
Section 4.0	Graywater Use – Control Measures
4.1	Control measures that apply to all graywater uses
4.2	Control measures that apply to subsurface irrigation graywater use
4.3	Indoor toilet and urinal flushing graywater use
Section 5.0	Graywater Treatment Works - Design Criteria
5.1	Design Criteria
5.2	Sizing
5.3	System Modifications
5.4	Variances
6.0	Permitting, Fees, Inspection, and Approval
6.1	Permitting
6.2	Fees

City and County of Denver  
Graywater Regulations

- 6.3 Inspection
- 7.0 Operations and Maintenance Manual
  - 7.1 General Requirements
- 8.0 Certified Operator
- 9.0 Reporting Requirements
  - 9.1 Self Certification Requirements for Category B and D Treatment Works
- 10.0 Graywater Database

BOARD OF ENVIRONMENTAL HEALTH

RULES AND REGULATIONS GOVERNING GRAYWATER TREATMENT WORKS

\_\_\_\_\_, 2016

Section 1.0 Introduction

1.1 Title

These requirements shall be known as the City and County of Denver Graywater regulations.

1.2 Authority

These requirements are adopted by the City and County of Denver Board of Environmental Health (hereinafter the "Board") and promulgated by the Executive Director of the Department of Environmental Health (hereinafter the "Department") in accordance with the authority in Article II, Part 12 of the City and County of Denver Charter and in Chapter 24, Article XIII of the Denver Revised Municipal Code (DRMC), and pursuant to the regulation and requirements of the Colorado Water Quality Control Act (CWQCA) section 25-8-205(1)(g), C.R.S. and the Colorado Water Quality Control Commission's (WQCC) Regulation 86, Graywater Control (5 CCR 1002-86).

1.3 Purpose and Scope

- A. The purpose of this regulation is to describe requirements, prohibitions, and standards for the use of graywater for nondrinking water purposes, to encourage the use of graywater, and to protect public health and water quality.
- B. This regulation establishes the allowed users and allowed uses of graywater within the City and County of Denver ("Denver"); and establishes the minimum standards for the location, design, construction, operation, installation, and modification of graywater treatment works in Denver.

1.4 Applicability

- A. All graywater uses and graywater treatment works must comply with the minimum requirements of this regulation.
  - 1. Graywater treatment works installed prior to the effective date of this regulation are only allowed if it can be demonstrated that they either meet the requirements of these regulations or were approved by the Department of Environmental Health prior to May 15, 2013 and pursuant to 5 CCR 1002-43, section 43.4(J) or pursuant to 5 CCR 1003-6, section IV.J for outdoor subsurface irrigation. Those systems are deemed to be in compliance with the requirements of this regulation unless or until any modification to the graywater treatment works is made.
  - 2. Should Denver's graywater program be revoked or rescinded, all graywater treatment works in Denver's must be physically removed or permanently disconnected within 365 days.

- B. Graywater use in Denver is only allowed under the City's graywater program and must meet the requirements of that program. Unauthorized graywater use and discharges are prohibited.
- C. This regulation does not apply to:
- Discharges pursuant to a Colorado Discharge Permit System (CDPS) permit,
  - Wastewater that has been treated and released to state waters prior to subsequent use,
  - Wastewater that has been treated and used at a domestic wastewater treatment works for landscape irrigation or process uses,
  - On-site wastewater treatment works authorized under the Colorado Water Quality Control Commission's (WQCC) Regulation #43,
  - Reclaimed wastewater authorized under WQCC's Regulation #84, or
  - Water used in an industrial process that is internally recycled, and rainwater harvesting.
- D. All graywater treatment works installed in the City and County of Denver must also meet the requirements of the WQCC's Regulation No. 86, the Colorado State Plumbing Board's Rules and Regulations (3 CCR 720-1), the Denver Building Code, and Section 5.05 of Denver Water's Engineering Standards effective at the time of system installation. In addition, all systems must be in compliance with any other applicable federal, state, and City and County or Denver requirements effective at the time systems were installed.

#### 1.5 Enforcement and Oversight

Denver's Departments of Environmental Health and Community Planning and Development have the authority to perform inspections and take enforcement actions to ensure compliance with these rules.

#### 1.6 Severability

The provisions of this regulation are severable, and if any provisions or the application of the provisions to any circumstances is held invalid, the application of such provision to other circumstances, and the remainder of this regulation shall not be affected thereby.

