

**Montrose County**

**Board of Health Resolution**

**On-Site Wastewater Treatment Systems**

-Governing-

Permitting, performance, location, construction, installation, alteration, repair, cleaning and use of On-Site Wastewater Treatment Systems in all areas of Montrose County.

Montrose County Board of Health

Montrose County  
Montrose, Colorado 81401

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## **1. Title & Declaration**

### A. Title

These regulations ~~shall~~ **will** be known as the Montrose County Amended and Restated On-Site Wastewater Treatment Regulations 43. **These Regulations as adopted will comply with and be as stringent, if not more than, the State of Colorado Act and Regulation 43.**

### B. Declaration

The Board of Health declares the purpose of these regulations is 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.

These regulations ~~shall~~ **will** be applicable throughout areas of jurisdiction of the Board of Health within Montrose County. These regulations are designed to control permitting, performance, alterations, construction, installation, location and use of domestic sewage disposal systems, the transportation and final disposal of domestic septage materials, and control of cleaners and installers of systems. The Board of Health declares that its general policy is to require the use of and/or connection to a sewage treatment works (municipal or centralized), where and whenever feasible, and to limit installation of On-site Wastewater Treatment Systems only to areas that are not feasible for sewage treatment works, or that cannot be reasonably serviced by sewage treatment works.

Except as provided in these regulations, no On-site Wastewater Treatment System permit ~~shall~~ **will** be issued to any person when the subject property is located within a special service or sewer district, which provides public sewer service.

### C. Authority

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

## **2. Scope and Purpose**

### A. Purpose

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.

B. Effluent Discharged to Surface Waters

Any system that will discharge into surface waters must be designed by a professional engineer. The discharge permit application must be submitted for preliminary approval to the Board of Health. Once approved by the 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~~ **will** be deemed full compliance with this regulation.

C. Jurisdiction of the Board of Health

The jurisdiction of the Montrose County Board of Health ~~shall~~ **extends** over all unincorporated areas and over all municipal corporations within the territorial limits of the county comprising the district public health agency, but not over the territory of any municipal corporation that maintains its own public health agency.

### **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. "Accessible" means easily reached, attained or entered by the necessary equipment or maintenance provider.
3. "Applicant" means a person who submits an application for a permit for an On-site Wastewater Treatment System, or System Cleaner.
4. "Basal Area" means the effective surface area available to transmit the treated effluent from the filter media in a mound system into the in-situ receiving soils. The perimeter is measured at the interface of the imported fill material and in-situ soil. On sloping sites, only the area down-gradient from the up-slope edge of the distribution media may be included in this calculation.
5. "Bed" means a below-grade soil treatment area with a level soil base consisting of a shallow excavation greater than three feet wide containing distribution media and more than one lateral.
6. "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.
7. "Bedroom" means a room with an egress window, a closet, and/or is intended for sleeping purposes: or as defined by the local board of health, as stated in the local OWTS regulation.
8. "Biochemical Oxygen Demand, Five-Day" (BOD5) 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).
9. "Biochemical Oxygen Demand, Carbonaceous Five Day" (CBOD5) 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).
10. "Board of Health" means the Montrose County Board of Health.
11. "Building sewer" means piping that conveys wastewater to the first system component or the sewer main.
12. "Carbonaceous Biochemical Oxygen Demand" See Biochemical Oxygen Demand, Carbonaceous.
13. "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.

14. "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.
15. "Cistern" means an underground, enclosed unpressurized reservoir or tank for storing water as part of a potable water supply system.
16. "Cleaning" means the act of removing septage or other wastes from a wastewater treatment system component or grease/waste from a grease interceptor.
17. "Colorado Plumbing Code" means ~~Examining Board of Plumbers Rules and Regulations~~ of the Colorado State Plumbing Board (3 CCR 720-1).
18. "Commission" means the Water Quality Control Commission created by section 25-8201, C.R.S.
19. "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~~ who has the appropriate expertise and is able to conduct and interpret the results of soil profile test pit excavations, percolation tests, and sit evaluations. This individual has also met the required competencies for a "Competent technician" as defined in section 5.
20. "Component" means a subsection of an On-site Wastewater Treatment System; a component may include multiple devices.
21. "Composting toilet" means a self-contained waterless toilet designed to decompose nonwater-carried human wastes through microbial action and to store the resulting matter for disposal.
22. "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 to an extent that the soil density would restrict permeability. Aspects of consistence are used to determine if the horizon will have permeability lower than that of the defined soil type. Additional insight to consistence can be found in the USDA-NRCS Field book for Describing and Sampling Soils: Version 3.0 Sept. 2012.
23. "Crest" means the highest point on the side of a dry gulch or cut bank.
24. "Cut bank" means a nearly vertical slope caused by erosion or construction that has exposed historic soil strata.
25. "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

pipe and sidewall area is allowed according to a formula specified in this regulation.

26. "Deficiency" See Malfunction.
27. "Department" means the Department of Public Health and Environment created by section 25-1-102, C.R.S.
28. "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.
29. "Design capacity" See Flow, Design.
30. "Design flow" See Flow, Design.
31. "Designer, on-site wastewater treatment system" means a Colorado Professional Engineer who utilizes site evaluation and investigation information to select an appropriate OWTS and prepares a design document in conformance with this regulation.
32. "Distribution" means the process of conveying wastewater or effluent to one or more components, devices, or throughout a soil treatment area.
33. "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~~ distribution laterals in the soil treatment area.
34. "Division" means the division of administration of the department of which the Water Quality Control Division is a part.
35. "Domestic wastewater" See Wastewater, domestic.
36. "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 **more than** 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.
37. "Dosing" means a high rate periodic discharge into a soil treatment area.
38. "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.

39. ~~“Dosing, pressure” means delivery of effluent under pressure to a component, device or to a soil treatment area for even distribution.~~ **a uniform application of wastewater throughout the intended portion of the soil treatment area through small diameter pipes and orifices, under pressure. For this definition, the term pressure indicates that the system is capable of creating upward movement of effluent out of the distribution system piping.**
40. “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.
41. “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.
42. “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.
43. “Drainfield” See Soil treatment area.
44. “Drop box” means a device used for serial or sequential distribution of effluent by gravity flow to a lateral of a soil treatment area.
45. “Dry gulch” See Gulch, dry.
46. “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.
47. “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.
48. “Effluent” means the liquid flowing out of a component or device of an On-site Wastewater Treatment System.
49. “Effluent filter” See Effluent screen.
50. ~~“Effluent line~~ **pipe**” means non-perforated pipe that conveys effluent from one On-site Wastewater Treatment System component to the next.
51. “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.

52. “Evapotranspiration/absorption system” means an unlined On-site Wastewater Treatment component that uses evaporation, transpiration, and absorption for dispersal of effluent.
53. “Evapotranspiration system” means an On-site Wastewater Treatment component with a continuous, impermeable liner that uses evapotranspiration and transpiration for dispersal of effluent.
54. “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.
55. “Failure” means ~~damage to a system component, structural member or connection~~ a condition existing within any component of an OWTS which prevents the system from functioning as intended, and which results in the discharge of untreated or partially treated wastewater onto the ground surface, into surface water or ground water, or which results in the back-up of sewage into the building sewer. Other conditions within an OWTS component that are deemed by a local public health agency to be a threat to public health and/or safety may also be deemed a failure.
56. “Field performance testing” means data gathering on a system in actual use that is being proposed for Division acceptance.
57. “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 **must** certify the flood plain elevations.
58. “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 **must** certify the floodway elevation and location.
59. “Flow, daily” means the measured volume of wastewater generated from a facility in a 24hour period expressed as gallons per day.
60. “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 **must** be multiplied by the maximum number of units that a facility can accommodate over

that time.

61. “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.
62. “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.
63. “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.
64. “Ground water” means that part of the subsurface water that is at or below the saturated zone.
65. “Ground water surface” means the uppermost limit of an unconfined aquifer at atmospheric pressure.
66. “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.
67. “Gulch, dry” means a deep, narrow ravine marking the course of an intermittent or ephemeral stream.
68. “Health Officer” means the director of Montrose County Department of Health and Environment or designee.
69. “Higher level treatment” means designated treatment levels other than treatment level 1. (See Table 6-3)
70. “Holding Tank” See Vault
71. “Individual Sewage Disposal System” means a term used for On-site Wastewater Treatment System in Colorado regulations from 1973 until 2013.
72. “Infiltrative surface” means designated interface where effluent moves from distribution media or a distribution device into soil. product into treatment media or original soil. In standard trench or bed systems this will be the interface of the distribution media or product and in-situ soil. Two separate infiltrative surfaces will exist in a mound system and an unlined sand filter, one at the interface of the distribution media and fill sand, the other at the interface of the fill sand and in-situ soil.
73. “Inspection port” means an access point in a system component that enables inspection, operation and/or maintenance.
74. “Invert” means elevation of the bottom of the inside pipe wall or fitting.

75. “Lateral” means a pipe, ~~tubing~~ chamber or other conveyance used to carry and distribute effluent.
76. “Leach field” See Soil treatment area.
77. “Limiting ~~condition~~ layer” means a ~~layer with low permeability, ground water surface or other condition that restricts the treatment capability of the soil.~~ horizon or condition in the soil profile or underlying strata that limits the treatment capability of the soil or severely restricts the movement of fluids. This may include soils with low or high permeability, impervious or fractured bedrock, or a seasonal or current ground water surface.
78. “Liner” means an impermeable synthetic or natural material used to prevent or restrict infiltration and/or exfiltration. For the purposes of this regulation, the minimum thickness of a liner must be 30 ml.
79. “Linear loading rate” means the amount of effluent applied per linear foot along the contour (gpd/linear ft.).
80. “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 (gal/ ft<sup>2</sup>/day).
81. “Malfunction” means the condition in which a component is not performing as designed or installed and is in need of repair in order to function as originally intended.
82. “Manufactured media” See Media, other manufactured.
83. “Media” means solid material that can be described by shape, dimensions, surface area, void space, and application.
84. “Media, enhanced manufactured” means an accepted proprietary manufactured distribution product, wrapped in a specified fabric, and placed on a specified sandbase or media that does not mask the infiltrative surface of the in-situ soil.
85. “Media, other manufactured” means an accepted proprietary manufactured distribution product made of synthetic media for distribution of effluent that is placed directly on the in-situ soil. ~~such as polystyrene blocks or beads or plastic grids.~~
86. “Media, treatment” means non-or slowly-degradable media used for physical, chemical, and/or biological treatment in an On-site Wastewater Treatment System component.
87. “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.~~  
a soil treatment area whereby the infiltrative surface is at or above original grade at any point.

88. “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.
89. “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.
90. “OWTS Act” means the On-site Wastewater Treatment System Act, 25-10-101, et seq. C.R.S.
91. “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.
92. “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.
93. “Permeability” means the property of a material which permits movement of water through the material.
94. “Permit” means a permit for the construction or alteration, installation, and use or for the repair of an On-site Wastewater Treatment System.
95. “Person” means an individual, partnership, firm, corporation, association, or other legal entity and also the state, any political subdivision thereof, or other governmental entity.
96. “Pressure distribution” ~~means application of effluent over an infiltrative surface via pressurized orifices and associated devices and parts (including pump, filters, controls, and piping).~~ See Dosing, pressure.
97. “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.
98. “Professional engineer” means an engineer licensed in accordance with section 12-25-1, C.R.S.
99. “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.
100. “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.
101. “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.
102. “Record drawing” means construction drawings provided to illustrate the progress or completion of the installation of an OWTS, or components of the OWTS; typically based on field inspections by the designer or local public health agency.
103. “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.
104. “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 intended performance.
105. “Repair” means restoration of functionality and/or treatment by reconstruction, relocation, or replacement of an on-site wastewater treatment system or any component thereof in order to allow the system to function as intended.
- ~~“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.~~
106. “Replacement system” See Repair.
107. “Riser” means a watertight vertical cylinder and lid allowing access to an OWTS component for inspection, cleaning, maintenance, or sampling.
108. “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.

109. "Sand filter" means an **engineer designed OWTS system** that utilizes a layer of specified sand as filter and treatment media and **incorporates** pressure distribution.
110. "Sand filter, lined" means an **engineer designed OWTS sand filter designed for higher level treatment** that has an impervious liner and under-drain below the **specified sand layer media**. 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.
111. "Sand filter, unlined" means an **engineer designed OWTS that includes** a layer of **specified** sand used as a **sand filter treatment media** without a liner between the sand and the existing soil on which it is placed.
112. "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.
113. "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.
114. "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.
115. "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 **pipe line** or device to the succeeding trench. The effluent does not pass through the distribution media before it enters succeeding trenches.
116. "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 **pipe 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.
117. "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.
118. "Sewage treatment works" has the same meaning as "domestic wastewater

treatment works” under section 25-8-103, C.R.S.

119. “Site evaluation” means a comprehensive analysis of soil and site conditions for an OWTS.
120. “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.
121. “Slit trench latrine” means a temporary shallow trench for use as disposal of non-watercarried human waste.
122. “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.
123. “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.
124. “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.
125. “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.  
~~“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.~~
116. “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.
117. “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 **type** shape, size class, and grade (degree of distinctness).
118. “Soil texture” means proportion by weight of sand, silt, and clay in a soil.



119. "Soil treatment area" means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drainfields, mounds and drip fields.
120. "Soil treatment area, alternating" means final treatment and distribution component that is composed of two soil treatment areas that are independently dosed.
121. "Soil treatment area, sequencing" means a soil treatment area having more than two sections that are dosed on a frequent rotating basis.
122. "State Waters" has the meaning set forth under section 25-8-103. C.R.S.
123. "Strength, wastewater" means the concentration of constituents of wastewater or effluent; usually expressed in mg/L.
124. "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. **which meets long-term acceptance rate requirements as defined in Table 10-1, and has the required vertical thickness below the infiltrative surface and above a limiting layer.**
125. "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.
126. "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.
127. "Total suspended solids" means measure of all suspended solids in a liquid; typically expressed in mg/L.
128. "Transfer of Title" means change of ownership of a property.  
~~"Treatment media" See Media, treatment.~~
129. "Treatment level" means defined concentrations of pollutants to be achieved by a component or series of components of an OWTS.
130. "Treatment media" See Media, treatment.
131. "Treatment unit" means a component or series of components where solids or pollutants are removed from wastewater or effluent from a preceding component.
132. "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.
133. "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.)
  134. "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.
  135. "Visual and tactile evaluation of soil" means determining the properties of soil by standardized tests of appearance and manipulation in the hand.
  136. "Volume, effective" means the amount of effluent contained in a tank under normal operating conditions; or a septic tank, effective volume is determined relative to the invert of the outlet. For a dosing tank, the effective volume under normal conditions is determined relative to the invert of the inlet and the control off level.
  137. "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.
  138. "Wastewater, high strength" means 1. influent wastewater from a structure having BOD5 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); or 2. effluent from a septic tank or other pretreatment component (as defined by NSF/ANSI Standard 40 testing protocol) that has BOD5 greater than 180 mg/L; and/or TSS greater than 80 mg/L; and/or fats, oils, and grease greater than 25 mg/L and is applied to an infiltrative surface.
  139. "Wastewater pond" means a designed pond which receives exclusively domestic wastewater from a septic tank and which provides an additional degree of treatment.
  140. "Water Quality Control Commission" See Commission.
  141. "Water Quality Control Division" See Division.
  142. "Wetland, constructed" See Rock-plant filter.
  143. "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
<b>NDDS</b>	<b>Non-pressurized Drip Dispersal System</b>
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

#### **4. Administration & Enforcement**

##### **A. General Sanitation Requirements**

- a. The owner of any property and or structure where people live, work or congregate shall provide and maintain, at that place or structure, an adequate, convenient, sanitary toilet and domestic sewage system in good working order. Under no condition shall domestic sewage or effluent be permitted to be discharged, uncontained, upon the surface of the ground, or into Waters of the State, unless the domestic sewage or effluent meets the water quality standards of the Colorado Water Quality Control Commission.
- b. An OWTS permit to construct a new OWTS shall not be approved unless the lot, tract, or parcel to be served by the OWTS contains a minimum land area of 1 acre (43,560 sq. ft.).
- c. Construction of a new OWTS for any lot, tract or parcel less than 1 acre (43,560 sq. ft.) in size legally created prior to adopted Montrose County Subdivision Regulations, shall be processed under the Variance Procedure as outlined in Section 4.T of this resolution.
- d. Repair or replacement of a new OWTS for any lot, tract or parcel less than 1 acre (43,560 sq. ft.) in size legally created prior to adopted Montrose County Subdivision Regulations, shall not require a Variance Procedure when all requirements of this resolution are met.
- e. An OWTS permit to construct, repair, or replace an existing OWTS shall not be approved unless all setback requirements per Table 7-1 can be met on any lot, tract, or parcel to be served by the OWTS.
- f. Connection to a sewage treatment works is mandatory if the property to be served is located within four hundred (400) feet of a sewage treatment works and the governing body allows the connection. The minimum distance required for connection may be even greater depending upon the specific circumstances, such as community impacts, and related rules, regulations, intergovernmental agreements, etc., as determined by the Board of Health, per CRS 30-20-416, et seq. (or as otherwise amended).

