



# ONSITE WASTEWATER SYSTEM REGULATIONS

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Boulder County Public Health  
3450 Broadway  
Boulder, Colorado 80304

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## Section 1. Title and Policy

**1.01 Title.** These regulations shall be known as the Boulder County Onsite Wastewater System Regulations.

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### **1.02 Policy**

- A. In order to preserve the environment and protect 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 minimum standards, rules and regulations for onsite wastewater systems in Boulder County, Colorado, and to provide the authority of the administration and enforcement of such minimum standards, rules and regulations.
- B. The purpose of these regulations as authorized and required by Article 10, Title 25, C.R.S. is to establish minimum standards for the locations, construction, performance, installation, alteration, and use of onsite wastewater systems within Boulder County, Colorado, and to specify rules and regulations concerning the application for the issuance of permits; inspection, testing and supervision of installed systems; issuance of cease and desist orders; maintenance and cleaning of systems; and disposal of waste material.
- C. Prohibition of Onsite Wastewater Systems in Unsuitable Areas:

The Board of Health may conduct a public hearing, after providing 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 for wastewater systems in defined areas which contain or are subdivided for a density of more than one dwelling units per acre. The Board of Health may order such prohibition upon a finding that the construction and use of additional onsite wastewater systems in the defined area will constitute a hazard to the public health or the environment. In such a hearing, the Board of Health may request affected property owners to submit engineering and geological reports concerning the defined area and

provide a study of the economic feasibility of constructing a community sewage treatment system.

- D. If properly sited, constructed and operated, an OWS should provide an environmentally acceptable system for waste disposal. However, increases in population density and the use of OWS in Boulder County have increased the potential for nutrients and microbiological contaminants present in human waste to reach local wells, surface water or wetlands. Higher nutrient levels may trigger eutrophic conditions, which reduce oxygen, disrupt the natural ecosystem, and negatively impact aquatic chemistry. Moreover, the traditional OWS does not effectively treat or remove many chemical wastes produced in modern homes, such as pesticides, paints, solvents, and photographic chemicals. As a result, the uses of community sewage treatment works are recommended where feasible.
- E. Some sites in Boulder County may be unsuitable for any type of conventional system and ownership of property, or the fact that the site is part of a platted subdivision, shall not guarantee to any person that a system application will be approved for the site.
- F. Site approval from the Colorado Department of public Health and Environment is required prior to BCPH issuing a permit for a system where the design flow exceeds 3,000 gallons per day, or where the average daily flow exceeds 2,000 gallons per day. These regulations then govern all other aspects of permits, performance, construction, alteration, and installation.
- G. These regulations shall apply to onsite wastewater systems.
- H. Systems discharging effluent into surface waters are required to obtain a discharge permit from the Colorado Department of Public Health and Environment prior to the commencement of the discharge.

## **Section 2. Definitions**

Absorption Bed or Leachfield – a subsurface soil absorption area, which is wider than three (3) feet, together with a system of approved distribution through which effluent may seep, leach, or infiltrate into the soil

Absorption System – sewage treatment/disposal field or trenches, or a leachfield and adjacent soils or other system for the treatment of sewage in an onsite wastewater system by means of an absorption into the ground and may include evapotranspiration.

Absorption Trench – one or more trenches, not over three feet in width, in which sewage effluent is percolated into the soil.

Aerobic Sewage Treatment System – an onsite wastewater system employing biological

action, which is maintained by the addition of air or oxygen.

Applicant – owner or authorized agent who submits an application for a permit for an onsite wastewater system.

Bedrock – the more or less solid undisturbed rock in place either at the surface or beneath surficial deposits of gravel, sand, or soil, or a consolidated rock formation of impervious material, which may exhibit, jointed, fractured, or deteriorated characteristics.

Bedroom – a room with a closet, a window, and with private access such that access to other rooms do not have to be gained by going through the bedroom.

Board of Health – the Boulder County Board of Health as designated by the Board of County Commissioners of Boulder County, Colorado.

Building – any permanent structure built for the support or shelter of any use or occupancy.

Building Sewer – that part of the piping of a drainage system, which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer, or primary treatment tank of an onsite wastewater system, or other point of disposal.

Cesspool – a covered, underground receptacle, which receives, untreated sewage from a building and permits the untreated sewage to seep into the surrounding soil.

Cistern – a watertight, covered receptacle of non-toxic material, which is designed for storage of potable water.

Community Sewage Treatment System – a sewage disposal system designed to serve more than one property.

Composting Toilet – a unit which consists of a toilet seat and cover over a riser, which connects to a compartment or a vault that contains or will receive composting materials sufficient to reduce waste by aerobic decomposition.

Constructed Wetland – a system, which utilizes a subsurface matrix and various wetland plants to provide secondary treatment of wastewater through biological, physical, and chemical processes.

Department – Boulder County Public Health, or BCPH.

Depth of System – vertical distance from the original grade after backfilling, to the bottom of the aggregate or top of the infiltrative surface for gravel less systems, as measured on the uphill side.

Design Flow – the design flow is 160% of average daily flow for residential use, as calculated by methods recognized in these regulations; also defined as maximum daily flow.

Dispersal System - a system for the disposal of effluent after final treatment in an onsite wastewater system by a method which does not depend upon or utilize the treatment capability of the soil.

Distribution Box – a watertight chamber, which receives wastewater from a septic tank or other primary treatment unit, from which effluent is distributed evenly throughout the absorption or dispersal system.

Dosing – a high rate periodic discharge in an absorption or dispersal system.

Dosing Tank – a tank, which provides for storage of wastewater from a septic tank intended to be fed to an absorption or dispersal area at a high-rate, periodic discharge.

Dry Well – a type of soil absorption system dependent upon suitable soil, filled with gravel, and containing a system of approved distribution, which is designed on the basis of sidewall and bottom absorption area.

Dwelling – a structure with a bedroom and/or a kitchen.

Effective Size – the size of granular media such that no more than 10% of the grains by weight is smaller than the size specified, and 90% are larger than or equal to the size specified.

Effluent – the liquid waste discharge from an onsite wastewater system.

Effluent Line – that part of the piping of an onsite wastewater system, which extends from the outlet of the tank to the distribution area.

Environmental Health Specialist – a person who is trained in physical, biological, and/or sanitary science to carry out educational and inspection duties in the field of environmental health.

Evapotranspiration (ET) System – a type of dispersal system that wholly or primarily utilizes liquid evaporation and transpiration by vegetation as a means of effluent disposal.

Experimental System – a particular design or type of system based upon improvements of development in the technology of sewage disposal and not otherwise provided for in paragraphs (e) to (k) of C.R.S.25-10-105(1).

Floodfringe – those portions of the 100-year floodplain that are not in the floodway.

Floodplain – 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 (NFIP). In the absence of FEMA/NFIP maps, a Colorado Registered Professional Engineer shall certify the floodplain elevations.

Floodway – that area of the floodplain in which the channel of the watercourse, and those portions of the adjoining floodplain must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot at any point, or as designated by the Federal Emergency Management Agency or

National Floor Insurance Program. In the absence of FEMA/NFIP maps, a Colorado Registered Professional Engineer shall certify the floodway elevation and locations.

