



## Council Memorandum

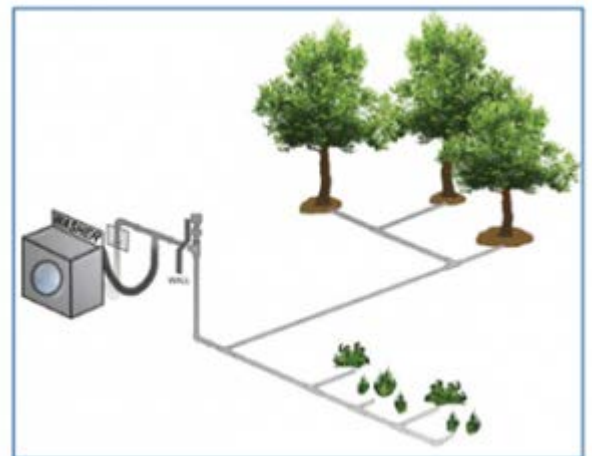
To: The Honorable Mayor and City Council  
From: Theresa Worsham, Sustainability Coordinator  
Through: Jason Slowinski, City Manager  
Carly Lorentz, Deputy City Manager  
Date: August 20, 2020  
Re: Ordinance No. 2143

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Purpose of Agenda Item: To consider a first reading of Ordinance No. 2143, a proposal to create a graywater reuse program for single family homes and if appropriate, schedule the ordinance for second reading and public hearing at the September 10<sup>th</sup> Council meeting.

Background: Water conservation includes several types of strategies; reduction in water losses, protection of water supplies, and beneficial reuse. Golden's goal to reduce per capital total water use by at least 15% by 2030 primarily focuses on reducing water losses, including increasing the efficiency of outdoor irrigation fixtures and preventing leaks in the system-wide water infrastructure. Graywater falls under the third strategy, beneficial reuse, and addresses water from sinks, showers, bathtubs, and laundry machines. Periodically, residents inquire about whether the City allows graywater systems or if there are incentives available.

In May of last year, the City applied for and received a \$25,000 grant from WaterNow to provide technical assistance in research and development of a potential graywater reuse program for residents. Over the past year, city staff have been working with WaterNow and its research partner, Western Resource Advocates, to assess current efforts in Colorado and use best practices to create a potential program for Golden. To reduce barriers to adoption and permitting, city staff propose to include a streamlined permitting process for only one type of residential graywater, "Laundry to Landscape". This narrowed use would include a simplified process that staff believes can help homeowners navigate the process from permit through construction.



Laundry-to-Landscape concept

A laundry-to-landscape system is a relatively simple system with distribution of washing machine graywater to an exterior landscaping area with plants. The washing machine's internal pump slightly pressurizes the graywater, so the system can irrigate plants across a flat yard.

The program is proposed as an addition to Chapter 15 of the Golden Municipal Code, amending the existing Building Code section. The draft ordinance proposes to:

1. Establish a process to review and inspect single family residential gray water systems and adopts criteria for evaluation.
2. Align Golden's program with the same requirements as state regulations, including citations to Colorado Revised Statutes 5 CCR 1002-86: Graywater Control Regulation (commonly referred to as "Reg 86").
3. Define common graywater terms.
4. Outline design criteria and required elements for applicants for use in drawings.
5. Describe the requirement for an Operations and Maintenance manual and how it must be kept with the infrastructure and used by the owner.
6. Provide a process and penalties for non-compliance.

Application process. Homeowners will find a number of resources on the City website to research how to install a graywater system. These include:

- A new webpage at [www.cityofgolden.net/graywater](http://www.cityofgolden.net/graywater) as a one-stop shop for all City regulations, guides, and application materials related to graywater use to offer a step by step approach. The page is also cross-linked to building department and sustainability pages to be easily found. The following materials can also be found on this page.
- Educational materials. These resources can answer questions from citizens that are new to the concept as well as those that are midway through a design process. FAQs will include questions like, What is a graywater system? What is laundry-to-landscape? What kind of detergents can I use? How much maintenance does a system need? Is my house suitable for a graywater system?
- Design Criteria specifications. The City has created sample designs to show what a typical system might look like and which components would be required by code. Created and reviewed by professional engineers, these specs will be useful to homeowner designers and professional plumbers alike.
- Operations and Maintenance manual. Staff has also created a sample manual for homeowners to keep and refer to throughout the life of their system. The O&M manual demonstrates how an owner should winterize the system and provides a checklist of annual maintenance best practices. An O&M manual is a required element of all graywater permits, per State of Colorado regulations.
- Building Permit Application. Staff have modified the current standard building permit application to include a category for residential graywater systems.
- Future follow up and data reporting. The State requires communities to report the number and location of active graywater systems on an annual basis. The City's

Backflow Prevention Program also reaches out to owners on an annual basis, for follow up maintenance and testing, so that office will also take on duties for state reporting and follow up to homeowners for the graywater program.