##### **B. Access to Site**

- a. For the purpose of inspecting and enforcing applicable regulations and the terms and conditions of any permit issued and investigating and responding to complaints, the 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 allow the local public health agency access to the property to make inspections, conduct required tests, take samples, and monitor compliance.

C. Permit Application Requirements

- a. Permit Application Form - Any property owner, owner of any dwelling, or Systems Contractor who intends to install new, alter, repair, replace, or expand the use of an OWTS in Montrose County, Colorado, shall obtain an OWTS permit application form from the County Planning and Development Department and submit the same with all required data filled in on the application form. The Permit application will not be processed unless it is accompanied by documentation as required by these regulations and required permit fee. No work shall commence until the Health Officer has reviewed the permit application and supporting data and given approval for work to commence. Final permit approval shall be addressed as outlined in Section 4.L.
- b. Permit Application - A permit application fee shall be required of each applicant for any new OWTS and for the expansion, replacement, alteration or repair of any existing OWTS. Permit fees are payable to Montrose County at the time of application. Fees shall be set by resolution by the Board of Health. 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.
  - (1) Surcharge - The Board of Health will collect a fee of twenty-three dollars for each permit issued for a new, repaired, or upgraded OWTS. Of that fee, the Board of Health shall retain three dollars to cover the local 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.
- c. Registered Professional Engineer Design Required – All OWTS permit applications to construct, repair, replace or alter an OWTS shall be accompanied by construction plans, specifications, and other data as required by these regulations that bear the signature and stamp of the Engineer of Record.

D. Minimum Permit Application Requirements:

- (1) Owner name and contact information;
- (2) Property address;

- (3) Property legal description;
- (3) Type of permit;
- (4) Report from Site and Soil Evaluation (section 5);
- (5) 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
- (6) Other information, data, plans, specifications and tests as required by Health Officer.
- (7) 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 Board of Health agency to develop its own information from its own source at its own expense.

E. Penalty fee – The standard fee will be doubled as a result of any enforcement action of an intentional violation of these regulations.

F. OWTS Permit Application Approval, Conditional Approval, and Denial

- a. The Health Officer shall have the authority to review, approve, conditionally approve, and deny any OWTS permit application.
- b. Certain situations may require that the Health Officer give a conditional permit application approval ; The conditional approval shall set conditions precedent to the issuance of a permit which may include effluent testing, cleaning or maintenance schedules, future availability of a sewage treatment works, and required connection, specific design criteria, or other special conditions. OWTS permit application shall be approved until the conditions have been met.
- c. Approval of the permit application will be denied if the proposed OWTS cannot be designed to comply with these regulations, or waivers, or variances as authorized by the Board of Health.

G. Permit Term

- a. An OWTS permit expires one year after the date of issuance if construction has not commenced or as specified by the Board of Health.
- 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 Health Officer.

## H. 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 Board of Health. The applicant must apply for a repair permit within two business days after receiving notice from the Health Officer 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 Health Officer must inspect the system to ensure it is functioning properly. Concurrently with the issuance of a repair permit, the Health Officer 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.
- c. 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.
- d. The issuance of a permit and specifications of terms and conditions therein shall not constitute assumption of liability, nor create a presumption that the Board of Health 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.
- e. 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.

## I. Applicability

- a. An OWTS with design capacity equal to or less than 2,000 gpd must comply with this resolution and the OWTS Act. Within the jurisdiction of the Board of Health, the regulations promulgated by the Board of Health shall govern

all aspects of OWTS permits, performance, location, construction, alteration, installation, and use.

- b. An OWTS with design capacity 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, 25-8501, 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 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 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.

## J. Determination



- a. The Board of Health will 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.

K. Inspection Stages

- a. Before a system is placed in use, the owner, the owner's agent or the systems contractor must provide the Board of Health and the engineer, 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.
- b. Construction Observation Required – No component of the OWTS shall be backfilled or otherwise covered until the Designer (or qualified field technician under the direction of the Designer) and the Health Officer has observed such component and given approval to backfill.

L. Final approval of the permit by the health officer must include, but is not limited to:

- a. Receipt of letter from the engineer certifying construction of system as designed, if engineer-designed;
- b. Receipt of ~~as-built~~ a record drawing which includes a scale drawing showing all components of the OWTS including their location from known and findable points, dimensions, depths, sizes, manufacturers' names and models as available, and other information relative to locating and maintaining the OWTS components;
- c. Final inspection prior to backfilling ~~system~~ the OWTS by the local public health agency confirming that ~~the OWTS~~ it was installed according to the permit requirements and regulations or variances to the regulations; and
- d. Identification of system contractor.

M. Division Authority to Administer and Enforce

- a. Wherever the term Board of Health 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.

N. Primary Enforcement Responsibility

- a. The primary responsibility for enforcement of the provisions of the OWTS Act and the regulations adopted under said article shall lie with the Board of Health.
- b. In the event that a 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 Board of Health as may be necessary to protect the public health and environment. 25-10-110, C.R.S.

O. Product Development Permit

- a. The Board of Health 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.
- b. 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.
  - (1) Applicant must provide evidence of nationally accepted third-party testing of the product to be evaluated, or;
  - (2) Provide test data from multiple single-family homes under normal working conditions that meet the following criteria:
    - (a) Test data must be provided from a minimum of four sites.
    - (b) Each system must be tested over a period of at least one year.
    - (c) Each system must be sampled at least three times during the year with at least one sample obtained during cold weather conditions.
    - (d) Laboratory results for all parameters for which acceptance is being requested must be submitted.
- c. A completed application for a product development permit must be submitted to the Board of Health at least 30 days in advance of installation of the product.
- e. An application for a product development permit must include the following:

- (1) 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;
  - (2) A description of the product under development including performance goals; ~~and~~
  - (3) 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.
- f. ~~Other than the performance standards identified in section 4-O-b above, the Board of Health may stipulate additional requirements for the product development permit necessary to assure the performance of the OWTS.~~ **Other than the performance standards identified in section 4-O-b above, the Board of Health may stipulate additional requirements for the product development permit necessary to ensure that the system performs as intended.**
  - g. A product development permit is a site-specific permit. Product development testing at multiple sites requires a product development permit for each site.
  - h. During the term of the product development permit, all data collected is to be submitted to the Division and the Board of Health.
  - i. The Board of Health may revoke or amend a product development permit, if the continued operation or presence of the product under development:
    - (1) Presents a risk to the public health or environment;
    - (2) Causes adverse effects on the proper function of the OWTS on the site;
    - (3) Leaks or discharges effluent on the surface of the ground; or
    - (4) If the developer of the product fails to comply with any requirements stipulated on the permit by the Board of Health agency or the Division.
  - j. If the product development permit is revoked, the product developer must install the replacement system **within the time frame established by the local public health agency.**
  - k. **Once the system is installed and approved, the local public health agency must supply the Division with a copy of the completed OWTS permit.**

~~P. Experimental Systems~~

- ~~a. 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 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.~~

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

Q. Prohibition of OWTS in Unsuitable Areas

a. The Board of Health may prohibit issuance of OWTS permits in accordance with applicable land use laws and procedures for defined areas in which the Board of Health determines that construction and use of additional OWTS may constitute a hazard to public health or water quality.

R. Licensing of Systems Cleaners

a. LICENSE REQUIRED:

(1) No person shall engage in the business of, or operate a business as, an On-site Wastewater Treatment Systems cleaner for the purpose of cleaning and removing domestic sewage or industrial waste, as defined in this Resolution, within all areas of Montrose County unless licensed as hereinafter provided (System Cleaner License). Employees of a validly licensed systems cleaner shall not be required to be individually licensed.

(2) Each person engaged in or operating a business of extraction, transport and disposal of sewage from and OWTS and/or industrial waste shall file an application to be licensed and shall register all vehicles and equipment used in such extraction, transport and disposal with the Montrose County Department of Health and Human Services. The applicant shall state the nature of the business and provide the mailing address and each location address from which the business is operated, if more than one location, number of employees if applicable, and any other pertinent information determined necessary by the County. The applicant shall register all vehicles and equipment used in the extraction, transport and disposal of sewage at the time of application as set forth under Section b, part A (1) below, and keep such information current during the term of licensure or any renewal thereof .

(3) The initial fee for a System Cleaner License shall be paid to the County of Montrose at the time the license application is submitted.

Licenses shall expire on December 31 of each year and an annual renewal fee shall be paid. No pro-rata amount will be applied to a license fee. A license, which lapses because of failure to renew or is revoked, shall be subject to the fees established for new licenses upon re-application. The initial license fee and renewal license fee shall be established from time to time by the Board of Health and in accordance with the requirements set forth in the Colorado Department of Public Health and Environment Water Quality Control Division at 5 CCR 1003-6. The Board of Health may review the fees annually, or as deemed necessary.

- (4) The signing of an application for licensure as a Systems Cleaner shall constitute permission for the County to inspect the equipment and vehicle(s) of the applicant used for extraction, transport and disposal for compliance with these regulations. The County may require, at a minimum, that the applicant demonstrate knowledge of these regulations and of vehicle and equipment operations to determine that the applicant is able to perform the services in a manner not detrimental to public health and safety or to the environment. If, after such investigation, the County is satisfied, a license shall be issued for the said business.
- (5) The license is not transferable from one licensee to another. The license shall be carried by the licensee at all times while engaged in the business of On-site Wastewater Treatment systems cleaning and disposal. All vehicles owned by the licensee being operated as sewage transport vehicles shall at all times, carry a copy of the current license.
- (6) Every Systems Cleaner engaged in the business of, or operating a business as, an On-site Wastewater Treatment systems cleaner for the purpose of cleaning and removing domestic sewage or industrial waste shall have a policy of motor vehicle liability insurance issued by an insurance carrier authorized to do business in the State of Colorado in the sum of not less than one hundred fifty thousand dollars (\$150,000.00) for damages for or on account of bodily injury to or death of each person as the result of any one accident; in the sum of not less than one hundred fifty thousand dollars (\$150,000.00) for damages to the property of others as the result of any one accident; and in the total sum of not less than four hundred thousand dollars (\$400,000.00) for damages for or on account of any bodily injury to or the death of all persons and for damages to the property of others. Any liability for failure to comply with the requirements of this Paragraph (6) shall be borne by the individual, partnership, or corporation who owns such vehicle(s); C.R.S. 30-15-401(1)(a)(VI).

- (7) Nothing in these regulations shall require licensure of an owner of private property or of a business on which an OWTS or industrial waste trap or receptacle (“trap”) is located, nor prohibit such owner from cleaning, servicing and removing the contained sewage or industrial waste from such system on their own property. An owner functioning as his/her own system cleaner shall clean the system or trap and dispose of the sewage or industrial waste removed in compliance with applicable state and local laws including these regulations.

b. VEHICLES AND EQUIPMENT:

- (1) All equipment and vehicles used in the extraction, transport and disposal of sewage or industrial waste products under these regulations shall be properly maintained so as to not create a nuisance or a hazard to the health, safety and welfare of the people of Montrose County or to the environment. At the time of initial application and any renewal thereof, the applicant shall be required to provide information as to equipment and vehicles used to extract transport and dispose of sewage from an On-site Wastewater Treatment System within Montrose County. This information shall include, but not limited to; type of vehicle, tank waste holding capacity and type of extraction and discharge system used.
- (2) All vehicles and equipment used for the purpose of extraction, transport and disposal of domestic sewage or industrial waste shall be inspected by the Health Officer or designee prior to the issuing of a Systems Cleaner license to the applicant. Such inspection shall provide that, at the time of inspection, the vehicle and equipment was in compliance with these regulations.
- (3) The license holder shall inform the County in writing of any vehicles or equipment added or no longer used for sewage or waste extraction, transport or disposal during the term of any license. For any vehicles or equipment added, the license holder shall provide the County with information as required in Part A (1) of this Section.
- (4) All vehicles and equipment must be designed, maintained, operated and stored in a sound, safe and sanitary manor. At no time shall such equipment and/or its operation create, or be the cause of any threat to the health, safety or welfare of the citizens within the unincorporated areas of Montrose County.

- (5) All vehicles and equipment shall be operated and maintained such that leakage, spillage or emission of offensive odors shall not occur. Discharge valves shall be drip-proof.
- (6) Any tank used for the removal of sewage shall be constructed of non-porous material and shall have an access opening on the top and an outlet at the bottom equipped with a gate valve or other approved valve. The tank must be equipped with a diaphragm pump or other approved non-clogging sewage pump or vacuum system.
- (7) Systems cleaner trucks must bear the business name, address and cleaner license number with a minimum of four (4) inch or larger size lettering of a color that is easily visible and contrasts with the truck or vehicle color.

c. SEWAGE AND INDUSTRIAL WASTE REMOVAL AND DISPOSAL:

- (1) Sewage and industrial waste product removed from an On-site Wastewater Treatment System or and industrial waste system shall be disposed of in such a manner so as not to create a nuisance or hazard to public health or a risk of pollution of air, land and water; and in compliance with applicable state and local rules and regulations.
- (2) Sewage and industrial waste product removed from an On-site Wastewater Treatment System or industrial waste system shall be disposed at a site that is in compliance with and meets all applicable federal, state and local laws, rules and regulations.

d. LAND APPLICATION of SEPTAGE:

- (1) SEPTAGE from residential septic tank systems may be land applied by a Montrose County licensed System Cleaner for beneficial use in Montrose County provided such application does not create a nuisance or present a hazard to the health, safety, and welfare of the people of Montrose County or contribute to environmental degradation.
- (2) A Land Application Permit, issued by the HEALTH OFFICER, shall be required of the property owner for the land application of septage. Such permit shall be valid for a period of one (1) year from the date of issuance. Any expansion or enlargement of the area for which the permit is issued shall require a new permit application.
- (3) The Land Application Permit request must contain the following information.

- (i) Name and license # of each licensed systems cleaner land applying septage.
  - (ii) Name and address of property owner.
  - (iii) Legal description of property where land application is to be allowed.
  - (iv) Total acreage of property where land application is to be allowed.
  - (v) Existing land use of the property under consideration.
  - (vi) Existing land uses of all properties adjacent to the property under consideration.
  - (vii) Present zone and overlay zones, if appropriate.
  - (viii) Signatures of the transporter, applicator and property owners.
  - (ix) Name, mailing address and phone number of any irrigation ditch company with irrigation ditches on the property under consideration.
  - (x) Location and depth of all wells within one (1) mile of the property under consideration.
  - (xi) Location of all lakes, rivers, streams, springs, bogs, canals or ditches within one (1) mile of the property under consideration.
  - (xii) The depth to the annual high groundwater table.
  - (xiii) The location of any mapped 100 year flood plain on the property under consideration
  - (xiv) Evidence that demonstrates that SEPTAGE application will be conducted at or below the agronomic rate of the proposed crop or crops. The determination of the agronomic rate shall consider historic crop yields at the proposed site and reasonable, realistic crop yield goals.
- (4) Location Limitations. SEPTAGE shall be land applied only on application sites approved by the HEALTH OFFICER, and public access shall be restricted for 30 days after the land application. No SEPTAGE shall be land applied:



- (i) Within five hundred (500) feet of a residence, business or recreational area.
  - (ii) Within fifty (50) feet of the property line of the application site
  - (iii) Without the depth of the annual high groundwater level having been established as greater than five (5) feet in depth.
  - (iv) Within five hundred (500) feet of the wellhead of a well supplying water for human consumption.
  - (v) Within one hundred (100) feet of the wellhead of any water well.
  - (vi) On land located up gradient, and within one (1) mile, of the point at which surface waters are diverted for use in a public water system.
  - (vii) Within the boundaries of a one-hundred-year floodplain.
  - (viii) On land within three hundred (300) feet of any body of surface water.
  - (ix) On land within fifty (50) feet of a dry streambed.
- (5) Requirements for Pathogen Destruction and Vector Attraction Reduction. Land applied SEPTAGE shall meet one of the conditions below for pathogen destruction and vector attraction reduction:
- (i) The SEPTAGE shall be subsurface injected.
  - (ii) The SEPTAGE shall be surface applied and incorporated into the soil within six (6) hours of application.
  - (iii) The SEPTAGE shall be raised to pH 12 or higher by alkali addition such as lime and without the addition of more alkali, shall remain at pH 12 or higher for 30 minutes.
- (6) Environmental Conditions and Limitations. SEPTAGE shall not be land applied under any of the following conditions:
- (i) When the quantity to be applied would result in the SEPTAGE running off the application site.
  - (ii) During precipitation events when soil is saturated.