Gravelless System – wastewater distribution and storage systems, including large diameter leachfield tubing or plastic chambers that have been approved by the Colorado Department of Public Health and Environment for use in absorption or evapotranspiration systems in place of standard 4” polyvinylchloride pipe and gravel.

Grey Water System – a system designed to collect, treat, and dispose only liquid wastes from sinks, lavatories, tubs, showers, laundry, or other approved plumbing fixtures, excluding toilet fixtures.

Groundwater Table – the upper surface of groundwater in the zone of saturation of a geologic formation.

Health Officer – the chief administrative and executive officer of Boulder County Public Health (BCPH), or other employee designated by the Board of Health.

Lift Station – a tank and associated pump, which provides for storage of sewage or wastewater intended to be pumped to a septic tank, absorption, or dispersal area, which is at a higher elevation.

Liner – a watertight membrane liner of at least 0.01-inch (10 mil) thickness, which is used

to prevent effluent from entering the soil or groundwater table. Material shall be polyvinyl chloride or material of equal or greater integrity.

Long-Term Acceptance Rate (LTAR) – the maximum effluent-loading rate of a soil based upon soil texture.

Maintenance – customary, ordinary, normal, and routine acts which are designed to keep an onsite wastewater system functioning properly; may include pumping of septic tanks, cleaning of lines, replacement of baffles, re-grouting, or other items which do no

constitute an installation and which are not covered under the definition of repair/alterations as defined below.

Manufacturer – the person or firm that constructs or assembles onsite wastewater system components.

Maximum Seasonal High Groundwater – the maximum extent of saturation into the normally unsaturated (vadose) zone, which occurs during times of peak groundwater infiltration, usually spring snowmelt and runoff, as exhibited by such conditions as soil mottling, streaking, or oxidation/reduction.

Mound/Raised System – an absorption system installed where the top of all the effluent distribution pipe is installed above the original grade of the area used for absorption.

Onsite Wastewater System(OWS)– an absorption system of any size or flow or a system or facility for collecting, storing, treating, neutralizing, stabilizing, or disposing of sewage which is not a part of or connected to a sewage treatment works. Commonly referred to as a septic system.

Owner – the person who is the owner of record of the land on which an onsite wastewater system is or will be located.

Percolation Tests – a subsurface soil test at the depth of a proposed absorption system or similar component of an onsite wastewater 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.

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

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

Plot Plan – an accurate drawing or map indicating the dimensions and location of property lines, buildings, wells, onsite wastewater systems, watercourses, geographical features, and other pertinent information as required by BCPH.

Privy – a 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.

Professional Geologist – a graduate of an institution of higher education, which is accredited by a regional or national accrediting agency, with a minimum of thirty semester (forty-five quarter) hours of undergraduate or graduate work in a field of geology and whose post-baccalaureate training has been in the field of geology with a specific record of an additional five years of geological experience to include no more

than two years of graduate work.

Registered Professional Engineer (R.P.E.) – an engineer licensed in the State of Colorado in accordance with Section C.R.S.12-25-113.

Repair Permit – a permit issued for the repair of an onsite wastewater system for an existing building. A major-repair permit is issued when the absorption area must be replaced or expanded, and when there is an unapproved onsite wastewater system that does not meet current design standards. A minor-repair permit is issued when a component of the onsite wastewater system need repair, such as the building sewer, septic tank, effluent line, or distribution box, and the absorption area is not malfunctioning.

Ripped Base Bed – an absorption bed used when native soil is not suitable soil and can be excavated without blasting and replaced with suitable soil.

Sand Filter – a subsurface system which utilizes wastewater filtration or absorption or both, and which contains an intermediate layer of sand as filter material.

Seepage Pit – a type of soil absorption system dependent upon suitable soil containing a structural internal void and designed on the basis of sidewall area.

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

Serial Distribution – an arrangement of absorption trenches or beds or seepage pits where effluent is retained to utilize the absorption capacity of a component before flowing into a succeeding component.

Sewage – a combination of liquid wastes which may include house wastes, human excreta, animal or vegetable matter in suspension or solution, or other solids in suspension or solution and which is discharged from a dwelling, building, or other structure.

Sewage Treatment Works – a system or facility for treating, neutralizing, stabilizing, or disposing of sewage, which system or facility has a designed capacity to receive more than 2,000 gallons of sewage per day, unless designed as an absorption system. The term “sewage treatment works” includes appurtenances such as interceptors, collection lines, outfall and the outlet sewers, pumping stations, and related equipment.

State Board – the State Board of Health created by Section C.R.S.25-1-103.

State Waters – any and all surface and subsurface waters which are contained in or flow in or through this state, except waters in sewerage systems, waters in treatment works of

disposal systems, waters in potable water distribution systems, and all waters withdrawn for use, until all uses and treatment have been completed.

Suitable Soil – a soil which will: effectively treat and filter effluent by removal of organisms and suspend solids before the effluent reaches any highly permeable feature such as joints in bedrock, gravels, or very coarse soils; displays an absence of consolidation or inhibiting swelling; and which meets percolation test requirements (5-60 minutes per inch) and has a vertical thickness of at least four feet below the bottom of the absorption area.

Systems Cleaner (Pumper) – a person engaged in and who holds oneself out as a specialist in the cleaning and pumping of sewage disposal systems and removal of the residues deposited in the operation thereof.

Systems Inspector (Inspector) – a person that has specialized experience and training to conduct inspections of onsite wastewater systems. Inspectors must possess one of the following credentials to be listed as a BCPH systems inspector: a registered professional engineer or certified under the NSF Onsite Wastewater Inspector Accreditation Program, the NAWT Onsite Wastewater Inspector Program, or equivalent.

Systems Contractor (Installer) – a person engaged in and who holds oneself out as a specialist in the installation, renovation, and repair of sewage disposal systems.

Uniformity Coefficient – a value which is the ratio of  $D_{60}$  to  $D_{10}$  where  $D_{60}$  is the soil diameter of which 60% of the soil weight is finer and  $D_{10}$  is the corresponding value at 10% finer. (A soil having a uniformity coefficient smaller than 4 would be considered “uniform” for purposes of this regulation.)

Vault – a watertight, covered receptacle, which is designed to receive and store excreta or wastes either from a sewer or from a privy, and is accessible for the periodic removal of its contents.

Wastewater Pond – a designed pond which receives exclusively wastewater from a first stage treatment unit and which provides an additional degree of treatment.

Water meter – a meter used to measure the quantity of water entering a building

Water Quality Control Commission – the commission created by Section 25-8-201, C.R.S. 2006, as amended.

