

1 CITY OF GRAND JUNCTION, COLORADO

2
3 ORDINANCE NO. XXXX

4
5 AN ORDINANCE AMENDING TITLE 13 OF THE GRAND JUNCTION MUNICIPAL
6 CODE TO ADD CHAPTER 13.40 REGARDING A GRAYWATER CONTROL
7 PROGRAM IN THE CITY OF GRAND JUNCTION
8

9 **Recitals:**

10 On May 11, 2015, the State of Colorado promulgated Regulation 86 – Graywater
11 Control Regulation (5 CCR 1002-86). Regulation 86 establishes the allowed uses and
12 users of graywater within the State; establishes the minimum state-wide standards for
13 the location, design, construction, operation, installation, modification of Graywater
14 Treatment Works; and establishes the minimum ordinance or resolution requirements
15 for a city, city and county, or county that chooses to authorize graywater use within its
16 jurisdiction.

17 The City of Grand Junction (“City”) enacted Title 13 of the Grand Junction
18 Municipal Code (“GJMC”) to establish standards for water supply, wastewater
19 management, and water conservation within the City, and to provide for the
20 management of the Persigo Wastewater Treatment Plant and 201 Planning Area for the
21 City and certain unincorporated areas of Mesa County. Title 13 defines water
22 conservation in the City as the practice of “eliminating water waste and making
23 beneficial water uses more efficient” (GJMC 13.36.020). Title 13 also identifies the
24 City’s goal to achieve “wise use of water for ordinary household uses and for outdoor
25 irrigation to a reasonable degree” (GJMC 13.36.090).

26 On June 20, 2012, the City adopted the Grand Valley Regional Water
27 Conservation Plan (“Water Conservation Plan”). The Water Conservation Plan advises
28 partners to “assist City and County Health Departments in distributing guidelines for
29 using graywater where legal and appropriate” (GJMC 45.04.390(g)).

30 On December 16, 2020, the City adopted the 2020 One Grand Junction
31 Comprehensive Plan (“Comprehensive Plan”). The Comprehensive Plan includes goals
32 for efficient and reliable management of water resources, including but not limited to the
33 promotion of water conservation (Comprehensive Plan Principle 8.1.a.), the protection
34 of water quality (Comprehensive Plan Principle 8.1.d.), and maximized water efficiency
35 in the construction of new buildings and the adaptive reuse of existing buildings (Plan
36 Principle 8.1.c.).

37 As provided by Regulation 86, a local city, city and county, or county with a local
38 graywater control program has exclusive enforcement authority regarding compliance
39 with the ordinance or resolution and, as applicable, rule. The City has not adopted a
40 graywater control program by ordinance, resolution, or rule prior to this ordinance.

41 As directed by Title 13 of the GJMC, the Water Conservation Plan, and the
42 Comprehensive Plan, and in the interest of advancing the public health, safety and
43 welfare of the community, the City Council does hereby create Chapter 13.40 in Title 13
44 of the GJMC and does establish guidelines and standards for the design, construction,
45 installation, repair, modification, maintenance, and use of graywater systems in the City.

46 **BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF GRAND JUNCTION**
47 **THAT:**

48 Chapter 13.40 shall be added to Title 13 of the Grand Junction Municipal Code
49 as follows (additions shown in **bold** print):

50

51 **Chapter 13.40 GRAYWATER CONTROL PROGRAM**

52

53 **13.40.010 Definitions**

54 ***Agricultural irrigation* means irrigation of crops produced for direct human**
55 **consumption, crops where lactating dairy animals forage, and trees that produce**
56 **nuts or fruit intended for human consumption. This definition includes household**
57 **gardens, fruit trees, and industrial hemp as defined by C.R.S. 35-61-101.**

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

60 ***City* means the City of Grand Junction, a Colorado home rule municipality.**

61 ***Closed sewerage system* means either a permitted Domestic Wastewater**
62 **Treatment Works, which includes a permitted and properly functioning On-site**
63 **Wastewater Treatment System (OWTS) with a design capacity more than 2,000**
64 **gpd, or a properly functioning and approved or permitted OWTS with a design**
65 **capacity of 2,000 gpd or less.**

66 ***Commission* means the Water Quality Control Commission 25-8-201, C.R.S.**

67 ***Component* means a subpart of a Graywater Treatment Works which may include**
68 **multiple devices.**

69 ***Cross-Connection* means any connection that could allow any water, fluid, or gas**
70 **such that the water quality could present an unacceptable health and/or safety**
71 **risk to the public, to flow from any pipe, plumbing fixture, or a customer's water**

72 system into a public water system's distribution system or any other part of the
73 public water system through backflow.

74 ***Design*** means the process of selecting and documenting in writing the size,
75 calculations, site specific data, location, equipment specification and
76 configuration of treatment components that match site characteristics and
77 Facility use.

78 ***Design flow*** means the estimated volume of graywater per unit of time for which a
79 component or Graywater Treatment Works is designed.

80 ***Dispersed subsurface irrigation*** means a subsurface irrigation system including
81 piping and emitters installed throughout an Irrigation Area.

82 ***Division*** means the Water Quality Control Division of the Colorado Department of
83 Public Health and Environment.

84 ***Facility*** means any building, structure, or installation, or any combination thereof
85 that uses graywater subject to a graywater control program (Program), is located
86 on one or more contiguous or adjacent properties, and is owned or operated by
87 the same person or legal entity. Facility is synonymous with the term operation.

88 ***Floodplain (100-year)*** means an area adjacent to a river or other watercourse
89 which is subject to flooding as the result of the occurrence of a one hundred
90 (100) year flood, and is so adverse to past, current or foreseeable construction or
91 land use as to constitute a significant hazard to public or environmental health
92 and safety or to property or is designated by the Federal Emergency Management
93 Agency (FEMA) or National Flood Insurance Program (NFIP). In the absence of
94 FEMA/NFIP maps, a professional engineer shall certify the floodplain elevations.

95 ***Floodway*** means the channel of a river or other watercourse and the adjacent
96 land areas that must be reserved to discharge the base flood without
97 cumulatively increasing the water surface elevation more than one foot or as
98 designated by the Federal Emergency Management Agency or National Flood
99 Insurance Program. In the absence of FEMA/NFIP maps, a professional engineer
100 shall certify the floodway elevation and location.