Public Outreach Efforts: CSAB solicited public comments and input at several meeting and events over the past year, including discussions at regular meetings (September 25, 2019 and June 24, 2020 ), community events (an annual Sustainability event on October 9, 2019 at the American Mountaineering Center) and more recently, through the citizen task forces meeting to discuss water conservation (the Water Reuse Task Force met December 4, 2019, March 9, 2020 and online through GuidingGolden.com.) Educational displays about graywater were featured at community events and a fall 2019 semester of Colorado School of Mines students worked with staff and the Board to produce additional research that is included as supplemental educational materials on the City website.

Fiscal Impact: Graywater permits would follow the same building permit review and fee assessment as any other construction project. Some additional, but minimal in-kind staff labor is expected to inspect and track the number of systems in Golden, to document graywater use in the City's Backflow Prevention program and to provide annual reports to the State.

Community Impact: The potential for graywater reuse to positively impact the City's sustainability goals is unknown, but likely represents a small portion of an overall water conservation strategy. CSAB would like to be able to measure real projects, so if a program for Golden is approved, CSAB plans to fund three residential pilot projects this fall. Homeowners could apply to receive a graywater system (design, installation, and inspections) which would then be published as case studies for public viewing.

Recommendations: At their June 24<sup>th</sup> meeting, CSAB voted unanimously to recommend adoption of a graywater program for Golden. Staff and representatives from WaterNow and Water Resources Advocates will be at the meeting to present materials and answer questions. If Council is supportive of the idea upon first reading at the August 27<sup>th</sup> meeting, the ordinance can be scheduled for second reading and public hearing on October 10<sup>th</sup>.

encl: Ordinance No. 2143  
Please see supplemental materials at [www.cityofgolden.net/graywater](http://www.cityofgolden.net/graywater)

**ORDINANCE NO. 2143**

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF GOLDEN ENACTING CHAPTER 15.70 TO TITLE 15, BUILDING AND CONSTRUCTION CODE, OF THE GOLDEN MUNICIPAL CODE PERTAINING TO GRAYWATER SYSTEMS**

**WHEREAS**, since 2007 the City’s Sustainability Goals include reducing per capita total water use by at least 15% by 2030 and integrating resiliency and resource recovery into the City of Golden’s (City or Golden) water infrastructure; and

**WHEREAS**, laundry-to-landscape graywater systems have demonstrated reduced potable water demand and associated energy demands related to water and wastewater treatment; and

**WHEREAS**, the Colorado Department of Public Health and Environment and Colorado’s Water Plan value the importance of water reuse to the future of the Front Range and the State of Colorado as a whole; and

**WHEREAS**, Title 15 of the Golden Municipal Code was enacted to establish standards and guidelines for building and construction within the City; and

**WHEREAS**, The City of Golden staff and Community Sustainability Advisory Board have been following the State’s progress in enacting graywater regulations through the passage of 5 CCR 1002-86, Regulation #86 adopted in 2015; and

**WHEREAS**, City Council desires to enact Chapter 15.70 to Title 15 of the Golden Municipal Code to establish standards and guidelines for the design, construction, installation, repair, modification, maintenance and use of laundry-to-landscape graywater systems to preserve and protect the environment and to protect the public health, safety, and welfare; and

**WHEREAS**, City Council finds such amendments will increase the effectiveness of the Golden Municipal Code with regard to those regulations and their underlying goals; and

**WHEREAS**, this ordinance provides guidance to homeowners and business owners regarding the implementation of graywater systems.

**NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GOLDEN, COLORADO:**

Section 1. Title 15 of the Golden Municipal Code is hereby amended by the addition of a new Chapter 15.70, Graywater Systems, to read as follows:

**Section 15.70.010 Purpose.**

This Chapter is enacted for the purpose of establishing a local graywater control program within the City of Golden, reducing per capita water demand, and integrating resiliency and resource recovery into the City’s water infrastructure as described in the City’s Sustainability Goals. The

intent of this Chapter is to establish standards and guidelines for the design, construction, installation, repair, modification, maintenance and use of laundry-to-landscape graywater systems, to encourage the use of graywater, and to protect public health and water quality.