### **Section 3. Administration and Enforcement**

#### **3.01 Permit Application Requirements and Procedures**

- A. Prior to commencement of installation, alteration, or repair of a system, a written application shall be submitted to Boulder County Public Health, hereinafter referred to as BCPH, and a permit shall be issued. The application shall provide the following information:
1. Name, address, and telephone number of the owner of the property.
  2. Name, address, and telephone number of the owner's agent, if applicable. Any person acting as agent for the property owner shall submit written authorization from the owner giving that person permission to serve as agent in acquiring a permit.
  3. Name of contractor.
  4. Legal description of property and assessor identification number.
  5. Plot plan.
  6. Accurate directions to property.
  7. Type of building use.
  8. Type of water supply and location of proposed and existing water lines.
  9. Results and supporting data of soil percolation or hydraulic conductivity or professional geologist at the location of the proposed system.
  10. Proximal location of bedrock at proposed location of system.
  11. Proximal location of the maximum seasonal high groundwater table at the proposed location of the system.
  12. Location of boundary of 100-year floodplain, as identified by the Boulder County Department of Transportation, Engineering Division.
  13. Type of onsite wastewater system proposed.
  14. Proposed design of the onsite wastewater system, including any restrictions on the use of adjoining property which may result from minimum separation requirements set forth in Appendix B.
  15. Signature of owner or of authorized person. The owner can authorize a person to act on his/her behalf by submitting a statement to that effect that is signed by the owner.

16. Such additional information as may be required by BCPH. When evidence is present of surface or subsurface conditions, which may cause difficulties in sewage treatment or pollution of State Waters, BCPH may require the applicant to provide additional hydrological, geological, or engineering data prepared by a R.P.E. or professional geologist
- B. A permit fee shall be paid to BCPH at the time of application according to the current schedule issued by BCPH subsequent to approval by the Board of Health. Their permit fees may be no greater than required to offset the actual and direct cost of BCPH's services. With respect to any permit, the fee for such permit. shall be set so as to recover, as nearly as can be practically established, the costs associated with that permit and may not exceed one thousand dollars.
- C. In the event BCPH receives written notice from the applicant that an application is to be withdrawn prior to the site inspection for the system., BCPH shall refund to the applicant eighty percent (80%) of the permit fee.
- D. A permit for an onsite wastewater system shall be non-transferable and shall extend only to the precise system and to the facts and circumstances set forth in the original application for the permit.
- E. If an applicant changes the location of the proposed site, provides for a different system than that which was described in the original application, or changes in the regulation affect the original permit conditions, a new application for a permit must be submitted and appropriate fees paid before changes will be considered.
- F. An issued permit is subject to review on an annual basis, and shall expire five years after the date of issuance.
- G. BCPH may transfer an unexpired permit from the name of the owner states in the application to the name of a subsequent purchaser of the property.
- H. The issuance of a permit does not constitute assumption by BCPH or its employees of liability for the failure of any sewage disposal system nor does it imply any guarantee by BCPH that a system will function properly.
- I. No onsite wastewater system permit shall be issued to any person when the subject property is located within a municipality or sanitation district which provides public sewer service, except where the municipality or sanitation district has indicated that providing sewer service to the property is not feasible and an onsite wastewater system is acceptable.
- J. Variance Procedure

1. The Boulder County Board of Health has adopted a variance procedure, which requires that the board must hear variance cases, and that approval of a variance requires a majority vote of the local board of health.
2. Prior to rendering of a decision on a variance request, a public hearing must be held. The hearing shall be the subject of a public notice or notice shall be sent via certified mail, with a minimum 20-day reply time from the date of the mailing, to all adjacent property owners.
3. Request must be accompanied by:
  - a. Site-specific request identifying the specific criteria from which a variance is being requested.
  - b. Technical justification by a Colorado Registered Professional Engineer or a professional geologist, which indicates the specific conditions which exist and/or the measures which will be taken to result in greater risk than that associated with compliance with the requirements of the regulation. Examples of conditions which exist, or measures which might be take, include but are not limited to the following: evidence of a natural or physical barrier to the movement of effluent to or toward the feature from which the variance is requested; soil amendment or replacement 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 equivalent to that required to meet National Sanitation Foundation (NSF) Standard 40 be provided.
  - c. A discussion of alternatives considered in lieu of the requested variance.
  - d. Technical support for selected alternative, which may include a testing program, which confirms that the variance does not increase the risk to public health and to the environment.
  - e. A statement of the hardship, which creates the necessity for the variance. No variance will be allowed solely for economic gain.
4. The applicant has the burden of proof that the variance is justified and will pose no greater risk to the public health and the environment that would a system meeting the standard being varied as in 3.b above.
5. The local board of health has the ability to impose requirement and conditions on any variance granted.
6. Outcome of the Variance Proceeding

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

7. Prohibitions on the granting of variance requests

- a. No variance will be issued to mitigate an error in construction involving any element of property improvements.
- b. No variance will be issued where the property can accommodate a conforming OWS.
- c. No variance will be issued, which will result in setbacks to an offsite physical feature, which do not conform to the minimum setbacks defined in Table II of these Guidelines.
- d. No variance will be issued, which reduces the 4-foot separation to groundwater or bedrock.
- e. No variance from the horizontal setback from a well shall be given which does not also meet the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

**3.02 Systems Requiring R.P.E. Design**

- A. The types of systems enumerated below shall be designed by a registered professional engineer whose area of discipline is civil, environmental, or agricultural engineering, or other engineer with expertise in designing wastewater treatment systems, and a permit for such a system shall be issued only after review and approval by BCPH:
  1. Systems disposing of effluent upon the surface of the ground or utilizing wastewater treatment ponds.
  2. Onsite wastewater systems, which service commercial, business, institutional, or industrial property, or multi--family dwellings.
  3. Systems designed to serve more than one single-family dwelling.
  4. Experimental systems.

5. Constructed wetlands.
  6. All other systems requiring engineer design so specified in Section 6.04B of these regulations.
  7. Systems whose design flow exceeds 3,000 gallons per day (average daily flow exceeds 2,000 gallons per day).
- B. Systems requiring R.P.E. design shall contain as a minimum the following items:
1. Complete site plan.
  2. Cross-section of proposed system.
  3. Soil profile information.
  4. General specification and special instructions.
  5. Design criteria.
  6. Design requirements.
  7. Original signature and stamp (rubber stamp is acceptable).
  8. Drawing number or similar identification.
  9. Legal description of property, assessor identification number, and name of property owner.
- C. All systems requiring an R.P.E. design must be installed by a systems contractor licensed in Boulder County in accordance with Section 4.01 of these regulations.

### **3.03 Application Review**

Each application for a system permit shall be reviewed by BCPH. The review shall include an inspection of the site conducted by a representative of BCPH. BCPH will review: soil percolation or hydraulic conductivity tests conducted by an R.P.E.; general geological conditions; determinations of the suitability of the site, and the proposed design based upon use of the site, adjacent land use, density of development, lot size, potential for groundwater contamination, location of maximum seasonal high groundwater table, depth of suitable soil, depth of bedrock, slope of site, the location of water supply systems, and the location of the system with reference to wells, streams, lakes, wetlands, ditches, structures, and other terrain features.

### **3.04 Action on Application**

After review in accordance with Section 3.02, BCPH shall determine whether the system complies with these Regulations and shall issue or deny the permit accordingly. Approval of the permit shall include such conditions in the permit as are authorized by these Regulation and are deemed necessary, including, but not limited to, effluent testing, or maintenance or cleaning schedules. A permit shall remain valid only while the system is operated in compliance with any such conditions.

