ON-SITE WASTEWATER TREATMENT SYSTEM REGULATIONS

ON-SITE WASTEWATER TREATMENT SYSTEM REGULATIONS

Promulgated by the
City and County of Broomfield
Board of Health

July 1, 2014

Pursuant to Title 25-10-101, et seq. Colorado Revised Statutes and the Colorado Department of Public Health and Environment Water Quality Control Commission On-Site Wastewater Treatment System Regulation 43, 5 CCR -1002-43.

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SECTION 1 AUTHORITY, SCOPE AND APPLICABILITY

1.1 Authority

This regulation is promulgated pursuant to the On-site Wastewater Treatment System (OWTS) Act, Title 25, Article 10, Section 101, et seq., Colorado Revised Statutes (C.R.S.).

1.2 Declaration

In order to preserve the environment and protect the public health; 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 standards, rules and regulations for On-site Wastewater Treatment System (OWTS) in the City and County of Broomfield, State of Colorado, and to provide the authority for the administration and enforcement of such minimum standards, rules and regulations.

The Board of Health of the City and County of Broomfield finds, determines and declares these regulations and standards to be necessary for the preservation of the public health and welfare of the inhabitants of the City and County of Broomfield. This regulation and standard is adopted by the Board of Health of the City and County of Broomfield on the 13th day of May, 2014 and effective July 1, 2014.

1.3 Purpose

The purpose of these regulations, as authorized by Title 25, Article 10, C.R.S., is to provide guidance and establish minimum standards for the location, construction, performance, installation, alteration and use of individual sewage disposal systems within the City and County of Broomfield; concerning the application for and issuance of permits, inspection, testing, and supervision of installed systems; and the use, maintenance and cleaning of systems and the disposal of waste material.

1.4 Severability

Should any section, paragraph, sentence, clause, or phrase of these regulations and standards be declared unconstitutional or invalid for any reason, such portion shall be deemed separate and distinct and shall not affect the validity of the remaining portion of these regulations and standards.

1.5 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 health officer. Once approved by the health officer, the application must be submitted to the Water Quality Control Division for review in accordance with the Water Quality Control Act, 25-8-101, et seq. C.R.S, and all applicable regulations of the Water Quality Control Commission. Compliance with such a permit shall be deemed full compliance with this regulation.

1.6 Regulation Coverage and Applicability

An OWTS with design capacity less than 2,000 gallons per day (gpd) must comply with these regulations and the OWTS Act. These regulations govern all aspects of OWTS permits, performance, location, construction, alteration, installation, and use.

An OWTS with design capacity equal to or greater than 2,000 gpd must comply with Regulation 43; site location and design approval in section 25-8-702, C.R.S., and the discharge permit requirements in the Water Quality Control Act, 25-8-501, et seq. C.R.S.

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).

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

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

1.7 Repeal

Individual Sewage Disposal System Regulations, adopted on January 13, 2004, are hereby repealed in its entirety and superseded by these regulations.

SECTION 2 DEFINITIONS

Absorption System – means a leaching field and adjacent soils or other system for the treatment of sewage in an OTWS by means of absorption into the ground. See Soil treatment area.

Applicant – means a person who submits an application for a permit for an OWTS.

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

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

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

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

Board of Health - means the Board of Health of the City and County of Broomfield.

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.

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 OWTS component or grease/waste from a grease interceptor.

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

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

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

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

Component – means a subsection of an OWTS; 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.

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

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

Department – as used in these regulations, means the City and County of Broomfield, Department of Health and Human Services, Public Health and Environment Division.

Design – means: 1) the process of selecting, sizing, locating, specifying, and configuring treatment train components that match site characteristics and facility use as well as creating the associated written documentation; and 2) written documentation of size, location, specification and configuration of a system.

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 this regulation.

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

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

Division – means the division of administration at the Colorado Department of Public Health and Environment of which the Water Quality Control Division is a part.

Domestic Wastewater – See Wastewater, domestic.

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

Effluent filter – See Effluent screen.

Effluent line – means non-perforated pipe that conveys effluent from one OWTS 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 (EHS) – 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 System – means an unlined OWTS component that uses evaporation, transpiration, and absorption for dispersal of effluent.

Evapotranspiration System – means an OWTS 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.

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

Floodway – means the channel of a river or other watercourse and the adjacent land areas that 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, OWTS Regulation, 5 CCR 1002-43.

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

Health officer – means the chief administrative public health officer of the City and County of Broomfield, Department of Health and Human Services, Public Health and Environment Division or his authorized representative.

Higher level treatment – means designated treatment levels other than treatment level 1.

Individual Sewage Disposal System – means a term used for OWTS in Colorado regulations from 1973 until 2013.

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.

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

Leach field – See Soil treatment area.

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.

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).

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 OWTS 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.

NDDS - means a non-pressurized drip dispersal system.

On-Site Wastewater Treatment System (**OWTS)** - or, where the context so indicates, the term **System** – means an absorption system of any size or flow or a system or facility for treating, neutralizing, stabilizing, or dispersing sewage generated in the vicinity, which system is not a part of or connected to a sewage treatment works.

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

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

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

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

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

Permit – means a permit for the construction or alteration, installation, and use or for the repair of an OWTS.

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

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** – means a privy over an unlined excavation.
b. **Vault privy** – means a privy over a vault.

Professional engineer – means an engineer licensed 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 30 semester (45 quarter) hours of undergraduate or graduate work in a field of geology and whose post-baccalaureate training has been in the field of geology with a specific record of an additional five years of geological experience to include no more than two years of graduate work. section 23-41-208, C.R.S. and section 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.

Regulation 43- means the CDPHE Water Quality Control Commission OWTS Regulation 43, 5 CCR 1002-43, Effective June 30, 2013.

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.

Reserve area –an area of land approved for the installation of a conforming OWTS and dedicated for replacement of the system upon its malfunction.

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; see wetland, constructed.

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

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

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

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

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

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

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

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

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

Sewage treatment works – has the same meaning as "domestic wastewater treatment works" under 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 OWTS.

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 – (STA) means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drainfields 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.

Systems cleaner – means a person engaged in and who holds himself or herself out as a specialist in the cleaning and pumping of OWTSs and removal of the residues deposited in the operation thereof.

Systems contractor – means a person engaged in and who holds himself or herself out as a specialist in the installation, renovation, and repair of OWTSs.

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 – (TL) means defined concentrations of pollutants to be achieved by a component or series of components of an OWTS.

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

Trench – means: 1) below-grade soil treatment area consisting of a shallow excavation with a width of three feet or less containing distribution media and one lateral; and 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 ten percent finer (A soil having a uniformity coefficient smaller than four would be considered "uniform" for purposes of this regulation).

Use Permit – means a permit authorizing the use of an OWTS as more fully set forth in section 43 herein.

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 OWTSs.

Visual and tactile evaluation of soil – means the determination of 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 BOD5 greater than 300 mg/L; and/or TSS greater than 200 mg/L; and/or fats, oils, and grease greater than 50 mg/L entering a pretreatment component (as defined by NSF/ANSI Standard 40 testing protocol); 2) effluent from a septic tank or other pretreatment component that has BOD5 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 Division.

Wetland, constructed – See Rock-plant filter.

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

SECTION 3 NEW, REPAIR AND EXPANSION PERMITS, AND INSPECTIONS

3.1 Permit Required

No person or persons shall install, alter, repair or use a system within the City and County of Broomfield, State of Colorado, unless such person holds a valid permit, issued by the Department in the name of the property owner for the specific construction, remodeling, installation, or use, proposed at the location described on the permit. A permit may be required for the expanded use of an existing system beyond the design capacity of said system.

3.2 Fees

A non-refundable fee shall be required of applicants for accepting and processing an application for a permit to construct and install any new system, for the repair or alteration of any existing system, or the use of any system as set forth in section 4, herein. The fee shall be payable to the Department at the time the application is made to the Department.

A. The Board of Health shall establish the amount of fees for each type of permit by resolution, as amended from time to time, which shall be available upon request. Fees are established pursuant to the provisions of the Act. The Department may, at its discretion, waive any permit fee normally required for a system.

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

3.3 Permit Application Requirements and Procedures Information Required

Minimum permit application requirements:

A. Owner name and contact information.

B. Property address.

C. Property legal description.

D. Type of permit.

E. Report from Site and Soil Evaluation (section 6.1).

F. System design with a legible, accurate site plan which shows pertinent physical features on subject property, and on adjacent properties, as noted in table 5, appendix A.

G. Other information, data, plans, specifications, and tests as required by the Department.

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

3.4 Minimum Lot Size Requirement

A. Installation of an OWTS shall be permitted only on building sites that conform to the acreage requirement, based on the source of potable water:

Source of Potable Water	Minimum Lot Size
Individual wells	2.5 acres or more
Public water system	1 acre or more

B. A variance from the minimum lot size requirement may be allowed by the public health officer provided that the owner or designated representative submits to the public health officer or his authorized representative the following information:

1) A scaled plot plan prepared or reviewed and approved by a professional engineer showing locations of the following:

a) Proposed or existing water supply.

b) Proposed or existing OWTS(s).

c) Proposed area of alternate or replacement OWTS(s).

d) Streams, lakes, and other surface water.

e) Proposed or existing dwellings or other structures.

2) Topographical data including slope and floodplain information, if applicable.

3) The following hydrologic and geologic information applicable to the area of the proposed OWTS(s) and alternate or replacement OWTS(s):

   a) Soil test data as required.

   b) Geologic data as required.

4) All other information that shall be required for an OWTS permit application.

5) Justification for the variance based on the mitigation of nitrate and bacterial loading of ground water.

3.5 Permit Expiration

Permits to install and construct an OWTS expire at the end of 12 months from date of issue unless the permit is extended to a fixed date upon written request by the applicant and at the discretion of the Department.

3.6 Changes in Condition after Permit Issuance

A. Any changes or relocation of proposed structures or additions to the plot plan without approval by the Department may void the permit.

B. No change of design of an OWTS after the permit has been issued shall be made unless authorized in writing by the Department.

3.7 Denial of a Permit

A. Denials of permits shall be made in writing by the Department stating reasons for the denial and requirements for reconsideration of the application.

B. The Department may refuse to issue a permit for the construction of an OWTS where a sewage treatment works is available within 100 feet of the nearest property line and connection can be made thereto. The applicant shall provide a letter from the Director of Public Works, stating whether it is permissible for the Department to issue a permit for installation, alteration, or repair of an OWTS.

C. Any applicant who is denied a construction permit may request a hearing before the Board of Health within 30 days following such denial.

D. Upon a finding, by the Board of Health after the review of a denial of the issuance of a permit as provided by section 25-10-111, C.R.S., that an applicant for OWTS has demonstrated that said system will be constructed and used in such a manner as to comply with the declaration and intent of these regulations and all applicable state and local rules and regulations and required terms and conditions in any permit issued pursuant thereto, a permit may be issued therefore.

3.8 Disclaimer

The issuance of a permit and specifications of terms and conditions therein shall not constitute assumption or create a presumption that the Department or its employees may be liable for the failure of any system nor act as a certification that the equipment used in the system or any component thereof used in its operation or that the system for which the permit was issued insures continuous compliance with the provision of the Act, and these rules and regulations adopted thereunder or any terms and conditions of a permit.

3.9 Primary Enforcement Responsibility

A. The primary responsibility for enforcement of the provisions of the OWTS Act and the regulations adopted under said article shall lie with the Board of Health and the Department as delegated responsibility pursuant to these regulations.

B. In the event that the Board of Health and Department fail to administer and enforce the provisions of said section and the regulations adopted under the OWTS Act, CDPHE or Division thereof may assume such functions of the Department or Board of Health as may be necessary to protect the public health and environment pursuant to section 25-10-110, C.R.S.

3.10 Repair Permits

A. Application to repair and for emergency use of a malfunctioning system shall be made within two business days by any owner or occupant after receiving notice from the Department that the system serving his/her property is not functioning in compliance with these regulations. The date of expiration for repair permits shall not extend beyond 30 days from the date of issuance and shall not be renewed unless such person can show good cause in writing to the Department and can demonstrate that no hazard or nuisance exists on the property.

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

C. A Major Repair Permit shall be required for the following types of repairs or alterations:

1) Replacement of an existing soil treatment area.

2) Addition of a soil treatment area.

3) Expansion of an existing soil treatment area.

D. A Minor Repair Permit shall be required for the following types of repairs or alterations:

1) Addition or replacement of a septic tank.

2) Addition of a lift station or pump and associated piping, where a lift station, pump, or piping were not a part of the original OWTS.

3.11 Variance Procedure

A. Request for Variance

1) An applicant for a permit to construct a new OWTS or to repair or expand an existing OWTS, may request a Variance from any provision of this regulation, except as prohibited in section 3.11 B.

2) A request for a Variance must be submitted to the health officer or their designee and shall include the following:

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 that exist and/or the measures which will be taken that support a finding that the variance will result in no greater risk than that associated with compliance with the

requirements of the regulation. Examples of conditions which exist, or measures which might be taken, include but are not limited to evidence of a natural or man-made 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, that confirms that the variance does not increase the risk to public health and to the environment.

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

B. 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 table 5, appendix A of this regulation 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 based on the level of treatment in table 6, appendix A.

6) No variance from the horizontal setback from a well shall be issued unless it also meets the variance requirements of the Board of Examiners of Water Well Construction and pump installation contractors.

C. 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 the Department, the hearing procedures in section 18.5, Hearing and Review of Variance Requests, below must 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. Variances requesting setbacks no closer than existing setbacks do not have to provide technical justification from a professional engineer or professional geologist.

D. Burden of Proof

The applicant shall have the burden of proof that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting the standard being varied as in section 3.11.A.2.b., above.

E. Public Hearing

Upon receipt of the request for a variance and the required information in section 3.11.A.2, the Department shall schedule a public hearing before the Board of Health. The Department will issue a Public Notice of the Hearing and send notice via certified mail, with a minimum 20-day reply time from the date of mailing, to all adjacent property owners. The applicant and his/her engineer may attend the hearing and present testimony regarding the request for a variance.

F. Outcome of the Variance Proceeding

1) Following the public hearing, the Board of Health shall vote on the proposed variance. Approval of the variance shall require a majority vote of the Board of Health. The applicant will receive written notification of the decision regarding the request for a variance.

2) The Board of Health may impose requirements and conditions on the variance granted and the notice of an approval of the variance will include any conditions of the approval. The notice of a denial of a variance shall include those reasons which form the basis for the denial.

3) The variance and any conditions thereof shall be recorded against the property so that notice of the variance and any conditions runs with the land and any expenses associated with that recording shall be the responsibility of the party obtaining the variance.

G. Findings on Appeal

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

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

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

3.12 Site Inspection Following Permit Application and Prior to Permit Issuance

After receiving an application as required in section 3.3 for an OWTS permit, the application shall be reviewed by the Department and an inspection of the premises (site visit), unless previously made, shall be made by the Department. A determination may be made as to the suitability of the site and of the proposed design based upon observation of a test pit as required in section 6.6 to verify depth of the ground water table, suitable soil, depth to bedrock, in addition to ground slope and pertinent physical features.

3.13 Department Review and Determination

The Department shall review each application along with test results and other required information. The Department will determine if the proposed system is in compliance with the Act, and these regulations adopted thereunder after which a permit may be issued.

3.14 Final Inspection: Non-Engineered (Conventional System)

A. It is the responsibility of the system contractor to notify the Department when construction, installation, alteration, or repair has been sufficiently completed to allow inspection of the conventional system before the system is placed in use.

B. Inspection of the system by the Department shall be made after being notified that the conventional system is ready for inspection.

C. Final inspection and approval of conventional OWTSs shall be made by the Department before fill is placed to cover any part of the system.

D. The Department will determine if work has been performed in accordance with the permit requirements and will determine if the system complies with the Act, and these regulations adopted thereunder.

3.15 Final Inspection: Engineered

A. It is the responsibility of the systems contractor to notify the design engineer and the Department when construction, installation, alteration, or repair has been sufficiently completed to allow inspection of the engineered system before the system is placed in use. The system installer shall notify the design engineer to make all specified inspections during the course of construction.

B. The Department may waive its inspection of the engineered system at its discretion.

C. Final inspection and approval of all engineered OWTSs shall be made by the design engineer before fill is placed to cover any part of the system.

D. If the Department determines that it is necessary to inspect an engineered system, final inspection and approval of the engineered OWTS shall be made by the Department before fill is placed to cover any part of the system.

E. Engineered systems shall be inspected by or under the supervision of the design engineer responsible for the design. If the design engineer is not available, another registered professional engineer may provide the inspections and will become the design engineer of record and be responsible for the system.

F. The Department will determine if work has been performed in accordance with the permit requirements and will determine if the system complies with the Act, and these regulations adopted thereunder.

3.16 Authorization to Enter Upon Property

For the purpose of inspection and enforcing applicable rules and regulations and the terms and conditions of any permit issued in these regulations, authorized members of the Department are authorized to enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether or not operating OWTS facilities and systems are functioning in compliance with the Act, and these regulations adopted thereunder 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 the property having an OWTS shall permit authorized members of the Department to access to the property to conduct required tests, take samples, monitor compliance, and make inspections.

3.17 Product Development Permit

A. The Department may issue a product development permit for a proprietary treatment component or series of components. Requirements for proprietary treatment component acceptance are in section 14.2. It must be shown that a complete system, meeting the requirements of this regulation and the site, can be installed in the event the proprietary treatment component or sequence fails to perform. The product under development may then be added to the treatment system, allowing the product developer to gather data about the product's performance in the field.

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

C. A completed application for a product development permit must be submitted to the Department at least 30 days in advance of installation of the product.

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

1) Proof of the ability to install a replacement OWTS in compliance with all local requirements in a timely manner in the event of a failure or malfunction of the system under testing.

2) A description of the product under development including performance goals.

3) Documentation signed by the owner of the proposed product development site allowing access to the Department and Division for inspection of the site.

E. The Department may stipulate additional requirements for the product development permit necessary to assure the performance of the OWTS.

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

G. During the term of the product development permit, all data collected is to be submitted to the Division and the Department.

H. The Department may revoke or amend a product development permit, if the continued operation or presence of the product under development:

1) Presents a risk to the public health or environment.

2) Causes adverse effects on the proper function of the OWTS on the site.

3) Leaks or discharges effluent on the surface of the ground.

4) If the developer of the product fails to comply with any requirements stipulated on the permit by the Department or the Division.

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

3.18 Experimental Systems

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

B. The Board of Health shall not arbitrarily deny any person the right to consideration of an application for such a system and shall apply reasonable performance standards in determining whether to approve such an application.

SECTION 4 USE PERMITS

4.1 Initial Issuance of Use Permit

For systems completed on or after July 1, 2014, the Department shall, upon final approval of the OWTS, issue a Use Permit, authorizing the use of the system. For systems that have been properly issued a permit, but were completed prior to July 1, 2014, final approval of a completed OWTS shall be considered to also constitute the issuance of a Use Permit for the purposes of these regulations. As of July 1, 2014, systems that have never completed the permitting or approval process established by the Department shall be deemed to be operating without a valid Use Permit, until a Use Permit has been issued as more fully set forth in this section 4.