101 ***Graywater*** means that portion of wastewater that, before being treated or
102 combined with other wastewater, is collected from fixtures within residential,
103 commercial, or industrial buildings or institutional facilities for the purpose of
104 being put to beneficial uses. Sources of graywater are limited to discharges from
105 bathroom and laundry room sinks, bathtubs, showers, and laundry machines.
106 Graywater does not include the wastewater from toilets, urinals, kitchen sinks,
107 dishwashers, or nonlaundry utility sinks. C.R.S. 25-8-103(8.3)(a)

108

109 **Graywater Control Program (Program)** is this ordinance and, as applicable, any
110 rule(s), including implementation practices, regulation(s), standard(s) authorized
111 by the City, and which follows the minimum requirements of this Chapter and
112 other applicable law(s), rule(s) and regulation(s).

113 **Graywater Treatment Works** means an arrangement of devices and structures
114 used to: (a) collect graywater from within a building or a Facility; and (b) treat,
115 neutralize, or stabilize graywater within the same building or Facility to the level
116 necessary for its authorized uses. C.R.S. 25-8-103(8.4)

117 **Indirect connection** means a waste pipe from a Graywater Treatment Works that
118 does not connect directly with the closed sewerage system, but that discharges
119 into the closed sewerage system though an air break or air gap into a trap,
120 fixture, receptor, or interceptor.

121 **Irrigation area** means that area of ground consisting of soil, Mulch, gravel, and
122 plant material to which water is directly applied by a graywater subsurface
123 irrigation system.

124 **Legally Responsible Party**

125 (a) For a residential property, the Legally Responsible Party is the property
126 owner.

127 (b) For a corporation, the Legally Responsible Party is a responsible
128 corporate officer, either:

129 (1) a president, secretary, treasurer, or vice-president of the
130 corporation in charge of a principal business function, or any other
131 person who performs similar policy- or decision-making functions
132 for the corporation, or

133 (2) the manager of operating facilities, provided, the manager is
134 authorized to make management decisions which govern the
135 operation of the regulated Facility including having the explicit or
136 implicit duty of making major capital investment recommendations,
137 and initiating and directing other comprehensive measures to assure
138 long term environmental compliance with environmental laws and
139 regulations; the manager can ensure that the necessary systems are
140 established or actions taken to gather complete and accurate
141 information for approval application requirements; and where
142 authority to sign documents has been assigned or delegated to the
143 manager in accordance with corporate procedures.

144 (c) For a general or limited partnership or sole proprietorship, the Legally
145 Responsible Party is the general partner, business matters partner or the
146 proprietor, respectively.

147 (d) For a limited liability company, the responsible party shall be the
148 manager or other authorized agent of the company and shall be a natural
149 person.

150 (e) For a Municipality, State, Federal, or other public agency, the Legally
151 Responsible Party is a principal executive officer or ranking elected official,
152 either

153 (1) the chief executive officer of the agency, or

154 (2) a senior executive officer having responsibility for the overall
155 operations of a principal geographic unit of the agency (e.g.,
156 Regional Administrators of EPA), or

157 (3) when the entity is the State of Colorado, the Commission.

158 **Local Public Health Agency** means any the Mesa County Colorado Health
159 Department.

160 **Modification** means the alteration or replacement of any component of a
161 Graywater Treatment Works that can affect the quality of the finished water, the
162 rated capacity of a Graywater Treatment Works, the graywater use, alters the
163 treatment process of a Graywater Treatment Works, or compliance with this
164 regulation and the local graywater control program. This definition does not
165 include normal operations and maintenance of a Graywater Treatment Works.

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

168 **Mulch basin** means a type of irrigation or treatment field filled with Mulch or other
169 approved permeable material of sufficient depth, length, and width to prevent
170 ponding or runoff. A Mulch Basin may include a basin around a tree, a trough
171 along a row of plants, or other shapes necessary for irrigation.

172 **Non-single-family** means any structure that is not a single-family structure.

173 **Nuisance** means the unreasonable, unwarranted and/or unlawful use of property,
174 which causes inconvenience or damage to others, including to an individual or to
175 the general public.

176 **On-site Wastewater Treatment System (OWTS)** means an absorption system of
177 any size or flow or a system or Facility for treating, neutralizing, stabilizing, or
178 dispersing sewage generated in the vicinity, which system is not a part of or
179 connected to a sewage treatment works. C.R.S. 25-10-103(12)

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

184 **Potable Water System** means a system for the provision of water to the public for
185 human consumption through pipes or other constructed conveyances, where
186 such system has less than fifteen service connections or regularly serves less
187 than an average of at least 25 people daily at least 60 days per year.

188 **Professional Engineer (P.E.)** means an engineer licensed in accordance with
189 section 12-25-1, C.R.S.

190 **Public Water System** means a system for the provision of water to the public for
191 human consumption through pipes or other constructed conveyances if such
192 system has at least fifteen service connections or regularly serves an average of
193 at least 25 individuals daily at least 60 days per year. A public water system is
194 either a community water system or a non-community water system. Such term
195 does not include any special irrigation district. Such term includes:

196 (a) Any collection, treatment, storage, and distribution facilities under
197 control of the supplier of such system and used primarily in connection
198 with such system.

199 (b) Any collection or pretreatment storage facilities not under such control,
200 which are used primarily in connection with such system.

201 **Regulation 86** means Colorado Department of Public Health and Environment
202 Water Quality Control Commission Regulation no. 86 – Graywater Control
203 Regulation, 5 CCR 1002-86.

204 **Single-family** means a detached or attached structure, arranged and designed as
205 a single-family residential unit intended to be occupied by not more than one
206 family and that has separate water and sewer services connections from other
207 dwelling units.

208 **Site Evaluation** means a comprehensive analysis of soil and site conditions for a
209 graywater Irrigation Area.

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

213 **Soil Profile Test Pit** means a trench or other excavation used for access to
214 evaluate the soil horizons for properties influencing effluent movement, bedrock,
215 evidence of seasonal high ground water, and other information to be used in
216 locating and designing a graywater Irrigation Area.