- (iii) When the land is frozen or snow covered.
  - (iv) When the application will result in ponding of the SEPTAGE, nutrient overloading in any portion of the field, SEPTAGE collection in low areas or road ditches, or creation of a nuisance condition.
  - (v) On land which is currently receiving biosolids from a wastewater treatment plant, has received such material within the previous eighteen (18) months, or is permitted for such use.
- (7) Application Conditions and Limitations:
- (i) All foreign and non-organic objects shall be screened from the SEPTAGE prior to land application.
  - (ii) All SEPTAGE shall be applied uniformly by either subsurface injection or surface application. If applied on the surface, a deflector must be used on the discharge tube of the vehicle to sufficiently and evenly spread the SEPTAGE, and it shall be incorporated into the soil within six (6) hours of application with the exception to lime stabilized SEPTAGE.
- (8) Irrigation Limitation after Application. The application site shall not be irrigated within twenty-four (24) hours after SEPTAGE land application.
- (i) Harvesting Limitations after Application.
  - (ii) Food crops with harvested parts that touch the SEPTAGE/soil mixture and are totally above the land surface shall not be harvested for 14 months after land application of SEPTAGE.
  - (iii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after land application of SEPTAGE.
  - (iv) Animal feed, fiber, and those food crops that do not touch the soil surface shall not be harvested for 30 days after land application of SEPTAGE.
  - (v) Animals shall not be grazed on the land for 30 days after land application of SEPTAGE.

(vi) Turf grown on the land where SEPTAGE is applied shall not be harvested for one year after land application of the SEPTAGE when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

(9) Record Keeping and Reporting Requirements. The property owner or operator of record of the application site shall maintain a record of each licensed systems cleaners applying SEPTAGE, including a listing of all loads received and quantity applied. Records shall be submitted to the Health Officer or designee and kept available for inspection by the HEALTH OFFICER for a period of four (4) years from the point in time when the first application of SEPTAGE occurs at the application site.

e. SAMPLING REQUIREMENTS

(i) The HEALTH OFFICER may require soil sampling of the proposed application site prior to land application of SEPTAGE.

(ii) The HEALTH OFFICER may require that land applied SEPTAGE be analyzed for the following parameters: pH, nitrate as N, phosphorus, potassium, sodium, arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc. Composite samples of SEPTAGE from different sources may be required to be tested to determine its chemical characteristics. If testing is required, samples shall be representative of all SEPTAGE.

f. ENFORCEMENT:

(1) Persons duly licensed to service and clean On-site Wastewater Treatment Systems and industrial waste systems in Montrose County, as set forth in this regulation, shall submit a quarterly report of daily activities to the Health Officer or Designee. The information on the reports shall include, but not be limited to, the business name and name of licensee, license number, location of each OWTS or industrial waste location serviced, the amounts of sewage or waste pumped from each location, and the amount of waste disposed and the location and method of disposal. Reports shall be received by the last business day of the succeeding month following the end of a quarter. Additional reports may be requested by the Board of Health or Health Officer at any time.

(2) Holders of a systems cleaner license shall notify the Montrose County within ten (10) working days of any change of information as documented on the applicable license.

- (3) Any equipment and/or vehicle used by a licensed systems cleaner to extract, transport, or dispose of sewage from On-site Wastewater Treatment Systems or industrial waste system within Montrose County may be inspected by the County authorized designee, at any time, and proof of the systems cleaner license requested.
- (4) Any spill or leakage of waste from the transporting equipment, other than at a sewage disposal site as set forth in Section IV, shall be reported to the County Health Officer immediately. Such spill or leakage shall be cleaned and disinfected properly. Disinfection where runoff may enter the surface waters of the state of disinfection products will be limited so as to prevent any negative impact on state surface waters and to prevent negative impacts to aquatic life. A written report, to include approximate size of spill, location of spill and type of clean-up, shall be completed and filed with the Health Officer.
- (5) Any person who engages in or operates a business as a Systems Cleaner, without having obtained a license as provided in these regulations shall be considered in violation of these regulations and subject the violator to civil and criminal fines and penalties as set forth in C.R.S. 25-10-113 and Section 3.25 of this Resolution.
- (6) Any disposal or reuse of sewage not in accordance with these regulations or corresponding federal or state requirements shall be considered a violation and subject the violator to revocation of license and, at a minimum, to civil and/or criminal fines and penalties as set forth in C.R.S. 25-10-113 and Section 3.25 of this Resolution.

g. REVOCATION AND/OR REFUSAL OF A SYSTEM CLEANER LICENSE:

- (1) A System Cleaner License may be revoked for failure to comply with these Regulations. Written notice of a proposed license revocation, particularizing the violations of these regulations, shall be served upon the holder of the Systems Cleaner License by certified mail, return receipt requested. Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than ten (10) days notice of the hearing and may be represented by counsel at the hearing.
- (2) If, at any time, a Systems Cleaner is determined to have violated these regulations in such a manner as to create an imminent hazard to the public health, welfare or safety, water quality or to the natural environment, the systems cleaner license may be summarily suspended following a hearing before the Board of Health. In such a case, the systems cleaner shall be notified in writing and an emergency hearing will be held before the Board of Health within

twenty-four (24) hours following identification of the hazard by the County's designee. The systems cleaner may be represented by counsel at the hearing.

- (3) The holder of a systems cleaner license whose license has been revoked pursuant to this Section g shall cease operation as a Systems Cleaner in Montrose County.

S. Appeal to Board of Health

- a. Any applicant whose OWTS permit application has been denied by the Health Officer may request review of the application by the Board of Health. In addition, any person who is determined by the Health Officer to be in non-compliance may request review of the determination by the Board of Health.
- b. A request for review shall be made in writing by the applicant to the Board of Health within forty-five (45) days after denial of an application or determination.
- c. The applicant shall bear the burden of supplying the Board of Health with sufficient evidence to document that the denied system will be constructed and used in such a manner as to comply with the declaration and intent of these guidelines and all applicable state and local rules and regulations and required terms and conditions in any permit issued pursuant thereto.

T. Variance Procedure:

- a. An application for variance from the requirements of these regulations must be submitted to the Montrose County Planning and Development Department.
  - (1) The variance must be heard by the Board of Health.
- b. The request and application must be submitted to the Planning and Development Department a minimum of forty-five (45) days in advance of the hearing by the Board of Health. The hearing shall be recorded. The applicant may be represented by legal counsel.
- c. The Health Officer will set the public hearing date. Prior to the public hearing a public notice will be sent via certified mail, with a minimum 20-day reply time from the date of mailing, to all adjacent property owners.
- d. An application fee shall be set by resolution by the Board of Health for all variance requests.
- e. The request must be accompanied by:

- (1) Site-specific information identifying the specific criteria from which the variance is being requested.
  - (2) Technical justification by a Colorado Registered 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 these regulations. 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 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 for the absorption field to the physical feature is no less than the travel time through the native soils at the prescribed setback and National Sanitation Foundation Standard 40.
  - (3) A discussion of the alternatives considered in lieu of the requested variance.
  - (4) Technical support for selected alternative, which may include a testing program, which confirms that the variance does not increase the risk to public health and environment.
  - (5) A statement of hardship, which creates the necessity for the variance.
- f. The applicant has the burden of proof that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting the standard being varied.
  - g. The Board of Health has the authority to impose site-specific requirements and conditions on any variance granted.

U. Outcome of the Variance Proceeding:

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

V. Prohibitions on Granting of Variance Requests:

- a. No variance shall be issued where the property can accommodate a conforming on-site OWTS.
- b. No variance will 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 will be issued, which will result in setbacks to an offsite physical feature which do not conform to the minimum setbacks defined in Table 7-1 of this Resolution. Property lines are considered offsite features.
- e. No variance will be issued, which reduces the separation to ground water or bedrock based on the level of treatment as outlined in this Resolution.
- f. No variance from the horizontal setback from a well shall be given which does not also meet the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

W. 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 required by this Resolution on neighboring properties, the hearing procedures in Section 3.15 as outlined above.
- b. For the repair of or addition to an approved existing system where the size of the lot precludes adherence to the distances in a permit installation of the repaired or upgraded system at a distance 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.

X. Finding on Appeal

- a. A request for review must be made within sixty (60) days after denial of an application by the Health Officer.
- b. The applicant must bear the burden of supplying the Health Officer 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 that that associated with compliance with the requirements of the regulation, will 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 C.R.S 24-4-105 (or as otherwise amended).

Y. Notice of Violations

- a. Whenever the Health Officer determines there has been a violation of any provisions of this regulation, he shall give notice of such violation to the responsible persons. Such notice shall be in writing, and shall particularize the violations, and be addressed to both the owner and the occupant of the property concerned. Service of such notice shall be as provided by the Colorado Rules of Civil Procedure, or by registered or certified mail, return receipt requested, deliverable to the addressee only. Service by mail shall be complete upon receipt by the Planning and Development Department of the return receipt. If one or more persons cannot be found or served after a diligent effort to do so, service may be made by posting a notice a conspicuous place in or about the property affected by the notice, in which case the Health Officer shall include in the record a statement as to why the posting was necessary.
- b. Application for a permit, if required, shall be made by such owner or occupant to the County Planning and Development Office within two businesses days after notice from the Health Officer that the system is not functioning in compliance with this regulation or otherwise constitutes a nuisance or hazard to public health. The permit shall provide for a reasonable period of time within which repairs shall be made, at the end of which period the system shall be inspected by the Health Officer to insure that it is functioning properly. Field testing, design work, inspections, and certification to Montrose County must be performed by a Registered Professional Engineer of Colorado where initiated as a result of any enforcement.

Z. Cease and Desist Orders

- a. The Health Officer may issue an order to cease and desist from the use of any system which is found by same not to be functioning in compliance with these regulations, or with these rules and regulations or is found to constitute a hazard to public health, or has not otherwise received timely repairs under the provisions of C.R.S. Section 25-10-106 (1) (j) (or as otherwise amended). Such an order shall be effective only after approval by the Health Officer not less than forty-eight (48) hours after written notice thereof is given to the owner or occupant of the property on which the system is located and at which the owner and occupant may be present with counsel, and be heard. The order shall require the owner or occupant bring the system into compliance or eliminate the health hazard within a reasonable period of time, not to exceed thirty (30) days, 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 Montrose County District Court upon a petition filed not later than ten (10) days after the order is issued.

AA. Operation, Maintenance and Cleaning Schedules

- a. To ensure good working order, the following minimum maintenance schedule is recommended for all On-site Wastewater Treatment Systems:

	Inspection or Maintenance	Cleaned or Pumped	Routine Effluent Testing
Septic Tanks	Every four (4) years	Every four (4) years*	As may be required
Vaults	Every four (4) years	As necessary*	None

\* As recommended by the licensed system cleaner or operation and maintenance provider.

CC. Responsibility: The owner and the party in possession of real property, upon which an OWTS is used, shall be jointly and severally responsible for operation and maintenance of the system unless jurisdiction for responsibility has been transferred to a public entity, quasi-public entity, or political subdivision. The person denying such responsibility shall bear the burden of proof for such denial upon establishment of ownership or possessory rights in the property served by the system.

DD. Maintenance and Cleaning: When directed by the Board of Health, for the purpose of obtaining compliance with rules and regulations, the owner or user of a system shall provide for maintenance and cleaning of such OWTS and shall notify the Board of Health upon completion of any maintenance work and report to said Department and submit such evidence of compliance with any maintenance and cleaning schedule in the form and as the Board of Health requires.

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

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

- (1) A permit to construct or remodel a building or structure that is not serviced by a sewage treatment works until the local public health agency has issued a permit for an OWTS.
  - (2) An occupancy permit for the use of a building that is not serviced by a sewage treatment works until the 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.
- b. The construction of new, or the repair of existing cesspools is prohibited. Where an existing cesspool is failing, a conforming OWTS must be installed. Where space is not available for a conforming OWTS, the criteria for repairs established within section 43.10.L must be followed.
  - c. 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.
  - d. 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.
  - e. 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.
- GG. Penalties; Section 25-10-113, C.R.S.
- a. Any person who commits any of the following acts or violates any of the provisions of this section commits a Class 1 petty offense as defined in section 18-1.3-503, C.R.S.:
    - (1) Constructs, alters, installs, or permits the use of any OWTS without first having applied for and received a permit as provided for in section 25-10-106, C.R.S.;
    - (2) Constructs, alters, or installs an OWTS in a manner which involves a knowing and material variation from the terms or specifications contained in the application, permit or variance;
    - (3) Violates the terms of a cease and desist order that has become final under the terms of section 25-10-106 (1) (k), C.R.S.;
    - (4) 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 Board of Health has adopted licensing regulations pursuant to that section;

- (5) 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 Board of Health has adopted licensing regulations pursuant to that section; 43.5 Site and Soil Evaluation
  - (6) Falsifies or maintains improper records concerning system cleaning activities not performed or performed improperly; or
  - (7) Willfully fails to submit proof of proper maintenance and cleaning of a system as required by regulations adopted by the Board of Health.
- b. Upon a finding by the local board of health that a person is in violation of this regulation, the local board of health may assess a penalty of up to fifty dollars for each day of violation. In determining the amount of the penalty to be assessed, the local board of health shall consider the seriousness of the danger to the health of the public caused by the violation, the duration of the violation, and whether the person has previously been determined to have committed a similar violation.
  - c. A person subject to a penalty assessed pursuant to section 43.4.Q.a may appeal the penalty to the local board of health by requesting a hearing before the appropriate body. The request must be filed within thirty days after the penalty assessment is issued. The local board of health shall conduct a hearing upon the request in accordance with section 24-4-105, C.R.S.

## **5. Site and Soil Evaluation**

- 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.
  - a. Each site evaluation shall consist of:
    - (1) Preliminary investigation;
    - (2) Reconnaissance;
    - (3) Detailed soil investigation; and
    - (4) 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:
  - a. Property Information:

- (1) Address;
    - (2) Legal description;
    - (3) Existing structures; and
    - (4) Location of existing or proposed wells on the property.
  - b. Local public health agency records.
  - c. Published site information:
    - (1) Topography; and
    - (2) Soil data.
  - d. Location of physical features, on and off the property that will require setbacks as identified in Table 7-1.
  - e. Preliminary soil treatment area size estimate based on information on existing or planned facility and local regulations.
  - f. Other information required by local public health agency.
  - g. Additional information that may be useful to the specific evaluation as available:
    - (1) Survey;
    - (2) Easements;
    - (3) Floodplain maps;
    - (4) Geology and basin maps and descriptions;
    - (5) Aerial photographs;
    - (6) Climate information; and
    - (7) 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:~~ **must be conducted. Information gathered as part of the site reconnaissance may include, but is not limited to:**
- a. Landscape position;
  - b. Topography;
  - c. Vegetation;

- d. Natural and cultural features; and
- e. Current and historic land use.