### **3.05 Denial of Permit: Appeal**

- A. Appeal from BCPH's decision to the Health Officer. In the event BCPH denies an application, written notice of the denial of the permit shall be given to the applicant via certified mail, return receipt requested. Any applicant who is denied a permit may appeal to the Health Officer. Such an appeal must be filed with BCPH, in writing, within thirty (30) days after the denial of permit has been mailed. Upon finding BCPH erred in its denial of a permit, the Health Office shall approve the permit. Upon finding that strict enforcement of these regulations would cause undue hardship to the applicant, and upon a further finding that non-compliance with these Regulations would not be injurious to public health or the environment, or be less restrictive than the State Guidelines, the Health Officer may authorize issuance of a permit despite non-compliance. In such cases, the burden of proof is upon the applicant to show that the system will not injure adjacent properties, will not conflict with the purposes of these regulations, and will not adversely affect the health of any person or the environment. Denial shall become final upon expiration of time for filing an appeal, or when final action is rendered, whichever comes first.
  
- B. Requesting the Board of Health to reconsider the Health Officer's decision. In the event the Health Officer denies an appeal under Section 3.05A of these Regulations, the applicant may request the Board of Health to reconsider the Health Officer's previous decision of denial. Such request for reconsideration must be submitted within thirty (30) days after the decision of denial by the Health Office.

### **3.06 Final Inspection**

- A. Standard System. When construction of an onsite wastewater system has been

completed and prior to replacing soil over the system, the system contractor or owner shall notify BCPH. One notification has been received, BCPH will make final inspection of the system as soon as is practicable. If upon final inspection of the system, BCPH finds that the system has been installed in accordance with these Regulations and the permit, BCPH shall issue final approval for the completed system. Written notice will be left at the site informing the owner or systems contractor of approval of the installation. Such notice of approval shall be considered as permission to replace soil or fill over the system components inspected. Final approval for the system will be withheld until all components of the system, including building sewer and house connections have been inspected.

- B. R.P.E.-Designed System. During construction of an onsite wastewater system designed by an R.P.E., the systems contractor or owner shall notify BCPH and the design engineer for all inspections specified in the permit and in the design. When construction of an onsite wastewater system requiring engineer design has been completed, and prior to replacing soil over the system, the systems contractor or owner shall notify both BCPH and the design engineer. Once notification has been received, BCPH will make final inspection of the system as soon as is practicable. If upon final inspection of the system, BCPH finds that the system has been installed in accordance with these Regulations and the permit, written notice to the effect will be left at the site. Permission to replace soil or fill over the system components inspected shall not be granted until both BCPH and design engineer have found the installation to be satisfactory. Final approval for the system shall be withheld until such time as the design engineer furnishes written notice to BCPH that an inspection by the engineer or engineering firm has been made and the system was installed in accordance with the approved design. Final approval for the system will be withheld until all components of the system, including building sewer and house connection have been inspected.
- C. Failure to Pass Final Inspection. If the final inspection discloses any significant departure from the description or design of the system as stated in the application or permit, or if any aspect of the system fails to comply with these Regulations, approval shall be withheld. BCPH shall leave, at the site, written notice of denial including deficiencies causing the disapproval. An additional inspection shall be made by BCPH upon notification that the deficiencies have been corrected and the system has been brought into compliance with these Regulations.

### **3.07 Operation, Inspection, Maintenance, and Testing of Systems**

- A. The property owner shall be responsible for proper operation, maintenance, and cleaning of the system and abatement of any nuisance arising from its failure,

unless jurisdiction for responsibility has been transferred to a public, quasi-public, or private entity or political subdivision.

- B. In order to insure good working order, the following minimum schedule of inspection, maintenance and cleaning, and effluent testing is necessary for all onsite wastewater systems:

<u>Type of Facility</u>	<u>Inspection and Maintenance</u>	<u>Cleaned or Pumped</u>	<u>Effluent Testing</u>
Septic Tank	Yearly	Every 2-4 years	
Vaults, Vault Privies	Every 60 days of occupancy	at 80% Capacity pumping receipts required	
Aeration Tanks	Every 6 months	Every 4 years	At intervals specified on permit
Constructed Wetland	As specified by design engineer	Every 2-4 years	At intervals specified on permit

- C. The board of Health or BCPH may require the owner of an onsite wastewater system to maintain and submit to BCPH records of inspection, maintenance, cleaning, and testing performed on the system. The property owner shall incur the cost of any maintenance or effluent testing.

### **3.08 Access to Site.**

For the purpose of inspecting and enforcing applicable rules and regulations and the terms and conditions of any permit issued, the representatives of BCPH are authorized to enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether or not operating onsite wastewater systems are functioning in compliance with these Regulations, 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 shall permit the representative of BCPH access to the property to conduct required tests, take samples, monitor compliance, and make inspections.

### **3.09 Violation.**

Whenever BCPH determines that a system is in violation of any provision of these Regulations, written notice shall be given to the owner of the property involved. Such

notice shall state the alleged violations and shall provide a reasonable time within which the alleged violations are to be corrected.

### **3.10 Cease and Desist Order.**

BCPH may issue an order to cease and desist from the use of any system which is found not to be in compliance with the Regulations and has not received timely repairs, or corrective action required by notice given under Section 3.09. Such an order may be issued only after a hearing which shall be conducted by the Health Officer not less than forty-eight (48) hours after written notice thereof is given to the owner of the property on which the system is located and at which the owner may be present, with counsel, and be heard. The order shall require that the owner bring the system into compliance or eliminate the nuisance or hazard within a reasonable period of time, not to exceed thirty (30) days, or thereafter cease and desist from the use of the system and of any building serviced by the system. A cease and desist order issued by the Health Officer shall be reviewable in the Boulder County District Court upon a petition filed not later than ten (10) days after the order is issued.

### **3.11 General Prohibitions.**

- A. Any onsite wastewater system which does not comply with the provisions of these Regulations regarding minimum separation between the maximum seasonal level of the groundwater table and the bottom of an absorption system shall not be permitted to remain in use after October 1, 1975.
- B. Use, construction, or existence of cesspools and non-vaulted-privies is prohibited.
- C. Not more than one dwelling or one commercial, business, institutional, or industrial unit shall be connected to the same onsite wastewater system unless such multiple connection was specified in the application submitted and in the permit issued for the system. In the event an application requests more than one dwelling or one commercial, business, institutional, or industrial unit to be connected to the same onsite wastewater system, prior to the issuance of the permit, the applicant shall submit and record with the Clerk and Recorder a suitable covenant that is satisfactory to BCPH and which describes the arrangements governing joint use of and responsibility for repair and maintenance of 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. No person shall allow sewage or effluent to be discharged on the surface of the ground or into waters of the State, unless sewage or effluent meets the minimum

requirements of these Regulations or the water quality standards of the Colorado Water Quality Control Commission.

### **3.12 Penalties.**

Any person who commits any of the following acts commits a Class 1 petty offense, as defined in Section 18-1.3-503, C.R.S. 2006:

- A. Constructs alters, installs, repairs, or permits the use of any onsite wastewater system without first having applied for and received a permit as provided for in Section 3.01 or as provided for in Section 25-10-105(1)(f) or Section 25-10-106, C.R.S. 2006.
- B. Constructs, alters, installs, repairs, or permits the use of any onsite wastewater system in a manner which involves a knowing and material variation from the terms or specifications contained in the application or permit.
- C. Violates the terms of a cease and desist order, which has become final under terms of Section 3.10 of these Regulations.
- D. Conducts a business as a systems contractor, a systems cleaner, or a systems inspector without having obtained the license or providing certification provided for in Section 4.01, Section 4.02, or Section 4.03 of these Regulations.
- E. Willfully fails to submit proof of proper maintenance, cleaning, or testing of effluent of a system as required by conditions stated in the permit for the system.

