Onsite Wastewater Treatment System Regulation of Jefferson County Colorado

Effective May 30, 2014

Winter, South Platte River

Photo by Victor Fenhaus

ONSITE WASTEWATER TREATMENT SYSTEM REGULATION OF JEFFERSON COUNTY COLORADO

Jefferson County Public Health

These Regulations were originally adopted by the Board of Health on April 1, 1967 and subsequently amended (effective dates) on:

November 10, 1973
December 6, 1974,
December 5, 1977,
June 20, 1980,
July 1, 1986,
August 1, 1995,
November 17, 1998,
July 4, 2003,
August 4, 2007 and

May 30, 2014

Jefferson County Board of Health

Bonnie McNulty, *President*

Maureen Sullivan, *Vice President*

Beverly Dahan, *Secretary*

Greg Deranleau

Linda Reiner

Amanda B. Cruser, Esq., Counsel for the Board

* * * * * * *

Jefferson County Public Health

645 Parfet Street, Lakewood CO 80215

Mark B. Johnson, MD, MPH
Executive Director

James Rada, REHS
Director, Environmental Health Services Division

* * * * * * *

***OUR MISSION**: "To create, promote and enhance health and vitality through innovation, collaboration, and celebration."*

TABLE OF CONTENTS

SECTION 1 – DECLARATION **Page**
1.0 Declaration 1
1.1 Purpose 1
1.2 Authority 1
1.3 Applicability 1
1.4 Severability and Savings Clause 1

SECTION 2 – DEFINITIONS, ABBREVIATIONS AND ACRONYMS **Page**
Definitions 3
Abbreviations and Acronyms 16

SECTION 3 - GENERAL REQUIREMENTS AND PROHIBITIONS **Page**
3.0 General Requirements 17
3.1 Design Capacity 17
3.2 Discharge to State Waters 17
3.3 Inspections and Right-of-Entry 18
3.4 Septage Disposal 18
3.5 Surface Activity 18
3.6 General Prohibitions 18
3.7 Materials Incorporated by Reference 19

SECTION 4 - PERMIT APPLICATION REQUIREMENTS AND PROCEDURES **Page**
4.0 Applicability 21
4.1 Minimum Application Requirements 21
4.2 Minimum Building Site Size Requirements 21
4.3 Access to Site 22
4.4 Site and System Identification 23
4.5 Easements 23
4.6 Preliminary Site Investigation 23
4.7 Application Review and Permit Issuance 24
4.8 Denial of a Permit 24
4.9 Changes in Plans or Specifications 24
4.10 Changes in Terms or Conditions after Permit Issuance 24
4.11 Inspections 25
4.12 Engineer Certification of Installations 25
4.13 Disclaimer 26

SECTION 5 - BOARD OF HEALTH ADMINISTRATIVE PROCEDURES **Page**
5.0 Variance Procedure from the Requirements of These Regulations 27
5.1 Variance Procedure from the Requirements of Regulation 43 for Repair Permits 27
5.2 Outcome of the Variance Proceeding 28
5.3 Review Procedures 28
5.4 Prohibition of System Installation in Unsuitable Areas 28
5.5 Conceptual Approvals 28

5.6 Hearing Procedures 29
5.7 Review of Applications Denied by the Health Officer 29
5.8 Reconsideration of Applications Denied by the Board of Health 29
5.9 Findings on Appeal 29
5.10 Appeal of Board Decisions 30

SECTION 6 – ENFORCEMENT **Page**
6.0 Cease and Desist Orders 31
6.1 Repair Permits 31
6.2 Penalties 32

SECTION 7 - SYSTEM CONTRACTORS AND OWNER INSTALLERS **Page**
7.0 General Requirements for Systems Contractors 33
7.1 Requirements for Owner-Installers 34

SECTION 8 - SYSTEM CLEANERS **Page**
8.0 General Requirements for Systems Cleaners 35
8.1 Pumping Requirements 35

SECTION 9 - EXPERIMENTAL SYSTEMS **Page**
9.0 General Requirements 37

SECTION 10 - USE PERMITS **Page**
10.0 Applicability 39
10.1 Application Requirements 39
10.2 Minimum Criteria for Approval of a Use Permit 39
10.3 Issuance of a Use Permit 40
10.4 Waiver of a Use Permit 40
10.5 Renewal of a Use Permit 41
10.6 Revocation of a Use Permit 41
10.7 Penalties 41

SECTION 11 - OPERATING PERMITS **Page**
11.0 Applicability 43
11.1 Minimum Application Requirements 43
11.2 Operating Permit Requirements 43
11.3 Inspection and Maintenance Requirements 44
11.4 Renewal of an Operating Permit 45
11.5 Penalties 45
11.6 Service Provider Requirements 45

SECTION 12 - SITE CHARACTERIZATION AND DESIGN REQUIREMENTS **Page**
12.0 Site and Soil Evaluation 47
12.1 Preliminary Investigation 47
12.2 Reconnaissance Visit 48
12.3 Detailed Soil Investigation 48

12.4 Percolation Tests 48
12.5 Visual and Tactile Evaluation of Soil Requirements 51
12.6 Determination of a Limiting Layer 51
12.7 Percolation Hole and Profile Test Pit Marking 52
12.8 Report and Site Plan 52
12.9 Design Document 53
12.10 Site Protection 54
12.11 Qualifications for a Competent Technician 54

SECTION 13 - WASTEWATER FLOW AND STRENGTH **Page**
13.0 Wastewater Flows 55
13.1 Single-Family Residential Homes 55
13.2 Non-Residential Auxiliary Buildings 55
13.3 Multi-Family and Commercial On-site Wastewater Treatment Systems 56
13.4 Flow Equalization 56
13.5 Wastewater Strength 57

SECTION 14 - COMPONENT DESIGN STANDARDS **Page**
14.0 General Standards 59
14.1 Accessibility for Inspection, Maintenance, and Servicing 59
14.2 Component Operating Instructions 59
14.3 Distribution Boxes 60
14.4 Drop Boxes 60
14.5 Electrical Equipment 60
14.6 Floats and Switches 60
14.7 Floor Drains 60
14.8 Grease Interceptor Tanks 60
14.9 Indicators of Capacity 61
14.10 Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus 61
14.11 Oil / Water Separators 61
14.12 Pipe Standards and Bedding Requirements 61
14.13 Plumbing Codes 62
14.14 Sampling Access 62
14.15 Sewer Lines 62
14.16 Step-down / Relief Lines 63
14.17 Wastewater Pumping Systems 63
14.18 Water Meters 63

SECTION 15 - SEPTIC TANKS **Page**
15.0 Liquid Capacities for Septic Tanks 65
15.1 Concrete Tank Structural Design 65
15.2 Fiberglass, Fiberglass-Reinforced Polyester and Plastic Tank Structural Design 65
15.3 Metal Tanks 66
15.4 Identification and Data Marking 66
15.5 Watertightness Requirements 66
15.6 Watertightness Testing Methods 66

15.7 Proportions of Septic Tanks 67
15.8 Installation of Septic Tanks 67
15.9 Anchoring of Tanks 68
15.10 Effluent Screens 68
15.11 Dosing Requirements 69
15.12 Dose Calculation 69
15.13 Location of Dosing Siphon or Pump 69
15.14 Dosing Siphon or Pump Discharge Piping 69
15.15 Dosing Siphon or Pump Access 70
15.16 Splice Boxes 70
15.17 Pump System Controls 70

SECTION 16 - SOIL TREATMENT AREAS **Page**
16.0 General Requirements 71
16.1 Calculation of Infiltrative Surface of Soil Treatment Area 71
16.2 Allowable Soil Treatment Area Reductions and Increases 71
16.3 Design of Soil Treatment Areas – General Requirements 71
16.4 Distribution Lines 73
16.5 Inspection Ports 73
16.6 Trenches 73
16.7 Beds 74
16.8 Serial and Sequential Distribution 74
16.9 Storage / Distribution Media 74
16.10 Pressure Distribution 75
16.11 Drip Distribution Systems 75
16.12 Evaporation and Evapotranspiration / Absorption Systems 76
16.13 Sand Filters – Unlined 77
16.14 Sequencing Zone Systems 77
16.15 Seepage Pits 77
16.16 Repairs to Existing Systems 77

SECTION 17 - HIGHER LEVEL TREATMENT SYSTEMS **Page**
17.0 General Requirements 81
17.1 Treatment Levels for Higher Level Treatment Systems 81
17.2 Lined Sand Filters – General Requirements 82
17.3 Lined Sand Filters – Single Pass 82
17.4 Lined Sand Filters – Recirculating 82
17.5 Mounded Sand Filters (Mound Systems) 82

SECTION 18 - ALTERNATE DISPOSAL SYSTEMS **Page**
18.0 General Requirements 85
18.1 Chemical Toilets 85
18.2 Composting Toilets 85
18.3 Incinerating Toilets 86
18.4 Pit (non-vaulted) Privies 86
18.5 Rock Plant Filters (Constructed Wetlands) 86

18.6 Vaults 86
18.7 Vaulted Privy 87
18.8 Wastewater Ponds 87
18.9 Other Treatment Systems 87

SECTION 19 - SYSTEM MAINTENANCE AND ABANDONMENT **Page**

19.0 Responsibility 89
19.1 Maintenance and Cleaning 89
19.2 Monitoring and Sampling 89
19.3 Disposal of Waste Materials 90
19.4 Termination of Use of System 90

APPENDICES **Page**

A Minimum Separation Distances 91
B Tables of Wastewater Flows and Strength 95
C Long Term Acceptance Rates 99
D Guidelines for Distance Reductions 101
E Summary of Treatment Level Options 105
F Regulatory Citations and Third Party Standards 107

TABLES **Page**

4-1 Minimum Building Site Sizes 22
13-1 Minimum Single-Family Residential Design Flows 55
13-2 Treatment Levels and Wastewater Strength 57
15-1 Minimum Septic Tank Size 65
16-1 Size Adjustment Factors for Application Methods in STA 72
16-2 Size Adjustment Factors for Types of Distribution Media in STA Accepting Treatment Level 1 Effluent 72
16-3 Minimum Vertical Separation between STA Infiltrative Surface and High Groundwater Surface or Bedrock 73
16-4 Gradation of Wicking Sand for Evapotranspiration Beds 77
17-1 Treatment Levels for Public Domain Higher Level Treatment Systems 81
19-1 Maintenance Recommendations 89
A-1 Minimum Horizontal Distance in feet between components of an OWTS and Water, Physical and Health Impact Features 92
B-1 Wastewater Flow and Strength for Single or Multi-Family Dwellings 95
B-2 Wastewater Flow and Strength for Single or Multi Family Dwellings (Fixture Flow) 95
B-3 Wastewater Flow and Strength For Non-Residential of Commercial Facilities 95

FIGURES **Page**

Figure 1 Determination of 200-foot Minimum Separation Distance Between Deep-Grouted Well and STA 102

INDEX 109

This page intentionally left blank.

Jefferson County Public Health	**DECLARATION**	**Section 1**

1.0 Declaration

In order to preserve the environment and protect the public health and water quality; to eliminate and control causes of disease, infection, and aerosol contamination; and to reduce and control the pollution of the air, land and water, the Jefferson County Board of Health declares it to be in the public interest to establish minimum standards and regulations for On-site Wastewater Treatment Systems (OWTS) in Jefferson County Colorado and to provide the authority for the administration and enforcement of such minimum standards and regulations.

1.1 Purpose

The purpose of these Regulations as authorized by the OWTS Act is to establish minimum standards for the location, design, construction, performance, installation, alteration and use of OWTS within Jefferson County Colorado, including but not limited to permit application requirements; requirements for issuing permits; the inspection, testing, and supervision of installed systems; the maintenance and cleaning of systems; the disposal of waste material and the issuance of cease and desist orders.

1.2 Authority

These Regulations are promulgated pursuant to the On-site Wastewater Treatment System Act, §25-10-101, et seq. C.R.S.

1.3 Applicability

These Regulations shall apply to all OWTS as defined in §25-10-103 (12), C.R.S.

1.4 Severability and Savings Clause

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

This page intentionally left blank.

"Absorption system" means a leaching field and adjacent soils or other system for the treatment of sewage in an On-site Wastewater Treatment System by means of absorption into the ground. See *Soil treatment area*.

"Applicant" means a person who submits an application for a permit for an On-site Wastewater Treatment System.

"Bed" means a below-grade soil treatment area consisting of a shallow excavation greater than three feet wide containing distribution media and more than one lateral.

"Bedrock" means continuous rock that underlies the soil or is exposed at the surface. Bedrock is generally considered impervious, but if fractured or deteriorated, it may allow effluent to pass through without adequate treatment.

"Biochemical Oxygen Demand, Five-Day" (BOD_5) means quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting, or treating biodegradable organic matter under aerobic conditions over a five-day incubation period; expressed in milligrams per liter (mg/L).

"Biochemical Oxygen Demand, Carbonaceous Five Day" ($CBOD_5$) means quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting, or treating the organic matter under aerobic conditions over a five-day incubation period while in the presence of a chemical inhibitor to block nitrification; expressed in milligrams per liter (mg/L).

"Blasting" means the use of explosives or blasting agents.

"Board of Health" means the Board of Health for Jefferson County Colorado.

"Carbonaceous Biochemical Oxygen Demand" See *Biochemical Oxygen Demand, Carbonaceous*

"Cesspool" means an unlined or partially lined underground pit or underground perforated receptacle into which raw household wastewater is discharged and from which the liquid seeps into the surrounding soil. Cesspool does not include a septic tank.

"Chamber" means an open, arch-shaped structure providing an open-bottom soil interface with permeable sidewalls used for distribution of effluent in a soil absorption system.

"Cistern" means a watertight, covered receptacle of nontoxic, food-grade material designed to store potable water.

"Cleaning" means the act of removing septage or other wastes from a wastewater treatment system component or grease/waste from a grease interceptor.

"Colorado Plumbing Code" means Examining Board of Plumbers Rules and Regulations (3 CCR 720-1).

"Commission" means the Water Quality Control Commission created by §25-8-201, C.R.S.

"Competent technician" means a person designated by the Department who is able to conduct and interpret the results of soil profile test pit excavations, profile holes, percolation tests, and site evaluations.

"Component" means a subsection of an On-site Wastewater Treatment System; a component may include multiple devices.

"Composting toilet" means self-contained waterless toilet designed to decompose non-water-carried human wastes through microbial action and store the resulting matter for disposal.

"Consistence" means the degree and kind of cohesion and adhesion that soil exhibits and/or the resistance of soil to deformation or rupture under an applied stress.

"Covered transaction" means the transfer, sale, conveyance or change in ownership of any real property served by an onsite wastewater treatment system, excluding the following:

A. change in ownership solely to include or exclude a spouse or children;

B. transfer subject to life estate;

C. transfer to effect foreclosure or forfeiture of real property, (does not include the subsequent sale of the foreclosed property after being titled to the foreclosing entity);

D. transfer by redemption from a tax sale (does not include the subsequent sale of the property after being titled to the redeeming entity);

E. transfer creating or ending joint ownership if at least one person is an original owner of the property and / or his or her spouse or children;

F. transfer of property containing premises that have been demolished or are otherwise uninhabitable;

G. transfer for the vacation or granting of a public right of way;

H. transfer from a person to a trust or to themselves as trustee(s) of a trust estate;

I. properties with onsite wastewater treatment systems that have never been used; and

J. new homes that have not yet been occupied.

"Crest" means the highest point on the side of a dry gulch or cut bank.

"Deep gravel system" means a soil treatment area for repairs only where the trenches utilize a depth of gravel greater than six inches below the distribution line and sidewall area is allowed according to a formula specified in these Regulations.

"Department" means the Jefferson County Public Health Department and its employees.

"Design" means

A. the process of selecting, sizing, locating, specifying, and configuring treatment train components that match site characteristics and facility use as well as creating the associated written documentation; and

B. written documentation of size, location, specification and configuration of a system.

"Design capacity" See *Flow, design*

"Design flow" See *Flow, design*

"Designer, on-site wastewater treatment system" means a practitioner who utilizes site evaluation and investigation information to select an appropriate OWTS and prepares a design document in conformance with these Regulations.

"Distribution" means the process of conveying wastewater or effluent to one or more components, devices, or throughout a soil treatment area.

"Distribution box" means a watertight component that receives effluent from a septic tank or other treatment unit and distributes effluent via gravity in approximately equal portions to two or more trenches or two or more laterals in the soil treatment area.

"Division" means the division of administration of the department of which the Water Quality Control Division is a part.

"Domestic wastewater" See *Wastewater, domestic.*

"Domestic Wastewater Treatment Works" means a system or facility for treating, neutralizing, stabilizing, or disposing of domestic wastewater which system or facility has a designed capacity to receive 2,000 gallons of domestic wastewater per day or more. The term "domestic wastewater treatment works" also includes appurtenances to such system or facility such as outfall sewers and pumping stations and to equipment related to such appurtenances but does not include industrial wastewater treatment plants or complexes whose primary function is the treatment of industrial wastes, notwithstanding the fact that human wastes generated incidentally to the industrial process are treated therein, per §25-8-103 (5), C.R.S.

"Dosing" means a high rate periodic discharge into a soil treatment area.

"Dosing, demand" means configuration in which a specific volume of effluent is delivered to a component based upon patterns of wastewater generation from the source.

"Dosing, pressure" means delivery of effluent under pressure to a component, device or to a soil treatment area for even distribution.

“Dosing, timed” means a configuration in which a specific volume of effluent is delivered to a component based upon a prescribed interval, regardless of facility water use.

“Dosing siphon” means a device used for demand dosing effluent; which stores a predetermined volume of water and discharges it at a rapid rate, from a tank at a given elevation to a component at a lower elevation, accomplished by means of atmospheric pressure and the suction created by the weight of the liquid in the conveying pipe.

“Dosing tank” means a tank, compartment or basin that provides for storage of effluent from a septic tank or other treatment unit intended to be delivered to a soil treatment area at a high rate periodic discharge.

“Drainfield” See *Soil treatment area*

“Dripline” or “Drip line” *See Drip tubing*

“Distribution, drip” means the application of effluent over an infiltrative surface via pressurized emitters and associated devices and parts (pump, filters, controls, and piping).

“Drip emitter” means a drip distribution device that dispenses effluent to the infiltrative surface at a predictable rate.

“Drip tubing” means small diameter flexible plastic tubing manufactured with emitters uniformly spaced along its length. See also *Drip emitter*

“Drop box” means a device used for serial or sequential distribution of effluent by gravity flow to a lateral of a soil treatment area.

“Dry gulch” See *Gulch, dry*

“Drywell” means an unlined or partially lined underground pit (regardless of geometry) into which drainage from roofs, basement floors, water softeners or other non-wastewater sources is discharged and from which the liquid seeps into the surrounding soil.

“Effective Size” means the size of granular media such that not more than 10 percent by weight of the media is finer than the size specified.

“Effluent” means the liquid flowing out of a component or device of an On-site Wastewater Treatment System.

“Effluent filter” See *Effluent screen*

“Effluent line” means non-perforated pipe that conveys effluent from one On-site Wastewater Treatment System component to the next.

“Effluent screen” means a removable, cleanable (or disposable) device installed on the outlet piping of a septic tank for the purpose of retaining solids larger than a specific size and/or modulating effluent flow rate. An effluent screen may be a component of a pump installation. An effluent screen may also be installed following the septic tank but before higher level treatment components or a soil treatment area.

“Evapotranspiration/absorption system” means an unlined On-site Wastewater Treatment component that uses evaporation, transpiration, and absorption for dispersal of effluent.

“Evapotranspiration system” means an On-site Wastewater Treatment component with a continuous, impermeable liner that uses evapotranspiration and transpiration for dispersal of effluent.

“Experimental system” means a design or type of system based upon improvements or development in the technology of sewage treatment that has not been fully tested.

“Failure” means damage to a system component, structural member or connection.

“Floodplain (100-year)” means an area adjacent to a stream which is subject to flooding as the result of the occurrence of a 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 flood plain elevations.

”Floodway” means the channel of a river or other watercourse and the adjacent land areas that shall 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 (FEMA) or National Flood Insurance Program. In the absence of FEMA/NFIP maps, a professional engineer shall certify the floodway elevation and location.

“Flow, daily” means the measured volume of wastewater generated from a facility in a 24-hour period expressed as gallons per day.

“Flow, design” means the estimated volume of wastewater per unit of time for which a component or system is designed. Design flow may be given in the estimated volume per unit such as person per unit time that shall be multiplied by the maximum number of units that a facility can accommodate over that time.

“Flow equalization” means a system configuration that includes sufficient effluent storage capacity to allow for regulated flow on a daily or multi-day basis to a subsequent component despite variable flow from the source.

“Flow equalizer” means an adjustment device to evenly distribute flow between outlets in a distribution box or other device that may be out of level.

“Grease interceptor tank” means a watertight device located outside a facility designed to intercept, congeal, and retain or remove fats, oils, and grease from sources such as commercial food-service that will generate high levels of fats, oils and greases.

“Ground water” means that part of the subsurface water that is at or below the saturated zone.

“Ground water surface” means the uppermost limit of an unconfined aquifer at atmospheric pressure.

“Guidelines” means State Board of Health Guidelines on Onsite wastewater treatment systems, (5 CCR 1003-6) – predecessor of Regulation 43, On-site Wastewater Treatment System Regulation (5 CCR 1002-43).

“Gulch, dry” means a deep, narrow ravine marking the course of an intermittent or ephemeral stream.

“Health officer” means the chief administrative and executive officer of Jefferson County Public Health or their designated representative.

“Higher level treatment” means designated treatment levels other than Treatment Level 1.

“Higher level treatment unit” means a device or component designed, installed and operated for the purpose of producing higher level treatment.

“Individual sewage disposal system” or “ISDS” means a term used for On-site Wastewater Treatment System in Colorado regulations from 1973 until 2013.

“Infiltrative surface” means the designated interface where effluent moves from distribution media or a distribution device into soil.

“Inspection port” means an access point in a system component that enables inspection, operation and/or maintenance.

“Invert” means elevation of the bottom of the inside pipe wall or fitting.

“**Landscape position”** means the specific geomorphic component of the landscape in which a site is located; two-dimensional landscape positions may be summit, shoulder, backslope, sideslope, footslope, or toeslope; three dimensional views of geomorphic landscape position can be described as headslope, noseslope, sideslope, base slope, etc.

“Lateral” means pipe, tubing or other conveyance used to carry and distribute effluent.

“Leach field” See *Soil treatment area*

“Limiting condition” or “Limiting layer” means a layer with low permeability, ground water surface or other condition that restricts the treatment capability of the soil.

“Limited occupancy” means the occupancy of a structure or dwelling as a residence on less than a full-time, year round basis, i.e. no more than 90 consecutive days or a total occupancy of 120 days per year

“Liner” means an impermeable synthetic or natural material used to prevent or restrict infiltration and/or exfiltration.

“Long-term acceptance rate” or “LTAR” means design parameter expressing the rate that effluent enters the infiltrative surface of the soil treatment area at equilibrium, measured in volume per area per time, e.g. gallons per square foot per day (gal / sq. ft. /day).

