Colorado Department of Public Health and Environment

Water Quality Control Division
Engineering Section
On-site Wastewater Treatment Systems

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303-692-6298

Local Regulation Review Submittal Form

A. General Information					
Type of Submittal	Complete Regulation Update	☒	Submittal Date:		
	Modification	☐	Portions Modified:		
Local Public Health Agency Name	Saguache County				
Submittal Title	Saguache County Guidelines for On-Site Waste Water Treatment Systems				
County/Counties Covered	Saguache County				
B:Local Public Health Agency (LPHA) Contact Information					
Main Contact Name	Wendi Maez				
Title	Land Use Administrator				
Address	PO Box 326				
	Saguache, CO 81149				
Email	wmaez@saguachecounty-co.gov				
Phone	719-655-2321		Fax	719-655-2321	
Alternate Contact Name					
Title	Director of Public Health				
Address	PO Box 68				
	Saguache, CO 81149				
Email					
Phone	719-655-2533		Fax		

C. Report Submittal Requirements		
One copy of any submitted material and an electronic copy (PDF). Send PDF to CDPHE.WQEngReview@state.co.us		☒
Local Regulation Format (Select appropriate description.)	Regulation format consistent with Regulation 43 sections.	☒
	Regulation follows a different section format. Note: If format is unique, a "cross-walk" must be completed. (See pages 5-6.)	☐

Local Public Health Agency:				
D. Decision Points Summary – Local On-site Wastewater Treatment System Regulations			**CROSSWALK**	
ITEM	**ALTERNATIVES** **Select Check Box for Decision Chosen.** **(Only one selection per item. Decisions must also be identified within the local regulation.)**		**Citation Reg #43**	**Citation Local Reg**
Same as in Guidelines				
Stringency	Same as Reg 43 with options below chosen, but nothing more Stringent than Reg 43.	☒	43.4.A.2.a.	
	More Stringent than Reg 43. Specify changes on separate page 4 of this form as well as options below.	☐		
Flow Rate – Residential	75 Gal./Person/Day	☐	43.6.A.2.a.	
	100 Gal./Person/Day	☒	43.6.A.2.b.	
Licensing Systems Contractors and Systems Cleaners	Neither *(Do not license contractors or cleaners)*	☐	43.4.L	
	Systems Contractors only are licensed	☐	43.4.L.1	
	Systems Cleaners only are licensed	☐	43.4.L.3	
	Both contractors and cleaners are licensed	☒	43.4.L.1 and 3	
Variances	Variances Allowed *(Must have a variance procedure prescribed within the local regulation.)*	☒	43.4.O.1.a. & 2.a.	
	Variances not allowed	☐	43.4.O.1.a	
NEW				
Occupancy – Residential	Bedrooms 1 through 3: 2 people per bedroom All additional Bedrooms: 1 person per bedroom	☒	43.6.A.2e.	
	All bedrooms: 2 persons per bedroom	☐	43.6.A.2.f.	
How the number of bedrooms in a home will be defined for flow requirements	Bedrooms: number of originally finished bedrooms is only area requiring flow estimates.	☒		
	If unfinished area is present in house, system must also be sized for 1 or 2 more bedrooms based on an assumption that 150 square feet of unfinished space can be converted into a bedroom, if the space can meet building code requirements for a bedroom.	☐	43.6.A.2.h.	
Effluent Screen	May be used *(owner's option)*	☒	43.9.I.1	
	Required in all new septic tanks	☐	43.9.I.1.	
Length of trenches or beds	100 feet maximum length for any OWTS system	☐	43.10.E.2.c.	
	100 feet maximum for gravity fed at one end and up to 150 feet if pressure dosed or effluent applied at center of lateral or chamber	☒	43.10.E.2.b. & c.	

Local Public Health Agency:				
ITEM	**ALTERNATIVES** **Select Check Box for Decision Chosen.** **(Only one selection per item.)**		**Citation Reg #43**	**Citation Local Reg**
Inspection ports at initial (front) end of lateral or chamber	Not required	☒		
	Required	☐	43.10.E.2.f.(3)	
Vault Privies – new	Allow new vault privies	☒	43.12.E.1	
	Prohibit new vault privies	☐	43.12.E.1.a.	
Vault Privies - existing	Allow continued use of existing vault privies	☒	43.12.E.1	
	Require abandonment of existing vault privies	☐	43.12.E.1.b.	
Pit Privies - new	Allow new pit privies	☐	43.12.E.2.	
	Prohibit new pit privies	☒	43.12.E.2.a.	
Pit Privies - existing	Allow continued use of existing pit privies	☐	43.12.E.2.	Saguache Co will Allow
	Require abandonment of existing pit privies	☒	43.12.E.2.b.	
Slit trenches	Allow slit trenches	☐	43.12.G.1.	
	Prohibit slit trenches	☒	43.12.G.1.	
Wide Beds	Width of beds = maximum of12 feet for new, wider than 12 feet allowed for repairs	☒	43.10.E.2.h.(1)	
	Maximum 12 feet for new, wider than 12 feet allowed for repairs. Wider beds also allowed for new systems, if higher level treatment is used *(with system inspection and maintenance and local oversight program included in local regulation).*	☐	43.10.I.2. & 43.10.E.2.h.(1)	
LPHA May Choose to Implement or Not				
Reductions in soil treatment area (STA) size or separation distances for higher level treatment systems with mandatory maintenance and maintenance oversight	Allow reductions for higher level treatment. *(To allow reductions, local regulation must require mandatory inspections and maintenance, and local public health agency program of inspection and maintenance oversight must be in place.)*	☐	43.14.D.2.	
	Reductions in area and separation distances not allowed for higher level treatment systems.	☒	43.14.D.3.	
Transfer of Title inspections	Required *(If transfer of title inspections are required, the criteria that inadequate systems must achieve following repair or replacement must be specified in local regulation.)*	☐	43.4.M.1.	
	Not required	☒	43.4.M.1.	
Renewable permit(s)	Used in local regulation *(Specify purpose within local regulation.)*	☐	43.4.N.1.	
	Not used in local regulation	☒		

Local Public Health Agency:	

Summary of Items More Stringent than Regulation 43
(To Be Completed for All Local Regulations Where More Stringent.)

Regulation 43 Requirement (e.g., section, topic)	**Local Requirement** (attach additional information as needed)	**Citation in Local Regulation**

Please supplement the Summary of Items More Stringent than Regulation 43 on additional sheets as necessary.

Local Public Health Agency:	

Local Regulation Cross-Walk to Regulation 43
(For Local Regulations That Do NOT Follow Regulation 43 Section Outline.)

Regulation 43 Citation	Requirement	Citation in Local Regulation
43.1	WQCD	
43.2	Scope and Purpose	
43.3	Definitions	
43.4	Applicability	
43.4.A	Regulations Adopted by Local Boards of Health	
43.4.B	Permit Application Requirements and Procedures	
43.4.C	Determination	
43.4.D	Access to Site	
43.4.E	Inspection Stages	
43.4.F	Final approval of the permit by the local public health agency	
43.4.G	WQCD (Division Authority to Administer and Enforce)	WQCD role
43.4.H	Primary Enforcement Responsibility	
43.4.I	Product Development Permit	
43.4.J	Experimental Systems	
43.4.K	Prohibition of OWTS in Unsuitable Areas	
43.4.L	Licensing of Systems Contractors and Systems Cleaners	
43.4.M	Transfer of Title Inspections	
43.4.N	Renewable Permits	
43.4.O	Variance Procedure	
43.4.P	General Prohibitions	
43.4.Q	Cease and Desist Orders	
43.4.R	Penalties	
43.5	Site and Soil Evaluation	
43.5.A	Site and Soil Evaluation Requirement	
43.5.B	Preliminary Investigation	
43.5.C	Reconnaissance Visit	
43.5.D	Detailed Soil Investigation	
43.5.E	Percolation Holes, Profile Holes, and Profile Test Pits Excavations – Marking	
43.5.F	Report and Site Plan	
43.5.G	Design Document	
43.5.H	As-Built Drawings	
43.5.I	Site Protection	
43.5.J	Qualifications for a Competent Technician	
43.6	Wastewater Flow and Strength	
43.6.A	Wastewater Flows	
43.6.B	Wastewater Strength	
43.7	Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features	
43.7.A	Horizontal Distances, general	
43.7.A	Reductions in Separation Distances [If higher level treatment and provisions for operation and maintenance in accordance with 43.14.D.]	
43.7.B	Dry Gulches, Cut Banks and Fill Areas	
43.7.C	Minimum or Increased Distances	
43.7.D	Separation Distances to Specific Features	
43.8	Design Criteria – General	
43.8.A	Performance	
43.8.B	Reliability	
43.8.C	Accessibility for Inspection, Maintenance, and Servicing	
43.8.D	Plumbing Codes	
43.8.E	Electrical Equipment	
43.8.F	Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus	
43.8.G	Sampling Access	
43.8.H	Component Operating Instructions	
43.8.I	Surface Activity	
43.8.J	Floodplains	
43.8.K	Business, Commercial, Industrial, Institutional or Multi-Family Dwelling Wastewater Systems	

Local Public Health Agency:	

Local Regulation Cross-Walk to Regulation 43
(For Local Regulations That Do NOT Follow Regulation 43 Section Outline.)

Regulation 43 Citation	Requirement	Citation in Local Regulation
43.9	Design Criteria – Components	
43.9.A	Tanks and Vaults	
43.9.B	Septic Tanks	
43.9.C	Abandonment of Tank	
43.9.D	Pipe Standards and Bedding Requirements	
43.9.E	Distribution Box	
43.9.F	Drop Box	
43.9.G	Stepdown/Relief Line	
43.9.H	Wastewater Pumping and Dosing Siphon Systems	
43.9.I	Effluent Screens	
43.9.J	Grease Interceptor Tanks	
43.10	Design Criteria – Soil Treatment Area	
43.10.A	Size and Design	
43.10.B	Conditions Requiring Professional Engineer	
43.10.C	Calculation of Infiltrative Surface of Soil Treatment Area	
43.10.D	Allowable Soil Treatment Area Reductions and Increases	
43.10.E	Design of Distribution Systems	
43.10.F	Alternating and Sequencing Zone Systems	
43.10.G	Dosing	
43.10.H	Soil Replacement	
43.10.I	Repairs	
43.11	Design Criteria – Higher Level Treatment Systems	
43.11.A	General	
43.11.B	Treatment Levels [Adequate maintenance required and documented in accordance with 43.14.D.]	
43.11.C	Sand Filters	
43.11.D	Rock Plant Filter (Constructed Wetland) Treatment Before a Soil Treatment Area	
43.12	Design Criteria – Other Facilities	
43.12.A	Separated Toilet Wastes	
43.12.B	Evapotranspiration and Evapotranspiration/Absorption Systems	
43.12.C	Wastewater Ponds	
43.12.D	Vaults Other Than Vault Privies	
43.12.E	Privies	
43.12.F	Incinerating, Composting, and Chemical Toilets	
43.12.G	Slit Trench Latrine	
43.12.H	Treatment Systems Other Than Those Discharging Through a Soil Treatment Area or Sand Filter System	
43.13	WQCD (Technology Review and Acceptance)	WQCD role
43.14	Operation and Maintenance	
43.14.A	Responsibility	
43.14.B	Service Label	
43.14.C	Local Regulations for maintenance, practices, submittals	
43.14.D	Permitting and Oversight of Maintenance for Soil Treatment Area Reductions and Vertical and Horizontal Separation Distance Reductions Based on Use of Higher Level Treatment	
43.14.E	Monitoring and Sampling	

Please supplement the Cross-Walk on additional sheets as necessary (e.g., if smaller portions of sections are separated).

SAGUACHE COUNTY REGULATIONS FOR ON-SITE WASTEWATER TREATMENT SYSTEM

I Title and Authority

These Regulations shall be known as the Saguache County Regulations On-site Wastewater Treatment Systems.

These Regulations have been adopted by the Saguache County Board of Commissioners acting as a Board of Health pursuant to and under authority contained in the On-site Wastewater Treatment System Act, 25-10-101, et seq. C.R.S. and has designated the Saguache County Land Use Department to implement these Regulations.

II Scope and Purpose

A. Declaration

1. This Regulation shall apply to On-site Wastewater Treatment Systems as defined in section 25-10-103(12), C.R.S.

B. Purpose

1. The purpose of these Regulations is to establish the minimum standards for the location, design, construction, performance, installation, alteration and use of OWTS with a design capacity less than 2,000 gallons per day within Saguache County.

C. Jurisdiction

1. These Regulations apply to all OWTS in the unincorporated areas of the county and over all municipal corporations within the territorial limits of Saguache County but not over the territory of any municipal corporation that maintains its own public health agency.

D. Prohibition of OWTS Where Public Sewer Service is Available and Feasible

1. 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.

E. Severability

1. Should any section, clause, or provision of these Regulations be declared by a court of competent jurisdiction to be invalid, such decision shall not affect the validity of these Regulations as a whole, or any part thereof other than the part declared to be invalid.

III Incorporation of Regulation 43

A. Included By Reference

1. The requirements of the Colorado Water Quality Control Commission's "On-site Wastewater Treatment System Regulation, Regulation 43, 5 CCR 1002-43," and future revisions thereto, are made a part of these Regulations and shall apply except where identified as an option of the local public health agency or are more stringent than Regulation 43, 5 CCR 1002-43, and included in these Regulations. All aspects of an On-site Wastewater Treatment System including, but not limited to, permits, design, performance, location, construction, alteration, inspection, maintenance and use shall be as provided in Regulation 43 and any additional requirements contained in these Regulations.

2. Allowable local options identified in Regulation 43 but not identified in this text and the designated decisions for these Regulations are identified in the attached Appendix A to OWTS Regulations for Saguache County. Appendix A is made a part of these Regulations.

B. Excluded

1. Reductions in soil treatment area size or separation distances and wide beds for higher level treatment units shall not be allowed under these Regulations. All designs must be based on TL-1 parameters in Regulation 43. Similarly, bed widths are limited to 12 feet except for repairs. Area or separation distance reductions and wider beds for higher level treatment can only be allowed in the future, if these Regulations are amended to include a program of oversight for inspection and maintenance of higher level treatment units. Amended Regulations must be approved by the Water Quality Control Division in the Colorado Department of Public Health and Environment.

IV Permits and Fees

A. Permits [43.4(B)]

1. Prior to installing, altering, expanding or repairing an OWTS, the applicant must obtain a permit from Saguache County Public Land Use Department.
2. The permit application must include information identified in section 43.4(B)(3) of Regulation 43.
3. An OWTS permit expires one year after the date of issuance if construction has not commenced. After expiration, a new application shall be required to begin construction.
4. Any change in plans or specifications of the OWTS after the permit has been issued invalidates the permit unless the permittee receives written approval from the Saguache County Land Use Department. After a permit is invalidated, a new application shall be required to begin construction.
5. Repair permits must identify a reasonable period of time in which the owner must make repairs.
6. Application for a product development permit may be approved by the Saguache County Land Use Department consistent with requirements of Section 43.4(I) of Regulation 43.
7. Application for an experimental permit may be approved by the Board of Health consistent with requirements of Section 43.4(J) of Regulation 43.

B. Board of Health Review [43.4(B)(9)]

1. When an application is denied by the Saguache County Land Use Department, an applicant may request review by the local board of health. All requests for review must be in writing and must be received by the local Board of Health no later than seven (7) days after the date of the action from which the appeal is taken.

C. Fees [43.4(B)(4) and 43.4(B)(5)]

1. Permit fees and fees for other services and tests associated with OWTS will be set by the Board of Health, in conformance with Section 43.4(B)(4) and (5) of Regulation 43 and 25-10-107, C.R.S.
2. A waiver of all fees shall be granted to all Federal and State governments, provided the government agency is listed as the installer, not the contractor.

D. Surcharge [43.4(B)(5)]

1. Surcharge of $23.00 will be collected for each permit issued by Saguache County Land Use Department. Of that fee, Saguache County Land Use Department will retain three

dollars to cover administrative costs and twenty dollars must be transmitted to the state treasurer.

V Inspections [43.4(E)]

A. Tank [43.9(B)(3)(c)]

1. The applicant must notify the local public health agency or its designee Saguache County Land Use Department so the local public health agency or its designee can conduct a field inspection of the septic tank before backfilling.

B. OWTS [43.4(F)(3)]

1. The applicant must notify the local public health agency or its designee Saguache County Land Use Department so the local public health agency or its designee can conduct a final field inspection of all related components of the OWTS before backfilling.

VI. Prohibition of OWTS in Unsuitable Areas [43.4(K)]

A. Except for repair or replacement of existing systems, OWTS will not be allowed in subdivisions or platted lots with lots smaller than one (1) acre. OWTS will permitted on multiple contiguous lots that are combined to create a minimum of one (1) acre parcel.

VII Licensing

A. Systems Contractors [43.4(L)(1)]

1. All systems contractors shall have a current license prior to providing services in Saguache County. All systems contractors must pass a test to install Onsite Waste Water Treatment Systems in Saguache County. The local Board of Health may adopt a fee for the initial license and renewal. The license shall be renewed annually. The local Board of Health may adopt a separate fee for administering the OWTS test.

B. Systems Cleaners [43.4(L)(3)]

1. All systems cleaners shall have a current license prior to providing services in Saguache County, and must be renewed annually. The local Board of Health may adopt a fee for the initial license and renewal.

VIII. Variances [43.4(O)]

A. Variances Allowed

1. The Board of Health may approve a variance from a requirement of this Regulation. Variances cannot be granted by staff.
2. Approval of a variance shall be based upon evidence presented by the applicant showing that the variance: a) would not be injurious to the public health, water quality, or environment; and b) would prevent a substantial hardship to the applicant.
3. Variances shall not be granted under the items identified in section 43.4(O)(5) of Regulation 43.

