

SAN • JUAN • BASIN  
**HEALTH**  
D E P A R T M E N T



***On-site Wastewater  
Treatment System  
Regulations  
2014***



These Regulations were originally adopted by the Board of Health in 1967.

Amended in 1973, 1974, 1981, 1986, 1989, 1997, 2003, 2006, 2011, and 2014.

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**San Juan Basin Health Department**  
**On-site Wastewater Treatment System Regulations**  
**2014**

**Section 1 Authority**

These Regulations are promulgated pursuant to the On-site Wastewater Treatment System Act (“OWTS Act”), 25-10-101, *et seq.* C.R.S. Wherever the terms local board of health, board of health, local public health agency, or Department are used in these Regulations, said terms shall also include the Colorado Department of Public Health and Environment – Water Quality Control Division under its designated authority for the purposes of administering and enforcing the provisions of these Regulations where necessary to protect the public health and environment.

The primary responsibility for enforcement of the provisions of the OWTS Act and the regulations adopted under said article shall lie with the local board of health. In the event that a local board of health fails to administer and enforce the provisions of said section and the regulations adopted under the OWTS Act, the Colorado Department of Public Health and Environment – Water Quality Control Division may assume such functions of the local public health agency or local board of health as may be necessary to protect the public health and environment. 25-10-110, C.R.S.

**Section 2 Scope and Purpose**

**2.1 Declaration**

- A. In order to preserve the environment and protect the public health and water quality; to eliminate and control causes of disease, infection, and aerosol contamination; and to reduce and control the pollution of the air, land and water, it is declared to be in the public interest to establish minimum standards and regulations for On-site Wastewater Treatment Systems (OWTS) in the state of Colorado and to provide the authority for the administration and enforcement of such minimum standards and regulations.
- B. These Regulations shall apply to On-site Wastewater Treatment Systems as defined in section 25-10-103(12), C.R.S.

- C. These Regulations, previously known as San Juan Basin Health Department's On-Site Wastewater System Regulations 2011, shall be known as San Juan Basin Health Department's On-site Wastewater Treatment System ("OWTS") Regulations 2014.

## **2.2. Purpose**

- A. The purpose of the state of Colorado's OWTS 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. The Board of Health of San Juan Basin Health Department declares the purpose of these Regulations are to protect the physical, mental, and environmental health of the people, to control communicable diseases and to regulate wastes from dwellings, businesses, industrial sites, and public buildings to protect water quality and the public health.

These Regulations are designed to control the design, construction, location, and operation of On-site Wastewater Treatment Systems, the transportation, treatment and final disposal of sewage materials, and work performed by designers and installers of such systems.

The Board of Health declares its general policy is to require the use of public sewer systems where and whenever feasible, and to limit the installation of On-site Wastewater Treatment Systems to areas where public sewers are not feasible in accordance with Colorado statutes.

The Board of Health has variance authority subject to C.R.S. Section 25-10-105.

### **2.3 Effluent Discharged to Surface Waters**

Any system that will discharge into State waters must be designed by a professional engineer. The discharge permit application must be submitted for preliminary approval to the local board of health. Once approved by the local board of health, the application must be submitted to the Colorado 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 Colorado Water Quality Control Commission. Compliance with such a permit shall be deemed full compliance with these Regulations.

### **2.4 Jurisdiction**

These Regulations shall be applicable throughout Archuleta County and La Plata County, Colorado and any County in which the Department has authority pursuant to a contract with such County, and shall be enforced by the San Juan Basin Health Department and the Board of Health. Except that these Regulations shall not apply to Indian trust lands, the Southern Ute Indian Tribe, or members of the Southern Ute Indian Tribe within the exterior boundaries of the Southern Ute Indian Reservation. These Regulations shall only apply to non-Indians on lands within the exterior boundaries of the Southern Ute Indian Reservation owned in fee by persons or entities other than the Southern Ute Indian Tribe.

### **2.5 Comply with other applicable Laws**

These OWTS Regulations address the requirements of public health and the environment. All persons desiring to install, construct, alter, repair and/or use OWTS must also comply with all applicable County, State, and federal statutes, rules, regulations, codes, directives, permits, etc.

### **2.6 Severability**

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

### **2.7 Effective Date**

The Board of Health adopted these Regulations on September 25, 2014, with an effective date of November 10, 2014.

### **Section 3 Definitions**

**“Acceptable Design”** means a design of a tank, treatment plant, or system that meets the review criteria of San Juan Basin Health Department (SJBHD).

**“Adequate On-site Wastewater Treatment System”** means a system that is functioning in compliance with these Regulations and does not create a threat to the public health, a public nuisance or unnecessary pollution to the environment.

**“Advanced Treatment Unit” (ATU)** means a treatment method using media and oxygen to reduce the biological oxygen demand of the sewage effluent leaving the treatment tank. Also, a treatment process that provides effluent quality in excess of primary treatment prior to discharge. Also see higher level treatment.

**“Alteration”** means physically changing an onsite wastewater system by lengthening, shortening, widening, building over, or changing flows into the system by adding flow, living quarter, structures, or changing the use in a manner as to alter the wastewater system and prior specifications for which the system was originally permitted.

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

**“Approved”** means an official consent, given in writing, accepting completion by the San Juan Basin Health Department.

**“Authorization to Construct”** means signatory authorization from the Department to begin a new or altered On-site Wastewater Treatment System installation.

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

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

**“Biochemical Oxygen Demand, Five-Day” (BOD<sub>5</sub>)** means quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting, or treating biodegradable organic matter under aerobic conditions over a five-day incubation period; expressed in milligrams per liter (mg/L).

**“Biochemical Oxygen Demand, Carbonaceous Five Day” (CBOD<sub>5</sub>)** 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).

**“Board of Health”** means the officially appointed governing body of the San Juan Basin Health Department.

**“Building sewer”** means piping that conveys wastewater to the first system component or the sewer main.

**“Carbonaceous Biochemical Oxygen Demand”** See Biochemical Oxygen Demand, Carbonaceous.

**“CDPHE”** means the Colorado Department of Public Health and Environment created by section 25-1-102, C.R.S. The state-level health department located at 4300 Cherry Creek Drive South, Denver, Colorado 80246-1530.

**“CDPHE-WQCD”** means the Colorado Department of Public Health and Environment – Water Quality Control Division.

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

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

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

**“Cluster Development”** means a planned community where residences, or building envelopes, are grouped or clustered together, to facilitate efficient use and construction of shared infrastructure, within a parcel of greater size resulting in protected areas of contiguous open space.

**“Colorado Plumbing Code”** means the Colorado Examining Board of Plumbers Rules and Regulations (3 CCR 720-1).

**“Commission”** means the Colorado Water Quality Control Commission created by section 25-8-201, C.R.S.

**“Competent technician”** means a person designated by San Juan Basin Health Department who is able to conduct and interpret the results of soil profile test pit excavations, profile holes, percolation tests, and site evaluations.

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

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

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

**“Construction Inspection”** means an inspection of an assembled system, including field tests of pressurized systems, completed prior to backfill.

**“Contour”** means a line drawn on a map connecting points of equal elevation (or value).

**“Continuous Supply of Water”** means wells, municipal water systems, or any other water supply that provides an adequate quantity without hauling.

**“Crest”** means the highest point on the side of a dry gulch or cut bank.

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

**“Department”** means the San Juan Basin Health Department and its employees.

**“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 the size, location, specification and configuration of a system.

**“Design capacity”** See Flow, Design.

**“Design flow”** See Flow, Design.

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

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

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

**“Division”** means the Environmental Health Division of San Juan Basin Health Department.

**“Domestic wastewater”** See Wastewater, domestic.

**“Domestic Wastewater Treatment Works”** means a system or facility for treating, neutralizing, stabilizing, or disposing of domestic wastewater which system or facility has a designed capacity to receive 2,000 gallons of domestic wastewater per day or more. The term "domestic wastewater treatment works" also includes appurtenances to such system or facility such as outfall sewers and pumping stations and to equipment related to such appurtenances. 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.

**“Dosing”** means a high rate periodic discharge into a soil treatment area.

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

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

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

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

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

**“Drainfield”** See Soil treatment area.

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

**“Dry gulch”** See Gulch, dry.

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

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

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

**“Effluent filter”** See Effluent screen.

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

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

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

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

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

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

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

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

**“Final Inspection”** means an inspection conducted by the Environmental Health Specialist or Professional Engineer to verify compliance with permit instructions and design specifications upon completion of system installation. Approval, signifying a satisfactory Final Inspection, is required to obtain the certificate of occupancy (C.O.) from the County Building Department.

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

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

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

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

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

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

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

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

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

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

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

**“Health Officer”** means the chief administrator and executive officer of the Department or his/her authorized representative.

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

**“Individual Sewage Disposal System”** means a term used for On-site Wastewater Treatment System in Colorado regulations from 1973 until 2013. This term was previously defined by the Department as an On-Site Wastewater System (OSWS).

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

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

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

**“Lagoon”** See Wastewater pond. As of January 27, 2003, the Department will not issue On-site Wastewater Treatment System permits for the installation of new wastewater ponds or lagoons.

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

**“Lateral terminal irrigation ditch”** means an irrigation ditch serving only the property being developed and does not flow through to any other property. The ditch is used only during times of active irrigation.

**“Leach field”** See Soil treatment area.

**“Limited use occupancy”** means the unpermitted occupancy of a property, structure, vehicle, camper, trailer, RV, boat, tent or otherwise as a dwelling for no more than 90 consecutive days or 120 total days per calendar year.

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

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

**“Local board of health”** means any local, county, or district board of health. San Juan Basin Health Department’s Board of Health is the local district board of health for Archuleta County and La Plata County, Colorado.

**“Local health department”** See Local public health agency.

**“Local public health agency”** means any county, district, or municipal public health agency and may include a county, district, or municipal board of health to oversee On-site Wastewater Treatment System permitting and inspection or an on-site wastewater treatment system program. A local public health agency may designate another agency to administer the OWTS program. San Juan Basin Health Department is the local public health agency for Archuleta County and La Plata County, Colorado.

**“Long-term acceptance rate” (LTAR)** means design parameter expressing the rate that effluent enters the infiltrative surface of the soil treatment area at equilibrium, measured in volume per area per time, e.g. gallons per square foot per day ( $g/ft^2/day$ ).

**“Lot”** means a designated parcel, tract or area of land established by subdivision or as otherwise permitted by law, to be used, developed or built upon.

**“Lot Layout”** means a plan view site-sketch suitable for submittal with an application for OWTS. Suitable styles include plan views, plot plan, survey, I.L.C., aerial photographs, and sketches. Approximate scale and the location of proposed OWTS improvements, water supply infrastructure, and other features are required.

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

**“Manufactured media”** See Media, manufactured.

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

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

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

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

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

**“On-Site Wastewater System”, or “O.S.W.S.”, or “OSWS”** See On-site Wastewater Treatment System.

**“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.

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

**“Owner”** means the person who is the owner of record of the land on which an On-site Wastewater Treatment System is to be designed, installed, constructed, altered, repaired and/or used.

**“Percolation test”** means a subsurface soil test at the depth of a proposed absorption system or similar component of an OWTS to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed. The rate is expressed in minutes per inch.

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

**“Permeability”** means the property of a material which permits movement of water through the material.

**“Permit”** means a document issued by San Juan Basin Health Department approving the installation, construction, alteration, repair, and/or use of an On-site Wastewater Treatment System.

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

**“Plat”** means an accurate drawing or map indicating the dimensions, acreage and location of property lines, buildings, wells, water courses, geographical features and other pertinent information as required.

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

**“Privy”** means an above grade structure allowing for the disposal of excreta not transported by a sewer and which provides privacy and shelter and prevents access to the excreta by flies, rodents, or other vectors.

- a. Pit privy – privy over an unlined excavation.
- b. Vault privy – privy over a vault.

**“Professional engineer”** means an engineer licensed in the state of Colorado in accordance with section 12-25-1, C.R.S.

**“Professional geologist”** means a person who is a graduate of an institution of higher education which is accredited by a regional or national accrediting agency, with a minimum of 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.

**“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.

**“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.

**“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.

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

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

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

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

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

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

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

**“Sandy Soil”** means a soil having a high sand content, high infiltration rate, and a high rate of water transmission.

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

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

**“Septic tank”** means a watertight, accessible, covered receptacle designed and constructed to receive sewage from a building sewer, settle solids from the liquid, digest organic matter, store digested solids through a period of retention, and allow the clarified liquids to discharge to other treatment units for final disposal.

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

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

**“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.

**“Sewer line”** means a pipe or piping system capable of conveying sewage.

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

**“Site evaluation”** means a comprehensive analysis of soil and site conditions for an OWTS.

**“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.

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

**“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.

**“Soil evaluation”** means a percolation test, soil profile, or other subsurface soil analysis at the depth of a proposed soil treatment area or similar component or system to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed or as an application rate of gallons per square foot per day.

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

**“Soil morphology”** means 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.

**“Soil profile test pit excavation”** means a trench or other excavation used for access to evaluate the soil horizons for properties influencing effluent movement, bedrock, evidence of seasonal high ground water, and other information to be used in locating and designing an On-site Wastewater Treatment System.

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

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

**“Soil treatment area”** means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drain-fields and drip fields.

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

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

**“State Waters”** has the meaning set forth under section 25-8-103. C.R.S.

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

**“Suitable soil”** means a soil which will effectively treat and filter effluent by removal of organisms and suspended solids before the effluent reaches any highly permeable earth such as joints in bedrock, gravels, or very coarse soils and which meets percolation test or soil test pit excavation requirements for determining 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.

**“System”** See On-site Wastewater Treatment System (OWTS).

**“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, and who is licensed by the Department.

**“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, and who is licensed by the Department.

**“Temporary Use Occupancy”** See Limited use occupancy.

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

**“Transfer of Title”** means change of ownership of a property.

**“Treatment media”** See Media, treatment.

**“Treatment level”** means defined concentrations of pollutants to be achieved by a component or series of components of an OWTS.

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

**“Trench”** means 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.

**“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 these Regulations.)

**“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.

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

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

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

**“Wastewater, high strength”** means 1. influent having BOD<sub>5</sub> greater than 300 mg/L; and/or TSS greater than 200 mg/L; and/or fats, oils, and grease greater than 50 mg/L entering a pretreatment component (as defined by NSF/ANSI Standard 40 testing protocol); 2. effluent from a septic tank or other pretreatment component that has BOD<sub>5</sub> greater than 170 mg/L; and/or TSS greater than 60 mg/L; and/or fats, oils, and grease greater than 25 mg/L and is applied to an infiltrative surface.