4.2 Issuance of a Use Permit or Renewal of a Use Permit

The owner or seller of a property served by an OWTS shall obtain the issuance of a Use Permit, or the Renewal of a Use Permit, as applicable, upon the occurrence of one or more of the following events:

A. The sale of the property, as more fully defined in section 4.3, herein.

B. A remodel that includes the addition of up to two bedrooms.

C. A change in use of the property from residential to commercial.

D. Connection of a modular unit or mobile home to the system.

E. Other conditions that the Department may deem appropriate.

In the case of a sale, as indicated above in 4.2 A, if the property owner does not obtain a Use Permit prior to a covered transaction, the purchaser of the property shall then be required to obtain a Use Permit.

4.3 Sale

For the purposes of these regulations, the term sale shall mean the transfer, sale or conveyance of any real property served by an OWTS, and therefore subject to these regulations, but shall exclude the following types of transfers:

A. Change in ownership solely to include or exclude a spouse or child.

B. Transfer subject to life estate.

C. Transfer to effect foreclosure or forfeiture of real property, provided, however, the subsequent sale of the foreclosed property by the foreclosing entity shall require the issuance or renewal of a Use Permit.

D. Transfer by redemption from a tax sale, provided, however, the subsequent sale of the redeemed property by the redeeming entity shall require the issuance or renewal of a Use Permit.

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

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

G. Transfer for the vacating or granting of a public right of way.

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

I. New homes that have not yet been occupied.

J. Sales or transfers occurring with six months of the previous issuance of a Use Permit or Renewal of Use Permit.

4.4 Application Requirements

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

A. Owner's name and contact information.

B. Physical address of property.

C. Legal description of property.

D. Name of Inspector.

E. Date and time of the inspection(s).

F. A septic tank Inspection Report completed within the previous 12 months, including a septic tank pumping receipt, when applicable, based on the Inspection Report.

G. An Inspection Report completed within the previous 12 months for any mechanical components such as pumps, alarms or higher level treatment systems.

H. Completed Inspection Report(s) on forms provided by the Department, from a Department-approved Use Permit Inspector, as hereinafter defined in section 4.10.

I. A non-refundable Use Permit fee or renewal of a Use Permit fee in the amount established by resolution of the Board of Health, as amended from time to time. The fee shall be payable to the Department at the time the application is made.

4.5 Minimum Criteria for Renewal of a Use Permit

For OWTSs (new, repair, or expansion) that were originally permitted and approved by the Department, the applicant shall obtain the Renewal of a Use Permit. In order to obtain a Renewal of a Use Permit, the inspection of the existing OWTS shall verify that the OWTS meets, at a minimum, the following criteria and conditions:

A. Submittal of an Inspection Report on Department approved forms.

B. Verification by the Department that the OWTS was originally permitted and approved by the Department.

C. Verification that all deficiencies identified during the inspection, as set forth in the Inspection Report have been corrected in accordance with these regulations.

D. If it is determined that OWTS meets the foregoing criteria, the Department shall issue a Renewal of a Use Permit, setting forth the terms and conditions of approval.

4.6 Minimum Criteria for Issuance of a Use Permit

For OWTSs that have never completed the permitting or approval process established by the Department, the applicant shall obtain a Use Permit. In order to obtain a Use Permit, the inspection of the existing OWTS shall verify that the OWTS meets, at a minimum, the following criteria and conditions:

A. All tanks must be structurally sound and in good working order and provided with suitable lids.

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

C. Alarms, control devices, and components necessary for the operation of the system are present and in good working order.

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

E. There are no unapproved wastewater discharges from the system.

F. Submittal of a completed Inspection Report on Department-approved forms by a Department-approved Use Permit Inspector.

G. Verification that all deficiencies identified during the inspection, as set forth in the Inspection Report have been corrected in accordance with these regulations.

H. If it is determined that OWTS meets the aforementioned criteria, the Department shall issue a Use Permit, setting forth the terms and conditions of approval.

4.7 Waiver of a Use Permit

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

B. If conditions, such as frozen ground, limit the ability to complete all necessary repairs, the 90 days allowed the purchaser may be extended by the Department.

4.8 Revocation of a Use Permit

The Department may revoke a Use Permit based upon a determination that the OWTS is no longer functioning in accordance with these regulations or that false or misleading material statements were made on the application or Inspection Reports.

4.9 Malfunctioning Systems

Systems found to be malfunctioning during inspection by the Use Permit Inspector shall be repaired in accordance with the terms of these regulations.

4.10 Penalties

Failure to obtain a Use Permit, or to obtain a renewal of a Use Permit upon the sale of a property, shall be deemed a violation of these regulations, subject to enforcement as more fully set forth in section 16, 17 and 18, herein.

4.11 Use Permit Inspectors

A Use Permit Inspector shall be a person currently licensed or certified by a nationally recognized inspector training and certification program such as the National Association of Wastewater Transporters (NAWT), National Sanitation Foundation (NSF), or approved equivalent certification.

SECTION 5 REGULATION OF SYSTEMS CONTRACTORS AND SYSTEMS CLEANERS

5.1 Systems Contractor License

A. No person shall install, alter, or repair an OWTS unless he holds a valid systems contractor license issued by the Department.

B. A system contractor license is issued to the individual who takes and passes the written systems contractor examination. The license shall follow the individual if they change employment. Each systems contractor shall have a minimum of one owner or employee with a valid systems contractor license at all times.

C. Application for systems contractor's licenses or renewals shall be made on forms supplied by the Department.

D. Prior to the issuance or renewal of a license, the Department may require the applicant to demonstrate adequate knowledge of these regulations. This may include, but is not limited to, passing an exam prepared by the Department or attending educational conferences conducted by the Department.

E. Licenses shall expire on December 31 of each year. A license which lapses because of failure to renew shall be subject to the fee established for a new license upon reapplication.

5.2 Systems Cleaner License

A. No person shall engage in the cleaning of OWTSs or the transportation of sewage to a disposal site unless he holds a valid systems cleaner license issued by the Department. Employees under direct supervision of a licensed systems cleaner shall not be required to be licensed.

B. Application for a systems cleaners license or renewals shall be made upon forms supplied by the Department. In addition to the application form, the systems cleaner shall submit to the Department the following information:

1) Copies of contracts with facilities approved by local county officials or the Department for accepting septage.

2) A record of the total volume of septage disposed at each facility in the past year.

C. Prior to the issuance or renewal of a license, the Department may require the applicant to demonstrate adequate knowledge of these regulations. This may include, but is not limited to, passing an exam prepared by the Department or attending educational conferences conducted by the Department.

D. Licenses shall expire on December 31 of each year. A license which lapses because of failure to renew shall be subject to the fee established for a new license upon reapplication.

5.3 License Fees

A non-refundable fee in the amount established by resolution of the Board of Health, as amended from time to time, shall be required of applicants for systems contractor and systems cleaner licenses. The fee shall be payable to the Department at the time the license application is made.

5.4 Revocation of a Systems Contractor or Systems Cleaner License

A. A systems contractor or cleaner's license may be revoked for failure to comply with these regulations. Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than ten days' notice of the hearing and may be represented at the hearing by counsel.

B. Written notice of revocation, specifying the violations, shall be served upon the holder of the license. Service of notice as required in this section shall be as provided by the Colorado Rules of Civil Procedure, or by registered or certified mail, return receipt requested, deliverable to addressee only.

C. Failure of a systems cleaner to keep records, submit records or quarterly reports upon request, show evidence of proper disposal or violate any of the other terms or conditions of these regulations or the Act, shall be cause for the Department to initiate revocation of license proceedings.

D. A person who has previously had a license revoked may be denied renewal by the Board of Health.

5.5 Standards of Performance Required of Holders of Systems Contractor License

A. The systems contractor shall be responsible for proper installation of the OWTS. Installation, alteration, or repair of any OWTS shall be in compliance with these regulations and with the conditions set out in the application and installation permit.

B. Notice of a requested inspection shall be given by the license holder not less than 48 hours before the inspection is to be made.

C. A license holder shall have made certain that an installation permit has been obtained prior to starting construction and the installer shall install the system in compliance with all plans and specifications as submitted by the applicant and approved by the Department.

D. System contractors shall have a copy of the permit, plans, and specifications on the property at all times that construction of the system is occurring and at the time of final inspection if so requested by the Department.

E. The systems contractor shall provide the Department or design engineer, prior to or at the time of the Department's or design engineer's final inspection of the system installation, a scale diagram As-built drawing, as detailed in section 6.11. (See diagram 1, appendix B). The diagram shall be drawn to scale on forms provided by the Department. Final approval of the system installation may be withheld for failure to submit the diagram.

F. The systems contractor shall be required by the Department, upon completion of the system installation, to appropriately mark and flag the system so as to identify its location in order to prevent vehicles or persons building the structure from driving over any part of the system. The contractor should also notify the general contractor of the above information.

5.6 Standard of Performance Required of Holders of Systems Cleaner License

A. A license holder, when cleaning tanks or aeration plants, shall remove the liquid, sludge and scum from both compartments of divided tanks and both tanks that are in series, leaving only enough sludge to act as a seed for continuing operation. Three inches of remaining residue is recommended. Tanks should not be washed or disinfected after pumping. The outlet tees or baffles of tanks shall be checked for proper installation and/or damage provided they can be observed as part of the routine pumping process. Missing or damaged tees or baffles on the outlet side of tanks shall be reported to the owner and the Department for immediate repair.

B. A license holder shall maintain his equipment so as to ensure that no spillage of sewage will occur during transportation, and that his employees are not subjected to undue health hazards.

C. A license holder shall dispose of the collected sewage only at sites approved by local county officials, or the Department in a manner which does not create a hazard to the public health, a nuisance or an undue risk of pollution and which complies with state and local rules and applicable regulations.

D. For each tank pumped, a license holder shall be required to keep a record of location serviced, volume of septage pumped, disposal facility, and condition of tank tees or baffles. These records shall be kept on forms approved by the Department. When requested by the Department, the license holder shall submit records for review by the Department. No later than December 31 of each year, the systems cleaner shall submit to the Department copies of contracts with facilities approved by local county officials or the Department for accepting septage.

SECTION 6 SITE AND SOIL EVALUATION

6.1 Requirements for a Site and Soil Evaluation

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

B. Each site evaluation shall consist of:

1) Preliminary investigation.

2) Reconnaissance.

3) Detailed soil investigation.

4) Report and site plan.

6.2 Preliminary Investigation

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

A. Property Information:

1) Address.

2) Legal description.

3) Existing structures.

4) Location of existing or proposed wells on the property.

B. Department records.

C. Published site information:

1) Topography.

2) Soil data.

D. Location of physical features, on and off the property, that will require setbacks as identified in table 5, appendix A.

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

F. Other information required by Department.

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

1) Survey.

2) Easements.

3) Floodplain maps.

4) Geology and basin maps and descriptions.

5) Aerial photographs.

6) Climate information.

7) Delineated wetlands maps.

6.3 Reconnaissance Visit

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:

A. Landscape position.

B. Topography.

C. Vegetation.

D. Natural and cultural features.

E. Current and historic land use.

6.4 Detailed Soil Investigation

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 holes or one or more soil profile test pit excavations.

B. If percolation tests are performed, at least one soil profile hole shall be evaluated to determine whether current ground water levels and/or bedrock is encountered within eight feet of the ground surface. A visual and tactile evaluation of a soil profile test pit excavation as described in section 6.6. may be substituted for a profile hole. Following two years after the effective date of this regulation, a visual and tactile evaluation of a soil profile test pit excavation shall be used instead of a soil profile hole when percolation tests are performed to determine long-term acceptance rates.

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.

D. Procedure for performing percolation tests

1) The percolation testing shall be performed by a trained person under the supervision of a professional engineer or by a competent technician.

2) Location:

a) 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 and at least one test hole in the reserve area.

b) 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.

3) Dimensions

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.

4) Change in Soil

If a change of soil type, color or structure is present within those soils comprising the depth of soil below the infiltrative surface as required in table 6, appendix A for vertical separation, a minimum of two soil percolation holes shall be terminated in the changed soil, and percolation tests shall be conducted in both holes.

6.5 Percolation Test Procedure

A. The percolation tests shall be conducted using the hole preparation, soil saturation and rate measurement procedures described below and in diagram 2, appendix B.

B. Preparation of Percolation Test Holes

1) Excavate the hole to the depth and diameter required.

2) 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.

3) Remove all loose soil from the hole.

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

C. Presoak

1) 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.

2) 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.

D. Percolation Rate Measurement

1) With the exception of Type 1 Soils (sand and loamy sand) in table 9, appendix A, percolation rate measurements shall be made on the day following the presoak procedure.

2) 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.

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

E. Sandy Soils

1) 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.

2) 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.

F. Dawson Sands

In Dawson Sands, the test shall be a minimum of four hours, or until the last three successive drops vary by less than one-sixteenth inch, whichever is greater.

G. Percolation Rate Determination and Reporting

1) The field percolation rate shall be the average rate of the percolation rates determined for all percolation test holes observed in the proposed soil treatment area in minutes per inch. The average percolation rate determined by the tests shall be used in determining the long-term acceptance rate for the proposed system from table 10, appendix A.

2) 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 6.9.G. The information in the subsections following section 6.9.G.1 through 6.9.G.5. may be included but is not required for this drawing. All holes shall be clearly labeled to relate to the information provided for the profile test pits and percolation tests.

H. Percolation Test Waiver

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.

I. Alternate Percolation Testing

1) 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.

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

6.6 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. The treatment depth is two to four feet depending on the required thickness for the treatment level below the infiltrative surface from item 4, table 6, appendix A.

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

6.7 Soil Descriptions for Determination of a Limiting Condition

Soil descriptions for determination of a limiting condition shall include:

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

B. Depth to the bedrock.

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

1) Redoximorphic features and other indicators of water levels.

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

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

6.8 Percolation Holes, Profile Holes, and Profile Test Pit 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, if required by the agency.

6.9 Report and Site Plan

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

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

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

C. Dates of preliminary and detailed evaluations.

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

E. Setback distances to features listed in table 5, appendix A.

F. Setback distances to features listed in table 6, appendix A, existing on the site or within applicable setback limits, whichever is greater.

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

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

   2) Contours or slope direction and percent slope.

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

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

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

H. Anticipated construction-related issues.

I. An assessment of 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.

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

6.10 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. Diagram 11, appendix B is an example of a scale drawing of an OWTS.

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.

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

6.11 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.

6.12 Qualifications for a Competent Technician

A. Design

1) Competencies needed:

a) Knowledge and ability to prepare required design documents.

b) Understand principles of OWTS siting and design.

c) Understand function and capacities of system components.

d) Understand sizing and design criteria of system components.

e) Identify and select appropriate components for site surface and subsurface conditions.

f) Understand construction and installation methods and operation and maintenance requirements of OWTS.

2) Possible demonstrations of competence in design:

a) Minimum of 40 hours of training for OWTS design.

b) Demonstrated knowledge of OWTS design principles through standardized OWTS design examination.

c) Maintenance of designer certification through certifying organization.

d) Minimum of two-years of experience designing or designing and constructing OWTS.

3) The Division or Department shall approve training for OWTS design.

B. Percolation Tests

1) Competencies needed:

a) Set up equipment.

b) Perform and run percolation tests according to the procedure in this regulation.

c) Record results and calculate percolation rates.

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

C. 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.

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.

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

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

SECTION 7 WASTEWATER FLOW AND STRENGTH

7.1 Wastewater Flows

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

B. Single-Family Residential Homes:

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

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

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

4) For homes with more than four bedrooms, the assumed number of persons shall be eight persons (first four bedrooms times two persons per bedroom) plus one additional person for each bedroom more than four bedrooms.

5) Table 2, appendix A summarizes the design flows for single-family residential homes up to six bedrooms.

7.2 Auxiliary Buildings

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

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

C. If the auxiliary building will have users in addition to residents and the flow from the auxiliary building will flow to the OWTS of the home, the design flow of the home must include the increased use.

D. If the auxiliary building has a separate OWTS, the facility shall be sized on the basis of table 3, appendix A and a septic tank detention time of 48 hours.

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

Design flow values and strengths for multi-family and commercial systems shall be determined from:

A. Table 3, appendix A.

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

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

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

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

7.4 Flow Equalization

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

B. The highest peak assumed shall be at least equal to the full capacity of the facility.

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.

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.

7.5 Wastewater Strength

A. Table 4, appendix A includes treatment levels (TL) that can be achieved by various OWTS components, excluding the soil treatment area. Systems qualifying for these treatment levels except TL1 produced by a septic tank alone must be approved under section 12 of this regulation. $CBOD_5$ strength must be reduced to Treatment Level TL1 or lower before applying to a soil treatment area.

SECTION 8 MINIMUM HORIZONTAL DISTANCES

8.1 Required Minimum Horizontal Distances-Applicability

Horizontal distances from the various components of a system to pertinent terrain features including streams, lakes, water courses, springs, wetlands, wells, subsurface drains, cisterns, water lines, suction lines, dry gulches, cut banks, dwellings, other occupied buildings and property lines, must be in accordance with table 5, appendix A. The setback requirements are applicable for minimum system performance and treatment levels with specific modifications allowed for higher treatment levels as provided in table 6, appendix A. All distance setback modifications must be analyzed and approved by the Board of Health or the Department and be in complete compliance with the variance procedures of this regulation and those of the Board of Health. Acceptable methods of analyzing horizontal separation distances with higher treatment levels include but are not limited to:

A. Analyzing the intended uses of impacted surface and/or ground waters.

B. Contacting adjacent property owners for potential conflicts with property line encroachments.

C. Analyzing potential impacts that system locations may have on building foundations and other potentially affected features.

8.2 Dry Gulches, Cut Banks and Fill Areas

A. Separation distances to dry gulches, cut banks, and fill areas in table 5, appendix A shall apply unless the designer or design engineer determines by observation of the exposed slope of the dry gulch, or cut bank, or by profile holes, or soil profile test pit excavations that a restrictive layer is present that will direct or allow the effluent from the soil treatment area to move laterally and surface.

B. A lesser distance may be used if it can be demonstrated by a professional engineer or professional geologist that the use of a barrier, such as a minimum 30 mil PVC liner placed between the soil treatment area and the slope of the dry gulch, cut bank or fill area will prevent effluent surfacing laterally.

C. The separation distance between a component and the crest of a dry gulch or cut bank 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.

8.3 Site Evaluation, Design, and Treatment Level Considerations

A. Components of an OWTS listed in table 5, appendix A shall be installed or located in accordance with the minimum distance requirements provided in the table or such increased distances provided by the Board of Health regulations.

B. Table 6, appendix A provides the required site evaluation, design, and treatment level considerations necessary to evaluate the site and to design and locate the soil treatment area component of an OWTS.