B. Variance Procedure

1. Variance requests shall be provided by filing an application for a variance with the Saguache County Board of Public Health or its designee as permitted by Sec 43.4.(0) of Regulation 43.
2. Variance requests shall include all items identified in section 43.4(O)(2)(d) of Regulation 43.

3. 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. The Board of Health shall determine if this item has been addressed prior to granting a variance.

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

C. Variances Requiring Public Hearings

1. Repairs: The Saguache County Board of Public Health may provide a variance from the design and/or sitting requirements of the Saguache County Regulations on On-Site Waste Water Treatment Systems.

2. A) Published Notice. Prior to the rendering on a variance request, a public hearing must be held. The hearing shall be the subject of a public notice in a newspaper of general circulation in the county. The notice shall be published no less than 30 days in advance of the public hearing.

B) Mailed Notice. Prior to the rendering a decision on a variance request, a notice to all property owners within 500 feet radius of the exterior boundary of the subject property at least 30 days before the scheduled public hearing, using available county records to compile a mailing list.

IX. Special Soil Types Requiring Different Percolation Test Procedure [43.5(D)(4)(e)(6)]

A. Requirements for site and evaluation soil.

1. In areas with high water tables and unsuitable soil, an engineered design and report is required.

X. Requirement for Percolation Holes and Profile Test Pits to Remain Open [43.5(E)]

A. Percolation Holes

1. Percolation holes must remain open until evaluation by the local public health agency or its designee.

B. Profile Test Pits

1. Profile test pit holes must remain open until an evaluation by the local public health agency or its designee.

Appendix A to the On-site Water Treatment System Regulations for Saguache County

Attached.

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Water Quality Control Commission

ON-SITE WASTEWATER TREATMENT SYSTEM REGULATION

REGULATION #43

5 CCR 1002-43

ADOPTED: May 13, 2013
EFFECTIVE: June 30, 2013

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DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Water Quality Control Commission

ON-SITE WASTEWATER TREATMENT SYSTEM REGULATION

5 CCR 1002-43

43.1 Authority

This regulation is promulgated pursuant to the On-site Wastewater Treatment System Act, 25-10-101, et seq. C.R.S.

43.2 Scope and Purpose

A. Declaration

1. 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, it is declared to be in the public interest to establish minimum standards and regulations for On-site Wastewater Treatment Systems (OWTS) in the state of Colorado and to provide the authority for the administration and enforcement of such minimum standards and regulations.

2. This regulation shall apply to On-site Wastewater Treatment Systems as defined in section 25-10-103(12), C.R.S.

B. Purpose

1. The purpose of this regulation as authorized by the OWTS Act is to establish minimum standards for the location, design, construction, performance, installation, alteration and use of OWTS within the state of Colorado, and establish the minimum requirements for regulations adopted by local boards of health 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.

C. Effluent Discharged to Surface Waters

1. Any system that will discharge into State waters must be designed by a professional engineer. The discharge permit application must be submitted for preliminary approval to the local board of health. Once approved by the local board of health, the application must 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 this regulation.

D. Jurisdiction of Local Health Agencies

1. The jurisdiction of any local health agency shall extend over all unincorporated areas and over all municipal corporations within the territorial limits of the county or the counties comprising the district public health agency, but not over the territory of any municipal corporation that maintains its own public health agency.

43.3 Definitions

1. "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.

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

3. "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.

4. "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.

5. "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).

6. "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).

7. "Building sewer" means piping that conveys wastewater to the first system component or the sewer main.

8. "Carbonaceous Biochemical Oxygen Demand" See Biochemical Oxygen Demand, Carbonaceous.

9. "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.

10. "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.

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

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

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

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

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

16. '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.

17. "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.

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

19. "Deep gravel system" means a soil treatment area for repairs only where the trenches utilize a depth of gravel greater than 6 inches below the distribution line and sidewall area is allowed according to a formula specified in this regulation.

20. "Department" means the Department of Public Health and Environment created by section 25-1-102, C.R.S.

21. "Design" means 1. 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 2. written documentation of size, location, specification and configuration of a system.

22. "Design capacity" See Flow, Design.

23. "Design flow" See Flow, Design.

24. "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 this regulation.

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

26. "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.

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

28. "Domestic wastewater" See Wastewater, domestic.

29. "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. The term "domestic wastewater treatment works" 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. 25-8-103 (5), C.R.S.

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

31. "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.

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

33. "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.

34. "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.

35. "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.

36. "Drainfield" See Soil treatment area.

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

38. "Dry gulch" See Gulch, dry.

39. "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.

40. "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.

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

42. "Effluent filter" See Effluent screen.

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

44. "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.

45. "Environmental health specialist" means a person trained in physical, biological, or sanitary science to carry out educational and inspectional duties in the field of environmental health.

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

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

48. "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.

49. "Failure" means damage to a system component, structural member or connection.

50. "Field performance testing" means data gathering on a system in actual use that is being proposed for Division acceptance.

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

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

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

54. "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.

55. "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.

56. "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.

57. "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.

58. "Ground water" means that part of the subsurface water that is at or below the saturated zone.

59. "Ground water surface" means the uppermost limit of an unconfined aquifer at atmospheric pressure.

60. "Guidelines" means State Board of Health Guidelines on Individual Sewage Disposal Systems, 5 CCR 1003-6 – predecessor of Regulation 43, On-site Wastewater Treatment System Regulation, 5 CCR 1002-43.

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

62. "Health officer" means the chief administrative and executive officer of a local public health agency, or the appointed health officer of the local board of health. Health officer includes a director of a local public health agency.

63. "Higher level treatment" means designated treatment levels other than treatment level 1.

64. "Individual Sewage Disposal System" means a term used for On-site Wastewater Treatment System in Colorado regulations from 1973 until 2013.

65. "Infiltrative surface" means designated interface where effluent moves from distribution media or a distribution device into soil.

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

67. "Invert" means elevation of the bottom of the inside pipe wall or fitting.

68. "Lateral" means pipe, tubing or other conveyance used to carry and distribute effluent.

69. "Leach field" See Soil treatment area.

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

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

72. "Local board of health" means any local, county, or district board of health.

73. "Local health department" See local public health agency.

74. "Local public health agency" means any county, district, or municipal public health agency and may include a county, district, or municipal board of health to oversee On-site Wastewater Treatment System permitting and inspection or an on-site wastewater treatment system program. A local public health agency may designate another agency to administer the OWTS program.

75. "Long-term acceptance rate" (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 (g/ ft^2/day).

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

77. "Manufactured media" See Media, manufactured.

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

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

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

81. "Mound" 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.

82. "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.

83. "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.

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

85. "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.

86. "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.

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

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

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

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

91. "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.

    a. Pit privy – privy over an unlined excavation.

    b. Vault privy – privy over a vault.

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

93. "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 thirty semester (forty-five 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. 23-41-208, C.R.S. and 34-1-201, C.R.S.

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

95. "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.

96. "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.

97. "Remediation system" means a treatment system, chemical/biological additive or physical process that is proposed to restore the soil treatment area of an OWTS to good performance.

98. "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.

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

100. "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.

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

102. "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.

103. "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.

104. "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.

105. "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.

106. "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.

107. "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.

108. "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.

109. "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.

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

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

112. "Site evaluator" means a practitioner who conducts preconstruction site evaluations, including visiting a site and performing soil analysis, a site survey, or other activities necessary to determine the suitability of a site for an OWTS.

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

114. "Soil" means 1. 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; 2. unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of: a) pedogenic and environmental factors of climate (including water and temperature effects) and b) macro and microorganisms, conditioned by relief, acting on parent material over a period of time.

115. "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.

116. "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.

117. "Soil morphology" means 1. 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 2. visible characteristics of the soil or any of its parts.

118. "Soil profile hole" means a hole dug or drilled near a proposed soil treatment area to locate bedrock or ground water, if present. Observations of soil cuttings may be made.

119. "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.

120. "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).

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

122. "Soil treatment area" means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drainfields and drip fields.

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

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

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

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

127. "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 long-term acceptance rate 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.

128. "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.

129. "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.

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

131. "Transfer of Title" means change of ownership of a property.

132. "Treatment media" See Media, treatment.

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

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

135. "Trench" means 1. below-grade soil treatment area consisting of a shallow excavation with a width of 3 feet or less containing distribution media and one lateral; and 2. excavation for placement of piping or installation of electrical wire or conduit.

136. "Uniformity coefficient" means a value which is the ratio of D60 to D10 where D60 is the soil diameter of which 60 percent of the soil weight is finer and D10 is the corresponding value at 10 percent finer. (A soil having a uniformity coefficient smaller than 4 would be considered "uniform" for purposes of this regulation.)

137. "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 two thousand gallons per day or more at full occupancy, the vault is a domestic wastewater treatment works. Vaults are On-site Wastewater Treatment Systems.

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

139. "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.

140. "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.

141. "Wastewater, high strength" means 1. 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); 2. 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.

142. "Wastewater pond" means a designed pond which receives exclusively domestic wastewater from a septic tank and which provides an additional degree of treatment.

143. "Water Quality Control Commission" See Commission.

144. "Water Quality Control Division" See Division.

145. "Wetland, constructed" See Rock-plant filter.

146. "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.

Table 3-1 Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
C.R.S.	Colorado Revised Statutes
CBOD	Carbonaceous Biochemical Oxygen Demand
CSA	Canadian Standards Association
gpd	gallons per day
IAPMO	International Association of Plumbing and Mechanical Officials
ISDS	Individual Sewage Disposal System
LTAR	Long-term Acceptance Rate
mg/L	milligrams per Liter
MPI	Minutes Per Inch
NAWT	National Association of Wastewater Technicians
NPCA	National Precast Concrete Association
NSF	National Sanitation Foundation
OWTS	On-site Wastewater Treatment System(s)
STA	Soil Treatment Area
TL	Treatment Level
TN	Total Nitrogen
TSS	Total Suspended Solids
UL	Underwriters' Laboratories

43.4 Applicability

A. Regulations Adopted By Local Boards of Health

1. Regulation Coverage

a. An OWTS with design capacity less than 2,000 gpd must comply with regulations adopted by local boards of health pursuant to this regulation and the OWTS Act. Within the jurisdiction of the local public health agency, the regulations promulgated by the local board of health 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 must comply with this regulation, site location and design approval in section 25-8-702, C.R.S., and the discharge permit requirements in the Water Quality Control Act, 25-8-501, et seq. C.R.S.

(1) Applicable Commission regulations include, but are not limited to, the following:

(i) Regulation 22 - Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works (5 CCR 1002-22).

(ii) Regulation 41 - The Basic Standards for Ground Water (5 CCR 1002-41).

(iii) Regulation 42 - Site-Specific Water Quality Classifications and Standards for Ground Water (5 CCR 1002-42).

(iv) Regulation 61 - Colorado Discharge Permit System Regulations (5 CCR 1002-61).

(v) Regulation 62 - Regulations for Effluent Limitations (5 CCR 1002-62).

(2) For systems equal to or greater than 2,000 gpd, the Division is also authorized to determine those parts of this regulation identified as the prerogative of the local public health agencies.

(3) 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.

(4) In the interest of facilitating communication of LPHA concerns regarding a design being reviewed by the Division, the local public health agency can provide comments to the Division for consideration during the Division's review of the proposed design and discharge permit application. Under such a coordinated process, the Division retains final authority for approval or denial of each domestic wastewater treatment works that is regulated under the site location approval and Colorado Discharge Permit System regulations. Prior to approval or denial of each OWTS domestic wastewater treatment works, the Division shall acknowledge and consider local OWTS regulations when they are more stringent and restrictive than this regulation.

2. Local Regulations

a. Local boards of health have one year from the effective date of this regulation to promulgate local regulations which must be as stringent as this regulation.

b. Local boards of health may seek a determination by the Division that their existing local regulations are as stringent as this regulation.

c. After one year from the effective date of this regulation, if a local board of health has not finalized regulations pursuant to section 25-10-104(2), C.R.S. and section 4.A.3 of this regulation, the Division will propose local rules based on this regulation to the Commission for approval for use in that county or district.

3. Procedures to Adopt Regulations by the Local Board of Health:

a. A local board of health must submit its proposed regulations to the Division for preliminary review at least 30 days prior to a public hearing before a local board of health.

b. The local board of health must hold a public hearing on the proposed regulations before adopting final regulations.

c. The local board of health must give notice of the time and place of the public hearing at least once and at least 20 days in advance in a newspaper of general circulation within its area of jurisdiction.

d. The local board of health may make changes or revisions to the proposed regulations after the public hearing and prior to final adoption, and no further public hearing shall be required regarding the changes or revisions.

e. All local regulations must be transmitted to the Division no later than five days after final adoption and become effective 45 days after final adoption unless the Division notifies the local board of health before the forty-fifth day that the regulations or any portions of the local regulations determined by the Division are not as stringent as the OWTS Act or with this regulation. Any portions of the local regulations determined by the Division not to be in compliance with the OWTS Act and this regulation shall not take effect or be published as regulations of the local board of health. For those portions of its regulations that do not comply, the local board of health may submit revisions to the Division. Only after the Division has determined that the local board of health's revised regulations comply with the OWTS Act and this regulation may the local board of health's revised regulations take effect and be published. Until the Division makes this determination, this regulation controls the unapproved portions of the local regulations.

B. Permit Application Requirements and Procedures

1. Prior to installing, altering, or repairing a system, the applicant must obtain a permit from the local public health agency.

2. An applicant must submit a complete application that is consistent with section 4.B.3. to the local public health agency prior to installing, altering or repairing a system.

3. Minimum Permit Application Requirements:

a. Owner name and contact information;

b. Property address;

c. Property legal description;

d. Type of permit;

e. Report from Site and Soil Evaluation (section 5);

f. System design with a legible, accurate site plan which shows pertinent physical features on subject property, and on adjacent properties, as noted in Table 7-1; and

g. Other information, data, plans, specifications and tests as required by local public health agency.

(1) When specific evidence suggests undesirable soil conditions exist, additional hydrological, geological, engineering or other information provided by a professional engineer or geologist may be required to be submitted by the applicant. This requirement shall not prejudice the right of the local public health agency to develop its own information from its own source at its own expense.

4. Permit Fees

a. A local board of health may set fees for permits. The permit fees may be no greater than required to offset the actual indirect and direct costs of the local public health agency. 25-10-107, C.R.S.

b. Permit application fees must not exceed the maximum fees established in section 25-10-107, C.R.S. Permit application fees must be submitted by an applicant with the permit application, and are due and payable upon receipt of the permit application.

c. The local board of health may make provision for the waiver of any local permit fee normally required for an OWTS.

5. Other Fees

a. A local board of health may set fees for inspections, percolation tests, soil evaluation, and other services performed by the local public health agency. The fees shall be no greater than required to offset the actual indirect and direct costs of the services, and shall not exceed the maximum amounts specified in section 25-10-107, C.R.S.

b. Surcharge - The local public health agency must collect a fee of twenty-three dollars for each permit issued for a new, repaired, or upgraded OWTS. Of that fee, the local public health agency shall retain three dollars to cover the local public health agency's administrative costs and twenty dollars shall be transmitted to the state treasurer, who shall deposit that sum in the water quality control fund created in section 25-8-502(1)(c), C.R.S.

6. Permit Term

a. An OWTS permit expires one year after the date of issuance if construction has not commenced or as specified by local board of health regulations.

b. Any change in plans or specifications of the OWTS after the permit has been issued invalidates the permit unless the permittee receives written approval from the local public health agency for such changes.

7. Repair Permit

   a. The owner or occupant of a property on which an OWTS is not in compliance must obtain a repair permit from the local public health agency. The applicant must apply for a repair permit within two business days after receiving notice from the local public health agency 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. The repair permit must provide for a reasonable period of time within which the owner or occupant must make repairs. At the end of that period, the local public health agency must inspect the system to ensure it is functioning properly. Concurrently with the issuance of a repair permit, the local public health agency 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.

8. A permit shall be required for the expanded use of an OWTS. The OWTS must 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.

9. Regulations of the local board of health must include provisions that provide for review by the local board of health of applications denied by the local public health agency when requested by an applicant.

10. The issuance of a permit and specifications of terms and conditions therein shall not constitute assumption of liability, nor create a presumption that the local public health agency 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 provision of the OWTS Act, the regulations adopted thereunder, or any terms and conditions of a permit.

11. 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.

C. Determination

1. A local public health agency must determine whether the information provided in the permit application, site and soil evaluations, assumptions and calculations, and design of the proposed OWTS are in compliance with the requirements of the OWTS Act and regulations adopted pursuant thereto. If the submittal is determined to be in compliance, authorization to begin installation may be given.

D. Access to Site

1. 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 local public health agency 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 applicable regulations adopted pursuant thereto and the terms and conditions of any permit issued and to inspect and conduct tests in evaluating any permit application. The owner or occupant of every property having an OWTS must permit the local public health agency access to the property to make inspections, conduct required tests, take samples, and monitor compliance.

E. Inspection Stages

1. Local regulations must specify the stages of site evaluation, construction, installation, alteration, or repair at which the local public health agency shall require inspections.

2. Before a system is placed in use, the owner, the owner's agent or the systems contractor must provide the local public health agency and the engineer, if engineer-designed, with notice that the progress of the work has been sufficiently completed to allow inspections to determine if all work has been performed in accordance with the permit requirements and to determine compliance of the system with the OWTS Act and the regulations adopted thereunder.

F. Final approval of the permit by the local public health agency must include, but is not limited to:

1. Receipt of letter from the engineer certifying construction of system as designed, if engineer-designed;

2. Receipt of as-built drawing;

3. Final inspection prior to backfilling system by the local public health agency confirming that the OWTS was installed according to the permit requirements and regulations or variances to the regulations; and

4. Identification of system contractor.

G. Division Authority to Administer and Enforce

1. Wherever the term local board of health or local public health agency is used in this regulation, said terms shall also include the Division under its designated authority for the purposes of administering and enforcing the provisions of this regulation where necessary to protect the public health and environment.