217 **Soil Structure** means the naturally occurring combination or arrangement of
218 primary soil particles into secondary units or peds; secondary units are
219 characterized because of shape, size class, and grade (degree of distinctness).

220 **Suitable Soil** means unsaturated soil in which the movement of water, air, and the
221 growth of roots is sustained to support healthy plant life and conserve moisture.
222 Soil criteria for graywater subsurface irrigation are further defined in Attachment
223 A: Graywater Design Criteria.,

224 **Subsurface irrigation** means a discharge of graywater into soil a minimum of four
225 inches (4”) and no deeper than twelve inches (12”) below the finished grade.

226 **State** means the State of Colorado or any of its agencies.

227 **State Waters** means any and all surface and subsurface waters which are
228 contained in or flow in or through this state, but does not include waters in
229 sewage systems, waters in treatment works of disposal systems, waters in
230 potable water distribution systems, and all water withdrawn for use until use and
231 treatment have been completed.

232

233 **13.40.020 Abbreviations and Acronyms.** The following meanings are associated
234 with the acronyms used in this chapter.

| | |
|----------------|--|
| ANSI | American National Standards Institute |
| BK | Blocky |
| C.R.S. | Colorado Revised Statutes |
| CDPS | Colorado Discharge Permit System |
| FEMA | Federal Emergency Management Agency |
| gpd | gallons per day |
| GR | Granular |
| mg/L | milligrams per Liter |
| MPI | Minutes Per Inch |
| NFIP | National Flood Insurance Program |
| NSF | NSF International, formerly known as National Sanitation Foundation |
| O&M | Operations and Maintenance |
| OWTS | On-Site Wastewater Treatment System(s) |
| PR | Prismatic |

235

236

237 **13.40.030 Purpose, Applicability, and Compliance**

238 **(a) Purpose.** The purpose of this chapter is to:

239 (1) Establish a Graywater Control Program (Program) within the City of
240 Grand Junction, Colorado.

241 (2) Reduce per capita water consumption in service of the City’s goals for
242 water and wastewater management.

243 (3) Establish standards including requirements, prohibitions, and
244 recommendations, for the use of graywater; and for the location, design,
245 construction, operation, installation, and Modification of Graywater
246 Treatment Works.

247 (4) Establish allowed users and uses of graywater within the City of Grand
248 Junction.

249 (5) Assist the City in its effort to protect public health and water quality.

250 (b) Applicability. This Chapter applies to:

251 (1) Properties within the legal boundaries of the City as the same now exist
252 or as the boundary may change over time.

253 (2) This Chapter does not apply to:

254 (i) Discharges pursuant to a Colorado Discharge Permit System
255 (CDPS) or National Pollutant Discharge Elimination System Permit
256 (NPDES) permit;

257 (ii) Wastewater that has been lawfully treated and released to state
258 waters prior to subsequent use;

259 (iii) Wastewater that has lawfully been treated and used at a
260 Domestic Wastewater Treatment Works for landscape irrigation or
261 process uses;

262 (iv) On-site wastewater treatment works authorized under and
263 operating in accordance with Regulation #43 (5 CCR 1002-43);

264 (v) Reclaimed wastewater authorized under and operating in
265 accordance with Regulation #84 (5 CCR 1002-84);

266 (vi) Water used in an industrial process that is internally recycled in
267 accordance with applicable law;

268 (vii) Graywater research activities exempted from graywater control
269 regulations under C.R.S. 25-8-205.3; and

270 (viii) Lawful rainwater harvesting.

271 (c) Compliance.

272 All graywater uses and Graywater Treatment Works within the City's jurisdiction
273 must comply with the minimum requirements of this Chapter, all applicable state
274 and federal requirements for graywater system, and all requirements imposed by
275 Mesa County Colorado Health department.

276 (1) Any Graywater Treatment Works installed prior to the effective date of
277 this regulation must be able to demonstrate they meet the minimum
278 requirements of this Chapter.

279 (2) Should the City Program be revoked or rescinded by the City, all
280 Graywater Treatment Works in the City's jurisdiction must within 365 days:

281 (i) If applicable, be regulated by Mesa County under a graywater
282 control program by which the County assumes authority over the
283 existing Graywater Treatment Works; or

284 (ii) Be physically removed or permanently disconnected in
285 accordance with local or state regulations.

286 (3) Should a property with a lawful Graywater Treatment Works be de-
287 annexed from the City of Grand Junction, the property owner must within
288 365 days

289 i (i) Ensure the Graywater Treatment Works complies with the
290 controlling jurisdiction of the property; or

291 (ii) Ensure the Graywater Treatment Works is physically removed or
292 permanently disconnected in accordance with applicable local and
293 state regulations.

294

295 (4) Graywater may be used only as allowed under and by the City Program.
296 Unauthorized graywater use and discharge(s) are prohibited.

297 (5) All Graywater Treatment Works installed in the City must:

298 (i) meet all requirements of Regulation 86 as may be amended, and

299 (ii) City Building Code, and

300 (iii) and any applicable federal law, state, City, and Mesa County
301 requirements.

302 (6) Graywater Treatment Works are prohibited from being installed in
303 properties that have new or existing On-Site Wastewater Treatment
304 Systems\ . Connection of the Graywater Treatment Works to the Persigo
305 Wastewater Treatment Plant is a requirement to own/operate a Graywater
306 Treatment Works.

307

308 **13.40.040 Materials Incorporated by Reference**

309 **(a) Design criteria incorporated by reference and cited herein are included in**
310 **Attachment A and are referred to herein as the Graywater Design Criteria.**

311 **(1) The Graywater Design Criteria shall be maintained in accordance with**
312 **Regulation 86, as amended and the most recent version of the International**
313 **Plumbing Code adopted by Mesa County.**

314 **(b) All materials referenced in and/or incorporated by reference in this ordinance**
315 **may be examined at gjcity.org or at the City Hall, Clerk's Office, 250 N 5th Street,**
316 **Grand Junction, CO 81501.**

317

318 **13.40.050 Permitting, Inspection and Approval**

319 **(a) Permitting. Prior to approval for use, all Graywater Treatment Works must be**
320 **approved by the City of Grand Junction.**

321 **(b) Inspection. Prior to approval for use, all Graywater Treatment Works must be**
322 **inspected, verified, and accepted by the City of Grand Junction.**