1) Items 1, 2 and 3 in table 6, appendix A address the allowable horizontal setback distance between the soil treatment area and the following physical features:

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

b) Setback distance from soil treatment area to water features.

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

2) Item 4 in table 6, appendix A addresses the required vertical separation distance between the infiltrative surface of the soil treatment area and the restrictive layer or the required depth of soil comprising the soil treatment area.

3) The designer may select the level of treatment from table 6, appendix A to be applied to the soil treatment area that is necessary in order to accommodate the site conditions.

SECTION 9 DESIGN CRITERIA - GENERAL

9.1 Performance

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

9.2 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. Other criteria include, but not limited to, those listed in diagram 5, appendix B.

9.3 Accessibility for Inspection, Maintenance, and Servicing

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

B. Concrete septic tanks and other concrete tanks containing treatment units, shall be installed no deeper that four feet, from the top of finished grade to the top of the tank. Fiberglass, fiberglass-reinforced polyester, and plastic tanks shall be no deeper than allowed by the manufacturer, or four feet, whichever is less.

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

D. 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.

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

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

9.4 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 relevant local plumbing code, designs shall adhere to the Colorado Plumbing Code (3 CCR 720-1). A local plumbing permit may be required.

9.5 Electrical Equipment

A. All electrical work, equipment, and material shall comply with the requirements of the currently applicable National Electrical Code as adopted by the State of Colorado and the City and County of Broomfield pursuant to Chapter 15-03 of the Broomfield Municipal Code. A local electrical permit shall be required.

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

9.6 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.

9.7 Sampling Access

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

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

9.8 Component Operating Instructions

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

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

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

9.10 Floodplains

A. New OWTS and replacement OWTS installed in a 100-year floodplain shall meet or exceed the requirements of the FEMA 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.

B. 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.

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

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.

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.

SECTION 10 DESIGN CRITERIA - COMPONENTS

10.1 Tanks and Vaults

A. Watertightness

1) 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.

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

B. Tank Anchoring

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

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

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

C. Identification and Data Marking

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

1) Name of manufacturer.

2) Model or serial number, if available.

3) Effective volume and unit of measure.

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

5) Inlet and outlet identifications, if relevant.

10.2 Septic Tanks

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

B. Sizing Requirements

1) Sizing for residential capacity for new installations shall be based upon the number of bedrooms according to table 8, appendix A.

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

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

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

C. Testing of Septic Tank Watertightness

1) 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.

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

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

4) If the inspection in the field indicates that the tank may be damaged or is not watertight, the inspector may require that the tank be tested for watertightness by the tank manufacturer or the system contractor.

D. Septic Tank Design and Dimension Criteria

1) Diagram 4, appendix B shows a typical septic tank.

2) 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.

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

4) 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.

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

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

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

8) 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.

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

10) Risers shall be installed in conformance with section 9.3 of this regulation.

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

E. Concrete Septic Tank Structural Design

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

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

3) Certification by a professional engineer must be submitted to the Division for acceptance.

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

5) Connections between tank and risers shall be sealed to be watertight.

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

1) 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.

2) 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.

3) 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.

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

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

G. Septic Tank Depth

1) Except for repairs, concrete septic tanks and other concrete tanks containing treatment units, shall be installed no deeper than four feet, from the top of finished grade to the top of the tank.

2) Except for repairs, Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tanks shall be no deeper than allowed by the manufacturer, or four feet, whichever is less.

H. Metal tanks are prohibited.

10.3 Abandonment of Tank

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

B. If the tank will remain in place:

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

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

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

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

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

C. The Department may require abandonment of a tank that is deemed to be a hazard.

D. The Department shall be notified, in writing, when a tank is abandoned, and a pump receipt provided.

10.4 Pipe Standards and Bedding Requirements

A. Pipe Standards

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

2) Where nonperforated 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.

3) 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.

4) 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.

5) Tile pipe, open-joint pipe, and cast iron pipe must not be used in an OWTS.

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

B. Bedding

1) 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.

2) Bedding material must be mechanically compacted to support piping. Diagram 3, appendix B shows proper pipe bedding.

C. Excavation

Excavations for pipelines, fittings, and appurtenances shall be open trench to the depth, grade and in the direction necessary. The trench bottom shall be graded to provide a smooth, firm and stable foundation at every point throughout the length of the pipe, fitting or appurtenance. Should large gravel, cobbles, rocks, clods, or other unsuitable material be encountered at the trench bottom, they shall be removed (See diagram 3, appendix B). Where necessary, approved fill as specified in section 10.4.D shall be placed to provide uniform support between the pipe, fitting or appurtenance and undisturbed trench bottom. The area of the trench at pipe joints (bells) shall be excavated as necessary to provide uniform bearing of the bells on undisturbed ground. Each joint shall be recessed in undisturbed soil or approved fill in such a manner as to relieve the bell of the pipe of all load and to ensure continuous bearing along the pipe barrel upon the pipe subgrade (trench bottom).

D. Approved Fill

Approved fill shall be as specified in section 12.3.A.1.a, and table 7, appendix A. All voids between the pipe and undisturbed soils shall be filled with approved fill. Approved fill shall be worked into place or tamped, as necessary, to consolidate the fill material and completely fill all void space between the pipe and undisturbed trench bottom. (See diagram 3, appendix B). Alternate fill materials and/or methods may

be allowed upon prior approval from the Department. The Department may require that an alternate fill material or method be specified and approved by a registered professional engineer.

E. Pipe Grade

The grade of the building sewer shall be at least two percent (two foot-fall per 100 feet or one-fourth inch per foot). Buildings shall be planned so that a proper slope can be obtained. Where the terrain is extremely flat, the Department may allow a slope of only six inches per 100 feet, or five-tenths percent (six inch-fall per 100 feet or one-sixteenth inch per foot).

10.5 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.

10.6 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.

10.7 Stepdown/Relief Line

In sequential or serial distribution, a non-perforated 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.

10.8 Wastewater Pumping and Dosing Siphon Systems

A. Pumps

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

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

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

B. Floats and Switches

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

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

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

C. Location of Pump or Siphon

1) 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.

2) 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.

D. Pump or Siphon Discharge Piping

1) 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.

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

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

4) 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.

E. Access

1) 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.

2) The access riser must have a watertight connection to the pump or dosing chamber/ compartment to prevent infiltration or exfiltration.

F. Splice Box

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

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

G. Controls

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

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

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

4) 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.

5) Control panels shall be UL listed.

10.9 Effluent Screens

A. Effluent screens may be used, at the owner's discretion, in the final chamber of the final septic tank for new installations and repairs where a septic tank is replaced, unless conditions stated in 10.9.B exist.

B. 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.

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

D. An alarm may be installed on an effluent screen indicating need for maintenance. The Department may require all effluent screens to be equipped with alarms.

10.10 Grease Interceptor Tanks

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

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

SECTION 11 DESIGN CRITERIA - SOIL TREATMENT AREA

11.1 Size and Design-Basis

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.

11.2 Engineered Systems

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:

A. The soil classifications are Types 0, 3A, 4, 4A, and 5 and Treatment Levels TL2, TL2N, TL3, and TL3N as specified in table 9, appendix A of this regulation.

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

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

D. The ground slope is in excess of 30 percent.

E. Pressure distribution is used.

11.3 Calculation of Infiltrative Surface of Soil Treatment Area

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

B. Long-term acceptance rates (LTARs) are shown in table 9, appendix A.

C. If the site evaluation includes a percolation test in addition to a visual tactile evaluation of a soil profile test pit excavation, and the visual tactile and percolation test results do not coincide with the same LTAR in table 9, appendix A the designer shall use the lesser LTAR in determining the size of the soil treatment area.

D. Factors for adjusting the size of the soil treatment area are in tables 10 and 11, appendix A.

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

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

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

2) Size adjustment factors for methods of application are in table 10, appendix A.

3) Size adjustment factors for types of storage/distribution media are in table 11, appendix A.

4) A required soil treatment area receiving TL1 effluent may be multiplied by one size adjustment factor from table 11, table 12, or both, appendix A.

5) A soil treatment area receiving TL2, TL2N, TL3, or TL3N effluent must be pressure dosed. The distribution media in table 10 and 11, appendix A may be used for distribution of higher level treatment system effluent, but an additional reduction factor from table 11, appendix A shall not be used.

11.4 Allowable Soil Treatment Area Reductions and Increases

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

B. For the purpose of the table 10, table 11, or both, appendix A, a baseline system, i.e. adjustment factor of 1.00, is considered to be Treatment Level 1 (TL1) applied by gravity to a gravel-filled trench.

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

D. Reductions for use of the higher level treatment categories listed in table 4, appendix A shall only apply provided the system is inspected and maintained as required in section 15.5.B.

E. Before permitting systems with a reduced soil treatment area as a result of higher level treatment, vaults, or vault privies, the Department requires inspections, maintenance, recordkeeping and enforcement to ensure and document that the systems are meeting the designed higher level treatment standards. At a minimum:

1) Maintain accessible records that indicate:

a) Owner and contact information.

b) Address and legal description of property.

c) Location of OWTS specifying location of septic tank, higher level treatment system, soil treatment area and other components.

d) Description of OWTS installed.

e) Level of treatment to be provided.

f) Copy of current contract with a service provider.

g) Inspection and maintenance performed:

i) Dates system was inspected and/or maintained.

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

iii) Condition of system at inspection.

iv) Maintenance tasks performed.

h) Permits, if required by the Department for the work performed.

i) Condition of system at completion of any maintenance activity.

2) Frequency of inspection and maintenance must be the most frequent of:

a) Manufacturer recommendations for proprietary systems or design criteria requirements for public domain technology.

b) Department requirements.

c) Every six months for higher level treatment systems with mechanical parts.

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

3) Owner responsibilities:

a) Ensure OWTS is operating, maintained and performing according to the required standards for the designated treatment level.

b) Maintain an active service contract with a maintenance provider at all times.

c) Each time his/her current contract with a maintenance provider is renewed or replaced, send a copy to the Department within 30 days of signing.

11.5 Design of Distribution Systems

A. General

1) The infiltrative surface and distribution lines must be level.

2) 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.

3) 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.

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

5) 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.

6) 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.

7) 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.

B. Distribution Lines

1) 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.

2) Distribution lines shall be a maximum of 150 feet long.

3) Distribution lines longer than 100 feet shall be pressure dosed.

4) 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.

5) Inspection Ports

a) An inspection port accessible from ground surface must be installed at the terminal end of each line. The bottom of the inspection port tube must extend to the infiltrative surface and not be connected to the end of the distribution pipe. Inspection ports in chambers may be installed according to manufacturer's instructions if the infiltrative surface is visible or can be measured from the inspection port.

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

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

6) Trenches

a) Trenches must be three feet wide or less.

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

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

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

7) Beds

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

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

c) 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.

8) Serial and Sequential Distribution

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

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

c) Adjacent trenches or beds must be connected with a stepdown/relief line or a drop box arrangement such that each trench fills with effluent to the top of the gravel or chamber outlet before flowing to succeeding treatment areas.

C. Storage/Distribution Media

1) Rock and Pipe

a) The pipe must be surrounded by clean, graded gravel, rock, or other material of equal efficiency which may range in size from one-half inch to two and one-half 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.

b) 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.

2) Tire Chips

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

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

c) Wire strands must not protrude from the tire chips more than 0.75 of an inch.

d) Tire chips must be free from balls of wire and fine particles less than two millimeters across.

e) 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.

3) Chambers

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

b) Installation must be according to manufacturer's instructions.

c) The width of the chamber unit, relative to the excavation of the bed or trench, must conform to section 14.5. A. 4.

d) Effluent may be distributed by gravity or pressure dosing.

e) Pipe installed to the ends or along the length of chambers shall not be installed on the infiltrative surface.

4) Manufactured Media

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

b) Installation must be according to manufacturer's instructions.

c) The width of the chamber unit, relative to the excavation of the bed or trench, must conform to section 14.5. A. 4.

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

5) Pressure Distribution

a) 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.

iv) Distal pressure head.

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

c) Diagram 8, appendix B illustrates the components of a typical pressure distribution system.

6) Driplines

a) 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.

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

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

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

e) Provisions must be made for backflushing or other cleaning.

11.6 Alternating and Sequencing Zone Systems

A. Alternating Systems

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

2) 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.

3) 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.

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

B. Sequencing Zone Systems

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

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

3) An automatic distribution valve must be used.

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

11.7 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.

11.8 Soil Replacement

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 12.3.A.1.a. All added soil must be completely settled prior to installation of components as specified and approved by the design engineer. The loading rate for sand filters must be used. Pressure distribution must be used.

11.9 Repairs

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

A. Wide Beds

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

B. Deep Gravel Trenches

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:

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

1) Where:

a) L = length of trench prior to adjustment for deep gravel

b) W = width of trench or bed in feet

c) D = additional depth in feet of gravel in excess of the minimum required six inches of gravel below the distribution pipe

2) Maximum allowable additional depth is five feet.

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

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

C. Seepage Pits

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

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

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

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

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

c) The over-excavated volume must be filled with rock ranging in size from one-half inch to two and one-half inches.

d) 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.

e) 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.

f) 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.

4) 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) The construction of new seepage pits for the treatment and dispersal of OWTS on new sites is prohibited unless:

a) The seepage pit is designed by a professional engineer.

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

D. Vaults

1) Criteria for vaults are in section 10.1 and section 13.5 of this regulation.

E. Higher Level Treatment Options

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

2) Design criteria for higher level treatment systems are in section 12.

SECTION 12 DESIGN CRITERIA - HIGHER LEVEL TREATMENT SYSTEMS

12.1 General

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

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

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

2) Proprietary systems must be designed, installed, and maintained according to manufacturer's instructions and additional criteria identified in the Technology Review and Acceptance, section 14.

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

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

E. 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.

F. 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.

12.2 Treatment Levels

The treatment levels identified in table 4, appendix A are specified in this section for public domain technology, and proprietary treatment systems shall be assigned a treatment level by the technology review and acceptance, section 14. Adequate maintenance for each must be required and documented as in section 15.

12.3 Sand Filters

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.

A. Intermittent (Single Pass) Sand Filters.

1) General

a) 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.

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

c) 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 two and one-half inch screen and must be retained on a three-quarter 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.

d) Diagrams 9 and 10, appendix B illustrate typical sand filter components.

e) Application Rates

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

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

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

2) Lined Sand Filters

a) 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.

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 two and one-half inch screen and must be retained on a three-quarter inch screen. Manufactured media may be used as an alternative to gravel or stone.

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

3) Unlined (Open Bottom) Sand Filters

a) 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.

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

c) An unlined sand filter is to be sized based on 12.3.A.1.e(i) or the long-term acceptance rate of the receiving soil for TL3, whichever results in the larger area.

4) Mounded Sand Filters (Mound Systems)

a) 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.

b) Mounded sand filters must conform to section 12.3.A.3. for unlined (open bottom) sand filters.

c) 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.

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

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

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

g) Diagram 7, appendix B shows a typical mounded system.

B. Recirculating Sand Filters

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

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

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

3) Sand depth must be a minimum of two feet.

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

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

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

12.4 Rock Plant Filter

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

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

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

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

SECTION 13 DESIGN CRITERIA - OTHER FACILITIES

13.1 Facilities Receiving Wastewater Other Than Toilet Waste

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.

13.2 Evapotranspiration and Evapotranspiration/Absorption; Systems Utilizing Imported Wicking Sand

A. An evapotranspiration (ET) system may be used exclusively or in combination with a soil absorption system (see diagram 6, appendix B.).

B. An ET system shall be designed by a registered professional engineer who shall furnish design data for a complete review of the design.

C. Data to be furnished shall include, but shall not be limited to: liner material and bedding, properties of the soil in the ET bed, and provision for vegetation cover.

D. An ET system shall be located in an area where there is unobstructed exposure to sunshine.

E. The system bed shall be crowned and covered with a minimum of four inches of selected backfill material and with a vegetation cover.

F. Sizing - ET Systems shall be sized using one of the following methods:

1) Formula Method

The following formula may be used as a guide for determining the area necessary for total ET of septic tank effluent:

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

Lake evaporation in the City and County of Broomfield area is shown on U.S. Department of Commerce Weather Bureau, *Technical Paper #17*, as ranging from 40 to 50 inches/year with the Front Range area at approximately 40 inches/year or an application rate of approximately 0.07-gal/ft^2/day.

2) Water Balance Method

An ET system may be designed on the basis of a monthly water balance for the system. Such a design shall provide for total storage of average daily flows for all periods in which ET is not shown to occur. Table 9, appendix A shall be used to determine the maximum allowable soil absorption rate based on the maximum percolation rate from the set of percolation test holes.

If the water balance method is selected, the following minimum information shall be provided in a table or spreadsheet format:

a) Monthly wastewater flow into system.

b) Monthly precipitation infiltrating into system.

c) Initial moisture content in bed sand and topsoil cover.

d) Monthly ET rate.

e) Amount absorbed into soils.

f) Storage capacity of bed in gallons.

g) Monthly precipitation and ET shall be from a reputable source such as the National Oceanic and Atmospheric Administration.

G. Design

The design shall conform to diagram 6, appendix B.

H. Topsoil

This material should be selected or mixed to provide a cover that will promote the movement of water to the surface and provide a base for good vegetative cover.

I. Sand

Sand utilized in ET beds shall meet the gradation requirements shown in table 12, appendix A. Sand shall be well graded as defined by ASTM D 2487, particularly between the number 40 and number 200 sieve sizes. Design engineers shall approve systems contractor's sand prior to delivery of material to the site and shall submit to the Department, prior to final approval, sand gradation results showing conformance with this section.

J. Gravel

Clean one-half inch to two and one-half inch rock.

K. Line Separation

Line separation shall not exceed six feet.

L. Chamber Systems within ET Beds

Approved chamber systems may be utilized in ET beds. The chamber units must be spaced to provide an equal or greater amount of storage within the bed than would be provided by gravel as required in diagram 6, appendix B.

M. Liner

When high groundwater table, permeable bedrock, fractured rock, or highly pervious material (percolation faster than five minutes per one inch) endanger the groundwater, a durable and impermeable liner shall be installed in the bed to prevent the sewage effluent from entering the underlying formation or groundwater table. Liners, if required, are to be a minimum of 20 mil. thickness. Surfaces on which liners are to be placed shall be thoroughly prepared to be free of protrusions and materials which could puncture or otherwise damage or weaken the liner. If it is not possible to remove protrusions which may damage the liner, the systems installer shall provide sand bedding for the liner of adequate thickness to protect the liner.

N. Drainage

All surface drainage must be diverted around the field and the field must be sufficiently crowned to provide good runoff.

O. Vegetation

It will be necessary to contact the Soil Conservation Service or County Extension Agent to determine what grasses are best suited for each area and landscaping plan. Trees should not be planted at any location which will eventually shade the field.

P. The bed area shall be protected to prevent damage from vehicular, pedestrian, or equestrian travel. A diversion ditch and/or berm shall be provided on the uphill side(s) of the bed to deflect precipitation and other outside water away from the ET system.