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

**“Water Quality Control Commission”** See Commission.

**“Water Quality Control Division”** See CDPHE - WQCD.

**“Wetland, constructed”** See Rock-plant filter.

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

**Table 3-1 Abbreviations and Acronyms**

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

## **Section 4 General Requirements, Rules and Prohibitions**

### **4.1 Regulation Coverage**

- A. An OWTS with design capacity less than 2,000 gpd must comply with regulations adopted by local boards of health pursuant to the state of Colorado's OWTS regulation and the OWTS Act. Within the jurisdiction of the local public health agency, the regulations promulgated by the local board of health govern all aspects of OWTS permits, performance, location, installation, construction, alteration, and use.
- B. An OWTS with design capacity equal to or greater than 2,000 gpd must comply with the state of Colorado's OWTS regulation, site location and design approval in section 25-8-702, C.R.S., and the discharge permit requirements in the Colorado Water Quality Control Act, 25-8-501, et seq. C.R.S.

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

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

### **4.2 General Rules and Prohibitions**

- A. The property owner shall be responsible for proper installation and maintenance of the On-site Wastewater Treatment System, for all damages and/or liabilities resulting from the system, and for the abatement of any nuisance arising from its failure.
- B. The owner of any structure where people live, work, or congregate shall insure that the structure contains adequate, convenient, sanitary toilet and On-site Wastewater Treatment Systems in good working order. Under no condition shall sewage or effluent be permitted to be discharged upon the surface of the ground,

or into Waters of the State, unless the sewage or effluent meets the minimum requirements of these regulations or the water quality standards of the Colorado Water Quality Control Commission, whichever are applicable.

- C. For the purpose of administration and enforcement of the OWTS Act, 25-10-101, et seq. C.R.S. and these Regulations the following provisions are:
1. No city or county shall issue to any person a permit to construct or remodel a building or structure that is not serviced by a sewage treatment works, until the Department has issued a permit for an On-site Wastewater Treatment System.
  2. No city or county shall issue to any person an occupancy permit for the use of a building that is not serviced by a sewage treatment works until the Department makes a final inspection of the On-site Wastewater Treatment System and the Department approves the installation.
  3. Construction and/or use of cesspools and pit privies are prohibited.
  4. A person must not connect more than one dwelling, commercial, business, institutional, or industrial unit to the same On-site Wastewater Treatment System unless such multiple connection was specified in the application submitted and the permit issued for the system.
  5. 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.
  6. No person shall occupy any dwelling or any other structure which is not equipped with adequate allowable facilities for the sanitary disposal of sewage.
  7. 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.
  8. Unless permitted by the Department, Recreational Vehicles (RV) units must be self-contained, mobile and be set up only on a temporary use occupancy basis.
  9. It shall be considered a violation of these Regulations for an owner, agent, contractor, or otherwise, to intentionally misrepresent data or information to the Department. Any permit issued based upon such misrepresentation shall be deemed in violation of these Regulations and void.

### **4.3 Access to Site, Inspections and Right of Entry**

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

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

## **Section 5 Permit Application Requirements and Procedures**

### **5.1 Permit Application**

- A. Prior to installing, constructing, altering, or repairing a system, any person who wishes to install, construct, alter, or repair an On-site Wastewater Treatment System in Archuleta County and La Plata County, Colorado, and any County in which the Department has authority pursuant to a contract with such County, shall obtain an OWTS permit from the San Juan Basin Health Department.
- B. An owner/applicant must submit to the Department a complete application that is consistent with Section 5.1.C. The owner/applicant must obtain from the Department all necessary approvals prior to installing, constructing, altering or repairing a system.
- C. Minimum Permit Application Requirements:
  - 1. Owner name and contact information;
  - 2. Property address;
  - 3. Property legal description and County Parcel Number;
  - 4. Type of permit;
  - 5. Proposed use of building and property;
  - 6. Type of water supply;
  - 7. Owner's signature;
  - 8. Report from Site and Soil Evaluation (Section 12);
  - 9. System design with a legible, accurate site plan (also known as a Lot Layout) which shows pertinent physical features on subject property, and on adjacent properties, as noted in **Appendix B**; and
  - 10. Other information, data, plans, specifications and tests as required by the Department.
    - a. When specific evidence suggests that 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 owner/applicant. This requirement shall not prejudice the right of the Department to develop its own information from its own source at its own expense.

## **5.2 Acreage Requirements**

- A. Regardless of the acreage, the Department shall deny issuance of an OWTS permit for an On-site Wastewater Treatment System if the Department concludes there are not appropriate lot conditions on the subject lot to replace 100% of the original system in the event the original system fails.
- B. An On-site Wastewater Treatment System must be on the same lot as the origin of the sewage; there are two (2) exceptions:
  - 1. an irrevocable recorded sufficient easement(s), and/or
  - 2. as described in Section 9.4 – Cluster Developments.
- C. SJBHD considers lot size as part of its determination of whether or not an OWTS meets the requirements to preserve the public health and environment. As set forth in Section 2.5 of these Regulations, an owner/applicant must comply with all other applicable County, State, and federal laws (e.g., minimum lot size, requirements for building, land use and subdivision permits).
- D. Prior to SJBHD issuing an OWTS permit, an owner/applicant shall demonstrate the owner/applicant owns the lot (or lot with easement as described in Section 5.2.B above).
- E. Where the owner/applicant is processing a matter with a County (e.g., lot consolidation, boundary adjustment, subdivision) that impacts the proposed OWTS design, the owner/applicant shall demonstrate that such County has formally taken final approval on the land use application.

## **5.3 Floodplains and Floodways**

New OWTS and replacement OWTS installed in a 100-year floodplain shall meet or exceed the requirements of the Federal Emergency Management Agency and the local emergency agency. Repairs of an existing system shall meet the requirements as feasible. The system as approved by the Department shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters.

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

## 5.4 Types of On-site Wastewater Treatment Systems

- A. The Department shall determine the type or types of On-site Wastewater Treatment Systems which are suitable for the property. The Department may give a conditional approval for a permit for the proposed OWTS, or may deny issuance of an OWTS permit if the proposed system does not comply with these Regulations. Conditional approval shall set forth conditions for the issuance of an OWTS permit including effluent testing, cleaning or maintenance schedules, or other special conditions.
- B. When the Department determines that on-site conditions may negatively affect on-site wastewater treatment or endanger water resources, the Department shall determine if dosing and a higher level treatment system is required. The Department shall consider, without limitation, if any of the following conditions exist: coarse soils with a percolation rate faster than 5 minutes per inch, shallow ground water, close proximity or capacity to influence nearby waterways, fractured bedrock, and the high density of neighboring OWTS.
- C. The Department shall not issue an OWTS permit to the owner/applicant or to a subsequent owner until all conditions have been met.
- D. The Department shall not issue an OWTS permit for the following systems unless they are designed by a Professional Engineer and have been reviewed and approved by the Department:
  - 1. Commercial systems which service business, institutions, industry, or multifamily dwellings (income properties).
  - 2. Cluster developments (see Section 9.4).
  - 3. Systems located in unsuitable soil. Absorption fields for which the location does not meet suitable soil requirements, or exceeds twenty-five percent slope, or contains shallow ground water or shallow bedrock (see Section 15.3.B and **Table 15-2**).
  - 4. Systems located within a floodplain.
  - 5. Systems that require pumping units and/or higher level treatment.
  - 6. Experimental systems.

## **5.5 Permit Fees**

- A. The Board of Health shall set fees for permits. The permit fees may be no greater than required to offset the actual indirect and direct costs of the Department. 25-10-107, C.R.S.
- B. Permit application fees must not exceed the maximum fees established in section 25-10-107, C.R.S. Permit application fees must be submitted by an applicant with the OWTS permit application, and are due and payable upon receipt of the permit application.
- C. The Board of Health may make provision for the waiver of any local permit fee normally required for an OWTS.

## **5.6 Other Fees**

- A. The Board of Health shall set fees for inspections, percolation tests, soil evaluation, and other services performed by the Department. The fees shall be no greater than required to offset the actual indirect and direct costs of the services, and shall not exceed the maximum amounts specified in section 25-10-107, C.R.S.
- B. Surcharge - The Department must collect a fee of twenty-three dollars for each OWTS permit issued for a new, repaired, or upgraded OWTS. Of that fee, the Department shall retain three dollars to cover the Department's administrative costs and twenty dollars shall be transmitted to the state treasurer, who shall deposit that sum in the water quality control fund created in section 25-8-502(1)(c), C.R.S.

## **5.7 Permit Term**

- A. An OWTS permit expires one year after the date of issuance if construction has not commenced or as specified by these Regulations.
- B. The Department may invalidate/revoke/void an OWTS permit issued for a system not yet installed if there are any changes to lot size, OWTS design, lot development plans and/or designs, and/or substantive matter that may alter the impact of the OWTS on the public health and the environment.
- C. Failure to fully complete an engineered design or installation of any approved system within two years shall render the OWTS permit void.

- D. An expired OWTS permit may be extended or renewed under the following conditions:
1. There has been no change in the plans and specifications of the proposed system as set out in the original application; and
  2. The use and applicable land use regulations of the lot and surrounding land, have not changed so as to cause the original application not to be acceptable under these Regulations; and
  3. Additional fees may be charged for changes in design or location requiring additional site inspections and data evaluation.
  4. An expired permit may not be extended to obsolete designs inconsistent with current regulations or suitability of the site.
- E. Any change in plans or specifications of the OWTS after the OWTS permit has been issued invalidates the permit unless the permittee receives written approval from the Department for such changes.

#### **5.8 Permit is required to repair or replace an OWTS**

- A. The owner/applicant of a property on which an OWTS is not in compliance must obtain an OWTS permit from the Department. The owner/applicant must apply for an OWTS permit within two business days after receiving notice from the Department that the system is not functioning in compliance with the OWTS Act or applicable regulations, or otherwise constitutes a nuisance or a hazard to public health or water quality.
- B. The OWTS 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 Department shall inspect the system to ensure it is functioning properly. Concurrently with the issuance of the OWTS permit, the Department may issue an emergency use permit authorizing continued use of a malfunctioning system on an emergency basis for a period not to exceed the period stated in the 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 OWTS permit through no fault of the owner or occupant and only if the owner/applicant will continue to make repairs to the system.

## **5.9 Permit is required to expand or alter flows to an OWTS**

- A. An OWTS 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.
- B. If conditions allow for the connection of a second structure, an OWTS permit shall be required for the addition to the existing OWTS. Second dwellings may not be added to an existing wastewater pond/lagoon.

## **5.10 Properties located within a Municipality or Special District**

- A. 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.
- B. The Department shall not issue an OWTS permit if the keeping and maintaining of an OWTS is prohibited by a municipality pursuant to C.R.S. Section 31-15-709(b).

## **5.11 Determination by the Department**

- A. After receiving an application for an OWTS permit, the Department shall review any information provided by a Professional Engineer and/or visit the owner/applicant's property to make a preliminary investigation and site evaluation report on behalf of the Department consisting of:
  - 1. Inspection of the premises.
  - 2. Verification of soil percolation or hydraulic conductivity tests.
  - 3. General geological conditions.
  - 4. The determination of the suitability of the site and of the proposed OWTS design based upon the land use in the area, the use to which the property is to be put, the size of the lot, easements, utilities, suitable soil, depth to ground water, depth to bedrock, the location of the OWTS with reference to

water supply systems, wells, streams, lakes, ponds, ditches, structures, roads, driveways, and other geographical features, including neighboring wells, neighboring water lines, and existing OWTS within 100 feet of the subject property.

5. When specific evidence indicates that subsurface conditions exist that may endanger state waters, additional hydrological, geological, or engineering information provided by a Professional Engineer or Geologist, may be required.
- B. The Department shall determine whether the information provided in the OWTS 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 will be given.
  - C. All existing On-site Wastewater Treatment Systems on the lot must be in compliance with these Regulations before the requested permit(s) is/are issued for the additional system(s). The owner/applicant shall apply for a new OWTS permit for all non-compliant systems and bring such systems into compliance with these Regulations.

## **5.12 Inspections**

### **A. Preliminary Inspections**

The Systems Contractor or owner/applicant shall initiate the site evaluations and percolation tests by request. The site evaluations/percolation tests will be scheduled by mutual agreement with Department personnel. The Department will keep the results of tests and evaluations so long as it keeps such records.

### **B. Construction Inspections**

1. The System Contractor or owner/applicant shall notify the Department prior to beginning construction of an OWTS.
2. The System Contractor or owner/applicant shall notify the Department when construction of an OWTS system has been completed but not yet back-filled, and a representative of the Department shall make a construction inspection at a time by mutual agreement. The Department shall make every reasonable effort to conduct the inspection within two full working days of receiving the request for inspection. The Department may make an inspection at any time during the construction process.

### 5.13 Final Approval of an OWTS Permit

- A. If the Department's inspection(s) disclose any significant departure from information submitted in the OWTS permit application, or if any aspect of the system fails to comply with permit specifications or these Regulations, approval shall be withheld by the Department. Written or verbal notice of deficiencies causing the disapproval shall be given to the Systems Contractor. Upon notification by the Systems Contractor (or the owner, as in an owner installation), that the deficiencies have been corrected and the system has been brought into compliance with these Regulations, a re-inspection will be made by the Department.
  
- B. If the system has been designed by or constructed under the supervision of a Professional Engineer (P.E.), the P.E. shall at this time provide the Department with:
  - 1. an as-built drawing (within 10-days), and
  - 2. a final certification letter stating that the installation, construction, alteration, and/or repair, and backfill of the system has been completed in accordance with the terms of the permit and these Regulations.
  
- C. Once the as-built drawing(s) and the professional engineer's final certification letter have been received, the Department shall issue final approval.
  
- D. If a Professional Engineer's certification is not required, the Department shall issue final approval once the system:
  - 1. is completed, inspected, and backfilled in accordance with these Regulations, and
  - 2. deficiencies, if any, have been addressed and approved, and
  - 3. as-built drawings have been completed.
  
- E. The Department shall identify the System Contractor that installed, constructed, altered, and/or repaired the system on the OWTS permit.

#### **5.14 Certification of an Existing OWTS**

When requested by an individual or lending agency, the Department will make an inspection of the existing OWTS to determine if the system is functioning properly.

- A. Systems older than 4 years of age shall have the septic tank pumped, and the lid or covers replaced, but left exposed for inspection prior to approval. If the tank has been pumped within the last two years and verified by a pumping receipt, the pumping requirement may be waived.
- B. A letter describing the observable condition and operation of the system will be issued. This letter does not imply any warranty on the part of the Department as to the overall condition or adequacy of the OWTS.
- C. Statement of Existing (SOE – an affidavit): An SOE may be used by the Department to document the existence of a previously unknown, non-permitted OWTS. Such OWTS must comply with applicable statutory and regulatory requirements. The SOE is a statement of the known system specifications provided by the owner to the Department. An SOE is not a permit and a permit may still be in order, following agency receipt of the SOE and site evaluation by the Department.

#### **5.15 Notice of Denial**

- A. The Department will provide a notice of the denial of an OWTS permit or disapproval of proposed plans to the applicant (or Professional Engineer, as necessary) typically within 21 days of the site evaluation or receipt of a proposed design. The owner/applicant (or Professional Engineer) may appeal in writing to the Department's Environmental Health Director in order to resolve, address, or correct noted deficiencies.
- B. Appeal to the Health Officer may be made if the denial stands or is not resolved by the Environmental Health Director. Appeal to the Board of Health may be made if denial stands or is not resolved by the Health Officer.