D. Detailed Soil Investigation

- a. Soil investigations to determine the long-term acceptance rate of a soil treatment area shall be either: **conducted per the following criteria:**
  - (1) Visual and tactile evaluation of two or more soil profile test pit excavations; ~~or~~ **must be conducted to determine soil type as well as to determine whether a limiting layer is encountered.**
  - (2) ~~Percolation tests plus one or more soil profile holes or one or more soil profile test pit excavations.~~ **In addition to the two soil profile test pit excavations, percolation testing may be conducted to obtain additional information regarding the long-term acceptance rate of the soil.**
  - (3) **If the site evaluation includes both a visual tactile evaluation of soil profile test pit excavations and percolation tests, and the results from these two evaluations do not coincide with the same LTAR as noted in Table 10-1, the designer must use the more restrictive LTAR in determining the size of the soil treatment area.**
- b. 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. After June 30, 2016, 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.
- c. **Procedure for performing** ~~If visual and tactile evaluations of soil are performed without percolation tests~~ in order 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 limiting layers, evidence of seasonal high ground water,~~ and best depth for the infiltrative surface. **The total number of soil profile test pit excavations beyond the required two shall be based on the judgment of the competent technician.**
  - 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.~~
- c. The minimum depth of the soil profile test pit excavation must be to any limiting layer, or four feet below the infiltrative surface of the in-situ soil, whichever is encountered first.
  - d. Layers and interfaces that interfere with the treatment and dispersal of effluent must be noted. Thus, any limiting soil characteristic such as consistence also needs to be evaluated. The evaluation of consistence may also include an evaluation of excavation difficulty, rupture resistance, and/or penetration resistance.
  - e. 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.
  - f. 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.
  - g. The soil observation method must allow observation of the different soil horizons that constitute the soil profile.
  - h. 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 must be conducted.
  - i. The soil type at the proposed infiltrative surface of the soil treatment area or a more restrictive soil type within the treatment depth must be used to determine the long-term acceptance rate from Table 10-1 or Table 10-1A. 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.
  - j. 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.
- d. Soil descriptions for determination of a limiting layer must include:
- (1) The depth of each soil horizon measured from the ground surface and a description of the soil texture, and structure of each soil horizon;

- (2) Depth to the bedrock;
- (3) 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.
- e. Procedure for performing percolation tests:
  - (1) The percolation testing shall be performed by a professional engineer or by a trained person under the supervision of a professional engineer or by a competent technician.
  - (2) Number of test holes; Location
    - (i) 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.~~
    - (ii) 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.
- e. 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.
- f. 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.
- g. 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) The Board of Health 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.~~

~~h. Visual and tactile evaluation of soil requirements:~~

- ~~(1) 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.~~
- ~~(2) 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.~~
- ~~(3) The soil observation method must allow observation of the different soil horizons that constitute the soil profile.~~
- ~~(4) 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.~~
- ~~(5) 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.~~

- ~~(6) 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.~~
- ~~(7) Soils data, previously collected by others at the site can be used for the purposes of an OWTS design with written approval of the tensing entity, engineer, ect. It is recommended that the data be verified, at a minimum, by performing an evaluation of a soil profile test pit excavation.~~

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

- ~~(1) The depth of each soil horizon measured from the ground surface and a description of the soil texture, structure, and consistency of each soil horizon;~~
- ~~(2) Depth to the bedrock;~~
- ~~(3) Depth to the periodically saturated soil as determined by:
  - ~~(i) Redoximorphic features and other indicators of water levels, or~~
  - ~~(ii) Depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level; and~~~~
- ~~(4) Any other soil characteristic that needs to be described to design a system, such as layers that will restrict permeability.~~

**E. ~~Marking of Soil Profile Test Pit Excavations or Percolation Holes, Profile Holes, and Profile Test Pits Excavations — Marking~~**

- a. The engineer or technician conducting the **soil profile test pit excavations or percolation tests** must, upon completion of the tests, flag or otherwise mark each **excavation or hole** to allow easy location by others. **Soil profile test pit excavations and percolation holes and profile test pits** must remain open until after evaluation by the local public health agency, if required by the agency. **Excavations must be suitably barricaded to prevent unauthorized access and to address safety concerns.**

**F. Report and Site Plan**

- a. 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:

- (1) The **Company** name, address, telephone number, e-mail address, **name of individual**, stamp and signature of the Designer conducting the site evaluation;
- (2) Preliminary and detailed evaluations, providing information from the surface site characteristics assessment and soils investigation;
- (3) Dates of preliminary and detailed evaluations;
- (4) A graphic soil log, to scale, indicating depth of ~~drill hole or~~ **the soil test pit** excavation, soil description and classification, depth to ground water **and or any limiting layer** encountered during ~~drilling or~~ excavation, type of equipment used to ~~drill the profile hole or~~ excavate the soil profile test pit, **and** date of soils investigation. ~~name of investigator and company name.~~
- (5) Setback distances to features listed in Table 7-1;
- (6) Setback distances to features listed in Table 7-2, existing on the site or within applicable setback limits, whichever is greater;
- (7) 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:
  - (i) **Fixed, non-degradable temporary or permanent benchmark**, 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;
  - (ii) Contours or slope direction and percent slope;

- (iii) The location of any visible or known unsuitable, disturbed or compacted soils;
  - (iv) The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and
  - (v) The proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark);
  - (vi) Anticipated construction-related issues, **if applicable**.
- b. 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, **if applicable**; and
  - c. 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, **if applicable**.

#### G. Design Document

- a. The report and site plan may be attached to the design document or the report and site plan may be combined with the design information as a single document.
- b. The design document shall **must** include a brief description of the facility and its proposed use, basis and calculations of design flow, and influent strength.
- c. The design document must contain all plan detail necessary for permitting, installation and maintenance, including:
  - (1) Assumptions and calculations for each component, **including total dynamic head (TDH) and gallons per minute (GPM) for all dosing systems**;
  - (2) **A fixed, non-degradable temporary or permanent benchmark, (North America Vertical Datum or assumed elevation is acceptable)**;
  - (3) A scale drawing showing location of each OWTS component and distances to water **supplies, surface water**, physical and health impact features **on both the subject and adjacent properties** requiring setbacks;
  - (4) Layout of soil treatment area, dimensions of trenches or beds, distribution method and equipment, distribution boxes, drop boxes, valves, or other components used;

- (5) **Elevation or depth of infiltrative surface of the soil treatment area, depth of the septic tank invert, depth of and all other components of the OWTS;**
- (6) **Special structural design considerations, as applicable to ensure the long-term integrity of each component;** ~~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;~~
- (7) References to design manuals or other technical materials used;
- (8) Installation procedures, **as applicable;**
- (9) Operation and maintenance manuals or instructions; and
- (10) 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: **Prior to and** during construction, the proposed soil treatment area and replacement area, if any, must be protected from disturbance, compaction, or other damage by **means of** staking, fencing, posting, or other effective method.

J. Qualifications for a Competent Technician

a. Percolation Tests

(1) Competencies needed:

- (i) Set up equipment;
- (ii) Perform and run percolation tests according to the procedure in this regulation; and

(iii) Record results and calculate percolation rates.

(2) Local public health agencies may approve training for percolation testing.

b. Visual and Tactile Evaluation of Soil

(1) Competencies needed:

- (i) Identify soil types by hand texturing and observation;
  - (ii) Identify presence or absence of soil structure;
  - (iii) Identify grade of soil structure;
  - (iv) Recognize evidence of highest seasonal groundwater surface;
  - (v) Identify layers and interfaces that will interfere with effluent movement;
  - (vi) Determine the most promising depth for infiltrative surface of OWTS and for percolation tests, if used; and
  - (vii) Understand basic principles of OWTS siting and design.
- (2) Possible demonstrations of competence in visual and tactile evaluation of soil:
- (i) Degree in soil science, agronomy, geology, other majors if a course(s) in soil morphology was included; or
  - (ii) Attendance at training or workshop for soil evaluation for OWTS including both class and field work.
2. If the training or workshop includes an exam to verify acceptable completion of the course, a passing grade on the exam must be attained.
- (3) The Division shall approve training for visual and tactile evaluation of soil.

## **6. Wastewater Flows**

- a. The Board of Health may require the installation of a meter to measure flow into the facility or the OWTS.
- b. Single-Family Residential Homes:
  - (1) Design flow per person shall be 75 gallons per day (gpd).
  - (2) The minimum design flow for a new home shall be for a two-bedroom house **unless otherwise noted in this regulation**. 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.
  - (3) For homes up to and including three bedrooms, the assumed number of persons per bedroom shall be two for design purposes.

- (4) 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.
- (7) Table 6-1 summarizes the design flows for single-family residential homes up to six bedrooms.
- (8) If a new home has unfinished areas, the number of bedrooms used for the design of the OWTS will be increased 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

**A. 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.

**B. 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
- b. 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:
  - (1) Metered water flows for inside use only for at least a year, or if use is seasonal, for a full season. If metered flows are less than full capacity, they shall be paired with actual use in units of persons present or meals served or other units as appropriate so that an actual daily rate per unit can be determined. The daily rate per unit times the number of units at full occupancy shall be the design flow.
  - (2) Total Suspended Solids and BOD5 or CBOD5 tests at times of full use. At least three samples taken at least one week apart are required.
  - (3) Explanation and justification for the comparability of the tested facilities with the proposed facility.

C. 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 **dosed** pressure distribution ~~shall~~ **or timed dosed NDDS must** be used. The soil treatment area reduction for ~~timed~~ pressure distribution **(Table 10-2)** 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 For Design Purposes, the Estimated Daily Wastewater Flow and BOD<sub>5</sub> Load Per Person Unless Otherwise Noted.**

	Average GPD	BOD <sub>5</sub> In Pounds Per Day
<b>Residential Wastewater</b>		
Single-family Dwellings	75	.20
<del>Or Single-family dwellings or Auxiliary buildings by fixture type</del>		
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
<del>Total with Kitchen sink garbage grinder</del>	<del>75</del>	<del>.20</del>
<del>Hotels and motels per room without private baths</del>	<del>50</del>	<del>.15</del>
Hotels and motels per room with private baths	75	.15
Multiple Family Dwellings or Apartments	75	.20
Board and rooming houses (users absent during working hours)	50	.15
Tiny Homes <sup>***</sup> , per unit	150	.40
Mobile home	75	.20
Mobile home park per space	300	.80

<b>Commercial</b>	<b>Average GPD</b>	<b>BOD<sub>5</sub> In Pounds Per Day</b>
Facilities with short-term or transient visitors Examples: Airports or bus stations	5	.02

per passenger; fairgrounds per person attending; ball parks; race tracks, stadiums, theaters or auditoriums per seat		
Airport per employee	10	.06
Barber and Beauty Shops per chair	100	.070*
Bowling Alleys - toilet waste only	5	.03*
Country club per member	30	.02
County club per employee	20	.06
Dentist Office per non-wet chair	50	.14*
Doctors Office 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 wastes per employee per eight-hour shift – showers provided	35	.05
(per employee, per 8 hour day, 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 station 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
<b>Food Service Establishments</b>	<b>Average GPD</b>	<b>BOD<sub>5</sub> In Pounds Per Day</b>
Restaurant open 1 to 2 meals per seat	50	.06/meal served
24-hour restaurant	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

<b>Institutional Wastewater Without Kitchens Unless Otherwise Noted</b>	<b>Average GPD</b>	<b>BOD<sub>5</sub> In Pounds Per Day</b>
Churches per seat; without any food service, or other uses	5 3.5	.01
Churches, per seat; warming kitchen only, no major food service	5	.01
Churches, per seat; with food service, per meal served****	4	.02
Hospitals per bed space	250	.20
Nursing Homes, Group homes for developmentally disabled, per bed space	400 125	.17 .20
Schools, boarding	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
<b>Recreational &amp; Seasonal Wastewater Use</b>	<b>Average GPD</b>	<b>BOD<sub>5</sub> In Pounds Per Day</b>
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	.04lbs./fixture
Public park urinal per fixture per hour when park is open	10	.01lbs/fixture
Public park shower per fixture per hour when park is open	100	.10lbs/fixture
Public park faucet per fixture per hour when park is open	15	.04lbs/fixture
Swimming pool and bathhouses	10	.06
Travel trailer parks with individual water and sewer hookup per unit **	50 100	.12 .24
Travel trailer parks without individual water and sewage hookup per unit**	50	.12

\* BOD levels need further verification depending on the specific use of the facility.

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

\*\*\* For the purposes of this Table, a “Tiny home” is a permanent, residential structure (a non-recreational vehicle) that has only one bedroom and has >300 sq. ft. of floor area and <400 sq. ft. of livable space, not including lofts. In this instance, the OWTS may be sized for only one bedroom.

\*\*\*\* For churches with food service, the 4 gal/meal must be added to the 3.5 gal/seat to determine projected design flows.

D. Wastewater Strength

- a. 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.
- b. ~~CBOD<sub>5</sub>~~ High Strength waste must be reduced to at least Treatment Level TL1 quality or lower before applying to a soil treatment area. Waste strength levels defined in Tables 6-3 and 6-4 must be used to determine compliance.

Table 6-3 Treatment Levels

Treatment Levels	CBOD <sub>5</sub> *	TSS (mg/L)	Total Nitrogen (mg/L)
<del>TL 1**</del>	145	80	60-80
<del>TL2</del>	24	30	60-80
<del>TL 2N</del>	25	30	>50% Reduction***
<del>TL 3</del>	10	10	40-60
<del>TL 3N</del>	10	10	20 mg/L

Table 6-3 Treatment Levels

Treatment Level	BOD <sub>5</sub> (mg/L)	CBOD <sub>5</sub> <sup>1</sup> (mg/L)	TSS (mg/L)	Total Nitrogen (mg/L)
TL1 <sup>2</sup>	180	-	80	60-80
TL2	-	25	30	N/A <sup>3</sup>
TL2N	-	25	30	>50% reduction <sup>4</sup>
TL3	-	10	10	N/A <sup>3</sup>
TL3N	-	10	10	20 mg/L

Shading indicates higher treatment levels.

~~\* If concentrations of organic material are submitted in BOD<sub>5</sub> without data in CBOD<sub>5</sub>, the data in BOD<sub>5</sub> shall be multiplied by 0.85 to estimate CBOD<sub>5</sub> levels.~~

- 1 Requirements for CBOD<sub>5</sub> are only related to effluent samples from a higher level treatment system.
- 2 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.
- 3 Total Nitrogen does not apply to Treatment Levels TL2 and TL3. Processes intended to reduce total nitrogen are addressed in Treatment Levels TL2N and TL3N. Any total nitrogen reductions that may be observed for TL2 and TL3 are as a result of the treatment process for BOD<sub>5</sub> and TSS reductions.
- 4 NSF/ANSI Standard 245 – Wastewater Treatment Systems – Nitrogen Reduction requires reduction of 50 percent rather than an absolute value.

**Table 6-4 High Strength Wastewater\***

	<b>BOD<sub>5</sub> (mg/L)</b>	<b>TSS (mg/L)</b>	<b>Fats, Oils, Grease (FOG) (mg/L)</b>
Septic Tank Influent	>300	>200	>50
Septic Tank Effluent	>180	>80	>25

\* High strength effluent prior to a septic tank has a wide range of concentrations. These values are typical, but values used for design purposes must account for site-specific information.

## **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 Board of Health and be in complete compliance with the variance procedures of this regulation and those of the Board of Health. Acceptable methods of analyzing horizontal separation distances with higher treatment levels include but are not limited to:
  - a. Analyzing the intended uses of impacted surface and/or ground waters;

- b. Contacting adjacent property owners for potential conflicts with property line encroachments; and
  - c. 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 are not permitted by the Board of Health
- C. Dry Gulches, Cut Banks and Fill Areas
- a. 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 43.7 Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features restrictive layer is present that will direct or allow the effluent from the soil treatment area to move laterally and surface. **In this instance, a greater distance may be required.**
  - b. A lesser distance may be used if it can be demonstrated by a professional engineer or professional geologist that the use of a barrier, such as a minimum 30 mil PVC liner placed between the soil treatment area and the slope of the dry gulch, cut bank or fill area will prevent effluent surfacing laterally.
  - c. The separation distance between a component and the crest of a dry gulch or cut bank 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 the Board of Health resolution.
- 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.
- a. 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:
    - (1) Setback distance from soil treatment area to on-site well;
    - (2) Setback distance from soil treatment area to water features; and

(3) Setback distance from soil treatment area to a dry gulch or cut bank.