H. Primary Enforcement Responsibility

1. The primary responsibility for enforcement of the provisions of the OWTS Act and the regulations adopted under said article shall lie with the local board of health.

2. In the event that a local board of health fails to administer and enforce the provisions of said section and the regulations adopted under the OWTS Act, the Division may assume such functions of the local public health agency or local board of health as may be necessary to protect the public health and environment. 25-10-110, C.R.S.

I. Product Development Permit

1. The local public health agency may issue a product development permit for a proprietary treatment component or series of components. Requirements for proprietary treatment component acceptance are in section 13.D. It must be shown that a complete system,

meeting the requirements of this regulation and the site, can be installed in the event the proprietary treatment component or sequence fails to perform. The product under development may then be added to the treatment system, allowing the product developer to gather data about the product's performance in the field.

2. Before a product development permit is issued, the Division must determine that the product to be tested qualifies for testing under the product development evaluation based on information submitted to the Division.

3. A completed application for a product development permit must be submitted to the local public health agency at least 30 days in advance of installation of the product.

4. An application for a product development permit must include the following:

   a. 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 system under testing;

   b. A description of the product under development including performance goals; and

   c. Documentation signed by the owner of the proposed product development site allowing access to the local public health agency and Division for inspection of the site.

5. The local public health agency may stipulate additional requirements for the product development permit necessary to assure the performance of the OWTS.

6. A product development permit is a site-specific permit. Product development testing at multiple sites requires a product development permit for each site.

7. During the term of the product development permit, all data collected is to be submitted to the Division and the local public health agency.

8. The local public health agency may revoke or amend a product development permit, if the continued operation or presence of the product under development:

   a. Presents a risk to the public health or environment;

   b. Causes adverse effects on the proper function of the OWTS on the site;

   c. Leaks or discharges effluent on the surface of the ground; or

   d. If the developer of the product fails to comply with any requirements stipulated on the permit by the local public health agency or the Division.

9. If the product development permit is revoked, the product developer must install the replacement system.

J. Experimental Systems

1. Except for designs or types of systems which have been approved by the Division pursuant to section 25-10-108 (1), C.R.S., the local board of health may approve an application for a type of system not otherwise provided for in this regulation only if the system has been designed by a professional engineer, and only if 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.

2. A local 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. 25-10-108 (2), C.R.S.

K. Prohibition of OWTS in Unsuitable Areas

1. A local board of health may prohibit issuance of OWTS permits in accordance with applicable land use laws and procedures 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.

L. Licensing of Systems Contractors and Systems Cleaners

1. The local board of health may adopt regulations which provide for the licensing of systems contractors. A fee not to exceed actual local public health agency costs may be charged by the local public health agency for the initial license of a systems contractor; a fee not to exceed actual costs may be charged by the local public health agency for a renewal of the license. Initial licensing and renewals thereof shall be for a period of not less than one year. Renewals may be scheduled to coincide with the calendar year.

2. The local board of health may revoke the license of a systems contractor for violation of the applicable provisions of the OWTS Act and the implementing regulations or for other good cause shown, after a hearing conducted upon reasonable notice to the systems contractor and at which the systems contractor may be present, with counsel, and be heard.

3. The local board of health may adopt regulations which provide for the licensing of systems cleaners. A fee not to exceed actual costs may be charged by the local public health agency for the initial license of a systems cleaner; a fee not to exceed actual costs may be charged for the renewal of the license. Initial licensing and renewals thereof shall be for a period of not less than one year. Renewals may be scheduled to coincide with the calendar year.

4. The local board of health may suspend or revoke the license of a systems cleaner for violation of the applicable provisions of the OWTS Act and the regulations adopted under said section or for other good cause shown after a hearing conducted upon reasonable notice to the systems cleaner and at which the systems cleaner may be present, with counsel, and be heard. 25-10-109, C.R.S.

M. Transfer of Title Inspections

1. A local board of health may choose to require a property owner of a residence or other building/facility served by an OWTS to have an inspection of that system to demonstrate that the system is functioning according to design prior to the sale or transfer of title of the property. A local board of health is not required to develop a transfer of title inspection program.

2. If the system is not functioning according to design, the system must be repaired so that it is functioning.

3. The local board of health may identify types of transfer of title that are not required to have inspections.

4. Applications for transfer of title and inspection reports must be made on forms furnished or approved by the local public health agency. Inspectors shall be certified by National Association of Wastewater Technicians or an equivalent program approved by the local public health agency. Inspectors for higher level treatment systems must have training relevant to the specific system or certification by the equipment manufacturer. The applications must include, as appropriate:

   a. Owner's name and contact information;

   b. Physical address of property;

   c. Legal description of property;

   d. Name of Inspector;

   e. Date and time of the inspection(s);

   f. A septic tank inspection report completed within the previous 12 months, including a septic tank pumping receipt, when applicable, based on the inspection report; and

   g. An inspection report completed within the previous 12 months for any mechanical components such as pumps, alarms or higher level treatment systems.

5. Minimum Criteria

   a. The existing system must meet, at a minimum, the following criteria and conditions:

      (1) All tanks must be structurally sound and in good working order and provided with suitable lids;

      (2) All internal devices and appurtenances such as tees, effluent screens and baffles that were originally provided with the tank or added later must be intact and in working order;

      (3) Alarms, control devices, and components necessary for the operation of the system are present and in good working order;

      (4) A soil treatment area, other means of subsurface wastewater treatment, evapotranspiration, or treatment system other than those discharging through a soil treatment area or sand filter is present and in good working order;

      (5) There are no unapproved wastewater discharges from the system; and

      (6) Any deficiencies noted in the inspection report(s) have been corrected with the necessary permits and inspections.

6. Issuance of an Acceptance Document

   a. When the criteria set forth above have been met, the local public health agency shall issue an acceptance document, using terminology adopted by the local public health agency, setting forth the terms and conditions of approval, including, as appropriate:

      (1) Statement of the size, type and capacity of the system and an as-built drawing, either from the local public health agency records or the inspection reports;

      (2) Evidence of past failures as shown in local public health agency records;

      (3) Circumstances or factors that may have affected the ability of the inspector to evaluate the system;

      (4) Whether the system meets the permitting requirements of the local public health agency; and

      (5) Other information the local public health agency may require.

7. The acceptance document shall remain valid until the date of real estate closing or for a period of six months, whichever comes first. Once the real estate closing has been completed, the acceptance document need not be renewed.

8. Renewal of an Acceptance Document

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

9. Waiver of an Acceptance Document

   a. If it is determined by the local public health agency that an OWTS does not meet the requirements for issuance of an acceptance document, a conditional acceptance document may be issued, provided that the purchaser of the property agrees to obtain a permit and complete all necessary repairs to the system (or connect to a sanitation district, if appropriate) within 90 days of occupancy of the structure.

10. If conditions, such as frozen ground, limit the ability to complete all necessary repairs, the 90 days allowed the purchaser may be extended by the local public health agency.

11. Revocation of an Acceptance Document

   a. An acceptance document must be revoked if it is determined that the system is no longer functioning in accordance with this regulation or that false or misleading material statements were made on the application or inspection reports.

12. Penalties

a. Failure to obtain an acceptance document for a covered transaction as provided by this regulation shall subject the owner who failed to obtain the document to a penalty assessed under section 25-10-113, C.R.S.

N. Renewable Permits

1. A local board of health may choose to issue a renewable permit authorizing the continued use of an OWTS. A local board of health is not required to develop a renewable permit program.

2. Renewable permits may be issued for purposes, including but not limited to:

a. Maintenance performed on an OWTS at regular intervals;

b. Higher level treatment system performance inspections;

c. Transfer of title inspections; or

d. Other situations deemed necessary or useful by a local public health agency.

3. A local public health agency may determine the renewal of a permit either at equal time intervals or based on recurring events.

4. A local public health agency may revoke a renewable permit for non-compliance.

5. A local public health agency may assess penalties for non-renewal of a renewable permit or non-compliance with the terms of a renewable permit as allowed in this regulation.

O. Variance Procedure

1. General

a. The purpose of this section is to provide a procedure for local public health agencies to consider variances from the design and/or siting requirements of the OWTS regulations. A local board of health may adopt these procedures or more stringent procedures, but is not required to adopt any variance procedure. Variances may only be included in permits issued by those local public health agencies which formally adopt and implement a state approved variance procedure.

b. The local board of health may set fees for processing an OWTS permit with a variance in accordance with section 25-10-107, C.R.S. This permit fee may be the standard OWTS permit fee or may be a separate fee based upon the cost of processing a permit with a variance.

2. Requirements for Variance Consideration

a. To consider a variance request, the local board of health must adopt a procedure for issuing variances.

b. Where the local board of health adopts a variance procedure, the board must hear the variance request.

c. The local board of health will determine what type of variances will require public hearings. Prior to the rendering a decision on a variance request requiring a public hearing, a public hearing must be held. The hearing must be the subject of a public notice or notice must be sent via certified mail, with a minimum 20-day reply time from the date of mailing, to all adjacent property owners.

d. Variance requests must be accompanied by:

(1) Site-specific request identifying the specific criteria from which a variance is being requested;

(2) Technical justification by a professional engineer or professional geologist, which indicates the specific conditions which exist and/or the measures which will be taken that support a finding that the variance will result in no greater risk than that associated with compliance with the requirements of the regulation. Examples of conditions which exist, or measures which might be taken, include but are not limited to the following: evidence of a natural or manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested; placement of a manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested; soil replacement with sand filter media to reduce the infiltration rate of the effluent such that the travel time of the effluent from the absorption field to the physical feature is no less than the travel time through the native soils at the prescribed setback and Treatment Level 2;

(3) A discussion of alternatives considered in lieu of the requested variance;

(4) Technical documentation for selected alternative, which may include a testing program, which confirms that the variance does not increase the risk to public health and to the environment; and

(5) A statement of the hardship that creates the necessity for the variance.

e. 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 the regulations.

3. The local board of health has the authority to impose site-specific requirements and conditions on any variance granted.

4. Outcome of the Variance Proceeding

a. The applicant must be notified, in writing, of the local board of health's decision regarding the request for a variance. The notice of a denial of a variance must include those reasons which form the basis for the denial. The notice of an approval of a variance must include any conditions of the approval. The variance, and any conditions thereof, must be recorded on the deed to the property and any expenses associated with that recording must be the responsibility of the party obtaining the variance.

5. Prohibitions on the Granting of Variance Requests

a. No variance shall be issued where the property can accommodate a conforming OWTS.

b. No variance shall be issued to mitigate an error in construction involving any element of property improvements.

c. No variance shall be allowed solely for economic gain.

d. No variance shall be issued, if it will result in a setback reduction to an offsite physical feature that does not conform to the minimum setbacks defined in Table 7-1 of this regulation without the written consent of the owner of property containing said feature. Property lines are considered offsite features.

e. No variance shall be issued, if it reduces the separation to ground water or bedrock based on the level of treatment in Table 7-2.

f. No variance from the horizontal setback from a well shall be issued unless it also meets the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

6. Variances for Repair of Failing Systems

a. When a proposed variance for a system repair or upgrade would result in encroachment on minimum distances to physical features on neighboring properties required by the Division, the hearing procedures in 4.O.2, Requirements for Variance Consideration above must be followed.

b. For the repair of or upgrade to an approved existing system where the existing system does not meet the required separation distances and where the size of the lot precludes adherence to the required distances, a variance to the separation distances may be requested. The repairs or upgrade shall be no closer to features requiring setbacks than the existing facilities. Variances requesting setbacks no closer than existing setbacks do not have to provide technical justification from a professional engineer or professional geologist.

7. Findings on Appeal

a. A request for review must be made within 60 days after denial of an application by the local public health agency.

b. The applicant must 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 the regulation, comply with the declaration and intent of this regulation, and comply with all applicable state and local regulations and required terms and conditions in any permit.

c. Such review must be conducted pursuant to the requirements of section 24-4-105, C.R.S.

P. General Prohibitions; Section 25-10-112, C.R.S.

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

a. A permit to construct or remodel a building or structure that is not serviced by a sewage treatment works until the local public health agency has issued a permit for an OWTS.

b. An occupancy permit for the use of a building that is not serviced by a sewage treatment works until the local public health agency makes a final inspection of the OWTS, provided for in section 25-10-106 (1) (h), C.R.S. and the local public health agency approves the installation.

2. Construction of new cesspools is prohibited.

3. A person must not 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.

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

5. 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.

Q. Cease and Desist Orders

1. The local public health agency 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 the OWTS Act or with applicable regulations or is found to constitute a hazard to public health, or has not otherwise received timely repairs under the provisions of section 25-10-106 (1) (j), C.R.S. 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. A cease and desist order issued by the health officer shall be reviewable in the district court for the county wherein the system is located and upon a petition filed not later than ten days after the order is issued.

R. Penalties; Section 25-10-113, C.R.S.

1. 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 section 18-1-107, C.R.S.:

a. Constructs, alters, installs, or permits the use of any OWTS without first having applied for and received a permit as provided for in section 25-10-106, C.R.S.;

b. 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;

c. Violates the terms of a cease and desist order that has become final under the terms of section 25-10-106 (1) (k), C.R.S.;

d. Conducts a business as a systems contractor without having obtained the license provided for in section 25-10-109 (1), C.R.S., in areas which the local board of health has adopted licensing regulations pursuant to that section;

e. Conducts a business as a systems cleaner without having obtained the license provided for in section 25-10-109 (2), C.R.S., in areas which the local board of health has adopted licensing regulations pursuant to that section;

f. Falsifies or maintains improper records concerning system cleaning activities not performed or performed improperly; or

g. Willfully fails to submit proof of proper maintenance and cleaning of a system as required by regulations adopted by the local board of health.

43.5 Site and Soil Evaluation

A. A site and soil evaluation must 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.

1. Each site evaluation shall consist of:

   a. Preliminary investigation;

   b. Reconnaissance;

   c. Detailed soil investigation; and

   d. Report and site plan.

B. 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:

   a. Address;

   b. Legal description;

   c. Existing structures; and

   d. Location of existing or proposed wells on the property.

2. Local public health agency records.

3. Published site information:

   a. Topography; and

   b. Soil data.

4. Location of physical features, on and off the property that will require setbacks as identified in Table 7-1.

5. Preliminary soil treatment area size estimate based on information on existing or planned facility and local regulations.

6. Other information required by local public health agency.

7. Additional information that may be useful to the specific evaluation as available:

   a. Survey;

b. Easements;

c. Floodplain maps;

d. Geology and basin maps and descriptions;

e. Aerial photographs;

f. Climate information; and

g. Delineated wetlands maps.

C. A reconnaissance visit to the property shall evaluate the topography and other surface conditions that will impact the selection and 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.

D. Detailed Soil Investigation

1. Soil investigations to determine the long-term acceptance rate of a soil treatment area shall be either:

   a. Visual and tactile evaluation of two or more soil profile test pit excavations; or

   b. Percolation tests plus one or more soil profile holes or one or more soil profile test pit excavations.

2. If percolation tests are performed, at least one soil profile hole shall be evaluated to determine whether current ground water levels and/or bedrock is encountered within 8 feet of the ground surface. A visual and tactile evaluation of a soil profile test pit excavation as described in section 5.D.5. may be substituted for a profile hole. Following three years after the effective date of this regulation, a visual and tactile evaluation of a soil profile test pit excavation shall be used instead of a soil profile hole when percolation tests are performed to determine long-term acceptance rates.

3. If visual and tactile evaluations of soil are performed without percolation tests to determine a long-term acceptance rate:

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

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

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

4. Procedure for performing 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.

b. Location

(1) 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.

(2) 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.

c. Dimensions

(1) 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.

d. Change in Soil

(1) 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 7-2 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.

e. Percolation Tests

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

(2) Preparation of Percolation Test Holes

(i) Excavate the hole to the depth and diameter required.

(ii) 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.

(iii) Remove all loose soil from the hole.

(iv) Add two inches of very coarse sand or fine gravel to protect the bottom of the hole from scouring and sediment.

(3) Presoak

(i) 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.

(ii) 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 over night. 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.

(4) Percolation Rate Measurement

(i) 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.

(ii) 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.

(iii) 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 1/16 inch; however, in no case shall a test under this section be less than two hours in duration.

(5) Sandy Soils

(i) 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 ten minutes and the test conducted for one hour. The drop that occurs during the final ten minutes shall be used to calculate the percolation rate.

(ii) 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.

(6) Special Soil Types

(i) A local public health agency may identify soil types in its area, for which it shall require different procedures such as extra presoaking to obtain a valid percolation rate.

(7) Percolation Rate Determination and Reporting

(i) 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 long-term acceptance rate for the proposed system from Table 10-1.

(ii) The technician performing the percolation tests shall furnish an accurate scale drawing, showing the location of the soil profile holes or soil profile test pit excavations and percolation holes tied to lot corners or other permanent objects. The drawing shall meet the criteria in section 5.F.1.g. The information in the subsections following section 5.F.1.g.(1) through 5.F.1.g.(5). 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.

(8) Percolation Test Waiver

(i) If the applicant demonstrates to the satisfaction of the local public health agency that the system is not dependent upon soil absorption, the requirement of percolation tests may be waived.

(9) Alternate Percolation Testing

(i) 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.

(ii) Prior approval from the local public health agency of alternate percolation test procedures is required.

5. Visual and tactile evaluation of soil requirements:

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

b. The soil observations must 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 must allow observation of the different soil horizons that constitute the soil profile.

d. Soil profile test pit observations must 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 must 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 long-term acceptance rate from Table 10-1. The treatment depth is two to four feet depending on the required thickness for the treatment level below the infiltrative surface from Item 4, Table 7-2.

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 local public health agency. It is recommended that the data be verified, at a minimum, by performing an evaluation of a soil profile test pit excavation.