323 **(c) Operation and Maintenance (O&M) Manual, All graywater systems must have**
324 **an O&M manual. The O&M Manual shall fully comply with the O&M manual**
325 **requirements, specifications and content all as provided in the Graywater Design**
326 **Criteria.**

327

328 **13.40.060 Enforcement and Oversight**

329 **(a) Responsible Agency. The City Manager shall be responsible for oversight and**
330 **implementation of this Chapter including, but not limited to, review, inspection,**
331 **enforcement, tracking, and receipt of complaints.**

332 **(b) Enforcement. The City and its contractor the Mesa County Building**
333 **Department (Building Department) are authorized to perform inspections and take**
334 **enforcement actions to ensure compliance with this Chapter.**

335 **(1) Enforcement of this Chapter shall be in accordance with the duty(ies)**
336 **set forth in GJMC 15.08.020.**

337 **(2) The Applicant shall install and maintain any Graywater Treatment Works**
338 **within the City in accordance with the Graywater Design Criteria in**
339 **Attachment A. The City Manager is authorized to perform inspection(s) and**
340 **take enforcement action(s) to ensure compliance with this Chapter.**

341 **(3) The City shall provide an application for, and when a complete**
342 **application is made, filed and fees are paid, review the proposed Graywater**
343 **Treatment Works.**

344 (4) The City shall review and approve, approve with conditions, or deny
345 each application within 30 days of the City determining the application to
346 be complete. An incomplete application will be denied.

347

348 **13.40.070 Reporting Requirements and Tracking System**

349 **(a) Owners (or their Legally Responsible Party) of Category B and D Graywater**
350 **Treatment Works are required to provide an annual self-certification of the legal**
351 **status of their Graywater Treatment Works. The letter must contain the following:**

352 (1) A statement indicating if the Graywater Treatment Works is still in
353 operation;

354 (2) A certification that the Graywater Treatment Works is being operated in
355 accordance with the operations and maintenance manual;

356 (3) A certification that no Modification(s) has(have) been made to the
357 Graywater Treatment Works. If Modification(s)has(have) been made to the
358 Graywater Treatment Works, the Modification(s) must be described in a
359 written statement.

360 (4) Written attestation that the Graywater Treatment Works is overseen by
361 an operator certified according to requirements of Regulation 100, 5 CCR
362 1003-2, if required.

363 **(b) The owner or operator of a Graywater Treatment Works must report the**
364 **following information to the City of Grand Junction for inclusion in a tracking**
365 **system of Graywater Treatment Works. The information must be received within**
366 **30 days of the treatment works becoming operational:**

367 (1) The legal address where the Graywater Treatment Works is located;

368 (2) The owner of the Graywater Treatment Works;

369 (3) A list of Graywater uses;

370 (4) A description of the Graywater Treatment Works; and

371 (5) Where required, the name and contact information for the certified
372 operator associated with the Graywater Treatment Works.

373 **(c) The owner or operator of a Graywater Treatment Works must report changes**
374 **to any of these items must be reported to City of Grand Junction within 60 days**
375 **of the changes.**

376

377

378 **13.40.080 Fees**

379 **(a) The City may impose fees for administration and oversight of the Graywater**
380 **Control Program.**

381 **(b) Plan Review Fees and Planning Clearance Fees, Building Permit and**
382 **Inspection Fees may be applicable as determined by the City Manager.**

383

384 **13.40.090 Graywater Use Categories.**

385 **The graywater use categories allowed are defined below. A Facility may have**
386 **multiple Graywater Treatment Works if all applicable use and design**
387 **requirements are satisfied.**

388 **(a) Category A: Single-family, subsurface irrigation**

389 **(1) Category A graywater use must meet the following:**

390 **(i) Allowed users: Single-family.**

391 **(ii) Allowed graywater sources: Graywater collected from bathroom**
392 **and laundry room sinks, bathtubs, showers, and laundry machines.**

393 **(iii) Allowed uses: Outdoor, subsurface irrigation within the confines**
394 **of the legal property boundary.**

395 **(iv) Design flow: The design flow for a single-family Graywater**
396 **Treatment Works shall not exceed 400 gallons per day (gpd).**

397 **(b) Category B: Non-single-family, subsurface irrigation, 2,000 gallons per day**
398 **(gpd) or less**

399 **(1) Category B graywater use must meet the following:**

400 **(i) Allowed users: Non-single-family users.**

401 **(ii) Allowed graywater sources: Graywater collected from bathroom**
402 **and laundry room sinks, bathtubs, showers, and laundry machines.**

403 **(iii) Allowed uses: Outdoor, subsurface irrigation within the confines**
404 **of the legal property boundary.**

405 **(iv) Design flow: The design flow for a non-single-family Graywater**
406 **Treatment Works shall not exceed 2,000 gallons per day (gpd) for**
407 **outdoor irrigation for the Facility.**

408 **(c) Category C: Single-family, indoor toilet and urinal flushing, subsurface**
409 **irrigation**

410 **(1) Category C graywater use must meet the following:**

- 411 (i) Allowed users: Single-family.
- 412 (ii) Allowed graywater sources: Graywater collected from bathroom
413 and laundry room sinks, bathtubs, showers, and laundry machines.
- 414 (iii) Allowed uses: Indoor toilet and urinal flushing and outdoor,
415 subsurface irrigation within the confines of the legal property
416 boundary.
- 417 (iv) Design flow: The design flow for a single-family Graywater
418 Treatment Works shall not exceed 400 gallons per day (gpd) for all
419 approved uses.

420

421 **(d) Category D: Non-single-family, indoor toilet and urinal flushing, subsurface**
422 **irrigation**

423 **(1) Category D graywater use must meet the following:**

- 424 (i) Allowed users: Non-single-family users.
- 425 (ii) Allowed graywater sources: Graywater collected from bathroom
426 and laundry room sinks, bathtubs, showers, and laundry machines.
- 427 (iii) Allowed uses: Indoor toilet and urinal flushing and outdoor,
428 subsurface irrigation within the confines of the legal property
429 boundary.
- 430 (iv) Design flow: There is no maximum design flow for a non-single
431 family Graywater Treatment Works for indoor toilet and urinal
432 flushing. There is no maximum design flow for wastewater from the
433 Facility that can go to a Closed Sewerage System. The design flow is
434 limited to 2,000 gallons per day (gpd) or less for outdoor irrigation
435 for the Facility.