**Section 15.70.020 Applicability and Jurisdiction.**

(a) The territorial jurisdiction and legal boundary of the city’s graywater use program established by this Chapter shall include the city’s water and wastewater utility enterprises respective service area boundaries, consisting of the city’s territorial limits and areas served through extraterritorial agreements.

(b) This Chapter shall apply to all graywater uses and graywater systems located within the city’s graywater system jurisdiction.

(c) No building permit shall be issued for construction of or modification to a graywater system, and no such construction or modification shall be performed unless an approved graywater system meets the following minimum requirements:

- (1) achieves the minimum design criteria provided in Section 15.70.080;
- (2) satisfies the use requirements provided in Section 15.70.070; and
- (2) complies with this Chapter and all applicable federal and state requirements for graywater systems.

(d) No building permit shall be issued for construction of or modification to any graywater system not otherwise allowed under the city’s graywater use program.

**Section 15.70.030 Appeals.**

An applicant or permittee may appeal an order, decision, or determination made by the building official relative to the application and interpretation of this Chapter according to the procedure set forth in Section 113 of the Building Code, as adopted and amended by the City.

**Section 15.70.040 Administration & Enforcement.**

(a) The Department shall be the agency responsible for oversight, administration, and enforcement of the city’s graywater use program established by this Chapter.

(b) The Department shall establish a process through which it will approve or deny applications for the construction of new or modifications to an existing graywater system, issue a building permit for such construction or modifications, and conduct inspections or verifications for the acceptance of approved new graywater systems or modifications thereto. The permit application and review process to be established by the Department shall be designed to ensure that only graywater systems meeting all applicable provisions of this Chapter are approved.

(c) In reviewing applications submitted under this Chapter, the Department shall, at a minimum, consider the design documentation associated with the graywater system, which must include the following information:

- (1) The types of graywater uses occurring at the property;
- (2) Location of the graywater system;
- (3) Design flow calculations for the graywater system;
- (4) The fixtures that are the sources of the graywater;
- (5) The design plans of the plumbing and subsurface irrigation system, if applicable;
- (6) A description of the products and components of the graywater system;
- (7) The name, address and signature of the legally responsible party;
- (8) Any supporting soils analysis, if applicable; and
- (9) The contact information for system designer or professional engineer and operator.

(d) Prior to issuing any permit, the Department shall conduct a visual inspection, verification, and acceptance of the new or existing graywater system and

(e) The Department shall develop a graywater system design criteria guidance document, which includes the following:

- (1) Requirements that are at least as stringent as the minimum design requirements provided in Section 15.70.080; and
- (2) Site evaluation protocols for subsurface irrigation systems associated with a graywater system, consistent with 5 CCR 1002-86, Reg. 86, as amended.

(f) The Department shall create and maintain at all times a searchable tracking mechanism that shall include, at a minimum, the following information:

- (1) Legal address of each facility with a graywater system, allowed graywater uses at each facility, and a graywater system description;
- (2) The legally responsible party associated with every graywater system; and
- (3) Any changes to the legally responsible party or status of the graywater system that shall be updated within 60 days of the change.

**Section 15.70.050 Fees.**

(a) A permit issued under this Chapter shall not be valid until the fees prescribed by law have been paid.

(b) Each application for a new or modification to an existing graywater system shall be accompanied by the payment in full of a fee in an amount set forth in the schedule as established by resolution of City Council.

(c) The Department shall be authorized to assess a re-inspection fee for each inspection or re-inspection when such portion of work for which inspection is called is not complete; when previously cited corrections called for are not made; when the inspection record card is not properly posted or otherwise available on the work site; when the approved permit or O&M manual is not readily available to the inspector; for failure to provide access on the date for which inspection is requested; or for deviating from plans requiring the approval of the Department. Said re-inspection fee shall be as set forth by City Council resolution. In instances where re-inspection fees have been assessed, the Department is authorized to suspend or withhold additional inspection of the work until the required fees have been paid.

(d) The Department may establish a fee refund or waiver policy.

**Section 15.70.060 Definitions.**

*Agronomic rate* means the rate of application of nutrients to plants that is necessary to satisfy the nutritional requirements of the plants.

*Component* means a subpart of a graywater system which may include multiple devices.

*Cross-Connection* means any connection that could allow any water, fluid, or gas such that the water quality could present an unacceptable health and/or safety risk to the public, to flow from any pipe, plumbing fixture, or a customer's water system into a public water system's distribution system or any other part of the public water system through backflow.