Q. ET beds and evapotranspiration-absorption beds maybe wider than 12 feet.

13.3 Evapotranspiration and Evapotranspiration/Absorption Systems-Non-Pressurized Drip Dispersal Systems (NDDS)

A. Diagram 12, appendix B illustrates a typical NDDS.

B. NDDS shall be designed by a registered professional engineer.

C. Trenches shall be excavated into undisturbed soils, unless installed in suitable fill material as described below.

D. Trenching shall not occur when soils are wet enough for the soils to smear.

E. Trenching shall be done with a trencher, unless otherwise specified in the engineer design and approved by the Department. An example of where excavation with a backhoe would include, but not be limited to: slopes exceeding 12 percent and soils with cobbles.

F. Trenches shall be spaced at two feet center to center, and shall be eight inches wide, unless otherwise specified in the engineer design and approved by the Department.

G. Laterals installed within the trenches shall be two inches in diameter, schedule 40 PVC.

H. Lateral orifices shall be one-quarter inch, at eight inches on center, in the six o'clock position.

I. Trench depth shall not exceed 30 inches and trench length shall not exceed 100 feet. The trench bottom shall be level plus or minus two inches.

J. NDDS shall be dosed.

K. Options for dosing include:

1) Manual Rotation using two inch or similar ball valves.

2) Automated Rotation using automatic distributing valve (ADV).

L. Dose Volume-NDDS using manual rotation:

1) The dose volume shall be sufficient to completely fill the following pipe components:

a) The supply line from the pump to the first primary manifold.

b) The primary manifold.

c) The supply lines from the primary manifold to the zone manifolds.

d) The zone manifolds.

2) The dose volume shall be sufficient to fill the perforated distribution laterals to 25-50 percent of capacity.

M. Dose Volume-NDDS using an ADV:

1) The dose volume shall be sufficient to completely fill the following pipe components:

a) The supply line from the pump to the ADV.

b) The supply line from the ADV to the zone manifold.

c) The zone manifold.

2) The dose volume shall be sufficient to fill the perforated distribution laterals to 25-50 percent of capacity.

N. The NDDS shall include an air relief valve or snifter to allow the system to gravity drain back to the tank and into the distribution system, once the pump shuts off. Where the supply line from the pump runs uphill to the primary manifold or an ADV, the valve shall be located at the high point in the supply line. Where the supply line from the pump runs downhill to the primary manifold or ADV, the valve shall be located inside the tank, to prevent siphoning of effluent from the tank to the supply line.

O. An inspection port, connected to the distal end of one lateral in each zone shall be installed. The inspection port shall extend at least 12 inches above grade, or may be left at grade if placed into a protective accessible cover. The port shall include a one-eighth to one-quarter inch drilled hole, for an air release.

P. No irrigation shall be allowed over the soil treatment area.

Q. Upon completion of the NDDS soil treatment area, the area shall be seeded. Seeding shall be done in a manner that does not damage the system. Recommendations for seed mixes can be obtained from the local Natural Resources Conservation Service and/or the County public works departments responsible for grading, erosion and sediment control permitting.

R. In observing the construction of the NDDS, the engineer or system contractor shall utilize appropriate equipment to assure that the distribution laterals are installed within the elevation tolerances of ± two inches.

S. Four feet of vertical separation is required to subsurface materials or limiting conditions unsuitable for treating septic tank effluent. Examples of limiting conditions include:

1) Fractured media which includes granite and gneiss and weathered or decomposed facies of the same.

2) Coarse gravel.

3) Permeable and jointed materials such as sedimentary sandstone and shale.

4) Seasonally high groundwater table.

T. Sites with minimum of six inches of existing suitable soil.

For sites without suitable soils necessary to meet the required four feet of vertical separation to a limiting condition, where a minimum of six inches of existing suitable soils (exclusive of topsoil) are present above the limiting condition, the design engineer shall submit a fill plan that, at a minimum, addresses the following:

1) Removal and storage of topsoil.

2) Type of fill material to be placed and manner of placement, as follows:

a) Fill material shall be of similar texture to the existing soils and shall be placed to achieve a similar density as the existing material.

b) Fill side-slopes shall not be steeper that 3:1 (three horizontal to one vertical).

c) Methods of placement, to include lift thickness and level of compaction.

d) Grade of fill to assure adequate drainage of precipitation runoff.

3) Testing of fill material, to include, at a minimum, percolation testing in the fill, to verify that the permeability is similar to the existing soils, and to establish a long term acceptance rate (LTAR).

4) Preparation of the surface of the existing soil, prior to placement of the fill, to include, at a minimum, scarification followed by placement and compaction of the fill material.

5) Replacement of topsoil, to include, at a minimum:

   Placement prior to trenching and placement of dispersal laterals, so that native soil, fill and topsoil can be mixed.

U. Sites with Less than Six Inches of Existing Suitable Soil

For sites without suitable soils necessary to meet the required four feet of vertical separation to a limiting condition, where less than six inches of existing suitable soils (exclusive of topsoil) are present above the limiting condition, the design engineer shall submit a fill plan that, at a minimum, addresses the following:

1) Removal and storage of topsoil.

2) Type of fill material to be placed and manner of placement, as follows:

   a) Fill material shall be of similar texture to soil types 2A, 3A, or 4A, from table 9, appendix A.

   b) Fill side-slopes shall not be steeper that 3:1 (three horizontal to one vertical).

   c) Methods of placement, to include lift thickness and level of compaction.

   d) Grade of fill, to assure adequate drainage of precipitation runoff.

3) Preparation of the surface of the existing soil or limiting condition, prior to placement of the fill, to include, at a minimum, scarification followed by placement and compaction of the fill material.

4) Replacement of topsoil, to include, at a minimum:

   Placement prior to trenching and placement of dispersal laterals, so that native soil, fill and topsoil can be mixed.

V. Sites with Irregular Topography

Where "fill" is required due to irregular topography which does not allow maintaining the pipe depth within the 12-inch to 30-inch limits, the installation shall include fill rather than cutting to level the ground. Cutting removes vegetation and root systems which are essential to the operation of NDDS. Where fill will be placed for these conditions, it must meet the requirements for fill described in 13.3 T.2., above.

W. System Sizing

The minimum NDDS area shall be calculated using the following formula:

$$\text{NDDS Area (in square feet)} = \frac{\text{Design Flow (in gallons/day)} \times 2.15}{\text{LTAR}^{1}\ \text{(in gallons/day/square foot)}}$$

[1]LTAR from table 9, appendix A.

The minimum area so calculated shall be comprised of the lateral trenches, the area between the lateral trenches, plus an additional one foot outside the outermost distribution laterals and the proximate and distal ends of the laterals. Each lineal foot of distribution lateral shall be the equivalent of two square feet of NDDS area.

X. Dawson Arkose

Dawson Arkose (DA) has characteristics of Type 3A and 4A soils, from table 9, appendix A. In addition, it may also be cemented to varying degrees. If DA is present on the site, the site evaluator shall determine if the DA is suitable for the installation of NDDS, and provide a statement in the site evaluation report, stating whether or not the DA is suitable.

At a minimum, the site evaluator shall evaluate the following characteristics:

1) Whether the material is fractured and jointed.

2) The cementation class of the DA, if applicable. Using the cementation classes from the Rupture Resistance Table on page 2-50 of the Natural Resources Conservation Service Field Book for Describing and Sampling Soils, National Soils Survey Center NRCS-USDA, September, 2002 (NRCS Field Book), or latest edition, the following cementation classes will be considered suitable: Non-Cemented (NC), Extremely Weakly Cemented (EW), Very Weakly Cemented (VW), Weakly Cemented (W). The following cementation classes will be considered unsuitable: Moderately Cemented (M), Strongly Cemented (ST), Very Strongly Cemented (VS), Indurated (I).

3) The DA material within four feet of the deepest infiltrative surface of the trenches.

4) The soil class from table 9, appendix A, as determined from the tests, as specified in section 6.6 , in order to determine the associated Long Term Acceptance Rate (LTAR).

The table below summarizes characteristics one and two above. A “yes” answer to either question below means the material is unsuitable.

DAWSON ARKOSE CHARACTERISTIC	ANSWER (A YES ANSWER MEANS THE DAWSON ARKOSE IS UNSUITABLE)
Is material fractured and/or jointed?	Yes/No
Is the cementation class, M, ST, VS, or I?	Yes/No

13.4 Wastewater Ponds

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

B. A septic tank must precede the wastewater pond.

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

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

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

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

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

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

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

13.5 Vaults Other Than Vault Privies

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

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

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

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

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

F. Variances may be granted for specialized commercial uses.

G. A vault, if permitted by the Department, must have a minimum 500 gallon effective volume or be capable of holding a minimum of the two day design wastewater flow, whichever is larger.

H. 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.

I. Concrete vaults must meet the strength and watertightness requirements for septic tanks. Prefabricated fiberglass, fiberglass-reinforced polyester, and plastic tanks may be used as vaults, if the tank manufacturer provides testing criteria certifying them for this use.

J. Vault Use Permits are valid for two years and may be renewed depending on sewer availability.

13.6 Privies

A. Vault Privy

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

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

B. Pit Privy

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

2) The pit must have at least 400 gallons of effective volume.

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

4) After July 1, 2014, no new Pit Privies will be permitted or allowed by the Department.

13.7 Incinerating, Composting and Chemical Toilets

A. The health officer may permit incinerating, composting, and chemical toilets.

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

C. Incinerating Toilets

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

D. Composting Toilets

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

2) 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.

3) 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.

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

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

E. Portable Chemical Toilets

1) A portable chemical toilet may be used by permit from the Department or other agency with authority to issue permits for portable chemical toilets.

2) 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 must be required.

13.8 Slit Trench Latrine

Slit trench latrines are prohibited.

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

A. For systems discharging to State waters, see section 1.5.

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

1) Be designed by a professional engineer.

2) Be reviewed by the health officer.

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

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

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

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

a) 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.

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

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

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

a) 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.

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

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

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

F. Methods of Analysis - Sampling Points:

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

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

SECTION 14 TECHNOLOGY REVIEW AND ACCEPTANCE

Systems and components employing new technologies may only be considered for review and approval by the Department if they have been approved and certified by the Division pursuant to CDPHE OWTS Regulation Section 43.13.

SECTION 15 OPERATION AND MAINTENANCE

15.1 Rules and Regulations-Board of Health Authority to Adopt

The Board of Health may adopt rules and regulations for the scheduling of maintenance and cleaning of systems and practices adequate to insure proper functioning of acceptable systems, and may require proof of proper maintenance and cleaning pursuant to any such schedules and practices to be submitted periodically to the Department by the owner of the system.

15.2 Responsibility

The owner must be responsible for maintenance of an OWTS unless the responsibility has been contractually assigned to a tenant or a third party or a public, quasi-public, or political subdivision.

15.3 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.

15.4 Cleaning, Tanks

In order to insure good working order, all tanks shall be inspected by a licensed systems cleaner every four years and pumped when recommended by the systems cleaner.

15.5 Inspection and Maintenance Requirements

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

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

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

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

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

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

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

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

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

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

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

B. For proprietary systems, inspection and maintenance of the system shall be performed by a service provider in accordance with the manufacturer's recommendations or section 15.5.C., whichever is more stringent. For older proprietary systems where manufacturer recommendations are unavailable, inspection and maintenance shall be performed in accordance with 15.5. C. At a minimum, maintenance and inspections shall take place every six months for higher level treatment systems with mechanical parts or every 12 months for higher level treatment systems with no mechanical parts such as mounded and single-pass sand filters. The Department may amend the operating permit to reduce or increase the maintenance frequency based on information contained in the required Inspection Reports.

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

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

2) Before permitting systems with a reduced soil treatment area as a result of higher level treatment, vaults, or vault privies, the Department requires inspections, maintenance, recordkeeping, and enforcement in order to ensure and document that the systems are meeting the designed higher level treatment standards. Proof of such shall be provided to the Department on Department forms. At a minimum:

a) Maintain accessible records that indicate:

i) Dates system was inspected and/or maintained.

ii) Owner and contact information.

iii) Address and legal description of property.

iv) Location of OWTS specifying location of septic tank, higher level treatment system, soil treatment area and other components.

v) Description of OWTS installed.

vi) Level of treatment to be provided.

vii) Copy of current contract with a service provider.

viii) Inspection and maintenance performed:

a. Dates system was inspected and/or maintained.

b. Name and contact information of inspector and/or maintenance provider.

c. Condition of system at inspection.

d. Maintenance tasks performed.

ix) Permits, if required by the Department for the work performed.

x) Condition of system at completion of any maintenance activity.

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

i) Manufacturer recommendations for proprietary systems or design criteria requirements for public domain technology.

ii) Department or Division requirements.

iii) Every six months for higher level treatment systems with mechanical parts.

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

c) Owner Responsibilities:

i) Ensure OWTS is operating, maintained and performing according to the required standards for the designated treatment level.

ii) Maintain an active service contract with a maintenance provider at all times.

iii) Each time his/her current contract with a maintenance provider is renewed or replaced, a copy shall be sent to the Department within 30 days of signing.

15.6 Monitoring and Sampling

A. 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 this regulation.

B. Sampling may be required by the Department in conjunction with an enforcement action.

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

1) 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.

2) Conditions when the Department can require routine monitoring:

   a) Indications of inadequate performance.

   b) Location in sensitive areas.

   c) Experimental systems.

   d) Systems under product development permits.

3) 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 and thereafter.

15.7 Disposal of Waste Materials

All material pumped from an OWTS during a cleaning procedure shall be disposed at a site approved by local county officials or the Department in a manner which does not create a hazard to the public health, a nuisance, or an undue risk of pollution which complies with all applicable state and local rules and regulations.

15.8 Termination (Abandonment) of Use of System

The contents of a septic tank, vault, seepage pit, or cesspool, the use of which has been terminated, shall be properly disposed of and the emptied tank, vault, pit, or cesspool shall be filled with soil or rock, collapsed and buried, or crushed and removed. The Department shall be notified, in writing, when a tank, vault, seepage pit, or cesspool is abandoned, and a pump receipt provided.

SECTION 16 GENERAL PROHIBITIONS AND PENALTIES

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

For purposes of administration and enforcement of the Act, the following provisions of the Act specifying general prohibitions and penalties are incorporated herein:

A. The Department shall not issue to any person:

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

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

B. Construction of new cesspools is prohibited.

C. A person must not connect more than one dwelling, commercial, business, institutional or industrial unit to the same OWTS unless such multiple connection was specified in the application submitted and in the permit issued for the system.

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

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

16.2 Prohibition of On-site Wastewater Treatment Systems in Unsuitable Areas

The Board of Health may conduct a public hearing, after written notice to all affected property owners as shown in the records of the county assessor and publication of notice in a newspaper of general circulation at least ten days prior to the hearing, to consider the prohibition of permits of OWTS in defined areas which contain or are subdivided for a density of more than two dwelling units per acre. The Board of Health may order such prohibition upon a finding that the construction and use of additional OWTS in the defined area will constitute a hazard to the public health. In such a hearing, the Board of Health may request affected property owners to submit engineering and geological reports concerning the defined area and provide a study of the economic feasibility of constructing a sewage treatment works.

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

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

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

B. Constructs, alters, or installs an OWTS in a manner which involves a knowing and material variation from the terms or specifications contained in the application, permit or variance.

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

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

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

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

G. Willfully fails to submit proof of proper maintenance and cleaning of a system as required by regulations adopted by the Board of Health.

SECTION 17 ENFORCEMENT

17.1 Hearings

Hearings shall be administered pursuant to the requirements of the Act.

17.2 Notice of Violation

Whenever the Department determines that there has been a violation of any provision of these regulations or standards as herein provided, the Department shall give notice of such violation to the responsible person. Such notice shall be in writing and shall particularize the violation, provide a reasonable time for correction, and be addressed to the owner and/or occupant of the property concerned.

17.3 Cease and Desist Orders

The Department may issue an order to cease and desist from the use of any OWTS or sewage treatment works which is found by the health officer not to be functioning in compliance with the OWTS Act, or with applicable regulations, or is found to constitute a hazard to public health, or has not otherwise received timely repairs under the provisions of section 25-10-106 (1) (j), C.R.S.; Such an order may be issued only after a hearing which shall be conducted by the health officer not less than 48 hours after written notice thereof is given to the owner or occupant of the property on which the system is located. The order shall require that the owner or occupant bring the system into compliance or eliminate the health hazard within a reasonable period of time, or thereafter cease and desist from the use of the system. A cease and desist order issued by the health officer shall be reviewable in the district court for the county wherein the system is located and upon a petition filed not later than ten days after the order is issued.

SECTION 18 BOARD OF HEALTH ADMINISTRATIVE PROCEDURES

18.1 Revocation of Systems Contractor's or Cleaner's Licenses

A systems contractor's or cleaner's license may be revoked for failure to comply with these regulations. Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than ten days notice of the hearing and may be represented at the hearing by counsel.

18.2 Prohibition of On-site Wastewater Treatment Systems in Unsuitable Areas

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

18.3 Rules and Regulations for Maintenance and Cleaning of On-site Wastewater Treatment Systems

The Board of Health may adopt rules and regulations for the scheduling of maintenance and cleaning of systems and practices adequate to insure proper functioning of acceptable systems, and may require proof of proper maintenance and cleaning pursuant to any such schedules and practices to be submitted periodically to the Department by the owner of the system.

18.4 Findings on Appeal

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

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

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

18.5 Hearing and Review of Variance Requests

A. Upon receipt of the request for a variance and the required information in section 3.11 the Department will schedule a public hearing before the Board of Health. The Department will issue a Public Notice of the Hearing and send notice via certified mail, with a minimum 20 day reply time from the date of mailing, to all adjacent property owners. The applicant and his/her engineer may attend the hearing and present testimony regarding the request for a variance.

B. Following the public hearing, the Board of Health shall vote on the proposed variance. Approval of the variance shall require a majority vote of the Board of Health.

C. The applicant will receive written notification of the decision regarding the request for a variance.

D. The Board of Health may impose requirements and conditions on the variance granted and the notice of an approval of the variance will include any conditions of the approval. The notice of a denial or a variance shall include those reasons which form the basis for the denial.

E. 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.

18.6 Civil Penalty

A. Assessment

Upon a finding by the Department that a person is in violation of the provisions of this regulation, the Department may assess a penalty of up to $50 for each day of violation. In determining the amount of the penalty to be assessed, the Board of Health shall consider the seriousness of the danger to the health of the public caused by the violation, the duration of the violation, and whether the person has previously been determined to have committed a similar violation.

B. Appeal

A person subject to a penalty assessed pursuant to section 18.6 may appeal the penalty to the Board of Health by requesting a hearing before the Department. Such a request shall be filed within 30 days after the penalty assessment is issued. A hearing before the Board of Health shall be conducted in accordance with section 24-4-105, C.R.S.