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

a. 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;

b. Depth to the bedrock;

c. Depth to the periodically saturated soil as determined by:

(1) Redoximorphic features and other indicators of water levels, or

(2) Depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level; and

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

E. Percolation Holes, Profile Holes, and Profile Test Pits Excavations – Marking

1. The engineer or technician conducting the percolation tests must, upon completion of the tests, flag or otherwise mark each hole to allow easy location by others. Percolation holes and profile test pits must remain open until after evaluation by the local public health agency, if required by the agency.

F. Report and Site Plan

1. A written report shall describe the results of the preliminary investigation, reconnaissance, and detailed 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 must include, but is not limited to:

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

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

c. Dates of preliminary and detailed evaluations;

d. 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 drill the profile hole or excavate the soil profile test pit, date of soils investigation, name of investigator and company name.

e. Setback distances to features listed in Table 7-1;

f. Setback distances to features listed in Table 7-2, existing on the site or within applicable setback limits, whichever is greater;

g. A drawing created to a scale that provides the complete property boundary lines. Minimum drawing size shall be 8.5-inches by 11-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 must 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 must be submitted. Drawings shall indicate dimensions, have a north arrow and graphic scale and include:

   (1) 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;

   (2) Contours or slope direction and percent slope;

   (3) The location of any visible or known unsuitable, disturbed or compacted soils;

   (4) The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and

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

h. Anticipated construction-related issues;

i. 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

j. 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.

G. Design Document

1. 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.

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

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

   a. Assumptions and calculations for each component;

   b. A scale drawing showing location of each OWTS component and distances to water, physical and health impact features requiring setbacks;

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

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

   e. Specifications of each component. Specifications for septic tanks or other buried components must 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;

   f. References to design manuals or other technical materials used;

   g. Installation procedures;

   h. Operation and maintenance manuals or instructions; and

   i. Other information that may be useful such as photos and cross-section drawings.

H. As-Built Drawings: Scale 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.

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

J. Qualifications for a Competent Technician

1. Percolation Tests

   a. Competencies needed:

      (1) Set up equipment;

      (2) Perform and run percolation tests according to the procedure in this regulation; and

(3) Record results and calculate percolation rates.

b. Local public health agencies may approve training for percolation testing.

2. Visual and Tactile Evaluation of Soil

a. Competencies needed:

(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.

b. Possible demonstrations of competence in visual and tactile evaluation of soil:

(1) Degree in soil science, agronomy, geology, other majors if a course(s) in soil morphology was included; or

(2) Attendance at training or workshop for soil evaluation for OWTS including both class and field work.

c. The Division shall approve training for visual and tactile evaluation of soil.

43.6 Wastewater Flow and Strength

A. Wastewater Flows

1. A local public health agency may require the installation of a meter to measure flow into the facility or the OWTS.

2. Single-Family Residential Homes:

a. Design flow per person shall be 75 gallons per day (gpd).

b. A local public health agency may increase the wastewater design flow per person to 100 gpd where justified.

c. The minimum design flow for a new home shall be for a two-bedroom house. The minimum design flow for the repair or replacement of an OWTS of an existing one-bedroom home shall be one-bedroom unless bedrooms are added.

d. For homes up to and including three bedrooms, the assumed number of persons per bedroom shall be two for design purposes.

e. For homes with more than three bedrooms, the assumed number of persons shall be six persons (first three bedrooms x two persons per bedroom) plus one additional person for each bedroom more than three bedrooms.

f. A local public health agency may increase the number of persons per bedroom to two for all bedrooms for design purposes.

g. Table 6-1 summarizes the design flows for single-family residential homes up to six bedrooms. A local public health agency has authority to adjust these values as described in sections 6.A.2.b. and 6.A.2.f.

h. If a new home has unfinished areas, a local public health agency may increase the number of bedrooms used for the design of the OWTS by one or two bedrooms based on an assumption that 150 square feet of unfinished space can be converted into a bedroom, if the space can meet building code requirements for a bedroom.

Table 6-1 Single-Family Residential Design Flows

# Bedrooms	Occupancy (# of Persons)	Wastewater Flow Per Person (gallons/day)	Design Flow (gallons/day)
2	4	75	300
3	6	75	450
4	7	75	525
5	8	75	600
6	9	75	675

3. Auxiliary Buildings

a. If a single-family home has an auxiliary building, such as a non-commercial shop with plumbing fixtures, the flow may be conveyed to the OWTS of the home, 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 home, it shall be assumed that the OWTS for the home will be adequately sized to include the auxiliary building if the flows are combined.

c. 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 home, the design flow of the home must include the increased use.

d. If the auxiliary building has a separate OWTS, the facility shall be sized on the basis of Table 6-2 and a septic tank detention time of 48 hours.

4. 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:

(1) Table 6-2; or

(2) An analysis of flows and strengths from at least three comparable facilities or from the facility, if it is an existing facility, must be submitted to the local public health agency for approval. The analysis shall include:

(i) 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.

(ii) Total Suspended Solids and BOD_5 or $CBOD_5$ tests at times of full use. At least three samples taken at least one week apart are required.

(iii) Explanation and justification for the comparability of the tested facilities with the proposed facility.

5. 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.

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 must be made for expanding the capacity of the OWTS in the event of changed use at the facility.

TABLE 6-2 Estimate of Average Daily Wastewater Flow and BOD_5 Load Per Person Unless Otherwise Noted

RESIDENTIAL WASTEWATER	AVERAGE GPD	BOD_5 IN POUNDS PER DAY
Single-family dwellings	75	.20
OR Single-family dwellings or auxiliary buildings by fixture type		
Bath/Shower	14.7	.014
Dishwasher	1.8	.002
Kitchen sink with garbage grinder	5.8	.052
Laundry washer	19.5	.037
Lavatory	8.4	.021
Water closet (toilet)	24.8	.029
Total with kitchen sink garbage grinder	75	.20
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	50	.15
Mobile home	75	.20
Mobile home park per space	300	.80
COMMERCIAL WASTEWATER	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Facilities with short-term or transient visitors Examples: Airports or bus stations per passenger; fairgrounds per person attending; ball parks, race tracks, stadiums, theaters or auditoriums per seat	5	.02
Airport per employee	10	.06
Barber and beauty shops per chair	100	.70*
Bowling alleys per lane - toilet wastes only	5	.03*
Country club per member	30	.02
County club per employee	20	.06

Dentist offices per non-wet chair	50	.14*
Doctor offices per doctor	250	.80*
Factories and plants exclusive of industrial wastewater per employee per eight-hour shift – no showers	20	.05
Factories and plants exclusive of industrial wastewater per employee per eight-hour shift - showers provided	35	.08
Kennels per dog	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*
Work or construction camps semi-permanent with flush toilets	50	.17
Work or construction camps semi-permanent without flush toilets	35	.02
FOOD SERVICE ESTABLISHMENT	**AVERAGE GPD**	**BOD_5 IN POUNDS PER 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
INSTITUTIONAL WASTEWATER WITHOUT KITCHENS UNLESS OTHERWISE NOTED	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Churches	5	.01
Hospitals per bed space	250	.20
Nursing homes per bed space	100	.17
Schools, Boarding per person	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 school workers	15	.06
RECREATIONAL AND SEASONAL WASTEWATER USE	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Camps, day, no meals served	15	.12
Luxury resort	125	.17
Resort night and day	50	.12
Campground per campsite**	50	.12
Public park flush toilet per fixture per hour when park is open	36	.04 lbs./ fixture
Public park urinal per fixture per hour when park is open	10	.01 lbs./fixture
Public park shower per fixture per hour when park is open	100	.10 lbs./ fixture
Public park faucet per fixture per hour when park is open	15	.04 lbs./ fixture
Swimming pools and bathhouses	10	.06
Travel trailer parks with individual water and sewage hookup per unit **	50	.12
Travel trailer park without individual water and sewage hookup per unit **	50	.12

*BOD levels need further verification

**Laundry facilities are to be calculated on a per commercial washer basis in accordance with other elements of this table

B. Wastewater Strength

1. Table 6-3 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 must be approved under section 13. of this regulation. If soil treatment area or vertical separation distance reductions are permitted, the local public health agency must have a maintenance oversight program under section 14.D. in place.

2. $CBOD_5$ strength must be reduced to Treatment Level TL1 or lower before applying to a soil treatment area.

Table 6-3 Treatment Levels

Treatment Level	$CBOD_5$* (mg/L)	TSS (mg/L)	Total Nitrogen (mg/L)
TL 1**	145	80	60-80
TL 2	25	30	60-80
TL 2N	25	30	>50% reduction***
TL 3	10	10	40-60
TL 3N	10	10	20 mg/L

Shading 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 must account for site-specific information.

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

43.7 Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features

A. Horizontal distances from the various components of a system to pertinent terrain features, including streams, lakes, water courses, springs, wetlands, wells, subsurface drains, cisterns, water lines, suction lines, dry gulches, cut banks, dwellings, other occupied buildings and property lines, must be in accordance with Table 7-1. The setback requirements are applicable for minimum system performance and treatment levels with specific modifications allowed for higher treatment levels as provided in Table 7-2. All distance setback modifications must be analyzed and approved by the local board of health or local public health agency and be in complete compliance with the variance procedures of this regulation and those of the local board of health. 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 must include provisions for operation and maintenance for the life of the system, as described in section 14.D.

C. Dry Gulches, Cut Banks and Fill Areas

1. Separation distances to dry gulches, cut banks and fill areas in Table 7-1 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.

2. 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.

3. The separation distance between a component and the crest of a dry gulch or cut bank will 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 7-1 shall be installed or located in accordance with the minimum distance requirements provided in the table or such increased distances provided by local board of health regulations.

E. Table 7-2 provides the required site evaluation, design, and treatment level considerations necessary to evaluate the site and to design and locate the soil treatment area component of an OWTS.

1. Items 1, 2 and 3 in Table 7-2 address the allowable horizontal setback distance between the soil treatment area and the following physical features:

   a. Setback distance from soil treatment area to on-site well;

   b. Setback distance from soil treatment area to water features; and

   c. Setback distance from soil treatment area to a dry gulch or cut bank.

2. Item 4 in Table 7-2 addresses the required vertical separation distance between the infiltrative surface of the soil treatment area and the restrictive layer or the required depth of soil comprising the soil treatment area.

3. The designer may select the level of treatment from Table 7-2 to be applied to the soil treatment area that is necessary in order to accommodate the site conditions, if higher level treatment for that purpose is permitted by the local public health agency.

43.7 Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features

Table 7-1 Minimum Horizontal Distances in Feet Between Components of an On-Site Wastewater Treatment System Installed After November 15, 1973 and Water, Physical and Health Impact Features

	Spring, Well, [1] Suction Line	Potable Water Supply Line	Potable Water Supply Cistern	Dwelling Occupied Building	Property Lines, Piped or Lined Irrigation Ditch	Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Infiltration Structure	Lake, Water Course, Irrigation Ditch, Stream, Wetland	Dry Gulch, Cut Bank, Fill Area (from Crest)	Septic Tank
Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault	50[2]	10[2]	25	5	10	10	50	10	--
Building Sewer or Effluent Lines	50[2]	10[2]	25[2]	0	10[2]	10[2]	50[2]	10[2]	--
STA Trench, STA Bed, Unlined Sand Filter, Sub-surface Dispersal System, Seepage Pit	100[3]	25[2]	25	20	10	25	50[3]	25	5
Lined Sand Filter	60	10[2]	25	15	10	10	25	10	5
Lined Evapo-transpiration Field or Outside of Berm of Lined Wastewater Pond	60	10[2]	25	15	10	10	25	10	5
Unlined Sand Filter in Soil With a Percolation Rate Slower than 60 Minutes per Inch, Unlined or Partially Lined Evapotrans-piration System, Outside of Berm of Unlined Wastewater Pond, or System Not Relying on STA for Treatment Other than Aerosol	100	25[2]	25	15	10	25	25	15	10

43.7 Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features

Vault Privy	50	10[2]	25	15	10	10	25	10	--
Slit Trench Latrine, Pit Privy	100	50[2]	25	N/A	25	25	100	25	N/A
System Not Relying on STA for Treatment and Utilizing Aerosol Methods	100[3]	10[2]	50	125	10	0	25[3]	10	10

NOTE: The minimum distances shown above must be maintained between the OWTS components and the features described. Where soil, geological or other conditions warrant, greater distances may be required by the local board of health or by the Water Quality Control Commission pursuant to section 25-8-206, C.R.S. and applicable regulations. For repair or upgrading of existing OWTS where the size of lot precludes adherence to these distances, a repaired OWTS shall not be closer to setback features than the existing OWTS, as reviewed and approved by the local public health agency. Components that are not watertight should not extend into areas of the root system of nearby trees.

1 Includes infiltration galleries permitted as wells by the Division of Water Resources.

2 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 must 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.

3 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. If effluent meets Treatment Level 3N and the local public health agency has a maintenance oversight program in accordance with section 14.D. of this regulation, the distance addition is not required. Flows equal to or greater than 2,000 gallons per day must be hydrologically analyzed for flow, velocity, hydraulic head, and other pertinent characteristics as means of estimating distances required to minimize contamination as part of the Division site application process.

Table 7-2 On-site Wastewater Treatment System Design Consideration and Treatment Requirements – Separation Distances from Soil Treatment Area

			PRESSURE DOSING REQUIRED		
ITEM	**OWTS DESIGN CONSIDERATION**	**Treatment Levels 1 and 2**	**Treatment Level 2N**	**Treatment Level 3**	**Treatment Level 3N**
	Horizontal Separation Distances				
1	Distance from soil treatment area to on-site well	Greater than or equal to 100 feet	Greater than or equal to 100 feet	Greater than or equal to 100 feet	Greater than or equal to 75 feet[1]
2	Distance from soil treatment area to pond, creek, lake, or other surface water feature	Greater than or equal to 50 feet	Greater than or equal to 25 feet	Greater than or equal to 25 feet	Greater than or equal to 25 feet
3	Distance from soil treatment area to dry gulch or cut bank	Greater than or equal to 25 feet	Greater than or equal to 10 feet	Greater than or equal to 10 feet	Greater than or equal to 10 feet
	Vertical Separation Distances				
4	Depth in feet from soil treatment area infiltrative surface to restrictive layer or ground water	4 feet (3 feet with pressure dosing)	Greater than or equal to 2 feet	Greater than or equal to 2 feet	Greater than or equal to 2 feet

NOTE: Treatment levels are defined in Table 6-3.
Reductions in separation distances with higher level treatment may be granted only if the local public health agency regulations have included provisions for operation and maintenance.

1 Prior to approval, all setback distance reductions to the 100 foot requirement for wells and soil treatment areas must be in full compliance with the minimum standards and variance requirements of the State of Colorado Division of Water Resources: Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction.

43.8 Design Criteria – General

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

B. Reliability: 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 erosion, corrosion, vibration, shock, climatic conditions, and usual household chemicals. Each component shall be free of non-functional protrusions or sharp edges, or other hazards, which could cause injury to persons, animals, or properties. 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.

C. Accessibility for Inspection, Maintenance, and Servicing

1. Septic tanks shall have risers over each access manhole and all risers shall extend to or above final grade.

2. Each treatment component of an OWTS other than the septic tank and soil 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.

3. Riser Lids

   a. 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.

   b. A local public health agency may require a secondary plug, cap, cover or screen be provided below the riser cover to prevent tank entry if the cover is unknowingly damaged or removed.

4. 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.

5. 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.

D. 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.

E. Electrical Equipment, If Used

1. 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.

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

F. Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus: 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. 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. A signal or message may also be sent remotely to a maintenance provider.

G. Sampling Access

1. 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.

2. 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 local public health agency or other issuer of a permit.

H. Component Operating Instructions

1. 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.

2. 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.

I. Surface Activity: Activity or use on the surface of the ground over any part of the OWTS must be restricted to that which shall allow the system to function as designed 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. 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.

J. Floodplains

1. New OWTS and replacement OWTS installed in a 100-year floodplain shall meet or exceed 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 a local public health agency shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters.

2. 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.

K. Business Commercial, Industrial, Institutional or Multi-Family Dwelling Wastewater Systems

1. An OWTS that will serve a business, commercial, industrial or institutional property, or a multifamily dwelling shall:

   a. Be designed by a professional engineer;

b. 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

c. Receive authorization by rule or a class V underground injection permit from the United States Environmental Protection Agency (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.

43.9 Design Criteria - Components

A. Tanks and Vaults

1. Watertightness

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

2. Tank Anchoring: 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, the tank, vault 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.

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

b. 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.

3. Identification and Data Marking: All tanks and treatment units 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.

B. Septic Tanks

1. The manufacturer shall provide sufficient information to demonstrate that the tank will meet the design specification.

2. Sizing Requirements:

   a. Sizing for residential capacity for new installations shall be based upon the number of bedrooms according to Table 9-1:

Table 9-1 Minimum Septic Tank Size Based on Number of Bedrooms

Number of Bedrooms	Tank Capacity (gallons)
2 or 3	1,000
4	1,250
Each Additional	250

   b. 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.

   c. For systems that remove toilet waste for separate treatment, tank capacity may be less than 1,000 gallons, if it provides a minimum of 48 hours detention time.

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

3. Testing of Septic Tank Watertightness

   a. Testing of septic tanks must be performed and evaluated as specified in section 9 of ASTM C1227-12 (Standard Specification for Precast Septic Tanks) for concrete tanks or in Standard IAPMO/ANSI Z1000-2007 (American Standards for Prefabricated Septic Tanks) for other prefabricated septic tanks.

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

   c. The inspection in the field shall be conducted by the local public health agency and be performed after the tank installation but before backfilling.

   d. 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.

4. Septic Tank Design and Dimension Criteria

   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. Inlet invert shall be at least two inches higher than the outlet invert.

   c. Inlet tee or baffle shall extend above the surface of the liquid at least five inches and shall extend a minimum of eight inches below the liquid surface.

   d. 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 must be located so that the effluent

screen has sufficient clearance to be removed through the access opening with a riser in place.

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

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

g. 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.

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

i. 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 must 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 gallon effective volume.