#### 1.6 Materials Incorporated by Reference

The materials incorporated by reference cited herein include only those versions that were in effect as of **January 1, 2016** and not later amendments to the incorporated material.

All materials referenced in this regulation may be examined online, where available, or at the Water Quality Control Division, at the Colorado Department of Public Health and Environment, 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530.

### Section 2.0 Definitions

- 2.1 "Agronomic rate" means the rate of application of nutrients to plants that is necessary to satisfy the nutritional requirements of the plants.
- 2.2 "Agricultural irrigation" means irrigation of crops produced for direct human consumption, crops where lactating dairy animals forage, and trees that produce nuts or fruit intended for human consumption. This definition includes household gardens and fruit trees, marijuana, and hops.
- 2.3 "Closed sewerage system" means either a permitted domestic wastewater treatment works, which includes a permitted and properly functioning OWTS with a design capacity more than 2,000 gpd, or a properly functioning and approved or permitted OWTS with a design capacity of 2,000 gpd or less.

- 2.4 “Component” means a subpart of a graywater treatment works which may include multiple devices.
- 2.5 “Design” means the process of selecting and documenting in writing the size, calculations, site specific data, location, equipment specification and configuration of treatment components that match site characteristics and facility use.
- 2.6 “Design flow” means the estimated volume of graywater per unit of time for which a component or graywater treatment works is designed.
- 2.7 “Dispersed subsurface irrigation” means a subsurface irrigation system including piping and emitters installed throughout an irrigation area.
- 2.8 “Emitter” means a device used in drip irrigation to control the flow of water into the soil.
- 2.9 “Facility” means any building, structure, or installation, or any combination thereof that uses graywater subject to a local graywater control program, is located on one or more contiguous or adjacent properties, and is owned or operated by the same person or legal entity. Facility is synonymous with the term operation.
- 2.10 “Graywater” means that portion of wastewater that, before being treated or combined with other wastewater, is collected from fixtures within residential, commercial, or industrial buildings or institutional facilities for the purpose of being put to beneficial uses. Sources of graywater are limited to discharges from bathroom and laundry room sinks, bathtubs, showers, and laundry machines. Graywater does not include the wastewater from toilets, urinals, kitchen sinks, dishwashers, or nonlaundry utility sinks.
- 2.11 “Graywater treatment works” means an arrangement of devices and structures used to: (a) collect graywater from within a building or a facility; and (b) treat, neutralize, or stabilize graywater within the same building or facility to the level necessary for its authorized uses.
- 2.12 “Legally responsible party” (1) For a residential property, the legally responsible party is the property owner. (2) For a corporation, the legally responsible party is a responsible corporate officer, either: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for approval application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. (3) For a partnership or sole proprietorship, the legally responsible party is either a general partner or the proprietor, respectively. (4) For a municipality, State, Federal, or other public agency, the legally responsible party is a principal executive officer or ranking elected official, either (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
- 2.13 “Modification” means the alteration or replacement of any component of a graywater treatment works that can affect the quality of the finished water, the rated capacity of a graywater treatment works, the graywater use, alters the treatment process of a graywater treatment works, or compliance with this regulation and the local graywater control program. This definition does not include normal operations and maintenance of a graywater treatment works.