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

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

Removed potable water supply cistern column

	Spring, Well <sup>1</sup> , Suction Line Potable Water Supply Sistern <sup>4</sup>	Potable Water Supply Line <sup>2</sup>	Dwelling Occupied Building Structure w/basement crawlspace or footing drains	Structure without basement, crawl space or footing drains	Property Lines, Piped or Lined Irrigation Ditch upslope curtain drain	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 Higher level treatment Unit, dosing tank, Vault or Privy
Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault or Vault Privy	50 <sup>2</sup>	10 <sup>2</sup>	5	5	10	10	50	10	–
Building Sewer or Effluent Lines	50 <sup>2</sup>	5 <sup>6</sup>	0	0	10 <sup>2</sup>	10 <sup>2</sup>	50 <sup>2</sup>	10 <sup>2</sup>	–
STA Trench, STA Bed, Unlined Sand Filter, Sub-Surface Dispersal System, Seepage Pit	100 <sup>2</sup>	25 <sup>2</sup>	20	10	10	25	50 <sup>3</sup>	25	5
Lined Sand Filter	60	10 <sup>2</sup>	15	10	10	10	25	10	5
Lined Evapo-Transpiration Field or Outside of Berm Lined Wastewater Pond	60	25 <sup>2</sup>	15	15	10	25	25	15	10



Table 7-1 Continued	Spring, Well <sup>1</sup> , Suction Line Potable Water Supply System <sup>4</sup>	Potable Water Supply Line <sup>2</sup>	Dwelling Occupied Building Structure w/basement crawl space or footing drains	Structure without basement, crawl space or footing drains	Property Lines, Piped or Lined Irrigation Ditch upslope curtain drain	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 Higher level treatment Unit, dosing tank, Vault or Privy
Unlined Sand Filter in Soil with a Percolation Rate Slower than 60 Minutes per inch, Unlined or Partially Lined Evaop- transpiration System, Outside of Berm of Unlined Wastwater Pond, or System Not Relying on STA for Treatment other than Aerosol	100	25 <sup>2</sup>	15	15	10	25	25	15	10
Vault Privy	50	40 <sup>2</sup>	15		10	10	25	40	=
Silt Trench Latrine, Pit Privy	100	50 <sup>2</sup>	N/A 25	25	25	25	100	25	N/A
System not Relying on STA for Treatment and Utilizing Aerosol Methods	100 <sup>3</sup>	10 <sup>2</sup>	125	125 <sup>5</sup>	10	0	25 <sup>3</sup>	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 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 **potable wells, irrigation wells and monitoring wells set within a potable aquifer and 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. Other methods of encasement that provide equal protection are allowed. These methods must be reviewed and approved by the local public health agency.
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. 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 **and permitting** process.
4. **All horizontal setbacks to a potable water supply cistern must be met.**
5. **If the structure is not used as a habitable unit, the isolation may be reduced by the local board of health to no less than 50 feet.**
6. **Building sewer installations shall meet the design requirements of the Colorado Plumbing Code.**

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

				Pressure Dosing Required	Pressure Dosing Required
Item	OWTS Design Consideration	Treatment Level 1	Treatment Level 2N	Treatment Level 3	Treatment Level 3N
	<u>Horizontal Separation Distances</u>				
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 <b>100 feet</b> <sup>1</sup>
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 back	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
	<u>Vertical Separation Distances</u>				
4	Treatment depth in feet from soil treatment area infiltrative surface to restrictive a limiting layer or ground water	4 feet <sup>2</sup> (3 feet with pressure dosing)	Greater than or equal to 2.5 feet	Greater than or equal to 2.5 feet	Greater than or equal to 2 feet

NOTE: Treatment levels are defined in Table 6-3.

<sup>1</sup> ~~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. For TL 3N effluent, a reduction to 75 feet is allowed if a variance from the Water Well Construction Regulations is obtained.

## **8. Design Criteria – General**

- A. The OWTS for single-family homes shall be designed to accommodate the proposed flows from the structure as defined in 43.6.b. Flow estimates for multi-family or commercial OWTS must comply with 43.6.B. Expected waste strength as noted in Table 6-3 and Table 6-4 must also be addressed, where applicable. Installation of low flow fixtures or the separation of toilet waste or other sources of wastewater does not allow for the reduction in the size of an OWTS.
- B. **Performance:** OWTS shall be designed and constructed to achieve the treatment level specified by the design.
- C. **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.
- D. **Accessibility for Inspection, Maintenance, and Servicing**
- a. Septic tanks shall have watertight risers over each access manhole and all risers shall extend to or above final grade.
  - b. For new construction, the top of any septic tank, dosing tank or vault must be no deeper than four feet below finished grade.

- c. 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.
  - d. Riser Lids
    - (1) Each riser lid **must be watertight** brought to **or above** the surface **and** shall have a secure closing mechanism, such as a lock, special headed bolts or screws, or sufficient weight (**defined as 59 pounds**) to prevent unauthorized access.
    - (2) 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.
  - e. 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.
  - f. 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.
- E. 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.
- a. 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 as intended. 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.

a. Sampling Access

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

b. 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.

- G. Surface Activity: Activity or use on the surface of the ground over any part of the OWTS must be restricted. **The soil treatment area must not be subject to damage or soil compaction from livestock, vehicular traffic, recreational use, or other site development activity. Construction equipment not necessary to install the OWTS must be kept off of the soil treatment area to prevent undesirable compaction of the soils.** ~~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/or new percolation tests **soil evaluations** may be performed. ~~to the disturbed or compacted soil and the.~~ **The system must be redesigned if the soil permeability has** parameters have changed.

## H. Floodplains

- a. ~~A new~~ **expanded or** ~~OWTS and repair/~~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 if required by such agency. Repairs of an existing system shall meet the requirements as feasible. The system as approved by the Board of Health shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters. **The OWTS must be located to avoid impairment to floodwaters or contamination from them during flooding.**
- b. ~~No~~ **A new or expanded OWTS shall** ~~must not~~ be installed in a floodway designated in a 100-year floodplain **where a conforming OWTS outside the floodway can be installed.** For any **new OWTS or** system repair that may affect the floodway delineation, appropriate procedures shall be followed including revision of the floodway designation, if necessary.

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

- a. An OWTS that will serve a business, commercial, industrial or institutional property, or a multifamily dwelling shall:
  - (1) Be designed by a professional engineer;
  - (2) 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
  - (3) 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.  
**Subsequent to acceptance by the EPA, the local public health agency may choose to also issue a permit for this type of use.**

## 9. Design Criteria - Components

### A. Tanks and Vaults

#### a. Watertightness

- (1) Septic tanks, vaults, ~~pump~~ **dosing** 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.

(2) When the final compartment of a tank is being proposed for use as a pump or siphon chamber, the wall between this chamber and the previous chamber must be watertight except for the intended hydraulic opening.

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

b. 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.

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

(2) 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.

c. 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:

(1) Name of manufacturer;

(2) Model or serial number, if available;

(3) Effective volume and unit of measure;

(4) Maximum depth of earth cover and external loads the tanks is designed to resist; and

(5) Inlet and outlet identifications, if relevant.

## B. Septic Tanks

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

b. Sizing Requirements:

(1) 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

- (2) 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.
- (3) 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.
- (4) Minimum tank size for new installations other than for a single-family residence is 400 gallons.

C. **Inspection and 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~~ **2013** (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.

D. **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. **However the inlet tee or baffle must not extend to a depth of more than 40 percent of the liquid depth measured from the liquid surface.**
- d. Outlet tee or baffle shall extend at least **5 inches above and** 14 inches below the outlet invert, **however it must not extend to more than 40 percent of the liquid depth measured from the liquid surface** ~~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~~ **opening** 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.

#### E. Concrete Septic Tank Structural Design

- a. Concrete septic tanks shall comply with the structural design criteria of ASTM C1227-13 (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 water tightness standard of this regulation.
- c. Certification by a professional engineer must be submitted to the Division for

acceptance.

d. Tank slab lids, mid-seam tanks, and the connections between the tank and risers must be designed to provide for a watertight seal.

~~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.~~

#### F. 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 2013(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.

G. Metal tanks are prohibited.

#### H. Abandonment of Tank

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

b. If the tank will remain in place:

(1) The tank shall be pumped to remove as much waste as possible;

(2) The bottom of the tank shall be broken so the tank neither floats nor fills with water;

(3) The top must be collapsed and the sides may be broken into the void;

(4) The remaining void shall be filled with gravel, sand or compacted soil;

(5) The filled excavation will be graded to surroundings, allowing for

settling.

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

I. Pipe Standards and Bedding Requirements:

J. Pipe Standards

- a. All wastewater lines pipes used in portions of an OWTS that are pressurized shall be constructed of compatible pipe, primer, bonding agent, and fittings. Flexible couplings to connect pipes may only be used in portions of an OWTS that are intended for gravity flow of the wastewater.
- 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.

- K. 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.

L. Cleanouts required between the building and the septic tank:

- a. Cleanouts must have a secure cap and a riser extending to or easily accessible from grade. The installation of two sanitary tees or a two way clean out is acceptable.
- b. Cleanouts must be provided within five (5) feet of the outside of the building or as close as practicle.

- c. Where a sewer has a change of horizontal direction greater than 45 degrees, a cleanout must be installed at the change of direction unless a cleanout already exists within 40 feet upstream of this fitting. Where more than one change of direction greater than 45 degrees occurs within 40 feet of a developed length of piping, the cleanout for the first change of direction may serve as the cleanout for all changes within that 40 feet of developed length of pipe.
  - d. Cleanouts must be provided at intervals within the building sewer from the structure to the tank of not more than 100 feet. The effluent pipe between the septic tank and soil treatment area is exempt from this requirement.
- M. 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.
- N. 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.
- O. 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.
- P. Wastewater Pumping and Dosing Siphon Systems
- a. Pumps
    - (1) 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.
    - (2) 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.
    - (3) 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.
  - b. Floats and Switches

- (1) Automatic liquid level controls must be provided to start and shut off pumps at a frequency or level specified in the design.
- (2) Floats must be mounted on a stem separate from the pump discharge piping to allow for removal, adjustment, and replacement of the float **from grade** without removing the pump.
- (3) 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.
- (4) **Dosing siphons for pressure dosing and higher level treatment systems must provide for a means of determining the number of dosing events.**

P. 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~~ **The tank must** 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~~ **a two compartment** septic tank ~~shall not~~ **may only** be used as the pump tank ~~unless~~ **when the tank is specifically designed for this purpose and** 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 **must be** screened or provided with an approved filtering device to assure that only liquid effluent will be discharged. **The transfer of liquid from the first to the second compartment must be at an elevation that is between the inlet and outlet invert elevations, and through a standard tee designed and located as per the requirements of section 9.D.d. Siphons must not be installed in the second compartment of a two compartment tank.**
- c. **The use of a three-compartment septic tank, sized to provide the required effective volume in the first two compartments with the pump or siphon in the third compartment is acceptable for tanks specifically designed for this purpose. The transfer of liquid from the second to the third compartment must be at an elevation that is between the inlet and outlet invert elevation, and through a standard tee designed and located as per the requirements of section 9.D.d.**

Q. Pump or Siphon Discharge Piping

- a. The discharge line ~~line~~ **pump** 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 ~~pipe~~ prior to exiting the tank.

- b. The pump discharge piping shall have a quick disconnect that is accessible ~~within the riser~~ from grade 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. **Pressure pipes must be designed to prevent air or vacuum locking and allow self draining of the pipes.** ~~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.~~

#### R. 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. **A smaller diameter riser may only be installed if it is accepted by the Division as an integral component of a specific product during the product review process.**
- b. The access riser must have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration. **All other intrusions to the riser for electrical or other component access must also be watertight.**

#### S. 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~~ **are prohibited** inside the tank, dosing chamber or riser. Wire splicing shall be completed with corrosion-resistant, watertight connectors.

#### T. Controls

- a. **Control panels or other electrical boxes used to control the functions of an OWTS must comply with the following, as appropriate:**
  - 1. The pump system shall have an audible and visual alarm notification in the event an excessively high water condition occurs.
  - 2. The pump shall be connected to a control breaker separate from the ~~high water~~ alarm breaker and from any other control system circuits.

3. An electrical disconnect must be provided within the line of sight of the pump chamber.
4. The pump system ~~shall have a switch so~~ must be provided with a means that will allow the pump ~~can~~ to be manually operated; such as an H.O.A. (hand/off/auto) switch.
5. 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.
6. Must bear the seal of a Nationally Recognized Testing Laboratory (NRTL), such as UL or ETL. ~~Control panels shall be UL listed.~~

#### U. Effluent Screens

- a. Effluent screens may be installed but are not required for septic tanks in new installations and repairs where the septic tank is replaced.
  1. If a pump or dosing siphon is used to remove septic tank effluent from the final compartment of the septic tank, ~~an~~ the effluent screen must be provided ~~filtered~~ prior to the pump or siphon inlet ~~dispersal into the soil treatment area.~~ An effluent screen, pump vault equipped with a filter cartridge, ~~or a filter on the discharge pipe,~~ would all be acceptable. ~~may be considered equivalent to an effluent screen preceding the pump.~~
  2. The effluent screen shall be cleaned at manufacturer-recommended intervals, or more often, if use patterns indicate.
  3. 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.
  4. Where an ejector pump, grinder pump or non-clog pump is proposed for use prior to the septic tank, an effluent screen must be installed on the outlet of the septic tank.
  5. The handle of the effluent screen must extend to within 12 inches of grade.
- b. 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.

3. The grease interceptor must have a minimum of two compartments and must be sized proportionate to the amount of fats, oils and grease it receives, the peak flow rate through the tank, and the expected cleaning frequency.
4. The inlet and outlet tees or baffles must extend into the bottom 1/3 of the liquid volume, but must be at least 12 inches off the inside floor of the interceptor.
5. The inlet and outlet tees or baffles must extend at least 5 inches above the liquid level and must provide for a free vent area across the liquid surface.

## **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:
  - a. ~~The~~ For soil classifications are types 0, 3A, 4, 4A, and 5, R-0, R-1, and R-2, and Treatment Level TL1 as specified in Tables 10-1 and 10-1A of this regulation;
  - b. The maximum seasonal level of the ground water surface is less than four feet below the bottom of the proposed ~~absorption system~~ infiltrative surface;
  - c. A ~~restrictive~~ limiting layer exists less than four feet below the bottom of the proposed ~~absorption system~~ infiltrative surface;
  - d. The ground slope is in excess of thirty percent; or
  - e. Pressure distribution is used.
- C. Calculation of Infiltrative Surface of Soil Treatment Area
  - a. The infiltrative surface of a trench or bed receiving any treatment level of effluent is only the bottom area. No sidewall credit is allowed except in deep gravel trenches and seepage pits that are permissible in repairs.
  - b. Long-term acceptance rates (LTARs) are shown in Tables 10-1 and 10-1A.
  - c. Factors for adjusting the size of the soil treatment area are in Tables 10-2 and 10-3.



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

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

- e. Adjusted Soil Treatment Area = Required Soil Treatment Area x Size Adjustment Factor(s).
- f. Size adjustment factors for methods of application are in Table 10-2.
- g. Size adjustment factors for types of storage/distribution media are in Table 10-3.
- h. 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.