“Malfunction” means the condition in which a component is not performing as designed or installed.

“Manufactured media” See *Media, manufactured*

“Media” means solid material that can be described by shape, dimensions, surface area, void space, and application.

“Media, manufactured” means a synthetic media for distribution such as polystyrene blocks or beads or plastic grids.

“Media, treatment” means non-or slowly-degradable media used for physical, chemical, and/or biological treatment in an On-site Wastewater Treatment System component.

“Mound” or **“Mounded Sand Filter”** means an above-grade soil treatment area designed and installed with at least 12 inches of clean sand between the bottom of the infiltrative surface and the original ground elevation; that utilizes pressure distribution and includes a final cover of suitable soil to stabilize the surface and support vegetative growth.

“Nitrogen reduction” means a minimum 50 percent reduction of influent nitrogen strength which is the minimum objective of NSF/ANSI Standard 245 - Wastewater Treatment Systems - Nitrogen Reduction.

“On-Site Wastewater Treatment System” or **"OWTS"** and, where the context so indicates, the term **"system"** 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.

“Operating Permit” means a renewable permit that addresses specific operation and/or maintenance requirements for an existing OWTS that includes mechanical or electrical treatment components, or a system that is designed to meet specific wastewater treatment levels as set forth in these Regulations.

“OWTS Act” means the On-site Wastewater Treatment System Act, §25-10-101, et seq. C.R.S.

"Owner" means the owner of record of a property.

"Percolation test" means a subsurface soil test at the depth of a proposed absorption system or similar component of an OWTS 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.

"Performance standard" means minimum performance criteria for water quality and operation and maintenance established by the regulatory authority to ensure compliance with the public health and environmental goals of the state or public health agency.

"Permeability" means the property of a material which permits movement of water through the material.

"Permit" means a permit for the construction or alteration, installation, and use or for the repair of an On-site Wastewater Treatment System.

"Person" means an individual, partnership, firm, corporation, association, or other legal entity and also the State, any political subdivision thereof, or other governmental entity.

"Potable spring" means a spring used to provide drinking water.

"Pressure distribution" means application of effluent over an infiltrative surface via pressurized orifices and associated devices and parts (including pump, filters, controls, and piping).

"Privy" means an above grade structure allowing for the disposal of excreta not transported by a sewer and which provides privacy and shelter and prevents access to the excreta by flies, rodents, or other vectors. Pit privies have an unlined excavation for disposal of excreta; vaulted privies have a water-tight concrete receptacle to hold excreta until removed for disposal.

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

"Professional geologist" means a person who is a graduate of an institution of higher education which is accredited by a regional or national accrediting agency, with a minimum of 30 semester or 45 quarter hours of undergraduate or graduate work in a field of geology and whose post-baccalaureate training has been in the field of geology with a specific record of an additional five years of geological experience to include no more than two years of graduate work as set forth in §23-41-208, C.R.S. and §34-1-201, C.R.S.

"Proprietary product or technology" means a manufactured component or other product that is produced by a private person. It may be protected by patent, trademark or copyright.

"Public domain technology" means a system that is assembled on location from readily available components and is based on well-established design criteria and is not protected by patent, trademark or copyright.

"Public water system" means a system that provides potable water that is approved and regulated by the State Health Department.

"Redoximorphic" means a soil property that results from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and subsequent desaturation.

"Regulation 43" means the On-Site Wastewater Treatment System Regulation of the State of Colorado (5 CCR 1002-43).

"Restrictive layer" means horizon or condition in the soil profile or underlying strata that restricts movement of fluids. A restrictive layer may constitute a limiting soil/site condition.

"Riser" means a watertight vertical cylinder and lid allowing access to an OWTS component for inspection, cleaning, maintenance, or sampling.

"Rock-plant filter" means a designed system which utilizes treatment media and various wetland plants to provide treatment of wastewater through biological, physical, and chemical processes. Also called a constructed wetland.

"Sand filter" means a system that utilizes a layer of specified sand as filter and treatment media and pressure distribution.

"Sand filter, lined" means a sand filter designed for higher level treatment that has an impervious liner and under-drain below the sand layer. Lined sand filters may be intermittent / single pass where the effluent is distributed over the sand bed a single time before distribution to a soil treatment area, or recirculating where part of the effluent is returned to an earlier component for additional treatment before distribution to a soil treatment area.

"Sand filter, unlined" means a layer of sand used as a sand filter without a liner between the sand and the existing soil on which it is placed.

"Seepage pit" means an excavation deeper than it is wide that receives septic tank effluent and from which the effluent seeps from a structural internal void into the surrounding soil through the bottom and openings in the side of the pit.

"Septage" means a liquid or semisolid that includes normal household wastes, human excreta, and animal or vegetable matter in suspension or solution generated from a residential septic tank system. Septage may include such material issued from a commercial establishment if the commercial establishment can demonstrate to the Division that the material meets the definition for septage set forth in this subsection. Septage does not include chemical toilet residuals.

"Septic tank" means a watertight, accessible, covered receptacle designed and constructed to receive sewage from a building sewer, settle solids from the liquid, digest organic matter, store

digested solids through a period of retention, and allow the clarified liquids to discharge to other treatment units for final disposal.

"Sequential distribution" means a distribution method in which effluent is loaded into one trench and fills it to a predetermined level before passing through a relief line or device to the succeeding trench. The effluent does not pass through the distribution media before it enters succeeding trenches.

"Serial distribution" means a distribution method in which effluent is loaded into one trench and fills it to a predetermined level before passing through a relief line or device to the succeeding trench. The effluent passes through the distribution media before entering succeeding trenches which may be connected to provide a single uninterrupted flow path.

"Service provider" means a person engaged in the business of servicing and maintaining higher-level treatment units. Service providers shall hold a current NAWT Operation and Maintenance credential (Parts 1 and 2), or equivalent. A property owner who meets these requirements may act as a service provider for their own higher level treatment system.

"Sewage" means a combination of liquid wastes that may include chemicals, house wastes, human excreta, animal or vegetable matter in suspension or solution, and other solids in suspension or solution, and that is discharged from a dwelling, building, or other establishment. See also *Wastewater*

"Sewage treatment works" has the same meaning as "domestic wastewater treatment works" under §25-8-103, C.R.S.

"Site evaluation" means a comprehensive analysis of soil and site conditions for an OWTS.

"Slit trench latrine" means a temporary shallow trench for use as disposal of non-water-carried human waste.

"Soil" means

A. unconsolidated mineral and/or organic material on the immediate surface of the earth that serves as a medium for the growth of plants and can potentially treat wastewater effluent;

B. unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of:

    1. pedogenic and environmental factors of climate (including water and temperature effects), and

    2. macro and microorganisms, conditioned by relief, acting on parent material over a period of time.

"Soil evaluation" means a percolation test, soil profile, or other subsurface soil analysis at the depth of a proposed soil treatment area or similar component or system 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 or as an application rate of gallons per square foot per day.

"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 or treatment of effluent.

"Soil morphology" means:

A. physical constitution of a soil profile as exhibited by the kinds, thickness, and arrangement of the horizons in the profile; and by the texture, structure, consistence, and porosity of each horizon; and

B. visible characteristics of the soil or any of its parts.

"Soil profile test pit excavation" 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 an On-site Wastewater Treatment System.

"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).

"Soil texture" means proportion by weight of sand, silt, and clay in a soil.

"Soil treatment area" or **"STA"** means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drain fields and drip fields.

"Soil treatment area, alternating" means final treatment and distribution component that is composed of two soil treatment areas that are independently dosed.

"Soil treatment area, sequencing" means a soil treatment area having more than two sections that are dosed on a frequent rotating basis.

"Spring" means groundwater seeping out of the earth where the water table intersects the ground surface. Also see *Potable spring*

"State" means the State of Colorado.

"State health department" means the Colorado Department of Public Health and Environment.

"State Waters" has the meaning set forth under §25-8-103, C.R.S.

"Strength, wastewater" means the concentration of constituents of wastewater or effluent; usually expressed in mg/L.

"Suitable soil" means a soil which will effectively treat and filter effluent by removal of organisms and suspended solids before the effluent reaches any highly permeable earth such as joints in bedrock, gravels, or very coarse soils and which meets percolation test or soil test pit excavation requirements for determining the LTAR and has a vertical thickness of at least four feet below the bottom of the soil treatment area unless the treatment goal is met by other performance criteria.

"Suspended-growth process" means a method of wastewater treatment wherein the microorganisms responsible for treatment are maintained in suspension within the wastewater.

"Systems cleaner" means a person engaged in and who holds himself or herself out as a specialist in the cleaning and pumping of On-site Wastewater Treatment Systems and removal of the residues deposited in the operation thereof.

"Systems contractor" means a person engaged in and who holds himself or herself out as a specialist in the installation, renovation, and repair of On-site Wastewater Treatment Systems.

"Third Party Standard" means a technical standard developed by an independent, nongovernmental organization that is used for the testing and evaluation of products or services. Examples of such organizations include NSF, ANSI and ASTM.

"Total suspended solids" means a measure of all suspended solids in a liquid; typically expressed in mg/L.

"Treatment media" See *Media, treatment*

"Treatment level" or "TL" means defined concentrations of pollutants to be achieved by a component or series of components of an OWTS.

"Treatment unit" means a component or series of components where solids or pollutants are removed from wastewater or effluent from a preceding component.

"Trench" means:

A. a below-grade soil treatment area consisting of a shallow excavation with a width of three feet or less containing distribution media and one lateral; and

B. an excavation for placement of piping or installation of electrical wire or conduit.

"Uniformity coefficient" means a value which is the ratio of D^{60} to D^{10} where D^{60} is the soil diameter of which 60 percent of the soil weight is finer and D^{10} is the corresponding value at 10 percent finer. Soil having a uniformity coefficient smaller than four would be considered "uniform" for purposes of these Regulations.

"Use permit" means a document issued by the Department for a covered transaction, approving the continued use of an existing OWTS.

"Use permit inspector" means a person engaged in the business of inspecting OWTS and who is a registered professional engineer, NAWT or NSF-certified onsite wastewater inspector, or equivalent.

"Vault" means a watertight, covered receptacle, which is designed to receive and store excreta or wastes either from a building sewer or from a privy and is accessible for the periodic removal of its contents. If the vault is intended to serve a structure or structures that are projected to generate a domestic wastewater flow of 2,000 gallons per day or more at full occupancy, the vault is a domestic wastewater treatment works. Vaults are On-site Wastewater Treatment Systems.

"Visual and tactile evaluation of soil" means determining the properties of soil by standardized tests of appearance and manipulation in the hand.

"Volume, effective" means the amount of effluent contained in a tank under normal operating conditions; for a septic tank, effective volume is determined relative to the invert of the outlet; for a dosing tank, effective volume under normal conditions is determined relative to the invert of the inlet and the control off level.

"Wastewater, domestic" means combination of liquid wastes (sewage) which may include chemicals, household wastes, human excreta, animal or vegetable matter in suspension or solution, or other solids in suspension or solution which are discharged from a dwelling, building or other structure.

"Wastewater, high strength" means

A. influent having BOD_5 greater than 300 mg/L; and/or TSS greater than 200 mg/L; and/or fats, oils, and grease greater than 50 mg/L entering a pretreatment component (as defined by NSF/ANSI Standard 40 testing protocol); and

B. effluent from a septic tank or other pretreatment component that has BOD_5 greater than 170 mg/L; and/or TSS greater than 60 mg/L; and/or fats, oils, and grease greater than 25 mg/L and is applied to an infiltrative surface.

"Water Quality Control Commission" See *Commission*

"Water Quality Control Division" See *Division*

"Water supply" means the type and source of the water supply for a building site that may consist of a well, public water system or a cistern.

"Well" means any excavation that is drilled, cored, bored, washed, fractured, driven, dug, jetted or otherwise constructed for the acquisition of groundwater for beneficial use, including infiltration galleries permitted as wells by the Division of Water Resources.

"Wetland, constructed" See *Rock-plant filter*

"Wetlands" means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	ASTM International
BOD	Biochemical Oxygen Demand
C.R.S.	Colorado Revised Statutes
CBOD	Carbonaceous Biochemical Oxygen Demand
CCR	Code of Colorado Regulations
CSA	Canadian Standards Association
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GPD	gallons per day
IAPMO	International Association of Plumbing and Mechanical Officials
ISDS	Individual sewage disposal system (former term)
LTAR	Long-term Acceptance Rate
Mg/L	Milligrams per Liter
MPI	Minutes per Inch
NAWT	National Association of Wastewater Technicians
NSF	NSF International
O&M	Operation and Maintenance
OWTS	On-site Wastewater Treatment System (current term)
STA	Soil Treatment Area
TL	Treatment Level
TN	Total Nitrogen
TSS	Total Suspended Solids
UL	Underwriters Laboratories, Inc.

3.0 General Requirements

A. The owner of any structure where people live, work, or congregate that is not connected to a sewage treatment works shall ensure that the structure contains a functional toilet, lavatory, tub or shower that are connected to an OWTS. This requirement does not apply to dwellings used for limited occupancy as defined by these Regulations or as otherwise determined by the local building code.

B. Sewage or effluent shall not be discharged upon the surface of the ground or into surface waters unless it meets the minimum requirements of the Colorado Water Quality Control Commission.

C. A permit shall be required for the expanded use of an OWTS. The OWTS shall be replaced or modified to handle the increased design flow unless it is determined that the existing system is adequately designed and constructed for the higher design flow rate.

3.1 Design Capacity

A. An OWTS with design capacity less than 2,000 GPD shall comply with these Regulations and the OWTS Act, which shall govern all aspects of OWTS permits, performance, location, construction, alteration, installation, and use.

B. An OWTS with design capacity equal to or greater than 2,000 GPD shall comply with these Regulations, site location and design approval in §25-8-702, C.R.S., and the discharge permit requirements in the Water Quality Control Act, §25-8-501, C.R.S., et seq. Applicable Commission regulations include, but are not limited to, the following Regulations:

1. Regulation 22 - Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works (5 CCR 1002-22);
2. Regulation 41 - The Basic Standards for Ground Water (5 CCR 1002-41);
3. Regulation 42 - Site-Specific Water Quality Classifications and Standards for Ground Water (5 CCR 1002-42);
4. Regulation 61 - Colorado Discharge Permit System Regulations (5 CCR 1002-61); and
5. Regulation 62 - Regulations for Effluent Limitations (5 CCR 1002-62).

C. The requirements for maintenance and standards of performance for systems equal to or greater than 2,000 GPD shall be determined by the site application approval and discharge permit.

3.2 Discharge to State Waters

A. Any system that will discharge into surface waters shall be designed by a professional engineer. The discharge permit application shall be submitted for preliminary approval to the Board of Health.

B. Once approved by the Board of Health, the application shall be submitted to the Water Quality Control Division for review in accordance with the Water Quality Control Act, §25-8-101, et seq. C.R.S, and all applicable regulations of the Water Quality Control Commission. Compliance with such a permit shall be deemed full compliance with these Regulations.

3.3 Inspections and Right-of-Entry

A. To enforce these Regulations the health officer may enter private property to determine if the onsite wastewater treatment system is in compliance with these Regulations.

B. The owner or occupant of every property having an OWTS shall give the health officer free access to the property for the purpose of such survey or inspection.

C. If access is denied, the health officer may apply to the Jefferson County District Court for an order authorizing entry.

3.4 Septage Disposal

All persons shall dispose of septage removed from systems in the process of maintenance or cleaning at an approved site and in an approved manner.

3.5 Surface Activity

A. Activity or use on the surface of the ground over any part of the OWTS shall be restricted to that which shall allow the system to function as designed, will not require irrigation or watering, and which shall not contribute to compaction of the soil or to structural loading detrimental to the structural integrity or capability of the component to function as designed.

B. During construction, equipment shall be kept off of the ground surface above the soil treatment area and out of the excavation to prevent compaction. If compaction occurs, the disturbed or compacted soil shall be re-evaluated and new percolation tests may be performed to the disturbed or compacted soil and the system redesigned if the parameters have changed.

3.6 General Prohibitions

A. No person shall construct or maintain any dwelling or other occupied structure which is not equipped with adequate facilities for the sanitary treatment of sewage.

B. No OWTS shall be located, constructed, installed, altered or repaired prior to the issuance of a permit by the Department. Minor repairs, such as replacing a broken or crushed pipe, sealing a leaking tank, etc. may be authorized by the health officer without the issuance of a permit, provided that the repair work shall comply with all other aspects of these Regulations. The health officer may require an inspection of the repair work.

C. No city, county, or city and county shall issue to any person:

1. a permit to construct or remodel a building or structure that is not serviced by a sewage treatment works until the Department has issued a permit for an OWTS.

2. an occupancy permit for the use of a building that is not serviced by a sewage treatment works until the Department makes a final inspection of the OWTS, provided for in §25-10-106 (1) (h), C.R.S. and the Department approves the installation.

D. No person may connect more than one dwelling, commercial, business, institutional or industrial unit to the same OWTS unless such multiple connection was specified in the application submitted and in the permit issued for the system.

E. No new cesspools, pit privies or slit trench latrines may be constructed.

F. No OWTS permit shall be issued to any person when the subject property is located within a municipality or special district that provides public sewer service, except where such sewer service to the property is not feasible in the determination of the municipality or special district, or the permit is otherwise authorized by the municipality or special district.

G. No new or expanded OWTS shall be installed in a 100-year floodplain unless it meets or exceeds the requirements of the Federal Emergency Management Agency and the local emergency agency. Repairs of an existing system shall meet the requirements as feasible. The system as approved by the Department shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters.

H. No new or expanded OWTS shall be installed in a floodway designated in a 100-year floodplain. For any system repair that may affect the floodway delineation, appropriate procedures shall be followed including revision of the floodway designation, if necessary.

3.7 Materials Incorporated by Reference

A. Throughout these Regulations, standards and requirements by outside organizations have been adopted and incorporated by reference. The materials incorporated by reference cited herein include only those versions that were in effect as of June 30, 2013 and not later amendments to the incorporated material.

B. Materials incorporated by reference are available for public inspection during normal business hours from the Colorado Department of Public Health and Environment, Water Quality Control Division, 4300 Cherry Creek Drive South, Denver, Colorado 80246. Copies may be purchased from the source organizations.

This page intentionally left blank.

4.0 Applicability

Prior to installing, altering, or repairing a system, the owner shall obtain a permit from the Department.

4.1 Minimum Application Requirements

A. The following forms and documents shall accompany an application for a permit to install an OWTS.

1. An application form that includes:

   a. applicant name and contact information;

   b. owner name and contact information;

   c. property address;

   d. property legal description;

   e. type of permit and use of structure to be served by the system;

   f. report from Site and Soil Evaluation from Section 12, prepared by a professional engineer;

   g. system design with a legible, accurate site plan no larger than 11 x 17 inches which shows pertinent physical features on subject property, and on adjacent properties, as noted in Appendix A, Table A-1; and

   h. other information, data, plans, specifications and tests as required by Department.

2. When specific evidence suggests undesirable soil conditions exist, additional hydrological, geological, engineering or other information may be required to be submitted by the applicant. This requirement shall not prejudice the right of the Department to develop its own information from its own source at its own expense.

3. Fees as established by the Board of Health shall accompany an OWTS permit application.

4. The application shall expire and become void one year from the date of approval unless a permit is issued or an extension is granted by the health officer based on policies adopted by the Board of Health.

4.2 Minimum Building Site Size Requirements

A. Installation of new OWTS shall be permitted only on building sites that conform to the minimum acreage requirement set forth in Table 4-1.

B. Individually platted lots or parcels included in the building site shall be merged through applicable procedures of the Jefferson County Planning and Zoning Division or restricted through a permit condition and/or supplemental agreement with the Department that shall

provide that none of the lots or parcels composing the building site shall be sold separately without approval of the Department.

Table 4-1 MINIMUM BUILDING SITE SIZES

SOURCE OF POTABLE WATER	DATE WHEN LOT OR BUILDING SITE WAS CREATED		
	Before Nov. 10, 1973	Between Nov. 10, 1973 and Dec. 5, 1977	After Dec. 5, 1977
Individual wells, potable springs or cisterns	1 acre	2 acres	5 acres (3.5 acres if per Section 4.2.C
Public water system	0.5 acre	1 acre	1 acre

C. Lot sizes for new subdivisions using individual wells or cisterns as a water supply may be reduced to a minimum of 3.5 acres provided that prior to plat approval by the Jefferson County Planning Commission, the applicant submits to the health officer the following data for each lot of less than five acres in the proposed subdivision:

1. a scaled plot plan prepared by a professional engineer showing locations of the following:

   a. proposed or existing wells or cisterns;

   b. proposed or existing OWTS;

   c. proposed area of alternate or replacement OWTS should the primary system require repair or replacement; and

   d. streams, lakes and other surface water features.

2. topographical data including slope direction, ten-foot contour intervals and location of floodplains;

3. soil test data as required in Section 12 for the area of the proposed and alternate or replacement OWTS; and

4. any other information that may be required by the health officer.

4.3 Access to Site

A. For the purpose of inspecting and enforcing applicable regulations and the terms and conditions of any permit issued and investigating and responding to complaints, the Department is authorized to enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether or not an operating OWTS is functioning in compliance with the OWTS Act and these Regulations and the terms and conditions of any permit issued, and to inspect and conduct tests in evaluating any permit application.

B. The owner or occupant of every property having an OWTS shall permit the Department access to the property to make inspections, conduct required tests, take samples, and monitor compliance.

4.4 Site and System Identification

A. Before applying for an OWTS permit, the owner or applicant shall ensure the following:

1. the site shall be marked at the primary road access by a sign not less than two feet square showing the property address;

2. the corners of the proposed soil treatment area shall be marked by stakes with an exposed height of not less than two feet. The stake shall be marked to show that it represents the location of the soil treatment area along with the lot or parcel number; and

3. if the on-site well has not been drilled, the well location or minimum well setback shall be marked by a stake with an exposed height of not less than two feet. The stake shall be marked to show that it represents the location of the well along with the lot or parcel number.

4.5 Easements

A. If geologic or topographic constraints limit the installation of an OWTS on a building site, components of the proposed system may be located on contiguous properties in such a manner that conforms to these Regulations.

B. In support of the above, an easement agreement shall be prepared and submitted for approval by the health officer prior to the issuance of a permit and shall include the following:

1. a survey from a professional land surveyor establishing the perimeter of the easement such that a minimum setback of at least 10 feet shall be maintained from all system components to be located in the easement;

2. written provisions for the installation of and perpetual maintenance, repair and use of the OWTS components located within the easement; and

3. any other information required by the health officer.

C. Upon approval by the health officer, the agreement shall be executed by the owners of the dominant and serviant estates subject to the easement agreement and recorded with the Jefferson County Clerk and Recorder after final approval of the system installation.

D. For the purposes of these Regulations, easements do not affect the size of building sites.

4.6 Preliminary Site Investigation

A. After receiving a permit application the health officer shall conduct a preliminary site investigation consisting of:

1. an inspection of the property;

2. an assessment of the general topographical, hydrologic and geologic conditions of the property and surrounding area; and

3. an assessment of the suitability of the proposed OWTS.