5. Concrete Septic Tank Structural Design

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

b. The design for each tank model and size by each manufacturer must 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 must be submitted to the Division for acceptance.

d. Tank slab lids or mid-seam tanks shall be sealed to be watertight.

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

6. Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tanks

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 must 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 the 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.

7. Metal tanks are prohibited.

C. Abandonment of Tank

1. A tank may be completely removed and the parts disposed of safely.

2. If the tank will remain in place:

a. The tank shall be pumped to remove as much waste as possible;

b. The bottom of the tank shall be broken so the tank neither floats nor fills with water;

c. The top must be collapsed and the sides may be broken into the void;

d. The remaining void shall be filled with gravel, sand or compacted soil; and

e. The filled excavation will be graded to surroundings, allowing for settling.

3. The local public health agency may require abandonment of a tank that is deemed to be a hazard.

D. Pipe Standards and Bedding Requirements:

1. Pipe Standards

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 D 3034 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 D 2729 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 must not be used in an OWTS.

f. Pressure pipe must be rated for the intended use to accommodate pump discharge pressure.

2. Bedding: All system piping, except for distribution laterals within the soil treatment area, shall be bedded with select material before final inspection by the local public health agency. 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 must be mechanically compacted to support piping.

E. Distribution Box: 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.

F. Drop Box: 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.

G. Stepdown/Relief Line: 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.

H. Wastewater Pumping and Dosing Siphon Systems

1. Pumps

   a. 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 3/4-inch diameter solids handling capacity if previously settled effluent is pumped.

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

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

2. Floats and Switches

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

   b. Floats must 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 must 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.

3. Location of Pump or Siphon

   a. A pump may be, or a siphon shall be, installed in a separate tank following the septic tank and be of sufficient volume to allow pump or siphon cycling commensurate with the design capacity. 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.

   b. The second compartment of the septic tank shall not be used as the pump tank unless it can be demonstrated to the satisfaction of the local public health agency that the minimum 48-hour detention time will not be decreased and the pump is screened or provided with an approved filtering device to assure that only liquid effluent will be discharged.

4. Pump or Siphon Discharge Piping

   a. The discharge line from the pumping or siphon chamber 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.

5. 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 must have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration.

6. Splice Box

   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.

7. 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.

I. Effluent Screens

1. A local public health agency may require that effluent screens be installed in all septic tanks in new installations and repairs where the septic tank is replaced.

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

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

4. An alarm may be installed on an effluent screen indicating need for maintenance. A local public health agency may require all effluent screens to be equipped with alarms.

J. Grease Interceptor Tanks

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

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

43.10 Design Criteria– Soil Treatment Area

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

B. At proposed soil treatment area locations where any of the following conditions are present, the system shall be designed by a professional engineer and approved by the local public health agency:

1. The soil classifications are Types 0, 3A, 4, 4A, and 5 and Treatment Levels TL2, TL2N, TL3, and TL3N as specified in Table 10-1 of this regulation;

2. The maximum seasonal level of the ground water surface is less than four feet below the bottom of the proposed absorption system;

3. A restrictive layer exists less than four feet below the bottom of the proposed absorption system;

4. The ground slope is in excess of thirty percent; or

5. Pressure distribution is used.

C. Calculation of Infiltrative Surface of Soil Treatment Area

1. 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.

2. Long-term acceptance rates (LTARs) are shown in Table 10-1.

3. Factors for adjusting the size of the soil treatment area are in Tables 10-2 and 10-3.

4. The required area for a soil treatment area is determined by the following formula:

$$\text{Soil Treatment Area in square feet required} = \frac{\text{Design Flow (in gallons per day)}}{\text{LTAR (in gallons per day per square foot)}}$$

   a. Adjusted Soil Treatment Area = Required Soil Treatment Area x Size Adjustment Factor(s).

   b. Size adjustment factors for methods of application are in Table 10-2.

   c. Size adjustment factors for types of storage/distribution media are in Table 10-3.

   d. A required soil treatment area receiving TL1 effluent may be multiplied by one size adjustment factor from Table 10-2, Table 10-3, or both.

   e. A soil treatment area receiving TL2, TL2N, TL3, or TL3N effluent must be pressure dosed. The distribution media in Table 10-3 may be used for distribution of higher level treatment system effluent, but an additional reduction factor from Table 10-3 shall not be used.

Table 10-1 Soil Treatment Area Long-term Acceptance Rates by Soil Texture, Soil Structure, Percolation Rate and Treatment Level

Soil Type, Texture, Structure and Percolation Rate Range					Long-term Acceptance Rate (LTAR); Gallons per day per square foot				
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]*
0	Soil Type 1 with more than 35% Rock (>2mm); Soil Types 2-5 with more than 50% Rock (>2mm)	--	0 (Single Grain)	<5	Minimum 3-foot deep unlined sand filter required[2]	Minimum 2-foot deep unlined sand filter required[2]			
1	Sand, Loamy Sand	--	0	5-15	0.80	1.25	1.25	1.40	1.40
2	Sandy Loam, Loam, Silt Loam	PR (Prismatic) BK (Blocky) GR (Granular)	2 (Moderate) 3 (Strong)	16-25	0.60	0.90	0.90	1.00	1.00
2A	Sandy Loam, Loam, Silt Loam	PR, BK, GR 0 (none)	1 (Weak) Massive	26-40	0.50	0.70	0.70	0.80	0.80
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR	2, 3	41-60	0.35	0.50	0.50	0.60	0.60
3A	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR 0	1 Massive	61-75	0.30	0.40	0.40	0.50	0.50
4	Sandy Clay, Clay, Silty Clay	PR, BK, GR	2, 3	76-90	0.20	0.30	0.30	0.30	0.30
4A	Sandy Clay, Clay, Silty Clay	PR, BK, GR 0	1 Massive	91-120	0.15	0.20	0.20	0.20	0.20
5	Soil Types 2-4A	Platy	1, 2, 3	121+	0.10	0.15	0.15	0.15	0.15

NOTE: Shaded areas require system design by a professional engineer.

1 Treatment levels are defined in Table 6-3.

2 Unlined sand filters in these soil types shall provide pathogen removal. Design shall conform to section 11.C.2.c, Unlined Sand Filters

* Higher long-term acceptance rates 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 long-term acceptance rate can be substantiated.

D. Allowable Soil Treatment Area Reductions and Increases:

1. The soil treatment area size determined by dividing the design flow rate by the long-term acceptance rate may be adjusted by factors for method of treatment, soil treatment area design, and type of distribution media.

2. For the purpose of the table, a "baseline system," i.e. adjustment factor of 1.00, is considered to be Treatment Level 1 (TL1) applied by gravity to a gravel-filled trench.

3. 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.

4. Reductions for use of the higher level treatment categories listed in Table 10-1 shall only apply provided the system is inspected and maintained as specified in the requirements of section 14.D., Permitting and Oversight of Maintenance for Soil Treatment Area Reductions and Vertical and Horizontal Separation Distance Reductions Based on Use of Higher Level Treatment.

Table 10-2 Size Adjustment Factors for Methods of Application in Soil Treatment Areas Accepting Treatment Levels 1, 2, 2N, 3 and 3N Effluent

Type of Soil Treatment Area	Method of Effluent Application from Treatment Unit Preceding Soil Treatment Area		
	Gravity	Dosed (Siphon or Pump)	Pressure Dosed
Trench	1.0	0.9	0.8
Bed	1.2	1.1	1.0

Table 10-3 Size Adjustment Factors for Types of Distribution Media in Soil Treatment Areas Accepting Treatment Level 1 Effluent

Type of Soil Treatment Area	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

E. Design of Distribution Systems

1. General

a. The infiltrative surface and distribution lines must be level.

b. The infiltrative surface must be no deeper than four feet unless adequate treatment at a deeper level can be demonstrated and is approved by the local public health agency. The depth will be measured on the downslope side of the trench or bed.

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

d. Pipe for gravity distribution must be no less than three inches in diameter.

e. A final cover of soil suitable for vegetation at least ten inches deep must 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 must be graded to divert stormwater runoff or other outside water from the soil treatment area. The area must 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

cover, minimizes settlement and maintains proper drainage.

2. Distribution Lines

a. Distribution between lines in a soil treatment area must be as even as possible. Uneven settling of portions of the distribution system following construction must 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. A local public health agency may limit the length of distribution lines to a maximum of 100 feet.

e. The end of a distribution pipe must 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.

f. Inspection Ports

(1) An inspection port accessible from ground surface must be installed at the terminal end of each line. The bottom of the inspection port tube must extend to the infiltrative surface and not be connected to the end of the distribution pipe. 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.

(2) Additional inspection ports connected to distribution pipes may be installed.

(3) In addition, a local public health agency may require an inspection port at the initial end of each line.

(4) 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.

g. Trenches

(1) Trenches must be three feet wide or less.

(2) The separating distance between trenches must be a minimum of six feet sidewall-to-sidewall.

(3) Perforated distribution pipe used in a trench must be as close to the center of the trench as possible.

(4) Perforations must be oriented downward unless pressure distribution is used and provision for pipe drainage is included.

h. Beds

(1) Maximum width for a bed must be 12 feet, unless the bed receives effluent meeting Treatment Level 2 quality or better.

(2) The separating distance between beds must be a minimum of six feet sidewall-to-sidewall.

(3) The separating distance between parallel distribution lines in an absorption bed must not exceed six feet and a distribution line must be located within three feet of each sidewall and endwall of the absorption bed.

i. Serial and Sequential Distribution:

(1) 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.

(2) The horizontal distance from the side of the absorption system to the surface of the ground on a slope must be adequate to prevent lateral flow and surfacing.

(3) Adjacent trenches or beds must be connected with a stepdown/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.

3. Storage/Distribution Media

a. Rock and Pipe

(1) The pipe must be surrounded by clean, graded gravel, rock, or other material of equal efficiency which may range in size from 1/2 inch to 2 1/2 inches. At least six inches of gravel, rock or other material must be placed below the pipe. The gravel, rock or other material must fill the trench around the pipe and at least two inches above the top of the distribution pipe.

(2) The top of the placed gravel or such material used must be covered with non-woven permeable geotextile meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material. An impervious covering must not be used.

b. Tire Chips

(1) The pipe may be surrounded with clean, uniformly-sized tire chips.

(2) Tire chips must be nominally two inches in size and may range from 1/2 inch to a maximum of four inches in any one direction.

(3) Wire strands must not protrude from the tire chips more than 0.75 inches.

(4) Tire chips must be free from balls of wire and fine particles less than two mm across.

(5) The top of the tire chips used must be covered with non-woven permeable geotextile meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material. An impervious covering must not be used.

c. Chambers

(1) Chambers must be installed with the base on the infiltrative surface.

(2) Installation must be according to manufacturer's instructions.

(3) Effluent may be distributed by gravity or pressure dosing.

d. Manufactured Media

(1) Manufactured media must be installed with the base on the infiltrative surface.

(2) Installation must be according to manufacturer's instructions.

(3) Effluent may be applied by pressure distribution only if the manufacturer specifies suitability of the product for that use.

e. Pressure Distribution

(1) Design of pressure distribution systems must include:

(i) Dose size and frequency for flows and soil or media long-term acceptance rate;

(ii) Pipe diameter and strength requirements;

(iii) Orifice size and spacing; and

(iv) Distal pressure head.

(2) Cleanouts must be installed at the end of each line.

f. Driplines

(1) The infiltrative surface area must be calculated using the long-term acceptance rate for the site or a more conservative value if recommended by the manufacturer.

(2) Driplines must be installed on manufacturer's spacing recommendations.

(3) Drainback must be provided for all drip lines, pipes and pumps.

(4) Provisions must be made to minimize freezing in the distribution lines, driplines, relief valves, and control systems.

(5) Provisions must be made for backflushing or other cleaning.

F. Alternating and Sequencing Zone Systems

1. Alternating Systems

a. An alternating system must have two zones that must be alternated on an annual or more frequent basis.

b. Each section must be a minimum of 50 percent of the total soil treatment area. Size adjustment factors for methods of effluent application or type of distribution media shall not be allowed.

c. A diversion valve or other approved diversion mechanism may be installed on the septic tank effluent line allowing soil treatment area sections to be alternated.

d. The diversion mechanism must be readily accessible from the finished grade.

2. Sequencing Zone Systems

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

b. Where soil conditions are similar between the sections, each section area shall be the same size. If soil conditions are such that long-term acceptance rates are different, each section may be sized for the same dose, but different long-term acceptance rates.

c. An automatic distribution valve must be used.

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

G. Dosing: Dosing may be used for soil treatment area distribution. The dose must be sized to account for the daily flow and the dosing frequency.

H. Soil replacement must be permitted to bring the soil within the requirements of suitable soil. Added soil must meet the specifications of sand filter media, as specified in section 43.11.C.2.a.(1). All added soil must be completely settled prior to installation of components as specified and approved by the design engineer. The loading rate for sand filters must be used. Pressure distribution must be used.

I. Repairs

1. 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, and seepage pits may be considered for repairs only. Other options are vaults or higher level treatment systems, if the local board of health permits them.

2. Wide Beds: For repairs, beds may be wider than 12 feet without being required to receive effluent meeting Treatment Level 2 quality or better.

3. Deep Gravel Trenches

   a. 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 according to the following formula:

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

   Where:

   L = length of trench prior to adjustment for deep gravel
   W = width of trench or bed in feet
   D = additional depth in feet of gravel in excess of the minimum required six inches of gravel below the distribution pipe

   b. Maximum allowable additional depth is five feet.

   c. Percolation tests and soil profile hole or soil profile excavation test pit evaluations must be performed at the proposed infiltrative surface depth.

   d. The reduction in field size area with the use of chambers must not be applied to deep gravel systems.

4. Seepage Pits

   a. For repairs, potential for risk to public health and water quality may be evaluated by the local public health agency. If risk is low in the determination of the local public health agency, a seepage pit without higher level treatment may be used.

   b. If the risks are not low, higher level treatment of at least TL2 must be attained prior to discharge to these systems for final disposal.

   c. A seepage pit shall consist of a buried vertical cylinder with holes in the wall.

(1) Pits must be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity.

(2) The excavation must be larger than the cylinder by at least 12 inches on each side.

(3) The over-excavated volume must be filled with rock ranging in size from 1/2 inch to 2 1/2 inches.

(4) The capacity of the pit must be computed on the basis of long-term acceptance rates determined for each stratum penetrated. The weighted average of the results must be used to obtain a design figure.

(5) Soil strata in which the percolation is slower than 30 minutes per inch must not be used for absorption or seepage. These strata must not be included in the weighted average to determine the long-term acceptance rate.

(6) 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.

d. Pits must 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 must be 20 feet.

e. The construction of new seepage pits for the treatment and dispersal of on-site wastewater on new sites is prohibited unless:

(1) The seepage pit is designed by a professional engineer; and

(2) The design includes higher level treatment of at least TL2.

5. Vaults

a. The allowable use of vaults for repairs in a local jurisdiction is determined by the local board of health.

b. Criteria for vaults are in section 12.D. of this regulation.

6. Higher Level Treatment Options

a. Reduction in required soil treatment area for repairs is possible with higher level treatment.

b. Design criteria for higher level treatment systems are in section 11.

43.11 Design Criteria – Higher Level Treatment Systems

A. General

1. Higher level treatment systems must be designed by a professional engineer.

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

a. Public domain technology systems must be designed, installed and maintained according to established criteria and additional criteria established by the local public health agency. When design criteria are not specifically provided in this regulation, the criteria used in the design must be from a reference commonly used as an industry standard and the criteria must be cited in the design.

b. Proprietary systems must be designed, installed, and maintained according to manufacturer's instructions and additional criteria identified in the Technology Review and Acceptance process, section 13.

3. Reductions to soil treatment area or separation distances based on higher level treatment must not be permitted unless the local public health agency has adopted a program for permitting and oversight of inspections and maintenance in section 14.D.

4. Soil treatment areas for higher level treatment systems must be pressure dosed.

5. Systems must be capable of accommodating all anticipated flows and organic loads.

6. Ventilation and air systems: Mechanical components must be installed in a properly vented location and all vents, air intakes, and air hoses must be protected from snow, ice, or water vapor accumulations.

7. Covers, barriers, or other protection: All systems must be installed to include protection of openings against entry of insects, rodents, other vectors and unauthorized people.

B. The treatment levels identified in Table 6-3 are specified in this section for public domain technology, and proprietary treatment systems shall be assigned a treatment level by the technology review and acceptance process in section 13. Adequate maintenance for each must be required and documented as in section 14.D.

C. Sand Filters

1. Sand filters, such as a lined intermittent sand filter or recirculating sand filter, may be used as a pre-treatment system where the treated effluent is collected and dispersed to a soil treatment area or where site conditions require importing treatment media, such as an unlined sand filter, a soil replacement system, or a mounded system.

2. Intermittent (Single Pass) Sand Filters

a. General

(1) The filtering material used in a sand filter must be clean, coarse sand, all passing a screen having four meshes to the inch. The sand must have an effective size between 0.25 and 0.60 mm. The uniformity coefficient must be 4.0 or less. Material meeting ASTM 33, for concrete sand, with one percent or less fines passing 200 mesh sieve may be used.

(2) The sand below the distribution lines must be at least two feet deep.

(3) Distribution system

(i) Dispersal of effluent to the surface of the sand filter must be by a pressurized distribution system for equal distribution.

(ii) Pipes used to disperse the effluent must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2-inch screen and must be retained on a 3/4-inch screen.

(iii) Manufactured media may be used as an alternative to gravel or stone.

(iv) The separation distance between parallel distribution lines must not exceed six feet, and a distribution line must be located within three feet of each filter sidewall.

(4) Application Rates

(i) When receiving wastewater that meets TL1 treatment level, a maximum sand filter application rate of 1.0 gpd/ft^2 must be used.

(ii) When receiving wastewater that meets TL2, TL2N, TL3, or TL3N treatment levels, the sand filter must be sized based on the long-term acceptance rate for Soil Type 1.