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					
Soil Type	USDA Soil Texture	USDA Soil Structure- Shape-Type	USDA Soil Structure - Grade	Percolation Rate (MPI)	Treatment Level 1 <sup>1</sup>
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 <sup>2</sup>
R	>35% Rock (>2mm); See Table 10-1A				
1	Sand, Loamy Sand	Single Grain	0 Structureless	5-15	0.80
2	Sandy Loam, Loam, Silt Loam	PR (Prismatic) BK (Blocky) GR (Granular)	2 (Moderate) 3 (Strong)	16-25	0.60
2A	Sandy Loam, Loam, Silt Loam	PR, BK, GR 0 (none)	1 (weak) Massive	26-40	0.50

		Massive	(Structureless)		
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR	2, 3	41-60	0.35
3A	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR Massive	1 Massive (Structureless)	61-75	0.30
4	Sandy Clay, Clay, Silty Clay Loam	PR, BK, GR	2, 3	76-90	0.20
4A	Sandy Clay, Clay Silty Clay	PR, BK, GR Massive	1 Massive (Structureless)	91-120	0.15
5	Soil Types 2-4A	Platy	1, 2, 3	121+	0.10

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

Soil Type	Treatment Level 2 <sup>1</sup>	Treatment Level 2N <sup>1</sup>	Treatment Level 3 <sup>1</sup>	Treatment Level 3N <sup>1*</sup>
Ø	Minimum 2-foot deep unlined sand filter required <sup>2</sup>	Minimum 2-foot deep unlined sand filter required <sup>2</sup>	Minimum 2-foot deep unlined sand filter required <sup>2</sup>	Minimum 2-foot deep unlined sand filter required <sup>2</sup>
R	>35% Rock (>2mm); See Table 10-1A			
1	1.40	1.40	1.55	1.55
2	1.0	1.0	1.1	1.1
2A	0.80	0.80	0.90	0.90
3	0.55	0.55	0.65	0.65
3A	0.45	0.45	0.55	0.55
4	0.30	0.30	0.30	0.30
4A	0.20	0.20	0.20	0.20
5	0.15	0.15	0.15	0.15

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1 Treatment levels are defined in Table 6-3

~~2 Unlined sand filter in these soil types shall provide pathogen removal. Design shall conform to Section 6.4.d 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 sustained.

Table 10-1A Design Criteria for Soils with High Rock Content (Type “R” Soils) <sup>1,2,3,4</sup>

<b>Required Sand or Media Depth Relative to the Quality of Effluent Applied to the Distribution System</b>				
<b>Soil Type</b>	<b>Percentage and Size of Rock<sup>5</sup></b>	<b>Maximum LTAR (Gal./sq.ft./ day)</b>	<b>Type of Distribution Required</b>	<b>Treatment Level 1<sup>6</sup></b>
R-0	Soil Type <sup>7</sup> 1 with more than 35% Rock (>2mm)	Unlined Sand Filter: 1.0 for “Preferred Sand Media”; 0.8 for “Secondary Sand Media”	Pressure Distribution <sup>8</sup>	Minimum 3-foot deep Unlined Sand Filter
R-1; Option 1	Soil Type <sup>7</sup> 2 – 5, >35 - 65% Rock (>2mm) ; with ≥50% of the Rock <20 mm (3/4 inch)	Use TL1 LTAR from Table 10-1 for the soil type corresponding to the soil matrix, with a maximum LTAR of 0.8	Pressure Distribution <sup>8</sup>	Minimum 2-foot deep Unlined Sand Filter
R-1; Option 2	Soil Type <sup>7</sup> 2 and 2A, >35 - 65% Rock (>2mm); with ≥50% of the Rock <20 mm (3/4 inch)	The allowable LTAR’s are defined in each individual treatment level column in this Table	Pressure Distribution <sup>8</sup>	Remove, mix, replace 4 feet of existing material; with a maximum LTAR of 0.6
R-2	Soil Type <sup>7</sup> 2 – 5, >65% Rock (>2mm), <b>OR</b> ≥50% of Rock >20 mm (3/4 inch)	Use TL1 LTAR from Table 10-1 for the soil type corresponding to the soil matrix, with a	Timed, Pressure Distribution <sup>8</sup>	Minimum 3-foot deep Unlined sand filter

		maximum LTAR of 0.8		
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<b>Required Sand or Media Depth Relative to the Quality of Effluent Applied to the Distribution System</b>			
<b>Treatment Level 2</b>	<b>Treatment Level 2N</b>	<b>Treatment Level 3</b>	<b>Treatment Level 3N</b>
Minimum 3-foot deep Unlined Sand Filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2-foot deep Unlined Sand Filter
Minimum 1-foot deep Unlined Sand Filter	Minimum 1-foot deep Unlined Sand Filter	Sand media not required	Sand media not required
Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.7	Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.7	Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.8	Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.8
Minimum 3-foot deep Unlined Sand Filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2-foot deep Unlined Sand Filter

1. General guidance for Table 10-1A: The intent of the soil type R-0 is to define a material that consists of a high percentage of rock, or rock fragments, and has a percolation rate of less than 5 mpi. Soil types R-1 and R-2 consist of a high percentage of rock or rock fragments, but have a percolation rate of greater than 5 mpi. Soil types R-0 and R-2 are considered to be a “limiting layer”.
2. No sizing adjustments are allowed for systems placed in type “R” soils. The maximum LTAR’s are provided in this table
3. The design of type “R” soil treatment systems must conform to sections 43.11.C.b and c.
4. All systems installed in a type “R” soil must be designed by a professional engineer.
5. The percentage of rock may be determined by a gradation conducted per ASTM standards, or an appropriate field evaluation by volume.
6. Type “R” soil treatment systems that are designed per the criteria noted in the Treatment Level 1 column of this table do not require O/M oversight by the LPHA.
7. The “Percentage and Size of Rock” column references the soil types noted in Table 10-1.

8. Design of the pressure distribution system for type “R” soils shall comply with the requirements of sections 43.11.C. b. 2, 3, 4, 5, 6, 7, 8, and 9.

D. Allowable Soil Treatment Area **Sizing Adjustments** ~~Reductions and Increases:~~

- a. 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.
- b. 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.
- c. ~~The maximum reduction from all combined reductions including higher level treatment shall be no greater than 50 percent of the baseline system required for a soil treatment area.~~
- d. **Sizing adjustments for use of the higher level treatment categories listed in Tables 10-1 will only apply provided the system is inspected and maintained as specified in the requirements of section 43.14.A, Permitting and Oversight of Maintenance for Soil Treatment Area Reductions and Vertical and Horizontal Separation Distance Reductions Based on Use of Higher Level Treatment. The Board of Health shall not allow reductions in soil treatment areas or vertical or horizontal separation distances based on 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 form 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 Distribution Media in Soil Treatment

Areas Accepting for Treatment Levels 1 Systems Effluent

Type of Soil Treatment Area	Type of Storage/Distribution Media Used in Soil Treatment Area		
	Category 1	Category 2	Category 3
	Rock or Tire Chips	Other Manufactured Media	Chambers or Enhanced Manufactured Media
Trench or Bed	1.0	0.9	0.7

1. All proprietary distribution products must receive acceptance and the applicable reduction through Division review per the applicable requirements of section 13.

E. Design of Distribution Systems

F. General

- a. The infiltrative surface and distribution lines laterals must be level.
- b. The infiltrative surface must be no deeper than four feet below grade unless adequate treatment at a deeper level can be demonstrated and is approved by the local public health agency TL2 or higher effluent is applied to the distribution media and the system is inspected and maintained as specified in the requirements of section 14.D. The depth of the infiltrative surface will be measured on the up-slope 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 vegetative cover, minimizes settlement and maintains proper drainage.
- h. Dosing may be used for soil treatment area distribution. The dose must be sized to account for the daily flow and the dosing frequency.

G. Distribution **Laterals; Lines**

- a. Distribution between **laterals** in a soil treatment area must be as **level** 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 **laterals**.
- b. Distribution **laterals** ~~lines~~ shall be a maximum of 100 feet long.
- c. The end of a distribution **laterals** ~~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.
- d. **To promote equal distribution to the soil treatment area, the forcemain or effluent pipe must be connected to as near to the middle of the distribution header as possible. However it must be offset from any distribution lateral to prevent preferential flow.**
- e. **Orifices must be oriented downward unless pressure distribution is used and provision for pipe drainage is included.**
- f. Inspection Ports
  - (1) A **4-inch** inspection port accessible from ground surface shall 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~~ **four** feet sidewall-to-sidewall.
- (3) Perforated distribution pipe **laterals** 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.
- (2) The separating distance between beds must be a minimum of six feet sidewall-to-sidewall.
- (3) The separating distance between parallel distribution **laterals** ~~lines~~ in an absorption bed must not exceed six feet and a distribution **lateral** ~~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.



## H. Storage/Distribution Media

### a. Rock and Pipe

- (1) The **perforated** 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. **AASHTO M 43 size no. 3 course aggregate meets this specification.** 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. **If placed on acceptable media, the manufacturer's installation instructions must be followed so as to prevent chambers from settling into the media.**
- (2) Installation must be according to manufacturer's instructions.
- (3) Effluent may be distributed by gravity, **pump**, pressure dosing, or **siphon**.
- (4.) **For width and square footage requirements, refer to section 13.E.a.4**

- d. **Media, Enhanced, or other Manufactured Media**
- (1) Manufactured media must be installed with the base on the in-situ soil or placed on acceptable media meeting the manufacturer's specifications for proprietary distribution products or combined treatment/distribution products.
  - (2) Installation must be according to manufacturer's instructions.
  - (3) Pressure distribution is required for TL2-TL3N effluent, unless otherwise noted in this regulation.
- e. **Pressure Distribution**
- (1) Design of pressure distribution systems must include:
    - (i) Dose size and frequency for either proposed flows and soil type, or media long-term acceptance rate;
    - (ii) Pipe diameter and strength requirements;
    - (iii) Orifice size and spacing
    - (iv) A 30 – 72 inch operating head at the distal end orifice.  
~~pressure head.~~
    - (v) Pump/siphon information; Total Dynamic Head; gallons/minute;
    - (vi) Drain-back volume from forcemain; and
    - (vii) Calculations, or a design software reference, that indicates the selected component sizing will provide equal flow within each active zone of the distribution system, and provide no more than a 10% flow differential from the initial orifice to the most distal end orifice within each zone.
  - (2) Cleanouts must be installed at the end of each line.
  - (3) The separating distance between parallel distribution pipes in a pressure distribution absorption bed must not exceed four feet, and the outer distribution pipe must be located within two feet of each sidewall and endwall. Specific requirements for the design of sand filters are noted in section 43.11.C.2.

- (4) Flushing assemblies must be installed at the distal end of each lateral and be accessible from finished grade. A sweeping 90 degree or bends limited to 45 degrees must be provided.
- (5) A local public health agency may require that all effluent be screened prior to discharging to a pressure distribution system. This may be accomplished by an effluent screen in the septic tank or pump chamber, or a filter placed on the discharge pipe from the pump or siphon.

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.

I. Alternating and Sequencing Zone Systems

a. Alternating Systems

- (1) An alternating system must have two **or more** zones that must be alternated on an annual or more frequent basis.
- (2) **For repairs**, each section must be a minimum of 50 percent of the total **required** soil treatment area. ~~Size adjustment factors for methods of effluent application or type of distribution media shall not be allowed.~~ **For new installations, each separate soil treatment area must meet the minimum sizing requirements of this regulation.**
- (3) A diversion valve or other approved diversion mechanism **that requires the owner or operator to manually alternate zones of the OWTS** may be installed on the septic tank effluent line allowing soil treatment area sections to be alternated.
- (4) The diversion mechanism must be readily accessible from the finished grade.

b. Sequencing Zone Systems

- (1) Sequencing zone systems have ~~more than two~~ **or more** soil treatment area sections that are dosed on a frequent rotating basis.
- (2) 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.
- (3) An automatic distribution valve must be used.
- (4) Dosing of each system must be evaluated by the design engineer based on projected daily flow rates, number of zones, and soil types.

J. 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.

K. **Soil replacement systems**

The construction of a soil replacement system is permitted to bring the soil treatment area into compliance with the requirements of this regulation

a. When a soil type “R” is removed, the following requirements must be met:

1. All added soil must comply with the following specifications:

- (i) Added soil must meet the specifications of either “preferred” or “secondary” sand filter media, as specified in section 43.11. C.2.
- (ii) The long-term applicable rates as specified in Table 10-1A must be used. No additional sizing adjustments are allowed.
- (iii) The depth of the added media must comply with the requirements of Table 10-1A.
  - (a) In order to utilize the reduced vertical separation requirements for TL2 or higher quality effluent, the local public health agency must have a program for inspection and oversight as specified in section 43.14.D.4.
- (iv) A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.
- (vi) All added soil must be completely settled prior to installation of components as specified and approved by the design engineer.

- (vii) Pressure distribution must be used.
- b. The removal and reinstallation of in-situ soil may only be allowed where the soils are determined to be a soil type “R-1” (Option 2). The design must comply with the requirements for this soil type noted in Table 10-1A (Soil Type R-1, Option 2).
- c. When a sand media is added to soil treatment area or to an excavation where a soil type 1-5 (Table 10-1) is the underlying soil, the following requirements must be met:
  1. Added soil must meet the specifications of either “preferred” or “secondary” sand filter media, as specified in section 43.11.C.2.d.
  2. Unless the design follows the criteria for a sand filter or mound system design as required in section 43.11, the TL1 long-term acceptance rate for the receiving soil must be used.
  3. A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.
  4. All added soil must be completely settled prior to installation of components.

~~Soil replacement must be permitted to bring the soil within the requirements of suitable soil.~~

- ~~a. 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.~~

#### L. Repairs

- a. When space is not available or if there are other site limitations that preclude other soil treatment area options for OWTS repairs, wide beds, deep gravel trenches, **deep beds** 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.** ~~Vaults also may be considered.~~
- b. Repairs to failing systems must conform to setbacks identified in Table 7-1 when possible. When this is not possible using all available methods described above, the jurisdiction with authority may permit reductions to setbacks. At no point will a setback reduction be approved by the jurisdiction less than what the existing separation is to existing OWTS. In maximizing this setback distance, all methods available in section

43.10.I.1 must be utilized including but not limited to the use of Higher Level Treatment, wide beds, seepage pits, etc., where allowed. Any setback reduction beyond what the existing failing system presents must be approved by the local board of health as outlined in section 43.4.O, if the local board of health has opted to allow variances.

- c. Wide Beds: For repairs, beds may be wider than 12 feet without being required to receive effluent meeting Treatment Level 2 quality or better.
- d. Deep Beds: For repairs, the infiltrative surface of a bed may be no deeper than five feet. Size adjustments as provided for in Tables 10-2 and 10-3 must not be applied. System sizing will be based strictly on the soil type and corresponding LTAR.

b. Deep Gravel Trenches

- (1) 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.

- (2) Maximum allowable additional depth is five feet.
- (3) Percolation tests ~~and soil profile hole~~ or soil profile **test pit** excavations ~~test pit evaluations~~ must be performed at the proposed infiltrative surface depth.
- (4) ~~The reduction in field size area with the use of chambers~~ **Size adjustments as provided for in Tables 10-2 and 10-3** must not be applied to deep gravel trenches.

c. Seepage Pits

- (1) For repairs, seepage pits will only be allowed in areas where Montrose County determines that the potential for risk to public

health is low. Note: Seepage pits are not allowed in high risk areas.

- (2) A seepage pit shall consist of a buried ~~vertical cylinder with holes in the wall.~~ **Structure of precast perforated concrete, or cinder or concrete block laid dry with open joints.**
- i. Pits must be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity.
  - ii. The excavation must be larger than the cylinder by at least 12 inches on each side **and may not exceed 5 feet beyond the structure wall.**
  - iii. The over-excavated volume must be filled with **clean, graded gravel or** rock ranging in size from 1/2 inch to 2 1/2 inches.
  - iv. 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.
  - v. 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.
  - vi. 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.
  - vii. **The bottom of the pit excavation must be greater than four feet above a limiting layer.**
- 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 is prohibited.

M. Vaults

- a. The allowable use of vaults for repairs shall be determined by the Board of Health.
- b. Criteria for vaults are in section 12.D. of this regulation.

**11. Design Criteria – Higher Level Treatment Systems**

- A. The use of higher level treatment systems does not allow for the reductions to the size of a soil treatment area or required separation distances.
- B. General
  - a. Higher level treatment systems must be designed by a professional engineer.
  - b. Higher level treatment systems may be public domain technology systems or proprietary systems.
    - (i) 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.
    - (ii) Proprietary systems must be designed, installed, and maintained according to manufacturer's instructions and additional criteria identified in the Technology Review and Acceptance process in Section 13.
  - d. Soil treatment areas for higher level treatment systems must be pressure dosed.
  - e. Systems must be capable of accommodating all anticipated flows and organic loads.
  - f. 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.
  - g. 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.
- C. 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.

#### Sand Filters

- a. A lined or unlined intermittent sand filter, or recirculating sand filter, may be used as a higher level treatment system prior to dispersing the effluent into a soil treatment area.