#### **5.16 Disclaimer**

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

## **Section 6 Board of Health Administrative Procedures**

### **6.1 Variance Procedures**

#### **A. Requirements for Variance Consideration**

1. In accordance with this section, an owner may request the Board of Health to approve a variance from a requirement of these Regulations.
2. The Board of Health shall follow the procedure in these Regulations for issuing variances.
3. The Board of Health shall hear the variance request.
4. Prior to the rendering a decision on a variance request, a public hearing shall be held. The hearing shall be the subject of a public notice or notice shall be sent via certified mail, with a minimum 20-day reply time from the date of mailing, to all adjacent property owners.
5. Variance requests must be accompanied by:
  - a. Site-specific request identifying the specific criteria from which a variance is being requested;
  - b. Technical justification by a professional engineer or professional geologist, which indicates the specific conditions which exist and/or the measures which will be taken that support a finding that the variance will result in no greater risk than that associated with compliance with the requirements of 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 a manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested; soil replacement with sand filter media to reduce the infiltration rate of the effluent such that the travel time of the effluent from the absorption field to the physical feature is no less than the travel time through the native soils at the prescribed setback and Treatment Level 2;
  - c. A discussion of alternatives considered in lieu of the requested variance;
  - d. Technical documentation for selected alternative, which may include a testing program, which confirms that the variance does not increase the risk to public health and to the environment; and

- e. A statement of the hardship that creates the necessity for the variance. Hardships must be an attribute of the property, not to a person or owner.
6. The applicant has the burden of proof to demonstrate that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting these Regulations.
- B. The Board of Health has the authority to impose site-specific requirements and conditions on any variance granted.
- C. Outcome of the Variance Proceeding
1. The applicant shall be notified, in writing, of the Board of Health's decision regarding the request for a variance. The notice of a denial of a variance shall include those reasons which form the basis for the denial. The notice of an approval of a variance shall include any conditions of the approval. 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.
- D. Prohibitions on the Granting of Variance Requests
1. No variance shall be issued where the property can accommodate a conforming OWTS.
  2. No variance shall be issued to mitigate an error in construction involving any element of property improvements.
  3. No variance shall be allowed solely for economic gain.
  4. No variance shall be issued, if it will result in a setback reduction to an offsite physical feature that does not conform to the minimum setbacks defined in **Appendix B** of these Regulations without the written consent of the owner of property containing said feature. Property lines are considered offsite features.
  5. No variance shall be issued, if it reduces the separation to ground water or bedrock.
  6. No variance from the horizontal setback from a well shall be issued unless it also meets the variance requirements of the Colorado Board of Examiners of Water Well Construction and Pump Installation Contractors.

## E. Variances for Repair of Failing Systems

1. When a proposed variance for a system repair or upgrade would result in encroachment on minimum distances to physical features on neighboring properties required by these Regulations, the hearing procedures shall be followed.
2. For the repair of or upgrade to an approved existing system where the existing system does not meet the required separation distances and where the size of the lot precludes adherence to the required distances, a variance to the separation distances may be requested. The repairs or upgrade shall be no closer to features requiring setbacks than the existing facilities.

## 6.2. Appeals of Department Actions

- A. In accordance with these Regulations, Section 5.15, and this section, an owner/applicant (or Professional Engineer) may make a written appeal request to the Board of Health to review a denial of an OWTS permit application by the Department.
- B. A written appeal request for review must be made to the Board of Health within 60 days after denial of an OWTS permit application by the Department.
- C. The owner/applicant (or Professional Engineer) must bear the burden of supplying the Board of Health with sufficient evidence to document that the denied system shall be constructed and used in such a manner that will result in no greater risk than that associated with compliance with the requirements of these Regulations, comply with the declaration and intent of these Regulations, and comply with all applicable state and local regulations and required terms and conditions in any OWTS permit.
- D. The owner/applicant's (or Professional Engineer's) appeal request for review must include:
  1. A written statement explaining the request for review. This statement shall include the following:
    - a. Property owner's name and address of the site.
    - b. The proposed use of the property.
    - c. The reason the review is requested, specifying hardships imposed by strict interpretation of these Regulations. Hardships must be an attribute of the property, not to a person or owner.

- d. Proof that existing systems are functioning properly and in compliance with applicable local regulations.
  2. A site map(s), including the following:
    - a. General location of the property.
    - b. An accurate drawing of the lot, adjoining lots and any property within a 100 feet radius of the proposed OWTS site. This drawing must include the names of the adjoining property owners and the location of all wells, springs, waterways, surface waters, utility lines, water lines, easements, buildings, roads and driveways.
    - c. Designation of all slopes greater than 25% on the lot.
  3. Proof of neighboring property owner notification:
    - a. All owners of adjoining property and of any property within 100 feet of the subject property must be notified that a review is being requested.
    - b. This notification can be by registered mail or by having the owners of the neighboring property sign a copy of the written statement explaining the request.
    - c. The neighboring property owners will be given 10 days to respond.
  4. Special circumstances may require additional information (examples: geologic, access, photographs, etc.).
- E. The appeal application and applicable fees must be submitted at least two weeks prior to the Board of Health meeting date. Appeals will be scheduled as the Board of Health agenda allows.
- F. The Board of Health shall conduct such review pursuant to the requirements of section 24-4-105, C.R.S.
- G. Following review by the Board of Health, the applicant shall receive written notification (within 30 days), to include the following:
  1. Findings of the Board of Health.
  2. Facts upon which findings were based.
  3. Reference to laws or regulations upon which Board of Health decision was based.

4. Conditions, which must be met as a condition of approval granted. The property owner may be required to file a legal record of approval conditions, which must be drafted by an attorney and recorded with the County Clerk and Recorder.
- H. A denial shall become final upon the determination by the Board of Health.

### **6.3 Prohibition of On-site Wastewater Treatment Systems 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 local board of health determines that construction and use of additional OWTS may constitute a hazard to public health or water quality.
- B. The Board of Health may conduct a public hearing, after written notice to all the affected County Commissioners, the affected County Planning Department and affected property owners as shown in the records of the county assessor and publication of notice in a newspaper of general circulation, at least twenty days prior to the hearing, to consider the prohibition of permits for OWTS in defined areas.

The Board of Health may order such prohibition upon a finding that the construction and use of additional On-site Wastewater Treatment Systems in the defined area will constitute a hazard to the public health or the environment. In such a hearing, the Board of Health may request affected property owners and the affected County to submit engineering and geological reports concerning the defined area and to provide a study of the economic feasibility of constructing a domestic wastewater treatment works.

## **Section 7 Enforcement**

### **7.1 Malfunctioning Systems**

An On-site Wastewater Treatment System is considered malfunctioning when it has failed, is not operating properly or is not in compliance with the OWTS Act (25-10-101, et seq. C.R.S.).

A. Malfunctioning systems include, but are not limited to, the following:

1. Absorption systems and/or dispersal systems which have sewage or effluent seeping or flowing to the surface of the ground or into waters of the state.
2. Systems which have sewage or effluent overflowing from any of its components.
3. Systems which fail to operate in accordance with design conditions and specifications.
4. Systems discharging effluent which does not comply with the applicable effluent discharge standards established by the CDPHE – WQCD, and/or the Colorado Water Quality Control Commission.
5. Cesspools and un-permitted pit privies.
6. Treatment tanks which are in unsound condition.
7. Systems which do not comply with the provision of these Regulations regarding minimum separation between the maximum seasonal level of ground water table and the bottom of an absorption system.
8. Systems causing a public health hazard or nuisance.

### **7.2 Maintenance and Cleaning**

For the purpose of obtaining compliance with these Regulations, the Department may require the owner of a system to provide for the maintenance and cleaning of the system. The owner of such system shall notify the Department in writing upon completion of any required maintenance work. The owner of such system shall submit written evidence of compliance with any maintenance and cleaning schedule as required by the Department.

In order to insure working order, the minimum recommended pumping/cleaning schedule for all tanks (septic, aeration, treatment, or vault) is every four (4) years.

### **7.3 Notice of Violations**

Whenever the Health Officer determines that there has been a violation of any provision of these Regulations, he/she shall give notice of such violation to the owner of the property. Such notice shall be in writing, shall list the violations, shall provide a specific time for correction, and be addressed to the owner 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 addressee only.

If one or more persons cannot be found or served after a diligent effort to do so, or attempts by registered or certified mail have failed, service may be made by posting a notice in a conspicuous place on the property affected by the notice. In that case, the Health Officer shall include in the record a statement as to why the posting was necessary.

### **7.4 Repair and Emergency Use Permits**

The Health Officer may issue an OWTS permit and/or an OWTS emergency use permit to the owner of the property on which a system is not functioning properly.

When the Department has notified the owner and occupant of a non-compliant system or public health nuisance or hazard, said owner must make application for an OWTS permit within two business days. The OWTS permit shall provide for a specified period of time within which repairs will be made, at the end of which period the system shall be inspected by the Health Officer or designee to insure that it is functioning properly.

Concurrently with the issuance of an OWTS 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. 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.

### **7.5 Cease and Desist Orders**

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

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

A cease and desist order issued by the Health Officer shall be reviewable in the district court for the county wherein the system is located and upon a petition filed not later than ten days after the order is issued.

## **7.6 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 18-1-107, 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 local 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 local board of health has adopted licensing regulations pursuant to that section;
  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 local board of health.

## **Section 8    Systems Contractors, Owner Installers, and Systems Cleaners**

### **8.1    Regulation of Systems Contractors and Owner Installers**

#### **A.    Licensure**

No person shall excavate, install, construct, alter, or repair an OWTS unless he/she holds a valid Systems Contractor License issued by the Department. A property owner or homeowner intending to install one's own system, must complete the Department's installer training course. Licenses shall expire on December 31<sup>st</sup> of each year, and an annual renewal fee shall be charged. Fees shall be set by the Board of Health.

Systems Contractors seeking licenses for the first time shall be required to complete the prescribed training courses before licenses are issued. Supervisors of installation work are each required to successfully complete the Department's prescribed training courses. The licensee in-charge shall be present at the time of Department inspections.

Any Systems Contractor who had a license which lapsed because of failure to renew, or has a license that has been suspended or revoked shall be subject to the fee established for new licenses upon reapplication. Systems Contractors who had a license which lapsed because of failure to renew, or has a license that has been revoked, or has been put on probation shall be required to repeat the Department's prescribed training courses before their licenses will be reinstated.

#### **B.    Standard of Performance and Requirements of holders of a Systems Contractor's License:**

1. Applications for Systems Contractors Licenses or renewals shall be made upon forms supplied by the Department.
2. Prior to the issuance or renewal of a license the Health Officer may require the applicant to demonstrate adequate knowledge of these Regulations.
3. Installation, construction, alteration, or repair of any OWTS shall be in compliance with these Regulations and with the conditions set out in the OWTS permit issued by this Department.
4. The Systems Contractor or property owner shall have the OWTS permit in his/her possession at the time construction begins, and shall insure the OWTS permit is available at the time of Department inspections.

5. Possession of an OWTS permit by a Systems Contractor does not constitute sole right to install, construct, alter, or repair that system. The property owner may secure the services of any licensed Systems Contractor of his/her choosing.
6. The Department may periodically prepare and present modernization techniques and standards in the form of refresher training.

C. Revocation of a Systems Contractor's License

1. A Systems Contractor's license may be suspended or revoked by the Health Officer for failure to comply with the OWTS Act and these Regulations. The Department's revocation may be appealed by formally requesting in writing a hearing before the Board of Health. The Systems Contractor shall be given not less than 10 days' notice of such hearing. The Systems Contractor may be present with counsel and be heard at the hearing.
2. Revocation proceedings may occur upon, but not be limited to, the following:
  - a. Installation, construction, alteration, or repair of an OWTS without an OWTS permit.
  - b. Failure to obtain approval for an OWTS before covering.
  - c. Misrepresentation of facts or data in order to secure an OWTS permit or be granted design approval.
  - d. Failure to notify the Department of failed or malfunctioning systems within their care or work.
3. Should the Board of Health's hearing result in a decision to suspend or revoke a Systems Contractor's license, such decision, including a listing of violations and any conditions set forth by the Board of Health shall be forwarded in writing by registered or certified mail, return receipt requested, and deliverable only to the Systems Contractor.

## 8.2 Regulation of Systems Cleaners

A. Licensure

No person shall engage in the cleaning of On-site Wastewater Treatment Systems or the transportation of septage to a disposal site unless he/she holds a valid Systems Cleaner License. Employees of a valid licensed Systems Cleaner shall not be required

to be licensed. Licenses shall expire on December 31<sup>st</sup> of each year, and an annual renewal fee shall be charged. Fees shall be set by the Board of Health.

Any Systems Cleaner who had a license lapse because of failure to renew, or has a license that has been suspended or revoked shall be subject to the fee established for new licenses upon reapplication.

B. Standard of Performance and Requirements of holders of a Systems Cleaner's License:

1. The Health Officer may require the Systems Cleaner to demonstrate adequate knowledge of this section of these Regulations prior to the issuance of or renewal of a license.
2. The Systems Cleaner, when cleaning a septic tank or other tank, shall remove the liquid, sludge and scum, leaving no more than three inches depth of sewage or effluent a non-back-flowing septic tank or other tank. In back-flowing types of systems, cleaning shall be effective in reducing solids and scum to the point of a near-new septic tank or near-new other tank.
3. The Systems Cleaner shall maintain his/her equipment to insure that no spillage of septage will occur during transportation of the septage, and that his/her employees are not subjected to undue health hazards.
4. The Systems Cleaner shall dispose of the collected septage only at a site designated by the Board of County Commissioners or the Board of Health.
5. All System Cleaners must mark the vehicles which transport septage with their business name in 6 inch letters or larger.
6. When in the normal course of work, a Systems Cleaner observes damaged or metal septic tanks, cesspools, failed or malfunctioning systems, or sewage being discharged onto the ground or beyond the normal area of confinement, thereby endangering public health, the Systems Cleaner shall notify the property owner/homeowner and the Department of any such hazard in writing within 72 hours.
7. A Systems Cleaner who performs work on malfunctioning or failed systems must notify the Department once prior to initiating the work.
8. The Systems Cleaner must provide to the property owner/homeowner a receipt listing the name, address, date, activity(s) performed, septic tank volume, number of chambers in the septic tank, and any system deficiency(s), malfunction, or broken equipment observed, such as cracks, infiltration, overflows, or non-standard equipment. A copy of this receipt shall be provided to the Department, upon the Department's request.