B. When specific evidence indicates that subsurface conditions exist that may endanger State Waters, the health officer may require the applicant to submit additional hydrological, geological or engineering information.

4.7 Application Review and Permit Issuance

A. If the health officer determines that the application and supporting engineering designs comply with these Regulations and the OWTS Act, the health officer shall issue a permit to install the proposed system.

B. The permit shall set forth the conditions relating to the installation, operation and maintenance of the system, including, but not limited to, effluent testing, cleaning or maintenance schedules, or other special conditions.

C. Unless specifically addressed in a permit condition, installation of an OWTS shall otherwise be governed by all aspects of these Regulations.

D. The permit shall expire and become void one year from the date of approval unless the system has been installed and approved by the health officer, or unless the health officer has granted an extension based on policies adopted by the Board of Health.

4.8 Denial of a Permit

A. If the health officer determines that the proposed system does not comply with these Regulations, the health officer shall deny the application and provide written notice to the applicant via first class mail.

B. Denial shall become final upon the expiration of time for filing an appeal under Section 5 or when the final action is taken upon an appeal, whichever is later.

4.9 Changes in Plans or Specifications

Any change in plans or specifications for the OWTS after the permit has been issued shall be submitted to the health officer for review and approval; otherwise the permit will become invalid.

4.10 Changes in Terms or Conditions after Permit Issuance

A. A permit shall become invalid if any construction or other material change in on or off-site conditions would cause the installation of the permitted system to violate these Regulations or any permit condition.

B. The permit shall become invalid if it is determined that material information contained in the application, engineering design or supporting documentation is incorrect, false or misleading.

C. Allegations regarding encroachment of system components onto adjacent properties shall be supported by a survey or similar documentation provided by the owner of that property showing the extent of the encroachment and shall be made prior to the final approval of the system. Allegations made after final approval has been given shall be considered to be civil matters between the parties involved.

4.11 Inspections

A. During the installation of the OWTS, all system components shall be inspected and approved by the health officer prior to back-filling.

B. The owner shall be responsible for providing the health officer with sufficient notice to perform all inspections required by the permit.

C. The owner shall assure reasonable and safe access for the inspection of any excavation required in the installation of the permitted system. For the purpose of these Regulations, a ladder is not considered reasonable and safe access.

D. If during the installation of the system an inspection reveals any significant departure from the design of the permitted system or change in the proposed water supply, or if any aspect of the system fails to comply with these Regulations, the health officer shall provide the owner with written notice of the deficiencies.

E. If upon final inspection the health officer finds the system is installed in accordance with these Regulations and the permit conditions, the health officer shall approve the completed system.

F. No OWTS shall be approved for use without a final inspection by the health officer.

G. Under certain circumstances and upon prior approval by the health officer, the design engineer may perform inspections on behalf of the health officer, provided that those inspections are documented and reported to the Department prior to final approval of the system.

4.12 Engineer Certification of Installations

A. The design engineer shall certify that the system was constructed in accordance with the permitted design. The certification shall include, but not be limited to:

1. suitability of in situ, imported or reconditioned site materials to provide adequate treatment of the effluent;
2. verification of location of water table;
3. proper installation and operation of any pumps, siphons, or other mechanical or electrical appurtenances, if applicable;
4. completed manufacturer's startup checklist for higher level treatment units, if applicable;
5. proper installation of sampling and / or monitoring equipment, if applicable;
6. suitability of blasting in conformance with the submitted blasting plan, if applicable;
7. name of Systems Contractor who installed the system;
8. name and qualifications of service provider, if applicable; and
9. any other information required by the Department.

B. The engineer shall provide a scaled drawing showing the OWTS as installed, including its location from known and findable points, dimensions, depths, sizes, manufacturers' names

and models, as available and other information relative to locating and maintaining the OWTS components.

C. Failure to provide the required certifications shall result in denial of the final approval of the system.

D. If the design engineer is deceased, no longer a practicing engineer, or is otherwise unable to provide such certifications, the health officer may waive the required certifications provided that the installation of the system complies with all aspects of these Regulations other than the certifications.

4.13 Disclaimer

A. The issuance of any permit under these Regulations does not constitute a guarantee, warranty or representation by the Board of Health, the health officer, or the Department that the permitted OWTS will operate properly or that the system will not fail.

B. The issuance of any permit and specifications of terms and conditions therein shall not constitute assumption of liability, nor create a presumption that the Department or its employees may be liable for the failure or malfunctioning of any system. Permit issuance shall not constitute a certification that the system, the equipment used in the system, or any component used for system operation will ensure continuous compliance with the provisions of these Regulations or the OWTS Act, or any terms and conditions of a permit.

5.0 Variance Procedure from the Requirements Of These Regulations

A. With the exception of those items noted in section 5.1 below, variances from any requirement of these regulations may be granted only for items that are more stringent than, or not addressed by regulation 43.

B. Approval of such a variance shall be based upon evidence presented by the applicant showing that the variance:

   1. would not be injurious to the public health, water quality or the environment; and

   2. would prevent a substantial hardship to the applicant.

5.1 Variance Procedure from the Requirements of Regulation 43 For Repair Permits

A. The Board of Health will consider requests for variances for repairs to existing systems that cannot meet the minimum setback requirements in Appendix A, Table A-1.

B. The components of the repaired system shall be no closer to features requiring setbacks than the components of the existing system.

C. A public hearing shall not be required for such variance requests.

D. Variances shall not be granted:

   1. where the property can accommodate a conforming OWTS;

   2. to mitigate an error in construction involving any element of property improvements;

   3. if it reduces the separation to ground water or bedrock based on the level of treatment as provided for in Table 16-3;

   4. if it reduces the horizontal setback from a well, unless it also meets the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors, or

   5. solely for economic gain.

E. Variance requests shall be accompanied by the following:

   1. a site-specific request identifying the specific criteria from which a variance is being requested;

   2. a discussion of alternatives considered in lieu of the requested variance; and

   3. a statement of the hardship that creates the necessity for the variance.

F. The applicant has the burden of proof to demonstrate that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting these Regulations.

G. The Board of Health has the authority to impose site-specific requirements and conditions on any variance granted.

5.2 Outcome of the Variance Proceeding

A. The applicant shall be notified in writing of the Board of Health's decision regarding the request for a variance. The notice of a denial of a variance shall include those reasons which form the basis for the denial. The notice of an approval of a variance shall include any conditions of the approval.

B. The variance, and any conditions thereof, shall be recorded on the deed to the property and any expenses associated with that recording shall be the responsibility of the party obtaining the variance.

5.3 Review Procedures

A. Systems listed below shall be reviewed by the Board of Health at a public hearing before issuance of a permit:

   1. systems discharging effluent into State Waters;

   2. systems discharging effluent onto the ground surface;

   3. systems utilizing new technology devices, if the engineering design provides for the timely installation of a backup system of acceptable design if the new technology device fails; and

   4. any other type of OWTS for which the health officer is not specifically authorized to issue a permit.

B. Factors that shall be considered in the review of these systems are limited to compliance with these Regulations and any formally adopted policies of the Board of Health.

C. When specific evidence suggests that limiting or unfavorable site conditions may exist, the health officer may require the applicant to submit additional geologic, hydrologic or engineering data prior to review by the Board of Health.

5.4 Prohibition of System Installation in Unsuitable Areas

A. The Board of Health may conduct a public hearing to consider a prohibition on the issuance of on-site wastewater treatment system permits for defined areas in which the local Board of Health determines that construction and use of additional OWTS may constitute a hazard to public health or water quality.

B. The hearing may be conducted after mailing a written notice to all affected property owners as shown in the records of the County Assessor and publishing a legal notice in a newspaper of general circulation at least 10 days prior to the hearing.

5.5 Conceptual Approvals

A. The Board of Health may issue conceptual approvals for the installation of OWTS for lots or parcels that are in the process of being subdivided or merged, parcels for which separate legal descriptions and / or addresses have not yet been established, or proposals to install OWTS on more than one legally platted lot or building site.

B. In support of such a request, the applicant shall submit all information and documentation required in Section 4.1 and 4.2 or as otherwise required by the Board of Health in their review of the application.

C. Conceptual approvals shall be valid until the subdivision process is completed, the subdivision process is suspended or for a period of not more than five years.

D. The health officer shall not issue a permit based upon conceptual approval by the Board of Health until the property has been legally subdivided and the applicant has complied with all conditions imposed in that conceptual approval, the requirements of the onsite wastewater treatment system regulations and any Board of Health policies in effect at the time application is made for the permit.

5.6 Hearing Procedures

Public hearings conducted pursuant to this section shall provide an opportunity for all interested persons to present relevant testimony or evidence in accordance with policies adopted by the Board of Health. At the conclusion of such hearing the Board of Health may deny or approve the application upon such terms and conditions it deems advisable, or table or continue the application pending additional information it deems necessary to render a decision.

5.7 Review of Applications Denied by the Health Officer

A. Any person whose application has been denied by the health officer pursuant to Section 4.8 may submit a request to the Board of Health to review the health officer's denial within 60 days of receipt of the notice of denial.

B. The request shall be made in writing and shall state the facts upon which the applicant bases their request for review, the reasons entitling them to relief, and the specific relief or outcome they seek.

C. At the next meeting of the Board of Health following the submission of a written request for review, the Board of Health shall either deny the request or schedule a hearing to consider the request.

5.8 Reconsideration of Applications Denied by the Board of Health

A. Any person whose application has been denied by the Board of Health may submit a written request to the Board of Health for reconsideration of the denial within 30 days following the Board of Health's decision.

B. The request for reconsideration shall state the facts upon which the applicant bases their request, the reasons entitling them to relief, and the specific relief or outcome they seek.

C. At the next meeting of the Board of Health following the submission of a request for reconsideration, the Board of Health shall either deny the request or schedule a hearing to reconsider the original denial of the application.

5.9 Findings on Appeal

A. A request for review shall be made within 60 days after denial of an application by the Department.

B. The applicant shall bear the burden of supplying the local Board of Health with sufficient evidence to document that the denied system shall be constructed and used in such a manner that will result in no greater risk than that associated with compliance with the requirements of these Regulations, comply with the declaration and intent of these Regulations, and comply with all applicable state and local regulations and required terms and conditions in any permit.

C. Such review shall be conducted pursuant to the requirements of §24-4-105, C.R.S.

5.10 Appeal of Board Decisions

An applicant need not file a request for reconsideration prior to seeking judicial review of the Board of Health's decision under the provisions of §25-1-513, C.R.S. However, in the event a request for reconsideration is received in a timely manner, the period for seeking judicial review shall terminate 90 days from the Board of Health's final decision on the request for reconsideration.

6.0 Cease and Desist Orders

A. The Department may issue an order to cease and desist from the use of any OWTS or sewage treatment works which is found by the health officer not to be functioning in compliance with these Regulations or is found to constitute a hazard to public health, or has not otherwise received timely repairs under the provisions of §25-10-106 (1) (j), C.R.S.

B. Such an order may be issued only after a hearing which shall be conducted by the health officer not less than 48 hours after written notice thereof is given to the owner or occupant of the property on which the system is located. The order shall require that the owner or occupant bring the system into compliance or eliminate the health hazard within a reasonable period of time, or thereafter cease and desist from the use of the system.

C. A cease and desist order issued by the health officer shall be reviewable in the district court for Jefferson County upon a petition filed not later than 10 days after the order is issued.

6.1 Repair Permits

A. The owner or occupant of a property on which an OWTS is not in compliance shall obtain a repair permit from the Department. The applicant shall apply for a repair permit within two business days after receiving notice from the Department that the system is not functioning in compliance with the OWTS Act or applicable regulations, or otherwise constitutes a nuisance or a hazard to public health or water quality.

B. Designs for repairs to OWTS shall comply with all requirements of these Regulations, including capacity and configuration of septic tanks as set forth in Section 15, except that:

   1. designs that cannot meet the minimum setback requirements in Appendix A, Table A-1 may apply to the Board of Health for a variance from those requirements as set forth in Section 5.1; and

   2. minimum building site sizes as set forth in Table 4-1 do not apply, provided that the size or the property has not been reduced since the issuance of the original system installation permit, if such a permit was issued.

C. The repair permit shall provide for a reasonable period of time within which the owner or occupant shall make repairs. At the end of that period, the Department shall inspect the system to ensure it is functioning properly.

D. Concurrently with the issuance of a repair permit, the Department may issue an emergency use permit authorizing continued use of a malfunctioning system on an emergency basis for a period not to exceed the period stated in the repair permit. Such an emergency use permit may be extended, for good cause shown, in the event repairs may not be completed in the period stated in the repair permit through no fault of the owner or occupant and only if the owner or occupant will continue to make repairs to the system.

6.2 Penalties

A. Any person who commits any of the following acts or violates any of the provisions of this section commits a Class 1 petty offense as defined in §18-1.3-503, C.R.S.:

1. constructs, alters, installs, or permits the use of any OWTS without first having applied for and received a permit as provided for in §25-10-106, C.R.S.;
2. constructs, alters, or installs an OWTS in a manner which involves a knowing and material variation from the terms or specifications contained in the application, permit or variance;
3. violates the terms of a cease and desist order that has become final under the terms of §25-10-106 (1) (k), C.R.S.;
4. conducts a business as a systems contractor without having obtained the license provided for in §25-10-109 (1), C.R.S;
5. conducts a business as a systems cleaner without having obtained the license provided for in §25-10-109 (2), C.R.S.;
6. falsifies or maintains improper records concerning system cleaning activities not performed or performed improperly; or
7. willfully fails to submit proof of proper maintenance and cleaning of a system as required by these Regulations.

7.0 General Requirements for Systems Contractors

A. Any person engaged in the business of installing, constructing or renovating OWTS shall hold a valid Systems Contractor license issued by the Department. Employees of a licensed Systems Contractor need not be individually licensed.

B. An applicant for a Systems Contractor license shall be required to pass a test that demonstrates knowledge of these Regulations. The license shall be valid only as long as the person passing the test remains in the employ of the Systems Contractor.

C. The initial license period shall be one year and renewals shall coincide with the calendar year. A license that lapses because of failure to renew, revocation or suspension shall be subject to the fee established for a new license upon re-application. If the date of re-application is more than six months from the date the license expired, the applicant shall also be required to comply with Section 7.0.B.

D. Systems Contractors shall:

1. verify that a permit to install an OWTS has been issued prior to commencing excavation and maintain a copy of the permit and the engineering design and specifications at the site of the installation;

2. post the permit inspection card on the building site in a conspicuous and accessible location. Approval or denial of inspections shall be recorded on this card. Inspections may not be conducted by the health officer if this card is not posted on the building site.

3. verify that there have been no changes in the site conditions under which the permit was issued prior to commencing construction. If any condition on the permit, the supporting engineering or otherwise provided for in these Regulations cannot be met, the Systems Contractor shall notify the health officer before proceeding with the installation;

4. perform all work in compliance with these Regulations and with the conditions specified on the permit and supporting engineering design; and

5. suspend work and notify the health officer should there be any change in site conditions after construction begins that would prevent the installation of the system in accordance with permit conditions or as otherwise provided for in the Regulations. Construction may resume only after authorized by the health officer.

E. The Board of Health may revoke or suspend a Systems Contractor license for failure to comply with these Regulations. Revocation or suspension shall take place only after a hearing before the Board of Health. The license holder shall be given no less than 10 days' notice of the hearing and may be represented at the hearing by legal counsel.

F. The Board of Health may lift the suspension or revocation after a hearing at which it is determined that the Systems Contractor has corrected or rectified the conditions that caused the suspension or revocation.

7.1 Requirements for Owner-Installers

A. The owner of property for which an OWTS permit has been issued may install that system without holding a Systems Contractor license provided that the owner has demonstrated their knowledge of these Regulations to the satisfaction of the health officer and has signed the Owner-Installer Affidavit.

B. Owner-installers shall be responsible for complying with all applicable requirements of these Regulations, including, but not limited to, assuring that all required inspections are scheduled with, and performed by the health officer.

C. No portion of the work for an owner-installed system shall be subcontracted to any other person who will be financially compensated for that work unless that person is a Systems Contractor.

D. An owner-installer shall install no more than one OWTS per year.

8.0 General Requirements for Systems Cleaners

A. Any person engaged in the business of cleaning or pumping of septic tanks, vaults, holding tanks or other components of an OWTS, or transporting sewage to a disposal site shall hold a valid Systems Cleaner license issued by the Department. Employees of a Systems Cleaner need not be individually licensed.

B. The health officer may require the applicant to demonstrate their knowledge of these Regulations prior to the issuance or renewal of a Systems Cleaner license

C. The initial license period shall be one year and renewals shall coincide with the calendar year. A license that lapses because of failure to renew, revocation or suspension, shall be subject to the fee established for a new license upon re-application.

8.1 Pumping Requirements

A. Systems Cleaners shall:

1. remove the liquid, sludge and scum from all compartments of the tank, leaving no more than three inches of sewage sludge in the bottom of the tank;

2. inspect the tees, baffles, aerator unit, pumps, alarms, filters, siphons and other internal or external components of the tank(s) being pumped and notify the property owner if any of these components are damaged or missing;

3. inspect and clean any filters or other devices which require routine maintenance and cleaning, if necessary;

4. replace all lids and secure the components to prevent unauthorized entry;

5. provide the property owner with an inspection report regarding the condition of the tank and any observable deficiencies;

6. maintain their equipment so that no spills will occur during pumping or transportation and that their employees are not subjected to health hazards from exposure to the sewage;

7. dispose of collected sewage only at sites approved by the Department; and

8. maintain records of the date and address for each septic tank pumped and the date and disposal site for all collected sewage. The health officer may require a Systems Cleaner to provide documentation regarding their disposal methods and practices.

B. The Board of Health may revoke or suspend a Systems Cleaner license for failure to comply with these Regulations. Revocation or suspension shall take place only after a hearing before the Board of Health. The license holder shall be given no less than 10 days' notice of the hearing and may be represented at the hearing by legal counsel.

C. The Board of Health may lift the suspension or revocation after a hearing at which it is determined that the Systems Cleaner has corrected or rectified the conditions that caused the suspension or revocation.

This page intentionally left blank.

9.0 General Requirements

A. Except for designs or types of systems which have been approved by the Division pursuant to §25-10-108 (1), C.R.S., the Board of Health may approve an application for a type of system not otherwise provided for in these Regulations only if the system has been designed by a professional engineer, and the application provides proof of the ability to install a replacement OWTS in compliance with all local requirements in a timely manner in the event of a failure or malfunction of the experimental system.

B. The Board of Health shall not arbitrarily deny any person the right to consideration of an application for such a system and shall apply reasonable performance standards in determining whether to approve such an application per §25-10-108 (2), C.R.S.

This page intentionally left blank.

10.0 Applicability

A. Prior to a covered transaction involving a dwelling or other structure served by an OWTS, the property owner shall obtain a use permit for that system unless exempted or waived as set forth in this section.

B. Owners of limited-occupancy dwellings not served by a water carriage sewer system shall obtain a use permit to allow continued limited occupancy of the dwelling.

C. If the OWTS for residential properties was installed and approved by the health officer less than five years from the date of property closing or application for the building permit, a use permit shall not be required. If any component of the system is more than five years old, a use permit shall be required for the entire system.

D. Properties with systems that were installed but never connected to a dwelling or structure do not require the issuance of a use permit prior to sale or transfer.

10.1 Application Requirements

A. Applications and reports shall be made on forms furnished by the Department and shall include, as appropriate:

1. a septic tank pumping and inspection report from a licensed Systems Cleaner dated not more than 12 months prior to the date of the use permit application;

2. an inspection report from a use permit inspector, dated not more than 30 days prior to the date of the use permit application which states whether each component is in good repair and proper working order and which details any obvious deficiencies such as overflows, damp areas, erosion, etc. that are observable on the site;

3. an inspection report dated not more than 30 days from the date of application if the system contains any mechanical components such as an aeration or secondary treatment system;

4. a copy of the current O&M contract or operating permit, as applicable, and

5. any other information required by the health officer.

B. Unless a use permit is issued, applications shall become void six months from the date of application.

10.2 Minimum Criteria for Approval of a Use Permit

A. The existing OWTS shall meet, at a minimum, the following criteria and conditions:

1. a primary (and secondary, if applicable) treatment unit such as a water-tight, concrete or synthetic septic tank, sealed vault or holding tank, composting or incineration toilet or aeration tank is present and in good working order, provided with suitable lids and all internal devices and appurtenances such as tees, filters and baffles that were originally provided with the tank;

2. all sewer lines and pipes are open, undamaged and free-flowing;
3. alarms or other mechanical devices necessary for the operation of the system are present and in good working order;
4. an absorption bed, trench, dry or leaching well, evaporation system or other means of subsurface wastewater treatment, is present and in good working order;
5. there is a current operating permit or O&M contract, as applicable, for systems utilizing mechanical components for wastewater treatment;
6. there are no unapproved wastewater discharges from the dwelling or structure such as washing machine drain lines, etc.;
7. the system has not been significantly altered from its original design and configuration as documented in Department records; and
8. any deficiencies noted in the inspection reports have been corrected.

B. For limited occupancy dwellings, the owner shall submit a Limited Use Occupancy Dwelling Agreement signed by the purchaser of the property setting forth the terms of continued occupancy. The Department shall record this form with the Jefferson County Clerk and Recorder.

10.3 Issuance of a Use Permit

A. When the conditions in Section 10.2 have been met, the Health Officer shall issue the use permit, setting forth the terms and conditions of approval, including, as appropriate:
   1. the existence of any permits in Department files;
   2. determination of size, type and capacity of the system either from the Department records or the inspection reports;
   3. evidence of past failures or malfunctions within the previous three years from the date of application as shown in Department records;
   4. circumstances such as lack of occupancy, snow coverage, or other factors that may have affected the ability of the inspector to evaluate the system; and
   5. any other information the health officer deems appropriate.

B. The use permit shall remain valid until the date of the real estate closing or for a period of six months, whichever comes first. Once the real estate closing has been completed the Use Permit need not be renewed.

10.4 Waiver of a Use Permit

A. If it is determined that an OWTS does not meet any of the requirements in Section 10.2, the requirement for a use permit may be waived, provided that the purchaser:
   1. has executed a written agreement with the health officer agreeing to upgrade, repair or replace those non-compliant components within 90 days of occupying the dwelling or structure, or,

2. has obtained a tap to allow connection to a sanitation district sewer line and agrees to complete the connection and abandon the non-compliant OWTS within 90 days of occupying the structure.

B. If conditions, such as frozen ground or lack of access limit the ability of the purchaser to complete all necessary repairs within 90 days, the health officer may authorize an extension.

10.5 Renewal of a Use Permit

Provided it has not expired, a use permit may be renewed one time for a period of six months upon completion of the appropriate form and payment of the required fee.

10.6 Revocation of a Use Permit

The health officer may revoke a use permit based upon a determination that the OWTS is no longer functioning in accordance with these Regulations or that false or misleading material statements were made on the application or inspection reports.