APPENDIX A

TABLES

TABLE #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
NRCS	Natural Resources Conservation Service
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
USDA	United States Department of Agriculture

TABLE #2: SINGLE-FAMILY RESIDENTIAL DESIGN FLOWS

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

TABLE #3: ESTIMATE OF AVERAGE DAILY WASTEWATER FLOW AND BOD5 LOAD PER PERSON UNLESS OTHERWISE NOTED

RESIDENTIAL WASTEWATER	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Single-family dwellings	75	.20
OR **Single-family dwellings or auxiliary buildings by fixture type**		
Bath/Shower	14.7	.014
Dishwasher	1.8	.002
Kitchen sink with garbage grinder	5.8	.052
Laundry washer	19.5	.037
Lavatory	8.4	.021
Water closet (toilet)	24.8	.029
Total with kitchen sink garbage grinder	75	.20
Hotels and motels per room without private baths	50	.15
Hotels and motels per room with private baths	75	.15
Multiple-family dwellings or apartments	75	.20
Boarding and rooming houses	50	.15
Mobile home	75	.20
Mobile home park per space	300	.80
COMMERCIAL WASTEWATER	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Facilities with short-term or transient visitors **Examples: Airports or bus stations per passenger; fairgrounds per person attending; ball parks, race tracks, stadiums, theaters or auditoriums per seat**	5	.02
Airport per employee	10	.06
Barber and beauty shops per chair	100	.70*
Bowling alleys per lane - toilet wastes only	5	.03*
Country club per member	30	.02
County club per employee	20	.06
Dentist offices per non-wet chair	50	.14*
Doctor offices per doctor	250	.80*
Factories and plants exclusive of industrial wastewater per employee per eight-hour shift – no showers	20	.05
Factories and plants exclusive of industrial wastewater per employee per eight-hour shift - showers provided	35	.08
Kennels per dog	30	.20
Laundries, self-service per commercial washer	400	.75
Office buildings per employee per eight-hour shift	15	.06
Service stations per toilet fixture	250	.50*
Stores and shopping centers per square foot of retail space	.1	.01*
Work or construction camps semi-permanent with flush toilets	50	.17
Work or construction camps semi-permanent without flush toilets	35	.02
FOOD SERVICE ESTABLISHMENT	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Restaurant open 1 or 2 meals per seat	50	.06/meal
24-hour restaurant per seat	75	.07/meal served
Restaurant with paper service only per seat	25	.01/meal served
Additional for bars and cocktail lounges per seat	30	.02
Drive-in restaurant per car space	50	.02

INSTITUTIONAL WASTEWATER WITHOUT KITCHENS UNLESS OTHERWISE NOTED	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Churches	5	.01
Hospitals per bed space	250	.20
Nursing homes per bed space	100	.17
Schools, Boarding per person	100	.17
Schools, Day without cafeteria, gym or showers	15	.04
Schools, Day with cafeterias, no gym or showers	20	.08
Schools, Day with cafeterias, gym and showers	25	.10
Schools, Day additional for school workers	15	.06
RECREATIONAL AND SEASONAL WASTEWATER USE	**AVERAGE GPD**	**BOD_5 IN POUNDS PER DAY**
Camps, day, no meals served	15	.12
Luxury resort	125	.17
Resort night and day	50	.12
Campground per campsite**	50	.12
Public park flush toilet per fixture per hour when park is open	36	.04 lbs./ fixture
Public park urinal per fixture per hour when park is open	10	.01 lbs./fixture
Public park shower per fixture per hour when park is open	100	.10 lbs./ fixture
Public park faucet per fixture per hour when park is open	15	.04 lbs./ fixture
Swimming pools and bathhouses	10	.06
Travel trailer parks with individual water and sewage hookup per unit **	50	.12
Travel trailer park without individual water and sewage hookup per unit **	50	.12

*BOD levels need further verification

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

TABLE #4: TREATMENT LEVELS			
Treatment Level	**$CBOD_5$* (mg/L)**	**TSS (mg/L)**	**Total Nitrogen (mg/L)**
TL 1**	145	80	60-80
TL 2	25	30	60-80
TL 2N	25	30	>50% reduction***
TL 3	10	10	40-60
TL 3N	10	10	20 mg/L

Shading indicates higher treatment levels

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

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

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

TABLE 5: MINIMUM HORIZONTAL DISTANCES IN FEET BETWEEN COMPONENTS OF AN OWTS INSTALLED AFTER NOVEMBER 15, 1973 AND WATER, PHYSICAL AND HEALTH IMPACT FEATURES

	Spring, Well, [1] Suction Line	Potable Water Supply Line	Potable Water Supply Cistern	Dwelling Occupied Building	Property Lines, Piped or Lined Irrigation Ditch	Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Infiltration Structure	Lake, Water Course, Irrigation Ditch, Stream, Wetland	Dry Gulch, Cut Bank, Fill Area (from Crest)	Septic Tank
Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault	50[2]	10[2]	25	5	10	10	50	10	--
Building Sewer or Effluent Lines	50[2]	10[2]	25[2]	0	10[2]	10[2]	50[2]	10[2]	--
STA Trench, STA Bed, Unlined Sand Filter, Sub-surface Dispersal System, Seepage Pit	100[3]	25[2]	25	20	10	25	50[3]	25	5
Lined Sand Filter	60	10[2]	25	15	10	10	25	10	5
Lined Evapo-transpiration Field or Outside of Berm of Lined Wastewater Pond	60	10[2]	25	15	10	10	25	10	5
Unlined Sand Filter in Soil With a Percolation Rate Slower than 60 Minutes per Inch, Unlined or Partially Lined Evapotrans-piration System, Outside of Berm of Unlined Wastewater Pond, or System Not Relying on STA for Treatment Other than Aerosol	100	25[2]	25	15	10	25	25	15	10
Vault Privy	50	10[2]	25	15	10	10	25	10	--
Slit Trench Latrine, Pit Privy	100	50[2]	25	N/A	25	25	100	25	N/A
System Not Relying on STA for Treatment and Utilizing Aerosol Methods	100[3]	10[2]	50	125	10	0	25[3]	10	10

NOTE: The minimum distances shown above must be maintained between the OWTS components and the features described. Where soil, geological or other conditions warrant, greater distances may be required by the Board of Health or by the Water Quality Control Commission pursuant to section 25-8-206, C.R.S. and applicable regulations. For repair or upgrading of existing OWTS where the size of lot precludes adherence to these distances, a repaired OWTS shall not be closer to setback features than the existing OWTS, as reviewed and approved by the 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 Division of Water Resources.

2 Crossings or encroachments may be permitted at the points as noted above provided that the water or wastewater conveyance pipe is encased for the minimum setback distance on each side of the crossing. A length of pipe shall be used with a minimum Schedule 40 rating of sufficient diameter to easily slide over and completely encase the conveyance. Rigid end caps of at least Schedule 40 rating must be glued or secured in a watertight fashion to the ends of the encasement pipe. A hole of sufficient size to accommodate the pipe shall be drilled in the lowest section of the rigid cap so that the conveyance pipe rests on the bottom of the encasement pipe. The area in which the pipe passes through the end caps shall be sealed with an approved underground sealant compatible with the piping used.

3 Add eight feet additional distance for each 100 gallons per day of design flows between 1,000 and 2,000 gallons per day, unless it can be demonstrated by a professional engineer or geologist by a hydrologic analysis or the use of a barrier, consisting of a minimum 30 mil PVC liner or equivalent, that contamination will be minimized. If effluent meets Treatment Level 3N and the local public health agency has a maintenance oversight program in accordance with section 15.5.C of this regulation, the distance addition is not required. Flows equal to or greater than 2,000 gallons per day must be hydrologically analyzed for flow, velocity, hydraulic head, and other pertinent characteristics as means of estimating distances required to minimize contamination as part of the Division site application process.

TABLE #6: ONSITE WASTEWATER TREATMENT SYSTEM DESIGN CONSIDERATION AND TREATMENT REQUIREMENTS-SEPARATION DISTANCES FROM SOIL TREATMENT AREA

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

NOTE: Treatment levels are defined in Table 4.
Reductions in separation distances with higher level treatment may be granted only if the local public health agency regulations have included provisions for operation and maintenance.

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

TABLE #7 APPROVED FILL SPECIFICATION	
Sieve Size	**Percent Passing**
3/8”	100
#4	70-80
#8	10-25
#16	0-10
#200	0-1

TABLE #8: MINIMUM SEPTIC TANK SIZE BASED ON NUMBER OF BEDROOMS	
Number of Bedrooms	**Tank Capacity (gallons)**
2 or 3	1,000
4	1,250
Each Additional	250

TABLE 9: SOIL TREATMENT AREA LONG-TERM ACCEPTANCE RATES BY SOIL TEXTURE, SOIL STRUCTURE, PERCOLATION RATE AND TREATMENT LEVEL									
Soil Type, Texture, Structure and Percolation Rate Range					Long-term Acceptance Rate (LTAR); Gallons per day per square foot				
Soil Type	**USDA Soil Texture**	**USDA Soil Structure-Shape**	**USDA Soil Structure-Grade**	**Percolation Rate (MPI)**	**Treatment Level 1[1]**	**Treatment Level 2[1]**	**Treatment Level 2N[1]**	**Treatment Level 3[1]**	Treatment Level 3N[1]*
0	Soil Type 1 with more than 35% Rock (>2mm); Soil Types 2-5 with more than 50% Rock (>2mm)	--	0 (Single Grain)	<5	Minimum 3-foot deep unlined sand filter required[2]	**Minimum 2-foot deep unlined sand filter required[2]**			
1	Sand, Loamy Sand	--	0	5-15	0.80	1.25	1.25	1.40	**1.40**
2	Sandy Loam, Loam, Silt Loam	PR (Prismatic) BK (Blocky) GR (Granular)	2 (Moderate) 3 (Strong)	16-25	0.60	0.90	0.90	1.00	**1.00**
2A	Sandy Loam, Loam, Silt Loam	PR, BK, GR 0 (none)	1 (Weak) Massive	26-40	0.50	0.70	0.70	0.80	**0.80**
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR	2, 3	41-60	0.35	0.50	0.50	0.60	**0.60**
3A[3]	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR 0	1 Massive	61-75	0.30	0.40	0.40	0.50	**0.50**
4	Sandy Clay, Clay, Silty Clay	PR, BK, GR	2, 3	76-90	0.20	0.30	0.30	0.30	**0.30**
4A	Sandy Clay, Clay, Silty Clay	PR, BK, GR 0	1 Massive	91-120	0.15	0.20	0.20	0.20	**0.20**
5	**Soil Types 2-4A**	**Platy**	**1, 2, 3**	**121+**	**0.10**	**0.15**	**0.15**	**0.15**	**0.15**

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

1 Treatment levels are defined in Table 4.

2 Unlined sand filters in these soil types shall provide pathogen removal. Design shall conform to section 13.3.A.3, Unlined Sand Filters

3. **At a minimum, Dawson Arkose shall be classified as a Type 3A soil, unless, based on additional data or information, the design engineer recommends it be classified as Soil Type 4, 4A or 5.**

* Higher long-term acceptance rates for Treatment Level 3N may be allowed for OWTS required to have a discharge permit, if the capability of the design to achieve a higher long-term acceptance rate can be substantiated.

TABLE 10: SIZE ADJUSTMENT FACTORS FOR METHODS OF APPLICATION IN SOIL TREATMENT AREAS ACCEPTING TREATMENT LEVELS 1,2,2N, 3 AND 3N EFFLUENT			
Type of Soil Treatment Area	**Method of Effluent Application from Treatment Unit Preceding Soil Treatment Area**		
	Gravity	**Dosed (Siphon or Pump)**	**Pressure Dosed**
Trench	1.0	0.9	0.8
Bed	1.2	1.1	1.0

TABLE 11: SIZE ADJUSTMENT FACTORS FOR TYPES OF DISTRIBUTION MEDIA IN SOIL TREATMENT AREAS ACCEPTING TREATMENT LEVEL 1 EFFLUENT			
Type of Soil Treatment Area	**Type of Storage/Distribution Media Used in Soil Treatment Area**		
	Rock or Tire Chips	**Manufactured Media Other Than Chambers**	**Chambers**
Trench or Bed	1.0	0.9	0.7

TABLE 12: GRADATION OF WICKING SAND FOR EVAPOTRANSPIRATION BEDS	
Sieve Size	Percent Passing
4	100
40	50-70
200	<15

APPENDIX B

DIAGRAMS

Onsite Wastewater Treatment System As-Built Drawing

Property Address _____
Permit # _____
Date System Completed _____
System's Contractor Name _____
System's Contractor License # _____
System's Contractor Address and Phone _____

Note: Drawing must be to scale.

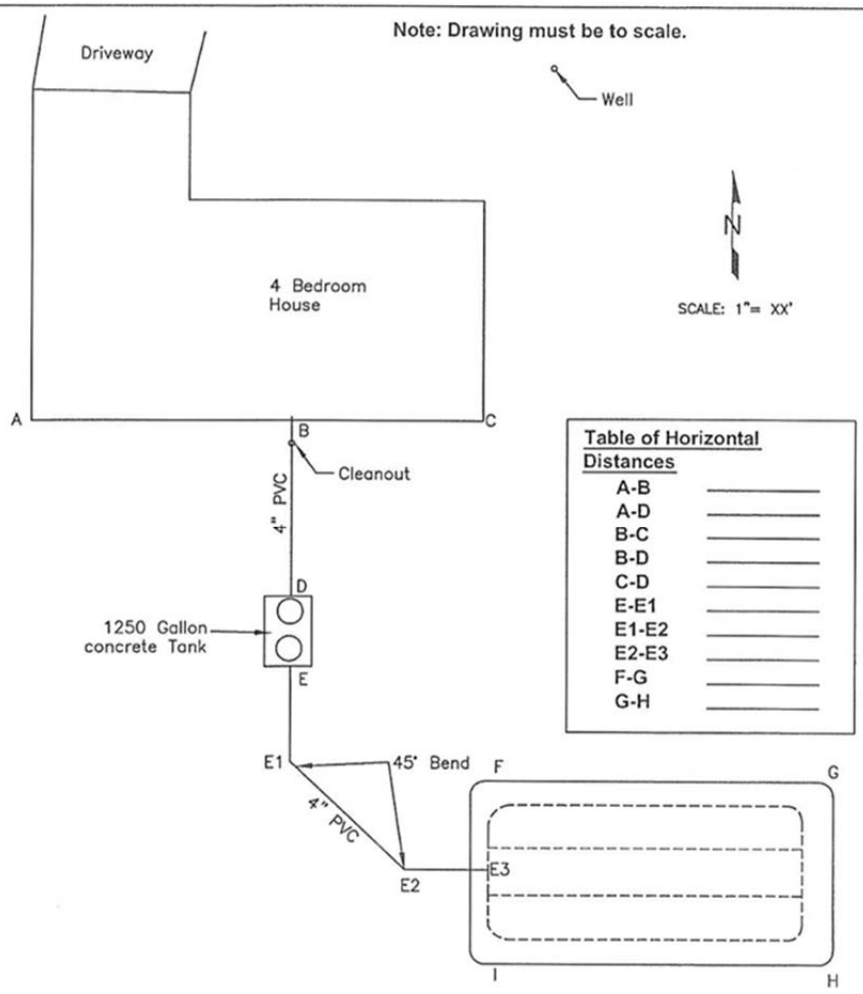
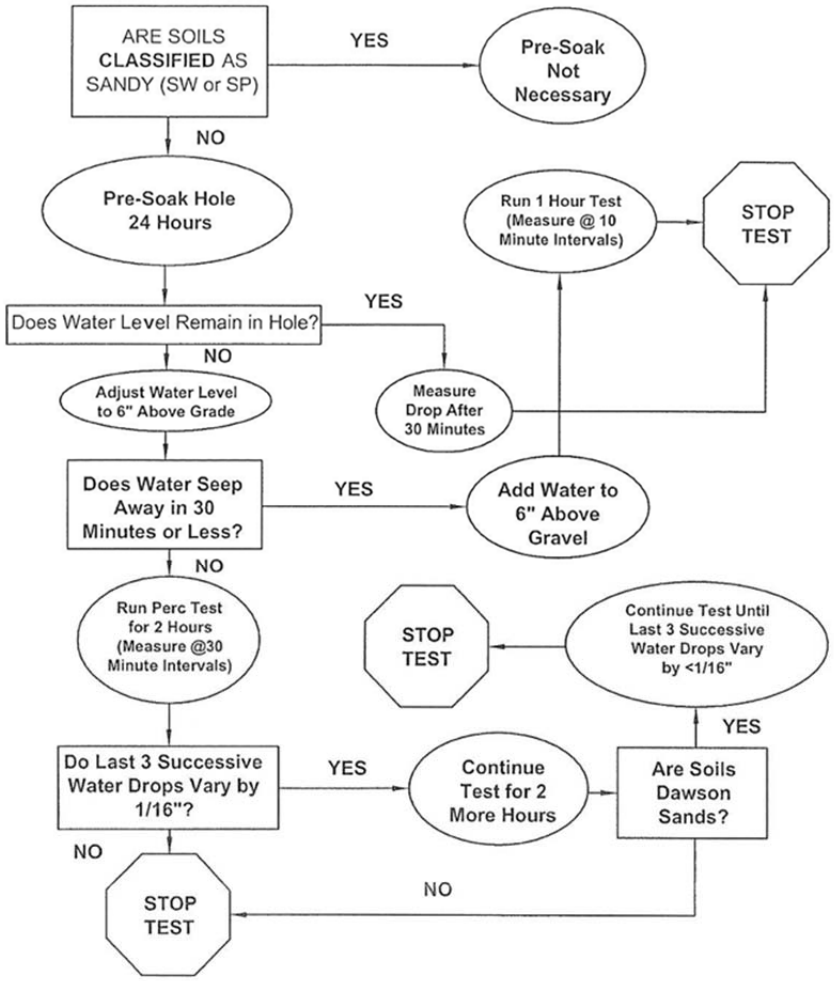


Table of Horizontal Distances	
A-B	_____
A-D	_____
B-C	_____
B-D	_____
C-D	_____
E-E1	_____
E1-E2	_____
E2-E3	_____
F-G	_____
G-H	_____