C. Revocation of a Systems Cleaner's License

1. A Systems Cleaner's license may be suspended or revoked by the Health Officer for failure to comply with the OWTS Act and these Regulations. The Department's revocation may be appealed by formally requesting in writing a hearing before the Board of Health. The Systems Cleaner shall be given not less than 10 days' notice of such hearing. The Systems Cleaner may be present with counsel and be heard at the hearing.
2. Revocation proceedings may occur upon, but not be limited to, the following:
  - a. Failure to maintain his/her equipment thereby allowing spillage of septage to occur during transportation of the septage.
  - b. Subjecting his/her employees to undue health hazards.
  - c. Disposing of the collected septage at a site or location that is not designated by the Board of County Commissioners or the Board of Health.
  - d. Failure to notify the Department of failed or malfunctioning systems within their care or work.
3. Should the Board of Health's hearing result in a decision to suspend or revoke a Systems Cleaner's license, such decision, including a listing of violations and any conditions set forth by the Board of Health shall be forwarded in writing by registered or certified mail, return receipt requested, and deliverable only to the Systems Cleaner.

## **Section 9 Proposed Subdivisions**

### **9.1 Plans**

Plans for proposed subdivisions shall be submitted to the Department for the review of proposed On-site Wastewater Treatment Systems in accordance with requirements of these Regulations and the requirements of the subdivision regulations of Archuleta County and La Plata County, Colorado, and any County in which the Department has authority pursuant to a contract with such County.

The Health Officer shall require the sub-divider to prove each lot has a suitable location for an OWTS prior to making recommendations.

### **9.2 Criteria**

- A. The Department will review proposed subdivisions and provide comments to the applicant and applicable County on whether the proposed lots in the subdivision are sufficient and suitable for OWTS consistent with these Regulations.
- B. The Department will generally consider, without limitation, the following:
  - 1. soil treatment area(s),
  - 2. setback distances,
  - 3. depth to bedrock,
  - 4. depth to groundwater,
  - 5. floodways and floodplains,
  - 6. streams, lakes, ponds and ditches,
  - 6. slopes,
  - 7. subdivision designs,
  - 8. other existing or planned improvements (including, but not limited to; easements, roads, driveways, utilities, buildings, wells, etc.), and
  - 9. any other matter regarding the Department's determination of OWTS permits as specified in Section 5.11.
- C. All existing On-site Wastewater Treatment Systems must be functioning as originally permitted by the Department. All non-compliant systems shall be required to be brought into compliance with these Regulations before the Department will recommend approval of the subdivision.

### **9.3 Required Submissions**

A. Required submissions for review and approval include:

1. An accurate plat of the subdivision showing:
  - a. Subdivision location.
  - b. Lot sizes and dimensions.
  - c. All existing buildings, wells, springs, surface water features, waterways, water lines, on-site wastewater treatment systems, slopes greater than 25%, roads, and driveways.
  - d. All proposed or actual locations of water supplies, roads, road easements and other easements.
  - e. Proposed general locations of primary and replacement sites for OWTS soil treatment area(s).
  - f. All platted subdivisions containing land located in the floodway or floodplain shall have:
    1. Floodway and floodplain boundaries identified.
    2. Proven and suitable locations identified on each lot for primary and replacement soil treatment areas.
2. A statement regarding the proposed use of the property.
3. The distance to the nearest sewer main of a municipal or central sewer system if within one-quarter (1/4) mile.
4. Verification that the proposed subdivision plans has been submitted to the Planning Department for review.
5. Additional hydrological, geological or engineering information as required when evidence indicates that an OWTS may not be suitable or may endanger ground water or surface water quality.

### **9.4 Cluster Developments**

In addition to the considerations described in Section 9.2, the Department will consider the following with respect to Cluster Developments.

- A. Each cluster of dwellings shall have a designated OWTS site with proposed general locations of primary and replacement sites for OWTS Soil Treatment Area(s).
- B. On-site Wastewater Treatment Systems for clustered dwellings must be sub-surface.

- C. The designated OWTS site must have sufficient area that meets the criteria as identified in Section 9 of these Regulations.
- D. Flows from the cluster of dwellings cannot be combined unless:
  - 1. The combined sewage flows are less than 2000 gallons per day (gpd);
  - 2. A quasi-public agency is responsible for system monitoring and repair;
  - 3. Systems are designed by a Professional Engineer and approved by the Department.
- E. Spacing of the On-site Wastewater Treatment Systems must comply with CDPHE – WQCD and Commission requirements for spacing whenever design flows for the entire cluster development project are greater than 2,000 gallons per day.
- F. The separation between wastewater areas and down-gradient wells must be a minimum of two hundred (200) feet, plus an additional eight (8) feet added for each one hundred (100) gallons per day of total design flow over one thousand (1,000) gallons per day. (also see **Appendix B** requirements).
- G. Any other condition that would constitute a public health concern must be resolved.

## **Section 10 Experimental Systems**

Except for designs or types of systems which have been approved by the CDPHE - WQCD 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 these Regulations 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.

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.

## **Section 11 Transfer of Title Inspection Program**

**RESERVED**

## **Section 12 Site and Soil Evaluation**

### **12.1 General Requirements**

- A. A site and soil evaluation must be conducted for each property on which an OWTS is proposed, to determine the suitability of a location to support an OWTS, and to provide the designer a sound basis to select the most appropriate OWTS design for the location and application.
1. Each site evaluation shall consist of:
    - a. Preliminary investigation;
    - b. Reconnaissance;
    - c. Detailed soil investigation; and
    - d. Report and site plan.

### **12.2 Preliminary Investigation**

- A. A preliminary investigation shall review documented information relative to the site and anticipated conditions. Information gathered as part of the preliminary investigation shall include, but is not limited to:
1. Property Information:
    - a. Address;
    - b. Legal description;
    - c. Existing structures; and
    - d. Location of existing or proposed wells on the property.
  2. Local public health agency records.
  3. Published site information:
    - a. Topography; and
    - b. Soil data.
  4. Location of physical features, on and off the property that will require setbacks as identified in **Appendix B**.

5. Preliminary soil treatment area size estimate based on information on existing or planned facility and local regulations.
6. Other information required in writing by the Department.
7. Additional information that may be useful to the specific evaluation as available:
  - a. Survey;
  - b. Easements;
  - c. Floodplain maps;
  - d. Geology and basin maps and descriptions;
  - e. Aerial photographs;
  - f. Climate information; and
  - g. Delineated wetlands maps.

### **12.3 Reconnaissance**

- A. A reconnaissance visit to the property shall evaluate the topography and other surface conditions that will impact the selection and location and design of the OWTS, including:
  1. Landscape position;
  2. Topography;
  3. Vegetation;
  4. Natural and cultural features; and
  5. Current and historic land use.

### **12.4 Detailed Soil Investigation (General Requirements)**

- A. Soil investigations to determine the long-term acceptance rate of a soil treatment area shall be either:
  1. Visual and tactile evaluation of two or more soil profile test pit excavations; or

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

- B. If percolation tests are performed, at least one soil profile test pit 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 shall follow the methods as described in Section 12.6. A visual and tactile evaluation of a soil profile test pit excavation shall be used when percolation tests are performed to determine long-term acceptance rates.
- C. If visual and tactile evaluations of soil are performed without percolation tests to determine a long-term acceptance rate:
  - 1. Evaluation of two or more soil profile test pit excavations must be performed to determine soil types and structure, restrictive layers, evidence of seasonal high ground water, and best depth for the infiltrative surface.
  - 2. 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.
  - 3. The total number of soil profile test pit excavations required is based on the judgment of the competent technician.

### **12.5 Procedure for performing percolation tests**

- A. The percolation testing shall be performed by a trained person under the supervision of a professional engineer or by a competent technician.
- B. Location
  - 1. Soil percolation tests shall be performed in at least three test holes in the area in which the soil treatment area is to be located, spaced reasonably evenly over the proposed area. There shall be no less than one test hole provided in every 1,200 square foot area of soil treatment area.
  - 2. If the likely depth of a proposed infiltrative surface is uncertain, percolation tests shall be performed at more than one depth to determine the depth of the infiltrative surface.
- C. Dimensions
  - 1. The percolation test hole shall have a diameter of eight to 12 inches and be terminated a minimum of six inches and a maximum of 18 inches below the proposed infiltrative surface.

#### D. Change in Soil

1. If a change of soil type, color or structure is present within those soils four feet below the proposed infiltrative surface, a minimum of two soil percolation holes shall be terminated in the changed soil, and percolation tests shall be conducted in both holes.

#### E. Percolation Tests

1. The percolation tests shall be conducted using the hole preparation, soil saturation and rate measurement procedures described below.
2. Preparation of Percolation Test Holes
  - a. Excavate the hole to the depth and diameter required.
  - b. Carefully scrape the bottom and sides of the hole with a knife blade or sharp instrument to remove any smeared soil surfaces and provide a natural soil interface into which water may percolate.
  - c. Remove all loose soil from the hole.
  - d. Add two inches of very coarse sand or fine gravel to protect the bottom of the hole from scouring and sediment.
3. Presoak
  - a. The hole shall be presoaked adequately to accomplish both saturation, which is filling the void spaces between the soil particles, and swelling, which is the intrusion of water into the individual soil particles.
  - b. To presoak the hole, carefully fill the hole with clean water to a minimum depth of 12 inches over the gravel placed in the bottom of the hole. In most soils, it is necessary to refill the hole by supplying a surplus reservoir of clean water, possibly by means of an automatic siphon, to maintain water in the hole for at least four hours and preferably overnight. Determine the percolation rate 24 hours after water is first added to the hole. This procedure is to ensure that the soil is given ample time to swell and to approach the condition it will be in during the wettest season of the year. In sandy soils containing five percent or less particles passing the #200 sieve, by weight, the swelling procedure is not essential and the test may be conducted after the water from one filling of the hole has completely seeped out of the hole.

#### 4. Percolation Rate Measurement

- a. With the exception of sandy soils containing five percent or less particles passing the #200 sieve, by weight, percolation rate measurements shall be made on the day following the presoak procedure.
- b. If water remains in the percolation test hole after the swelling period, adjust the depth to approximately six inches above the gravel in the bottom of the hole. From a fixed reference point, measure the drop in water level over a series of 30 minute intervals. The drops are used to calculate the percolation rate.
- c. If no water remains in the hole after the swelling period, carefully add clean water to bring the depth of water in the hole to approximately six inches above the top of the gravel in the bottom of the hole. From a fixed reference point, measure the drop in water level at 30 minute intervals for four hours, refilling to six inches over the top of the gravel as necessary. The drop in water level that occurs during the final 30-minute period is used to calculate the percolation rate. If the water level drops during prior periods provide sufficient information, the procedure may be modified to suit local circumstances. The requirement to conduct a four hour test under this section is waived if three successive water-level drops do not vary by more than 1/16 inch; however, in no case shall a test under this section be less than two hours in duration.

#### 5. Sandy Soils

- a. In sandy soils or other soils in which the first six inches of water seeps out of the hole in less than 30 minutes, after the 24 hours swelling period, the time interval between measurements shall be taken as 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.
- b. If the soil is so sandy or coarse-textured that it will not retain any water, then the infiltration rate shall be recorded as less than one minute per inch.

#### 6. Special Soil Types

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

#### 7. Percolation Rate Determination and Reporting

- a. The field percolation rate shall be the average rate of the percolation rates determined for all percolation test holes observed in the proposed soil

treatment area in minutes per inch. The average percolation rate determined by the tests shall be used in determining the long-term acceptance rate for the proposed system from **Table 15-2**.

- b. 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 12.7.A.7. The information in the subsections following Sections 12.7.A.7.a. through 12.7.A.7.e. 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
    - a. If the applicant demonstrates to the satisfaction of the Department that the system is not dependent upon soil absorption, the requirement of percolation tests may be waived.
  9. Alternate Percolation Testing
    - a. Alternate percolation test procedures may be approved, provided the test results of alternate procedures are substantially equivalent to those determined using the test procedures described in this section.
    - b. Prior approval from the local public health agency of alternate percolation test procedures is required.

## **12.6 Visual and tactile evaluation of soil requirements**

- A. Each soil profile test pit excavation observed at the proposed soil treatment area must be evaluated under adequate light conditions with the soil in an unfrozen state.
- B. The soil observations must be conducted at or immediately adjacent to the location of the proposed soil treatment area, but if possible, not under the final location of a trench or bed.
- C. The soil observation method must allow observation of the different soil horizons that constitute the soil profile.
- D. Soil profile test pit observations must be conducted prior to percolation tests to determine whether the soils are suitable to warrant percolation tests and, if suitable, at what depth percolation tests shall be conducted.

- E. The minimum depth of the soil profile test pit excavation must be to the periodically saturated layer, to the bedrock, or four feet below the proposed depth of the infiltrative surface, whichever is encountered first.
- F. The soil type at the proposed infiltrative surface of the soil treatment area or a more restrictive soil type within the treatment depth shall be used to determine the long-term acceptance rate from **Table 15-2**.
- G. Soils data, previously collected by others at the site can be used for the purposes of an OWTS design at the discretion of the Department. It is recommended that the data be verified, at a minimum, by performing an evaluation of a soil profile test pit excavation.
- H. Soil descriptions for determination of a limiting layer shall include:
  - 1. The depth of each soil horizon measured from the ground surface and a description of the soil texture, structure, and consistency of each soil horizon;
  - 2. Depth to the bedrock;
  - 3. Depth to the periodically saturated soil as determined by:
    - a. Redoximorphic features and other indicators of water levels, or
    - b. Depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level; and
  - 4. Any other soil characteristic that needs to be described to design a system, such as layers that will restrict permeability.
- I. Percolation Holes, Profile Holes, and Profile Test Pits Excavations – Marking  

The engineer or technician conducting the percolation tests must, upon completion of the tests, flag or otherwise mark each hole to allow easy location by others. Percolation holes and profile test pits must remain open until after evaluation by the Department only if specifically requested in writing by the Department prior to the percolation tests being conducted.

## **12.7 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 name, address, telephone number, e-mail address, and credentials and qualifications of the individual conducting the site evaluation;
2. Preliminary and detailed evaluations, providing information from the surface site characteristics assessment and soils investigation;
3. Dates of preliminary and detailed evaluations;
4. A graphic soil log, to scale, indicating depth of drill hole or excavation, soil description and classification, depth to ground water encountered during drilling or excavation, type of equipment used to drill the profile hole or excavate the soil profile test pit, date of soils investigation, name of investigator and company name.
5. Setback distances to features listed in **Appendix B**;
6. 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:
  - a. Horizontal and vertical reference points of the proposed soil treatment area; soil observations; percolation testing results and pertinent distances from the proposed OWTS to all required setbacks, lot improvements, easements; ordinary high water mark of a pond, creek, stream, lake, wetland or other surface waters, and detention or retention ponds; and property lines;
  - b. Contours or slope direction and percent slope;
  - c. The location of any visible or known unsuitable, disturbed or compacted soils;
  - d. The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and
  - e. The proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark);

7. Anticipated construction-related issues;
8. An assessment of how known or reasonably foreseeable land use changes are expected to affect the system performance, including, but not limited to, changes in drainage patterns, increased impervious surfaces and proximity of new water supply wells; and
9. A narrative explaining difficulties encountered during the site evaluation, including but not limited to identifying and interpreting soil and landform features and how the difficulties were resolved.