10.7 Penalties

Failure to obtain a use permit for a covered transaction as provided for these Regulations shall subject the seller or purchaser who failed to obtain the permit to a penalty assessed under the provisions of §25-10-113, C.R.S.

This page intentionally left blank.

11.0 Applicability

A. An operating permit shall be required for any system that includes a higher level treatment unit as defined by these Regulations.

B. An operating permit shall be maintained and renewed until the system is either abandoned or the Department authorizes the decommissioning or removal of the higher level treatment unit.

C. The Department shall not authorize the removal of a higher level treatment unit unless the OWTS would conform to the requirements for TL1 systems, including minimum distance setbacks set forth in Appendix A, Table A-1 and vertical separation from the STA infiltrative surface to any limiting condition as set forth in Section 16.

D. The Board of Health shall adopt fees and policies for the administration of operating permits.

11.1 Minimum Application Requirements

A. Application for an operating permit shall include:

1. owner name and contact information;
2. property address;
3. type of higher level treatment system;
4. level of treatment to be provided;
5. name of service provider;
6. copy of operation and maintenance service contract of at least one year duration; and
7. fees as determined by the Board of Health.

11.2 Operating Permit Requirements

A. An operating permit shall specify the following for each higher level treatment component that requires routine maintenance, including:

1. type, make and model of the component (s) requiring maintenance;
2. name and qualifications of the service provider;
3. length of service contract;
4. required service intervals per Section 11.3.C;
5. reporting requirements; and
6. sampling requirements, if applicable.

11.3 Inspection and Maintenance Requirements

A. For proprietary systems, inspection and maintenance of the system shall be performed in accordance with the manufacturer's recommendations. For proprietary systems where manufacturer recommendations are unavailable, inspection and maintenance shall be performed in accordance with 11.3.B.

B. For public domain systems, inspection and maintenance shall be as determined by the design engineer or the following requirements, whichever is more stringent. Not all requirements will apply to all types of higher level treatment systems.

1. Tanks shall be inspected to assure that they are structurally sound and that all components such as lids, baffles, tees, vents, etc. are present and in good condition. The scum and sludge level in the tanks shall be measured and tanks shall be pumped if the scum or sludge depth exceeds 18 inches or is less than four inches from the bottom of the treatment unit. The liquid level in the tank should not be lower than the outlet invert.

2. Effluent filters shall be inspected and cleaned at an appropriate interval to assure proper function.

3. Each motor and pump and all appurtenances shall be inspected to assure that they are operating properly.

4. Internal electrical connections shall be inspected to assure that they are not damaged or otherwise subject to corrosion or damage that could cause a failure or electrical short circuit.

5. The control panel and its appurtenances shall be inspected to assure that all components such as timers, event recorders or counters, audible and visual alarms, auto-dialers, etc. are functioning properly. Batteries shall be checked and replaced as needed.

6. Components intended to agitate or introduce air into the wastewater such as impellers, air jets, bubblers, air diffusers, aspirators, paddles, etc. shall be inspected to assure that they are functioning properly and are free from lint, hair and other debris. Blowers or compressors shall be inspected to assure they are operating properly and that vents are clear and air filters are cleaned or replaced. If so equipped, the ammeter or voltage regulator shall be checked to verify that the motor is not drawing excess current.

7. All components such as media filters, sand filters, suspended growth media, etc. shall be inspected to verify that there is no damage, excess sludge buildup, clogging, filter bridging, etc. and that spray or dispersal nozzles are free from debris and functioning properly.

8. The STA shall be inspected to verify that no wastewater is being discharged onto the surface of the ground and that it is not being impacted by erosion, excess or improper vegetation, or compaction.

9. The service provider shall also note any unusual or abnormal conditions such as excessive or strong odors, noise, improper wastewater color and odor, etc. that may indicate an operational problem with the system.

10. Upon completion of the service inspection the service provider shall close and secure all inspection or access ports, reset the control panel and restore the system for normal operation.

C. At a minimum, maintenance shall take place every six months for higher level treatment systems with mechanical parts or every 12 months for higher level treatment systems with no mechanical parts such as mounded and single-pass sand filters, unless otherwise specified by the manufacturer. The Department may amend the operating permit to reduce or increase the maintenance frequency based on information contained in the required inspection reports.

11.4 Renewal of an Operating Permit

Upon expiration of an operating permit the owner shall submit an application to renew the permit.

11.5 Penalties

A Department may assess penalties for non-renewal of an operating permit or non-compliance with the terms the permit as provided for in Section 6.2 of these Regulations.

11.6 Service Provider Requirements

A. A service provider shall, at a minimum:

1. perform inspection, maintenance and sampling as set forth in the operating permit;

2. provide a copy of their inspection report and sampling results to the owner;

3. report the findings of their inspection and sample test results, if required, in a manner acceptable to the Department;

4. report any additional alarm conditions or service calls to the Department; and

5. notify the Department within seven days if an O&M contract is terminated prior to the original termination date as set forth on the operating permit.

This page intentionally left blank.

12.0 Site and Soil Evaluation

A. A site and soil evaluation shall be conducted for each property on which an OWTS is proposed, to determine the suitability of a location to support an OWTS and to provide the designer a sound basis to select the most appropriate OWTS design for the location and application.

B. Each site evaluation shall consist of:

1. preliminary investigation;
2. reconnaissance;
3. detailed soil investigation; and
4. report and site plan.

12.1 Preliminary Investigation

A. A preliminary investigation shall review documented information relative to the site and anticipated conditions. Information gathered as part of the preliminary investigation shall include, but is not limited to:

1. property Information, including:
   a. address;
   b. legal description;
   c. existing structures; and
   d. location of existing or proposed wells on the property.
2. Department records of any previous system installation or repair;
3. published site information, including topography and soil data;
4. location of physical features, on and off the property that will require setbacks as identified in Appendix A, Table A-1;
5. preliminary soil treatment area size estimate based on information on existing or planned facility and local regulations;
6. additional information that may be useful to the specific evaluation as available:
   a. surveys;
   b. easements;
   c. floodplain maps;
   d. geology and basin maps and descriptions;
   e. aerial photographs;

f. climate information;

g. delineated wetlands maps, and

7. other information required by Department.

12.2 Reconnaissance Visit

A. A reconnaissance visit to the property shall evaluate the topography and other surface conditions that will impact the selection, location and design of the OWTS, including:

1. landscape position;

2. topography;

3. vegetation;

4. natural and cultural features; and

5. current and historic land use.

12.3 Detailed Soil Investigation

A. Soil investigations to determine the LTAR of a soil treatment area shall be either:

1. visual and tactile evaluation of two or more soil profile test pit excavations; or

2. percolation tests plus one or more soil profile test pit excavations.

B. If percolation tests are performed, at least one soil profile test pit excavation shall be evaluated to determine whether current ground water levels and/or bedrock is encountered within eight feet of the ground surface.

C. If visual and tactile evaluations of soil are performed without percolation tests to determine the LTAR:

1. Evaluation of two or more soil profile test pit excavations shall be performed to determine soil types and structure, restrictive layers, evidence of seasonal high ground water, and best depth for the infiltrative surface.

2. At least one of the soil profile test pit excavations shall be performed in the portion of the soil treatment area anticipated to have the most limiting conditions.

3. The total number of soil profile test pit excavations required is based on the judgment of the competent technician.

12.4 Percolation Tests

A. The percolation testing shall be performed by a trained person under the supervision of a professional engineer or by a competent technician as provided for in Section 12.11.

B. Soil percolation tests shall be performed in at least three test holes in the area in which the soil treatment area is to be located, spaced reasonably evenly over the proposed area. There shall be no less than one test hole provided in every 1,200 square foot area of soil treatment area.

C. If the likely depth of a proposed infiltrative surface is uncertain, percolation tests shall be performed at more than one depth to determine the depth of the infiltrative surface.

D. The percolation test hole shall have a diameter of eight to 12 inches and be terminated a minimum of six inches and a maximum of 18 inches below the proposed infiltrative surface.

E. If a change of soil type, color or structure is present within those soils comprising the depth of soil below the infiltrative surface as required in Table 16-3 for vertical separation, a minimum of two soil percolation holes shall be terminated in the changed soil, and percolation tests shall be conducted in both holes.

F. The percolation tests shall be conducted using the hole preparation, soil saturation and rate measurement procedures described below.

1. Preparation of percolation test holes shall be as follows:

    a. excavate the hole to the depth and diameter required;

    b. carefully scrape the bottom and sides of the hole with a knife blade or sharp instrument to remove any smeared soil surfaces and provide a natural soil interface into which water may percolate;

    c. remove all loose soil from the hole; and

    d. add two inches of very coarse sand or fine gravel to protect the bottom of the hole from scouring and sediment.

2. Presoak

    a. The hole shall be presoaked adequately to accomplish both saturation, which is filling the void spaces between the soil particles, and swelling, which is the intrusion of water into the individual soil particles.

    b. To presoak the hole, carefully fill the hole with clean water to a minimum depth of 12 inches over the gravel placed in the bottom of the hole. In most soils, it is necessary to refill the hole by supplying a surplus reservoir of clean water, possibly by means of an automatic siphon, to maintain water in the hole for at least four hours and preferably overnight. Determine the percolation rate 24 hours after water is first added to the hole. This procedure is to ensure that the soil is given ample time to swell and to approach the condition it will be in during the wettest season of the year. In sandy soils containing five percent or less particles passing the #200 sieve, by weight, the swelling procedure is not essential and the test may be conducted after the water from one filling of the hole has completely seeped out of the hole.

3. Percolation Rate Measurement

    a. With the exception of sandy soils containing five percent or less particles passing the #200 sieve, by weight, percolation rate measurements shall be made on the day following the presoak procedure.

    b. If water remains in the percolation test hole after the swelling period, adjust the depth to approximately six inches above the gravel in the bottom of the hole. From

a fixed reference point, measure the drop in water level over a series of 30 minute intervals. The drops are used to calculate the percolation rate.

c. If no water remains in the hole after the swelling period, carefully add clean water to bring the depth of water in the hole to approximately six inches above the top of the gravel in the bottom of the hole. From a fixed reference point, measure the drop in water level at 30 minute intervals for four hours, refilling to six inches over the top of the gravel as necessary. The drop in water level that occurs during the final 30-minute period is used to calculate the percolation rate. If the water level drops during prior periods provide sufficient information, the procedure may be modified to suit local circumstances. The requirement to conduct a four hour test under this section is waived if three successive water-level drops do not vary by more than one-sixteenth inch; however, in no case shall a test under this section be less than two hours in duration.

4. Sandy Soils

   a. In sandy soils or other soils in which the first six inches of water seeps out of the hole in less than 30 minutes, after the 24 hours swelling period, the time interval between measurements shall be taken as 10 minutes and the test conducted for one hour. The drop that occurs during the final 10 minutes shall be used to calculate the percolation rate.

   b. If the soil is so sandy or coarse-textured that it will not retain any water, then the infiltration rate shall be recorded as less than one minute per inch.

   c. The Department may identify soil types in its area, for which it shall require different procedures such as extra presoaking to obtain a valid percolation rate.

5. Special Soil Types

   a. The Department may identify soil types in its area, for which it shall require different procedures such as extra presoaking to obtain a valid percolation rate.

6. Percolation Rate Determination and Reporting

   a. The field percolation rate shall be the average rate of the percolation rates determined for all percolation test holes observed in the proposed soil treatment area in minutes per inch. The average percolation rate determined by the tests shall be used in determining the LTAR for the proposed system from Appendix C.

   b. The technician performing the percolation tests shall furnish an accurate scale drawing, showing the location of the soil profile test pit excavations and percolation holes tied to lot corners or other permanent objects. The drawing shall meet the criteria in Section 12.9. The information the Section 12.9.C.6 through 12.9.C.10 may be included but is not required for this drawing. All holes shall be clearly labeled to relate to the information provided for the profile test pits and percolation tests.

6. Percolation Test Waiver

    a. If the applicant demonstrates to the satisfaction of the Department that the system is not dependent upon soil absorption, the requirement of percolation tests may be waived.

7. Alternate Percolation Testing

    a. Alternate percolation test procedures may be approved, provided the test results of alternate procedures are substantially equivalent to those determined using the test procedures described in this section.

    b. Prior approval from the Department of alternate percolation test procedures is required.

12.5 Visual and Tactile Evaluation of Soil Requirements

A. Each soil profile test pit excavation observed at the proposed soil treatment area shall be evaluated under adequate light conditions with the soil in an unfrozen state.

B. The soil observations shall be conducted at or immediately adjacent to the location of the proposed soil treatment area, but if possible, not under the final location of a trench or bed.

C. The soil observation method shall allow observation of the different soil horizons that constitute the soil profile.

D. Soil profile test pit observations shall be conducted prior to percolation tests to determine whether the soils are suitable to warrant percolation tests and, if suitable, at what depth percolation tests shall be conducted.

E. The minimum depth of the soil profile test pit excavation shall be to the periodically saturated layer, to the bedrock, or four feet below the proposed depth of the infiltrative surface, whichever is encountered first.

F. The soil type at the proposed infiltrative surface of the soil treatment area or a more restrictive soil type within the treatment depth shall be used to determine the LTAR from Appendix C. The treatment depth is two to four feet depending on the required thickness for the treatment level below the infiltrative surface from Section 16.3.

G. Soils data, previously collected by others at the site can be used for the purposes of an OWTS design at the discretion of the Department. Previous soils data shall be verified by performing, at a minimum, an evaluation of a soil profile test pit excavation.

12.6 Determination of a Limiting Layer

A. Soil descriptions for determination of a limiting layer shall include:

    1. the depth of each soil horizon measured from the ground surface and a description of the soil texture, structure, and consistency of each soil horizon;

    2. depth to the bedrock;

    3. depth to the periodically saturated soil as determined by:

a. redoximorphic features and other indicators of water levels, or

b. depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level, and

4. any other soil characteristic that needs to be described to design a system, such as layers that will restrict permeability.

12.7 Percolation Hole and Profile Test Pit Marking

The engineer or technician conducting the percolation tests shall, upon completion of the tests, flag or otherwise mark each hole to allow easy location by others. Percolation holes and profile test pits shall remain open until after evaluation by the Department unless otherwise approved. Excavations shall be suitably barricaded to prevent access by unauthorized persons.

12.8 Report and Site Plan

A. A written report shall describe the results of the preliminary investigation, reconnaissance, and detailed soil evaluations. The report may be in text and/or tabular form and shall include a drawing locating features relative to the proposed OWTS location and test locations. The report may be included as part of the OWTS design document. The report shall include, but is not limited to:

1. the name, address, telephone number, e-mail address, and credentials and qualifications of the individual conducting the site evaluation;

2. preliminary and detailed evaluations, providing information from the surface site characteristics assessment and soils investigation;

3. dates of preliminary and detailed evaluations;

4. a graphic soil log, to scale, indicating depth of drill hole or excavation, soil description and classification, depth to ground water encountered during drilling or excavation, type of equipment used to excavate the soil profile test pit, date of soils investigation, name of investigator and company name;

5. setback distances to features listed in Appendix A, Table A-1, existing on the site or within applicable setback limits, whichever is greater;

6. A drawing created to a scale that provides the complete property boundary lines with a minimum drawing size of 8.5-inches by 11-inches and a maximum of 11 by 17 inches. If the property is too large to adequately indicate and label the profile test pits and percolation test holes, a detail of the portion of the site containing the soil profile test pits and percolation test holes shall be submitted. If the property is too large to adequately show site evaluation information, a detail drawing that includes the information required from the site and soil evaluation that will impact the location of the OWTS shall be submitted. Drawings shall indicate dimensions, have a north arrow and graphic scale and include:

a. horizontal and vertical reference points of the proposed soil treatment area; soil observations; percolation testing results and pertinent distances from the proposed OWTS to all required setbacks, lot improvements, easements; ordinary high water mark of a pond, creek, stream, lake, wetland or other surface waters, and detention or retention ponds; and property lines;

b. contours or slope direction and percent slope;

c. the location of any visible or known unsuitable, disturbed or compacted soils;

d. the estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and

e. the proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark).

B. anticipated construction-related issues;

C. an assessment of how known or reasonably foreseeable land use changes are expected to affect the system performance, including, but not limited to, changes in drainage patterns, increased impervious surfaces and proximity of new water supply wells; and

D. a narrative explaining difficulties encountered during the site evaluation, including but not limited to identifying and interpreting soil and landform features and how the difficulties were resolved.

12.9 Design Document

A. The report and site plan may be attached to the design document or the report and site plan may be combined with the design information as a single document.

B. The design document shall include a brief description of the facility and its proposed use, basis and calculations of design flow, and influent strength.

C. The design document shall contain all plan detail necessary for permitting, installation and maintenance, including:

1. assumptions and calculations for each component;

2. a scale drawing showing location of each OWTS component and distances to water, physical and health impact features requiring setbacks as set forth in Appendix A, Table A-1, including all wells and STA less than 250 feet apart, on or offsite;

3. layout of soil treatment area, dimensions of trenches or beds, distribution method and equipment, distribution boxes, drop boxes, valves, or other components used;

4. depth of infiltrative surface of soil treatment area, depth of the septic tank, depth of other components;

5. specifications of each component;

6. specifications for septic tanks or other buried components shall include loads due to burial depth, additional weight or pressure loads, and highest elevation of ground

water. Resistance to local water composition such as high sulfates shall be included in the specification if such conditions exist at the site;

7. references to design manuals or other technical materials used;
8. installation procedures;
9. operation and maintenance manuals or instructions; and
10. other information that may be useful such as photos and cross-section drawings.

12.10 Site Protection

During construction, the proposed soil treatment area and replacement area, if any, shall be protected from disturbance, compaction, or other damage by staking, fencing, posting, or other effective method.

12.11 Qualifications for a Competent Technician

A. Technicians performing percolation tests shall have the following competencies:
   1. set up equipment;
   2. perform and run percolation tests according to the procedure in these Regulations; and
   3. record results and calculate percolation rates.
B. The Department may approve training for percolation testing.
C. Technicians performing visual and tactile evaluation of soil shall have the following competencies:
   1. identify soil types by hand texturing and observation;
   2. identify presence or absence of soil structure;
   3. identify grade of soil structure;
   4. recognize evidence of highest seasonal water surface;
   5. identify layers and interfaces that will interfere with effluent movement;
   6. determine the most promising depth for infiltrative surface of OWTS and for percolation tests, if used; and
   7. understand basic principles of OWTS siting and design. Possible demonstrations of competence in visual and tactile evaluation of soil:
      a. degree in soil science, agronomy, geology, other majors if a course(s) in soil morphology was included; or
      b. attendance at training or workshop for soil evaluation for OWTS including both class and field work.

13.0 Wastewater Flows

A. The Department may require the installation of a meter to measure flow into the facility or the OWTS.

B. Reductions in flow rates shall not be permitted for the installation of water-saving plumbing fixtures.

C. An OWTS treating the wastewater remaining after the separation of the toilet wastes shall meet all minimum design and construction standards for a TL1 OWTS based on the volume and character of wastes for the fixtures and the number of persons to be served.

13.1 Single-Family Residential Homes

A. Table 13-1 provides the design flows for single-family residential dwellings.

B. For repairs to systems serving existing single family dwellings, the number of bedrooms shall be determined by the records of the Jefferson County Assessor or by a previous installation permit, whichever is greater. If neither the Assessor nor the Department has such records the design engineer shall determine the number of bedrooms. The health officer may request documentation from the engineer regarding this determination.

C. The minimum design flow for the repair or replacement of an OWTS of an existing 1-bedroom dwelling or a dwelling where separate bedrooms are not provided shall be 1-bedroom unless bedrooms are to be added to the dwelling.

Table 13-1 MINIMUM SINGLE-FAMILY RESIDENTIAL DESIGN FLOWS

# of Bedrooms	Occupancy (# of Persons)	Design Flow (75 gallons / person / day)
2 (minimum)	4	300
3	6	450
Each additional	add 1	Add 75

13.2 Non-Residential Auxiliary Buildings

A. If a single-family residential dwelling has a non-residential auxiliary building, such as a non-commercial shop with plumbing fixtures, home office, etc. the flow may be conveyed to the OWTS of the dwelling, or to a separate OWTS constructed to handle the flow from the auxiliary facility.

B. If the flow from the auxiliary building is only generated by residents of the dwelling, it shall be assumed that the existing OWTS for the dwelling will be adequately sized to include the auxiliary building if the flows are combined.

C. The flow from the auxiliary building shall be conveyed to the existing OWTS such that it passes through all of the system components. All installation requirements and minimum setback requirements in Appendix A must be met.

D. The Department shall inspect this installation. A permit will not be required unless a new septic tank, pump or other such component is required.

E. If the auxiliary building will have users in addition to residents and the flow from the auxiliary building will flow to the OWTS of the dwelling, the design flow of that OWTS shall include the increased use.

F. If the auxiliary building has a separate OWTS, the facility shall be sized on the basis of Appendix B and a septic tank detention time of no less than 48 hours.

13.3 Multi-Family and Commercial On-site Wastewater Treatment Systems

A. Design flow values and strengths for multi-family and commercial systems shall be determined from Appendix B; or

B. An analysis of flows and strengths from at least three comparable facilities or from the facility, if it is an existing facility, shall be submitted to the Department for approval. The analysis shall include the following:

   1. metered water flows for inside use only for at least a year, or if use is seasonal, for a full season. If metered flows are less than full capacity, they shall be paired with actual use in units of persons present or meals served or other units as appropriate so that an actual daily rate per unit can be determined. The daily rate per unit times the number of units at full occupancy shall be the design flow.

   2. TSS and BOD_5 or $CBOD_5$ tests at times of full use. At least three samples taken at least one week apart are required; and

   3. explanation of and justification for the comparability of the tested facilities with the proposed facility.

13.4 Flow Equalization

A. Flow equalization may be used if a facility has flows that vary from day to day by more than four times the average flow.

B. The highest peak assumed shall be at least equal to the full capacity of the facility. If that peak exceeds 2,000 gallons per day, the design shall also comply with the provisions of Section 3.1.B.

C. The stored flow shall be distributed to the soil treatment area before the next greater-than-average peak.

D. Flow equalization may be used only if:

   1. the facility is non-residential;

   2. the facility is only used for one purpose;

   3. flows will follow a predictable pattern; and

   4. there is a long-term expectation that size and pattern of the flows will remain the same.

E. Timed pressure distribution shall be used. The soil treatment area reduction for timed pressure distribution shall not be used in addition to the flow equalization reduction.

F. Contingency plans shall be made for expanding the capacity of the OWTS in the event of changed use at the facility.

13.5 Wastewater Strength

A. Table 13-2 includes levels of treatment that can be achieved by various OWTS components, excluding the soil treatment area. Systems qualifying for these treatment levels except TL1 produced by a septic tank alone shall be approved under Section 17 of these Regulations.

B. $CBOD_5$ strength shall be reduced to TL1 or lower before applying to a soil treatment area.

C. Systems serving commercial, industrial, institutional or multi-family structures shall:

1. receive only such biodegradable wastes for treatment and distribution as are compatible with those biological treatment processes as occur within the septic tank, any additional treatment unit and the soil treatment area; and

2. receive authorization by rule or a Class V underground injection permit from the EPA before an application for an OWTS permit is approved if the system may receive non-residential wastewater or is otherwise covered by the EPA underground injection control program.