## **Section 4. Regulation and Licensing of Systems Contractors and Cleaners**

### **4.01 Regulation of Systems Contractors**

- A. Property owners shall be permitted to perform the installation of an onsite wastewater system on their own property provided it is a standard (non-engineer design) system. Any person, not a systems contractor, who installs alters, or repairs a standard system shall perform all aspects of such work in compliance with these Regulations.
- B. No person shall engage in business as a systems contractor without possessing a valid Boulder County Systems Contractor License. The initial fee for a Systems Contractor License shall be paid to BCPH at the time the license application is submitted. Licenses shall expire on December 31 each year and an annual renewal fee shall be paid. A license, which lapses because of failure to renew or is revoked, shall be subject to the fees established for new licenses upon re-

application. Employees of licensed systems contractors shall not be required to be individually licensed.

- C. Application for a Systems Contractor License or renewal shall be made upon forms supplied by BCPH. Prior to the issuance or renewal of a license, BCPH may require the applicant to demonstrate adequate knowledge of these Regulations and experience installing onsite wastewater systems. In accepting a license, a systems contractor shall agree that all work performed in constructions, installation, alteration, or repair of an onsite wastewater system shall be in compliance with these Regulations and with conditions set out in the permit. It shall be the responsibility of the systems contractor to ensure that all bed and trench excavations are level.
- D. A Systems Contractor License may be revoked for failure to comply with these Regulations. Written notice of a proposed license revocation, particularizing the violations of these regulations, shall be served by BCPH upon the holder of the Systems Contractor License by certified mail, return receipt requested. Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than ten (10) days notice of the hearing and may be represented at the hearing by counsel.

#### **4.02 Regulation of Systems Cleaners.**

- A. No person shall engage in business as a systems cleaner without possessing a valid Boulder County Systems Cleaner License. Employees of a validly licensed systems cleaner business shall not be required to be individually licensed. The initial fee for a Systems Cleaner License shall be paid to BCPH at the time the license application is submitted. Licenses shall expire on December 31 each year and an annual renewal fee shall be paid. A license, which lapses because of failure to renew or is revoked, shall be subject to the fees established for new licenses upon re-application.
- B. All systems cleaners shall be required to dispose of septic tank wastes at a site approved by BCPH for accepting or treating such wastes and in a manner that is not injurious to the public health or the environment. Systems cleaners are required to maintain their pumping and disposal records for a period of one year and produce records at the request of BCPH.
- C. All systems cleaners shall be required to maintain their vehicles such that leakage and spillage does not occur. Discharge valves shall be drip-tight.
- D. Systems cleaners' trucks must bear the business name and address with two inch or larger letters of a color that contrasts the truck color.
- E. In the event of a spill, septage shall be immediately cleaned up.

- F. A Systems Cleaner License may be revoked for failure to comply with these Regulations. Written notice of a proposed license revocation, particularizing the violations of these regulations, shall be served by BCPH upon the holder of the Systems Cleaner License by certified mail, return receipt requested. Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than ten (10) days notice of the hearing and may be represented at the hearing by counsel.

#### **4.03 Regulation of Systems Inspectors**

- A. No person shall engage in business as a systems inspector without possessing: a valid license as a registered professional engineer in the State of Colorado, certification from the NSF Onsite Wastewater Inspector Accreditation Program, certification from the NAWT Onsite Wastewater Inspector Program, or equivalent. The credentials qualifying a person to be an inspector must be submitted to BCPH every two years in order to be eligible to conduct inspections in Boulder County and to remain on the list of certified inspectors.
- B. A Systems Inspector may be removed from the list of approved inspectors for failure to comply with these Regulations. Written notice of a proposed removal, particularizing the violations of these regulations, shall be served by BCPH upon the holder of the Systems Inspector certification by certified mail, return receipt requested. Removal shall take place only after a hearing before the Board of Health. The inspector shall be given not less than ten (10) days notice of the hearing and may be represented at the hearing by counsel.

### **Section 5. General Technical Requirements**

#### **5.01 Calculation of Sewage Flow and Characteristics**

- A. Where gallons per day and pounds of biochemical oxygen demand (BOD<sub>5</sub>) per day can be obtained by measurement of existing conditions, such data may be used. BCPH may require installation of a meter located to measure flow into the onsite wastewater system.
- B. Unless otherwise approved by BCPH or Board the Health, the average flow and BOD<sub>5</sub> strength of sewage shall be determined according to the type of establishment as set forth in Appendix A.
- C. The anticipated maximum daily sewage flow shall be assumed to be 160% of the average daily flow and shall be considered adequate design criteria to permit the

use of garbage grinding and automatic clothes washing facilities. The average daily flow from dwellings shall be computed based on two (2) persons per bedroom for the number of bedrooms served or anticipated and in no case shall be based on less than two (2) bedrooms per dwelling.

- D. In no event may the system be designed for a lesser capacity than the anticipated maximum daily sewage flow or treatment requirements of the sewage or wastes in the system.
- E. BCPH, at its discretion, may require an increase of average daily flow for the plumbing fixtures that may increase the quantity of wastewater that is generated in structures.

### **5.02 Minimum Horizontal Distances Between Components of a System and Physical Features**

- A. Minimum, horizontal distances from the various components of a system to pertinent terrain features, including streams, lakes, water courses, springs, wells, subsoil drains, cisterns, water lines, suction lines, gulches, dwellings, other occupied buildings and property lines shall be in accordance with Appendix B.
- B. Wells, springs, or potable water supply suction lines and all other constructed units listed in Appendix B shall be installed or located in accordance with the minimum distance requirements provided in the table.
- C. The minimum horizontal distance required from manmade cut banks and fill areas to onsite wastewater system components discharging effluent into or onto the surrounding soil shall be four (4) times the height of the bank, measured from the bottom of absorption field, unless it can be demonstrated by a Registered Professional Engineer or a Professional Geologist that a mechanical or natural barrier will prevent lateral effluent surfacing.
- D. For the repair of or addition to an approved existing system where the size of the lot precludes adherence to the distances in Appendix B, BCPH may permit installation of the repaired or upgraded system at a distance no closer to features requiring setbacks than the existing facilities.

### **5.03 Soil Percolation Test**

- A. Location: Soil percolation tests shall be performed in at least three (3) test holes in the area in which the absorption system is to be located, spaced uniformly over the proposed site, except there shall be no less than one (1) test hole in any twelve hundred (1200) square foot area of the absorption system. If soil conditions are highly variable, more tests may be required.