*Department* shall mean the City of Golden Public Works Department.

*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.

*Design flow* means the estimated volume of graywater per unit of time for which a component or graywater system is designed.

*Dispersed subsurface irrigation* means a subsurface irrigation system including piping and emitters installed throughout an irrigation area.

*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.

*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 non-laundry utility sinks.

*Graywater use program* refers to the provisions of this chapter regulating the design and operation of graywater systems and the use of graywater within the city's graywater system jurisdiction, as established by this ordinance.

*Graywater system* 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.

*Graywater system jurisdiction* shall mean the legal boundary of the city's graywater use program, which shall consist of the City of Golden's water and wastewater enterprise service boundary, including the territorial City limits and areas served through extraterritorial agreements.

*Legally responsible party* shall mean a person or entity who is the property owner of record.

*Modification* means the alteration or replacement of any component of a graywater system that can affect the quality of the finished water, the rated capacity of a graywater system, the graywater use, alters the treatment process of a graywater system, or compliance with this regulation and the city's graywater use program. This definition does not include normal operations and maintenance of a graywater systems.

*Mulch* means organic material including but not limited to leaves, prunings, straw, pulled weeds, and wood chips.

*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.

*Percolation test* means a subsurface soil test at the depth of a proposed irrigation area to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed. The rate is expressed in minutes per inch.

*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.

*Professional engineer* means an engineer licensed in accordance with applicable state law.

*Public nuisance* shall have the same meaning as the term "nuisance" as defined in Section 5.01.010 of the Golden Municipal Code.

*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.

*Site evaluation* means a comprehensive analysis of soil and site conditions for a graywater irrigation area.

*Soil horizon* means layers in the soil column differentiated by changes in texture, color, redoximorphic features, bedrock, structure, consistence, and any other characteristic that affects water movement.

*Soil profile test pit* means a trench or other excavation used for access to evaluate the soil horizons for properties influencing effluent movement, bedrock, evidence of seasonal high ground water, and other information to be used in locating and designing a graywater irrigation area.

*Soil structure* means the naturally occurring combination or arrangement of primary soil particles into secondary units or peds; secondary units are characterized on the basis of shape, size class, and grade (degree of distinctness).

*Suitable soil* means unsaturated soil in which the movement of water, air, and growth of roots is sustained to support healthy plant life and conserve moisture.

*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.

**15.70.070 Authorized Graywater Use.**

(a) Graywater systems shall be permitted only upon lots or parcels used and developed as a one-household residential dwelling or structure. A one-household or two-household dwelling or structure may have multiple graywater systems, as long as all applicable use and design requirements are satisfied.

(b) For properties upon which a one-household dwelling or structure is located, only the following graywater use or activity is permitted under the city’s graywater use program: outdoor, subsurface irrigation; provided, however, such use or activity meets the following requirements:

- (1) *Allowed graywater sources:* Graywater collected from laundry machines only.
- (2) *Allowed discharges:* Outdoor, subsurface irrigation must discharge to a mulch basin within the confines of the legal property boundary only.
- (3) *Design flow:* The design flow is limited to a 400 gallons per day (gpd) or less combined flow for all approved uses.

- (4) *Graywater system sizing:* The graywater system must be sized appropriately using the following flow projection methods:
- a. *Residential users.* Flow to graywater systems must be calculated on the occupancy and the fixtures connected to the graywater system. The calculated graywater flow is the number of occupants multiplied by the estimate graywater flow in terms of gpd/occupant from the attached fixtures.
    - i. The occupancy must be calculated based on a minimum of two (2) occupants for the first bedroom and one (1) occupant for each additional bedroom.
    - ii. The estimated graywater flow from each fixture is based on the design flow of the fixture or if the fixture's design flow is unknown then the estimated graywater flow per occupant is with based on the following gallons per day per occupant.
      - (a) Traditional fixtures: 25 gpd/occupant for each shower, bathtub, and wash basin and 15 gpd/occupant for each clothes washer.
      - (b) Water saving fixtures: 20 gpd/occupant for each shower, bathtub, and wash basin and 8 gpd/occupant for each clothes washer.