Table 13-2 TREATMENT LEVELS AND WASTEWATER STRENGTH

Treatment Level	$CBOD_5$* (mg/L)	TSS (mg/L)	Total Nitrogen (mg/L)
TL1**	145	80	60-80
TL2	**25**	**30**	**60-80**
TL2N	**25**	**30**	**> 50 percent reduction*** **
TL3	**10**	**10**	**40-60**
TL3N	**10**	**10**	**20**

TABLE NOTES
BOLD indicates higher treatment levels

**If concentrations of organic material are submitted in BOD_5 without data in $CBOD_5$, the data in BOD_5 shall be multiplied by 0.85 to estimate $CBOD_5$ levels.*

***Domestic septic tank effluent prior to soil treatment or higher level treatment has a wide range of concentrations. These values are typical, but values used for design shall account for site-specific information.*

****NSF/ANSI Standard 245 – Wastewater Treatment Systems – Nitrogen Reduction requires reduction of at least 50 percent rather than an absolute value.*

This page intentionally left blank.

14.0 General Standards

A. An OWTS shall be designed and constructed to achieve the treatment level specified by the design.

B. An OWTS shall be designed and constructed such that each component shall function, when installed and operated, in a manner not adversely affected by normal operating conditions including earth and hydrostatic pressure, erosion, corrosion, vibration, shock, climatic conditions, and usual household chemicals.

C. Each OWTS component shall be free of non-functional protrusions or sharp edges, or other hazards, which could cause injury to persons, animals, or properties.

D. The OWTS design shall be such as to exclude flies and rodents and other vectors and to prevent the creation of nuisances and public health hazards and shall provide for efficient operation and maintenance.

E. All components shall be installed and used in accordance with the recommendation of the manufacturer or the requirements of these Regulations, whichever is more stringent.

14.1 Accessibility for Inspection, Maintenance, and Servicing

A. Each treatment component of an OWTS other than treatment area shall be equipped with access manholes with risers that extend to or above final grade, located to permit periodic physical inspection, collection and testing of samples and maintenance of all components and compartments.

B. Each riser lid brought to the surface shall have a secure closing mechanism, such as a lock, special headed bolts or screws, or sufficient weight to prevent unauthorized access.

C. Components that require access for maintenance shall include but not be limited to submerged bearings, moving parts, pumps, siphons, valves, tubes, intakes, slots, distribution boxes, drop boxes, cleanouts, effluent screens, filters, inlet and outlet baffles, aerators, treatment equipment and other devices.

D. Components shall be designed and constructed so that, when installed, they shall be easily maintained, sampled, and serviced according to the manufacturer's recommendations. Easy physical access to treatment components by maintenance personnel and equipment shall be provided.

14.2 Component Operating Instructions

A. The manufacturer of proprietary treatment units utilizing mechanical components shall provide clear, concise written instructions covering the components which, when followed, shall assure proper installation and safe and satisfactory operation and maintenance.

B. If the OWTS uses public domain technology, the design engineer shall provide clear, concise written instructions covering the components which, when followed, shall assure proper installation and safe and satisfactory operation and maintenance.

14.3 Distribution Boxes

A distribution box, if used, shall be of sufficient size to distribute effluent equally to the lateral lines of a trench or absorption bed system. The box shall be constructed with the inlet invert at least one inch above the level of the outlet inverts. Flow equalizers or similar devices shall be used to adjust the flow between lines. Access to the box shall be provided with a manhole riser with access lid at or above grade if the top of the box does not reach final grade.

14.4 Drop Boxes

In sequential or serial distribution, a watertight box may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow to the next trench. A drop box shall have a riser at or above final grade, if the top of the drop box does not reach final grade. Outlet lines in sequential distribution shall be designed and installed so that they may be capped off for resting periods.

14.5 Electrical Equipment

A. All electrical work, equipment, and material shall comply with the requirements of the currently applicable National Electrical Code as designated by the State Electrical Board Rules and Regulations (3 CCR 710-1). A local electrical permit may be required.

B. Electrical components shall be protected from moisture and corrosive gases.

14.6 Floats and Switches

A. Automatic liquid level controls shall be provided to start and shut off pumps at a frequency or level specified in the design.

B. Floats shall be mounted on a stem separate from the pump discharge piping to allow for removal, adjustment, and replacement of the float without removing the pump.

C. Float switches shall be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL or an equivalent certification program and be constructed of corrosion resistant materials.

14.7 Floor Drains

Floor drains from any facility or area where maintenance work is performed on internal combustion engines shall not be connected to any OWTS unless that system consists solely of a sealed vault or holding tank.

14.8 Grease Interceptor Tanks

A. All commercial food service facilities and other facilities generating fats, oils and greases in their waste shall install a grease interceptor tank.

B. Grease interceptor tanks shall be properly maintained and shall treat only those portions of the total wastewater flow in which grease and oils are generated.

14.9 Indicators of Capacity

A signal device shall be installed in all vaults or holding tanks to provide a warning to the user that the liquid level in the vault or holding tank has reached a maximum of 80 percent of capacity. This signal device shall meet the requirements of Section 14.10.

14.10 Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus

A. A signal device shall be installed which will provide a recognizable indication or warning to the user that the system or component is not operating or is operating but malfunctioning.

B. This indication or warning shall be a visual signal or an audible signal or both and shall be located in a centralized area within visual and audible range of the system user.

C. The device shall be capable of sending a signal or message to a service provider. This requirement may be waived if it can be demonstrated to the satisfaction of the health officer that this is not feasible due to site conditions or other constraints.

D. If located on the exterior of a structure, the signal device shall be enclosed in a waterproof housing and shall have a sound pressure level of at least 80 decibels (dB) measured at 24 inches from the housing.

14.11 Oil / Water Separators

Unless the system consists of a sealed vault or holding tank, discharges from oil / water separators shall not be conveyed to the OWTS.

14.12 Pipe Standards and Bedding Requirements

A. All wastewater lines used in an OWTS shall be constructed of compatible pipe, primer, bonding agent, and fittings.

B. Where unperforated plastic pipe and fittings are used for gravity flow, the minimum wall thickness of the pipe shall conform to ASTM Standard D3034 or equivalent or greater strength. Schedule 40 pipe is preferred.

C. Perforated distribution pipe surrounded by rock within a soil treatment area shall have a minimum wall thickness and perforations conforming to ASTM Standard D3034 or equivalent or greater strength. Corrugated polyethylene pipe with smooth interior that meets ASTM F405 or AASHTO M252 specifications or equivalent may be used.

D. Schedule 40 or pipe of equivalent or greater strength shall be used for the placement of piping under driveways or roadways and in instances where sewer line setback distances are granted a variance for any reason.

E. Tile pipe, open-joint pipe, and cast iron pipe shall not be used in an OWTS.

F. Pressure pipe shall be rated for the intended use to accommodate pump discharge pressure.

G. All system piping, except for distribution laterals within the soil treatment area, shall be bedded with select material before final inspection by the Department. Select bedding material shall consist of loose, granular material, free from stones, clods, frozen soil, or

other deleterious material. Select material may consist of on-site job-excavated or imported material. Bedding material shall be mechanically compacted to support piping.

14.13 Plumbing Codes

Plumbing fixtures, building sewers, vents, sewer lines and other appurtenances shall be designed, operated and maintained so as to comply with the minimum requirements of the most recently revised locally enforceable plumbing code. In absence of a local plumbing code, designs shall adhere to the Colorado Plumbing Code (3 CCR 720-1). A local plumbing permit may be required.

14.14 Sampling Access

A. If sampling for testing or as a requirement for a permit will be required of effluent from a component other than the soil treatment area, an accessible sampling point shall be provided.

B. If sampling of the treated wastewater from the soil treatment area will be required for testing or as a requirement for a permit, a monitoring well or wells shall be constructed. Monitoring wells shall be located down gradient from the soil treatment area, accessible, and provided with a properly securable cover at or above the ground surface. Monitoring wells up gradient of the system may also be required. Lysimeters or other collection devices under the soil treatment area may be used instead of a monitoring well if approved by the Department or other issuer of a permit.

14.15 Sewer Lines

A. Except for pressurized systems, sewer lines shall be installed such that gravity flow is maintained throughout the length of the line.

B. The grade of the sewer line between the structure and the first treatment component shall be at least two percent except for the five feet preceding the septic tank where the grade shall not exceed four percent. If the tank consists of a sealed vault, the grade of the building sewer shall be sufficient to assure gravity flow into the tank.

C. Bends in the sewer line between the structure and the first treatment component shall be limited to 45 degree ells or long sweep 90 degree bends.

D. There shall be at least one clean-out for each 100 feet of sewer line or fraction thereof. The clean-out shall be of the same material as the pipe, extend at least 12 inches above final grade and fitted with a removable cap.

E. Non-pressurized sewer lines shall have a minimum diameter of three inches, except for the line between the structure and the first treatment component which shall have a minimum diameter of four inches.

F. The inlet and outlet pipes of the septic tank shall be grouted and sealed with watertight materials.

14.16 Step-down / Relief Lines

In sequential or serial distribution, an unperforated pipe may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow from that trench.

14.17 Wastewater Pumping Systems

A. A design for the wastewater pumping system shall accompany the permit application. The design shall include a drawing and specifications sheet which has been approved by the design engineer.

B. Pumps shall be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of UL, CSA, or an equivalent testing program and be constructed of corrosion resistant materials.

C. Non-clog pump opening shall have at least two inch diameter solids handling capacity where raw wastewater is pumped. A pump opening shall not have more than 0.75 inch diameter solids handling capacity if previously settled effluent is pumped.

D. Automatic air release valves shall be installed at high points in the pressure line where necessary to prevent air locking.

E. Grinder pumps shall also be certified to NSF/ANSI Standard 46 and bear the seal of approval of the NSF or equivalent testing and certification program.

F. In-vault pumps shall be provided with quick-disconnect joints to allow for routine removal for maintenance and replacement as well as a surrounding screen or filter for pumps placed in the second compartment of septic tanks.

14.18 Water Meters

Water meters, if required, shall be equipped with a remote counter or read-out such that they can be read from a readily accessible location.

This page intentionally left blank.

15.0 Liquid Capacities For Septic Tanks

A. Sizing for residential capacity for new installation shall be based upon the number of bedrooms according to Table 15-1.

Table 15-1 MINIMUM SEPTIC TANK SIZE

Number of Bedrooms	Total Tank Capacity (gallons)	1st Compartment Capacity (min)
Up to 3	1000	500
4	1250	625
5	1500	750
Each Additional	Add 250	add 125

B. For systems that remove toilet waste for separate treatment, tank capacity may be less than 1000 gallons if it provides a minimum of 48 hours retention time.

C. For multi-family and non-residential applications, a septic tank shall be sized to permit detention of incoming wastewater design flows for a minimum of 48 hours.

D. Minimum tank size for new installations other than for a single-family residence is 400 gallons.

15.1 Concrete Tank Structural Design

A. Concrete septic tanks shall comply with the structural design criteria of ASTM C1227-12 (Standard Specifications for Precast Septic Tanks).

B. The design of each tank model and size by each manufacturer shall be certified by a professional engineer as complying with these design and structural requirements and the watertightness standard of this regulation

C. Certification by a professional engineer shall be submitted to the Division for acceptance.

D. Tanks slab lids or mid-seam tanks shall be sealed to be watertight.

E. Connections between tank and risers shall be sealed to be watertight.

15.2 Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tank Structural Design

A. All fiberglass, fiberglass-reinforced polyester, and plastic tanks shall meet the minimum design and structural criteria of IAPMO/ANSI Z1000-2007 (American Standards for Prefabricated Septic Tanks) and be certified by a professional engineer as meeting these standards. The professional engineer certifying the criteria shall be registered or licensed in the United States, but need not be registered in Colorado.

B. All tanks shall be sold and delivered by the manufacturer or manufacturer's designated representative, preferably completely assembled. On-site tank assembly will be allowed on an as-needed basis.

C. Tanks shall be structurally sound and support external forces as specified in standard referenced above when empty and internal forces when full. Tanks shall not deform or creep resulting in deflection of more than five percent in shape as a result of loads imposed.

D. All tanks shall be constructed of sound, durable materials and not be subject to excessive corrosion, decay, frost damage, or cracking.

E. All seams or connections including to risers shall be sealed to be watertight.

15.3 Metal Tanks

The installation of metal tanks is prohibited.

15.4 Identification and Data Marking

All septic tanks shall be permanently and legibly marked in a location for the purpose of inspection that is readily visible when inspected before backfilling. The marking inscription shall include the following:

A. name of manufacturer;

B. model or serial number, if available;

C. effective volume and unit of measure;

D. maximum depth of earth cover and external loads the tanks is designed to resist; and

E. inlet and outlet identifications, if relevant.

15.5 Watertightness Requirements

A. Septic tanks, vaults, pump tanks, other treatment components, risers and lids shall not allow infiltration of ground water or surface water and shall not allow the release of wastewater or liquids through other than designed openings.

B. The health officer may require watertightness testing of such components that are installed in environmentally-sensitive locations, such as floodplains, alluvial soils, areas of high groundwater or known groundwater contamination, etc., or for components that may receive other than domestic wastewater from single family dwellings.

15.6 Watertightness Testing Methods

A. Acceptable watertightness testing methods performed at a manufacturer's site or in the field include water filling the tank or vacuum testing.

B. Testing of septic tanks shall be performed and evaluated as specified in Section 9 of ASTM C1227-12 for concrete tanks or in Standard IAPMO/ANSI Z1000-2007 for other prefabricated septic tanks.

C. Each unit shall be inspected in the field for conditions that may compromise its watertightness.

D. The inspection in the field shall be conducted by the Department and be performed after the tank installation but before backfilling.

E. If the inspection in the field indicates that the tank may be damaged or is not watertight, the inspector may require that the tank be tested for watertightness by the tank manufacturer or the System Contractor.

15.7 Proportions of Septic Tanks

A. A septic tank shall have two or more compartments or more than one tank may be used in series. The first compartment of a two-compartment tank or the first tank in a series shall hold no less than one-half of the required effective volume.

B. A septic tank shall have a minimum of 25 square feet of liquid surface area and have at least a six-foot separation between inlets and outlets. Septic tanks in series, combined, shall have a minimum of 25 square feet of liquid surface area and the sum of the distances between inlets and outlets of all tanks shall be at least six feet. The requirements for liquid surface area and separation between inlet and outlet may be waived for tanks with less than 750 gallons effective volume.

C. Liquid depth of a septic tank shall be a minimum of 30 inches and the maximum depth shall not exceed the tank length.

D. At least one access manhole no less than 20 inches across shall be provided in each compartment of a septic tank.

E. The inlet invert shall be at least two inches higher than the outlet invert.

F. An inlet tee or baffle shall be provided and shall extend above the surface of the liquid at least five inches and shall extend a minimum of eight inches below the liquid surface.

G. Additional tees or baffles shall be provided on the inlet side of each divider wall in the tank.

H. The transfer of liquid from the first compartment to the second or successive compartment shall be made at a liquid depth of between 35 and 40 percent of the liquid depth measured from the liquid surface. Liquid transfer shall not be made in the sludge zone.

I. The distance from the outlet invert to the underside of the tank top shall be at least 10 inches.

J. The outlet tee or baffle shall extend at least 14 inches below the outlet invert and, if needed, be modified to accommodate an effluent screen. The outlet tee or baffle that accommodates an effluent screen shall be located so that the effluent screen has sufficient clearance to be removed through the access opening with a riser in place.

15.8 Installation of Septic Tanks

A. Septic tanks shall be transported, handled and set in accordance with the manufacturer's recommendations so as to avoid undue strain on the tank and the pipes entering and exiting the tank.

B. Septic tanks shall be installed at least six feet from soil treatment areas or evaporation systems.

C. When installed, septic tanks shall have risers over each access manhole and all risers shall extend to or above final grade and be equipped with lids made of materials resistant to

degradation from moisture or sewer gas, provided with suitable handles for lifting and placed so as to prevent infiltration of ground or surface waters.

D. Risers shall meet the requirements of Section 14.1.

E. The tank shall be completely covered by backfill and no portion of the tank except for the risers and lids or may remain exposed.

F. All areas disturbed by the installation of the septic tank shall be re-graded and re-seeded to control erosion.

G. Roof drains, foundation drains, water softener discharge lines, area drains or cistern overflows shall not enter the tank or any part of the system and shall be placed in a manner which diverts water away from the OWTS.

H. No structure shall be constructed over any portion of the septic tank, except that decks may be constructed over the tank provided that the support piers for the deck do not touch the tank itself and that sufficient access openings in the deck surface are provided for routine maintenance and pumping of each compartment of the tank.

15.9 Anchoring of Tanks

A. In locations where ground water or floodwaters may cause instability problems to the septic tank, vault, or other treatment unit in the OWTS due to flotation, that component or unit shall be anchored in a manner sufficient to provide stability when the tank is empty. Risers shall be included in the buoyancy calculations.

B. If a manufacturer provides recommendations for anchoring designs they may be used if they meet the conditions present at the site.

C. If a manufacturer does not provide recommendations for provisions to compensate for buoyancy or if the professional engineer chooses to provide his/her own designs, the anchoring system design shall be prepared by the professional engineer.

15.10 Effluent Screens

A. An effluent screen shall be installed on the outlet tee of all septic, treatment and pump tanks. If an effluent screen cannot be fitted in the tank it may also be installed following the septic tank but before higher level treatment components or a soil treatment area.

B. The effluent screen shall be provided with a handle of sufficient length to allow for removal and cleaning of the screen.

C. The effluent screen shall be cleaned at manufacturer-recommended intervals, or more often, if use patterns indicate.

D. If a pump is used to remove septic tank effluent from the final compartment of the septic tank, an effluent screen shall be provided prior to the pump inlet. A pump vault equipped with a filter cartridge may be considered equivalent to an effluent screen preceding the pump.

15.11 Dosing Requirements

A. Unless otherwise provided for in these Regulations, dosing is required for all new installations and for repairs where the existing septic tank is being replaced or upgraded. Dosing may be accomplished by means of a dosing siphon or a pump and may be demand or time based.

B. Dosing is not required for TL1 systems with a design flow of less than 150 GPD, or where TL1 effluent is to be applied and topography or other conditions will not allow a dosing siphon to function properly, unless the type of STA requires dosing as otherwise provided for in these Regulations.

15.12 Dose Calculation

A dosing siphon or pump shall provide a periodic dose equivalent to at least 100 percent of the volume of the distribution pipes in the soil treatment area or as otherwise determined by the design engineer.

15.13 Location of Dosing Siphon or Pump

A. A dosing siphon shall be installed in a separate tank following the septic tank. The tank shall be of sufficient volume to allow siphon cycling commensurate with the design capacity.

B. For pumps, the use of a three-compartment septic tank, sized to provide effective volume in the first two compartments with the pump in the third compartment, is acceptable provided that:

   1. the third compartment shall be of sufficient volume to allow pump cycling commensurate with the design capacity,

   2. the baffle or wall between the second and third compartment shall be properly sealed to prevent cross-compartment flow, and

   3. the pump is screened or provided with an approved filtering device to assure that only liquid effluent will be discharged. An effluent screen installed between the second and third compartments of the tank is also acceptable.

15.14 Dosing Siphon or Pump Discharge Piping

A. The discharge line from the pumping or siphon chamber or tank shall be protected from freezing by burying the pipe below frost level or sloping the pipe to allow it to be self-draining. Drainage shall be provided through the bottom of the pump or through a weep hole located in the discharge line prior to exiting the tank.

B. The pump discharge piping shall have a quick disconnect that is accessible within the riser to allow for easy pump access and removal.

C. The pipe shall be sized to maintain a velocity of two or more feet per second.

D. Automatic air/vacuum release valves shall be installed at high points in the pressure line where necessary to prevent air or vacuum locking and allow self-draining of the lines.

15.15 Dosing Siphon or Pump Access

A. The pump or dosing system tank, chamber, or compartment shall have a minimum 24-inch diameter access riser, made of corrosion-resistant material, extending to or above ground level.

B. The access riser shall have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration.

C. Access risers shall meet the requirements of Section 14.1.

15.16 Splice Boxes

A. Splice boxes shall be located outside the pump system access riser and be accessible from the ground surface.

B. No wire splices shall be made inside the tank, dosing chamber or riser. Wire splicing shall be completed with corrosion-resistant, watertight connectors.

15.17 Pump System Controls

A. The pump system shall have an audible and visual alarm notification in the event an excessively high water condition occurs.

B. The pump shall be connected to a control breaker separate from the high water alarm breaker and from any other control system circuits.

C. The pump system shall have a switch so the pump can be manually operated.

D. The pump system for pressure dosing and higher level treatment systems shall have a mechanism for tracking either the amount of time the pump runs or the number of cycles the pump operates.

E. Control panels shall be UL listed or equivalent.

16.0 General Requirements

The size and design of the soil treatment area (STA) shall be based on the results of the site and soil evaluation, design criteria, and construction standards for the proposed site and OWTS selected.

16.1 Calculation of Infiltrative Surface of Soil Treatment Area

A. The infiltrative surface of a trench or bed receiving any treatment level of effluent is only the bottom area. No sidewall credit is allowed except in deep gravel trenches and seepage pits that are permissible in repairs.

B. LTAR are shown in Appendix C.

C. Factors for adjusting the size of the STA are in Tables 16-1 and 16-2.

D. The required area for STA is determined by the following formula:

$$\frac{\textbf{Design Flow (GPD)}}{\textbf{LTAR (GPD/sq. ft.)}} = \textbf{Required STA (sq. ft.)}$$

E. The adjusted STA is the required STA multiplied by the Size Adjustment Factors.

F. The Size Adjustment Factors for methods of application are in Table 16-1.

G. The Size Adjustment Factors for types of storage / distribution media are in Table 16-2.

H. A required soil treatment area receiving TL1 effluent may be multiplied by one factor from Table 16-1, Table 16-2, or both.

I. A soil treatment area receiving TL2, TL2N, TL3 or TL3N effluent shall be pressure dosed. The distribution media in Table 16-2 may be used for distribution of higher level treatment system effluent but an additional reduction factor from Table 16-2 shall not be used.

16.2 Allowable Soil Treatment Area Reductions and Increases

A. The soil treatment area size determined by dividing the design flow rate by the LTAR may be adjusted by factors for method of treatment, soil treatment area design, and type of distribution media.

B. For the purpose of the Table 16-1, a “baseline system,” i.e. adjustment factor of 1.0, is considered to be TL1 effluent dosed to a gravel or tire chip filled trench.

C. The maximum reduction from all combined reductions including higher level treatment shall be no greater than 50 percent of the baseline system required for a soil treatment area.