- B. Preparation of Test Holes: The percolation test holes shall preferably be six (6) inches in diameter. The diameter may vary from four (4) to eight (8) inches where prohibitive soil and geological conditions exist. The holes shall be terminated at the depth of the proposed absorption system or within the soil horizon in which the systems will be installed. The percolation tests shall be conducted within those soils comprising the four (4) feet of acceptable soils beneath the bottom of absorption field. The sides of the holes shall be scratched with a sharp pointed instrument. Percolation test holes shall remain open for inspection by BCPH and shall be easily visible.
- C. Soaking Period: Percolation test holes shall be located in unfrozen soil and filled with water to a depth of 14 inches or more. Water shall be maintained for at least eight (8) hours, but not more than twenty-four (24) hours, prior to conducting the percolation test. Presoaking is required in all soils except sandy soils.
- D. Procedure: A four-hour falling head percolation test shall be conducted unless:
1. Water stays in the hole after the presoak, in which case two (2) 30-minute intervals is adequate.
  2. The first six inches of water seeps away in less than 30 minutes, in which case a 1-hour test of 10-minute intervals may be used.
  3. The test is being conducted in sandy soil, in which case a 1-hour test of 10-minute intervals may be used.
  4. Three successive water level drops do not vary by more than 1/16 inch, in which case a 2-hour test may be used.
- E. Measurement: Water level is adjusted to six (6) inches above the bottom of the hole or gravel, if used. Water level is measured from a fixed reference point to the nearest 1/16 inch at 30-minute intervals. The test is continued until successive water level drops do not vary by more than 1/16 inch (except for provisions in Section 5.03D) After each measurement the water level is readjusted to the six-inch depth. The last water level drop is used to calculate the percolation rate.
- F. Calculation: Divide the time interval used between measurements by the last measured water level drop to obtain a percolation rate in minutes per inch.

The field percolation rate shall be the average rate of the percolation tests after rate has stabilized in all the test holes observed in the proposed absorption area. If the tests in the area vary by more than 20 minutes per inch, variations of soil type are indicated and the percolation rates should not be averaged. Use of the slowest percolation rate may be allowed or additional percolation tests may be required.

- G. Performance of Percolation Tests:

1. The percolation test shall be performed by or under the supervision of a Registered Professional Engineer or Professional Geologist.
2. If the applicant demonstrates to the satisfaction of BCPH that the system is not dependent upon soil absorption, the requirement for percolation tests may be waived.

#### **5.04 Alternate Percolation Test.**

Alternate percolation tests or other soil test procedures may be approved by BCPH providing the test results of alternate procedures meet or exceed those determined using the test procedure detailed in this section.

#### **5.05 Soil Profile.**

- A. At least one soil profile hole shall be required for any system dependent on soil absorption, discharging below the ground surface, or utilizing a wastewater pond or evapotranspiration field. For systems depending on soil absorption, one soil profile hole may be required for each 1,200 square feet of proposed absorption area. BCPH may require additional soil profile holes in order to evaluate the subsurface conditions that may interfere with the proposed installation or operation of the system.
- B. Each soil profile hole shall be excavated to a depth of at least eight (8) feet or to bedrock or groundwater and shall be of sufficient width to permit observation of soil types throughout the depth of the hole. A soil profile log may be submitted as supplementary information and shall be mandatory for all systems requiring engineer design. Soil shall not be replaced in profile holes until BCPH has made an inspection of the site pursuant to Section 3.03.
- C. Soil profile holes in which borings are used to determine bedrock depth shall be of sufficient diameter to allow observation of soil types throughout the depth of the holes and shall be reviewed by an R.P.E. The R.P.E.'s report shall accompany the application.
- D. The purpose of the soil profile hole shall be to:
  1. Determine the characteristics and suitability of the soil for the intended use.

2. Determine the proximal location of bedrock.
3. Determine the location of maximum seasonal high groundwater table. Determination of maximum seasonal high groundwater may be accomplished by, but not limited to:
  - a. The direct observation of infiltrated water within a soil profile hole at a time of year when the groundwater table is highest.
  - b. Observation of the soil profile for evidence of seasonal soil saturation evidenced by salt crystals, stains, soil chroma, or reduced iron.
  - c. Soil moisture tests including water saturation.
  - d. The use of available records, existing wells, or borings indicating water table depth in the immediate area.

BCPH may require that a groundwater test hole be monitored for a maximum period of one year prior to issuing a permit for an installation in a suspected high groundwater area to determine the maximum seasonal high groundwater table.

## **Section 6. Component Design Criteria**

### **6.01 General Design Features**

- A. **Reliability:** Onsite wastewater systems shall be designed and constructed such that component shall function, when installed and operated, in a manner not adversely affected by the normal operating conditions including erosion, vibration, shock, climatic conditions, and usual household chemicals used. 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 to prevent the creation of nuisances and public health hazards and shall provide for efficient operation and maintenance.
- B. **Pipe Standards:** All wastewater lines used in onsite wastewater systems shall be constructed of compatible pipe, bonding agent, and fittings. Where plastic pipe and fittings are used, the minimum wall thickness of the pipe shall conform to ASTM Standard D3034, SDR35, or equivalent. Perforated distribution pipe thickness conforming to ASTM ASTM Standard D2729. Corrugated polyethylene pipe with smooth interior that meets ASTM F405 and AASHTO M252 specifications or equivalent may also be used. Tile, open-joint pipe, and cast iron pipe shall not be used in onsite wastewater systems.

- C. Plumbing Codes: Plumbing fixtures, composting toilets, grease traps, building sewers, vents, sewer lines, and other appurtenances shall be designed, operated and maintained so as to comply with the minimum requirements of the applicable and current Plumbing Code or other local plumbing code in force on the date of the onsite wastewater system permit application.
- D. Electrical Equipment, if used: All electrical work, equipment, and material shall comply with the requirements of the current National Electrical Code in force on the effective date of these guidelines, or those revisions of said code as are adopted by the State Electrical and Plumbing Board.
- E. Identification and Data Marking: A permanent type plate or other indelible marking so inscribed as to be easily read and visible for the purpose of inspection shall be provided on major components not constructed on the site where installed. Said inscription shall include the following: name of manufacturer; model or serial number designation; maximum design capacity of the unit and the unit of measurement.
- F. Structural Integrity: Tanks shall be so constructed and installed as to withstand earth and hydrostatic pressures when full and when empty. All metal surfaces shall be properly coated to prevent corrosion. The Colorado Department of Public Health and Environment shall certify the structural integrity of all tank treatment units, and piping materials for use in onsite wastewater systems.
- G. Watertight Requirement: Watertight tanks, vaults, or other units, shall not allow infiltration of groundwater or surface water and shall not permit the release of wastewater or liquids through other than designed openings.
- H. Tank Anchoring: In the 100-year floodplain and in locations where groundwater may cause instability problems to the septic tank, pumping chamber, vault, or other tanks in the onsite wastewater system due to flotation, the tank shall be anchored in a sufficient manner in order to provide stability when the tank is empty. The method of anchoring must be designed by an R.P.E. and approved by BCPH.
- I. Accessibility for Inspection and Maintenance: Each treatment unit shall be equipped with an access hole located to permit periodic physical inspection, collection and testing of samples and maintenance of all components and compartments including but not limited to submerged bearings, moving parts, tubes, intakes, slots, filters, inlet and outlet baffles, and other devices.
- J. Indicators of Failure 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 in the form of a visual or audible signal, or both.