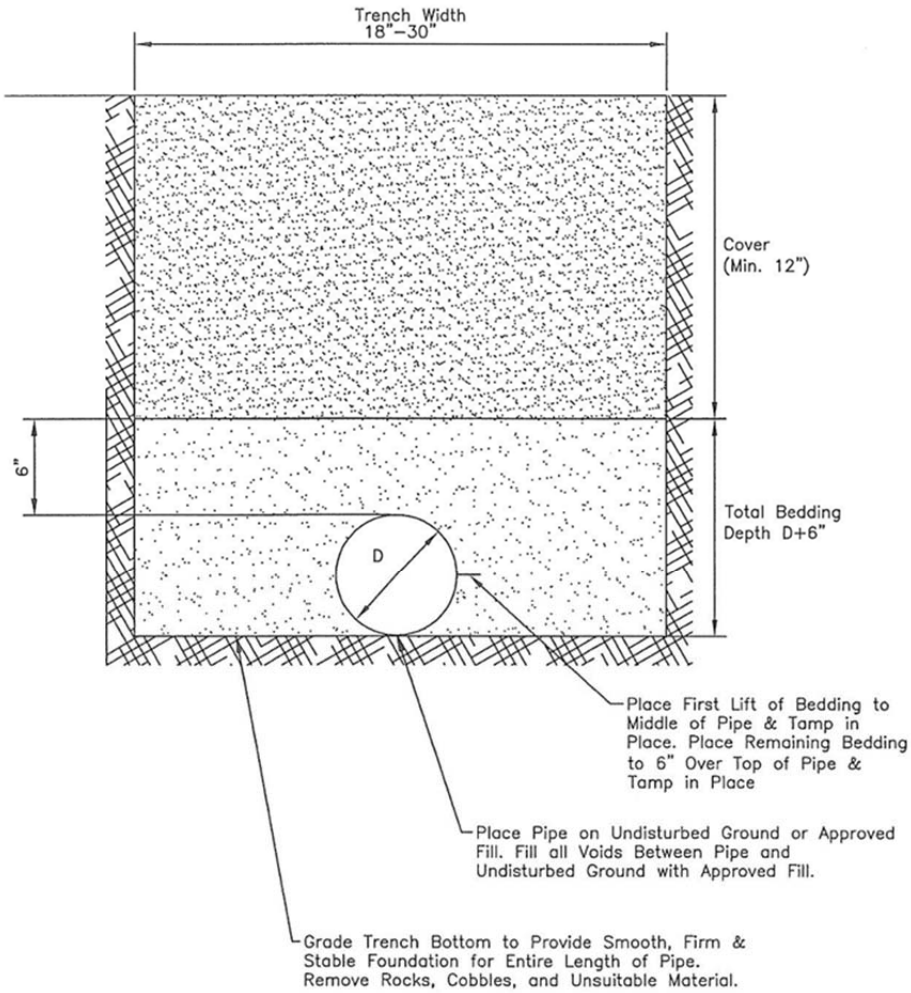
Onsite Wastewater Treatment System
As-Built Drawing

	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 1 Sheet 1/1



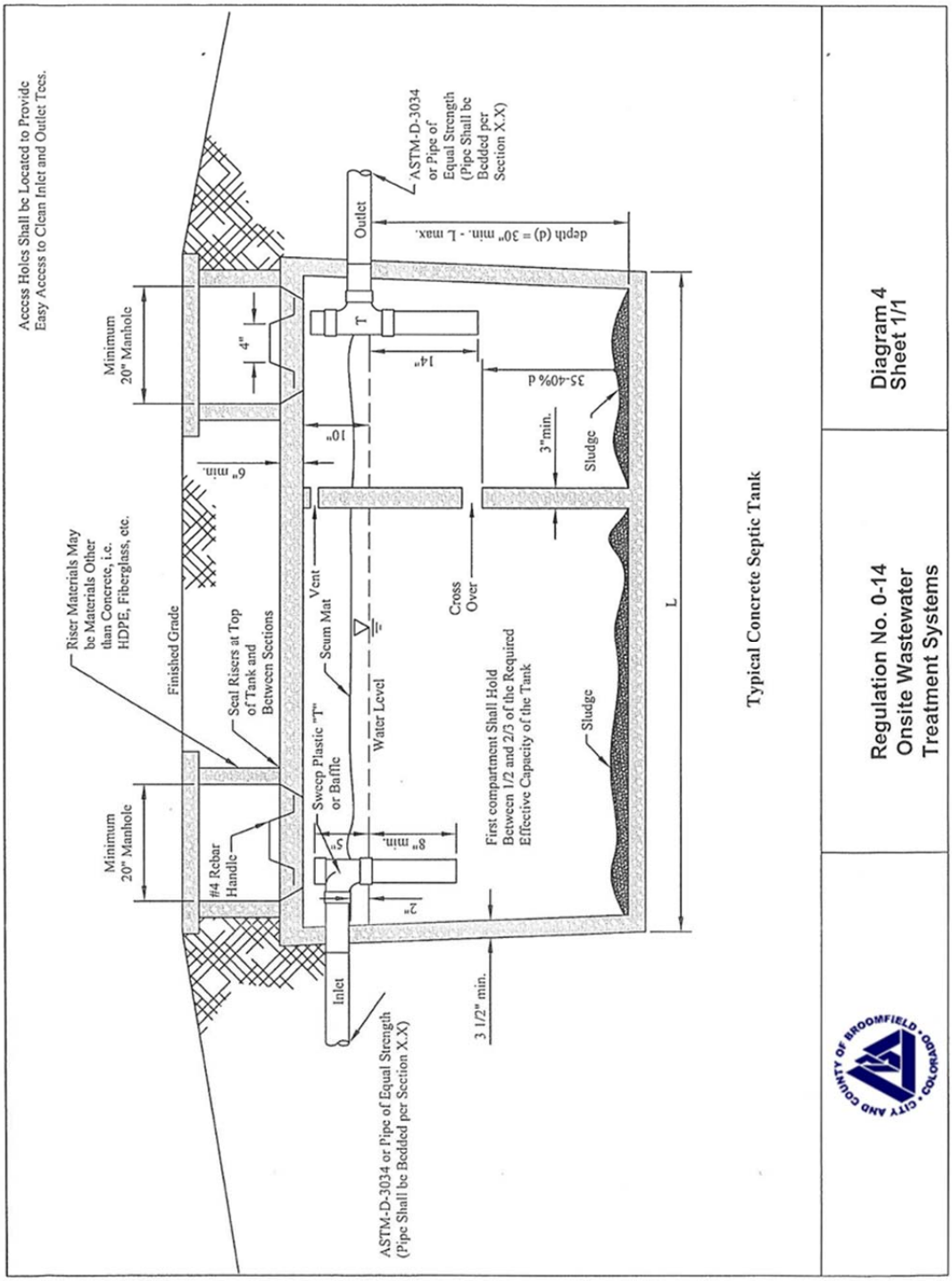
Percolation Test Procedure

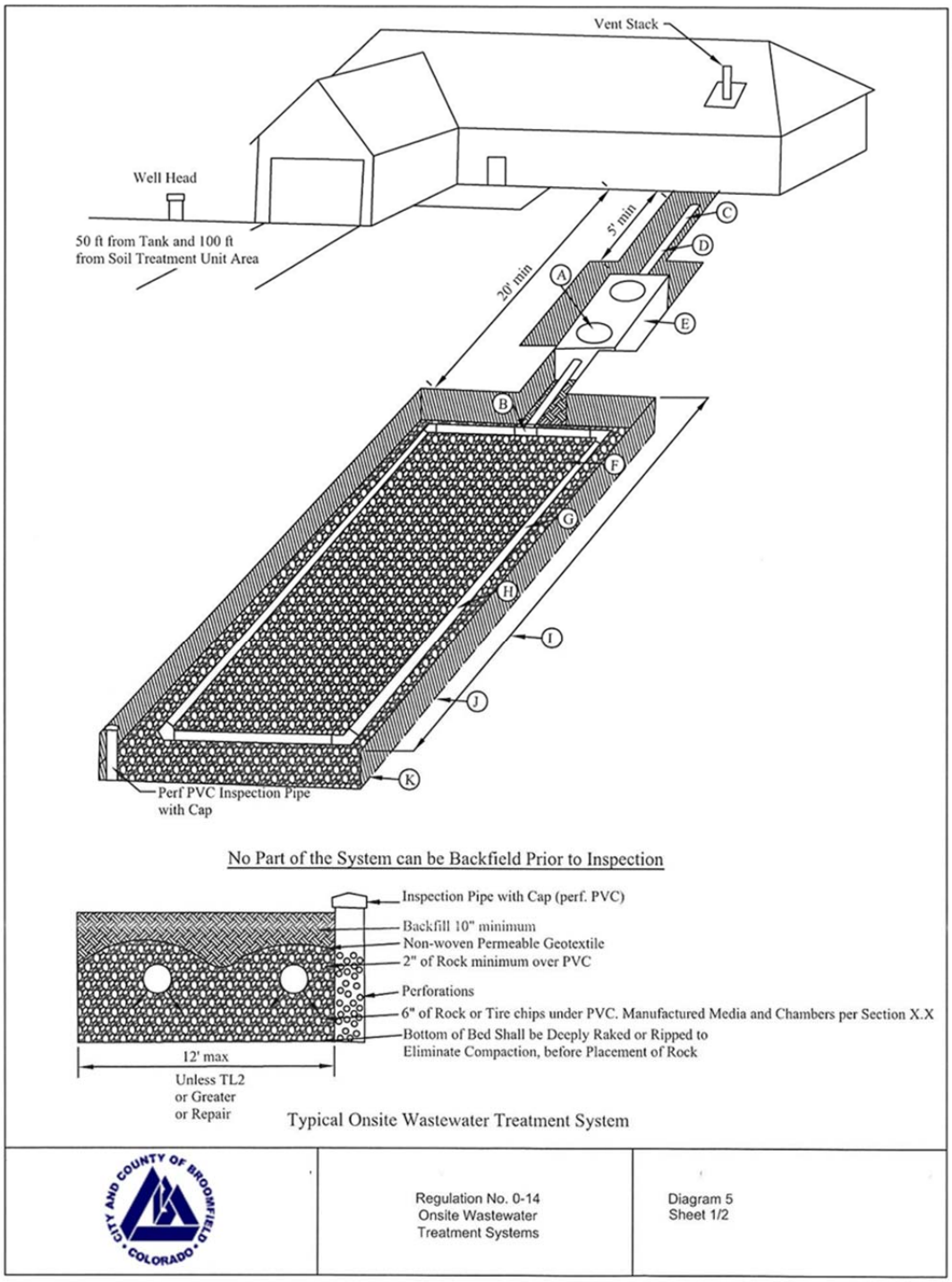
CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 2 Sheet 1/1



Pipe Bedding Detail

CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 3 Sheet 1/1


Access Holes Shall be Located to Provide Easy Access to Clean Inlet and Outlet Tees.
Minimum 20" Manhole
Minimum 20" Manhole
Riser Materials May be Materials Other than Concrete, i.e. HDPE, Fiberglass, etc.
Finished Grade
Seal Risers at Top of Tank and Between Sections
#4 Rebar Handle
6" min.
4"
10"
Sweep Plastic "T" or Baffle
Vent
Scum Mat
Water Level
5"
8" min.
12"
Inlet
ASTM-D-3034 or Pipe of Equal Strength (Pipe Shall be Bedded per Section X.X)
3 1/2" min.
Cross Over
First compartment Shall Hold Between 1/2 and 2/3 of the Required Effective Capacity of the Tank
Sludge
Sludge
3" min.
35-40% d
14"
T
Outlet
ASTM-D-3034 or Pipe of Equal Strength (Pipe Shall be Bedded per Section X.X)
depth (d) = 30" min. - L max.
L
Typical Concrete Septic Tank
Diagram 4
Sheet 1/1
Regulation No. 0-14
Onsite Wastewater
Treatment Systems
CITY AND COUNTY OF BROOMFIELD · COLORADO


Vent Stack
Well Head
50 ft from Tank and 100 ft
from Soil Treatment Unit Area
5' min
20' min
A
B
C
D
E
F
G
H
I
J
K
Perf PVC Inspection Pipe
with Cap
No Part of the System can be Backfield Prior to Inspection
Inspection Pipe with Cap (perf. PVC)
Backfill 10" minimum
Non-woven Permeable Geotextile
2" of Rock minimum over PVC
Perforations
6" of Rock or Tire chips under PVC. Manufactured Media and Chambers per Section X.X
Bottom of Bed Shall be Deeply Raked or Ripped to
Eliminate Compaction, before Placement of Rock
12' max
Unless TL2
or Greater
or Repair
Typical Onsite Wastewater Treatment System
CITY AND COUNTY OF BROOMFIELD
COLORADO
Regulation No. 0-14
Onsite Wastewater
Treatment Systems
Diagram 5
Sheet 1/2

TYPICAL ONSITE WASTEWATER TREATMENT SYSTEM

A. Both manhole lids and risers shall extend to grade (see Diagram 4).

B. "T" - set level and may be attached at any point.

C. Five (5) foot cast iron or local plumbing code.

D. At least one-quarter (1/4) inch per foot (2%) fall. Clean-out required if one hundred (100) feet or more. Pipe shall be bedded per Diagram 3.

E. Two-compartment tank or two (2) tanks in series, set level. both inlet and outlet must have a "T" or baffle.

F. One (1) foot clean, graded rock, one-half (1/2) inch to two and one-half (2-1/2) inch in size, tire chips chambers or manufactured media.

G. Perforated PVC imbedded in rock at least two (2) inches over top and six (6) inches below. Perforated PVC must be three (3) feet from edge of bed and no more than six (6) feet apart.

H. Perforated PVC must be level.

I. Soil treatment area (STA) shall not exceed one hundred (100) feet in length unless pressure dosed - must be ten (10) feet from property.

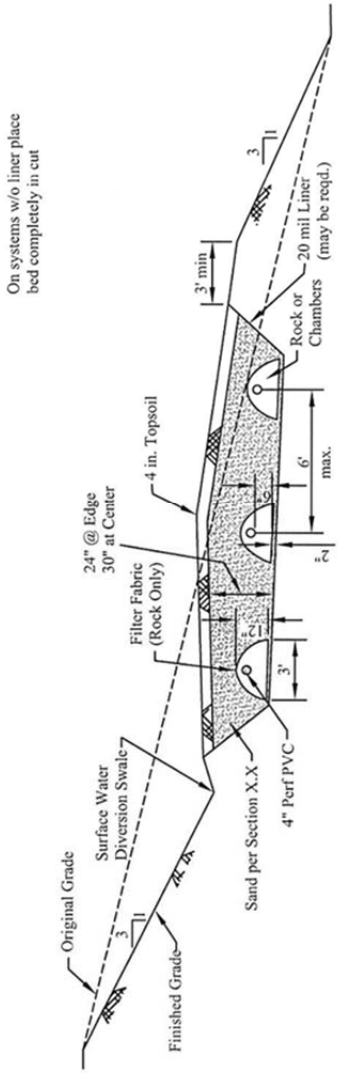
J. STA width shall not exceeded 12 feet, unless receiving TL2 effluent or better or for repair if approved by the Department.

K. STA depth shall not exceed four feet on downslope side unless designer can demonstrate adequate treatment and approved by the Department.

Bottom of bed or trench excavated level. STA shall not be excavated when soil is wet enough to smear or compact. Perforated PVC shall be placed so that perforations are opposite each other at the bottom (see end view drawing). the ends must be joined (looped) together.