436

437 **13.40.100 Design Criteria**

438 **(a) Design Criteria**

- 439 **(1) All Graywater Treatment Works must meet the requirements of the**
440 **Graywater Design Criteria in effect at the time of installation of the system.**
441 **The Graywater Design Criteria is included in Attachment A. Attachment A is**
442 **incorporated by this reference as if fully set forth.**

443 **(b) Sizing**

444 (1) Graywater Treatment Works must be sized appropriately using the flow
445 projection methods described in the Graywater Design Criteria.

446 (2) The size of Irrigation Areas must be determined using the sizing
447 protocols described in the Graywater Design Criteria.

448 **(c) System Modifications**

449 (1) Graywater Treatment Works requiring Modifications must be upgraded
450 to the requirements of the Graywater Design Criteria in effect at the time of
451 Modifications. All system Modifications must be approved by the City of
452 Grand Junction.

453

454 **13.40.110 Control Measures**

455 **(a) General control measures.**

456 **All Graywater Treatment Works and uses must be conducted in accordance with**
457 **the following control measures:**

458 (1) Graywater must be collected in a manner that minimizes the presence or
459 introduction of:

460 (i) Hazardous or toxic chemicals in the graywater to the greatest
461 extent possible;

462 (ii) Human excreta in the graywater to the greatest extent possible;

463 (iii) Household wastes; and

464 (iv) Animal or vegetable matter.

465 (2) Use of graywater is limited to the confines of the Facility from which the
466 graywater is derived.

467 (3) All graywater systems must have an operation and maintenance (O&M)
468 manual. The Graywater Treatment Works must be operated and maintained
469 in accordance with the O&M manual, including all manufacturer
470 recommended maintenance activities. See the Graywater Design Criteria
471 for O&M manual requirements.

472 (i) The O&M manual must remain with the Graywater Treatment
473 Works throughout the system's life and be updated based on each
474 Modification and approval made to the system.

475 (ii) The O&M manual must be transferred, upon change of ownership
476 or occupancy, to the new owner or tenant.

477 (iii) For Category D Graywater Treatment Works that have a capacity
478 to receive greater than 2,000 gallons per day (gpd), operational and
479 maintenance records must be maintained for a minimum of the past
480 five (5) years.

481 (4) The owner or operator of a Graywater Treatment Works must minimize
482 exposure of graywater to humans and domestic pets.

483 (5) Graywater use and Graywater Treatment Works must not create a
484 nuisance.

485 (6) Graywater may not be stored for more than 24 hours unless the
486 graywater has been treated by a Graywater Treatment Works. All Graywater
487 must be stored inside a tank(s) that meets the design requirements of the
488 Graywater Design Criteria.

489 (7) Temporary or semi-temporary connections from the Potable Water
490 System or public water system to the Graywater Treatment Works are
491 prohibited. Permanent connections from the Potable Water System or
492 public water system to the Graywater Treatment Works must meet the
493 design requirements of the Graywater Design Criteria.

494 (b) Subsurface irrigation system control measures. All subsurface irrigation
495 systems must be operated in accordance with the additional following control
496 measures:

497 (1) Agricultural irrigation with graywater is prohibited by Regulation 86 and
498 this Chapter.

499 (2) Irrigation with graywater is prohibited when the ground is frozen, plants
500 are dormant, during rainfall events, or the ground is saturated.

501 (3) Irrigation scheduling must be adjusted so that application rates are
502 closely matched with soil and weather conditions.

503 (4) Graywater must be applied in a manner that does not result in ponding,
504 runoff, or unauthorized discharge to state waters. For Dispersed
505 Subsurface Irrigation systems, the graywater must be applied at an
506 agronomic rate. For Mulch Basins systems, the graywater must not be
507 applied in excess of the soil adsorption rate.

508 (5) For Mulch Basin systems, Mulch must be replenished and undergo
509 periodic maintenance as needed to reshape or remove material to maintain
510 surge capacity and to prevent ponding and runoff.

511 (c) Control measures that apply to indoor toilet and urinal flushing graywater use
512 Indoor toilet and urinal flushing Graywater Treatment Works (Categories C and D)
513 must be operated in accordance with the following additional control measures.

514 (1) Graywater for toilet and urinal flushing use must be disinfected.

515 (a) Graywater Treatment Works that utilize chlorine for disinfection
516 must have a minimum of 0.2 mg/L and a maximum of 4.0 mg/L of free
517 chlorine residual throughout the indoor graywater plumbing system,
518 including fixtures.

519 (b) Single-family Graywater Treatment Works that utilize non-
520 chemical methods, such as UV, for disinfection must have a chlorine
521 puck present in each toilet or urinal tank.

522 (2) Graywater for toilet and urinal flushing must be dyed with either blue or
523 green food grade vegetable dye and be visibly distinct from potable water.

524

525 **13.40.120 Certified Operator of Category D Systems**

526 (a) Category D Non-single-family systems of over 2,000 gallons per day must be
527 operated by qualified personnel who meet any applicable requirements of
528 Regulation #100 the Water and Wastewater Facility Operators Certification
529 Requirements (5 CCR 1003-2).

530

531 **13.40.130 Nuisance**

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

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

539 (c) It shall be unlawful and constitute a nuisance for any person to use graywater,
540 or conduct any graywater activity, upon property located within the City for any
541 purpose except as otherwise expressly permitted this Chapter.

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

545

546 **13.40.140 Remedies for Noncompliance**

547 (a) Compliance orders. Whenever the City determines that any activity is
548 occurring which is not in compliance with a building permit and/or the

549 requirements of this Chapter, the City may issue a written compliance order to
550 the Legally Responsible Party containing a compliance schedule (Schedule).

551 (1) The Schedule shall direct specific action(s) by the Legally Responsible
552 Party including dates for the completion of the action(s). It shall be
553 unlawful for any person to fail to comply with any compliance order.

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

558 (c) Stop work orders. Whenever the City determines that any activity is occurring
559 which is not in compliance with an approved permit and/or the requirements of
560 this chapter, the City may order such activity stopped upon service of written
561 notice upon the Legally Responsible Party. Any and all work or other activity(ies)
562 under, or in reliance on a permit having issued, shall immediately stop until
563 authorized in writing by the city to proceed.