## **12.8 Design Document**

- A. The report and site plan may be attached to the design document or the report and site plan may be combined with the design information as a single document.
- B. The design document shall include a brief description of the facility and its proposed use, basis and calculations of design flow, and influent strength.
- C. The design document must contain all plan detail necessary for permitting, installation and maintenance, including:
  1. Assumptions and calculations for each component;
  2. A scale drawing showing location of each OWTS component and distances to water, physical and health impact features requiring setbacks;
  3. Layout of soil treatment area, dimensions of trenches or beds, distribution method and equipment, distribution boxes, drop boxes, valves, or other components used;
  4. Depth of infiltrative surface of soil treatment area, depth of the septic tank, depth of other components;
  5. Specifications of each component. 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;
  6. References to design manuals or other technical materials used;
  7. Installation procedures;

8. Operation and maintenance manuals or instructions; and
9. Other information that may be useful such as photos and cross-section drawings.

## **12.9 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.

## **12.10 Site protection**

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

## **12.11 Qualifications for a Competent Technician**

### **A. Percolation Tests**

1. Competencies needed:
  - a. Set up equipment;
  - b. Perform and run percolation tests according to the procedure in these Regulations; and
  - c. Record results and calculate percolation rates.
2. The Department may approve training for percolation testing.

### **B. Visual and Tactile Evaluation of Soil**

1. Competencies needed:
  - a. Identify soil types by hand texturing and observation;

- b. Identify presence or absence of soil structure;
  - c. Identify grade of soil structure;
  - d. Recognize evidence of highest seasonal water surface;
  - e. Identify layers and interfaces that will interfere with effluent movement;
  - f. Determine the most promising depth for infiltrative surface of OWTS and for percolation tests, if used; and
  - g. Understand basic principles of OWTS siting and design.
2. Possible demonstrations of competence in visual and tactile evaluation of soil:
- a. Degree in soil science, agronomy, geology, other majors if a course(s) in soil morphology was included; or
  - b. Attendance at training or workshop for soil evaluation for OWTS including both class and field work.
3. The CDPHE - WQCD shall approve training for visual and tactile evaluation of soil.

## Section 13    **Wastewater Flow and Strength**

### **13.1 Wastewater Flow and Strength**

#### **A. Wastewater Flows**

1. The Department may require the installation of a meter to measure flow into the facility or the OWTS.
2. Single-Family Residential Homes:
  - a. Design flow per person shall be 75 gallons per day (gpd).
  - b. The Department may increase the wastewater design flow per person to 100 gpd where justified.
  - c. The minimum design flow for a new home shall be for a two-bedroom house. The minimum design flow for the repair or replacement of an OWTS of an existing one-bedroom home shall be one-bedroom unless bedrooms are added.
  - d. For homes up to and including three bedrooms, the assumed number of persons per bedroom shall be two for design purposes.
  - e. For homes with more than three bedrooms, the assumed number of persons shall be six persons (first three bedrooms x two persons per bedroom) plus one additional person for each bedroom more than three bedrooms.
  - f. **Table 13-1** summarizes the design flows for single-family residential homes up to six bedrooms.

**Table 13-1            Single-Family Residential Design Flows**

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

### 3. Auxiliary Buildings

This section of the OWTS Regulations is specifically subject to any additional County Code requirements applicable to auxiliary buildings (i.e., accessory or additional dwelling units). See the requirements of Section 2.5.

- 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 **Appendix A** and a septic tank detention time of 48 hours.
- ### 4. Multi-Family and Commercial On-site Wastewater Treatment Systems

- a. Design flow values and strengths for multi-family and commercial systems shall be determined from:
  1. **Appendix A**; or
  2. An analysis of flows and strengths from at least three comparable facilities or from the facility, if it is an existing facility, must be submitted to the Department for approval. The analysis shall include:
    - i. Metered water flows for inside use only for at least a year, or if use is seasonal, for a full season. If metered flows are less than full capacity, they shall be paired with actual use in units of persons present or meals served or other units as appropriate so that an actual daily rate per unit can be determined. The daily rate per unit times the number of units at full occupancy shall be the design flow.
    - ii. Total Suspended Solids and BOD<sub>5</sub> or CBOD<sub>5</sub> tests at times of full use. At least three samples taken at least one week apart are required.
    - iii. Explanation and justification for the comparability of the tested facilities with the proposed facility.

## 5. Flow Equalization

- a. Flow equalization may be used if a facility has flows that vary from day to day by more than four times the average flow.
- b. The highest peak assumed shall be at least equal to the full capacity of the facility.
- c. The stored flow shall be distributed to the soil treatment area before the next greater-than-average peak.
- d. Flow equalization may be used only if:
  1. The facility is non-residential;
  2. The facility is only used for one purpose;
  3. Flows will follow a predictable pattern; and
  4. There is a long-term expectation that size and pattern of the flows will remain the same.
- e. Timed pressure distribution shall be used. The soil treatment area reduction for timed pressure distribution shall not be used in addition to the flow equalization reduction.
- f. Contingency plans must be made for expanding the capacity of the OWTS in the event of changed use at the facility.

## B. Wastewater Strength

1. **Table 13-2** includes levels of treatment that can be achieved by various OWTS components, excluding the soil treatment area. Systems qualifying for these treatment levels except TL1 produced by a septic tank alone must be approved by CDPHE – WQCD.
2. CBOD<sub>5</sub> strength must be reduced to Treatment Level TL1 or lower before applying to a soil treatment area.

**Table 13-2 Treatment Levels**

<b>Treatment Level</b>	<b>CBOD<sub>5</sub>* (mg/L)</b>	<b>TSS (mg/L)</b>	<b>Total Nitrogen (mg/L)</b>
TL 1**	145	80	60-80
TL 2	25	30	60-80
TL 2N	25	30	>50% reduction***
TL 3	10	10	40-60
TL 3N	10	10	20 mg/L

Shading indicates higher treatment levels

\*If concentrations of organic material are submitted in BOD<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.

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

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

## Section 14

### **Minimum Distances between Components of an On-site Wastewater Treatment System and Physical Features (“Setbacks”) See Appendix B**

- 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 **Appendix B**.
- B. Dry Gulches, Cut Banks and Fill Areas
1. Separation distances to dry gulches, cut banks and fill areas in **Appendix B** shall apply unless the designer or design engineer determines by observation of the exposed slope of the dry gulch or cut bank or by profile holes or soil profile test pit excavations that a restrictive layer is present that will direct or allow the effluent from the soil treatment area to move laterally and surface.
  2. A lesser distance may be used if it can be demonstrated by a professional engineer or professional geologist that the use of a barrier, such as a minimum 30 mil PVC liner placed between the soil treatment area and the slope of the dry gulch, cut bank or fill area will prevent effluent surfacing laterally.
  3. The separation distance between a component and the crest of a dry gulch or cut bank will be evaluated for potential erosion or slope instability if the component and the slope are too close together. If there is potential for erosion or instability, the separation distance shall be increased until the risk is minimized.
- C. Components of an OWTS listed in **Appendix B** shall be installed or located in accordance with the minimum distance requirements provided in the table or such increased distances provided by these Regulations.

## **Section 15 Design Criteria**

### **15.1 Design Criteria – General**

- A. Performance: OWTS shall be designed and constructed to achieve the treatment level specified by the design.
- B. Reliability: OWTS shall be designed and constructed such that each component shall function, when installed and operated, in a manner not adversely affected by normal operating conditions including erosion, corrosion, vibration, shock, climatic conditions, and usual household chemicals. Each component shall be free of non-functional protrusions or sharp edges, or other hazards, which could cause injury to persons, animals, or properties. Design shall be such as to exclude flies and rodents and other vectors and to prevent the creation of nuisances and public health hazards and shall provide for efficient operation and maintenance.
- C. Accessibility for Inspection, Maintenance, and Servicing
  - 1. Septic tanks shall have risers over each access manhole and all risers shall extend to or above final grade.
  - 2. Each treatment component of an OWTS other than the septic tank and soil treatment area shall be equipped with access manholes with risers that extend to or above final grade, located to permit periodic physical inspection, collection and testing of samples and maintenance of all components and compartments.
  - 3. Riser Lids
    - a. Each riser lid brought to the surface shall have a secure closing mechanism, such as a lock, special headed bolts or screws, or sufficient weight to prevent unauthorized access.
  - 4. Components that require access for maintenance shall include but not be limited to submerged bearings, moving parts, pumps, siphons, valves, tubes, intakes, slots, distribution boxes, drop boxes, cleanouts, effluent screens, filters, inlet and outlet baffles, aerators, treatment equipment and other devices.
  - 5. Components shall be designed and constructed so that, when installed, they shall be easily maintained, sampled, and serviced according to the manufacturer's recommendations. Easy physical access to treatment components by maintenance personnel and equipment shall be provided.

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

E. Electrical Equipment, if used

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

F. Indicators of Failure or Malfunctioning for Systems utilizing Mechanical Apparatus:

A signal device shall be installed which will provide a recognizable indication or warning to the user that the system or component is not operating or is operating but malfunctioning. This indication or warning shall be a visual signal or an audible signal or both and shall be located in a centralized area within visual and audible range of the system user. A signal or message may also be sent remotely to a maintenance provider.

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

G. Sampling Access

1. If sampling for testing or as a requirement for a permit will be required of effluent from a component other than the soil treatment area, an accessible sampling point shall be provided.
2. If sampling of the treated wastewater from the soil treatment area will be required for testing or as a requirement for a permit, a monitoring well or wells shall be constructed. Monitoring wells shall be located down gradient from the soil treatment area, accessible, and provided with a properly securable cover at or above the ground surface. Monitoring wells up gradient of the system may also be required.

#### H. Component Operating Instructions

1. The manufacturer of proprietary treatment units utilizing mechanical components shall provide clear, concise written instructions covering the components which, when followed, shall assure proper installation and safe and satisfactory operation and maintenance.
2. If the OWTS uses public domain technology, the design engineer shall provide clear, concise written instructions covering the components which, when followed, shall assure proper installation and safe and satisfactory operation and maintenance.

- I. Surface Activity: Activity or use on the surface of the ground over any part of the OWTS must be restricted to that which shall allow the system to function as designed and which shall not contribute to compaction of the soil or to structural loading detrimental to the structural integrity or capability of the component to function as designed. During construction, equipment shall be kept off of the ground surface above the soil treatment area and out of the excavation to prevent compaction. If compaction occurs, the disturbed or compacted soil shall be re-evaluated and new percolation tests may be performed to the disturbed or compacted soil and the system redesigned if the parameters have changed.

#### J. Floodplains

See Section 5.3 Floodplains and Floodways

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

1. An OWTS that will serve a business, commercial, industrial or institutional property, or a multifamily dwelling shall:
  - a. Be designed by a professional engineer;
  - b. Receive only such biodegradable wastes for treatment and distribution as are compatible with those biological treatment processes as occur within the septic tank, any additional treatment unit and the soil treatment area; and
  - c. Receive authorization by rule or a class V underground injection permit from the United States Environmental Protection Agency (EPA) before an application for an OWTS permit is approved if the system may receive non-residential wastewater or is otherwise covered by the EPA underground injection control program.

## 15.2 Design Criteria – Components

### A. Tanks and Vaults

1. Water-tightness
  - a. Septic tanks, vaults, pump tanks, other treatment components, risers and lids shall not allow infiltration of ground water or surface water and shall not allow the release of wastewater or liquids through other than designed openings.
  - b. Acceptable water-tightness testing methods performed at a manufacturer's site or in the field include water filling the tank or vacuum testing.
2. Tank Anchoring: In locations where ground water or floodwaters may cause instability problems to the septic tank, vault, or other treatment unit in the OWTS due to flotation, the tank, vault or unit shall be anchored in a manner sufficient to provide stability when the tank is empty. Risers shall be included in the buoyancy calculations.
  - a. If a manufacturer provides recommendations for anchoring designs, they may be used if they meet the conditions present at the site.
  - b. If a manufacturer does not provide recommendations for provisions to compensate for buoyancy, or if the professional engineer chooses to provide his/her own designs, the anchoring system design shall be prepared by the professional engineer.
3. Identification and Data Marking: All tanks and treatment units shall be permanently and legibly marked in a location for the purpose of inspection that is readily visible when inspected before backfilling. The marking inscription shall include the following:
  - a. Name of manufacturer;
  - b. Model or serial number, if available;
  - c. Effective volume and unit of measure;
  - d. Maximum depth of earth cover and external loads the tanks is designed to resist; and
  - e. Inlet and outlet identifications, if relevant.

B. Septic Tanks

1. The manufacturer shall provide sufficient information to demonstrate that the tank will meet the design specification.
2. Sizing Requirements:
  - a. Sizing for residential capacity for new installations shall be based upon the number of bedrooms according to **Table 15-1**:

**Table 15-1 Minimum Septic Tank Size (*in gallons*) based on Number of Bedrooms**

<u>Number of Bedrooms</u>	<u>Subsurface Disposal</u>	<u>existing wastewater pond (lagoon)</u>
2 or less	1000	1000
3	1000	1500
4	1250	2000
5	1500	2500
Each additional	add 250	add 500

- b. For multi-family and non-residential applications, a septic tank shall be sized to permit detention of incoming wastewater design flows for a minimum of 48 hours.
    - c. For systems that remove toilet waste for separate treatment, tank capacity may be less than 1,000 gallons, if it provides a minimum of 48 hours detention time.
    - d. Minimum tank size for new installations other than for a single-family residence is 400 gallons.
  3. Testing of Septic Tank Water-tightness
    - a. Testing of septic tanks must be performed and evaluated as specified in section 9 of ASTM C1227-12 (Standard Specification for Precast Septic Tanks) for concrete tanks or in Standard IAPMO/ANSI Z1000-2007 (American Standards for Prefabricated Septic Tanks) for other prefabricated septic tanks.
    - b. Each unit shall be inspected in the field for conditions that may compromise its water-tightness.