Typical Onsite Wastewater Disposal System

CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 5 Sheet 2/2

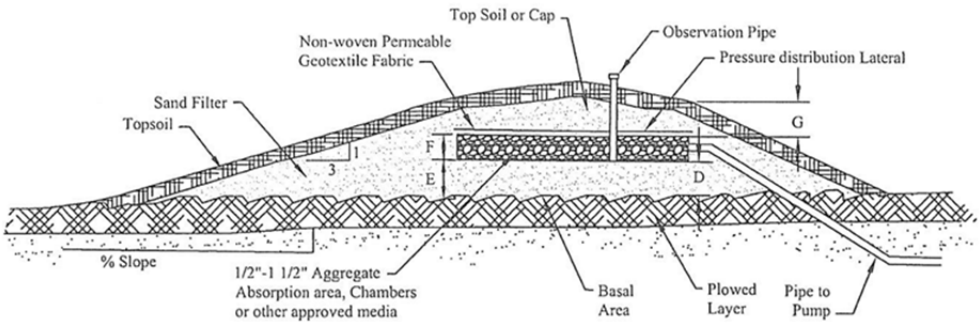


Not To Scale

Typical Evapotranspiration (ET) Bed Section

Diagram 6
Sheet 1/1

Regulation No. 0-14
Onsite Wastewater
Treatment Systems



Section A-A

Diagram 7-1
Cross-Section of a Mound System on a Site

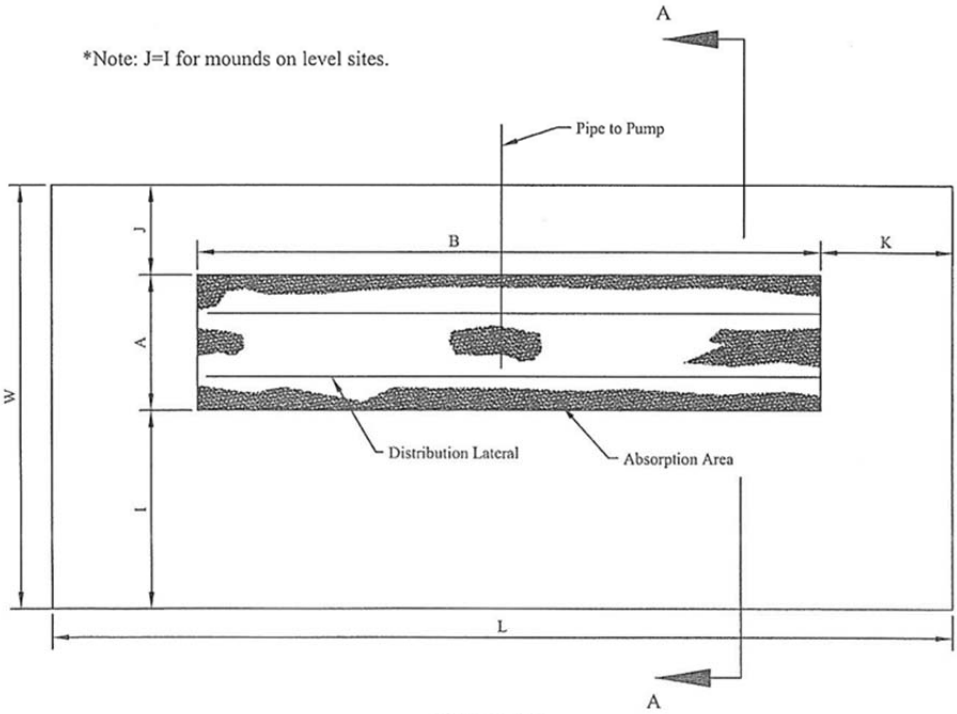
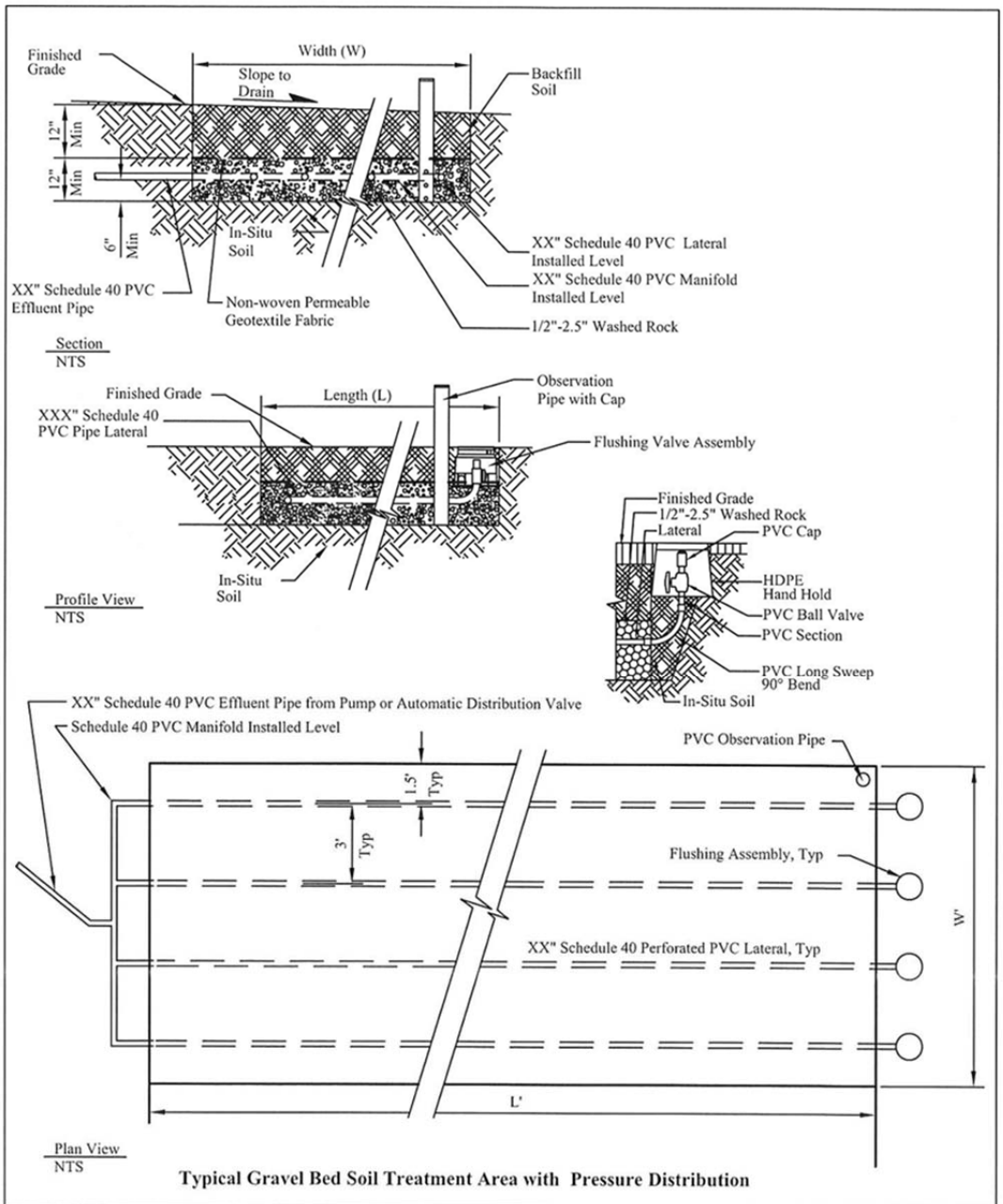


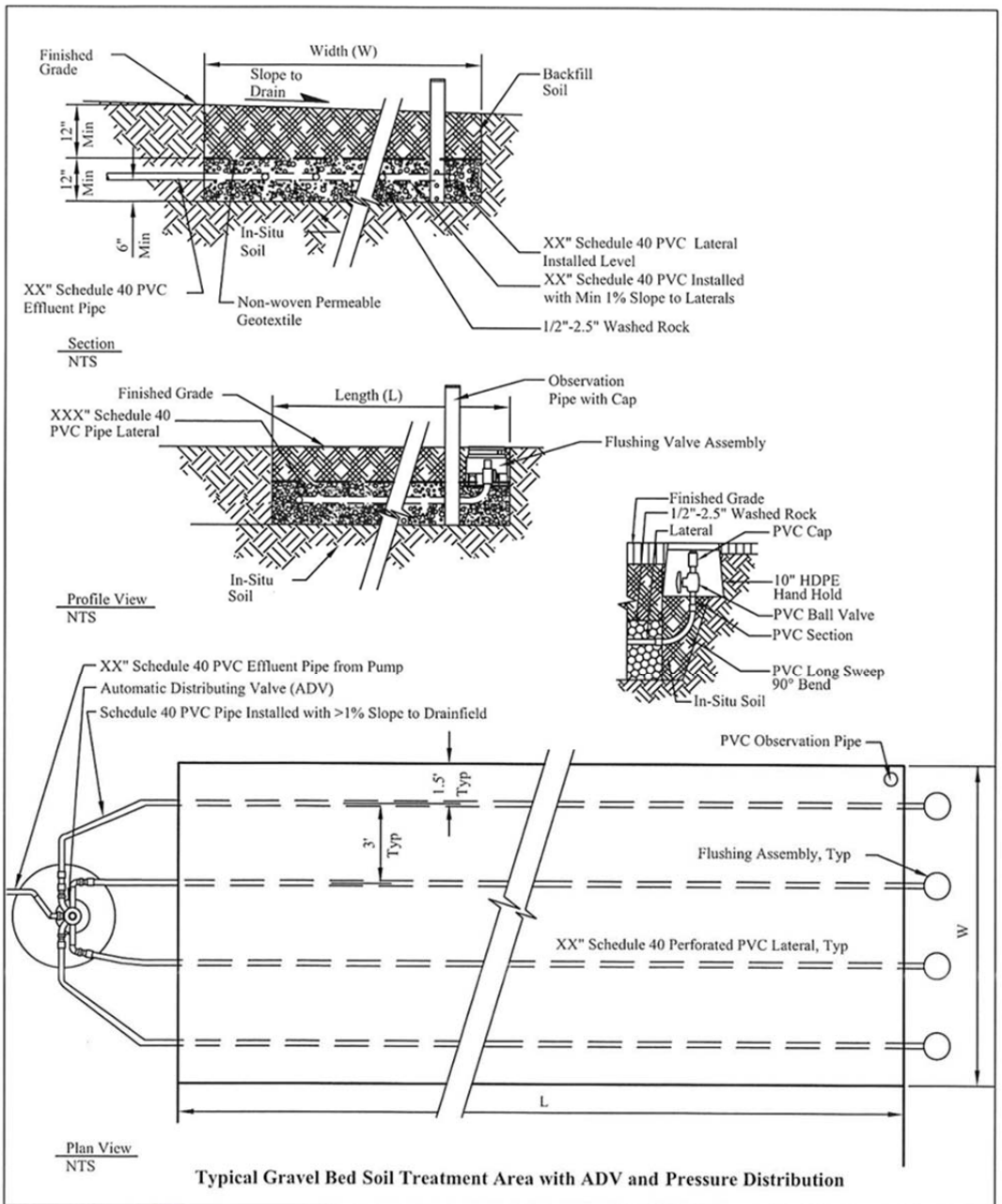
Diagram 7-2
Typical Mound System Detail

	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 7 Sheet 1/1



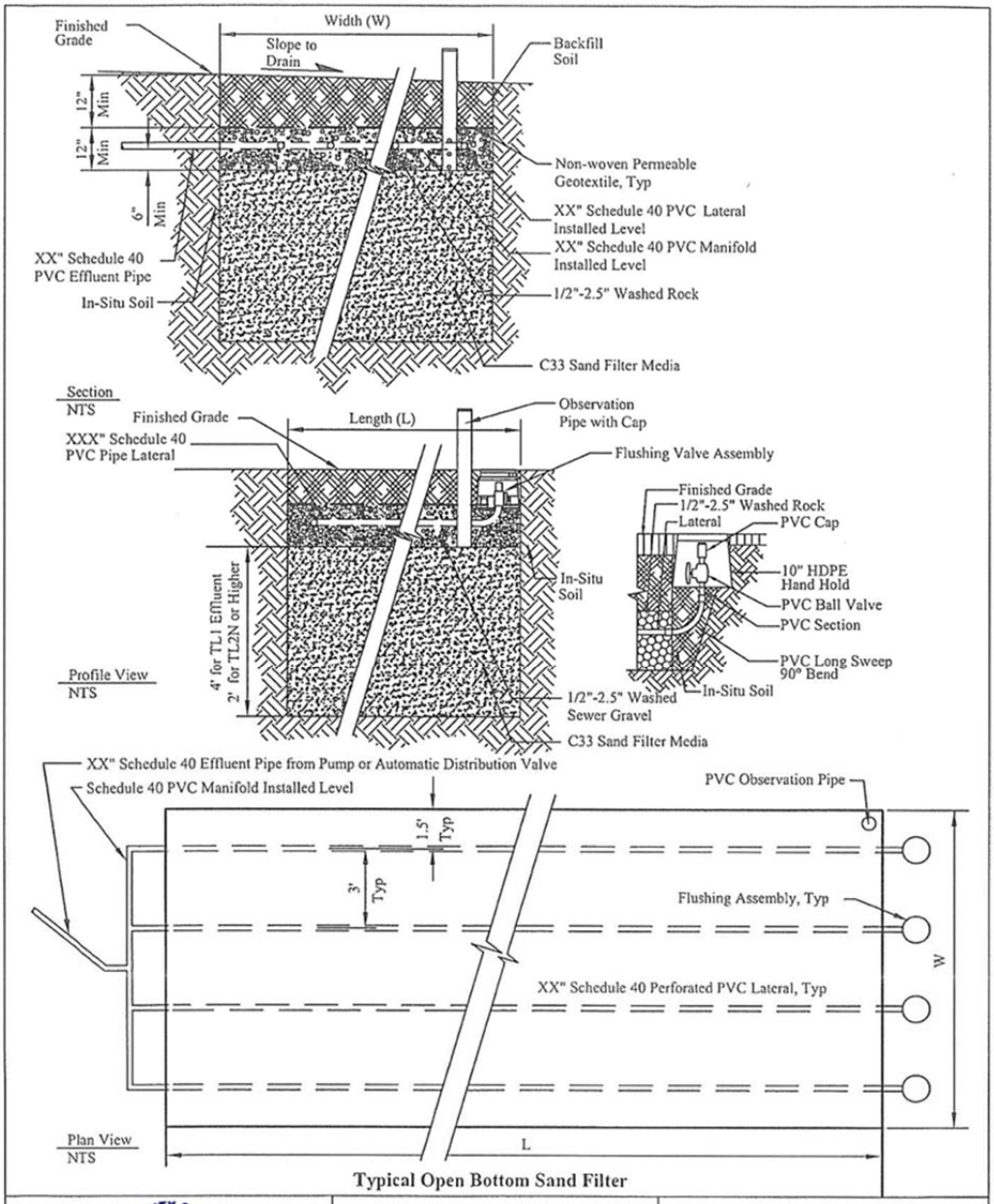
Typical Gravel Bed Soil Treatment Area with Pressure Distribution

CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 8 Sheet 1/2



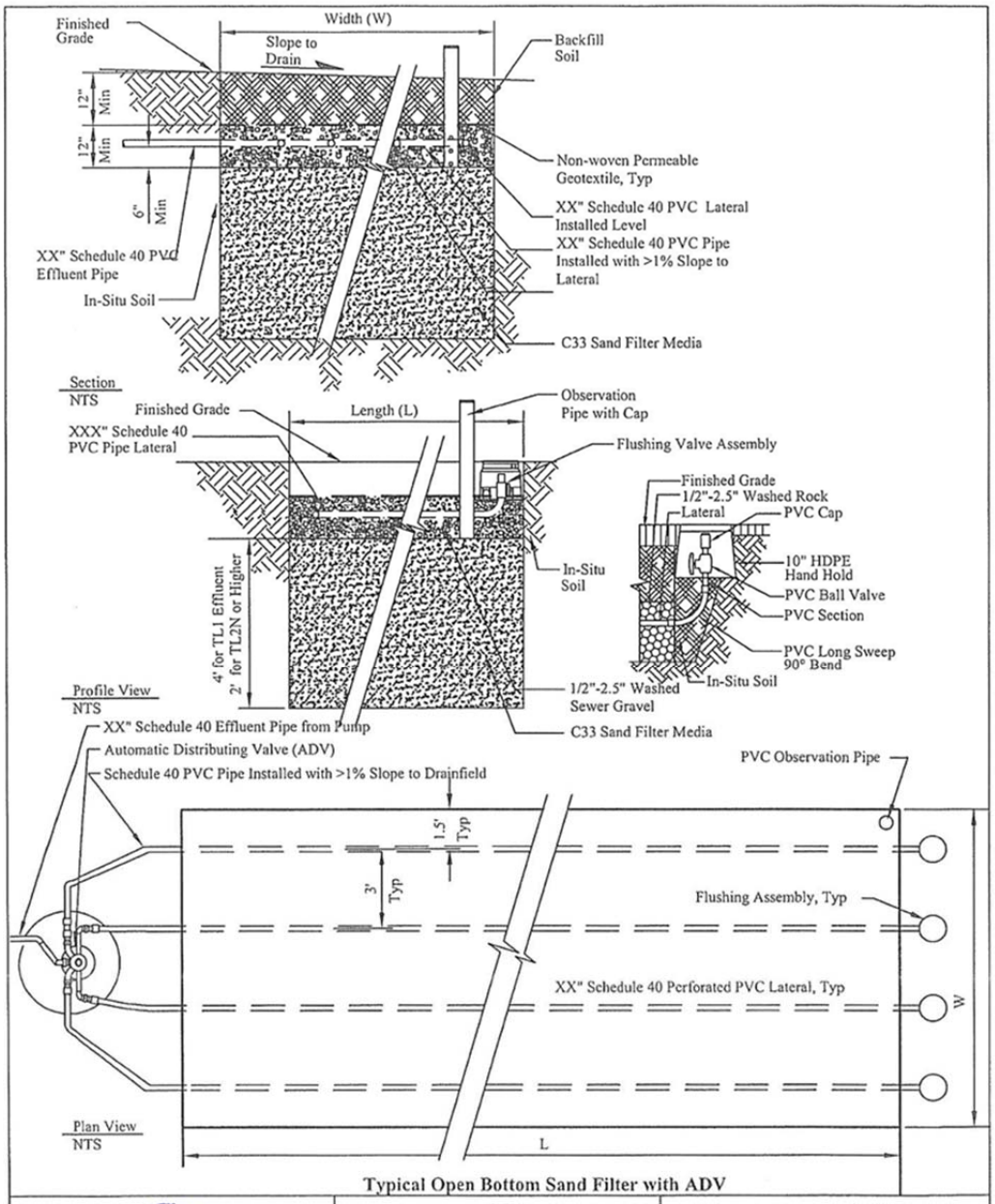
Typical Gravel Bed Soil Treatment Area with ADV and Pressure Distribution

CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 8 Sheet 2/2



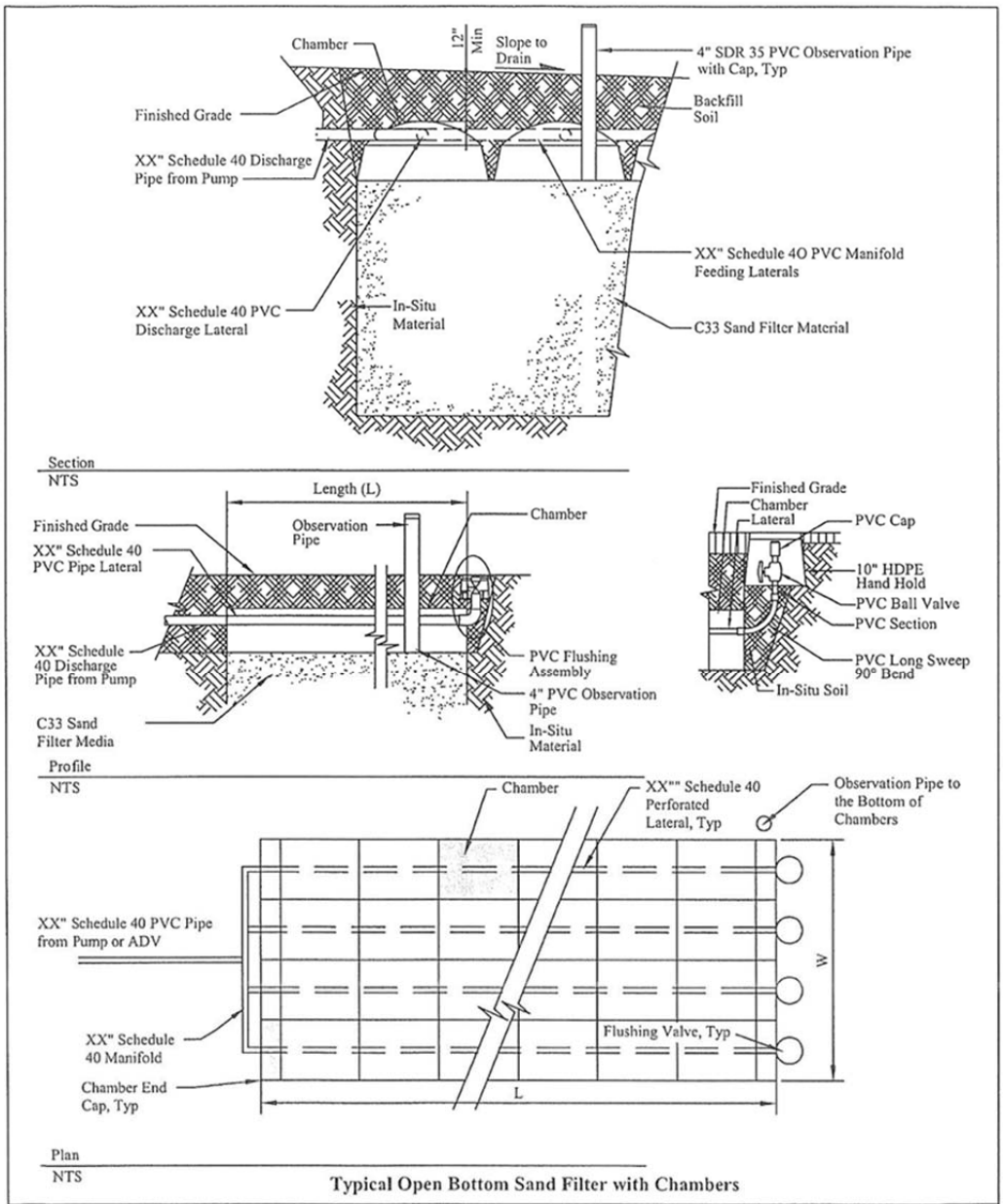
Typical Open Bottom Sand Filter

CITY AND COUNTY OF BROOMFIELD · COLORADO	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 9 Sheet 1/2