City and County of Denver  
Graywater Regulations

- 2.14 “Mulch” means organic material including but not limited to leaves, prunings, straw, pulled weeds, and wood chips.
- 2.15 “Mulch basin” means a type of irrigation or treatment field filled with mulch or other approved permeable material of sufficient depth, length, and width to prevent ponding or runoff. A mulch basin may include a basin around a tree, a trough along a row of plants, or other shapes necessary for irrigation.
- 2.16 “Non-Single Family” means any structure that is not a single family structure.
- 2.17 “On-site wastewater treatment system” or “OWTS” means an absorption system of any size or flow or a system or facility for treating, neutralizing, stabilizing, or dispersing sewage generated in the vicinity, which system is not a part of or connected to a sewage treatment works.
- 2.18 “Potable water system” means a system for the provision of water to the public for human consumption through pipes or other constructed conveyances, where such system has less than fifteen service connections or regularly serves less than an average of at least 25 individuals daily at least 60 days per year.
- 2.19 “Professional engineer” means an engineer licensed in accordance with section 12-25-1, C.R.S.
- 2.20 “Public nuisance” means the unreasonable, unwarranted and/or unlawful use of property, which causes inconvenience or damage to others, including to an individual or to the general public.
- 2.21 “Public water system” means a system for the provision of water to the public for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. A public water system is either a community water system or a non-community water system. Such term does not include any special irrigation district. Such term includes:
- A. Any collection, treatment, storage, and distribution facilities under control of the supplier of such system and used primarily in connection with such system.
  - B. Any collection or pretreatment storage facilities not under such control, which are used primarily in connection with such system.
- 2.22 “Single family” means a detached or attached structure, arranged and designed as a single family residential unit intended to be occupied by not more than one family and that has separate water and sewer services connections from other dwelling units.
- 2.23 “Site evaluation” means a comprehensive analysis of soil and site conditions for a graywater irrigation area.
- 2.24 “Subsurface irrigation” means a discharge of graywater into soil a minimum of four inches (4”) and no deeper than twelve inches (12”) below the finished grade.
- 2.25 “State waters” means any and all surface and subsurface waters which are contained in or flow in or through this state, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.

Table 1 Abbreviations and Acronyms

C.R.S.	Colorado Revised Statutes
FEMA	Federal Emergency Management Agency
gpd	gallons per day
mg/L	milligrams per Liter
O&M	Operations and Maintenance
OWTS	On-site Wastewater Treatment System(s)

### Section 3.0 Graywater Use Categories

General: Allowable graywater use categories are defined below. A single facility may have multiple graywater treatment works as long as all applicable use and design requirements are satisfied.

#### 3.1 Category A: Single family, subsurface irrigation

Category A graywater use must meet the following:

- A. Allowed users: Single family.
- B. Allowed graywater sources: Graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
- C. Allowed uses: Outdoor, subsurface irrigation within the confines of the legal property boundary.
- D. Design flow: The design flow for a single family graywater treatment works is limited to 400 gallons per day (gpd) or less combined flow for approved uses.

#### 3.2 Category B: Non-single family, subsurface irrigation, 2,000 gallons per day (gpd) or less

Category B graywater use must meet the following:

- A. Allowed users: Non-single family users.
- B. Allowed graywater sources: Graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
- C. Allowed uses: Outdoor, subsurface irrigation within the confines of the legal property boundary.
- D. Design flow: The design flow for a non-single family graywater treatment works is limited to 2,000 gpd or less for the entire facility for allowed sources.

#### 3.3 Category C: Single family, indoor toilet and urinal flushing, subsurface irrigation

Category C graywater use must meet the following:

- A. Allowed users: Single family.
- B. Allowed graywater sources: Graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.



- C. Allowed uses: Indoor toilet and urinal flushing and outdoor, subsurface irrigation within the confines of the legal property boundary.
- D. Design flow: The design flow for a single family graywater treatment works is limited to 400 gallons per day (gpd) or less combined flow for allowed sources and uses.

3.4 Category D: Non-single family, indoor toilet and urinal flushing, subsurface irrigation

Category D graywater use must meet the following:

- A. Allowed users: Non-single family users.
- B. Allowed graywater sources: Graywater collected from bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
- C. Allowed uses: Indoor toilet and urinal flushing and outdoor, subsurface irrigation within the confines of the legal property boundary.
- D. Design flow: There is no maximum design flow for a non-single family graywater treatment works for indoor toilet and urinal flushing. There is no maximum design flow for the amount of wastewater from the facility that can go to a closed sewerage system. The design flow is limited to 2,000 gallons per day (gpd) or less for outdoor irrigation for the entire facility.

3.5 Other Uses

- A. Other categories for use of graywater are allowable under the following circumstances:
  - 1. A variance has been granted for the use by the State of Colorado's Water Quality Control Commission;
  - 2. A variance has been granted for the use by the Colorado State Plumbing Board;
  - 4. System design meets all requirements of Denver's graywater design criteria documents, and;
  - 4. The City's Board of Environmental Health has granted a variance for the system. The Board of Environmental Health will not approve a request for a variance until the applicant has demonstrated its request has met the requirements of Section 3.5.(A)(1) through 3.5(A)(4).