- c. The inspection in the field shall be conducted by the Department and be performed after the tank installation but before backfilling.
  - d. If the inspection in the field indicates that the tank may be damaged or is not watertight, the inspector may require that the tank be tested for watertightness by the tank manufacturer or the system contractor.
4. Septic Tank Design and Dimension Criteria
- a. A septic tank shall have two or more compartments or more than one tank may be used in series. The first compartment of a two-compartment tank or the first tank in a series shall hold no less than one-half of the required effective volume.
  - b. Inlet invert shall be at least two inches higher than the outlet invert.
  - c. Inlet tee or baffle shall extend above the surface of the liquid at least five inches and shall extend a minimum of eight inches below the liquid surface.
  - d. Outlet tee or baffle shall extend at least 14 inches below the outlet invert and be modified to accommodate an effluent screen. The outlet tee or baffle that accommodates an effluent screen must be located so that the effluent screen has sufficient clearance to be removed through the access opening with a riser in place.
  - e. The distance from the outlet invert to the underside of the tank top shall be at least ten inches.
  - f. Liquid depth shall be a minimum of 30 inches and the maximum depth shall not exceed the tank length.
  - g. The transfer of liquid from the first compartment to the second or successive compartment shall be made at a liquid depth of between 35 and 40 percent of the liquid depth measured from the liquid surface.
  - h. At least one access manhole no less than 20 inches across shall be provided in each compartment of a septic tank.
  - i. A septic tank shall have a minimum of 25 square feet of liquid surface area and have at least a six-foot separation between inlets and outlets. Septic tanks in series, combined, shall have a minimum of 25 square feet of liquid surface area and the sum of the distances between inlets and outlets of all tanks must be at least six feet. The requirements for liquid surface area and separation between inlet and outlet may be waived for tanks with less than 750 gallon effective volume.

## 5. Concrete Septic Tank Structural Design

- a. Concrete septic tanks shall comply with the structural design criteria of ASTM C1227-12 (Standard Specification for Precast Septic Tanks).
- b. The design for each tank model and size by each manufacturer must be certified by a professional engineer as complying with these design and structural requirements and the water-tightness standard of the state of Colorado's OWTS regulation.
- c. Certification by a professional engineer must be submitted to the CDPHE - WQCD for acceptance.
- d. Tank slab lids or mid-seam tanks shall be sealed to be watertight.
- e. Connections between tank and risers shall be sealed to be watertight.

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

- a. All fiberglass, fiberglass-reinforced polyester, and plastic tanks shall meet the minimum design and structural criteria of IAPMO/ANSI Z1000-2007 (American Standards for Prefabricated Septic Tanks) and be certified by a professional engineer as meeting these standards. The professional engineer certifying the criteria must be registered or licensed in the United States, but need not be registered in Colorado.
- b. All tanks shall be sold and delivered by the manufacturer or manufacturer's designated representative, preferably completely assembled. On-site tank assembly will be allowed on an as-needed basis.
- c. Tanks shall be structurally sound and support external forces as specified in the standard referenced above when empty and internal forces when full. Tanks shall not deform or creep resulting in deflection of more than five percent in shape as a result of loads imposed.
- d. All tanks shall be constructed of sound, durable materials and not be subject to excessive corrosion, decay, frost damage, or cracking.
- e. All seams or connections including to risers shall be sealed to be watertight.

## 7. Metal tanks and coated metal tanks are prohibited.

C. Abandonment of Tank

1. A tank may be completely removed and the parts disposed of safely.
2. If the tank will remain in place:
  - a. The tank shall be pumped to remove as much waste as possible;
  - b. The bottom of the tank shall be broken so the tank neither floats nor fills with water;
  - c. The top must be collapsed and the sides may be broken into the void;
  - d. The remaining void shall be filled with gravel, sand or compacted soil; and
  - e. The filled excavation will be graded to surroundings, allowing for settling.
3. The Department may require abandonment of a tank that is deemed to be a hazard.

D. Pipe Standards and Bedding Requirements:

1. Pipe Standards

- a. All wastewater lines used in an OWTS shall be constructed of compatible pipe, primer, bonding agent, and fittings.
- b. Where unperforated plastic pipe and fittings are used for gravity flow, the minimum wall thickness of the pipe shall conform to ASTM Standard D 3034 or equivalent or greater strength. Schedule 40 pipe is preferred.
- c. Perforated distribution pipe surrounded by rock within a soil treatment area shall have a minimum wall thickness and perforations conforming to ASTM Standard D 2729 or equivalent or greater strength. Corrugated polyethylene pipe with smooth interior that meets ASTM F405 or AASHTO M252 specifications or equivalent may be used.
- d. Schedule 40 or pipe of equivalent or greater strength shall be used for the placement of piping under driveways or roadways and in instances where sewer line setback distances are granted a variance for any reason.
- e. Tile pipe, open-joint pipe, and cast iron pipe must not be used in an OWTS.
- f. Pressure pipe must be rated for the intended use to accommodate pump discharge pressure.

2. Bedding: All system piping, except for distribution laterals within the soil treatment area, shall be bedded with select material before final inspection by the Department. Select bedding material shall consist of loose, granular material, free from stones, clods, frozen soil, or other deleterious material. Select material may consist of on-site job-excavated or imported material. Bedding material must be mechanically compacted to support piping.
- E. Distribution Box: A distribution box, if used, shall be of sufficient size to distribute effluent equally to the lateral lines of a trench or absorption bed system. The box shall be constructed with the inlet invert at least one inch above the level of the outlet inverts. Flow equalizers or similar devices shall be used to adjust the flow between lines. Access to the box shall be provided with a manhole riser with access lid at or above grade if the top of the box does not reach final grade.
  - F. Drop Box: In sequential or serial distribution, a watertight box may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow to the next trench. A drop box shall have a riser at or above final grade, if the top of the drop box does not reach final grade. Outlet lines in sequential distribution shall be designed and installed so that they may be capped off for resting periods.
  - G. Step-down/Relief Line: In sequential or serial distribution, an unperforated pipe may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow from that trench.
  - H. Wastewater Pumping and Dosing Siphon Systems
    1. Pumps
      - a. Non-clog pump opening shall have at least two-inch diameter solids handling capacity where raw wastewater is pumped. A pump opening shall not have more than 3/4-inch diameter solids handling capacity if previously settled effluent is pumped.
      - b. Pumps must be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL or an equivalent testing program and be constructed of corrosion resistant materials.
      - c. Grinder pumps must also be certified to NSF/ANSI Standard 46 and bear the seal of approval of the NSF or equivalent testing and certification program.
    2. Floats and Switches
      - a. Automatic liquid level controls must be provided to start and shut off pumps at a frequency or level specified in the design.

- b. Floats must be mounted on a stem separate from the pump discharge piping to allow for removal, adjustment, and replacement of the float without removing the pump.
  - c. Float switches must be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL or an equivalent certification program and be constructed of corrosion resistant materials.
3. Location of Pump or Siphon
- a. A pump may be, or a siphon shall be, installed in a separate tank following the septic tank and be of sufficient volume to allow pump or siphon cycling commensurate with the design capacity. The use of a three-compartment septic tank, sized to provide effective volume in the first two compartments with the pump in the third compartment, is acceptable.
  - b. The second compartment of the septic tank shall not be used as the pump tank unless it can be demonstrated to the satisfaction of the Department that the minimum 48-hour detention time will not be decreased and the pump is screened or provided with an approved filtering device to assure that only liquid effluent will be discharged.
4. Pump or Siphon Discharge Piping
- a. The discharge line from the pumping or siphon chamber shall be protected from freezing by burying the pipe below frost level or sloping the pipe to allow it to be self-draining. Drainage shall be provided through the bottom of the pump or through a weep hole located in the discharge line prior to exiting the tank.
  - b. The pump discharge piping shall have a quick disconnect that is accessible within the riser to allow for easy pump access and removal.
  - c. The pipe shall be sized to maintain a velocity of two or more feet per second.
  - d. Automatic air/vacuum release valves shall be installed at high points in the pressure line where necessary to prevent air or vacuum locking and allow self- draining of the lines.
5. Access
- a. The pump or dosing system tank, chamber, or compartment shall have a minimum 24-inch diameter access riser, made of corrosion-resistant material, extending to or above ground level.
  - b. The access riser must have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration.

## 6. Splice Box

- a. Splice boxes shall be located outside the pump system access riser and be accessible from the ground surface.
- b. No wire splices shall be made inside the tank, dosing chamber or riser. Wire splicing shall be completed with corrosion-resistant, watertight connectors.

## 7. Controls

- a. The pump system shall have an audible and visual alarm notification in the event an excessively high water condition occurs.
- b. The pump shall be connected to a control breaker separate from the high water alarm breaker and from any other control system circuits.
- c. The pump system shall have a switch so the pump can be manually operated.
- d. The pump system for pressure dosing and higher level treatment systems shall have a mechanism for tracking either the amount of time the pump runs or the number of cycles the pump operates.
- e. Control panels shall be UL listed.

## I. Effluent Screens

1. An effluent screen shall be installed in all septic tanks in new installations and repairs where the septic tank is replaced.
2. If a pump or dosing siphon is used to remove septic tank effluent from the final compartment of the septic tank, an effluent screen must be provided prior to the pump or siphon inlet. A pump vault equipped with a filter cartridge may be considered equivalent to an effluent screen preceding the pump.
3. The effluent screen shall be cleaned at manufacturer-recommended intervals, or more often, if use patterns indicate.

## J. Grease Interceptor Tanks

1. All commercial food service facilities and other facilities generating fats, oils and greases in their waste must install a grease interceptor tank.
2. Grease interceptor tanks shall treat only those portions of the total wastewater flow in which grease and oils are generated.

### 15.3 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 Department:
  - 1. The soil classifications are Types 0, 3A, 4, 4A, and 5 as specified in **Table 15-2** of these Regulations;
  - 2. The maximum seasonal level of the ground water surface is less than four feet below the bottom of the proposed absorption system;
  - 3. A restrictive layer exists less than four feet below the bottom of the proposed absorption system;
  - 4. The ground slope is in excess of twenty-five percent; or
  - 5. Pressure distribution is used.
  
- C. Calculation of Infiltrative Surface of Soil Treatment Area
  - 1. The infiltrative surface of a trench or bed receiving any treatment level of effluent is only the bottom area. No sidewall credit is allowed except in deep gravel trenches and seepage pits that are permissible in repairs.
  - 2. Long-term acceptance rates (LTARs) are shown in **Table 15-2**.
  - 3. Factors for adjusting the size of the soil treatment area are in **Table 15-3** and **Table 15-4**.

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

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

- a. Adjusted Soil Treatment Area = Required Soil Treatment Area x Size Adjustment Factor(s).
- b. Size adjustment factors for methods of application are in **Table 15-3**.
- c. Size adjustment factors for types of storage/distribution media are in **Table 15-4**.
- d. A required soil treatment area receiving TL1 effluent may be multiplied by one size adjustment factor from **Table 15-3**, **Table 15-4**, or both.

**Table 15-2 Soil Treatment Area Long-term Acceptance Rates by Soil Texture, Soil Structure, Percolation Rate and Treatment Level**

<b>Soil Type, Texture, Structure and Percolation Rate Range</b>					
<b>Soil Type</b>	<b>USDA Soil Texture</b>	<b>USDA Soil Structure-Shape</b>	<b>USDA Soil Structure-Grade</b>	<b>Percolation Rate (MPI)</b>	<b>Treatment Level 1<sup>1</sup></b>
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>
1	Sand, Loamy Sand	--	0	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
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 0	1 Massive	61-75	0.30
4	Sandy Clay, Clay, Silty Clay	PR, BK, GR	2, 3	76-90	0.20
4A	Sandy Clay, Clay, Silty Clay	PR, BK, GR 0	1 Massive	91-120	0.15
5	Soil Types 2-4A	Platy	1, 2, 3	121+	0.10

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

- 1 Treatment levels are defined in Table 13-2.
- 2 Unlined sand filters in these soil types shall provide pathogen removal. Design shall conform to Section 15.4.C.2.c. (Unlined Sand Filters).

D. Allowable Soil Treatment Area Reductions and Increases:

1. The soil treatment area size determined by dividing the design flow rate by the long-term acceptance rate may be adjusted by factors for method of treatment, soil treatment area design, and type of distribution media.
2. For the purpose of the table, a “baseline system,” i.e. adjustment factor of 1.00, is considered to be Treatment Level 1 (TL1) applied by gravity to a gravel-filled trench.
3. The maximum reduction from all combined reductions including higher level treatment shall be no greater than 50 percent of the baseline system required for a soil treatment area.

**Table 15-3 Size Adjustment Factors for Methods of Application in Soil Treatment Areas**

Type of Soil Treatment Area	Method of Effluent Application from Treatment Unit Preceding the 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 15-4 Size Adjustment Factors for Types of Distribution Media in Soil Treatment Areas**

Type of Soil Treatment Area	Type of Storage/Distribution Media used in Soil Treatment Area		
	Rock or Tire Chips	Manufactured Media other than Chambers	Chambers
Trench or Bed	1.0	0.9	0.7

## E. Design of Distribution Systems

### 1. General

- a. The infiltrative surface and distribution lines must be level.
- b. The infiltrative surface must be no deeper than four feet unless adequate treatment at a deeper level can be demonstrated and is approved by the Department. The depth will be measured on the downslope side of the trench or bed.
- c. Trenches must follow the ground surface contours so variations in infiltrative surface depth are minimized. Beds must be oriented along contours to the degree possible.
- d. Pipe for gravity distribution must be no less than three inches in diameter.
- e. A final cover of soil suitable for vegetation at least ten inches deep must be placed from the top of the geotextile or similar pervious material in a rock and pipe system, chamber, or manufactured media up to the final surface grade of the soil treatment area.
- f. Following construction, the ground surface must be graded to divert storm-water 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.

### 2. Distribution Lines

- a. Distribution between lines in a soil treatment area must be as even as possible. Uneven settling of portions of the distribution system following construction must be addressed by provisions in the design to adjust flows between lines.
- b. Distribution lines shall be a maximum of 150 feet long.
- c. Distribution lines longer than 100 feet shall be pressure dosed or the application of the effluent shall be at the center of the line.
- d. The end of a distribution pipe must be capped, unless it is in a bed or trenches in a level soil treatment area, where the ends of the lines may be looped.

e. Inspection Ports

1. An inspection port accessible from ground surface must be installed at the both the initial end and 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. 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.

f. Trenches

1. Trenches must be three feet wide or less.
2. The separating distance between trenches must be a minimum of six feet sidewall-to-sidewall.
3. Perforated distribution pipe used in a trench must be as close to the center of the trench as possible.
4. Perforations must be oriented downward unless pressure distribution is used and provision for pipe drainage is included.

g. Beds

1. Maximum width for a bed must be 12 feet unless the bed receives effluent meeting Treatment Level 2 quality or better.
2. The separating distance between beds must be a minimum of six feet sidewall-to-sidewall.
3. The separating distance between parallel distribution lines in an absorption bed must not exceed six feet and a distribution line must be located within three feet of each sidewall and end-wall of the absorption bed.

#### h. 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 step-down/relief line or a drop box arrangement such that each trench fills with effluent to the top of the gravel or chamber outlet before flowing to succeeding treatment areas.

### 3. Storage/Distribution Media

#### a. Rock and Pipe

1. The pipe must be surrounded by clean, graded gravel, rock, or other material of equal efficiency which may range in size from 1/2 inch to 2 1/2 inches. At least six inches of gravel, rock or other material must be placed below the pipe. The gravel, rock or other material must fill the trench around the pipe and at least two inches above the top of the distribution pipe.
2. The top of the placed gravel or such material used must be covered with non-woven permeable geotextile meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material. An impervious covering must not be used.