(iii) An intermittent sand filter must not be used to treat wastewater that does not conform to TL1 treatment level or better.

b. Lined Sand Filters

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

(2) A minimum four-inch diameter under-drain pipe must be used. The under-drain pipe must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2 inch screen and must be retained on a 3/4-inch screen. Manufactured media may be used as an alternative to gravel or stone.

(3) Under-drain effluent collected below the sand filter shall be dispersed to a soil treatment area. The soil treatment area receiving the sand filter effluent may be sized with a long-term acceptance rate for TL3 effluent.

c. Unlined (Open Bottom) Sand Filters

(1) The bottom of the sand filter receiving TL1 must be no less than two feet above the high ground water surface or bedrock for installations in which effluent percolates downward through the soil.

(2) The bottom of the sand bed receiving TL2, TL2N, TL3 or TL3N must be at or above the high ground water surface or bedrock.

(3) An unlined sand filter is to be sized based on section 11.C.2.a.(4)(i) or the long-term acceptance rate of the receiving soil for TL3, whichever results in the larger area.

d. Mounded Sand Filters (Mound Systems)

(1) 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.

(2) Mounded sand filters must conform to section 11.C.2.c. for unlined (open bottom) sand filters.

(3) The basal area and linear loading rate must be determined from the loading rate for the soil type under the mound and the slope of the site.

(4) The final slope of the mound must be no greater than three feet horizontal to one foot vertical.

(5) The surface of the mounded area must be planted with a suitable vegetative cover.

(6) If the thickness of the sand 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.

3. Recirculating Sand Filters

a. A recirculating sand filter must have an impervious liner on the sides and bottom of the filter. The liner must consist of a 30 mil thickness PVC material or equivalent.

b. A minimum four-inch diameter under-drain pipe must be used. The under-drain pipe must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2-inch screen and must be retained on a 3/4-inch screen. Manufactured media may be used as an alternative to gravel or stone.

(1) Filter media effective size (D10) must range from 1.0 to 1.50 mm and the uniformity coefficient (D60/D10) must be less than 4.0. Fines passing a 200 mesh sieve must be less than one percent.

c. Sand depth must be a minimum of two feet.

d. Typical loading rates are 3.0 to 5.0 gpd/ ft^2. Rate must not exceed 5.0 gpd/ ft^2.

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

f. Effluent collected from the sand filter must be discharged to a soil treatment area. The soil treatment area receiving the sand filter effluent may be sized with a long-term acceptance rate for TL3N effluent.

D. Rock Plant Filter (Constructed Wetland) Treatment Before a Soil Treatment Area

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

2. The design must 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.

3. The treated effluent from a rock plant filter must be distributed to a soil treatment area.

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

43.12 Design Criteria – Other Facilities

A. An OWTS treating the wastewater remaining after the separation of the toilet wastes must 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.

B. Evapotranspiration and Evapotranspiration/Absorption Systems:

1. An evapotranspiration system may be designed to consider evaporation and transpiration only, or in soil types 3A, 4, 4A and 5, absorption may also be considered.

   a. An evapotranspiration system or evapotranspiration/absorption system must be designed by a professional engineer.

   b. Data to be furnished must 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:

$$\text{Area (in square feet)} = \frac{\text{Design Flow (in gallons per day)} \times 586}{\text{Lake Evaporation Rate at the Site (in inches per year)}}$$

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

   f. Sand utilized in evapotranspiration or evapotranspiration/absorption beds for wicks must meet the gradation requirements in Table 12-1 and be approved by the design engineer.

Table 12-1 Gradation of Wicking Sand for Evapotranspiration Beds

Sieve Size	Percent Passing
4	100
40	50-70
200	<15

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

   h. 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 long-term acceptance rate for that soil type.

i. Except for dwellings, if the system is designed for summer use only, as determined by the local public health agency, the surface area may be multiplied by 0.6 to obtain the required area.

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

C. Wastewater Ponds

1. Construction of new wastewater ponds for single-family homes is prohibited.

2. A septic tank must precede the wastewater pond.

3. The depth of the design volume of the wastewater pond must be five feet.

4. A wastewater pond must have two feet of free board above the design volume of the pond.

5. A wastewater pond must be fenced to keep out livestock, pets, vermin, and unauthorized people.

6. Wastewater ponds must be designed on the basis of monthly water balance including design flow, precipitation, evaporation, and seepage.

7. Wastewater ponds must be constructed so the seepage out of the bottom or sides does not exceed 1/32 of an inch per day. If this limit cannot be achieved using compacted natural soil materials including soil additives, an impermeable synthetic membrane liner must be used.

8. Maintenance must include preventing aquatic and wetland plants from growing in or on the edge of the pond, protecting sides from erosion, and mowing grasses on the berm and around the pond.

9. Wastewater ponds must be designed by a professional engineer.

D. Vaults Other Than Vault Privies

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

2. A local board of health may allow or prohibit vaults for use at a permanent facility, except where section 12.D.1. applies.

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

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

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

6. 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 must be treated in an adequately-sized OWTS.

7. Variances may be granted for specialized commercial uses.

8. A vault, if permitted by the local public health agency, must have a minimum 500 gallon effective volume or be capable of holding a minimum of the two-day design wastewater flow, whichever is larger.

9. A visual or an audible signal device or both, indicating filling to a maximum of 75 percent capacity, must be installed to indicate when pumping is necessary.

10. Concrete vaults must meet the strength and watertightness requirements for septic tanks. 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.

E. Privies

1. Vault Privy

   a. A local board of health may prohibit the new construction of vault privies.

   b. A local board of health may prohibit the continued use of existing vault privies.

   c. Effective volume of the vault must be no less than 400 gallons and it must be constructed of concrete or plastic. The vaults for privies must meet the structural and watertightness standards of vaults.

   d. A vault privy must be built to include: fly- and rodent-tight construction, a superstructure affording complete privacy, an earth mound around the top of the vault and below floor level that slopes downward away from the superstructure base, a floor, and a riser of concrete or other impervious material with hinged seats and covers of easily cleanable, impervious material. All venting must be fly-proofed with No. 16 or tighter mesh screening.

2. Pit Privy

   a. A local board of health may prohibit the new construction of pit privies.

   b. A local board of health may prohibit the continued use of existing pit privies.

   c. If pit privies are permitted by the local public health agency:

      (1) The bottom of the pit must be located above at least four feet of suitable soil and four feet above a limiting condition;

      (2) The pit must have at least 400 gallons of effective volume; and

      (3) The superstructure must provide complete privacy and have fly- and rodent-tight construction, an earth mound around the top of the pit and below floor level that slopes downward away from the superstructure base, a floor, and a riser of concrete or other impervious material with hinged seats and covers of easily cleanable, impervious material. All venting must be fly-proofed with No. 16 or tighter mesh screening.

F. Incinerating, Composting and Chemical Toilets

1. The local board of health may permit incinerating, composting and chemical toilets.

2. Permitting of an incinerating or composting toilet may also be subject to the jurisdiction of a local agency regulating plumbing or the Colorado Plumbing Board, whichever has jurisdiction over plumbing in the location.

3. An incinerating or composting toilet may be used for toilet waste where an OWTS is installed for treating wastewater remaining after removal of toilet waste. Subject to local board of health or other applicable regulations or codes (e.g., Colorado Plumbing Code if a local code does not exist), the compartment may be located within a dwelling or building provided the unit complies with the applicable requirements of this regulation, and provided the installation will not result in conditions considered to be a health hazard as determined by the local public health agency. Compartment and appurtenances related to the unit must include fly-tight and vector-proof construction and exterior ventilation.

4. Incinerating Toilets: An approved incinerating toilet must be designed and installed in accordance with all applicable federal, state, and local air-pollution requirements and manufacturer's instructions.

5. Composting Toilets

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

   c. Residue from the composting toilet must be removed when it is filled to 75 percent of capacity. Residue from the unit must be properly disposed of by methods recommended by the manufacturer and acceptable to the local public health agency. Disposal methods must prevent contamination of water and not cause a public health nuisance. Disposal using solid waste practices is recommended.

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

   e. Composting toilets must be operated according to manufacturer's specifications.

6. Portable Chemical Toilets

   a. A portable chemical toilet may be used by permit from the local public health agency or other agency with authority to issue permits for portable chemical toilets.

   b. Use of a portable chemical toilet in permanently occupied buildings is prohibited except during construction or under emergency circumstances as determined by

the local public health agency. Proper ventilation of a chemical toilet used inside must be required.

G. Slit Trench Latrine

1. If permitted by the local board of health, a slit trench latrine must be utilized only in remote or emergency situations when other approved sanitary means are unavailable. Other agencies may have more stringent regulations that must be adhered to.

2. A slit trench latrine must be considered a temporary convenience to be used no longer than seven days and must be backfilled and graded to match its surroundings when its use is discontinued.

3. A slit trench latrine must be located only in a place that does not adversely affect public health or the environment. The location must provide ample privacy and should be exposed to several hours of sunlight each day. A slit trench latrine must not be located:

   a. In a building;

   b. In a covered or partially covered location such as a cave or overhanging cliff; or

   c. On a slope of greater than 30 percent.

4. A slit trench latrine must be installed only in suitable soil.

5. A slit trench latrine must be excavated approximately one foot wide and two feet deep for the required length. All human waste and tissue placed into the slit trench latrine must be covered with at least two inches of soil at least once a day or more frequently if requested by the local public health agency.

H. Treatment Systems Other Than Those Discharging Through a Soil Treatment Area or Sand Filter System

1. For systems discharging to State Waters, see section 2.C.

2. Systems that discharge other than through a soil treatment area or a sand filter system must:

   a. Be designed by a professional engineer;

   b. Be reviewed by the local board of health; and

   c. Not pose a potential health hazard or private or public nuisance or undue risk of contamination.

3. The local board of health may choose to permit only systems that do not allow drainage of effluent off the property of origin.

4. The following minimum performance criteria must be required for all permitted systems pursuant to this section:

   a. If effluent discharge is made into areas in which the possibility exists for occasional direct human contact with the effluent discharge, the effluent at the point of discharge must meet the minimum treatment criteria of TL3 effluent and specifically adhere to each of the following standards:

(1) The geometric mean of the fecal coliform density must not exceed 25 per 100 milliliters when averaged over any five consecutive samples, and no single sample result for fecal coliform can exceed 200 per 100 milliliters.

(2) The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand ($CBOD_5$) must not exceed ten milligrams per liter when averaged over any three consecutive samples.

(3) The arithmetic mean of the total suspended solids must not exceed ten milligrams per liter when averaged over any three consecutive samples.

b. If the effluent discharge is made into an area so restricted as to protect against the likelihood of direct human contact with the discharged effluent, the effluent at the point of discharge must meet the treatment criteria of TL2 effluent and specifically adhere to each of the following standards:

(1) The geometric mean of the fecal coliform density must not exceed 500 per 100 milliliters when averaged over any five consecutive samples, and no single sample can exceed 5000 fecal coliform per 100 milliliters.

(2) The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand ($CBOD_5$) must not exceed 25 milligrams per liter when averaged over any three consecutive samples.

(3) The arithmetic mean of the total suspended solids must not exceed 30 milligrams per liter when averaged over any three consecutive samples.

5. To determine compliance with the standards contained in this section, the required sampling frequency for fecal coliform, $CBOD_5$, and total suspended solid levels must be performed at least once per month when the system is in operation and the results submitted to the local public health agency for compliance with the permit requirements.

6. Methods of Analysis - Sampling Points:

a. All effluent samples must be analyzed according to the methods prescribed in the American Public Health Association, American Water Works Association, and Water Environment Federation: Standards Methods for the Examination of Water and Wastewater, 21st edition.

b. The sampling point must be a location that is representative of final discharge from the system.

43.13 Technology Review and Acceptance

A. OWTS technologies must either be public domain, including but not limited to rock and pipe distribution systems, sand filters with pressure distribution and mound systems, with criteria for design, installation, maintenance and use as described in this regulation, or proprietary products that have received Division review and acceptance before the local public health agency may permit them for use.

B. The Division must review and accept proprietary products in these technology categories:

1. Proprietary treatment products (e.g. treatment systems, remediation systems);

2. Propriety distribution products (e.g. manufactured distribution products or subsurface dripline);

3. Septic tanks;

4. Composting toilets;

5. Incinerating toilets; and

6. Others as needed.

C. Product Acceptance Requirements – General:

1. To qualify for product acceptance, manufacturers desiring to sell or distribute proprietary products in Colorado must submit a completed application to the Division in the format provided by the Division and a report describing in detail the test procedures and data confirming the performance and properties of the product claimed by the manufacturer. Products within a single series or model line sharing distinct similarities in design, materials, capacities, configuration, and claiming the same level of treatment may be accepted under a single application. Products outside of the series or model line must be accepted under separate applications. The following information must be included in the application:

   a. Manufacturer's name, mailing address, street address, and phone number;

   b. Contact individual's name, mailing address, street address, phone number and email address. The contact individual must be vested with the authority to represent the manufacturer in the acceptance process;

   c. Category of product (e.g., proprietary treatment product, proprietary distribution product, septic tank);

   d. Name, including specific brand and model, of the proprietary product;

   e. A description of the functions of the proprietary product, along with any known limitations on the use of the product;

   f. Product description and technical information, including dimensioned drawings; materials and characteristics; component design specifications; and volumes, design capacity, and flow assumptions and calculations, as relevant;

   g. Siting and installation requirements;

   h. Product performance information in appropriate product section;

   i. Detailed description, procedure and schedule of routine service and maintenance events;

   j. Copies of manufacturer's literature to include sales and promotion, design, installation, operation and maintenance, and owner instructions; and

   k. Identification of information subject to protection from disclosure and trade secrets, if any.

2. Upon receipt of an application, the Division must verify that the application is complete and meets the requirements for which the product is being evaluated. If the application is found to be complete, and the requirements of this section needed to accept the product are met, the Division shall place the product on a list of accepted proprietary products for the type of product.

3. Manufacturers must have readily accessible and up to date information for designers, regulators, product owners, and other interested parties about their product including:

   a. Product manuals;

   b. Design instructions;

   c. Installation instructions;

   d. Operation and maintenance instructions; and

   e. A list of representatives and manufacturer-certified service providers in Colorado, if any. If none exist, information on how service on the product will be provided in Colorado.

4. If, at any time after a proprietary product has been accepted for use, the Division receives information that the product so accepted does not meet the required standards, or in any way constitutes a public health or environmental hazard, the Division may, at its discretion, revoke the product acceptance. The Division shall notify the manufacturer and local public health agencies within 30 days of any revocation.

D. Proprietary Treatment Product Acceptance Requirements

1. If a proprietary treatment product is submitted to meet a specific treatment level, a report with test procedures and data must be submitted to the Division to demonstrate that it can meet the treatment level for which the approval is being requested on a consistent basis in actual installations. The Division must approve the test methods and programs. Test results from product certification testing must also be submitted.

2. If a product is accepted for a specific treatment level, the product may also be used for applications requiring lower treatment levels. Reductions based on higher level treatment may not be applied unless the local public health agency has a maintenance oversight program in place as described in section 14.D.

3. Field Performance Testing

   a. Testing must be performed by a neutral third party.

   b. Testing for residential applications must be performed on a minimum of 12 single-family homes under normal operating conditions.

   c. Each system must be tested over a period of at least one year.

   d. Each system must be sampled at least four times during the year with the sampling evenly distributed throughout the year.

   e. Laboratory results for all parameters for which acceptance is being requested must be submitted.

f. Testing may be performed in Colorado under a Product Development Permit.

g. Testing may be performed in locations other than Colorado, if elevation and climate conditions are similar to those in Colorado.

(1) Increased elevation results in lower atmospheric pressure and lower oxygen content. If components are changed or adjustments made to compensate for these conditions, those changes or adjustments must be specified.

(2) Colorado has a semi-arid climate. If components are changed or adjustments made to compensate for these conditions, those changes or adjustments must be specified.

(3) If nitrogen reduction is claimed, the provisions for nitrification at cold temperatures must be specified.

h. The report conclusions must indicate the proprietary treatment unit can consistently be expected to meet the treatment level for which acceptance is being requested.

i. The report must include estimated operating costs for the first five years of the treatment system's life. This must include both estimated annual electricity or other energy costs, and routine inspection and maintenance costs, including replacement of parts.

(1) Energy and other costs are to be based on typical Denver, Colorado, costs at the time of the acceptance request.

(2) Replacement part costs must include shipping and handling.

(3) If media or other major part replacement is expected during the normal life of the system, the cost of replacement and the typical replacement interval must be included even if replacement is not expected within five years.

j. If a proprietary product has been accepted for use in Colorado under NSF/ANSI 40 or equivalent testing and at least one product unit has been installed in Colorado prior to the effective date of this regulation, the acceptance for use in Colorado may continue as treatment level 2.

E. Proprietary Distribution Product Acceptance Requirements

1. Proprietary manufactured distribution products must:

a. Be constructed or manufactured from materials that are non-decaying and non-deteriorating and do not leach chemicals when exposed to septic tank effluent and the subsurface soil environment;

b. Provide liquid storage volume at least equal to the storage volume within the assumed 30 percent void space in a rock and pipe distribution system assuming six inches of rock below the pipe and two inches above the pipe;

c. Maintain the integrity of the trench or bed. The material used, by its nature and its manufacturer-prescribed installation procedures, must withstand the physical

forces of the soil sidewalls, soil backfill and the weight of equipment used in the backfilling; and

d. If the width of a proprietary manufactured distribution product is within 90 percent of the width of the excavation, it may be approved as being equivalent to the full width of the excavation, if information is provided that demonstrates distribution over the full width.

2. Proprietary subsurface dripline products must:

a. Be warranted by the manufacturer for use with OWTS effluent;

b. Specify required treatment level of influent to the driplines;

c. Be designed for resistance to root intrusion; and

d. Incorporate emitters that may be controlled either by use of pressure-compensation emitters or with a pressure regulator.