Section 4.0 Graywater Use Requirements - Control Measures

Control measures are operational requirements representing best management practices that graywater treatment works must follow.

4.1 Control measures that apply to all graywater uses

All graywater treatment works must be operated in accordance with the following control measures:

- A. Graywater must be collected in a manner that minimizes the presence or introduction of:
  - 1. Hazardous or toxic chemicals in the graywater to the greatest extent possible;
  - 2. Human excreta in the graywater to the greatest extent possible;

City and County of Denver  
Graywater Regulations

3. Household wastes; and
  4. Animal or vegetable matter.
- B. Use of graywater is limited to the confines of the facility that generates the graywater.
  - C. The owner or operator of a graywater treatment works must minimize exposure of graywater to humans and domestic pets.
  - D. Graywater use and graywater treatment works must not create a public nuisance.
  - E. Graywater must not be stored for more than 24 hours unless the graywater has been treated by a graywater treatment works that meets the design requirements of the City and County of Denver's Graywater Design Criteria Document. All graywater must be stored inside a tank(s) that meets the design requirements of the City and County of Denver's Graywater Design Criteria Document.
  - F. Temporary or semi-temporary connections from the potable water system or public water system to the graywater treatment works are prohibited. Permanent connections from the potable water system or public water system to the graywater treatment works are allowed, but must meet the requirements of Section 5.05 of Denver Water's Engineering Standards (available at <http://www.denverwater.org/DoingBusinesswithUs/EngineeringOverview/>).

4.2 Control measures that apply to subsurface irrigation graywater use

Graywater used for subsurface irrigation must also comply with the following additional control measures:

- A. Agricultural irrigation with graywater is prohibited.
- B. Irrigation is prohibited when the ground is frozen, plants are dormant, during rainfall events, or the ground is saturated.
- C. Irrigation scheduling must be adjusted so that application rates are closely matched with soil and weather conditions.
- D. Graywater must be applied in a manner that does not result in ponding, runoff, or unauthorized discharge to state waters. For dispersed subsurface irrigation systems, the graywater must be applied at an agronomic rate. For mulch basins systems, the graywater must not be applied in excess of the soil adsorption rate.
- E. For mulch basin systems, mulch must be replenished and undergo periodic maintenance as needed to reshape or remove material to maintain surge capacity and to prevent ponding and runoff.

4.3 Indoor toilet and urinal flushing graywater use

Graywater used for indoor toilet and urinal flushing must also comply with the following additional control measures.

- A. Graywater for toilet and urinal flushing use must be disinfected.

1. Graywater treatment works that utilize chlorine for disinfection must have a minimum of 0.2 mg/L and a maximum of 4.0 mg/L of free chlorine residual throughout the indoor graywater plumbing system, including fixtures.
  2. Single family graywater treatment works that utilize non-chemical methods, such as UV, for disinfection must have a chlorine puck present in each toilet or urinal tank.
- B. Graywater for toilet and urinal flushing must be dyed with either blue or green food grade vegetable dye and be visibly distinct from potable water.

## Section 5.0 Graywater Treatment Works - Design Criteria

### 5.1 Design Criteria

All graywater treatment works must meet the requirements of the design criteria in effect at the time of installation of the system. The most recent version of the design criteria are available from the City's Community Planning and Development Department.

### 5.2 Sizing

- A. Graywater treatment works must be sized appropriately using the flow projection methods described in the design criteria.
- B. The size of irrigation areas must be determined using the sizing protocols described in the design criteria.

The most recent version of the design criteria are available from **the City's Community Planning and Development Department**.

### 5.3 System Modifications

Graywater treatment works requiring modifications must be upgraded to the requirements of design criteria in effect at the time of modifications. All system modifications must be approved by the City's Departments of Community Planning and Development and Environmental Health.

### 5.4 Variances

- A. The City's Board of Environmental Health will consider approval of requests for variances to the City's Graywater Design Criteria if the following conditions have been met:
1. A variance to the design criteria included in the Colorado Water Quality Control Commission's Regulation 86, Graywater Control, has been granted by the State of Colorado's Water Quality Control Commission;
  2. A variance to the 2015 IPC Plumbing Code has been granted by the Colorado State Plumbing Board;
  3. The applicant has adequately demonstrated that the system design will prevent human exposure to graywater, and;
  4. System design meets the requirements of Section 4.1 of this rule.
- B. Variances will not be granted for criteria in Section 3.10 of the Design Criteria document.