16.3 Design of Soil Treatment Areas – General Requirements

A. The infiltrative surface and distribution lines within the STA shall be level.

Table 16-1 SIZE ADJUSTMENT FACTORS FOR APPLICATION METHODS IN STA

Type of STA	Method of Effluent Application		
	Gravity	Dosed (Siphon or Pump)	Pressure Dosed
Trench	1.1	1.0	0.9
Bed	1.2	1.1	1.0

Table 16-2 SIZE ADJUSTMENT FACTORS FOR TYPES OF DISTRIBUTION MEDIA IN STA ACCEPTING TREATMENT LEVEL 1 EFFLUENT

Type of STA	Type of Storage/Distribution Media Used in Soil Treatment Area		
	Rock or Tire Chips	Manufactured Media Other Than Chambers	Chambers
Trench or Bed	1.0	0.9	0.7

B. The infiltrative surface shall be no deeper than four feet unless adequate treatment at a deeper level can be demonstrated and is approved by the Department. The depth of the infiltrative surface will be measured on the downslope side of the trench or bed excavation.

C. Trenches shall follow the ground surface contours so variations in infiltrative surface depth are minimized. Beds shall be oriented along contours to the degree possible.

D. Pipe for gravity distribution shall be no less than three inches in diameter.

E. A final cover of soil suitable for vegetation at least 12 inches deep shall be placed from the top of the geotextile or similar pervious material in a rock and pipe system, chamber, or manufactured media up to the final surface grade of the soil treatment area.

F. Following construction, the ground surface shall be graded to divert storm water runoff or other outside water from the soil treatment area. The area shall be protected against erosion. Subsurface drains upslope of the soil treatment area may be installed to divert subsurface flow around the area.

G. Backfilling and compaction of soil treatment areas shall be accomplished in a manner that does not impair the intended function and performance of the storage/distribution media and soil and distribution laterals, allows for the establishment of vegetative cover, minimizes settlement and maintains proper drainage.

H. Soil replacement is permitted to bring the soil within the requirements of suitable soil. Added soil shall meet the specifications of sand filter media, as specified in section 17.2.D All added soil shall be completely settled prior to installation of components as specified and approved by the design engineer. The loading rate for sand filters shall be used. Pressure distribution shall be used.

I. Horizontal distance separations between STA and various physical features are shown in Appendix A, Table A-1.

J. Minimum vertical separation distance from the STA infiltrative surface to groundwater or a limiting layer shall be four feet, except as provided for in Table 16-3.

Table 16-3 – MINIMUM VERTICAL SEPARATION BETWEEN STA INFILTRATIVE SURFACE AND HIGH GROUNDWATER SURFACE OR BEDROCK

	Treatment Levels				
Type of STA	**TL1**	**TL2**	**TL2N**	**TL3**	**TL3N**
Unlined Sand Filters (any type)	2[1]	0[2]	0[2]	0[2]	0[2]
Trenches or Beds using *In Situ* Soils	4 (3)[3]	3	2	2	2

TABLE NOTES

1. The bottom of the required three-foot sand layer shall be at least two feet above the high ground water surface or bedrock for installations in which effluent is percolated downward through the soil.
2. The bottom of the required two-foot sand layer shall be at or above the high ground water surface or bedrock for installations in which effluent is percolated downward through the soil.
3. If pressure dosed.

K. For repairs to existing systems where space is not available or there are other site limitations, Section 16.16 provides alternative design methodologies for soil treatment areas.

16.4 Distribution Lines

A. Distribution of effluent between lines in a soil treatment area shall be as even as possible. Uneven settling of portions of the distribution system following construction shall be addressed by provisions in the design to adjust flows between lines.

B. Distribution lines shall be a maximum of 150 feet long.

C. Distribution lines longer than 100 feet shall be pressure dosed or the application of the effluent shall be at the center of the line.

D. The end of a distribution pipe shall be capped, unless it is in a bed or trenches in a level soil treatment area, where the ends of the lines may be looped.

16.5 Inspection Ports

A. An inspection port accessible from ground surface shall be installed at the terminal end of each trench or bed. The bottom of the inspection port tube shall extend to the infiltrative surface and not be connected to the end of the distribution pipe. That portion of the tube in contact with the distribution media shall be perforated. Inspection ports in chambers may be installed according to manufacturer's instructions if the infiltrative surface is visible or can be measured from the inspection port.

B. At least one inspection port connected to the distribution pipes shall be provided for each trench or bed.

C. The top of inspection ports may be below the final grade of the surface if each has a cover at the surface such as a valve box for a lawn irrigation system.

16.6 Trenches

A. Trenches shall be three feet wide or less.

B. The separating distance between trenches shall be a minimum of six feet sidewall-to-sidewall.

C. Perforated distribution pipe used in a trench shall be placed as close to the center of the trench as possible.

D. Perforations shall be oriented downward unless pressure distribution is used and provision for pipe drainage is included.

16.7 Beds

A. Maximum width for a bed shall be 12 feet, unless the bed receives effluent meeting TL2 or better, or for repairs to existing systems as provided for in Section 16.16.

B. The separating distance between beds shall be a minimum of six feet sidewall-to-sidewall.

C. The separating distance between parallel distribution lines in an absorption bed shall not exceed six feet and a distribution line shall be located within three feet of each sidewall and end wall of the absorption bed.

16.8 Serial and Sequential Distribution

A. A serial or sequential distribution system may be used where the ground slope does not allow for suitable installation of a single level soil treatment area unless a distribution box or dosing chamber is used.

B. The horizontal distance from the side of the absorption system to the surface of the ground on a slope shall be adequate to prevent lateral flow and surfacing.

C. Adjacent trenches or beds shall be connected with a step-down / relief line or a drop box arrangement such that each trench fills with effluent to the top of the gravel or chamber outlet before flowing to succeeding treatment areas.

16.9 Storage / Distribution Media

A. Rock and Pipe

1. The pipe shall be surrounded by clean, graded gravel, rock, or other material of equal efficiency which may range in size from 0.5 inch to 2.5 inches or that meets ASTM D448 (AASHTO M43) Sizes 2-5. At least six inches of gravel, rock or other material shall be placed below the pipe. The gravel, rock or other material shall fill the trench or bed around the pipe and at least two inches above the top of the distribution pipe.

2. The top of the placed gravel, rock or other material used shall be covered with non-woven permeable geotextile meeting a maximum thickness rating of two ounces per square yard or equivalent pervious material. An impervious covering shall not be used.

B. Tire Chips

1. Tire chips shall be placed within a trench or bed in accordance with Section 16.9.A

2. Tire chips shall be nominally two inches in size and may range from one-half inch to a maximum of four inches in any one direction.

3. Wire strands shall not protrude from the tire chips more than three-quarter inch.
4. Tire chips shall be free from balls of wire and fine particles less than two millimeters across.

C. Chambers

1. Installation shall be according to manufacturer's instructions provided that those instructions are no less stringent than these Regulations.
2. Chambers shall be installed with the base on the infiltrative surface.
3. A distribution pipe shall be placed extending the length of the chambers and may be either suspended or left in contact with the ground.
4. Except for higher level treatment units, effluent may be distributed by gravity or pressure dosing.

D. Manufactured Media

1. Manufactured media shall be installed with the base on the infiltrative surface.
2. Installation shall be according to manufacturer's instructions provided that those instructions are no less stringent than these Regulations.
3. Effluent may be applied by pressure distribution only if the manufacturer specifies suitability of the product for that use.

16.10 Pressure Distribution

A. Design of pressure distribution systems shall include:

1. dose size and frequency for flows and soil or media LTAR;
2. pipe diameter and strength requirements;
3. orifice size and spacing; and
4. distal pressure head.

B. Cleanouts shall be installed at the end of each line.

16.11 Drip Distribution Systems

A. The infiltrative surface area shall be calculated using the LTAR for the site or a more conservative value if recommended by the manufacturer.

B. Drip tubing shall be installed on manufacturer's spacing recommendations.

C. Drain back shall be provided for all drip tubing, pipes and pumps.

D. Provisions shall be made to minimize freezing in the distribution lines, drip tubing, relief valves, and control systems.

E. Provisions shall be made for back flushing or other cleaning.

16.12 Evaporation and Evapotranspiration / Absorption Systems

A. An evapotranspiration (ET) system may be designed to consider evaporation and transpiration only, except that absorption may also be considered in soil types 3A, 4, 4A and 5.

B. Data to be furnished shall include, but shall not be limited to: dimensions; distribution system design; specifications of gravel and wicking sand if used, liner material if used, and bedding; properties of the soil under the evapotranspiration system and provision for vegetation cover.

C. the following formula may be used as a guide for determining the area necessary for total evapotranspiration of septic tank effluent:

$$\text{Area (sq. ft.)} = \frac{\textbf{design flow (GPD) x 586}}{\textbf{lake evaporation rate at the site (in inches per year)}}$$

D. As an alternative, a system may be designed and sized on the basis of a monthly water balance for the system. Such a design would provide for total storage of average daily flows for all periods in which evapotranspiration is not shown to occur.

E. The ET bed area shall be fenced or otherwise protected to prevent compaction.

F. The ground surface shall be graded to deflect precipitation and other outside water away from the bed area. The area of the ET bed shall not be irrigated.

G. Pressure dosing is required for all ET systems.

H. If the design provides wicks (sand structures which penetrate through the rock media to the bottom of the bed), they shall be equal to 10 to 15 percent of the bed surface area. The wicks shall be uniformly spaced throughout the bed.

I. Sand utilized in evapotranspiration or evapotranspiration/absorption beds for wicks shall meet the gradation requirements in Table 16-4 and be approved by the design engineer.

Table 16-4 GRADATION OF WICKING SAND FOR EVAPOTRANSPIRATION BEDS

Sieve Size	Percent of Sand Passing
4	100
40	50 – 70
200	< 15

J. Adequate surface area shall be provided to evaporate / transpirate total annual average daily flows at a rate equivalent to the local net lake evaporation including over the part of the year when the evaporation rate is not measured.

K. If the system is designed as an evapotranspiration/absorption system, the amount of storage and evapotranspiration capacities may be reduced by the volume of effluent absorbed by the soil based on the LTAR for that soil type.

L. Evapotranspiration beds and evapotranspiration-absorption beds may be wider than 12 feet.

16.13 Sand Filters - Unlined

A. An unlined sand filter shall be constructed in accordance with Section 17.2 except that a liner is not placed on the sides or bottom of the excavation.

B. An unlined sand filter is to be sized based on Section 16.1 or the LTAR as set forth in Appendix C.

16.14 Sequencing Zone Systems

A. Sequencing zone systems have more than two soil treatment area sections that are dosed on a frequent, rotating basis.

B. The combined size of the zones shall equal the minimum size of the soil treatment area as calculated in Section 16.1.

C. Where soil conditions are similar between the sections, each section area shall be the same size. If soil conditions are such that LTAR are different, each section may be sized for the same dose, but different LTAR.

D. An automatic distribution valve or dual dosing siphon shall be used.

E. Dosing of each system shall be evaluated by the design engineer based on projected daily flow rates, number of zones, and soil types.

16.15 Seepage Pits

A. The construction of seepage pits for the treatment and dispersal of on-site wastewater on new sites is permitted provided that the design includes higher level treatment of at least TL2.

B. Installation of seepage pits shall conform to Section 16.16.E.

16.16 Repairs to Existing Systems

A. When space is not available or if there are other site limitations that preclude other soil treatment area options for OWTS repairs, wide beds, deep gravel trenches, alternating systems and seepage pits may be considered for repairs only. Other options are vaults or higher level treatment systems.

B. For repairs, beds may be wider than 12 feet without being required to receive effluent meeting TL2 or better.

C. For deep gravel trenches or beds, the length of an absorption trench or bed may be calculated by allowance for the sidewall area of additional depth of gravel in excess of six inches below the bottom of the distribution pipe.

   1. Formula for adjusting the length of deep-gravel trenches:

$$L \times \frac{(W+2)}{(W+1+2D)} = \text{Adjusted Length}$$

Where: **L** = length of trench or bed prior to adjustment for deep gravel
W = width of trench or bed in feet
D = additional gravel depth (ft.) in excess of the minimum required six inches of gravel below the distribution pipe (maximum allowable additional gravel depth is five feet).

2. Percolation tests and soil profile excavation test pit evaluations shall be performed at the proposed infiltrative surface depth.
3. The reduction in field size area with the use of chambers shall not be applied to deep gravel systems.

D. Alternating Systems

1. An alternating system may be used only for repairs to existing systems when the existing STA is retained and a new one is added.
2. A maximum of 25 percent of the minimum total required STA infiltrative surface may be allocated to the existing STA. Size adjustment factors for methods of effluent application or type of distribution media shall not be allowed.
3. Wastewater shall be alternated between the existing and new STA zones on an annual or more frequent basis as determined by the design engineer.
4. A diversion valve or other approved diversion mechanism shall be installed on the septic tank effluent line allowing STA zones to be alternated.
5. The diversion mechanism shall be readily accessible from the finished grade.

E. Seepage Pits

1. For repairs to existing systems, the potential for risk to public health and water quality may be evaluated by the Department. If risk is low in the determination of the Department, a seepage pit without higher level treatment may be used.
2. If the risks are not low, higher level treatment of at least TL2 shall be attained prior to discharge to these systems for final disposal.
3. A seepage pit shall consist of a buried vertical cylinder with holes in the wall. This may consist of a stack of perforated concrete rings or other suitable materials.
4. Pits shall be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity.
5. The excavation shall be larger than the cylinder by at least 12 inches on each side.
6. The space between the cylinder wall and the edge of the excavation shall be filled with rock ranging in size from one half inch to two and one half inches.

7. The capacity of the pit shall be computed on the basis of the LTAR determined for each stratum penetrated. The weighted average of the results shall be used to obtain a design figure.
8. Soil strata in which the percolation is slower than 30 minutes per inch shall not be used for absorption or seepage. These strata shall not be included in the weighted average to determine the LTAR.
9. The infiltrative surface of the pit is the vertical wall area (based on dug perimeter) of the pervious strata below the inlet plus the bottom area inside the vertical cylinder.
10. Pits shall be separated by a distance equal to three times the greatest lateral dimension of the largest pit. For pits over 20 feet in depth, the minimum space between pits shall be 20 feet.

This page intentionally left blank.

17.0 General Requirements

A. Higher level treatment systems may be public domain technology systems or proprietary systems.

   1. Public domain technology systems shall be designed, installed and maintained according to established criteria and any additional criteria established by the Department. When design criteria are not specifically provided in these Regulations, the criteria used in the design shall be from a reference commonly used as an industry standard and the criteria shall be cited in the design. Public domain systems require review and approval by the Board of Health.

   2. Proprietary systems shall be designed, installed, and maintained according to manufacturer's instructions, additional criteria identified by CDPHE as part of their Technology Review and Acceptance process, or as set forth in Section 11.

B. Soil treatment areas for higher level treatment systems shall be pressure dosed.

C. All systems shall be capable of accommodating all anticipated flows and organic loads.

D. Mechanical components shall be installed in a properly vented location and all vents, air intakes, and air hoses shall be protected from snow, ice, or water vapor accumulations.

E. All systems shall be installed to include protection of openings against entry of insects, rodents, other vectors and unauthorized people.

F. The owners of properties with higher level treatment systems shall obtain and maintain an operating permit issued by the Department for that system.

G. For higher level treatment systems or other components under a service contract, a clearly visible, permanently attached label or plate giving instructions for obtaining service shall be placed at a conspicuous location.

17.1 Treatment Levels for Higher Level Treatment Systems

A. Treatment levels for proprietary systems shall be assigned by CDPHE based on their Technology Review and Acceptance process and shall be used to size the soil treatment area in accordance with Section 16. Proprietary systems cannot be approved for use until that process has been completed and a treatment level assigned.

B. Treatment levels for public domain higher level treatment systems are shown in Table 17-1.

Table 17-1 TREATMENT LEVELS FOR PUBLIC DOMAIN HIGHER LEVEL TREATMENT SYSTEMS

Type of System	Treatment Level	Design Criteria
Lined Sand Filters (single pass)	TL3	Section 17.3
Lined Sand Filters (recirculating)	TL3N	Section 17.4
Mounded Sand Filters (mound systems)	TL2	Section 17.5

17.2 Lined Sand Filters – General Requirements

A. Effluent introduced into a lined sand filter shall be pre-treated to TL1 or better.

B. Lined sand filters shall have an impervious liner on the sides and bottom of the filter. The liner shall consist of a 30 mil thickness PVC material or equivalent.

C. Lined sand filters shall be constructed in a manner that will retain their structural integrity under normal operating conditions.

D. Filter media effective size (D^{10}) shall range from 1.0 to 1.50 millimeters and the uniformity coefficient (D^{60}/D^{10}) shall be less than 4.0. Fines passing a 200 mesh sieve shall be less than one percent. Material meeting ASTM C33, for concrete sand, with one percent or less fines passing 200 mesh sieve may be used.

E. Sand depth shall be a minimum of two feet.

F. A minimum four-inch diameter under-drain pipe shall be used. The under-drain pipe shall be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone shall pass a 2.5 inch screen and shall be retained on a 0.75 inch screen. Manufactured media may be used as an alternative to gravel or stone.

G. Distribution of effluent to the surface of the sand filter shall be by a pressurized distribution system for equal distribution.

17.3 Lined Sand Filters – Single Pass

A. Filter construction shall meet the requirements of Section 17.2.

B. When receiving wastewater that meets TL1, a maximum sand filter application rate of 1.0 gal / sq. ft. / day shall be used.

C. Under-drain effluent collected below the sand filter shall be dispersed to a soil treatment area.

17.4 Lined Sand Filters - Recirculating

A. Filter construction shall meet the requirements of Section 17.2.

B. Typical loading rates are 3.0 to 5.0 gal / sq. ft. / day, however, the rate shall not exceed 5.0 gal / sq. ft. / day.

C. Design re-circulation ratios may be from 3:1 to 5:1.

D. Effluent collected from the sand filter shall be discharged to a soil treatment area.

17.5 Mounded Sand Filters (Mound Systems)

A. Effluent introduced into a mounded sand filter shall be pre-treated to TL1 or better.

B. When the infiltrative surface area of the media receiving wastewater effluent is above the natural ground surface, the system shall be considered a mounded sand filter.

C. Mounded sand filters shall conform to section 16.13 for unlined (open bottom) sand filters.

D. The basal area and linear loading rate shall be determined from the loading rate for the soil type under the mound and the slope of the site.

E. The final slope of the mound shall be no greater than three feet horizontal to one foot vertical.

F. The surface of the mounded area shall be planted with a suitable vegetative cover that does not require irrigation.

G. If the thickness of the sand in the mound is at least two feet, the treatment level for mounded sand filters is TL2 and it does not need an additional two-foot unlined sand filter.

This page intentionally left blank.

18.0 General Requirements

Design criteria and construction standards for alternative systems shall be sufficient to exclude flies and rodents from access to human excreta, prevent nuisances and health hazards, provide for cleanliness of such facilities, and prevent ground or surface water pollution.

18.1 Chemical Toilets

A. Use of chemical toilets in permanently occupied buildings is prohibited except during construction or under emergency circumstances as determined by the Department. Proper ventilation of a chemical toilet used inside shall be required.

B. The use of commercial portable chemical toilets (sometimes referred to as Porta Potties, etc.) is not regulated by the Department.

18.2 Composting Toilets

A. An approved composting toilet shall treat deposits of feces, urine, and readily decomposable household garbage that are not diluted with water or other fluids and are retained in a compartment in which aerobic composting will occur.

B. Only manufactured composting toilets meeting NSF/ANSI 41 or an equivalent testing program and approved by CDPHE may be installed.

C. A system to collect and dispose of gray water shall be provided for dwellings and other facilities that generate such waste water.

D. The composting toilet may be located within a dwelling or building provided that:

   1. it is specifically designed for interior use;

   2. it complies with the applicable requirements of these Regulations and the local building code; and

   3. the installation will not result in conditions considered to be a health hazard as determined by the health officer.

E. The effective volume of the composting toilet receptacle shall be sufficient to accommodate the number of persons served in the design of the unit installed. The effective volume of the unit shall include sufficient area for the use of composting materials which shall not be toxic to the process or hazardous to persons and which shall be used in sufficient quantity to assure proper decomposition.

F. Residue from the composting toilet shall be removed when it is filled to 75 percent of capacity. Residue from the unit shall be properly disposed of by methods recommended by the manufacturer and acceptable to the Department. Disposal methods shall prevent contamination of water and not cause a public health nuisance.

G. If a system will be installed where low temperature may be a factor, design and installation shall address the effects of the low temperature.

H. Composting toilets shall be operated according to manufacturer's specifications.

18.3 Incinerating Toilets

An approved incinerating toilet shall be designed and installed in accordance with all applicable federal, state, and local air-pollution requirements and manufacturer's instructions. Incineration toilets shall meet the requirement of NSF P157 or equivalent

18.4 Pit (non-vaulted) Privies

A. The construction of new pit privies is prohibited.

B. The continued use of existing pit privies is prohibited except for limited occupancy dwellings and remote recreational facilities.

C. For existing pit privies, the bottom of the pit shall be located above at least four feet of suitable soil and four feet above a limiting condition.

18.5 Rock Plant Filters (Constructed Wetlands)

A. A rock plant filter system shall be designed by a professional engineer.

B. The design shall be site specific and include specifications for: loading, capacity, dimensions, liner material, filter media, effluent depth and depth control mechanism, density and species of plant material, and other site specific information.

C. The treated effluent from a rock plant filter shall be distributed to a soil treatment area.

D. Although capable of producing higher level treatment, rock plant filters shall not be assigned a treatment level higher than TL1 because of system and seasonal variability.

18.6 Vaults

A. Vaults for full time use in new construction are prohibited where a property can accommodate an OWTS with a soil treatment area.

B. Vaults for full time use may be permitted when a failing OWTS cannot be replaced.

C. Vaults may be permitted for limited use occupancy on a property which cannot accommodate an OWTS with soil treatment area.

D. Vaults may be permitted if the facility is on land where the installation of an OWTS with soil treatment area is not permitted.

E. Vaults may be permitted for systems where some of the wastewater flows are separated, such as toilet wastes only, into a vault. The portion not retained in the vault shall be treated in an adequately-sized OWTS.

F. Vaults for non-residential use shall have a minimum 500 gallon effective volume or be capable of holding a minimum of the two-day design wastewater flow, whichever is larger.

G. Vaults for residential use shall have a minimum 1,000 gallon effective volume or be capable of holding a minimum of the two-day design wastewater flow, whichever is larger.

H. Vaults shall have a visual or an audible signal device or both, indicating filling to a maximum of 75 percent capacity, to indicate when pumping is necessary.

I. Vaults shall meet the strength and watertightness requirements for septic tanks and shall meet the same installation and construction standards that apply to septic tanks, except that the vault shall contain a single compartment and no effluent outlet shall be provided.

J. Prefabricated fiberglass, fiberglass-reinforced polyester, and plastic tanks may be used as vaults, if the tank manufacturer provides testing criteria certifying them for this use.

K. Vaults shall be located in an area that is readily accessible for routine pumping during all seasons of the year as documented by a letter from a Systems Cleaner.