564 (1) Service shall be by hand delivery or posting the property.

565 (2) If the Legally Responsible Party cannot be located, the notice to stop
566 shall be posted in a conspicuous place upon the property where the
567 activity is occurring.

568 (3) The notice shall state the nature of the violation.

569 (4) The notice shall not be removed until the violation has been cured or
570 authorization to remove the notice has been issued by the city.

571 (5) It shall be unlawful for any person to fail to comply with a stop work
572 order.

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

581

582 13.40.150 Severability

583 (a) The provisions of this Chapter are severable. If any portion of this Chapter
584 should be declared invalid for any reason whatever, such decision shall not affect
585 the remaining portions thereof.

586

587

588

589 Introduced on first reading the ____ day of ____ 2022 and ordered published in
590 pamphlet form.

591

592 Adopted on second reading this ____ day of ____ 2022 and ordered published in
593 pamphlet form.

594

595

596 ATTEST:

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603 _____
Amy Phillips City Clerk

Anna M. Stout

President of City Council

ATTACHMENT A: GRAYWATER DESIGN CRITERIA

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1.0 Introduction

This Graywater Design Criteria document contains the minimum requirements for all Graywater Treatment Works installed in the City of Grand Junction.

2.0 Definitions

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, fruit trees, and industrial hemp as defined by C.R.S. § 35-61-101.

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

City means the City of Grand Junction, a Colorado home rule Municipality.

Closed sewerage system means either a permitted Domestic Wastewater Treatment Works, which includes a permitted and properly functioning On-site Wastewater Treatment System 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.

Commission means the Water Quality Control Commission 25-8-201, C.R.S.

Component means a subpart of a Graywater Treatment Works 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.

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 Treatment Works is designed.

Dispersed subsurface irrigation means a subsurface irrigation system including piping and emitters installed throughout an Irrigation Area.

Division means the Water Quality Control Division of the Colorado Department of Public Health and Environment.

Facility means any building, structure, or installation, or any combination thereof that uses graywater subject to a graywater control program (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.

Floodplain (100-year) means an area adjacent to a river or other watercourse which is subject to flooding as the result of the occurrence of a one hundred (100) year flood, and is so adverse to past, current or foreseeable construction or land use as to constitute a significant hazard to public or environmental health and safety or to property or is designated by the Federal Emergency Management Agency (FEMA) or National Flood Insurance Program (NFIP). In the absence of FEMA/NFIP maps, a professional engineer shall certify the floodplain elevations.

Floodway means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot or as designated by the Federal Emergency Management Agency or National Flood Insurance Program. In the absence of FEMA/NFIP maps, a professional engineer shall certify the floodway elevation and location.

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. C.R.S. 25-8-103(8.3)(a)

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. C.R.S. 25-8-103(8.4)

Irrigation area means that area of ground consisting of soil, Mulch, gravel, and plant material to which water is directly applied by a graywater subsurface irrigation system.

Indirect connection means a waste pipe from a Graywater Treatment Works that does not connect directly with the closed sewerage system, but that discharges into the closed sewerage system through an air break or air gap into a trap, fixture, receptor, or interceptor.

Legally Responsible Party

(a) For a residential property, the Legally Responsible Party is the property owner.

(b) For a corporation, the Legally Responsible Party is a responsible corporate officer, either:

(1) 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

(2) 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.

(c) For a general or limited partnership or sole proprietorship, the Legally Responsible Party is the general partner, business matters partner or the proprietor, respectively.

(d) For a limited liability company, the responsible party shall be the manager or other authorized agent of the company and shall be a natural person.

(e) For a Municipality, State, Federal, or other public agency, the Legally Responsible Party is a principal executive officer or ranking elected official, either

(1) the chief executive officer of the agency, or

(2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA), or

(3) when the entity is the State of Colorado, the Commission.

Graywater control program (Program) is this ordinance and, as applicable, any rule(s), including implementation practices, regulation(s), standard(s) authorized by the City, and which follows the minimum requirements of this Chapter and other applicable law(s), rule(s) and regulation(s).

Local public health agency means any the Mesa County Colorado Health Department.

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.

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.

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. C.R.S. 25-10-103(12)

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 people daily at least 60 days per year.

Professional engineer means an engineer licensed in accordance with section 12-25-1, C.R.S.

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.

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.

Regulation 86 means Colorado Department of Public Health and Environment Water Quality Control Commission Regulation no. 86 – Graywater Control Regulation, 5 CCR 1002-86.

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.

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 because of shape, size class, and grade (degree of distinctness).

Suitable soil means unsaturated soil in which the movement of water, air, and the growth of roots is sustained to support healthy plant life and conserve moisture. Soil criteria for graywater subsurface irrigation are further defined 6.0(b)(11)(i) of this document.

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.

State means the State of Colorado or any of its agencies.

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.

Abbreviations and Acronyms. The following meanings are associated with the acronyms used in this chapter.

| | |
|----------------|---|
| ANSI | American National Standards Institute |
| BK | Blocky |
| C.R.S. | Colorado Revised Statutes |
| CDPS | Colorado Discharge Permit System |
| FEMA | Federal Emergency Management Agency |
| gpd | gallons per day |
| GR | Granular |
| mg/L | milligrams per Liter |
| MPI | Minutes Per Inch |
| NFIP | National Flood Insurance Program |
| NSF | NSF International, formerly know as National Sanitation Foundation |
| O&M | Operations and Maintenance |
| OWTS | On-Site Wastewater Treatment System(s) |
| PR | Prismatic |

3.0 Graywater Treatment Works – Sizing Criteria

(a) Sizing Criteria for all graywater treatment works

(1) Graywater treatment works must be sized appropriately using the following flow projection methods:

(i) Residential users: Flow to graywater treatment works must be calculated on the occupancy and the fixtures connected to the

graywater treatment works. The calculated graywater flow is the number of occupants multiplied by the estimate graywater flow in terms of gpd/occupant from the attached fixtures.

(A) 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.

(B) 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.

(ii) Non-residential users: Graywater treatment works must be sized in accordance with fixture or water use records taking into account the number of fixtures attached to the graywater treatment works.