F. Proprietary Remediation Product Acceptance Requirements

1. Manufacturers of products for remediation of a soil treatment area must submit test data as described in field performance testing, section 13.D.3. demonstrating that the soil treatment area has been remediated for a period of at least three years.

2. Remediation must be demonstrated by showing that a soil treatment area that had been surfacing, does not surface again after use of the proprietary remediation product when the OWTS is operated under the same conditions as it was before the surfacing began.

3. Laboratory data may be submitted but will not take the place of field performance testing.

4. In addition to the field performance testing, the following additional requirements must be met for the appropriate situation.

a. For aeration or other higher level treatment installed following the septic tank, test data as described in field performance testing must be submitted demonstrating that the septic tank effluent strength has been reduced.

b. For aeration or other higher level treatment installed inside septic tank, test data as described in field performance testing must be submitted demonstrating that the septic tank effluent strength has been reduced and is lower than TL1.

c. For chemical and/or biological remediation, the chemicals or biological agents used in the remediation product must be demonstrated to have no negative effects on public health, environment, and soil properties. A material safety data sheet must be submitted, if available.

d. For physical remediation, the process used must be demonstrated to have no negative effects on public health, environment, and soil properties. The physical remediation process must not be repeated during the test time period.

G. Septic Tank Acceptance Requirements

1. Septic tank design must conform to the requirements of section 9.B. of this regulation.

2. Each manufacturer must test five percent of its tanks for watertightness at the manufacturing facility, unless the tanks are certified for use as a septic tank by the International Association of Plumbing and Mechanical Officials (IAPMO) or Canadian Standards Association (CSA), or the manufacturer participates in the Plant Certification Program of the National Precast Concrete Association (NPCA).

3. Watertightness results must be sent to the Division along with measures taken to repair a tank that fails the test and prevent similar problems in future tanks.

4. IAPMO, CSA, and NPCA certifications must be submitted to the Division for acceptance.

H. Composting Toilet Acceptance Requirements

1. Composting toilets must meet the requirements of NSF/ANSI Standard 41 and bear the seal of approval of the NSF or an equivalent testing and certification program.

I. Incinerating Toilets Acceptance Requirements

1. Incinerating toilets must meet the requirements of the NSF Protocol P157 and bear the seal of approval of the NSF or an equivalent testing and certification program.

J. Other Product Acceptance Requirements

1. The Division may adopt review and acceptance requirements for additional products as needed.

43.14 Operation and Maintenance

A. Responsibility: The owner must 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. Service Label: 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 must be placed at a conspicuous location.

C. The local board of health may adopt regulations for:

1. Scheduling of maintenance and cleaning;

2. Practices adequate to ensure performance of an OWTS; and/or

3. Submission of proof of maintenance and cleaning to the local public health agency by the owner of the system.

D. Permitting and Oversight of Maintenance for Soil Treatment Area Reductions and Vertical and Horizontal Separation Distance Reductions Based on Use of Higher Level Treatment

1. Purpose: Reductions in requirements for soil treatment areas, vertical separation distances to limiting layers or reductions in horizontal separation distances by using higher level treatment systems are based on the criteria that these systems are functioning as designed. If these criteria are not met, failure or malfunction is likely, which could result in damage to public health and water quality.

2. The local board of health may choose to permit reductions in the size of soil treatment areas and horizontal and vertical separation distances based on higher level treatment of effluent, only if an oversight program for inspection, maintenance, and repair is implemented by the local public health agency. Monitoring may be required.

3. A local board of health is not required to allow reductions in soil treatment areas or vertical or horizontal separation distances based on higher level treatment. If these reductions are not allowed, the local board of health is not required to implement section 14.D.

4. Before permitting systems with a reduced soil treatment area as a result of higher level treatment, a local public health agency must develop a program of inspections, maintenance, recordkeeping and enforcement to ensure and document that the systems are meeting the designed higher level treatment standards. At a minimum:

   a. Maintain accessible records that indicate:

      (1) Owner and contact information;

      (2) Address and legal description of property;

      (3) Location of OWTS specifying location of septic tank, higher level treatment system, soil treatment area and other components;

      (4) Description of OWTS installed;

      (5) Level of treatment to be provided;

      (6) Copy of current contract with a service provider;

      (7) Inspection and maintenance performed:

         (i) Dates system was inspected and/or maintained;

         (ii) Name and contact information of inspector and/or maintenance provider;

         (iii) Condition of system at inspection; and

         (iv) Maintenance tasks performed;

      (8) Permits, if required by the local public health agency for the work performed; and

      (9) Condition of system at completion of any maintenance activity.

   b. Frequency of inspection and maintenance must be the most frequent of:

      (1) Manufacturer recommendations for proprietary systems or design criteria requirements for public domain technology;

      (2) Local public health agency or Division requirements;

      (3) Every six months for higher level treatment systems with mechanical parts; or

(4) Every 12 months for higher level treatment systems with no mechanical parts.

c. Owner responsibilities:

(1) Ensure OWTS is operating, maintained and performing according to the required standards for the designated treatment level;

(2) Maintain an active service contract with a maintenance provider at all times; and

(3) Each time his/her current contract with a maintenance provider is renewed or replaced, send a copy to the local public health agency within 30 days of signing.

E. Monitoring and Sampling

1. For an OWTS for which monitoring of effluent is required, the local public health agency or delegated third party must collect and test effluent samples to ensure compliance with the provisions of this regulation.

2. Sampling may be required by the local public health agency in conjunction with an enforcement action.

3. Any owner or occupant of property on which an OWTS is located may request the local public health agency to collect and test an effluent sample from the system. The local public health agency may perform such collection and testing services. The owner or occupant must pay for these services.

a. If the local public health agency 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 must be stated in the permit as a condition for its continued use.

b. Conditions when a local public health agency can require routine monitoring:

(1) Indications of inadequate performance;

(2) Location in sensitive areas;

(3) Experimental systems; and/or

(4) Systems under product development permits.

c. Sampling and analysis must 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.

43.15 Severability

The provisions of this regulation 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 this regulation shall not be affected thereby.

43.16 Materials Incorporated by Reference

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.

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

43.17 – 43.21 Reserved

43.22 Statement of Basis and Purpose - September 20, 2000

The Individual Sewage Disposal System Guidelines mandated by Article 10 of Title 25, Section 25-10-104 (1) C.R.S., were first adopted in October of 1973 as temporary emergency guidelines. The State Board of Health then adopted those Guidelines, with minor revisions, in 1974.

As more experience was gained in the field, many questions were directed to the Water Quality Control Division for resolution. Based on the subsequent discussions held with local health agencies, the General Services Section of this Division conducted a limited investigation into the various causes of the ISDS failures throughout the State during the summer of 1977.

The Office of the Attorney General advised the Division of the need to review the 1974 Guidelines. The Division's experience had shown that some local jurisdictions had not adopted their own ISDS regulation as required by Section 25-10-104 (2). This made monitoring and enforcement difficult for this Division. Therefore, the Guidelines, which were adopted in May of 1979, contained a provision that the Guidelines became the local ISDS regulations for any jurisdiction, which failed to adopt its own regulations within one year.

The advent of alternatives in on-site treatment and disposal technology and the 1983 passage of HB 1400, which redefined an individual sewage disposal system, necessitated the revision of the 1979 Guidelines. The Department notified all local boards of health of the opportunity to participate in this revision and accepted all that attended the first two meetings as committee members.

The Colorado Court of Appeals ruled on June 9, 1988 that Language in Section IX of the 1984 Guidelines, providing that systems must "consistently meet" certain standards, is unconstitutionally vague. The 1988 Guidelines identified effluent sampling frequencies and defined the allowable amount and frequency of exceedances of those standards in response to the Court of Appeals ruling.

Further advances in on-site treatment and disposal technologies, as well as a need for general housekeeping review of the regulations, necessitated a revision of the 1988 Guidelines in 1994. This process was initiated by members of the Western Colorado Association of Environmental Health Officers who authored the initial draft of the revised Guidelines. Input was then solicited from all local health agencies. The resulting revisions were then referred back to all local health agencies and to those individuals who had expressed interest in the process.

The main objectives in the 1994 Guidelines were to incorporate new treatment and disposal alternatives, to generally improve the readability of the document, and to correct a long-standing error in the formula for sizing of evapotranspiration systems.

In 1997 the Colorado General Assembly made significant revisions to the Individual Sewage Disposal Systems Act. Among the revisions to the ISDS Act was a provision allowing the local board of health "to grant variances to ISDS rules in accordance with the guidelines for rules adopted and revised by the state board" (Section 25-10-105 (2) (a)). On January 19, 2000 the State Board of Health adopted Section XVIII

Variance Procedure. This addition to the Guidelines established the framework for that local variance process. All other elements of the Guidelines remained as adopted in 1994.

A review of the newly adopted Section XVIII by the staff of the Office of Legislative Legal Services commenced a discussion of the respective roles of local boards of health and staff regarding the hearing and issuance of variances. The concern centered on the compatibility of the delegation of authority by the board of health to the health officer, environmental health specialist, or similarly qualified individual with the legislative provision granting the authority to grant variances to the local board of health. Ultimately, it was the opinion of the staff of the Office of Legislative Legal Services that the provisions of paragraph B.2.b., providing that "the board may delegate the authority to approve or deny variance requests to the health officer, environmental health specialist, or similarly qualified individual, as designated" to impose requirements and conditions on an approved variance, conflict with the ISDS Act. The ISDS Act, in Paragraph (2) (a) of 25-10-105 provides that "a local board of health shall have authority to grant variances to ISDS rules".

The purpose for adoption of these Guidelines is to bring the variance procedure into compliance with the provisions for such a process as defined in the enabling statute.

In these revised 2000 Guidelines, changes are made to delete provisions related to the delegation of authority from the Local Board of Health to the health officer, environmental health specialist, or other similarly qualified individual with respect to the variance process. The remaining changes proposed are for the purpose of readopting changes made at the previous rulemaking hearing so that the rule as published in CRS is consistent with that adopted by the Board. Language related to liability on the part of local boards of health, which grant variances, is also deleted. The description of the ISDS permit fee is expanded to cover permits with variances. Examples are provided describing conditions, which might exist, or actions, which might be taken to justify the granting of a variance. The prohibition on the granting of variances to mitigate construction errors is expanded to cover issues other than the ISDS itself.

All other element of the Guidelines remain as adopted in 1994 and all other provisions of Section XVIII establishing minimum procedural requirements regarding the application for, review of, and decision making regarding variances from elements of the ISDS Guidelines remain as adopted in January of 2000.

This statement of basis and purpose applies only to the current Guidelines and not to any previous version.

The above statements are intended to comply with section 24-10-103 C.R.S.

43.23 Statement of Basis, Specific Statutory Authority and Purpose; March 12, 2013 Rulemaking, Final Action May 13, 2013, Effective June 30, 2013

The provisions of sections 25-10-101 through 113, C.R.S. provide the specific statutory authority for adoption of this regulation. The Commission also adopted, in compliance with section 24-4-103(4), C.R.S., the following statement of basis and purpose.

Basis and Purpose

The March 2013 hearing culminated the efforts of many parties, both before and after the release of the "Recommendations of the Individual Sewage Disposal System Steering Committee" in February 2002, to improve Colorado's On-site Wastewater Treatment System (OWTS) framework. The Water Quality Control Division and numerous interested parties were engaged in a robust stakeholder process since the summer of 2009 to evaluate and recast the previous Individual Sewage Disposal System (ISDS) Guidelines that had not been substantively modified since 1994.

Because of the many changes and the reorganization of the ISDS Guidelines, the Commission repealed the ISDS Guidelines and adopted the On-site Wastewater Treatment System Regulation, Regulation #43. The new regulation built on the previous ISDS regulation to reflect a more current state of On-site Wastewater Treatment System industry practice and to provide more options and flexibility in design and local regulation.

In addition, provisions were included in the new regulation to incorporate changes made in House Bill (HB) 12-1126, the OWTS Act passed by the Colorado General Assembly in the 2012 legislative session. The major changes include revised versions of previous and addition of new definitions, updated terminology (such as changing "Individual Sewage Disposal Systems" to "On-site Wastewater Treatment Systems"), new requirements for design of OWTS, and optional provisions for local public health agencies to adopt in the areas of OWTS design, permitting, and operation.

An "authority" section was included to indicate the statutory authority for the regulation.

Previous section XII. on discharges to State waters from the ISDS Guidelines was incorporated into section 2. (Scope and Purpose). Content from other sections from the ISDS Guidelines were moved as appropriate. These included moving several sections scattered throughout the ISDS Guidelines into section 4. of Regulation #43 (Applicability).

The terms individual sewage disposal system and local health departments were replaced throughout the regulation by the terms On-site Wastewater Treatment System and local public health agency, respectively, to reflect the terms used in statute.

The major definitions revised or added by the Commission include:

The definition of absorption system from the amended OWTS statute is still included in the regulation. However, the term soil treatment area based on current industry terminology has largely superseded its importance.

A definition of cesspool was added based on the definition in the OWTS statute as included in HB 12-1126.

The definition of drywell was revised to limit its use to non-wastewater sources.

A definition of effluent screen was included as there were several references to this component added throughout the regulation.

Definitions of OWTS failure and malfunction were added, as these are critical terms in implementation of an OWTS program by local public health agencies.

A definition of field performance testing was added for testing during normal operation at a field installation of new treatment systems that are being considered for acceptance by the Division.

The definition of design flow was modified to remove the reference to 150 percent of the average daily flow rate, as this concept is no longer in use for OWTS.

The definition of grey water system was removed as the Commission found that the OWTS application of the separation of toilet wastes with the remaining wastewater being treated in a down-sized OWTS is inconsistent with other uses of the term grey water.

The definition of liner was revised to be written in more general terms and the specific reference to the thickness of the material was incorporated into design criteria.

The definition of long-term acceptance rate (LTAR) was revised to be stated in terms of what the LTAR is rather than how it relates to other factors such as design flow and soil treatment area.

The definition of "mound system" was changed to "mound" and revised to clarify distinctions between mounds and other OWTS.

A definition of performance standard was added, as this concept is fundamental to revisions made in this version of the regulation.

The definitions of sanitarian and seepage bed or absorption bed were deleted based on their being redundant with other defined terms (environmental health specialist and soil treatment area bed, respectively).

A definition of septage was added consistent with the new definition added to the statute by HB 12-1126.

New definitions of site evaluation, site evaluator, soil, soil evaluator, soil profile hole and soil profile test pit excavation were added based on the increased emphasis in the new regulation on the need for robust soils and site evaluations in the design of OWTS. In addition, several technically based definitions were added such as consistence, distribution, several sub-definitions under the definition of dosing, infiltrative surface, inspection port, limiting condition, nitrogen reduction, redoximorphic, remediation system, restrictive layer, riser, rock-plant filter, sequential distribution, soil morphology, soil structure, soil texture, and visual and tactile evaluation of soil. Many of these terms were included to provide context and greater detail to better describe the necessary processes for site and soil evaluation and designing an OWTS.

As previously indicated, content was moved from section II of the ISDS Guidelines to section 4. of Regulation #43. The Commission included several subsections to the Applicability section to identify other Commission regulations that may apply to OWTS with a design capacity of 2,000 gallons per day or greater and to be explicit that the requirements for maintenance and standards of performance (e.g., effluent limitations) will be determined by the site application approval and discharge permit processes for such OWTS. Also, the Commission adopted section 4.A.1.b to indicate that all other aspects of permitting, performance, and construction will be in conformance with the regulations adopted by the local board of health.

The Commission modified, in section 4.B. of Regulation #43, the provision from section IV.A.1. of the ISDS Guidelines to clarify that a permit must be issued by the local public health agency before construction is commenced on a new, altered, or repaired system. New detailed requirements for information to be submitted with a permit application were included.

In conformance with HB 12-1126, the Commission included language in section 4.B.4. on fees to indicate that fees for permits shall be based on the actual direct and indirect costs up to the statutory maximum and clarified that fees for other services such as soil evaluations will also be based on actual indirect and direct costs.

In section 4.B.7., the Commission clarified that the owner of a malfunctioning OWTS is required to obtain a repair permit whereas the applicable section of the ISDS Guidelines (IV.A.5) only required that application for a repair permit be made.

In section 4.F., the Commission established requirements for final approval of a permit for an OWTS.

The Commission included section 4.I. ("Product Development Permits") for proprietary treatment systems undergoing testing under actual operating conditions. It includes application requirements for such systems and other requirements such as for reporting of any data collected and authority for the local public health agency to revoke or amend the permit based on several identified factors.

The Commission, consistent with changes made in HB 12-1126, replaced the provisions of section IV.K.1. of the ISDS Guidelines with section 4.K. removing the requirement to hold a public hearing prior to prohibiting a permit for an OWTS and deleted the provision that such prohibitions are limited to areas where there are more than two dwellings per acre or areas that are subdivided for more than two dwellings per acre. Pursuant to the changes in the statute, the Commission adopted a simpler condition that provides that the areas shall be identified based on applicable local land use laws or areas defined by potential problems.

The Commission, in sections 4.L.1. and 4.L.3., modified the provisions of ISDS Guidelines sections IV.M.1. and 2., respectively, to authorize local boards of health to charge fees for initial licensing of OWTS contractors and cleaners and renewal of those licenses based on the actual cost to the local public health agency rather than the specific amounts in the Guidelines.

The Commission established a new optional transfer of title inspection provision that the local board of health may choose to implement at its discretion. If adopted by a board of health, the local regulation would have to be consistent with the requirements of Regulation #43 except that the local board of health would have the authority to identify types of title transfers that are not required to be inspected. The Commission established application requirements, criteria determining that an OWTS is acceptable, a requirement that unacceptable OWTS be repaired, and other provisions, including for penalties should a property in a local public health agency jurisdiction transfer without obtaining a required inspection. The Commission finds it appropriate to adopt an optional title transfer inspection provision based on interest shown in the stakeholder group for a consistent approach to this practice and that there will be costs to be borne by the local public health agency in implementing the program so a mandate is not appropriate.