**Section 15.70.080 Design Criteria.**

- (a) *Minimum criteria applicable to all graywater systems.*

The following minimum design criteria are required for all graywater systems. All graywater systems must:

- (1) Meet all design requirements of this regulation and meet any additional design requirements of the Colorado Plumbing Code as adopted and amended by the city.
- (2) Each system component or combination of multiple components must have a design flow greater than the calculated peak graywater production, if upstream of the storage tank or if no tank is present.
- (3) Include a diversion valve that directs graywater to the graywater systems. The diversion valve must be:
  - a. Easily operable;
  - b. Clearly labeled;
  - c. Constructed of material that is durable, corrosion resistant, watertight;

- d. Designed to accommodate the inlet and outlet pipes in a secure and watertight manner; and
- (4) Not have any piping that allows the treatment process(es) or a storage tank to be bypassed prior to graywater use.
- (b) *Minimum criteria applicable to all subsurface irrigation systems.*

The following minimum design criteria are required for all graywater systems being used for subsurface irrigation. All subsurface graywater irrigation systems must:

- (1) Have the subsurface irrigation components of the graywater irrigation system installed a minimum of four inches (4”) and a maximum of twelve inches (12”) below the finished grade.
- (2) Have the subsurface irrigation components of the graywater irrigation system installed in suitable soil, as defined in section 86.8(36).
- (3) Have a minimum of twenty-four inches (24”) of suitable soil between the subsurface irrigation components of the graywater irrigation system and any restrictive soil layer, bedrock, concrete, or the highest water table. Restrictive soil layers are soil types 4, 4A, and 5 in Table 12-2.
- (4) Include controls, such as valves, switches, timers, and other controllers, as appropriate, to ensure the distribution of graywater throughout the entire irrigation zone.
- (5) If utilizing emitters, the emitters be designed to resist root intrusion and be of a design recommended by the manufacturer for the intended graywater flow and use. Minimum spacing between emitters shall be sufficient to deliver graywater at an agronomic rate and to prevent surfacing or runoff.
- (6) Have all irrigation supply lines be polyethylene tubing or PVC Class 200 pipe or better and Schedule 40 fittings. All joints shall be pressure tested at 40 psi (276 kPa), and shown to be drip tight for five minutes before burial. Drip feeder lines can be poly or flexible PVC tubing.
- (7) Meet the following setback distances in Table 12-1.

Table 12-1: Graywater System Setback Requirements

Minimum Horizontal Distance Required from:	Graywater Storage Tank	Irrigation Field
Buildings	5 feet	2 feet
Property line adjoining private property	10 feet	10 feet

Property line adjoining private property with supporting property line survey	1.5 feet	1.5 feet
Streams and lakes	50 feet	50 feet
Domestic potable water service line	10 feet	10 feet
Public water main	10 feet	10 feet

- (8) The irrigation field must be located on slopes of less than thirty percent (30%) from horizontal.
- (9) *Protocols for determining the size of the subsurface irrigation area.* The irrigation area must be determined using one of the following protocols.
- a. Site evaluation protocol:* The following site evaluation must be conducted to determine the appropriate size of the irrigation area for all subsurface irrigation systems, except one-household dispersed subsurface irrigation systems that are sized using the irrigation area equation protocol as defined in section 15.70.080(b)(9)(b), below.

The site evaluation must include:

- i. Site information, including:
  - (a) a site map; and
  - (b) location of proposed graywater irrigation area in relation to physical features requiring setbacks in Table 12-1.
- ii. Soil investigation to determine long-term acceptance rate of a graywater irrigation area as a design basis. Soil investigation must be completed by either:
  - (a) a visual and tactile evaluation of soil profile test pit, or
  - (b) a percolation test.
- iii. Irrigation rates must not exceed maximum allowable soil loading rates in Table 12-2 based on the finest textured soil in the twenty-four inches (24”) of suitable soil beneath the subsurface irrigation components.

Table 12-2: Soil Type Description and Maximum Hydraulic Loading Rate

Soil Type	USDA Soil Texture	USDA Structure – Shape	USDA Soil Structure-Grade	Percolation Rate (MPI)	Loading Rate for Graywater (gal./sq. ft./day)
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0	Soil Type 1 with more than 35% Rock (>2mm); Soil Types 2-5 with more than 50% Rock (>2mm)	--	0 (Single Grain)	Less than 5	Not suitable without augmentation  1.0 with augmentation
1	Sand, Loamy Sand	--	0	5-15	Not suitable without augmentation  1.0 with augmentation
2	Sandy Loam, Loam, Silt Loam	PR BK GR	2 (Moderate) 3 (Strong)	16-25	0.8
2A	Sandy Loam, Loam, Silt Loam	PR, BK, GR 0 (none)	1 (Weak) Massive	26-40	0.6
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR	2, 3	41-60	0.4
3A	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR 0	1 Massive	61-75	0.2
4	Sandy Clay, Clay, Silty Clay	PR, BK, GR	2, 3	76-90	Not suitable
4A	Sandy Clay, Clay, Silty Clay	PR, BK, GR 0	1 Massive	91-120	Not suitable
5	Soil Types 2-4A	Platy	1, 2, 3	121+	Not suitable