- K. Serviceability: Components shall be so designed and constructed that when installed in accordance with manufacturer's recommendations, they shall be capable of being easily maintained, sampled, drained, pumped, inspected and cleaner.
- L. Sampling Access: Where a required final effluent sample cannot be easily obtained, a sampling well shall be constructed. The sampling well shall be accessible and provided with a properly secured cover.
- M. Instructions: The manufacturer shall provide clear, concise instructions covering the unit which, when followed, will assure proper installation and safe and satisfactory operation.
- N. Surface Activity: The surface of the ground over the onsite wastewater system or any part thereof, must be restricted to activity or use which will allow the system to function as designed and which will not contribute to compaction of the soil nor to structural loading detrimental to the capability of the component to function as designed. Irrigation (sprinkler) systems shall not be installed on an absorption system.
- O. Sewage Pumping System Where Applicable: All sewage pumping systems must be designed by an R.P.E.
1. Non-clog pump opening shall have at least 2-inch diameter solids handling capacity where raw sewage is pumped or not more than ½ -inch diameter solids handling capacity if previously settled effluent is pumped.
  2. Automatic liquid level controls shall be provided to start and shut off pumps at a frequency required by the design.
  3. Pressure pipe shall be of sufficient strength to accommodate pump discharge pressure and the pipe shall be sized to maintain a velocity of 2 or more feet per second.
  4. Automatic air release valves shall be installed at high points in the pressure line where necessary to prevent air locking.
  5. A storage basin preceding the pump shall be provided to allow pump cycling commensurate with the pump design capacity. The second compartment of the septic tank shall not be used as a pumping chamber. A third compartment may not be used as a pumping chamber unless it can be shown that the minimum 30-hour retention time will not be decreased.

6. The discharge line from the pumping chamber shall be protected from freezing by burying the pipe below frost level or sloping the pipe to allow it to be self-draining.

P. Building Sewer:

1. Building sewers and effluent lines shall have a uniform slope of a least one-eighth (1/8) of an inch per foot toward the point of treatment.
2. Building sewer and effluent line piping shall be laid on a firm bed throughout its entire length.
3. Building sewers and effluent lines shall be installed a minimum of one (1) foot below grade.
4. Building sewer cleanouts shall be installed at least every one hundred (100) feet in straight runs.
5. Building sewer bends shall be limited to forty-five (45) degree ells or long sweep quarter bends.
6. Schedule 40 PVC, PVC SDR 35 or pipe of equivalent strength is required whenever building sewer or effluent lines are located under a road or driveway.

Q. Grease Interceptors:

1. Grease interceptors shall be required for all commercial food service establishments.
2. Grease interceptors shall be located as close as practicable to the wastewater source.
3. Sizing shall be in accordance with the requirements of the applicable local plumbing code in force on the date of the onsite wastewater system permit application.

- R. Floodplains: No new or expanded system shall be installed in a floodway. When a system is installed in a 100-year floodplain, then the new, expanded, or repaired system shall meet or exceed the requirements of the National Flood Insurance Program. The system shall be designed to minimize or eliminate infiltration of floodwaters into the system, and discharge of the system into the floodwaters.

## **6.02 Septic Tanks**

- A. A septic tank shall be constructed to permit retention of incoming sewage for a minimum of thirty (30) hours, or the capacity shall be based upon the number of bedrooms according to the following table:

### SEPTIC TANK SIZE BASED UPON NUMBER OF BEDROOMS

<u>Number of Bedrooms</u>	<u>Minimum Effective Liquid Tank Capacity (gallons)</u>
3 or less	1,000
4	1,250
Each additional	250

- B. Septic tank design criteria:
1. Except for grey water systems, the effective liquid capacity shall be no less than 1,000 gallons.
  2. Inlet invert shall be at least 3 inches higher than the outlet invert.
  3. Outlet tee or baffle shall extend above the surface of the liquid to within 1 inch of the underside of the tank top and shall extend at least 14 inches below the outlet invert.
  4. The distance from the outlet invert to the underside of the tank top shall be at least 10 inches.
  5. Liquid depth shall be a minimum of 30 inches and the maximum depth shall not exceed the tank length or 60 inches, whichever is less.
  6. A septic tank shall have two or more compartments or more than one tank

may be used in series to provide the capacity arrangement such that the first compartment of a septic tank shall hold no less than ½ of the required effective capacity.

7. The transfer of liquid from the first compartment to the second or successive compartment shall be made at a liquid depth of at least 14 inches below the outlet invert, but not in the sludge zone.
  8. At least one access, no less than 20 inches across, shall be provided in each compartment of a tank.
  9. The opening cover of a septic tank access hole, inspection port, or sampling access port shall be no deeper than 8 inches below the finished grade, and made of materials resistant to degradation from moisture or sewer gases.
  10. Concrete septic tanks shall meet all construction code requirements for reinforced concrete as specified in the American Concrete Institute Publication #318 and in the Uniform Building Code. Tanks shall be constructed of Portland Type II sulfate resistant cement with a minimum compressive strength of 3,000 p.s.i. at the end of twenty-eight (28) days. It shall be the manufacturer's responsibility for proper design mix and to insure the tank is watertight. The walls, floor, and cover of the tank shall be at least three and one-half (3 ½) inches thick. Tank cover and lids shall be reinforced to withstand anticipated loadings. The manufacturer's name and the tank capacity shall be cast in the cover of the tank. BCPH must give prior approval of plans and specifications of any tank fabricated on site and such tanks shall be designed, inspected, and approved in writing by an R.P.E.
  11. Metal or coated metal tanks shall not be used for septic tanks. Other materials such as fiberglass or plastic, which produce tanks that are adequate, durable, and resistant to corrosion and decay may be approved by BCPH. Fiberglass and plastic tanks shall be surrounded by sand or other suitable material to protect the tank from punctures.
- C. Pipe meeting or exceeding ASTM standard D3034 properly supported to prevent failure by settling shall extend from the septic tank for a distance of at least five (5) feet from the inlet and outlet ends.

### **6.03 Aerobic Sewage Treatment Systems**

- A. General Design: The shape and design of an aeration compartment, its inlet and outlet arrangements, and air application shall:

1. Allow for intimate mixing of applied sewage, return solids, and applied air.
  2. Prevent excessive short-circuiting of flow.
  3. Prevent the deposition and buildup of solids in the aeration compartment.
  4. Be National Sanitation Foundation (NSF)-approved.
- B. Method of Aeration: The method of aeration shall be accomplished by mechanical aeration, diffused air, or a combination of these. The method of aeration shall at all times maintain aerobic conditions at the maximum organic loading in both the aeration and settling compartments. A warning device indicating aeration unit failure shall be installed.
- C. Service Agreement: A biannual service agreement must be in place and on record with BCPH prior to final approval of the aerobic system and must be in place throughout the use of the system.

#### **6.04 Soil Absorption System (General).**

A site shall normally be evaluated for purposes of compliance with these Regulations as it exists in its natural state. Any substantial reconstruction or alteration of the existing natural terrain which may be proposed in the application in order to render the site suitable for an onsite wastewater system shall be supported by the report of an R.P.E. which includes a finding that the proposed reconstruction or alteration of the site will not result in surface instability or subject the site to significant risk of erosion.