L. Vaults used in conjunction with a gray water system, shall be placed at least five feet away from the gray water septic tank and such that the top of the vault is one foot horizontally below the top of the gray water tank, unless it can be demonstrated to the satisfaction of the health officer that a connection between the vault and the gray water tank cannot readily be made.

M. The owner of a system that includes a vault shall obtain and maintain a contract with a Systems Cleaner for the routine pumping of the vault. The owner shall maintain copies of all pumping receipts for a period of three years and shall furnish copies to the Department upon request.

18.7 Vaulted Privy

A. The continued use of vaulted privies is permitted.

B. A vaulted privy shall be built to include:

1. fly and rodent-tight construction;
2. a superstructure affording complete privacy;
3. an earth mound around the top of the vault and below floor level that slopes downward away from the superstructure base for the purpose of diverting surface water away from the vault;
4. a floor, and a riser of concrete or other impervious material with hinged seats and covers of easily cleanable, impervious material;
5. venting that is fly-proofed with No. 16 or tighter mesh screening; and
6. an effective volume of the vault shall be no less than 400 gallons and constructed of concrete or plastic. The vaults for privies shall meet the structural and watertightness standards of vaults.

18.8 Wastewater Ponds

Wastewater ponds shall meet the requirements set forth in Section 43.12.C of Regulation 43 and shall require approval by the Board of Health.

18.9 Other Treatment Systems

Treatment systems other than those discharging through a soil treatment area or sand filter system shall meet the requirements of Section 43.12.H of Regulation 43 and shall require approval by the Board of Health.

This page intentionally left blank.

19.0 Responsibility

A. The owner shall be responsible for maintenance of an OWTS unless the responsibility has been contractually assigned to a tenant or a third party or a public, quasi-public, or political subdivision.

B. Any person denying responsibility for the proper operation and maintenance of an OWTS shall bear the burden of proof for such denial upon establishment of ownership or possessory rights for the property served by the system.

19.1 Maintenance and Cleaning

Unless required as a condition of approval or set forth in an operating permit, the following inspection and maintenance schedule is recommended for all OWTS to ensure good working order.

Table 19-1 MAINTENANCE RECOMMENDATIONS

TYPE OF SYSTEM	INSPECTION OR MAINTENANCE	CLEANED OR PUMPED
Septic tanks	Annually	Every 2-4 years
Vaults, privy vaults, holding tanks		At 80 percent capacity
Aeration, mechanical or higher level treatment units	Per Installation or Operating Permit conditions	
New Technology Devices		

19.2 Monitoring and Sampling

A. For an OWTS for which monitoring of effluent is required, the Department or delegated third party shall collect and test effluent samples to ensure compliance with the provisions of these Regulations.

B. Sampling may be required by the Department in conjunction with an enforcement action.

C. Any owner or occupant of property on which an OWTS is located may request the Department to collect and test an effluent sample from the system. The Department may perform such collection and testing services. The owner or occupant shall pay for these services.

D. If the Department or a delegated third party collects and tests effluent samples, a fee not to exceed that which is allowed by the OWTS Act may be charged for each sample collected and tested. Payment of such charge shall be stated in the permit as a condition for its continued use.

E. Conditions when the Department can require routine monitoring include:

1. indications of inadequate performance;
2. location in sensitive areas;

3. experimental systems; and/or

4. systems under product development permits.

F. Sampling and analysis shall be performed according to American Public Health Association, American Water Works Association, and Water Environment Federation: Standards Methods for the Examination of Water and Wastewater, 21st edition.

19.3 Disposal of Waste Materials

Disposal of waste materials (excluding liquid wastes and sludge) removed from a system in the process of maintenance or repair may be accomplished at the site in a manner that complies with State and local regulations, provided it does not create a hazard to the public health, a nuisance, or risk of pollution of surface or ground water. Liquid wastes and sludge shall be removed by a Systems Cleaner for proper disposal.

19.4 Termination of Use of System

A. A septic tank, vault or holding tank shall be abandoned in the following manner.

1. A tank may be completely removed and the parts disposed of safely.

2. If the tank will remain in place:

a. electrical lines, if present, shall be removed;

b. the inlet and outlines shall be capped or removed;

c. the tank shall be pumped to remove as much waste as possible;

d. the bottom of the tank shall be broken so the tank neither floats nor fills with water;

e. the top shall be collapsed and the sides may be broken into the void; and

f. the remaining void shall be filled with gravel, sand or compacted soil, re-graded to match the surrounding topography, and re-vegetated.

B. An absorption bed or trench, mound, or evaporation system may be abandoned in place by disconnecting and capping the inlet line.

C. A seepage pit, cesspool or other system that contains a large internal void shall be abandoned by pumping out the liquid contents, capping or removing the inlet line, then either collapsing the void or filling with soil or other inert materials to prevent subsidence or collapse.

D. A non-vaulted privy shall be abandoned by pumping any liquid material from the privy pit, treatment with quicklime or other disinfectant, then back-filling the pit with soil or inert materials. The privy structure may remain in place provided that the stool is removed and a solid floor placed in the structure.

E. The Department may require abandonment of a tank or other system component that is deemed to be a hazard.

F. The owner shall report the abandonment of any system to the Department within 30 days.

MINIMUM SEPARATION DISTANCES

Appendix A

1.0 Setback Requirements

A. Horizontal distances from the various components of a system to pertinent terrain features shall be in accordance with Table A-1.

B. Where soil, geological or other conditions warrant, greater distances may be required by the Board of Health or by the Water Quality Control Commission pursuant to §25-8-206, C.R.S. and applicable regulations.

C. For repairs to existing OWTS where the size of lot precludes adherence to these distances, the proposed STA shall not be closer to setback features than the existing OWTS, as reviewed and approved by the Department per Section 5.1. Components that are not watertight should not extend into areas of the root system of nearby trees.

2.0 Modifications and Reductions

A. All requests for distance setback modifications shall be analyzed and approved by the Department and be in complete compliance with the variance procedures of these Regulations. Acceptable methods of analyzing horizontal separation distances with higher treatment levels include but are not limited to:

   1. analyzing the intended uses of impacted surface and/or ground waters;

   2. contacting adjacent property owners for potential conflicts with property line encroachments; and

   3. analyzing potential impacts that system locations may have on building foundations and other potentially affected features.

B. Reductions in separation distances with higher level treatment shall include provisions for operation and maintenance for the life of the system, as described in Section 11.

3.0 Dry Gulches, Cut Banks and Fill Areas

A. Separation distances to dry gulches, cut banks and fill areas in Table A-1 shall apply unless the designer or design engineer determines by observation of the exposed slope of the dry gulch or cut bank or by profile holes or soil profile test pit excavations that a restrictive layer is present that will direct or allow the effluent from the soil treatment area to move laterally and surface.

B. A lesser distance may be used if it can be demonstrated by a professional engineer or professional geologist that the use of a barrier, such as a minimum 30 mil PVC liner placed between the soil treatment area and the slope of the dry gulch, cut bank or fill area will prevent effluent surfacing laterally.

C. The separation distance between a component and the crest of a dry gulch or cut bank shall be evaluated for potential erosion or slope instability if the component and the slope are too close together. If there is potential for erosion or instability, the separation distance shall be increased until the risk is minimized.

D. Components of an OWTS listed in Table A-1 shall be installed or located in accordance with the minimum distance requirements provided in this table.

Table A-1 - MINIMUM HORIZONTAL DISTANCES IN FEET BETWEEN COMPONENTS OF AN OWTS AND WATER, PHYSICAL AND HEALTH IMPACT FEATURES

	Septic tank or higher level treatment unit, dosing tank, vault	Building Sewer or effluent lines	STA trench or bed, unlined sand filter, subsurface dispersal system or seepage pit	Lined sand filter, lined evapotranspiration field	Unlined sand filer in soil with a percolation rate slower than 60 MPI, unlined or partially lined evapotranspiration system, or systems not relying on STA for treatment (other than aerosol)	Vaulted Privy	Existing Pit Privy	Aerosol dispersal methods
Wells, potable springs, suction lines	50[1]	50[1]	200[2] (100)[5,6]	60	100	50	200[2] (100)[5]	200[2]
Springs	50[1]	50[1]	100[2]	60	100	50	100[2]	100[2]
Potable water supply lines	10[1]	10[1]	25[1]	10[1]	25[1]	10[1]	50[1]	10[1]
Potable water cisterns	25	25[1]	25	25	25	25	25	50
Dwelling or occupied building	5	0	20	15	15	15	25	125
Property lines, piped or lined irrigation ditch	10	10[1]	10	10	10	10	NA	10
Subsurface drain, intermittent irrigation lateral, drywell or storm water infiltration structure	10	10[1]	25	10	25	10	25	0
Lake, watercourse, irrigation ditch, stream, wetland	50	50[1]	50[2] (25)[3]	25	25	25	100	25[2]
Dry gulch, cut bank, fill area (from crest)	10	10[1]	25 (10)[4]	10	15	10	25	10

TABLE NOTES

1. Crossings or encroachments may be permitted at the points as noted above provided that the water or wastewater conveyance pipe is encased for the minimum setback distance on each side of the crossing. A length of pipe shall be used with a minimum Schedule 40 rating of sufficient diameter to easily slide over and completely encase the conveyance. Rigid end caps of at least Schedule 40 rating shall be glued or secured in a watertight fashion to the ends of the encasement pipe. A hole of sufficient size to accommodate the pipe shall be drilled in the lowest section of the rigid cap so that the conveyance pipe rests on the bottom of the encasement pipe. The area in which the pipe passes through the end caps shall be sealed with an approved underground sealant compatible with the piping used.

2. Except for systems with effluent that meets TL3N, add eight feet additional distance for each 100 gallons per day of design flows between 1,000 and 2,000 gallons per day, unless it can be demonstrated by a professional engineer or geologist by a hydrologic analysis or the use of a barrier, consisting of a minimum 30 mil PVC liner or equivalent, that contamination will be minimized.
3. Minimum setback of 25 feet permitted for systems receiving TL2N, TL3 and TL3N effluent
4. Minimum setback of 10 feet permitted for systems receiving TL2N, TL3 and TL3N effluent
5. Minimum setback of 100 feet permitted upon submission of a written report demonstrating compliance with the provisions of Appendix D.
6. Minimum setback of 100 feet permitted for effluent meeting TL2N or better or for effluent where toilet wastes have been removed for separate treatment and disposal.

This page intentionally left blank.

TABLES of WASTEWATER FLOWS and STRENGTH

Appendix B

1.0 Estimates of Wastewater Flow

The table in this section provides standardized estimates of wastewater flows and strength from various facilities. Actual, documented flows from similar facilities may be used for design purposes if they meet the requirements of Section 13.3. Flow from facilities not referenced in this table shall be as set forth in Regulation 43, Table 6-2.

Table B-1 – WASTEWATER FLOW AND STRENGTH FOR SINGLE OR MULTI FAMILY DWELLINGS

Bedrooms	gal/day	lbs. /BOD_5/ day	Bedrooms	gal/day	lbs. /BOD_5/ day
1*	150	0.40	4	525	1.4
2	300	0.80	5	600	1.6
3	450	1.20	additional, add	75	0.20

**may be used only for existing dwellings that either have only one (1) bedroom, or where separate bedrooms are not provided within the structure*

Table B-2 – WASTEWATER FLOW AND STRENGTH FOR SINGLE OR MULTI FAMILY DWELLINGS (FIXTURE FLOW)

Fixture	gal/day	lbs. /BOD_5/ day	Fixture	gal/day	lbs. /BOD_5/day
Water closet	24.8	.029	Kitchen sink*	5.8	.052
Clothes washer	19.5	.037	Lavatory	8.4	.021
Bath/shower	14.7	.014	Dishwasher	1.8	.002
TOTAL FLOW PER PERSON PER DAY				**75**	**0.2**

**includes garbage disposal*

Table B-3 – WASTEWATER FLOW AND STRENGTH FOR NON-RESIDENTIAL OR COMMERCIAL FACILITIES

PUBLIC ACCOMMODATIONS	GPD	lbs. /BOD_5/day
Hotels and motels per room without private baths	50	.15
Hotels and motels per room with private baths	75	.15
Multiple-family dwellings or apartments	75	.20
Boarding and rooming houses per room	50	.15
Mobile home (per person)	75	.20
Mobile home park (per space)	300	.80
COMMERCIAL WASTEWATER	**GPD**	**lbs. /BOD_5/day**
Facilities with short-term or transient visitors such as fairgrounds per person attending; ball parks, race tracks, stadiums, theaters or auditoriums, per seat	5	.02
Barber and beauty shops, per chair	100	.70*
Country club, per member	30	.02
County club, per employee	20	.06
Dental offices, per non-wet chair	50	.14*

Medical offices, per doctor	250	.80*
Kennels, per run	30	.20
Laundries, self-service, per commercial washer	400	.75
Office buildings, per employee per eight-hour shift	15	.06
Service stations, per toilet fixture	250	.50*
Stores and shopping centers, per square foot of retail space	.1	.01*
FOOD SERVICE ESTABLISHMENTS	**GPD**	**lbs. /BOD_5/day**
Restaurant open 1 or 2 meals, per seat	50	.06/meal
24-hour restaurant, per seat	75	.07/meal served
Restaurant with paper service only, per seat	25	.01/meal served
Additional for bars and cocktail lounges, per seat	30	.02
Drive-in restaurant, per car space	50	.02
INSTITUTIONS W/O KITCHENS UNLESS OTHERWISE NOTED	**GPD**	**lbs. /BOD_5/day**
Religious institutions, per person	5	.01
Hospitals, per bed space	250	.20
Nursing homes, per bed space	100	.17
Schools, Day, without cafeteria, gym or showers	15	.04
Schools, Day, with cafeterias, no gym or showers	20	.08
Schools, Day, with cafeterias, gym and showers	25	.10
Schools, Day, additional for employees	15	.06
RECREATIONAL AND SEASONAL FACILITIES	**GPD**	**lbs. /BOD_5/day**
Camps, day, no meals served	15	.12
Luxury resort, per person	125	.17
Resort night and day, per person	50	.12
Campground, per campsite**	50	.12
Public park flush toilet, per fixture per operating hour	36	.04 lbs./ fixture
Public park urinal, per fixture per operating hour	10	.01 lbs./fixture
Public park shower, per fixture per operating hour	100	.10 lbs./ fixture
Public park faucet, per fixture per operating hour	15	.04 lbs./ fixture
Swimming pools and bathhouses, per user	10	.06
Travel trailer parks, per unit (water and sewage hookup)**	50	.12
Travel trailer park, per unit (no water and sewage)**	50	.12

TABLE NOTES:

* BOD_5 levels may need further verification

**Laundry facilities, if provided, are to be calculated on a per commercial washer basis in accordance with other elements of this table.

2.0 Multiple Flow Factors

For design purposes, estimates of sewage flow rates may require inclusion of several flow factors from Table B-3. Examples:

CASE I: Daily sewage flow rate for a 30-run dog kennel with 3 employees would be calculated as follows:

30 runs x 30 gal / run / day	=	900	GPD
3 employees x 15 gal / employee / day	=	+45	GPD
TOTAL DAILY SEWAGE FLOW		**945**	**GPD**

CASE II: Daily sewage flow rate for a 2,000 sq. ft. retail store with 5 employees and public restrooms would be calculated as follows:

2,000 sq. ft. x 0.1 gal / sq. ft. / retail space=	200	GPD
5 employees x 15 gal / employee / day=	+75	GPD
TOTAL DAILY SEWAGE FLOW	**275**	**GPD**

NOTE: Flow rate shown for "employees" is based on a typical 8-hour shift; if the facility is operated additional hours the flow rate must be adjusted accordingly.

This page intentionally left blank.

LONG TERM ACCEPTANCE RATES

Appendix C

Soil Type, Texture, Structure and Percolation Rate Range					Corresponding Long Term Acceptance Rate (LTAR) in gallons per day per sq. ft.				
Soil Type	USDA Soil Texture	USDA Soil Structure-Shape	USDA Soil Structure-Grade	Percolation Rate (MPI)	Treatment Level 1[1]	Treatment Level 2[1]	Treatment Level 2N[1]	Treatment Level 3[1]	Treatment Level 3N[1,3]
0	Soil Type 1 with more than 35 percent rock (>2 mm) and Soil Types 2-5 with more than 50 percent rock (>2 mm)	--	Single Grain	<5	1.0 (minimum 3-foot deep unlined sand filter required [2])	1.0 (minimum 2-foot deep unlined sand filter required [2])			
1	Sand, Loamy Sand	--	Single Grain	5-15	0.80	1.25	1.25	1.40	1.40
2	Sandy Loam, Loam, Silt Loam	Prismatic Blocky Granular	Moderate Strong	16-25	0.60	0.90	0.90	1.00	1.00
2A	Sandy Loam, Loam, Silt Loam	Prismatic Blocky Granular None	Weak Massive	26-40	0.50	0.70	0.70	0.80	0.80
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	Prismatic Blocky Granular	Moderate Strong	41-60	0.35	0.50	0.50	0.60	0.60
3A	Sandy Clay Loam, Clay Loam, Silty Clay Loam	Prismatic Blocky Granular None	Weak Massive	61-75	0.30	0.40	0.40	0.50	0.50
4	Sandy Clay, Clay, Silty Clay	Prismatic Blocky Granular	Moderate Strong	76-90	0.20	0.30	0.30	0.30	0.30
4A	Sandy Clay, Clay, Silty Clay	Prismatic Blocky Granular None	Weak Massive	91-120	0.15	0.20	0.20	0.20	0.20
5	Soil Types 2-4A	Platy	Weak Moderate Strong	121+	0.10	0.15	0.15	0.15	0.15

TABLE NOTES

1. Treatment levels are defined in Tables 13-2 and 17-1.
2. Unlined sand filters in these soil types shall provide pathogen removal. Design shall conform to Section 16.
3. Higher LTAR for Treatment Level 3N may be allowed for OWTS required to have a discharge permit, if the capability of the design to achieve a higher LTAR can be substantiated.

This page intentionally left blank.

For this Appendix, the following terms and definitions shall apply:

"Affected well" means a water well that will be located less than 200 feet, but more than 100 feet from any STA, existing or proposed, that receives TL1 or TL2 effluent.

"Annular space" means the void between the outside of the well casing and the walls of the well bore hole.

"Grout" means any material, approved by the State Board of Examiners of Water Well Construction and Pump Installation Contractors, that is used to form a permanent impermeable seal in the annulus between the casing and the borehole wall or between two strings of casing, or that is used in plugging, sealing, and abandoning boreholes or wells.

2.0 General Requirements

A. A site-specific surface and subsurface geological report is required in support of a request for a minimum separation between wells and STA receiving TL1 or TL2 effluent that is less than 200 feet but more than 100 feet.

B. A minimum of one excavation test pit that meets the requirements of Section 12.5 is required within or immediately adjacent to the proposed STA. All excavations shall remain open for inspection by the health officer unless previously arranged and shall be suitably protected to prevent unauthorized entry. Excavations are not required when the reduction is for an off-site, existing STA.

3.0 Reduction Based on Suitable Soil Conditions

A. If the onsite investigation documents the presence of eight feet of suitable soil as defined by these Regulations, a distance separation of not less than 100 feet between wells and STA receiving TL1 or TL2 effluent shall be permitted.

B. Blasting to install the system shall not be permitted.

4.0 Reduction Based on Impermeable Bedrock Conditions

A. If the onsite investigation documents the presence of less than eight feet of suitable soil as defined in Regulations, but the soil layer is underlain by impermeable, un-fractured bedrock with no visible conduits for effluent flow, a distance separation of not less than 100 feet between wells and STA receiving TL1 or TL2 effluent shall be permitted.

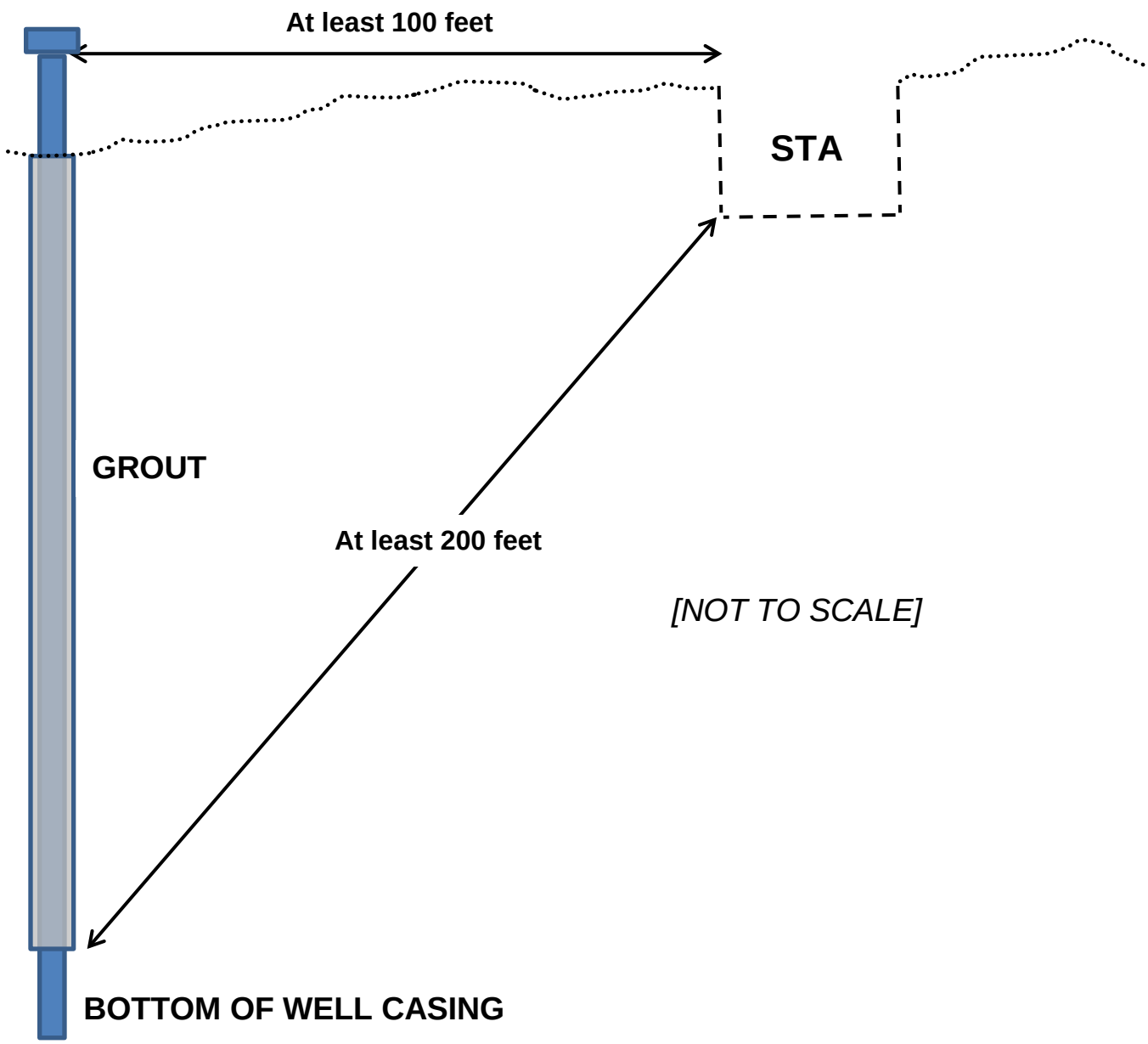
B. Blasting to install the system shall not be permitted.