- b. Intermittent (Single Pass) Sand Filters; General Requirements
1. The treatment level for intermittent sand filters is considered TL3.
  2. General Design Parameters: Not all combinations of the variables noted below will result in a proper distribution system design. The design engineer must justify through calculations or design software that the selected values will concur with industry standards.
    - (i) Distribution pipe size: 3/4 inch – 1.5 inches (PVC Class 200, min.)
      - (a) 2 inch distribution pipe may only be used where other design modifications cannot overcome a greater than 10% variation in the pressure head between the initial and distal orifices.
    - (ii) Distribution pipe spacing: 18 inches – 48 inches
    - (iii) Orifice size: 1/8 inches – 3/8 inches (Also see section 43.11.C.b.5 below)
    - (iv) Orifice spacing: 18 inches – 48 inches
    - (v) Operating head at the distal end of distribution pipes: 30 inches – 72 inches (60 inches typ.). Larger orifices allow for an operating head at the lower end of this range, while smaller orifices will necessitate an operating head at the higher end of this range.
  3. Dosing:
    - (i) Pressure distribution is required. The design of the distribution system must also comply with the requirements of 43.10.E.3.a.
    - (ii) Number of cycles/day: Will vary with design (Short, frequent doses are preferred.)
    - (iii) Proposed dose volume: Will vary with design (0.25 – 1.0) gallons/orifice/dose, or 3-5 times distribution pipe volume
    - (iv) Timed dosing is recommended where design considerations allow.
  4. Sand Filter Treatment Media

- (i) The depth of the sand media below the distribution system must be at least 24 inches unless otherwise noted in Table 10-1A for type “R” soils.
- (ii) “Preferred” sand media requirements:
  - (a) Effective size: 0.25-0.60 mm
  - (b) Uniformity coefficient:  $\leq 4.0$
  - (c) Percent fines passing #200 sieve:  $\leq 3.0$
- (iii) “Secondary” sand media requirements:
  - (a) Effective size: 0.15-0.60 mm
  - (b) Uniformity coefficient:  $\leq 7.0$
  - (c) Percent fines passing #200 sieve:  $\leq 3.0$
- (iv) A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.

#### 5. Gravel Requirements

- (i) Clean, graded gravel, or rock, must range in size from 1/2 inch to 2 1/2 inches. AASHTO M 43 size No.3 coarse aggregate meets this specification.
- (ii) The gravel must surround the distribution pipes used to disperse the effluent and must be at least 6 inches below and 2 inches above the pipes.
- (iii) Division accepted manufactured media may be used as an alternative to specified gravel.

#### 6. Filter Fabric Requirements

- (i) The top layer of gravel must be covered with a non-woven permeable geotextile fabric meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material.

#### 7. Final Cover Material

- (i) 8 inches – 10 inches of Type 1 or 2 soil with an additional 2 inches top soil

8. Size adjustment factors provided in Tables 10-2 and 10-3 are not applicable for sand filters.
  9. Sand filters must not be used to treat wastewater that does not conform to TL1 treatment level or better.
- c. Unlined (Open Bottom) Sand Filters
1. All requirements of 43.11.C.2.a-i will apply to unlined sand filters.
  2. Application rates:
    - (i) Maximum hydraulic loading rate for TL1 effluent applied to “Preferred Sand Media” in an unlined sand filter is 1.0 gal./sq.ft./day, or the long-term acceptance rate of the receiving soil for TL3 (Table 10-1) whichever results in the larger area.
    - (ii) Maximum hydraulic loading rate for TL1 effluent applied to “Secondary Sand Media” in an unlined sand filter is 0.8 gal./sq.ft./day, or the long term acceptance rate of the receiving soil for TL3 (Table 10-1) whichever results in the larger area.
    - (iii) Maximum hydraulic loading rate for TL2, TL2N, TL3, or TL3N effluent applied to “Preferred” or “Secondary” Sand Media in an unlined sand filter must be the long-term acceptance rate of the receiving soil for TL3, (Table 10-1).
  3. The upper infiltrative surface of an unlined sand filter receiving TL1 – TL2 effluent must be at least three feet above a limiting layer.
  4. The upper infiltrative surface of an unlined sand filter receiving TL2N-TL3 effluent must be at least two and one-half feet above a limiting layer.
  5. The upper infiltrative surface of an unlined sand filter receiving TL3N effluent must be at least two feet above a limiting layer.
- d. Lined Sand Filters
1. All requirements of 43.11.C.2.a-i will apply to unlined sand filters.
  2. Application rates:
    - (i) Hydraulic loading rate for TL1 effluent applied to “Preferred Sand Media” in a lined sand filter is 1.0 gal./sq.ft./day.

- (ii) Hydraulic loading rate for TL1 effluent applied to “Secondary Sand Media” in a lined sand filter is 0.8 gal./sq.ft./day.
  - 3. The minimum depth of the sand media in a lined sand filter must be two feet.
  - 4. An intermediate layer of pea gravel, two inches in thickness, must be placed between the sand filter media and the coarse under-drain media to prevent the migration of sand into the lower layer of under-drain gravel. ASTM C 33, No. 8, coarse aggregate meets this specification.
  - 5. A minimum four-inch diameter slotted SCH40 PVC under-drain pipe must be used to collect the treated effluent. The under-drain pipe must be installed in the center of a 5 inches thick bed of washed, graded gravel, or rock ranging in size from 1/2 inch to 2 1/2 inches. AASHTO M 43, No.3 coarse aggregate meets this specification.
  - 6. Lined sand filters must have an impervious liner on the sides and bottom of the filter. The liner must consist of a minimum 30 mil thick PVC material or equivalent.
  - 7. Effluent collected by the under-drain must be dispersed to a soil treatment area. The soil treatment area may be sized with a maximum long-term acceptance rate of the receiving soil for TL3 effluent.
- e. Recirculating Sand Filter, Minimum Requirements:
- 1. Treatment level:
    - (i) Treatment level provided within recirculating sand filters is TL3.
  - 2. General Design Parameters: Not all combinations of the variables noted below will result in a proper distribution system design. Engineer must justify through calculations or design software that the selected values will concur with industry standards.
    - (i) Distribution pipe size: 3/4 inch – 2 inches (PVC Class 200, min.)
    - (ii) Distribution pipe spacing: 18 inches – 36 inches (24 inches typ.)
    - (iii) Orifice size: 1/8 inch – ¼ inch
    - (iv) Orifice spacing: 18 inches – 36 inches (24 inches typ.)

- (v) Pressure head at end of distribution pipe: 24 inches – 72 inches (60 inches typ.)
3. Dosing:
- (i) Timed dosed, pressure distribution is required. The design of the distribution system must comply with the requirements of section 43.10.E.3.a.
  - (ii) Recirculation ratio: 3:1 – 5:1
  - (iii) Gallons/orifice/dose: 1 – 3 (2.0 typ.)
  - (iv) Hydraulic loading: 3 - 5 gal./sq.ft./day (4 – 5 typ.)
  - (v) Dosing time “ON”; <2.5 min. (<2.0 typ.)
  - (vi) Number of cycles/day: 48 – 120
4. Top gravel requirements:
- (i) Washed, graded gravel, or rock, must range in size from 1/2 inch to 2 1/2 inches. AASHTO M 43, No.3 coarse aggregate meets this specification.
  - (ii) The gravel must surround the distribution pipes used to disperse the effluent and must be at least 6 inches below and 2 inches above the pipes.
  - (iii) State accepted manufactured media may be used as an alternative to specified gravel.
  - (iv) Soil cover is prohibited. The upper gravel layer must be open to the atmosphere.
5. Filter media requirements:
- (i) Effective size: 1.5 – 2.5 mm
  - (ii) Uniformity coefficient:  $\leq 3$
  - (iii) Fines passing #200 sieve:  $\leq 1.0$
  - (iv) Media depth (min.):  $\geq 24$  inches
6. Intermediate gravel layer:
- (i) An intermediate layer of pea gravel, two inches in thickness, must be placed between the coarse underdrain media and

the sand filter media to prevent the migration of sand into the lower layer of under-drain gravel (ASTM C 33, No. 8, coarse aggregate).

7. Under-drain requirements:

- (i) A minimum four-inch diameter slotted SCH40 PVC under-drain pipe must be used to collect the treated effluent. The under-drain pipe must be installed in the center of a 5 inches thick bed of washed, graded gravel, or rock ranging in size from 1/2 inch to 2 1/2 inches. AASHTO M 43, No.3 coarse aggregate meets this specification.

8. PVC liner requirements:

- (i) 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.

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

D. Mound Systems

1. When the infiltrative surface area of the media receiving wastewater effluent is at or above the natural ground surface at any point, it shall be considered a mound system.
2. Mound systems that provide a minimum of 24 inches of sand treatment media may use the application rates for the in-situ receiving soil for TL3 effluent (Table 10-1). Size adjustment factors within Table 10-3 must not be applied to mound designs where TL3 application rates are used. However they may be applied if TL1 application rates are used.
3. Mound systems must conform to the design requirements of sections 43.11.C.3.a through e for unlined (open bottom) sand filters, with the following exceptions.
  - a. A mound system may include less than 24 inches of imported sand media on a site where a lesser depth of sand media is sufficient to meet vertical separation requirements above a limiting layer. Application rates for the in-situ receiving soil for TL1 effluent must be used when less than 24 inches of sand media is used, unless higher level treatment is provided prior to dispersal into the mound system.

- b. For the design of a mound system where less than 24 inches of sand media is proposed, and application rates for TL1 are used, the size adjustment factors within Table 10-3 may be used.
4. The basal area must be determined using the LTAR from Table 10-1 for the in-situ receiving soil under the mound.
5. Linear loading rates must be determined. The evaluation of many factors is required for an accurate determination of the linear loading rate. While application rates for the in-situ receiving soil under the mound is a main component, placement on the slope, and percent of slope must also be addressed when defining the linear loading rate. If the movement of the effluent is primarily vertical, then the linear loading rate is not as critical. However, if the movement of the effluent will be primarily horizontal, as would be expected in soil types 3A through 5 (Table 10-1), then the linear loading rate is extremely important and long narrow mounds are strongly recommended.
  - a. When TL1 effluent is applied to the distribution media of a mound system installed above in-situ soil types 1 through 3 (Table 10-1) and R-0 through R-2 (Table 10-1A), the suggested linear loading rate is between 6 gpd/lin.ft. and 12 gpd/lin.ft. The maximum width of the distribution media in a mound system installed above these soil types is 12 feet when TL1 effluent is applied to the distribution media of a mound system.
  - b. When TL2 through 3N effluent is applied to the distribution media of a mound system installed above in-situ soil types 1 through 3 (Table 10-1) and R-0 through R-2 (Table 10-1A), the linear loading rate may exceed 12 gpd/lin.ft.; subsequently the mound may be wider than 12 feet.
  - c. When TL1 through TL3N effluent is applied to mound systems installed above in-situ soil types 3A through 5 (Table 10-1), the suggested linear loading rate is between 3 gpd/lin.ft. and 5 gpd/lin.ft. The maximum width of the distribution media in a mound system placed above these soil types is 12 feet.
6. The final cover over a mound system must extend at least twelve inches horizontally beyond the perimeter of the distribution media prior to sloping down to existing grade. The final slope of the mound must be no greater than three feet horizontal to one foot vertical.
7. The surface of the mounded area must be planted with a suitable vegetative cover.
8. A suggested reference for the design and installation of mound systems is, "*The Wisconsin Mound Soil Absorption System: Siting, Design, and*

*Construction Manual, January 2000*". Note that this is suggested guidance, and where the requirements of this regulation differ from those in the referenced mound document, the requirements of this regulation will govern in those cases.

- E. 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. Evapotranspiration and Evapotranspiration/Absorption Systems:~~

##### ~~1. Non-Pressurized Drip Dispersal System (NDDS):~~

~~a. An NDDS is considered a type of evapotranspiration/absorption system. However as specific design criteria is provided for an NDDS, they are exempt from the additional requirements of section 43.12.A.2, 3 and 4.~~

~~b. *The Colorado Professionals in Onsite Wastewater Guidelines for the Design and Installation of Non-Pressurized Drip Dispersal Systems (NDDS)*, September, 2016 is the procedural guideline in the design of a NDDS and must be followed when an NDDS is proposed.~~

~~c. The width of an NDDS system may be wider than 12 feet.~~

~~2. The following section provides general criteria which must be followed when an evapotranspiration or evapotranspiration/absorption bed is proposed.~~

~~a. The design may only be permitted in arid climates where the annual evaporation rate exceeds the annual precipitation rate by more than 20 percent, and where site characteristics dictate that conventional methods of effluent dispersal are not appropriate.~~



- b. ~~The design may only be permitted in soil types 4, 4A and 5.~~
- c. ~~The system must be designed by a professional engineer.~~
- d. ~~If data for the Pan Evaporation Rate is provided, it must be multiplied by 0.70, or less, to obtain the equivalent Lake Evaporation Rate.~~
- e. ~~The width of the bed may be wider than 12 feet.~~
- f. ~~The required capillary or wicking sand must meet the gradation requirements in Table 12-1 and be approved by the design engineer. This sand is to be covered by a crowned, thin layer of loamy sand mix and appropriate vegetation that will assist in drawing the water to the surface.~~
- g. ~~Adjustment factors as provided in Tables 10-2 and 10-3 must not be used.~~

**Table 12-1 ~~Gradation of Wicking Sand for Evapotranspiration Beds (Fine Sand)~~**

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

- 3. ~~For systems designed strictly as an evapotranspiration bed, the following criteria must be met:~~
  - a. ~~Design data to be furnished must include, but shall not be limited to: system dimensions, distribution system design, specifications of distribution media and wicking sand, liner material if used, bedding, properties of the soil under the system, vegetation cover, and a water balance calculation including annual precipitation and storage requirements for periods of the year when evapotranspiration does not occur.~~
  - b. ~~The following formula must be used for determining the minimum area necessary for total evapotranspiration of septic tank effluent:~~

$$\text{Area (in square feet)}^* = \frac{\text{Design Flow (in gallons per day)}}{\text{Lake Evaporation Rate at the Site (in inches per year)} \times 5.86}$$

~~\* Additional area may be required based on the annual water balance calculations.~~

- c. ~~Designs will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system 6 to 8 feet on center. A thin non-woven fabric may be placed above the distribution system. Capillary wicking of the effluent is accomplished by a uniform depth layer of the specified sand media (capillary wicks), no more than 24 inches deep, placed between and above the distribution media. The base of the evapotranspiration bed may be no more than 30 inches below finished grade.~~
  - d. ~~Capillary wicks which penetrate between the distribution system to the bottom of the bed, must be at least 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the system.~~
  - e. ~~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.~~
4. ~~For systems designed as an evapotranspiration/absorption bed, the following criteria must be met.~~
- a. ~~Data to be furnished must include, but is not limited to: system dimensions, distribution system design, specifications of wicking sand, properties of the soil under the evapotranspiration/absorption bed, provision for vegetation cover, and a water balance calculation including annual precipitation and storage requirements for periods of the year when evapotranspiration does not occur.~~
- D. ~~b. Design will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system 6 to 8 feet on center. A thin non-woven fabric may be placed above the distribution media. Capillary wicking of the effluent is accomplished by a uniform depth la~~
- D. ~~Sand Filters~~
- a. ~~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.~~
- b. ~~Intermittent (Single Pass) Sand Filters~~
- (1) ~~General~~
    - (i) ~~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, maximum sand filter application rate of 1.0 gpd/ft<sup>2</sup> must be used.~~

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

#### ~~c. 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 sand filter effluent must be sized with a long-term acceptance rate for TL1 effluent.

d. ~~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) An unlined sand filter is to be sized based on section 11.C.b.4.i.~~

e. ~~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.d. 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.~~

f. ~~Recirculation Sand Filters~~

- ~~(1) 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.~~
- ~~(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.
  - ~~(i) 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.