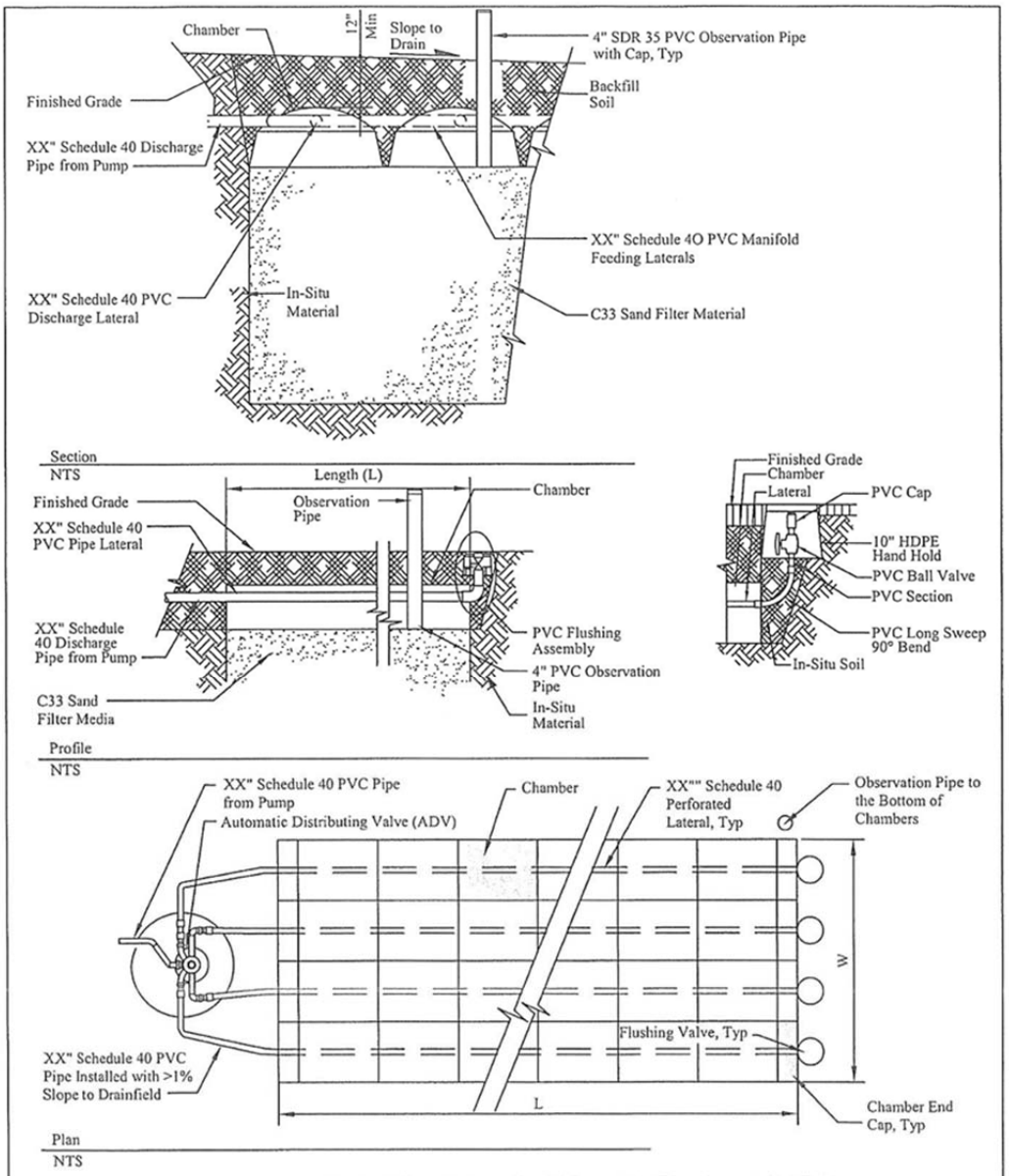
Typical Open Bottom Sand Filter with ADV

CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 9 Sheet 2/2



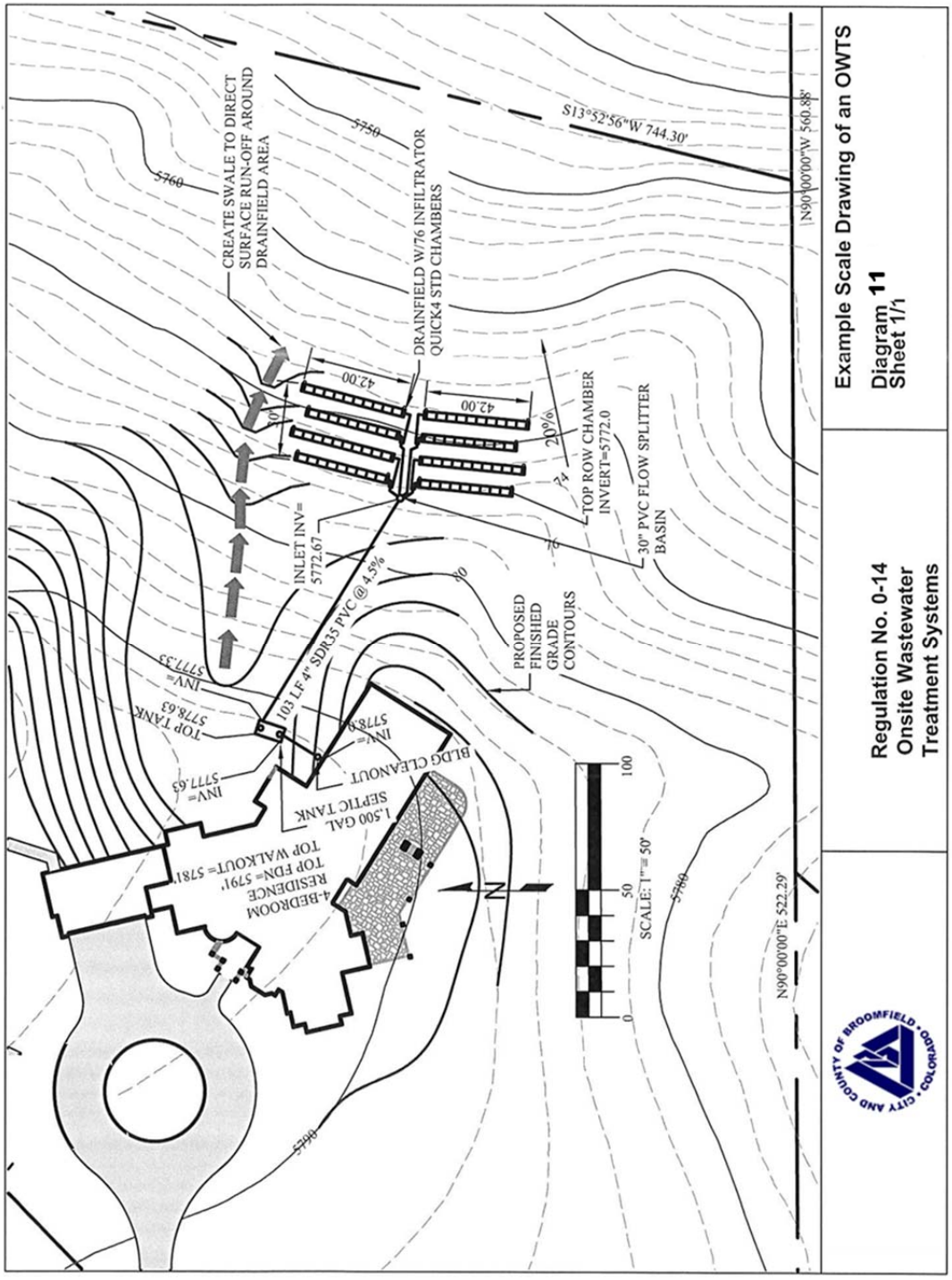
Typical Open Bottom Sand Filter with Chambers

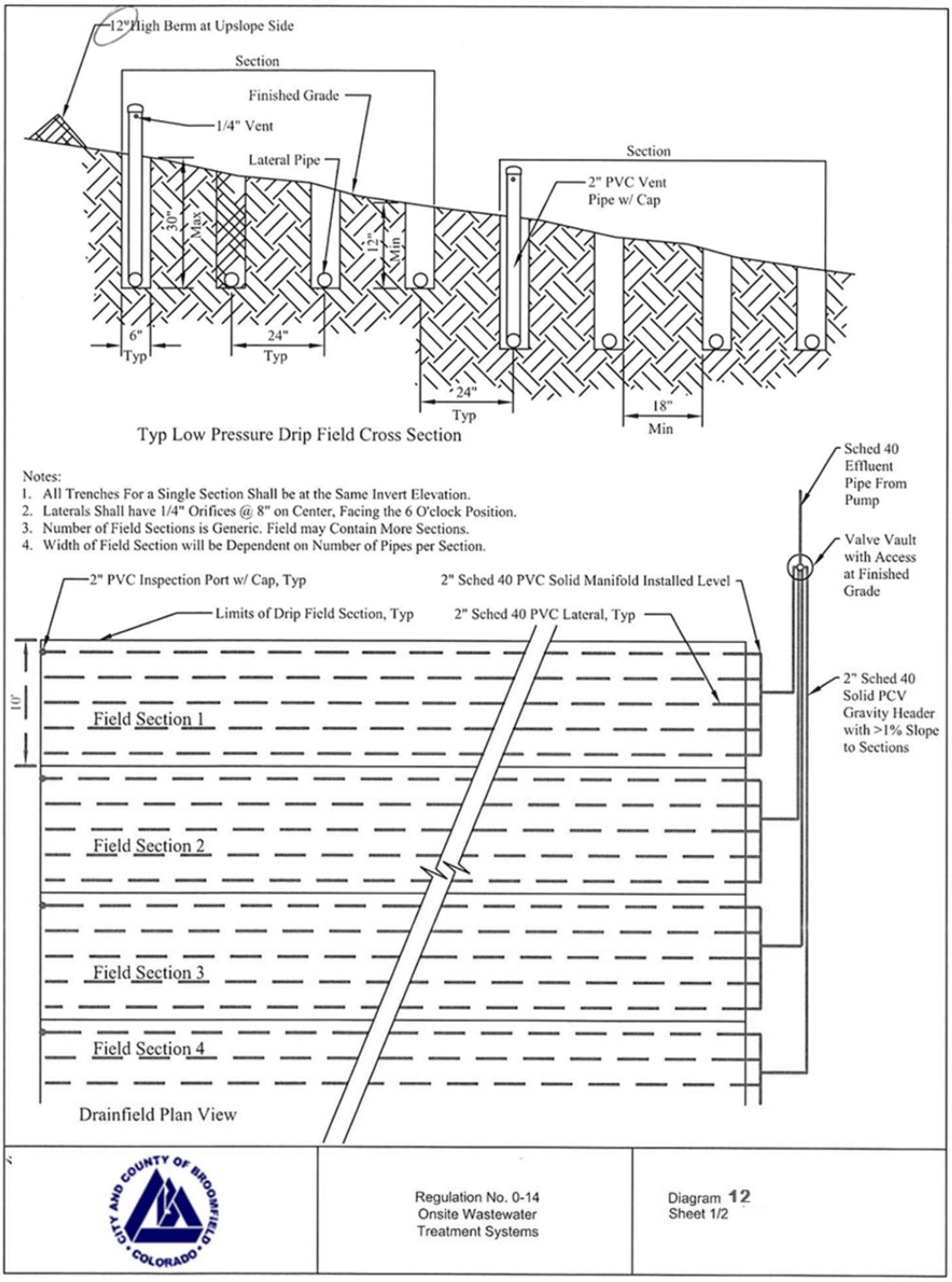
CITY AND COUNTY OF BROOMFIELD · COLORADO	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 10 Sheet 1/2



Typical Open Bottom Sand Filter with Chambers with ADV

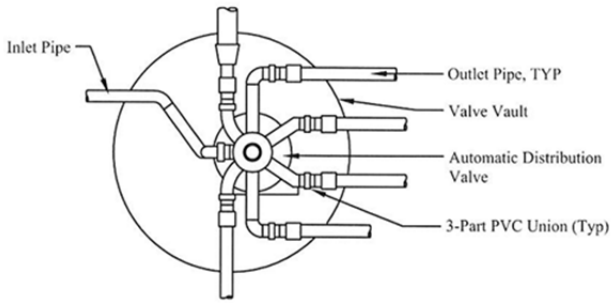
CITY AND COUNTY OF BROOMFIELD · COLORADO	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram **10** Sheet 2/2


CREATE SWALE TO DIRECT SURFACE RUN-OFF AROUND DRAINFIELD AREA
DRAINFIELD W/76 INFILTRATOR QUICK4 STD CHAMBERS
S13°52'56"W 744.30'
N90°00'00"W 560.88'
42.00
42.00
20%
TOP ROW CHAMBER INVERT=5772.0
30" PVC FLOW SPLITTER BASIN
INLET INV= 5772.67
103 LF 4" SDR35 PVC @ 4.5%
PROPOSED FINISHED GRADE CONTOURS
INV= 5777.33
TOP TANK 5778.63
INV= 5778.9
INV= 5777.63
BLDG CLEANOUT
1,500 GAL SEPTIC TANK
4-BEDROOM RESIDENCE TOP FDN= 5791' TOP WALKOUT= 5781'
SCALE: 1"= 50'
0 50 100
N90°00'00"E 522.29'
5760
5750
5740
5780
Example Scale Drawing of an OWTS
Diagram 11
Sheet 1/1
Regulation No. 0-14
Onsite Wastewater
Treatment Systems
COUNTY OF BROOMFIELD CITY AND COUNTY COLORADO

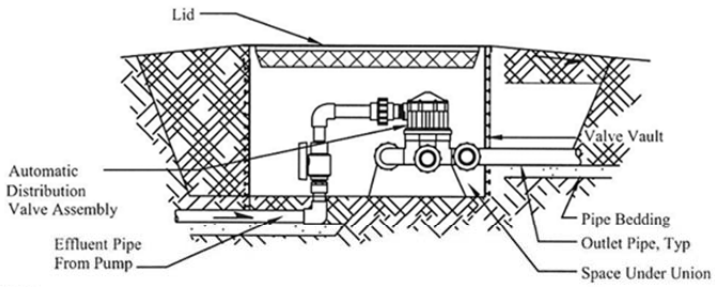

12" High Berm at Upslope Side
Section
Finished Grade
1/4" Vent
Lateral Pipe
Section
2" PVC Vent Pipe w/ Cap
30" Max
12" Min
6" Typ
24" Typ
24" Typ
18" Min
Typ Low Pressure Drip Field Cross Section
Notes:
1. All Trenches For a Single Section Shall be at the Same Invert Elevation.
2. Laterals Shall have 1/4" Orifices @ 8" on Center, Facing the 6 O'clock Position.
3. Number of Field Sections is Generic. Field may Contain More Sections.
4. Width of Field Section will be Dependent on Number of Pipes per Section.
Sched 40 Effluent Pipe From Pump
Valve Vault with Access at Finished Grade
2" PVC Inspection Port w/ Cap, Typ
2" Sched 40 PVC Solid Manifold Installed Level
Limits of Drip Field Section, Typ
2" Sched 40 PVC Lateral, Typ
2" Sched 40 Solid PCV Gravity Header with >1% Slope to Sections
10'
Field Section 1
Field Section 2
Field Section 3
Field Section 4
Drainfield Plan View
CITY AND COUNTY OF BROOMFIELD COLORADO
Regulation No. 0-14
Onsite Wastewater
Treatment Systems
Diagram 12
Sheet 1/2

Automatic Distribution Valve (ADV)

Plan View



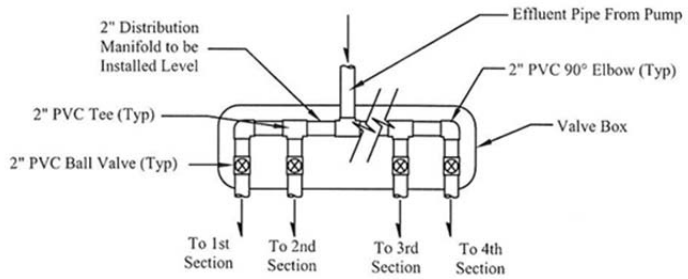
Profile View



Notes:

1. ADV Shall be Installed at the High Point of the System. Min 1% Slope Shall be provided to Drain Effluent from ADV to Field and Septic Tank.
2. Valve Vaults / Boxes shall be Installed to Allow Access from Finished Grade.

Distribution Manifold & Valves



CITY AND COUNTY OF BROOMFIELD • COLORADO •	Regulation No. 0-14 Onsite Wastewater Treatment Systems	Diagram 12 Sheet 2/2

Broomfield Health and Human Services Department
Public Health and Environment Division
6 Garden Center
Broomfield, CO 80020
720.887.2220

MEMORANDUM

TO: Debra Oldenettel, Health and Human Services Director
City and County of Broomfield

FROM: Jason Vahling, Public Health Director
City and County of Broomfield

DATE: July 3, 2014

SUBJECT: Addendum to the City and County of Broomfield On-site Wastewater Treatment System Regulations

The State of Colorado, Colorado Department of Public Health and Environment, enacted Regulation 43 (5 CCR 1002-43) in order to establish minimum standards and regulations for On-site Wastewater Treatment Systems (OWTS) in Colorado. The authority to administer and enforce these standards lies within the City and County of Broomfield (CCOB) Health and Human Services Department, Public Health and Environment Division (PHE), through the recently adopted City and County of Broomfield On-Site Wastewater Treatment System Regulations, Resolution No. 2014-72-BH (CCOB OWTS Regulations).

Acting in my capacity as the Public Health Director and serving as the primary enforcement authority for the CCOB OWTS Regulations, I am issuing this addendum to ensure CCOB's full compliance with the On-site Wastewater Treatment Systems Act, Article 10 of Title 25, C.R.S. or Regulation 43. This memorandum clarifies the Use Permit process by hereby including Sections 43.4(M)(6),(7), and (8) of Regulation 43, which are listed below, to the CCOB OWTS Regulations.

These added sections will be administered through Regulation 43 and implemented by the CCOB PHE. Application forms for obtaining a Use Permit are located at http://www.broomfield.org/septic.

Regulation 43, Section 43.4 M

6. Issuance of an Acceptance Document
    a. When the criteria set forth above have been met, the local public health agency shall issue an acceptance document, using terminology adopted by the local public health agency, setting forth the terms and conditions of approval, including, as appropriate:
        1) Statement of the size, type and capacity of the system and an as-built drawing, either from the local public health agency records or the inspection reports;
        2) Evidence of past failures as shown in local public health agency records;
        3) Circumstances or factors that may have affected the ability of the inspector to evaluate the system;
        4) Whether the system meets the permitting requirements of the local public health agency; and
        5) Other information the local public health agency may require.
7. The acceptance document shall remain valid until the date of real estate closing or for a period of six months, whichever comes first. Once the real estate closing has been completed, the acceptance document need not be renewed.
8. Renewal of an Acceptance Document
    a. Provided it has not expired, an acceptance document may be renewed one time for a period of six months upon completion of the appropriate form and payment of the required fee.

If you have any questions regarding this policy addendum, please contact me at (720) 887-2220 or by email at publichealth@broomfield.org.