5.0 Reduction Based on Well Grouting

A. If the onsite investigation fails to document any of the soil or geological conditions in Section 3.0 or Section 4.0 of this Appendix, a minimum separation distance between a well and STA receiving TL1 or TL2 effluent of not less than 100 feet shall be permitted provided that an impervious grout is placed within the annular space of the affected well

sufficient to maintain a 200 foot diagonal separation distance between the bottom of the grout and the STA as shown in Figure 1.

Figure 1 - Determination of 200-Foot Minimum Separation Distance Between Deep-Grouted Well and STA.



B. In support of such a request, the design engineer shall:

1. provide a scaled drawing showing the depth to which the grouting shall extend to assure the required 200 foot diagonal separation, including relative positions of wells and STA and accounting for the topographic slope;

2. specify the type of grouting materials to be used;
3. specify the manner in which the grout will be introduced into the annular space; and
4. determine the volume of the grout required to fill the annular space.

C. The health officer may require the design engineer to certify that the grouting has been done in accordance with their proposal.

D. Such a reduction will not be allowed where a higher level treatment system can be installed to meet the required minimum setback. However, if the onsite well must be grouted to allow a distance of less than 200 feet to an off-site system, this method may also be used in support of a request for a reduced setback to the onsite well.

6.0 Written Report Requirements

A. A written report in support of the proposed distance reduction shall be prepared by, or under the supervision of, a professional geologist or professional engineer and submitted to the Department at the time of application for a permit to install an OWTS.

B. The report shall detail all site-specific surface and subsurface geologic information and relate such information to regional geology and hydrology. This information shall include, at a minimum:

1. a description of the thickness and characteristics of surficial deposits; and
2. a scaled geologic log of the highest wall of the open excavation, showing surficial and bedrock units, weathering zones, and fracture or joint sets.

7.0 Other Methods for Allowing Distance Reductions

The Board may consider the use of other methods for determining the suitability of distance reductions as a variance from the requirements of these Regulations.

This page intentionally left blank.

Jefferson County Public Health	SUMMARY of TREATMENT LEVEL OPTIONS	Appendix E

The installation of an OWTS providing higher level treatment as set forth in Table 13-2 and Section 17 allows for various distance reductions and other considerations, providing the engineer with a variety of options in the design and placement of such a system. These options are summarized below (TL1 is not considered higher level treatment but is provided for comparison purposes).

NOTE: This is a summary of regulatory requirements – refer to the text of the Regulations for additional details on the specific requirements.				**Minimum Horizontal Distance Setbacks in feet *(from Appendix A, Table A-1)***			**Minimum vertical separation in feet between STA infiltrative surface and ground water or limiting layer *(from Table 16-3)***	
Treatment Levels (from Table 13-2)	**Method of dosing *(See Section 15.11 through 15.15)***	**STA maximum bed width (in feet)**	**Operating permit required *(See Section 11)***	**STA to wells – on or off-site**	**STA to surface waters**	**STA to dry gulch**	**Standard bed or trench**	**Unlined Sand Filter**
TL1	Pump or siphon[1]	12[5]	NO	200	50	25	4 (3)[2]	2[3]
TL2	Pressure Only	None	YES				3	0[4]
TL2N	Pressure Only		YES	100	25	10	2	0[4]
TL3								
TL3N								

TABLE NOTES

1. Dosing is not required if due to topography a siphon will not function properly, or for system designs with a flow rate of 150 GPD or less unless otherwise provided for in these Regulations.

2. Allowed with pressure dosing.

3. The bottom of the required three-foot sand layer shall be at least two feet above the high ground water surface or bedrock for installations in which effluent is percolated downward through the soil.

4. The bottom of the required two-foot sand layer shall be at or above the high groundwater surface or bedrock for installations in which effluent is percolated downward through the soil.

5. Except for repairs to existing systems per Section 16.16.

This page intentionally left blank.

REGULATORY CITATIONS and THIRD PARTY STANDARDS

Appendix F

The following is a summary of various regulatory citations and third party standards as referenced in these Regulations.

CITATIONS FROM THE COLORADO REVISED STATUTES (C.R.S)					
CITATION (§)	Pages	CITATION (§)	Pages	CITATION (§)	Pages
12-25-1	*10*	**25-8-201**	*4*	**25-10-106 (1) (j)**	*31*
18-1.3-503	*32*	**25-8-206**	*91*	**25-10-106 (1) (k)**	*32*
23-41-208	*10*	**25-8-501**	*17*	**25-10-108 (1)**	*37*
24-4-105	*30*	**25-8-702**	*17*	**25-10-108 (2)**	*37*
25-1-513	*30*	**25-10-101**	*9*	**25-10-109 (1)**	*32*
25-8-101	*17*	**25-10-103 (12)**	*1*	**25-10-109 (2)**	*32*
25-8-103	*12-13*	**25-10-106**	*32*	**25-10-113**	*41*
25-8-103 (5)	*5*	**25-10-106 (1) (h)**	*19*	**34-1-201**	*10*

CITATIONS FROM THE CODE OF COLORADO REGULATIONS (CCR)					
CITATION	Pages	CITATION	Pages	CITATION	Pages
3 CCR 710-1	*60*	**5 CCR 1002-41**	*17*	**5 CCR 1002-61**	*17*
3 CCR 720-1	*4, 62*	**5 CCR 1002-42**	*17*	**5 CCR 1002-62**	*17*
5 CCR 1002-22	*17*	**5 CCR 1002-43**	*8, 11*	**5 CCR 1003-6**	*8*

REFERENCES TO THIRD PARTY STANDARDS					
STANDARD	Pages	STANDARD	Pages	STANDARD	Pages
AASHTO M252	*61*	**ASTM D3034**	*61*	**NSF/ANSI 46**	*63*
AASHTO M43	*74*	**ASTM F405**	*61*	**NSF/ANSI 245**	*9, 57*
ASTM C33	*82*	**IAPMO/ANSI Z1000-2007**	*65-66*	**NSF P157**	*86*
ASTM C1227-12	*65-66*	**NSF/ANSI 40**	*15*		
ASTM D448	*74*	**NSF/ANSI 41**	*85*		

This page intentionally left blank.

INDEX

A

Absorption systems, 3
Access
  denied to rodents and insects, 85
  for components, 59
  for inspections, 45
Access to site, 22
Affected wells, 101
Alternating systems, 78
American Public Health Association, 90
American Water Works Association, 90
Annular space, 101
Applicant, 3
Applications
  expiration of, 21
  extension of, 21
  review and permitting, 24
  submittal requirements, 21

B

Bedrock
  defined, 3
  depth to, 51
  determination of, 48
  in written report, 53
  required elevation above, 73
Beds
  and distribution lines, 74
  deep gravel adjustments for, 78
  defined, 3
  maximum width of, 74
  oriented along contours, 72
  separation between, 74
  width allowed for repairs, 77
Biochemical Oxygen Demand, Five Day (BOD_5)
  defined, 3
  in treatment levels, 57
  in wastewater flows, 95-96
  testing for, 56
Biochemical Oxygen Demand, Carbonaceous Five Day ($CBOD_5$)
  defined, 3
  in treatment levels, 57
  testing for, 56
Blasting
  defined, 3
  prohibited for distance reductions, 101
Board of Examiners of Water Well Construction and Pump Installation Contractors, 27
Board of Health
  approval of other treatment systems, 87
  approval of wastewater ponds, 87
  declaration of public interest, 1
  defined, 3
  findings on appeal, 29
  reconsideration of denied applications, 29
  review of applications denied by health officer, 29
  review of discharge permits, 17
  review of experimental systems, 37
  to approve increased setback distances, 91
  variance and review proceedings, 27-28
Building sites, 21
Burden of proof, 27

C

Cease and desist orders, 31
Cesspools
  abandonment of, 90
  continued use prohibited, 19
  defined, 3
Chambers
  defined, 3
  installation requirements for, 75
  placement of distribution pipe in, 75
  sizing reductions for, 71-72
Chemical toilets, 85
Cisterns, 3
Cities and counties, 18

Class V injection wells, 57
Cleaning, 3
Code of Colorado Regulations, 107
Colorado Revised Statutes, 107
Commission
approval of discharge permits, 17-18
approval of increased setback requirements, 91
defined, 4
Competent technician
defined, 4
qualifications for, 54
tests performed under, 48
Components
access for sampling, 62
access for maintenance, 59
defined, 4
general standards for, 59
operating instructions for, 59
Composting toilets
defined, 4
design criteria for, 85
Conceptual approvals
expiration of, 29
permitting requirements, 29
provisions for, 28
Consistence, 4
Control panels
for pump systems, 70
inspection of, 44
to be secured after inspection, 45
Covered transactions
and use permits, 39
defined, 4
Crest
defined, 4
separation distance from, 91
Crossings, 92

D

Deep gravel systems
calculation of, 77
defined, 4
when permitted, 77
Department, 5
Designs
and septic tanks, 65
defined, 5
requirements for application, 21
to acount for low temperatures, 85
Design capacity
defined, 5
for systems greater than 2000 gpd, 17
for systems less than 2000 gpd, 17
Design document, 53
Design flow, 5, Also see Flow, design
Designer, on-site wastewater treatment systems, 5
Discharge into surface waters, 17
Disclaimer, 26
Disposal of waste materials, 90
Distance setbacks
measurements of, 91
modifications of, 91
provisions for, 72
reductions in, 101
table of required, 92
Distribution
defined, 5
pressure, 75
pressure, for HLT systems, 81
Distribution boxes
defined, 5
in design document, 53
specifications for, 60
Distribution, drip, 6
Distribution lines, 73
Distribution systems, 82
District Court for Jefferson County, 31
Division
applications to be made to, 17
defined, 5,
submission of discharge permit to, 17
Domestic wastewater treatment works, 5
Dosing
defined, 5
demand, 5
location of siphon or pump, 69
minimum required dose, 69
pressure, 5
timed, 6

when not required, 69
Dosing siphons
access to, 70
defined, 6
discharge piping for, 69
dual, 77
Dosing tanks, 6
Drainfields, 6
Drip distribution systems, 75
Drip emitters, 6
Drip tubing
defined, 6
in drip distribution systems, 75
Drop boxes
defined, 6
design of, 60
in design document, 53
Dry gulches, See Gulch, dry
Drywells, 6

E

Easements
in design criteria, 47
recording of, 23
requirements for, 23
Effective size
defined, 6
for filter media, 82
Effluent
access for sampling, 62
and pumping systems, 63
and sand filters, 82
defined, 6
Effluent filters, See Effluent screens
Effluent lines, 6
Effluent screens
accessability of, 59
cleaning of, 68
defined, 7
in septic tanks, 67
location of, 68
when used with pumps, 68
Electrical equipment, 60
Emergency use permits, 31
Encroachments
allegations of, 24
conditions for allowing, 92
Engineer certification of installations, 25
Environmental Protection Agency, 57
Erosion, 68
Evapotranspiration systems
defined, 7
design of, 76
width of beds in, 77
Experimental systems
Board of health to approve, 37
defined, 7
requirements for, 37

F

Failure, 7
Fees
for operating permits, 43
for permit applications, 21
for use permits, 39
Federal Emergency Management Agency, 7
Floats and switches, 60
Floodplains
and preliminary investigations, 47
defined, 7
installations prohibited in, 19
Floodways
defined, 7
installations prohibited in, 19
Floor drains, 60
Flow
for auxiliary structures, 56
no reductions for graywater, 55
stored, 56
use of multiple flow factors, 96
Flow, daily, 7
Flow, design
defined, 7
for single family dwellings, 55
for nonresidental and auxiliary buildings, 55
for multi-family and commencial structures, 56

Flow equalization
defined, 7
methods used to calculate, 56
Flow equalizer, 7
Foundation drains, 68

G

Geological reports, 101
Gravel, 74
Gray water
and use of composting toilets, 85
no reductions in flow rate, 55
strength of, 55
Grease interceptor tanks
defined, 8
specifications for, 60
when required, 60
Ground water
analysis of intended uses, 91
defined, 8
seasonal high levels of, 48
Ground water surface, 8
Grout, 101
Guidelines, 8
Gulch, dry
defined, 8
separation distances from, 91

H

Hardships, 27
Health officer, 8
Higher level treatment, 8
Higher level treatment systems
and use permits, 44
general requirements for, 81
instruction plate required, 81
pressure dosing required, 81
pump controls, 70
Higher level treatment unit, 8
Holding tanks, 61

I

Incinerating toilets, 86
Indicators of capacity, 61
Indicators of failure, 61
Individual sewage disposal systems, 8
Infiltrative surfaces
and manufactured media, 75
and placement of chambers, 75
defined, 8
in design document, 53
maximum depth of, 72
proposed depth of, 49
shall be level, 71
soil type at, 51
written report to include, 53
Inspection and maintenance requirements
for operating permits, 44
Inspection ports
defined, 8
minimum requirements for, 73
Inspections
and owner-installers,34
and system contractors, 33
card must be posted, 33
for auxilary unit connections, 56
right of entry to perform, 18
when engineer may perform, 25
when required, 25
Installations
general requirements for, 33
procedures in design document, 54
system contractor license reqired, 33
Inverts, 8

J

Jefferson County Government
Clerk and Recorder, 23
Planning and Zoning Division, 21
Planning Commission, 22
Public Health, See Department

L

Lake evaporation rate, 76
Landscape position
defined, 8
noted in reconnaissance visit, 48
Leach field, 8, Also see Soil treatment area

Limited occupancy
and use permits, 39
defined, 9
Limiting conditions
defined, 8
to be referenced in designs, 48
Limiting layers
defined, 8
determination of, 51
Liners
defined, 9
minimum thickness of, 91
Long-term acceptance rate
and percolation rates, 50
and pressure distribution, 75
defined, 9
methods to determine, 48
soil type used to determine, 51
table of, 99
Lot sizes
for existing properties, 22
for new subdivisions, 22
for repairs, 31
LTAR, 9
Lysimeters, 62

M

Maintenance and cleaning
and operating permits, 44
component requirements, 59
recommendations for, 89
Malfunctions, 9
Manholes
for septic tanks, 67
for treatment components, 59
Media, 9
Media, manufactured
as alternative to rock, 82
defined, 9
general requirements for, 75
sizing calculations for, 72
Media, treatment, 9
Minor repairs, 18
Monitoring and sampling, 89
Mounded Sand Filter
defined, 9
design criteria for, 82
placement of gravel layer, 82
Municipalities and special districts, 19

N

National Flood Insurance Program, 7
New technology devices, 28
Nitrogen reduction, 9
Non-residential auxiliary buildings, 55
Non-vaulted privy, See Privies

O

Oil / water separators, 61
On-site wastewater treatment systems, 9
Operating permits
and use permits, 39
application requirements for, 43
conditions for issuance, 43
defined, 9
fees for, 43
penalties, 45
renewal of, 45
when required, 43
Operation and maintenance contracts, 39
Other treatment systems, 87
Owner
defined, 10
must ensure functional facilities, 17
must obtain required permits, 21
requirements for sealed vaults, 87
responsibility for maintenance, 89
responsibility for site marking, 23
shall report abandonment, 90
Owner-installers, 34
OWTS Act
and permit issuance, 24,
and repair permits, 31
authority to regulate under, 1
compliance with, 22
defined, 9
design capacity must comply, 17

P

Penalties, 32
Percolation test holes
  diameter and depth of, 49
  general requirements for, 49
  in written reports, 52
  marking and protection of, 52
  number required, 48
  preparations for, 49
Percolation rates
  and long term acceptance rates, 99
  determination and reporting of, 50
  measurement of, 49
Percolation tests
  alternate, 51
  and surface activity, 18
  basis for waiver of, 51
  defined, 10
  documentation of, 50
  qualifications to perform, 48
  when required, 48
Performance standards, 10
Permeability, 10
Permits
  appeal of denials, 29
  changes in plans or specifications, 24
  changes in terms or conditions, 24
  defined, 10
  denial of, 24
  electrical, 60
  expiration of, 24
  fees for, 21
  for multiple connections, 19
  issuance of, 24
  plumbing, 62
  required for expanded use, 17
  when required, 18
Permits, repair, See Repair permits
Person, 10
Pipe
  bedding requirements for, 61
  cast iron, prohibited, 61
  distribution, 61
  minimum diamter for gravity distribution, 72
  open joint, prohibited, 61
  perforated, placement of, 74
  plastic, 61
  pressurized, 61
  sand filter underdrains, 82
  standards for, 61
  tile, prohibited, 61
Pit privies, See Privies
Plumbing code, 62
Porta potties, 85
Potable springs, 10
Preliminary site investigations, 23
Pressure distribution
  and higher level treatment units, 81
  and replacement soils, 72
  defined, 10
  design requirements for, 75
Privies
  abandonment of, 90
  and limited occupancy dwellings, 86
  defined, 10
  new installations prohibited, 86
  when continued use permitted, 86
Professional engineer, 10
Professional geologist, 10
Prohibition of system installations, 28
Proprietary product or technology, 10
Proprietary systems
  and operating permits, 44
  instructions for operation of, 59
  technology review process for, 81
Public domain systems
  and operating permits, 44
  Board of Health to approve, 81
  general requirements for, 81
  instructions for operation of, 60
Public domain technology, 10
Public hearings, 27-28
Public water systems, 11
Pump system controls, 70
Pump tanks, 66
Pumps, 63

R

Reconnaissance visit, 48

Redoximorphic
defined, 11
features as indicators of, 52
Regulation 43
defined, 11
variances from, 27
Repair permits
allowable systems for, 77
determination of bedrooms for, 55
dosing requirements for, 69
setback distances for, 91
variance requirements for, 27
Report and site plan, 52
Restrictive layer, 11
Review procedures, 28
Risers
defined, 11
for dosing siphon or pumps, 70
lids to ground surface, 59
minimum requirements for, 68
required over manholes, 67
tank connections for, 65
watertightness of, 66
Rock, See Gravel
Rock plant filter
defined, 11
design requirements for, 86
Roof drains, 68

S

Samples
access for sampling, 59, 62
analysis standards for, 90
when required, 89
Sand
for evaporation beds, 76
minimum depth for soil treatment areas, 82
specifications for, 82
Sand filters, lined
application rates for, 82
defined, 11
pressure dosing required, 82
specifications for, 82
Sand filters, mounded See Mounded sand filters
Sand filters, unlined
defined, 11
specifications for, 77
Seepage pits
abandonment of, 90
defined, 11
for new construction, 77
for repairs to existing systems, 78
Separation distances, 92
Septage
defined, 11
disposal of, 18
Septic tanks
abandonment of, 90
access for service, 68
anchoring of, 68
concrete, design requirements for, 65
data marking of, 66
defined, 11
installation of, 67
liquid capacities of, 65
metal tanks prohibited, 66
minimum detention time for, 56
proportions of, 67
watertightness of, 66
synthetic, design requirements for, 65
Sequencing zone systems, 77
Serial and sequential distribution, 74
defined, 12
specifications for, 74
Service providers
defined, 12
in written report, 52
responsibilities of, 45
Sewage, 12
Sewage treatment works, 12
Sewer lines
certain types prohibited, 61
clean outs required in, 62
minimum diameter of, 62
pipe specifications for, 61
pressurized, 61
Site and soil evaluations, 47
Site and system identification, 23

Site evaluation
defined, 12
in written report, 52, 53
Site protection, 54
Slit trench latrines
defined, 12
prohibited, 19
Soil evaluations, 12
Soil horizons
and limiting layers, 51
defined, 13
Soil investigations
design criteria for, 48
use of previously collected data for, 51
Soil logs, 52
Soil morphology, 13
Soil profile test pit excavations
as part of soil investigation, 48
defined, 13
in written report, 52
specifications for, 51
visual and tactile examination of, 51
when required, 51
Soil replacement, 72
Soil structure, 13
Soil texture, 13
Soil treatment areas
and operating permits, 43
defined, 13
final cover for, 72
final grading of, 72
in written report, 53
infiltrative surface, calculation of, 71
size adjustment factors for, 71
vertical separation requirements, 73
Soil treatment areas, alternating, 13
Soil treatment areas, sequencing, 13
Soils
defined, 12
replacement, 72
sandy, 50
saturated, 51
special soil types, 50
Splice boxes, 70
Spring, 13
State, 13
State Board of Examiners of Water Well Construction and Pump Installation Contractors, 101
State Electrical Board, 60
State health department, 13
State waters
and subsurface conditions, 24
defined, 13
discharges to, 17, 28
Step-down / relief lines, 63
Storage / distribution media, 74
Strength, wastewater
defined, 13
table of, 95
Suitable soil
and distance reductions, 101
defined, 14
Surface activity, 18
Suspended-growth process, 14
System, baseline, 71
Systems cleaners
defined, 14
licensing of, 35
performance standards for, 35
pumping of vaults by, 87
Systems contractors
defined, 14
licensing of, 33
performance standards for, 33

T

Technology Review and Acceptance Process, 81
Termination of use of system, 90
Third party standards
defined, 14
where referenced, 107
Timed pressure distribution, 57
Tire chips, 74
Total suspended solids, 14
Treatment levels
defined, 14
for proprietary systems, 81
for public domain systems, 81
table of, 57

Treatment unit, 14
Trenches
defined, 14
design of, 73

U

Uniformity coefficient, 14
Use permits
application for, 39
defined, 14
minimum approval criteria for, 39
penalties for not obtaining, 41
renewal of, 41
revocation of, 41
terms of issuance, 40
waivers of, 40
when required, 39
Use permit inspectors
defined, 15
to perform inspections, 39

V

Valves
and alternating systems, 78
air release, 63
automatic distribution, 77
diversion, 78
referenced in design document, 53
Variances
basis for approving, 27
conditions for, 28
denial of, 28
for repairs, 27
from Regulation 43, 27
from these Regulations, 27
outcome of proceedings, 28
when shall not be granted, 27
Vaults
anchoring of, 68
and repairs, 77
and sewer lines, 62
defined, 15
non-residential,minimum capacity of, 86
residential, minimum capacity of, 86
setback to graywater tank, 87
signal device required, 86
watertightness of, 66
Vaulted privy, 87
Visual and tactile evaluation
defined, 15
how to perform, 51
when required, 48
Voids, 49
Volume, effective, 15

W

Wastewater flows
flow equalization, 56
general requirements, 55
multiple flow factors, 97
tables of, 95
Wastewater ponds, 87
Wastewater, domestic, 15
Wastewater, high strength, 15
Wastewater pumping systems, 63
Water balance, 76
Water Environment Federation, 90
Water levels, 52
Water meters
specifications for, 63
when required, 55
Water Quality Control Commission, See Commission
Water Quality Control Division, See Division
Water softener discharge lines, 68
Water supply, 15
Watertightness
requirements, 65
testing to document, 66
Wells
defined, 15
monitoring of, 62
setbacks to, 92
Wetlands, 15

This page intentionally left blank.