#### b. Tire Chips

1. The pipe may be surrounded with clean, uniformly-sized tire chips.
2. Tire chips must be nominally two inches in size and may range from 1/2 inch to a maximum of four inches in any one direction.
3. Wire strands must not protrude from the tire chips more than 0.75 inches.
4. Tire chips must be free from balls of wire and fine particles less than two mm across.

5. The top of the tire chips used must be covered with non-woven permeable geotextile meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material. An impervious covering must not be used.
- c. Chambers
1. Chambers must be installed with the base on the infiltrative surface.
  2. Installation must be according to manufacturer's instructions.
  3. Effluent may be distributed by gravity or pressure dosing.
- d. Manufactured Media
1. Manufactured media must be installed with the base on the infiltrative surface.
  2. Installation must be according to manufacturer's instructions.
  3. Effluent may be applied by pressure distribution only if the manufacturer specifies suitability of the product for that use.
- e. Pressure Distribution
1. Design of pressure distribution systems must include:
    - i. Dose size and frequency for flows and soil or media long-term acceptance rate;
    - ii. Pipe diameter and strength requirements;
    - iii. Orifice size and spacing; and
    - iv. Distal pressure head.
  2. Cleanouts must be installed at the end of each line.
- f. Drip-lines
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. Drip-lines must be installed on manufacturer's spacing recommendations.
  3. Drain-back must be provided for all drip lines, pipes and pumps.

4. Provisions must be made to minimize freezing in the distribution lines, drip-lines, relief valves, and control systems.
5. Provisions must be made for back-flushing or other cleaning.

F. Alternating and Sequencing Zone Systems

1. Alternating Systems

- a. An alternating system must have two zones that must be alternated on an annual or more frequent basis.
- b. Each section must be a minimum of 50 percent of the total soil treatment area. Size adjustment factors for methods of effluent application or type of distribution media shall not be allowed.
- c. A diversion valve or other approved diversion mechanism may be installed on the septic tank effluent line allowing soil treatment area sections to be alternated.
- d. The diversion mechanism must be readily accessible from the finished grade.

2. Sequencing Zone Systems

- a. Sequencing zone systems have more than two soil treatment area sections that are dosed on a frequent rotating basis.
- b. Where soil conditions are similar between the sections, each section area shall be the same size. If soil conditions are such that long-term acceptance rates are different, each section may be sized for the same dose, but different long-term acceptance rates.
- c. An automatic distribution valve must be used.
- d. Dosing of each system must be evaluated by the design engineer based on projected daily flow rates, number of zones, and soil types.

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

H. Soil replacement must be permitted to bring the soil within the requirements of suitable soil. Added soil must meet the specifications of sand filter media, as specified in Section 15.4.C.2.a.1. All added soil must be completely settled prior to installation of components as specified and approved by the design engineer. The loading rate for sand filters must be used. Pressure distribution must be used.

I. Repairs

1. When space is not available or if there are other site limitations that preclude other soil treatment area options for OWTS repairs, wide beds, deep gravel trenches, and seepage pits may be considered for repairs only.
2. Wide Beds: For repairs, beds may be wider than 12 feet without being required to receive effluent meeting Treatment Level 2 quality or better.
3. Deep Gravel Trenches
  - a. The length of an absorption trench or bed may be calculated by allowance for the sidewall area of additional depth of gravel in excess of six inches below the bottom of the distribution pipe according to the following formula:

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

Where:

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

- b. Maximum allowable additional depth is five feet.
  - c. Percolation tests and soil profile excavation test pit evaluations must be performed at the proposed infiltrative surface depth.
  - d. The reduction in field size area with the use of chambers must not be applied to deep gravel systems.
4. Seepage Pits
- a. For repairs, seepage pits will only be allowed in areas where the Department determines that the potential for risk to public health is low. Seepage pits are not allowed in high risk areas.

- b. A seepage pit shall consist of a buried vertical cylinder with holes in the wall.
  - 1. Pits must be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity.
  - 2. The excavation must be larger than the cylinder by at least 12 inches on each side.
  - 3. The over-excavated volume must be filled with rock ranging in size from 1/2 inch to 2 1/2 inches.
  - 4. The capacity of the pit must be computed on the basis of long-term acceptance rates determined for each stratum penetrated. The weighted average of the results must be used to obtain a design figure.
  - 5. Soil strata in which the percolation is slower than 30 minutes per inch must not be used for absorption or seepage. These strata must not be included in the weighted average to determine the long-term acceptance rate.
  - 6. The infiltrative surface of the pit is the vertical wall area (based on dug perimeter) of the pervious strata below the inlet plus the bottom area inside the vertical cylinder.
- c. 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.

## 5. Vaults

- a. The allowable use of vaults for repairs may be considered, if all other options are deemed by the Department to not be feasible.
- b. Criteria for vaults are in section 15.5.C of these Regulations.

## 15.4 Design Criteria – Higher Level Treatment Systems

### A. General

1. Higher level treatment systems must be designed by a professional engineer.
2. Higher level treatment systems may be public domain technology systems or proprietary systems.
  - a. Public domain technology systems must be designed, installed and maintained according to established criteria. When design criteria are not specifically provided in these Regulations, the criteria used in the design must be from a reference commonly used as an industry standard and the criteria must be cited in the design.
  - b. Proprietary systems must be designed, installed, and maintained according to manufacturer's instructions and additional criteria identified in the Technology Review and Acceptance process, see Section 17.
3. Reductions to soil treatment area or separation distances based on higher level treatment are not permitted.
4. Soil treatment areas for higher level treatment systems must be pressure dosed.
5. Systems must be capable of accommodating all anticipated flows and organic loads.
6. Ventilation and air systems: Mechanical components must be installed in a properly vented location and all vents, air intakes, and air hoses must be protected from snow, ice, or water vapor accumulations.
7. Covers, barriers, or other protection: All systems must be installed to include protection of openings against entry of insects, rodents, other vectors and unauthorized people.

- B. The treatment levels identified in **Table 13-2** are specified in this section for public domain technology. Proprietary treatment systems shall be assigned a treatment level by the CDPHE – WQCD in accordance with the technology review and acceptance process, see Section 17. Adequate maintenance for each must be required and documented as in Section 18.

## C. Sand Filters

1. Sand filters, such as a lined intermittent sand filter or recirculating sand filter, may be used as a pre-treatment system where the treated effluent is collected and dispersed to a soil treatment area or where site conditions require importing treatment media, such as an unlined sand filter, a soil replacement system, or a mounded system.
2. Intermittent (Single Pass) Sand Filters
  - a. General
    1. The filtering material used in a sand filter must be clean, coarse sand, all passing a screen having four meshes to the inch. The sand must have an effective size between 0.25 and 0.60 mm. The uniformity coefficient must be 4.0 or less. Material meeting ASTM 33, for concrete sand, with one percent or less fines passing 200 mesh sieve may be used.
    2. The sand below the distribution lines must be at least two feet deep.
    3. Distribution system
      - i. Dispersal of effluent to the surface of the sand filter must be by a pressurized distribution system for equal distribution.
      - ii. Pipes used to disperse the effluent must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2-inch screen and must be retained on a 3/4-inch screen.
      - iii. Manufactured media may be used as an alternative to gravel or stone.
      - iv. The separation distance between parallel distribution lines must not exceed six feet, and a distribution line must be located within three feet of each filter sidewall.
    4. Application Rates
      - i. When receiving wastewater that meets TL1 treatment level, a maximum sand filter application rate of 1.0 gpd/ft<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.

b. Lined Sand Filters

1. Lined sand filters must have an impervious liner on the sides and bottom of the filter. The liner must consist of a 30 mil thickness PVC material or equivalent.
2. A minimum four-inch diameter under-drain pipe must be used. The under-drain pipe must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2 inch screen and must be retained on a 3/4-inch screen. Manufactured media may be used as an alternative to gravel or stone.
3. Under-drain effluent collected below the sand filter shall be dispersed to a soil treatment area.

c. Unlined (Open Bottom) Sand Filters

1. The bottom of the sand filter receiving TL1 must be no less than two feet above the high ground water surface or bedrock for installations in which effluent percolates downward through the soil.
2. An unlined sand filter is to be sized based on Section 15.4.C.2.a.4.i. or the long-term acceptance rate of the receiving soil for TL1, whichever results in the larger area.

d. Mounded Sand Filters (Mound Systems)

1. When the infiltrative surface area of the media receiving wastewater effluent is above the natural ground surface, the system shall be considered a mounded sand filter.
2. Mounded sand filters must conform to Section 15.4.C.2.c. for unlined (open bottom) sand filters.
3. The basal area and linear loading rate must be determined from the loading rate for the soil type under the mound and the slope of the site.
4. The final slope of the mound must be no greater than three feet horizontal to one foot vertical.
5. The surface of the mounded area must be planted with a suitable vegetative cover.

3. Recirculating Sand Filters

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

- b. A minimum four-inch diameter under-drain pipe must be used. The under-drain pipe must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2-inch screen and must be retained on a 3/4-inch screen. Manufactured media may be used as an alternative to gravel or stone.
    - 1. Filter media effective size (D10) must range from 1.0 to 1.50 mm and the uniformity coefficient (D60/D10) must be less than 4.0. Fines passing a 200 mesh sieve must be less than one percent.
  - c. Sand depth must be a minimum of two feet.
  - d. Typical loading rates are 3.0 to 5.0 gpd/ ft<sup>2</sup>. Rate must not exceed 5.0 gpd/ ft<sup>2</sup>.
  - e. Design re-circulation ratios may be 3:1 to 5:1.
- D. Rock Plant Filter (Constructed Wetland) Treatment before a Soil Treatment Area
- 1. A rock plant filter system must be designed by a professional engineer.
  - 2. The design must be site specific and include specifications for: loading, capacity, dimensions, liner material, filter media, effluent depth and depth control mechanism, density and species of plant material, and other site specific information.
  - 3. The treated effluent from a rock plant filter must be distributed to a soil treatment area.
  - 4. Although producing higher level treatment, rock plant filters must not be assigned a treatment level higher than TL1 because of system and seasonal variability.

### **15.5 Design Criteria – Other Facilities**

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

B. Evapotranspiration and Evapotranspiration/Absorption Systems:

1. An evapotranspiration system may be designed to consider evaporation and transpiration only, or in soil types 3A, 4, 4A and 5, absorption may also be considered.
  - a. An evapotranspiration system or evapotranspiration/absorption system must be designed by a professional engineer.
  - b. Data to be furnished must include, but shall not be limited to: dimensions; distribution system design; specifications of gravel and wicking sand if used, liner material if used, and bedding; properties of the soil under the evapotranspiration system and provision for vegetation cover.
  - c. The following formula may be used as a guide for determining the area necessary for total evapotranspiration of septic tank effluent:

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

- d. As an alternative, a system may be designed and sized on the basis of a monthly water balance for the system. Such a design would provide for total storage of average daily flows for all periods in which evapotranspiration is not shown to occur.
- e. If the design provides wicks (sand structures which penetrate through the rock media to the bottom of the bed), they must be equal to 10 to 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the bed.
- f. Sand utilized in evapotranspiration or evapotranspiration/absorption beds for wicks must meet the gradation requirements in **Table 15-5** and be approved by the design engineer.

**Table 15-5 Gradation of Wicking Sand for Evapotranspiration Beds**

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

- g. Adequate surface area must be provided to evaporate/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 rate is not measured.
- h. If the system is designed as an evapotranspiration/absorption system, the amount of storage and evapotranspiration capacities may be reduced by the volume of effluent absorbed by the soil based on the long-term acceptance rate for that soil type.
- i. Except for dwellings, if the system is designed for summer use only, as determined by the Department, the surface area may be multiplied by 0.6 to obtain the required area.
- j. Evapotranspiration beds and evapotranspiration-absorption beds may be wider than 12 feet.

#### C. Vaults Other Than Vault Privies

- 1. Vaults for full time use in new construction are prohibited where a property can accommodate an OWTS with a soil treatment area.
- 3. Vaults for full time use may be permitted when a failing OWTS cannot be replaced.
- 4. Vaults may be permitted on a property which cannot accommodate an OWTS with soil treatment area.
- 5. A vault may be permitted if the facility is on land where the installation of an OWTS with soil treatment area is not permitted.
- 7. Variances may be granted for specialized commercial uses.
- 8. A vault must have a minimum 1000 gallon effective volume or be capable of holding a minimum of the five-day design wastewater flow, whichever is larger.
- 9. A visual or an audible signal device or both, indicating filling to a maximum of 75 percent capacity, must be installed to indicate when pumping is necessary.
- 10. Concrete vaults must meet the strength and water-tightness 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 and the tank has been reviewed and approved by CDPHE – WQCD.

## D. Privies

### 1. Vault Privy

- a. The allowable use of a vault privy may be considered, if all other options are deemed by the Department to not be feasible.
- b. The vault privy must be designed by a professional engineer.
- c. Effective volume of the vault must be no less than 400 gallons and it must be constructed of concrete or plastic. The vaults for privies must meet the structural and water-tightness standards of vaults.
- d. A vault privy must be built to include: fly- and rodent-tight construction, a superstructure affording complete privacy, an earth mound around the top of the vault and below floor level that slopes downward away from the superstructure base, a floor, and a riser of concrete or other impervious material with hinged seats and covers of easily cleanable, impervious material. All venting must be fly-proofed with No. 16 or tighter mesh screening.

### 2. Pit Privy

- a. The new construction of pit privies is prohibited.
- b. The continued use of existing pit privies is prohibited.

## E. Incinerating, Composting and Chemical Toilets

1. The Department may permit incinerating, composting and chemical toilets.
2. Permitting of an incinerating or composting toilet are also subject to the jurisdiction of the local agency regulating plumbing or the Colorado Plumbing Board, whichever has jurisdiction over plumbing in the location.
3. An incinerating or composting toilet may be used for toilet waste where an OWTS is also installed for treating all wastewater remaining after removal of toilet waste. Subject to 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 these Regulations, and provided the installation will not result in conditions considered to be a health hazard as determined by the Department. Compartment and appurtenances related to the unit must include fly-tight and vector-proof construction and exterior ventilation.

4. Incinerating Toilets:

- 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. A CDPHE – WQCD approved incinerating toilet must be designed and installed in accordance with all applicable federal, state, and local air-pollution requirements and manufacturer's instructions.

5. Composting Toilets:

- a. 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.
- b. A CDPHE – WQCD 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. 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.
- c. 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.
- d. 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 Department. Disposal methods must prevent contamination of water and not cause a public health nuisance. Disposal using solid waste practices is recommended.
- e. If a system will be installed where low temperature may be a factor, design and installation must address the effects of the low temperature.
- f. Composting toilets must be operated according to manufacturer's specifications.

## 6. Portable Chemical Toilets

- a. A portable chemical toilet may be used by permit from the Department.
- b. Use of a portable chemical toilet in permanently occupied buildings is prohibited except during construction or under emergency circumstances as determined by the Department. Proper ventilation of a chemical toilet used inside is required.