Provisions for a new optional renewable permit program were established. These permits could be used to set requirements for activities such as required maintenance, a schedule for required inspections of the performance of higher level treatment systems, when a transfer of title inspection is required or other requirements deemed necessary by the local board of health. Similar to the transfer of title inspection program, stakeholders indicated a desire for a consistent approach and the Commission did not find it appropriate to create a mandate where there would be a cost to the local public health agency.

Content in section XVIII. of the ISDS Guidelines regarding variance provisions became section 4.O. of Regulation #43. The Commission modified the requirements for local board of health hearings regarding variances and required a public hearing to be held on all variances.

The Commission moved content in section XV. of the ISDS Guidelines to section 4.O.7. of Regulation #43. Similarly, the Commission moved the un-numbered "General Prohibitions" section that follows section XV. to section 4.P. and the unnumbered "Penalties" section to section 4.R. The Commission, consistent with a change made in HB 12-1126, removed the prohibition against allowing an OWTS that did not meet required separation distance between maximum seasonal ground water table and the bottom of an absorption system to remain in use without compliance with the Guidelines. The Commission, consistent with section 25-10-112 (5) added a new requirement to properly dispose of septage.

The Commission incorporated site and soil evaluation requirements into section 5. of Regulation #43. These include significant revisions to the previous soil test provisions in section VII. of the ISDS Guidelines as well as the addition of more specific information to be provided regarding the proposed site such as a legal description of the property, location of features on and off the property for which setbacks may apply, and the characteristics of the site such as topography.

There had been no specific process identified in the ISDS Guidelines for a site and soil evaluation. The Commission determined that there are several elements of each that are consistent with current standard OWTS design industry practice and therefore appropriate to include in Regulation #43. These include a requirement to conduct an initial site evaluation, a reconnaissance evaluation of the site, and detailed soil evaluations, and prepare a report that documents the required information that will be used to support the design of the OWTS.

The process builds from a "desktop" preliminary investigation to identify site location and ownership information, soils information from available sources such as the Natural Resources Conservation Service, and, most importantly, information on physical features (property boundaries, streams, wells, etc.) from which setbacks will have to be determined. This information, facility information, and local OWTS regulations are used to identify a preliminary OWTS size. This is a sensible first step that will allow the system designer to become familiar with the general information to be refined and verified in the following steps.

The next step the Commission identified is a reconnaissance investigation to identify topography, landscape position, natural and cultural features, and vegetation. This is information that will assist in determining a preliminary location for the soil treatment area (STA) and where the soil investigation will be conducted.

The final step is to conduct the soils evaluation. The Commission found it imperative that this process be based on a thorough physical examination of the soil in the proposed STA. The soils provide critical treatment of the wastewater including reduction of pollutant concentrations and filtration to remove microorganisms before the treated wastewater reaches the ground water. The use of soil profile test pit excavations is accepted practice in the OWTS industry and the Commission, as part of its move to "modernize" the OWTS regulations, adopted this approach to ensure that the required level of treatment in the soils is achieved.

The ISDS Guidelines allowed a soil profile hole to be drilled along with the use of percolation tests. The Commission found that the use of soil profile holes does not provide critical information such as the seasonally high ground water level and limiting layers that are not bedrock. In order to provide for a transition to the use of soil profile test pit excavations, which allow an examination of the in-situ soil profile, the Commission allowed soil profile holes in conjunction with percolation tests to be used for a three-year period from the effective date of Regulation #43. After that time, at least one soil profile test pit excavation will be required if percolation tests are to be used to determine the LTAR. Visual and tactile evaluation in soil profile test pit excavations may be used to determine the LTAR without percolation tests.

The Commission included additional information on the conduct of percolation tests and soil evaluations based on current OWTS industry practice to ensure that the information used to size the soil treatment area is as accurate as practicable.

Percolation tests and soils evaluations are required to be conducted under the supervision of a professional engineer licensed under Colorado law or a competent technician as defined in the regulation. The Commission established expertise that the competent technician must possess to conduct percolation tests and soils evaluations and identified means by which the required expertise can be obtained. The Commission expects that individuals that do not possess this expertise will obtain the necessary training or degree. The Commission is aware that there is training available in soils evaluation, such as that available through the Colorado Professionals in On-Site Wastewater, and, to the extent practical, encourages the Division to ensure that training is available in different areas of the state.

The Commission required the preparation of a report documenting the site and soils information collected, to be used for the design of the OWTS and to determine whether other treatment prior to the STA is necessary. The Commission established elements of the report in order to ensure that the required information was provided for the design of the OWTS and that it was properly collected.

The Commission modified the requirements previously in section V. of the ISDS Guidelines in section 6. of Regulation #43. Modifications include establishing that the minimum size of a new single-family home for determination of the OWTS design flow is two bedrooms and providing the local public health agency the authority to increase the number of bedrooms based on unused space that could be converted into one or more bedrooms. The Commission included these provisions based on its intent that OWTS are often used for thirty or more years and that it is appropriate to size the OWTS based on an assumption that additional bedrooms are likely to be added in these types of situations. Also, the Commission

deleted the provision that the maximum flow be 150 percent of the design flow and be used as the basis for the OWTS design. The Commission modified calculations of STA size rather than apply a factor to flow rates.

The other requirements regarding flow (gallons per day) and biochemical oxygen demand (pounds per day) for multi-family, commercial, and institutional facilities remains the same as in the ISDS Guidelines.

The Commission also included in section 6, various treatment levels (e.g., TL2 and TL2N) with associated levels of carbonaceous BOD_5, total suspended solids, and total nitrogen that are used in conjunction with provisions in section 7, to determine where STA size or the depth of required soil can be reduced.

The Commission maintained the table of minimum horizontal distances between components of an OWTS and pertinent physical features from section VI of the ISDS Guidelines and added an option for reducing the applicable distance where higher level treatment (e.g., TL2N) is provided. This provides options to reduce the distance between the STA and identified physical features where higher level treatment is provided in contrast to the previous approach under which setback distances from identified features were required to be met regardless of level of treatment unless a variance was granted. This provides flexibility and the beginning of what may be a transition to a performance-based regulatory approach.

Where the distance from an STA to proximate physical features is allowed to be reduced due to provision of higher level treatment, the Commission included a requirement for mandatory operation and maintenance of the system in accordance with section 14.D. of Regulation #43.

The Commission, in section 8. of Regulation #43 (Design Criteria – General), modified the requirements from section VIII. of the ISDS Guidelines to add requirements in section 8.C. to ensure that septic tanks and treatment components are accessible for inspection, maintenance and servicing. The Commission finds that these activities must be performed in order for an OWTS to function properly and in order to protect public health and the environment. This will require installation of a riser at or above the ground surface for tanks, effluent screens and treatment components of new systems. Where risers are not provided or components are buried at a great depth, they often cannot be located when maintenance is required.

Minor modifications to the other provisions from section VIII. of the ISDS Guidelines in section 8. of Regulation #43 were made to clarify or add additional detail. The Commission included section VIII.D.7. of the ISDS Guidelines in section 8.K. whereas the remaining requirements of section VIII.D. were included in section 10 of Regulation #43.

The Commission, in section 9. of Regulation #43, modified the provisions of the ISDS Guidelines to require watertight testing of tanks either at the manufacturing site or at the property where the tank is to be installed. This is necessary to provide documentation of the tank's watertight condition prior to installation. For septic tanks, the Commission required that accepted test methods be used to demonstrate watertight conditions. The local public health agency inspector will conduct a field inspection after the tank has been placed in the final excavation but before the tank is buried and may require a watertightness test. This will aid in evaluating that factory tested tanks have not been damaged in transit. The Commission also modified the requirement that had been in the Guidelines regarding tank anchoring. Instead, manufacturer's instructions may be followed where provided or, where such instructions are not provided or a choice is made to use an alternate approach, a professional engineer is required to design the anchoring system.

The Commission bolstered the provisions for septic tank structural integrity to require that the manufacturer provide documentation regarding what load conditions a tank can withstand, including depth of burial and other loads or pressures including from the seasonally high level of ground water.

The Commission added more specific requirements for structural integrity for septic tanks (concrete and fiberglass/plastic) that identify generally accepted industry standards to be met. Also, more specific requirements for pipe and pipe bedding and pumping and dosing systems were added based on current industry standards and practice.

Consistent with current industry practice for septic tank design, the Commission increased the minimum size of a tank for a residential application to 1,000 gallons and reduced the minimum tank size for OWTS serving non-residential buildings to 400 gallons. The requirements in section 9.B.4.d. of Regulation #43 for inlet and outlet tees or baffles were modified to ensure that installation and servicing of effluent screens can be accommodated. Other minor changes to tank dimension requirements were also made.

The Commission added a provision authorizing the use of effluent screens and providing that the local public health agency can require such screens. Additional requirements to ensure proper cleaning of screens and requiring an effluent screen where effluent is pumped from a septic tank were also included. The Commission encourages the use of effluent screens as they can prevent clogging of STA distribution piping and extend field life.

A requirement for a grease interceptor was added for commercial food establishments and other facilities that generate significant quantities of fats or grease. This is necessary to reduce organic load and wastes that are difficult to treat.

In section 10. of Regulation #43, the Commission laid out significantly more detailed requirements for the design of STA. As previously indicated, the design of the STA is to be based on information developed in the site and soil evaluation.

In section 10.B., the Commission expanded the conditions under which a professional engineer is required to design an STA to include presence of an impervious layer and different soil types rather than the requirements in the ISDS Guidelines that had limits based on presence of bedrock and percolation rate, respectively. This is in keeping with the increased focus on the importance of soil evaluation in the design of an STA.

The Commission adopted a design approach upon which the STA sizing is based on the LTAR rather than a calculation using the percolation rate. Soil percolation values, where collected, can be used to establish the LTAR. Of course, as indicated in section 5. (site and soil evaluation), the design of an STA can be based wholly on a soil evaluation through the use of visual and tactile examination of soils in a test pit excavation. This change in approach is supported by significant research in the field.

The Commission established LTARs based on the soil type and provided for an increase in the LTAR where higher-level treatment is provided prior to the soil absorption system. This approach adjusts the level of treatment that is required in the soil based on treatment having been provided prior to distribution into the STA. The Commission established a specific requirement for a sand filter to be provided where the soils contain large amounts of rock. This is appropriate, as rocky soils will likely allow wastewater to pass through the STA without being fully treated. The depth of the required sand filter is greater (three feet) for TL1 (septic tank effluent) treatment systems than for other (types 2N, 3, and 3N) systems (two feet).

The allowance of reduction in seepage bed or trench area where dosing and chambers are used is continued, although the reductions were adjusted. The Commission also added a reduction for manufactured media based on the reduction of fines in natural gravel and reduced compaction from the deposition of gravel. The Commission, based on research indicating that beds do not perform as well as trenches, included an upward adjustment (STA sizing factor greater than 1.0) for beds in table 10-2.

The Commission maintained the previous provisions regarding distribution systems and trenches/beds in Regulation #43 and also added requirements that limit the width of a bed to 12 feet to aid in air/oxygen transfer to improve aerobic treatment in the soil. Width of beds may be greater than 12 feet if treated

septic tank effluent is applied. The width of evapotranspiration beds may be greater than 12 feet because air/oxygen transfer to the soil is not a component of evapotranspiration beds.

The Commission added a provision in section 10.E.1.b. limiting the depth of the infiltrative area to four feet, to improve oxygen transfer. The depth will be measured from the downslope side of the trench or bed. The Commission, in section 10.E.2., limited the length of gravity fed distribution lines to 100 feet and pressure dosed lines to 150 feet. A requirement to install an inspection port at the terminal end of each distribution line was added to allow the STA to be visually inspected to determine whether plugging or a structural problem is occurring. Also, criteria were included for the use of chambers, manufactured media, pressure distribution, sequencing systems, and drip lines as these commonly used design approaches/components were not addressed in the ISDS Guidelines.

The Commission modified the requirements for alternating systems to allow reductions to be given where dosing or manufactured media systems are used. The Commission deleted the required frequency of dosing that had been included in the ISDS Guidelines to allow more design flexibility.

The Commission added specific provisions for repairs allowing the use of deep gravel systems, wider beds, and seepage pits. These technologies had been allowed for new/enlarged systems under the ISDS Guidelines. The Commission determined that these technologies do not provide the same level of treatment or public health/water quality protection as the systems allowed under this regulation. Therefore, their use should be limited to repair situations where an allowed system cannot be properly installed due to site constraints or other limiting factors.

The Commission included additional requirements for new seepage pits to offset, as much as practicable, their performance limitations.

The Commission adopted section 11. for design criteria for higher level systems. This section generally replaces or consolidates the criteria previously in section VIII.B.2. and sections IX. and X. of the ISDS Guidelines. The Commission distinguished between higher level treatment systems using public domain technology design information and proprietary systems. The Commission required public domain technology systems to be designed, installed, and maintained in accordance with established criteria such as applicable references and any conditions established by the local public health agency. Proprietary systems must be designed, installed and maintained in accordance with manufacturer's instructions and any additional criteria established through the technology review and acceptance process in section 13. The Commission established these requirements to ensure that these more complex technologies will perform at the intended level since they are replacing simpler systems that may not rely on mechanical systems that are subject to failure and that require much less operational attention and maintenance. These systems will be assigned a treatment level based on those described in section 6.

In section 13., the Commission added significant detail to the previous provisions for sand filters in section VIII.C.5. of the ISDS Guidelines. These include subcategories for several different sand filter types and associated sizing requirements and minimum requirements. Other detail was added to ensure proper design and performance, such as allowable slope for a mound system and the distance between the bottom of the sand filter and the ground water or bedrock.

The Commission prohibited new wastewater ponds for single-family residences based on the difficulty of maintaining adequate water levels in a small pond in semi-arid conditions. Additional items were added such as maintenance requirements and a maximum allowable seepage rate.

The Commission clarified that vaults may be used for full time occupancy properties where a failing OWTS cannot be replaced or for new systems where an OWTS with an STA is not feasible or for properties where an STA is not allowed.

The Commission provided authorization for local public health authorities to prohibit new and the use of existing vault privies and pit privies.

For incinerating and composting toilets, the Commission clarified that these may be subject to the requirements of a local plumbing agency or the Colorado Plumbers Board, whichever has jurisdiction in the specific location. The Commission added requirements for composting toilets including proper disposal of residue and accounting for low temperatures in the design.

The Commission expanded the provisions for acceptance of new product technology in section 13. of Regulation #43. This included a new requirement and associated elements for an application to be submitted in support of a proprietary treatment or remediation product. Also, product acceptance requirements were established for many types of products ranging from meeting National Sanitation Foundation requirements for composting toilets to detailed field performance testing to demonstrate performance for proprietary treatment products. Details for both the application and acceptance processes were added to provide the Division and technology proponents with a clear understanding of the level of information required and the basis for the Division's decision.

Also, the Commission established specific criteria for acceptance of remediation products that are necessary to ensure that owners of failing systems are not led to believe that the system can be remediated by the use of a remediation product when, in fact, repair or replacement is the only option.

The Commission, subject to a proprietary treatment product having met the NSF/ANSI Standard 40 or equivalent testing program and where at least one unit has been installed in Colorado as of the effective date of Regulation #43, allowed the continued use of a proprietary treatment product with a treatment level of TL2.

The provision of a public hearing where approval of a product has been denied has been removed as it is unnecessary. Final decisions of the Division, including the denial of a technology, may be appealed to the Commission pursuant to sections 25-8-202(k) and 25-8-401, C.R.S. The Commission's decision can be appealed by either party to the district court.

The Commission established new operation and maintenance (O&M) requirements including a mandatory O&M program where higher-level treatment is used as the basis for reduction of a vertical or horizontal setback distance or for a reduction in the STA area. This is appropriate given that the protection of public health and water quality under these circumstances depends on the proper functioning of the higher level treatment system and these systems must be operated and maintained to function at the intended level of treatment.

A local board of health must adopt regulations requiring appropriate O&M in order to offer a reduction in the setback distance or in the size of the STA where higher level treatment is proposed. The local board of health is not required to adopt this provision of the regulation. Where the provisions of the regulation are adopted, however, they must include requirements for the local public health agency to develop a program of inspections, maintenance, recordkeeping, and enforcement to ensure that the systems are meeting the designed higher level treatment standards and maintaining appropriate records.

The Commission included required minimum inspection and maintenance frequencies, depending on the type of higher level treatment (e.g., with or without mechanical parts), and a requirement for system owners to maintain an active maintenance contract at all times. The Commission modified the monitoring provisions of section XIV.D. of the ISDS Guidelines to clarify that a local public health agency can require monitoring where there are indications of inadequate performance, where an OWTS is located in a sensitive area, and for experimental systems and systems under product development permits. The monitoring of experimental systems and systems under product development permits is necessary in order to establish a baseline expectation for system owners and local public health agencies. A local board of health could choose to require additional monitoring at its discretion.

43.23 Statement of Basis, Specific Statutory Authority and Purpose; March 12, 2013 Rulemaking, Final Action May 13, 2013, Effective June 30, 2013

The Commission encouraged stakeholders to consider the following issues in the next review of Regulation #43: 1) mandatory inspections at title transfer (currently an option of the LPHA), 2) inspection ports at both ends of the distribution lines (currently an option of the LPHA), 3) use of E. coli instead of fecal coliform in Section 43.12.H, and 4) training and licensing. Although few training requirements are included in Regulation #43, the Commission supports efforts to increase training opportunities and requirements for OWTS practitioners in Colorado.

PARTIES TO THE RULEMAKING HEARING

1. Colorado Professionals in Onsite Wastewater
2. Eljen Corporation
3. Tri-County Health Department
4. Colorado Directors of Environmental Health
5. Board of County Commissioners for the County of Gunnison, Colorado
6. Underground Solutions, Inc.
7. Jefferson County School District R-1
8. Front Range Precast Concrete
9. Colorado Hospital Association