- iv. Suitable soil may consist of original, undisturbed soil or original soil that is augmented. Not suitable soil may be augmented as needed to ensure suitable soil is used.
- v. If the original soil is augmented, the mixture used for augmentation must meet the following criteria to ensure that suitable soil is achieved:
  - (a) The mixture must have an organic content that is at least five percent (5%) and no greater than ten percent (10%);
  - (b) The mixture must be a well-blended mix of mineral aggregate (soil) and compost where the soil ratio depends on the requirements for the plant species; and
  - (c) The mineral aggregate must have the following gradation:

Sieve Size	Percent Passing
3/8	100
No. 4	95 - 100

No. 10	75 - 90
No. 40	25 - 40
No. 100	4 - 10
No. 200	2 - 5

- vi. If the original soil is augmented, the additional soil must be tilled into the native soil a minimum of six inches (6”) below irrigation application zone.
- vii. Soil types 0 and 1 must be augmented before use. Soil type 4, 4A, and 5 are not suitable for subsurface irrigation.

b. *Irrigation area equation protocol:* The following irrigation area equation protocol may be used to determine the appropriate size of the irrigation area for one-household, dispersed subsurface irrigation systems. This protocol cannot be used to size mulch basins.

$$LA = GW / (CF \times ET \times PF)$$

Where:

LA = Landscaped area (square feet);

GW = Estimated graywater flow (gallons per week);

CF = 0.62 (square foot x inch / gallon) = ((7.48 gallons/ 1-cu-ft) /12 inch/ft);

ET = Evapotranspiration rate (inch / week), as determined by USDA Natural Resources Conservation Service CO652.0408 “Figure CO4-1: Map of Colorado Climate Zones” dated April 1978, or weekly averages based on actual conditions;

PF = Plant factor, 0.5

(c) *Minimum criterial applicable to mulch basin irrigation systems.* The following minimum design criteria are required for graywater systems using mulch basin systems for subsurface irrigation:

- (1) Mulch shall be permeable enough to allow rapid infiltration of graywater.
- (2) The minimum void space mulch basin volume must be either:
  - a. Three (3) times the anticipated average daily flow for graywater systems without a storage tank to allow for graywater volume surges and to prevent surfacing or runoff.

- b. One and a half (1.5) times the anticipated average daily flow for graywater systems with a storage tank meeting the design criteria set forth in Section 86.12(A)(5), 5 CCR 1002-86, Reg. 86, as amended.
- (3) Piping to mulch basins must discharge a minimum of four inches (4”) below grade into a container for dispersal of graywater into the mulch basin. The container must be designed to have four inches (4”) of freefall between the invert of the discharge pipe and the mulch. The container must have an access lid for observation of flow and to check mulch levels.
  - (4) The mulch basin must have a minimum depth of twelve inches (12”) below grade and not more than twenty four (24”) below grade.
  - (5) A filter is not required.

(d) *Minimum criteria applicable to dispersed subsurface irrigation systems.* The following minimum design criteria are required for graywater systems using dispersed irrigation systems for subsurface irrigation:

- (1) Include a cartridge filter, which must meet the following requirements:
  - a. A minimum of 60 mesh;
  - b. Located between the storage tank and the irrigation system;
  - c. If a pump is being used to pressurize the graywater distribution system, the filter must be located after the pump.

**Section 15.70.090 Operation & Maintenance.**

(a) *Manual.* All graywater systems must have an operation and maintenance (O&M) manual. O&M manuals must:

- (1) Include the following items:
  - a. A graywater system description including: equipment list, design basis data including but not limited to, design volumes, design flow rates of each component and service area, system as-built drawing, and process description.
  - b. Maintenance information for the graywater system including but not limited to: component maintenance schedule, instructions for component repair, replacement, or cleaning, replacement component source list, testing and frequency for potable containment device, and instructions for periodic removal of residuals.