- ~~(3) Sand depth must be a minimum of two feet.~~
- ~~(4) Typical loading rates are 3.0 to 5.0 gpd/ft<sup>2</sup>. Rate must not exceed 5.0 gpd/ft<sup>2</sup>.~~
- ~~(5) Design re-circulation ratios may be 3:1 to 5:1.~~
- ~~(6) Effluent collected from the sand filter must be discharged to a soil treatment area. The soil treatment area receiving the sand filter effluent must be sized with a long term acceptance rate for TL1 effluent.~~

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

- ~~a. A rock plant filter system must be designed by a professional engineer.~~
- ~~b. 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.~~
- ~~c. The treated effluent from a rock plant filter must be distributed to a soil treatment area.~~
- ~~d. Although producing higher level treatment, rock plant filters must not be assigned a treatment level higher than TL1 because of system and seasonal variability.~~

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

- a. Approval is required by the Division for systems discharging to State Waters.
- b. Systems that discharge other than through a soil treatment area or a sand filter system must:
  - (1) Be designed by a professional engineer;
  - (2) Be reviewed by the Board of Health; and
  - (3) Not pose a potential health hazard or private or public nuisance or undue risk of contamination.
- c. The Board of Health may choose to permit only systems that do not allow drainage of effluent off the property of origin.
- d. The following minimum performance criteria must be required for all

permitted systems pursuant to this section:

- (1) 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:
    - (i) The geometric mean of the ~~fecal coliform~~ **E. coli** density must not exceed ~~25~~ **15** per 100 milliliters when averaged over any five consecutive samples, and no single sample result for ~~fecal coliform~~ **E. coli** can exceed **126** per 100 milliliters.
    - (ii) The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand (CBOD5) must not exceed ten milligrams per liter when averaged over any three consecutive samples.
    - (iii) The arithmetic mean of the total suspended solids must not exceed ten milligrams per liter when averaged over any three consecutive samples.
  - (2) 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:
    - (i) The geometric mean of the ~~fecal coliform~~ **E. coli** density must not exceed **126** per 100 milliliters when averaged over any five consecutive samples, and no single sample can exceed **325** ~~fecal coliform~~ **E. coli** per 100 milliliters.
    - (ii) The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand (CBOD5) must not exceed 25 milligrams per liter when averaged over any three consecutive samples.
    - (iii) The arithmetic mean of the total suspended solids must not exceed 30 milligrams per liter when averaged over any three consecutive samples.
- e. To determine compliance with the standards contained in this section, the required sampling frequency for ~~fecal coliform~~ **E. coli** CBOD5, 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.

f. Methods of Analysis -Sampling Points:

- (1) 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.
- (2) The sampling point must be a location that is representative of final discharge from the system.

**12. Design Criteria – Other Facilities**

A. Evapotranspiration and Evapotranspiration/Absorption Systems:

a. Non-Pressurized Drip Dispersal System (NDDS):

1. An NDDS is considered a type of evapotranspiration/absorption system. However as specific design criteria is provided for an NDDS, they are exempt from the additional requirements of section 43.12.A.2, 3 and 4.
2. *The Colorado Professionals in Onsite Wastewater Guidelines for the Design and Installation of Non-Pressurized Drip Dispersal Systems (NDDS)*, September, 2016 is the procedural guideline in the design of a NDDS and must be followed when an NDDS is proposed.
3. The width of an NDDS system may be wider than 12 feet.

b. The following section provides general criteria which must be followed when an evapotranspiration or evapotranspiration/absorption bed is proposed.

1. The design may only be permitted in arid climates where the annual evaporation rate exceeds the annual precipitation rate by more than 20 percent, and where site characteristics dictate that conventional methods of effluent dispersal are not appropriate.
2. The design may only be permitted in soil types 4, 4A and 5.
3. The system must be designed by a professional engineer.
4. If data for the Pan Evaporation Rate is provided, it must be multiplied by 0.70, or less, to obtain the equivalent Lake Evaporation Rate.

5. The width of the bed may be wider than 12 feet.
6. The required capillary or wicking sand must meet the gradation requirements in Table 12-1 and be approved by the design engineer. This sand is to be covered by a crowned, thin layer of loamy-sand mix and appropriate vegetation that will assist in drawing the water to the surface.
7. Adjustment factors as provided in Tables 10-2 and 10-3 must not be used.

**Table 12-1 Gradation of Wicking Sand for Evapotranspiration Beds (Fine Sand)**

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

- c. For systems designed strictly as an evapotranspiration bed, the following criteria must be met:
  1. Design data to be furnished must include, but shall not be limited to: system dimensions, distribution system design, specifications of distribution media and wicking sand, liner material if used, bedding, properties of the soil under the system, vegetation cover, and a water balance calculation including annual precipitation and storage requirements for periods of the year when evapotranspiration does not occur..
  2. The following formula must be used for determining the minimum area necessary for total evapotranspiration of septic tank effluent:

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

\* Additional area may be required based on the annual water balance calculations.

3. Designs will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system 6 to 8 feet on center. A thin non-woven fabric may be placed above the distribution system. Capillary wicking of the effluent is accomplished by a uniform depth layer of the specified sand media (capillary wicks), no more than 24 inches deep, placed between and above the distribution media. The base



of the evapotranspiration bed may be no more than 30 inches below finished grade.

4. Capillary wicks which penetrate between the distribution system to the bottom of the bed, must be at least 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the system.
  5. 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.
- d. For systems designed as an evapotranspiration/absorption bed, the following criteria must be met.
1. Data to be furnished must include, but is not limited to: system dimensions, distribution system design, specifications of wicking sand, properties of the soil under the evapotranspiration/absorption bed, provision for vegetation cover, and a water balance calculation including annual precipitation and storage requirements for periods of the year when evapotranspiration does not occur.
  2. Design will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system 6 to 8 feet on center. A thin non-woven fabric may be placed above the distribution media. Capillary wicking of the effluent is accomplished by a uniform depth layer of the specified sand media (capillary wicks) no more than 24 inches deep placed between and above the distribution media. The infiltrative surface may be no more than 30 inches below finished grade.
  3. Capillary wicks which penetrate between the distribution system to the bottom of the bed, must be at least 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the bed.
  4. Amount of storage and evapotranspiration capacities may be reduced by the volume of effluent absorbed by the underlying soil based on the long-term acceptance rate for that soil type and the formulas provided in section 43.12.A.4.e below.
  5. The following formula must be used for determining the minimum area necessary for evapotranspiration/absorption of septic tank effluent:
    - (i) 
$$\text{Area (sq. ft.)}^* = \frac{\text{Flow (gpd)}}{(\text{LTAR} + \text{ETR})}$$
    - (a) LTAR refers to the long-term acceptance rate of the underlying soil as provided in Table 10-1 for TL1 effluent.
    - (ib) ETR refers to the evapotranspiration rate derived from the following formula:

$$\text{ETR (gal./day sq. ft.)} = \frac{\text{Lake Evaporation Rate at the Site (in inches per year)}}{586}$$

\* Additional area may be required based on the annual water balance calculations.

~~B. Evapotranspiration and Evapotranspiration/Absorption Systems:~~

~~a. 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.~~

- ~~(1) An evapotranspiration system or evapotranspiration/absorption system must be designed by a professional engineer.~~
- ~~(2) 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.~~
- ~~(3) The following formula may be used as a guide for determining the area necessary for total evapotranspiration of septic tank effluent:~~

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

- ~~(4) 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.~~
- ~~(5) 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.~~
- ~~(6) 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
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- ~~(7) Adequate surface area must be provided to evaporate/transpire total annual average daily flows at a rate equivalent to local net lake evaporation including over the part of the year when the evaporation rat is not measured.~~
- ~~(8) Of the system is designed a an evapotranspiration/absorption system, the amount of storage and evapotranspiration capacities may be reduced by the volume of the effluent absorbed by the soil based on the long-term acceptance rate for that soil type.~~
- ~~(9) 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.~~
- ~~(10) Evapotranspiration beds and evapotranspiration-absorption beds may be wider than 12 feet.~~

C. Wastewater Ponds

- a. Construction of new wastewater ponds for single-family homes is prohibited.
- b. For repairs of an existing wastewater pond, the 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, the repair of a wastewater pond may be permitted, however the following criteria must be followed:
  1. A septic tank must precede the wastewater pond.
  2. The depth of the design volume of the wastewater pond must be five feet.
  3. A wastewater pond must have two feet of free board above the design volume of the pond.
  4. A wastewater pond must be fenced to keep out livestock, pets, vermin, and unauthorized people.
  5. Wastewater ponds must be designed on the basis of monthly water balance including design flow, precipitation, evaporation, and seepage.
  6. 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.

7. If the evapotranspiration does not exceed the rate of inflow of effluent from the structure, a soil treatment area meeting the requirements of this regulation must be installed to accept the excess flow
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

- a. Vaults for full time use in new construction are prohibited where a property can accommodate an OWTS with a soil treatment area.
- b. The Board of Health may allow or prohibit vaults for use at a permanent facility, except where Section 12.D.a applies.
- c. Vaults for full time use may be permitted when a failing OWTS cannot be replaced.
- d. Vaults may be permitted for limited use occupancy on a property which cannot accommodate and OWTS with soil treatment area.
- e. A vault may be permitted if the facility is on land where the installation of an OWTS with soil treatment area is not permitted.
- f. 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.
- g. Variance may be granted for specialized commercial uses.
- h. A vault must have a minimum 500 gallon effective volume or be capable of holding a minimum of the two-day design wastewater flow, whichever is greater.
- i. 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.
- j. 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

a. Vault Privy

- (1) 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.
- (2) 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.

b. Pit Privy

- (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. The use of an incinerating, composting or chemical toilet will not reduce the required size of the OWTS**
  - a. 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.
  - b. 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 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.

- c. 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.
- d. Composting Toilets
  - (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.
  - (2) 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.
  - (3) 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.
  - (4) 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.
  - (5) If a system will be installed where low temperature may be a factor, design and installation must address the effects of the low temperature.
  - (6) Composting toilets must be operated according to manufacturer's specifications.
- e. Incinerating Toilets Acceptance Requirements
  - a. 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.
  - b. Incinerating toilets must be operated according to manufacturer's specifications.

G. Portable Chemical Toilets

- a. 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.

H. Slit Trench Latrine

- a. 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.
- b. 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.
- c. 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:
  - (1) In a building;
  - (2) In a covered or partially covered location such as a cave or overhanging cliff; or
  - (3) On a slope of greater than 30 percent.
- d. A slit trench latrine must be installed only in suitable soil.
- e. 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.

**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:

- a. Proprietary treatment products (e.g. treatment systems, remediation systems);
  - c. Propriety distribution products (e.g. manufactured distribution products or subsurface dripline);
  - d. Septic tanks;
  - e. Composting toilets;
  - f. Incinerating toilets; and
  - g. Others as needed.
- C. Product Acceptance Requirements – General:
- a. 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:
    - (1) Manufacturer’s name, mailing address, street address, and phone number;
    - (2) 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;
    - (3) Category of product (e.g., proprietary treatment product, proprietary distribution product, septic tank);
    - (3) Name, including specific brand and model, of the proprietary product;
    - (4) A description of the functions of the proprietary product, along with any known limitations on the use of the product;
    - (5) 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;



- (6) Siting and installation requirements;
  - (7) Product performance information in appropriate product section;
  - (8) Detailed description, procedure and schedule of routine service and maintenance events;
  - (9) Copies of manufacturer's literature to include sales and promotion, design, installation, operation and maintenance, and owner instructions; and
  - (10) Identification of information subject to protection from disclosure and trade secrets, if any.
- b. 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.
  - c. Manufacturers must have readily accessible and up to date information for designers, regulators, product owners, and other interested parties about their product including:
    - (1) Product manuals;
    - (2) Design instructions;
    - (3) Installation instructions;
    - (4) Operation and maintenance instructions; and
    - (5) 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.
  - d. 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

- a. 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.

- b. If a product is accepted for a specific treatment level, the product may also be used for applications requiring lower treatment levels.
- c. Field Performance Testing
  - (1) Testing must be performed by a neutral third party.
  - (2) Testing for residential applications must be performed on a minimum of 12 single-family homes under normal operating conditions **unless otherwise noted below.**
    - (i) **If the proprietary treatment product is requesting TL2 acceptance and that product has received NSF/ANSI 40 certification, the number of home sites to be tested may be reduced to six. The NSF/ANSI 40 certification must be submitted if the reduced number of test sites is requested.**
    - (ii) **If the proprietary treatment product is requesting TL2N acceptance and that product has received NSF/ANSI 245 certification, the number of home sites to be tested may be reduced to six. The NSF/ANSI 245 certification must be submitted if the reduced number of test sites is requested.**
  - (3) Each system must be tested over a period of at least one year.
  - (4) Each system must be sampled at least four times during the year with the sampling evenly distributed throughout the year.
  - (5) Laboratory results for all parameters for which acceptance is being requested must be submitted.
  - (6) Testing may be performed in Colorado under a Product Development Permit.
  - (7) Testing may be performed in locations other than Colorado, **As part of the testing, the manufacturer must define, to the acceptance of the Division, what adjustments or modifications to the product will be required to compensate for the following conditions: if elevation and climate conditions are similar to those in Colorado.**
    - (i) Increased elevation results in lower atmospheric pressure and lower oxygen content. Adjustments or modifications to the treatment process may be required to compensate for these

conditions and those adjustments or modifications must be specified.

- (ii) Winter season conditions in Colorado include cold temperatures that may affect product performance. Adjustments or modifications to the treatment process may be required to compensate for these conditions and those adjustments or modifications must be specified. This item must be addressed if nitrogen reductions are claimed.

~~(i) 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.~~

~~(ii) 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.~~

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

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

(iii) 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.

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

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

(vi) 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.

- (8) If a proprietary product has been **previously** accepted for use in Colorado under NSF/ANSI 40 or equivalent testing and at least one product unit had been installed in Colorado prior to **June 30, 2013**, ~~the effective date of this regulation~~, the acceptance for use in Colorado may continue as treatment level 2. **A request for this**

continued acceptance must be submitted to the Division on the forms provided by the Division. Documentation of a product installation must be provided.

E. Proprietary Distribution Product Acceptance Requirements

a. Proprietary manufactured distribution products must:

- (1) 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;
- (2) For gravity distribution systems, the product must provide a 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;
- (3) 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
- (4) 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. Thus, the product must cover at least 90 percent of the excavated area in either a trench or bed configuration in order to receive sizing adjustments provided in Table 10-3.

b. Proprietary subsurface dripline products must:

- (1) Be warranted by the manufacturer for use with OWTS effluent;
- (2) Specify required treatment level of influent to the driplines;
- (3) Be designed for resistance to root intrusion; and
- (4) Incorporate emitters that may be controlled either by use of pressure-compensation emitters or with a pressure regulator.

F. Proprietary Remediation Product Acceptance Requirements

- a. Manufacturers of products for remediation of a soil treatment area must submit test data as described in field performance testing - Section 12.D.c. demonstrating that the soil treatment area has been remediated for a period of at least three years.

- b. 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.
- c. Laboratory data may be submitted but will not take the place of field performance testing.
- d. In addition to the field performance testing, the following additional requirements must be met for the appropriate situation.
  - (1) 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.
  - (2) 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.
  - (3) 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.
  - (4) 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

- a. Septic tank design must conform to the requirements of Section 9.B. of this regulation.
- b. Each manufacturer must **annually** 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).
- c. Watertightness results must be sent to the Division **on an annual basis unless otherwise addressed in section 43.13.F.2 above. The manufacturer must provide information that specifies** ~~measures along with~~ measures taken to repair a tank that fails the **watertightness** test. **The manufacturer**

must also define the measures taken to prevent similar problems in future tanks. and prevent similar problems in future tanks.

- d. IAPMO, CSA, and NPCA certifications must be submitted to the Division for acceptance. Current certifications must be submitted to the Division on an annual basis.

#### H. Other Product Acceptance Requirements

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

#### ~~I. Composting Toilet Acceptance Requirements~~

- ~~a. 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.~~

#### ~~J. Incinerating Toilets Acceptance Requirements~~

- ~~a. 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.~~

#### ~~K. Other Product Acceptance Requirements~~

- ~~a. The Division may adopt review and acceptance requirements for additional products as needed.~~

### **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. The Board of Health shall not allow reductions in soil treatment areas or vertical or horizontal separation distances based on higher level treatment.

### **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.

### **16. Materials Incorporated by Reference**

- A, Throughout these regulations, standards and requirements by outside organizations have been adopted and incorporated by reference. The materials incorporated by reference cited herein include only those versions that were in effect as of June 30, 2013 and not later amendments to the incorporated material.
  
- B. Materials incorporated by reference are available for public inspection during normal business hours from the Water Quality Control Division, 4300 Cherry Creek Drive South, Denver, Colorado 80246. Copies may be purchased from the source organizations.