4.0 Design Criteria Applicable to All Graywater Treatment Works

(a) All graywater treatment works must meet all design requirements of this regulation and meet any additional design requirements of the Colorado Plumbing Code.

(b) At minimum, all graywater treatment works must:

(1) Be constructed such that each treatment component or combination of multiple components has a design flow greater than the calculated peak graywater production, if upstream of the storage tank or if no tank is present.

(2) Include a diversion valve that directs graywater to either the graywater treatment works or a closed sewerage system. The diversion valve must be:

(i) Easily operable;

(ii) Clearly labeled;

(iii) Constructed of material that is durable, corrosion resistant, watertight;

(iv) Designed to accommodate the inlet and outlet pipes in a secure and watertight manner; and e. Indirectly connect the bypass line to the closed sewerage system.

(3) Not have any piping that allows the treatment process(es) or a storage tank to be bypassed prior to graywater use.

(4) Include a tank to collect and store graywater, except for a subsurface irrigation system that discharges to a mulch basin. The storage tank must:

(i) Be constructed of durable, non-absorbent, water-tight, and corrosion resistant materials;

(ii) Be closed and have access openings for inspection and cleaning;

(iii) Be vented;

(iv) For indoor tanks, be vented to the atmosphere outside of the house;

(v) For outdoor tanks, have a downturned screened vent;

(vi) Have an overflow line: i. with the same or larger diameter line as the influent line; ii. without a shut off valve; iii. that is trapped to prevent the escape of gas vapors from the tank; and iv. that is indirectly connected to the closed sewerage system;

(vii) Have a valved drain line with the same or larger diameter line as the influent line that is indirectly connected to the closed sewerage system;

(viii) Be a minimum of 50 gallons;

(ix) Be placed on a stable foundation;

(x) If located outdoors, not be exposed to direct sunlight; and

(xi) Have a permanent label that states "CAUTION! NON-POTABLE WATER. DO NOT DRINK."

(5) For indoor toilet or urinal flushing systems (Categories C and D) graywater treatment works must have a backup potable water system connection. For subsurface irrigation systems (Categories A and B) graywater treatment works may, but are not required to, have a backup potable water system that provides potable irrigation water when graywater is not being produced or is produced in insufficient quantities. A backup potable water system connection must meet the following requirements:

(i) For non-public water system, potable water system connections: uncontrolled cross connections between a potable water system and

a graywater treatment works are prohibited. All cross connections must be protected by a reduced pressure principle backflow prevention zone assembly or an approved air gap.

(ii) For public water system, potable water system connections: uncontrolled cross connections between a public water system and a graywater treatment works are prohibited. The graywater treatment works design must protect the public water system from cross connections by meeting the requirements of Regulation #11: Colorado Primary Drinking Water Regulations.

(6) Not be used as a factor to reduce the design, capacity or soil treatment area requirements for OWTS or domestic wastewater treatment works.

(7) Have any wastewater from graywater treatment works (e.g., filter backwash water) be properly contained and disposed into a closed sewerage system or an approved Underground Injection Control (UIC) well.

(8) Have all graywater piping clearly distinguished and must be clearly labeled, including pipe identification and flow arrows.

(9) If located in a 100-year floodplain area, meet or exceed the requirements of FEMA and the local emergency agency. The graywater system must be designed to minimize or eliminate infiltration of floodwaters into the system and prevent discharge from the system into the floodwaters.

(10) Not be located in floodways.

(11) Be located within the confines of the legal property boundary and not within an easement;

5.0 Design Criteria for Indoor Toilet and Urinal Flushing Graywater Treatment Works

(a) All toilet and urinal flushing graywater systems must meet all design requirements of this regulation and meet any additional design requirements of the Colorado Plumbing Code.

(b) The following minimum design criteria are required for all graywater treatment works being used for single family, indoor toilet and urinal flushing graywater treatment works (Category C).

(1) All single family, indoor toilet and urinal flushing graywater treatment works must:

(i) Be certified under “Class R” of NSF/ANSI 350 Onsite Residential and Commercial Water Reuse Treatment Systems.

(ii) If a disinfection process is not part of NSF/ANSI 350-2011 equipment, include separate disinfection system equipment. For graywater treatment works that use sodium hypochlorite (bleach), the graywater treatment works must be capable of providing a free chlorine residual of 0.2 to 4.0 mg/L in the graywater throughout the indoor graywater plumbing system.

(iii) Include a dye injection system that is capable of providing a dye concentration that is visibly distinct from potable water.

(2) For Category C indoor toilet and urinal flushing graywater treatment works that are also capable of using graywater for subsurface irrigation, the system may be designed to allow graywater to be diverted to the subsurface irrigation graywater treatment works prior to the disinfection and dye process, however after the point of diversion the subsurface irrigation portion of the system must meet the requirements in section 6.0 of this document.

(c) The following minimum design criteria are required for all graywater treatment works being used for non-single family, indoor toilet and urinal flushing graywater treatment works (Category D).

(1) All non-single family, indoor toilet and urinal flushing graywater treatment works must:

(i) Be certified under “Class R” or “Class C” of NSF/ANSI 350 Onsite Residential and Commercial Water Reuse Treatment Systems. Required classification shall be dictated by the size of the graywater treatment works and if the graywater sources are residential or commercial as defined by NSF/ANSI 350.

(ii) If a disinfection process is not part of NSF/ANSI 350-2011 equipment, include a separate disinfection system equipment. A graywater treatment works must be capable of providing a free chlorine residual of 0.2 to 4.0 mg/L in the graywater throughout the indoor graywater plumbing system.

(iii) Include a dye injection system that is capable of providing a dye concentration that is visibly distinct from potable water.

(2) For Category D indoor toilet and urinal flushing graywater treatment works that are also capable of using graywater for subsurface irrigation, the system may be designed to allow graywater to be diverted to the subsurface irrigation graywater treatment works prior to the disinfection and dye process, however after the point of diversion the subsurface irrigation portion of the system must meet the requirements in Section 6.0.

(3) For graywater treatment works that have a capacity to receive greater than 2,000 gallons per day, the design must be prepared under the supervision of and submitted with the seal and signature of a professional engineer licensed to practice engineering in the State of Colorado in accordance with the requirements of the Colorado Department of Regulatory Agencies (DORA) – Division of Registrations.