6.0 Permitting, Fees, Inspection, and Approval

6.1 Permitting

DEH and CPD are responsible for approval or denial of all new graywater treatment works or modifications to existing graywater treatment works in the City and County of Denver. Permittees must submit a design to both agencies for review and approval. The submittal must include the following design information:

- A. Graywater uses,
- B. Location of the graywater treatment system,
- C. Design flow calculations for the graywater treatment works,
- D. Fixtures that are the source of the graywater,
- E. Design of the plumbing or irrigation system including,
  - a. A description of any products or components of the system,
  - b. Any supporting soil analysis information, if applicable,
  - c. If graywater is to be used for subsurface irrigation, a site evaluation report or irrigation area calculations,
  - d. Contact information for the system designer or professional engineer and operator, if applicable, and
- F. Name and address of the legally responsible party.

The application for graywater treatment works must be signed by the legally responsible party.

Graywater treatment works may not be installed until such time as CPD and DEH have approved the design of the system.

6.2 Fees

The City's Community Planning and Development Department sets permit fees for plumbing. Those fees, which apply to the installation of graywater treatment works, are collected at the time of application for a building permit. There are no additional permitting fees for graywater treatment works.

6.3 Inspection

- A. Prior to approval for use, all graywater treatment works must be inspected, verified, and accepted by DEH and CPD.

7.0 Operation and Maintenance Manual

7.1 General Requirements

- A. All graywater treatment works must have an Operations and Maintenance (O&M) manual. At a minimum, the O&M manual must include all information specified in **Section 9.0** of the Design Criteria document.

- B. The graywater treatment works must be operated and maintained in accordance with the O&M manual, including all manufacturer recommended maintenance activities.
- C. The O&M manual must remain with the graywater treatment works throughout the system's life and be updated based on each time upgrades or modifications are made to the system.
- D. The O&M manual must be transferred, upon change of ownership or occupancy, to the new owner or tenant.
- E. Category D graywater treatment works with a capacity to receive greater than 2,000 gallons per day (gpd) must be maintain operation and maintenance records for a minimum period of five (5) years.

## 8.0 Certified Operator

### A. Applicability

The requirements of this Section apply to operators of Category B and D graywater treatment works with a capacity of 520 gpd or greater. Category B and D graywater treatment works with a capacity of 520 gpd must be operated by qualified personnel who meet the requirements of The Colorado Water Quality Control Commission's Regulation #100, the Water and Wastewater Facility Operators Certification Requirements.

Operators of Category A and C graywater treatment works are not required to be certified by the State Water and Wastewater Facility Operators Board.

### B. Certification Requirements

Category B and D graywater treatment works with a capacity of 520 gpd or greater are considered to be wastewater collection systems and must be overseen by an operator certified in accordance with Section 100.8 of Regulation #100, the Water and Wastewater Facility Operators Certification Requirements.C. Compliance with Regulation #100

The requirements of Regulation #100 supersede the requirements of this section. Should Regulation #100 requirements related operation of graywater treatment works change, operators must obtain the appropriate certification.

## 9.0 Reporting Requirements

### 9.1 Self Certification Requirements for Category B and D Treatment Works

Every     years, category B and D graywater treatment works are required provide a letter self-certifying containing the following:

- A. A statement indicating if the treatment works is still in operation,
- B. A certification that the treatment works is being operated in accordance with the operations and maintenance manual, and
- C. A certification that no modifications have been made to the treatment works. If modifications have been made to the treatment works, those modifications must be described and a statement must be included certifying that the modifications were approved by DEH and CPD

Self-certification reports should be submitted to DEH.

**Failure to submit a self-certification letter will result in....**

10.0 Graywater Database

Graywater systems will be recorded in a document and filed with the Clerk and Recorder's Office to ensure that the locations of all graywater treatment works in the City and County of Denver are known. The document will be indefinitely maintained and will include, at a minimum, the following information:

- A. The legal address of each facility with graywater treatment works, allowed graywater uses at each facility, and a graywater treatment works description;
- B. The legally responsible party associated with every graywater treatment works;
- C. Where required, the certified operator associated with every graywater treatment works; and
- D. Any changes to the legally responsible party, certified operator, and status of the graywater treatment works must be updated within 60 days.