## F. Slit Trench Latrine

1. The new construction of a slit trench latrine is prohibited.

The continued use of an existing slit trench latrine is prohibited.

## G. Treatment Systems other than those Discharging through a Soil Treatment Area or Sand Filter System

1. For systems discharging to State Waters, see Section 2.3.
2. Systems that discharge other than through a soil treatment area or a sand filter system must:
  - a. Be designed by a professional engineer;
  - b. Be reviewed by the local board of health; and
  - c. Not pose a potential health hazard or private or public nuisance or undue risk of contamination.
3. The following minimum performance criteria must be required for all permitted systems pursuant to this section:
  - a. If effluent discharge is made into areas in which the possibility exists for occasional direct human contact with the effluent discharge, the effluent at the point of discharge must meet the minimum treatment criteria of TL3 effluent and specifically adhere to each of the following standards:
    1. The geometric mean of the fecal coliform density must not exceed 25 per 100 milliliters when averaged over any five consecutive samples, and no single sample result for fecal coliform can exceed 200 per 100 milliliters.

2. The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>) must not exceed ten milligrams per liter when averaged over any three consecutive samples.
  3. The arithmetic mean of the total suspended solids must not exceed ten milligrams per liter when averaged over any three consecutive samples.
- b. If the effluent discharge is made into an area so restricted as to protect against the likelihood of direct human contact with the discharged effluent, the effluent at the point of discharge must meet the treatment criteria of TL2 effluent and specifically adhere to each of the following standards:
1. The geometric mean of the fecal coliform density must not exceed 500 per 100 milliliters when averaged over any five consecutive samples, and no single sample can exceed 5000 fecal coliform per 100 milliliters.
  2. The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>) must not exceed 25 milligrams per liter when averaged over any three consecutive samples.
  3. The arithmetic mean of the total suspended solids must not exceed 30 milligrams per liter when averaged over any three consecutive samples.
4. To determine compliance with the standards contained in this section, the required sampling frequency for fecal coliform, CBOD<sub>5</sub>, 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 Department for compliance with the permit requirements.
5. Methods of Analysis - Sampling Points:
- a. All effluent samples must be analyzed according to the methods prescribed in the American Public Health Association, American Water Works Association, and Water Environment Federation: Standards Methods for the Examination of Water and Wastewater, 21st edition.
  - b. The sampling point must be a location that is representative of final discharge from the system.

## **Section 16 Wastewater Ponds and Lagoons**

- A. As of January 27, 2003, the Department will not issue On-site Wastewater Treatment System permits for the installation of new wastewater ponds or lagoons.
- B. Any OWTS permit application that has not been previously approved for the installation of a wastewater pond or lagoon must utilize subsurface technology.
- C. Historic OWTS permits approved for wastewater ponds or lagoons, but which were not installed, are void and are required to convert to subsurface technology as of January 27, 2004.
- D. Permitted wastewater ponds or lagoons were designed to be non-surface discharging. Owners of a surface discharging (malfunctioning) wastewater pond or lagoon must obtain an OWTS permit from the Department for replacement with a compliant subsurface system.
- E. Any non-permitted, unauthorized wastewater pond or lagoon is illegal unless it clearly predates the OWTS permit program adopted by the Board of Health (1967) and is otherwise compliant with all applicable statutes and regulations pertaining to waterway setbacks and other separation distances. Illegal wastewater ponds or lagoons must be replaced with a permitted OWTS utilizing subsurface technology.
- F. Expanded use of an existing permitted wastewater pond or lagoon will require the approval of the Department's Environmental Health Director, and will be limited to:
  - 1. a maximum of 3 bedrooms for an existing dwelling with a continuous water (well or central water) supply; and
  - 2. a maximum of 4 bedrooms for an existing dwelling with a hauled (non-continuous) water supply.

Additional dwelling units will require the installation of a permitted OWTS utilizing subsurface technology.

- G. All existing permitted wastewater ponds and/or lagoons shall meet the following design criteria:
1. Adequate septic tank(s) or aeration tank(s) must precede the wastewater pond/lagoon (see **Table 15-1**). If the organic loading exceeds 0.46 lbs. BOD<sub>5</sub> per 1000 ft<sup>2</sup> or causes a nuisance condition, the wastewater pond/lagoon will be required to be aerated or be replaced with an OWTS utilizing subsurface technology.
  2. The maximum wastewater pond/lagoon depth shall not exceed 6 feet. The maximum wastewater (water) depth shall not exceed 4 feet with a minimum freeboard of 2 feet.
  3. If more than 50 percent of the wastewater pond/lagoon is built above the existing ground level, the berm compaction shall be 90% ASTM D-698 or greater and certified by a Professional Engineer. The inside slope of the wastewater pond/lagoon, dike or embankment shall not be steeper than three (3) feet horizontal to one (1) foot vertical upon repair or maintenance. A center inlet shall be provided. The outside slope of the lagoon shall not be steeper than two (2) feet horizontal to one (1) foot vertical. The ground must be scarified and all vegetation removed below the constructed berm to provide a bond with native material.
  3. All wastewater ponds/lagoons shall be securely fenced with a strong durable fence of woven wire or equivalent to a height of 40 inches or greater. A strong field fence (2 inch x 4 inch mesh) is recommended. Chicken wire type fencing is not acceptable. The fence shall be tight to the ground. Posts must be secure and be no greater than 10 feet apart. The fence must keep out livestock, pets, vermin, and unauthorized people at all times.
  4. Surface runoff shall be diverted away from the wastewater pond/lagoon.
  5. There shall be four-feet of separation between the bottom of any existing wastewater pond/lagoon and the maximum seasonal high ground water level.

## **Section 17 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 these Regulations, or proprietary products that have received CDPHE - WQCD review and acceptance before the Department may permit them for use.
  
- B. In accordance with the state of Colorado's OWTS regulation, the CDPHE – WQCD reviews and may approve proprietary products in these technology categories:
  - 1. Proprietary treatment products (e.g. treatment systems, remediation systems);
  - 2. Proprietary distribution products (e.g. manufactured distribution products or subsurface drip-line);
  - 3. Septic tanks;
  - 4. Composting toilets;
  - 5. Incinerating toilets; and
  - 6. Others as needed.
  
- C. OWTS technologies must either be: (1) 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 these Regulations; or (2) proprietary products that have received CDPHE - WQCD review and acceptance under the requirements stated in section 43.13 of Regulation #43 – On-site Wastewater Treatment System Regulation (5 CCR 1002-43).

## **Section 18    Operation and Maintenance**

- A. **Responsibility**: The owner shall be responsible for maintenance of an OWTS.
- B. **Service Label**: For higher level treatment systems or other components under a service contract, a clearly visible, permanently attached label or plate giving instructions for obtaining service must be placed at a conspicuous location.
- C. The Board of Health may adopt regulations for:
  - 1. Scheduling of maintenance and cleaning;
  - 2. Practices adequate to ensure performance of an OWTS; and/or
  - 3. Submission of proof of maintenance and cleaning to the Department by the owner of the system.
- D. **Monitoring and Sampling**
  - 1. For an OWTS for which monitoring of effluent is required, the Department or delegated third party must collect and test effluent samples to ensure compliance with the provisions of these Regulations.
  - 2. Sampling may be required by the Department in conjunction with an enforcement action.
  - 3. Any owner or occupant of property on which an OWTS is located may request the Department to collect and test an effluent sample from the system. The Department may perform such collection and testing services. The owner or occupant must pay for these services in advance.
    - a. If the Department or a delegated third party collects and tests effluent samples, a fee not to exceed that which is allowed by the OWTS Act may be charged for each sample collected and tested. Payment of such charge must be stated in the permit as a condition for its continued use.
    - b. Conditions when the Department can require routine monitoring:
      - 1. Indications of inadequate performance;
      - 2. Location in sensitive areas;
      - 3. Experimental systems; and/or
      - 4. Systems under product development permits.

- c. Sampling and analysis must be performed according to American Public Health Association, American Water Works Association, and Water Environment Federation: Standards Methods for the Examination of Water and Wastewater, 21st edition.

## **Section 19    Materials Incorporated by Reference**

Throughout these Regulations, standards and requirements by outside organizations have been adopted and incorporated by reference. These materials are also referenced in the state of Colorado's OWTS regulation from which these Regulations were developed.

## Appendix A

### **Estimate of Average Daily Wastewater Flow and BOD<sub>5</sub> Load per Person (*unless otherwise noted*)**

<b>RESIDENTIAL WASTEWATER</b>	<b>AVERAGE GPD</b>	<b>BOD<sub>5</sub> in POUNDS per DAY</b>
<b>Single-family dwellings</b>	75	.20
<b>OR</b> Single-family dwellings or auxiliary buildings by fixture type		
Bath/Shower	14.7	.014
Dishwasher	1.8	.002
Kitchen sink with garbage grinder	5.8	.052
Laundry washer	19.5	.037
Lavatory	8.4	.021
Water closet (toilet)	24.8	.029
Total with kitchen sink garbage grinder	75	.20
Hotels and motels per room without private baths	50	.15
Hotels and motels per room with private baths	75	.15
Multiple-family dwellings or apartments	75	.20
Boarding and rooming houses	50	.15
Mobile home	75	.20
Mobile home park per space	300	.80

<b>COMMERCIAL WASTEWATER</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 per passenger; fairgrounds per person attending; ball parks, race tracks, stadiums, theaters or auditoriums per seat	5	.02
Airport per employee	10	.06
Barber and beauty shops per chair	100	.70*
Bowling alleys per lane - toilet wastes only	5	.03*
Country club per member	30	.02
County club per employee	20	.06
Dentist offices per non-wet chair	50	.14*
Doctor offices per doctor	250	.80*
Factories and plants exclusive of industrial wastewater per employee per eight-hour shift – no showers	20	.05
Factories and plants exclusive of industrial wastewater per employee per eight-hour shift - showers provided	35	.08
Kennels per dog	30	.20
Laundries, self-service per commercial washer	400	.75
Office buildings per employee per eight-hour shift	15	.06
Service stations per toilet fixture	250	.50*
Stores and shopping centers per square foot of retail space	.1	.01*
Work or construction camps semi-permanent with flush toilets	50	.17
Work or construction camps semi-permanent without flush toilets	35	.02

<b>FOOD SERVICE ESTABLISHMENT</b>	<b>AVERAGE GPD</b>	<b>BOD<sub>5</sub> in POUNDS per DAY</b>
Restaurant open 1 or 2 meals per seat	50	.06/meal
24-hour restaurant per seat	75	.07/meal served
Restaurant with paper service only per seat	25	.01/meal served
Additional for bars and cocktail lounges per seat	30	.02
Drive-in restaurant per car space	50	.02
<b>INSTITUTIONAL WASTEWATER WITHOUT KITCHENS UNLESS OTHERWISE NOTED</b>	<b>AVERAGE GPD</b>	<b>BOD<sub>5</sub> IN POUNDS per DAY</b>
Churches	5	.01
Hospitals per bed space	250	.20
Nursing homes per bed space	100	.17
Schools, Boarding per person	100	.17
Schools, Day without cafeteria, gym or showers	15	.04
Schools, Day with cafeterias, no gym or showers	20	.08
Schools, Day with cafeterias, gym and showers	25	.10
Schools, Day additional for school workers	15	.06

<b>RECREATIONAL AND 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	.04 lbs./ fixture
Public park urinal per fixture per hour when park is open	10	.01 lbs./fixture
Public park shower per fixture per hour when park is open	100	.10 lbs./ fixture
Public park faucet per fixture per hour when park is open	15	.04 lbs./ fixture
Swimming pools and bathhouses	10	.06
Travel trailer parks with individual water and sewage hookup per unit **	50	.12
Travel trailer park without individual water and sewage hookup per unit **	50	.12

\* BOD levels need further verification

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

**Appendix B Minimum Horizontal Distances (*in feet*) between Components of an On-site Wastewater Treatment System and Water, Physical and Health Impact Features**

	Spring, Well, <sup>1</sup> Suction Line	Potable Water Supply Line	Potable Water Supply Cistern	Dwelling Occupied Building	Property Lines, Piped or Lined Irrigation Ditch	Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Infiltration Structure	Lake, Water Course, Irrigation Ditch, Stream, Wetland	Dry Gulch, Cut Bank, Fill Area (from Crest)	Septic Tank
Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault	50 <sup>2</sup>	10 <sup>2</sup>	25	5	10	10	50	10	--
Building Sewer or Effluent Lines	50 <sup>2</sup>	10 <sup>2</sup>	25 <sup>2</sup>	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>3</sup>	25 <sup>2</sup>	25	20	10	25	50 <sup>3</sup>	25	5
Lined Sand Filter	60	10 <sup>2</sup>	25	15	10	10	25	10	5
Lined Evapo-transpiration Field or Outside of Berm of Lined Wastewater Pond	60	10 <sup>2</sup>	25	15	10	10	25	10	5
Unlined Sand Filter in Soil with a Percolation Rate slower than 60 MPI, Unlined or Partially Lined Evapo-transpiration System, or System <u>not</u> relying on STA for Treatment other than Aerosol	100	25 <sup>2</sup>	25	15	10	25	25	15	10

Vault Privy	50	10 <sup>2</sup>	25	15	10	10	25	10	--
Outside Berm of unlined Wastewater Pond (lagoon)	100	25 <sup>2</sup>	25	15	80 <sup>4</sup>	25	25	15	10
System <u>not</u> Relying on STA for Treatment and Utilizing Aerosol Methods	100 <sup>3</sup>	10 <sup>2</sup>	50	125	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 Colorado 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 Department. Components that are not watertight should not extend into areas of the root system of nearby trees.

1. Includes infiltration galleries permitted as wells by the Colorado Division of Water Resources.
2. Crossings or encroachments may be permitted at the points as noted above provided that the water or wastewater conveyance pipe is encased for the minimum setback distance on each side of the crossing. A length of pipe shall be used with a minimum Schedule 40 rating of sufficient diameter to easily slide over and completely encase the conveyance. Rigid end caps of at least Schedule 40 rating must be glued or secured in a watertight fashion to the ends of the encasement pipe. A hole of sufficient size to accommodate the pipe shall be drilled in the lowest section of the rigid cap so that the conveyance pipe rests on the bottom of the encasement pipe. The area in which the pipe passes through the end caps shall be sealed with an approved underground sealant compatible with the piping used.
3. Add eight feet additional distance for each 100 gallons per day of design flows between 1,000 and 2,000 gallons per day, unless it can be demonstrated by a professional engineer or geologist by a hydrologic analysis or the use of a barrier, consisting of a minimum 30 mil PVC liner or equivalent, that contamination will be minimized. 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 CDPHE - WQCD site application process.
4. The Horizontal Setback for existing wastewater ponds (lagoons) from property lines permitted in: 2003 – 1997 = 80 feet, 1996 – 1986 = 40 feet, and prior to 1986 = 10 feet. The Horizontal Setback for existing wastewater ponds (lagoons) from piped or lined irrigation ditch(s) = 10 feet.