6.0 Design Criteria for Subsurface Irrigation Systems

(a) All subsurface irrigation systems must meet all design requirements of this regulation and meet any additional design requirements of the Colorado Plumbing Code.

(b) The following minimum design criteria are required for all graywater treatment works 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 6.0(b)(11)(i).

(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 6-2.

(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 6-1.

Table 6-1: 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 |
| Water supply wells | 50 feet | 100 feet |
| Streams and lakes | 50 feet | 50 feet |
| Seepage Pits and cesspools | 5 feet | 5 feet |
| OWTS disposal field | 5 feet | 25 feet |
| OWTS tank | 5 feet | 10 feet |
| Domestic potable water service line | 10 feet | 10 feet |
| Public water main | 10 feet | 10 feet |

(8) Be applied to an irrigation field located on slopes of less than thirty percent (30%) from horizontal.

(9) Comply with the following protocols for determining the size of the subsurface Irrigation Area:

(i) Site evaluation protocol conducted to determine the appropriate size of the Irrigation Area for all subsurface irrigation systems, except single family dispersed subsurface irrigation systems (Category A and C dispersed subsurface irrigation systems) that are sized using the Irrigation Area equation protocol as defined in section 6.0(b)(12)(i). This site evaluation must include:

(A) Site information, including:

a. A site map; and

b. Location of proposed graywater Irrigation Area in relation to physical features requiring setbacks in Table 6-1.

(B) Soil investigation to determine long-term acceptance rate of a graywater Irrigation Area as a design basis. This soil investigation must be completed by either:

a. A visual and tactile evaluation of soil profile test pit, or

b. A percolation test.

(10) Comply with the following standards for appropriate irrigation rates.

(i) Irrigation rates shall not exceed maximum allowable soil loading rates in Table 6-2 based on the finest textured soil in the twenty-four inches (24”) of suitable soil beneath the subsurface irrigation components.

Table 6-2: 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) |
|------------------|--|-----------------------------|------------------------------------|-------------------------------|---|
| 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 |

(11) Be applied only to soils that comply with the following standards for soil suitability.

(i) 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.

(ii) 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:

Table 6-3: Mineral Aggregate 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 |

(iii) 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.

(iv) Soil types 0 and 1 must be augmented before use. Soil type 4, 4A, and 5 are not suitable for subsurface irrigation.

(12) Comply with the following protocols for determining the size of the subsurface Irrigation Area for single family, dispersed subsurface irrigation systems (Categories A and C dispersed subsurface irrigation systems):

(i) For graywater treatment works using subsurface Irrigation Areas not including mulch basins, use the following Irrigation Area equation protocol to determine the appropriate size of the Irrigation Area:

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

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

ii) For graywater treatment works using mulch basin systems for subsurface irrigation, comply with the following minimum design criteria:

(A) Mulch shall be permeable enough to allow rapid infiltration of graywater.

(B) The minimum void space mulch basin volume must be either:

a. Three (3) times the anticipated average daily flow for graywater treatment works 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 treatment works with storage tank meeting the design criteria in Section 3.0 Sizing Criteria.

(C) 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.

(D) The mulch basin must have a minimum depth of twelve inches (12") below grade and not more than twenty four (24") below grade.

(E) A filter is not required.

iii) For graywater treatment works using dispersed irrigation systems for subsurface irrigation, comply with the following minimum design criteria:

(A) 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.**

7.0 Signage Requirements

(a) All required notifications shall include posting of signs of sufficient size to be clearly read with the language below in the dominant language(s) expected to be spoken at the site.

(b) Signage for non-single family graywater treatment works (Categories B and D) shall comply with the following.

(1) A permanent warning sign must be visible at all fixtures from which graywater is collected. The signs must state that, "WATER FROM THIS FIXTURE IS REUSED. CHEMICALS, EXCRETA, PETROLEUM OILS AND HAZARDOUS MATERIALS MUST NOT BE DISPOSED DOWN THE DRAIN";

(2) Each room that contains graywater treatment works components must have a sign that says "CAUTION GRAYWATER TREATMENT WORKS, DO NOT DRINK, DO NOT CONNECT TO THE POTABLE DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM."; and

(c) Signage for non-single family, subsurface irrigation non-single family graywater treatment works (Categories B and D) shall comply with the following.

(1) Each Irrigation Area must have a sign that says "CAUTION GRAYWATER BEING USED FOR IRRIGATION. DO NOT DRINK, DO NOT CONNECT TO THE POTABLE DRINKING WATER SYSTEM."

(d) Signage for non-single family, indoor toilet or urinal flushing, non-single family graywater treatment works (Category D) shall comply with the following:

(1) Each toilet and urinal must have a sign that says: “TO CONSERVE WATER, THIS BUILDING USES TREATED NON-POTABLE GRAYWATER TO FLUSH TOILETS AND URINALS.”

8.0 Operations and Maintenance Manual.

(a) The Operations and Maintenance Manual shall be referred to as the O&M manual. The O&M manual must include the following items:

(1) A graywater treatment works description including:

(i) equipment list

(ii) design basis data including but not limited to:

(A) design volumes;

(B) design flow rates of each component and service area;

(C) system as-built drawing; and

(D) process description.

(2) Maintenance information for the graywater treatment works including but not limited to:

(i) component maintenance schedule;

(ii) instructions for component repair, replacement, or cleaning;

(iii) replacement component source list;

(iv) testing and frequency for potable containment device; and

(v) instructions for periodic removal of residuals.

(3) Operational ranges for parameters including but not limited to:

(i) disinfectant concentration levels;

(ii) filter replacement parameters;

(iii) pressure ranges;

(iv) tank level; and

(v) valve status under normal operation.

(4) Step-by-step instructions for starting and shutting down the graywater treatment works including but not limited to:

(i) valve operation;

(ii) any electrical connections;

(iii) cleaning procedures;

(iv) visual inspection; and

(v) filter installation.

(5) A guide for visually evaluating the graywater treatment works and narrowing any problem scope based on alarm activations, effluent characteristics, system operation, and history.

(6) A list of graywater control measures in which the graywater treatment works must be operated.