- c. Operational ranges for parameters including but not limited to: disinfectant concentration levels, filter replacement parameters, pressure ranges, tank level, and valve status under normal operation.
  - d. Step-by-step instructions for starting and shutting down the graywater system including but not limited to: valve operation, any electrical connections, cleaning procedures, visual inspection, and filter installation
  - e. A guide for visually evaluating the graywater system and narrowing any problem scope based on alarm activations, effluent characteristics, system operation, and history.
  - f. A list of graywater control measures in which the graywater system must be operated.
- (2) Remain with the graywater system throughout the life of the system;
  - (3) Be updated at the time the system is modified; and
  - (4) Be transferred to the new owner or tenant upon change of ownership or occupancy of the property where the graywater system is located.
- (b) *Graywater system control measures.* All graywater systems must be operated in accordance with the following control measures:
- (1) *Control measures that apply to all graywater uses:*
    - a. Graywater must be collected in a manner that minimizes the presence or introduction of:
      - i. hazardous or toxic chemicals in the graywater to the greatest extent possible;
      - ii. human excreta in the graywater to the greatest extent possible;
      - iii. household wastes; and
      - vi. animal or vegetable matter.
    - b. Use of graywater is limited to the confines of the facility that generates the graywater.
    - c. The graywater system must be operated and maintained in accordance with the O&M manual, including all manufacturer recommended maintenance activities. The O&M manual must remain with the graywater system throughout the system's life and be updated based on each modification and approval made to the system. The O&M manual must be transferred, upon change of ownership or occupancy, to the new owner or tenant.



- d. The owner or operator of a graywater system must minimize exposure of graywater to humans and domestic pets.
- e. Graywater use and graywater systems must not create a nuisance.
- f. Graywater must not be stored for more than 24 hours unless the graywater has been treated. All graywater must be stored inside a tank(s) that meets the design requirements of Section 86.12(A)(5), 5 CCR 1002-86, Reg. 86, as amended.
- g. Temporary or semi-temporary connections from the potable water system or public water system to the graywater system are prohibited. Permanent connections from the potable water system or public water system to the graywater system must meet the design requirements Section 86.11(A)(6), 5 CCR 1002-86, Reg. 86, as amended.

(c) *Subsurface irrigation system control measures.* All subsurface irrigation systems must be operated in accordance with the following control measures:

- (1) Agricultural irrigation with graywater is prohibited.
- (2) Irrigation is prohibited when the ground is frozen, plants are dormant, during rainfall events, or the ground is saturated.
- (3) Irrigation scheduling must be adjusted so that application rates are closely matched with soil and weather conditions.
- (4) 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.
- (5) 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.

**Section 15.70.110 Nuisance provisions.**

(a) It shall be unlawful and constitute a nuisance for any person to erect, install, or use a graywater system upon property located within the city’s graywater system jurisdiction without first having obtained a building permit, issued pursuant to this Chapter, for an approved, compliant graywater system.

(b) It shall be unlawful and constitute a nuisance for any person to collect or cause to be collected graywater from any sources except as otherwise expressly permitted under Section 15.70.070.

(c) It shall be unlawful and constitute a nuisance for any person to use graywater, or conduct any graywater activity, upon property located within the city's graywater system jurisdiction for any purpose except as otherwise expressly permitted under Section 15.70.070.

(d) It shall be unlawful and constitute a nuisance for any person to operate a graywater system or subsurface irrigation system without implementing the control measures provided in Section 15.70.090 of this Chapter.

### **Section 15.70.120 Remedies for noncompliance.**

(a) *Compliance orders.* Whenever the city determines that any activity is occurring which is not in compliance with a building permit and/or the requirements of this chapter, the city may issue a written compliance order to the legally responsible party containing a compliance schedule. The schedule shall contain specific actions the legally responsible party must complete, including dates for the completion of the actions. It shall be unlawful for any person to fail to comply with any compliance order requirement.

(b) *Suspension and revocation of permit.* The city may suspend or revoke a building permit for violation of any provision of this chapter, violation of the permit, and/or misrepresentations by the permittee or the permittee's agents, employees, or independent contractors.

(c) *Stop work orders.* Whenever the city determines that any activity is occurring which is not in compliance with an approved permit and/or the requirements of this chapter, the city can order such activity stopped upon service of written notice upon the legally responsible party or a person responsible for or conducting such activity. Such person shall immediately stop all activity until authorized in writing by the city to proceed. Service shall be by United States Postal Service mail or hand delivery. If a responsible person cannot be located, the notice to stop shall be posted in a conspicuous place upon the area where the activity is occurring. The notice shall state the nature of the violation. The notice shall not be removed until the violation has been cured or authorization to remove the notice has been issued by the city. It shall be unlawful for any person to fail to comply with a stop work order.

(d) *Civil proceedings.* In case of any violation of any provision of this chapter, or any amendment thereof, the city may, at its discretion, initiate civil proceedings, including administrative citations pursuant to chapter 8.25 of the Code injunction, mandamus, abatement, declaratory judgment or other appropriate actions or proceedings, to prevent, enjoin, abate, remove, or otherwise correct any such unlawful condition. Civil remedies provided for under this section are not exclusive and shall not preclude prosecution for criminal violations under the provisions of this chapter.

Section 2. Section 8.25.010, Administrative citations, of the Golden Municipal Code is amended to read as follows:

This chapter provides for administrative penalties that may be imposed for violation of parking offenses as set forth in Part 12 of the Model Traffic Code, 2010 revised edition, as adopted by the city; specific nuisances including litter prohibited, prohibition of scattering

gravel mud and dirt on streets and roads, and camping on public property as set forth in chapter 5.01 of the Code, container required (trash) as set forth in chapter 5.03 of the Code, removal required (weeds) as set forth in chapter 5.05 of the Code, pruning, corner clearances (trees, shrubs and bushes) as set forth in chapter 5.06 of the Code, hobby repair work (vehicles) as set forth in chapter 5.07 of the Code, noise prohibited, restrictions amplified outdoor music, exhaust and muffler restrictions, and use of sirens, red light restriction as set forth in chapter 5.15 of the Code, cultivation regulations and operational regulations (marijuana) as set forth in chapter 5.19 of the Code, rabies control, reporting animal bites, confinement-quarantine, license required, running at large prohibited, incompetent control prohibited, cats reasonable control, disturbing the peace, confinement during estrus, removal of animal excrement, animal scattering trash, livestock fencing requirement, horses prohibited, and picketing on public property as set forth in title 7 of the Code, consumption regulated (alcohol open container), underage persons tobacco restriction and prohibitions, possession of marijuana, possession of open container marijuana, and possession, manufacture, sale or delivery of drug paraphernalia as set forth in chapter 8.04 of the Code, the park and recreation facility rules as set forth in chapter 8.30 of the Code, permit required and permit restrictions as set forth in chapter 10.90 of the Code and as otherwise specified in the Code, the rules, orders and regulations issued by the city manager pursuant to section 2.08.110 of the Code, which are deemed reasonably necessary for the administration, protection and maintenance of any public property or buildings belonging to or under control of the city, stormwater quality regulations, requirements, and prohibitions set forth in chapter 13.30 of the Code, requirements, rules and regulations set forth in title 18 of the Code, and the graywater system regulations, requirements and prohibitions set forth in chapter 15.70 of the Code.

Section 3. If any article, section, paragraph, sentence, clause or phrase of this ordinance is held to be unconstitutional or invalid for any reason, such decision shall not affect the validity or constitutionality of the remaining portions of the ordinance. The City Council hereby declares that it would have passed this ordinance and each part of parts thereof irrespective of the fact that any one part or parts be declared unconstitutional or invalid.

Section 4. All other ordinances or portions thereof inconsistent or conflicting with this ordinance or any portion hereof is hereby repealed to the extent of such inconsistency or conflict.

Section 5 The repeal or modification of any provision of the Municipal Code of the City of Golden by this ordinance shall not release, extinguish, alter, modify or change in whole or in part any penalty, forfeiture or liability, either civil or criminal, which shall have been incurred under such provision. Each provision shall be treated and held as still remaining in force for the purpose of sustaining any and all proper actions, suits, proceedings and prosecutions for enforcement of the penalty, forfeiture or liability, as well as for the purpose of sustaining any judgment, decree or order which can or may be rendered, entered or made in such actions, suits, proceedings or prosecutions.

Section 6. This ordinance is deemed necessary for the protection of health, welfare and safety of the community.

Section 7. Violations of this ordinance shall be punishable as set forth in Section 1.01.110 of the Golden Municipal Code.

INTRODUCED, READ AND PASSED AS AN ORDINANCE, ON FIRST READING,  
AT A REGULAR MEETING OF THE CITY COUNCIL OF THE CITY OF GOLDEN,  
COLORADO, THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020.

READ, PASSED AND ADOPTED AS AN ORDINANCE ON SECOND READING,  
AT A REGULAR MEETING OF THE CITY COUNCIL OF THE CITY OF GOLDEN,  
COLORADO, THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 2020.

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Laura Weinberg  
Mayor

ATTEST:

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Monica S. Mendoza, CMC  
City Clerk

APPROVED AS TO FORM:

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David S. Williamson  
City Attorney