- A. For a system treating and disposing of effluent through a soil absorption system, the method for calculating minimum absorption area shall be based upon the amount of suitable soil and the capacity of the soil to absorb liquids as established by the percolation test or long-term acceptance rate and upon design criteria and construction standards for such type of absorption system as set forth in these Regulations.
- B. Registered Professional Engineer design is required for sites:
1. Where the soil percolation rate is slower than sixty minutes per inch or faster than five minutes per inch.
  2. Where the maximum seasonal level of the groundwater table, bedrock, or unsuitable soil is less than six feet below original grade.

3. Where the ground slope is in excess of thirty (30) percent.
  4. Where the system will be located within the floodplain.
  5. Where a system must be installed such that any portion of the distribution matrix is above original grade.
  6. Where the system will serve commercial, business, institutional, or industrial properties or multi-family dwellings or more than one single-family dwelling.
  7. Where the system requires a lift station or sewage pumping system.
  8. Where the system requires a lift station or sewage pumping system.
- C. Soil building or replacement may be permitted to bring the soil within the requirements of suitable soil when specified by an R.P.E.

D. Absorption Area Formula:

1. Trench Systems: Absorption area in square feet (A) for an onsite wastewater system utilizing absorption trenches shall be determined as a function of the design flow of sewage in gallons per day, (Q), and the percolation rate in minutes per inch, (t), according to the formula:

$$A = \frac{Q}{5} \sqrt{t}$$

2. Bed Systems: Absorption area in square feet (A) for an onsite wastewater system utilizing absorption beds shall be determined as a function of the design flow of sewage in gallons per day, (Q) and the percolation rate in minutes per inch, (t) according to the formula:

$$A = 1.3 \frac{Q}{5} \sqrt{t}$$

Note: Where the percolation rate is found to be faster than five minutes per inch in soils of sandy texture, the minimum value of the “t” for use in this formula shall not be less than “5” and soil replacement required.

3. A in square feet may also be computed as a function of the design flow (Q) and the Long-Term Long-Term Acceptance Rates (LTAR): The

minimum absorption area Acceptance Rate (LTAR) according to the formula:

$$A = \frac{Q}{\text{LTAR}}$$

LTAR's for Wastewater for Soil Absorption Systems

Perc Rate Loading (Minutes/Inch)	Typical Soil Textures	Maximum Rate (gal/ft <sup>2</sup> /day)
<5**	Gravel **	Not suitable
1-5	Coarse to medium sand	1.30
6-10	Fine Sand to Loamy Sand	1.20
11-20	Sandy Loam to Loam	0.72
21-30	Loam	0.50
31-40	Loam to Silty Sand	0.40
41-60	Clay Loam to Clay*	0.30
over 60*	Silty Loam Clay/Silty Loam	0.20

\* Soils without highly expansive clays

\*\* Design By Registered Professional Engineer required

Soil textures must be determined by a soil scientist, professional geologist, or lab analysis, and must be approved by BCPH.

E. Allowable Absorption Area Reductions and Increases:

1. Adjustment for Deep Gravel: The length of an absorption trench or leachfield may be calculated by allowance for the sidewall area of additional depth of gravel in excess of six (6) inches below the bottom of the distribution pipe according to the following formula:

$$L_A = \frac{L(W + 2)}{W + 1 + 2d}$$

Where:  $L_A$  = Adjusted length of absorption trench or leachfield, in feet  
 $L$  = Original length of absorption trench or leachfield, in feet

$W$  = width of trench in feet

$d$  = depth of gravel below distribution pipe, in feet

2. If dosing is used in conjunction with an absorption system, a reduction of twenty-five percent (25%) may be allowed for pressurized dosing or fifteen percent (15%) for non-pressurized dosing.
- F. The maximum reduction shall be no greater than twenty-five (25%) of the standard required soil absorption area.

#### **6.05 Soil Absorption Systems Installation Requirements:**

- A. Excavation: An absorption trench or bed shall be of sufficient width and length or dimension to provide the required absorption area. The bottom of the trench or bed shall be level and excavated no deeper than directed by the installation instructions. If not otherwise specified on the permit, no portion of the trench or bed shall be excavated deeper than four (4) feet below existing ground surface on the uphill side. Under no circumstances shall the infiltrative surface be placed within four (4) feet of bedrock or the maximum seasonal groundwater table. Blasting shall not be permitted as a means of excavating an absorption bed or trench.
- B. Distribution Box: A distribution box shall be required for all systems discharging below the ground surface through more than one distribution line and utilizing gravity distribution of effluent. The distribution box shall be constructed of Portland Type \*\* sulfate-resistant cement or other material approved by BCPH. The box shall be of sufficient size to accommodate the necessary distribution lines and provide for equal distribution of effluent. The inlet invert shall be at least one inch above the level of the outlet inverts. The outlet inverts shall be three to six inches above the floor of the distribution box. The box shall be properly bedded in sand or gravel to prevent settling. Prior to final inspection, the box shall be water leveled to verify even distribution of effluent.
- C. Distribution Lines: All distribution lines shall be perforated pipe constructed of polyvinylchloride (PVC) or material approved by BCPH. Tile or open-joint pipe shall not be used. In absorption beds, if two or more distribution pipes exit the distribution box in parallel, perforated pipe shall be used on only one line and solid pipe on the remaining lines until three foot separation between lines is achieved. Distribution lines shall be installed level with all perforations equally offset from the bottom of the pipe in order to obtain even distribution. Lines for gravity distribution shall not exceed 100 feet in length or be less than four (4) inches in diameter. The terminal end of all lines shall be capped with an approved end cap unless lines are looped.
- D. Line Placement in Absorption Trenches: Absorption trenches shall not exceed three (3) feet in width, with the distribution line extending the entire length of the

trench and centered between both sidewalls. Adjacent trenches shall be separated by a minimum of six (6) feet.

- E. Line Placement in Leachfields: Distribution lines can extend to within one and one-half (1½) feet but not further than three (3) feet of all absorption sidewalls with no more than six (6) feet between any two (2) adjacent distribution lines.
- F. Aggregate: There shall be a minimum of twelve (12) inch vertical thickness of clean, washed, graded gravel, rock or material of equal efficiency throughout the absorption trench or leachfield. This material shall range in size from ½ inch to 2 ½ inches in diameter and shall be placed from at least 2 inches above the top of the distribution pipe to at least 6 inches below the bottom of the distribution pipe. The aggregate shall be evenly distributed without mounding over the distribution lines.
- G. Supporting Fill and Final Cover: For an absorption trench or bed installed such that any portion of the aggregate is to be located above the level of the existing ground, there shall be constructed a minimum of three (3) horizontal feet of compacted, supporting soil berm with a minimum 10 mil poly vinyl chloride liner to prevent lateral flow of waste outside of the absorption area. Additional supporting fill shall be required when necessary to preserve the stability of the absorption field and shall be sufficiently compacted to resist the effects of weathering. If the absorption area is to be installed in new or reworked fill materials, the fill area must be designed and retested in accordance with Section 5.03 by an R.P.E. Results from this testing shall be submitted to BCPH. In addition, the fill material shall consist of well-graded soil with a percolation rate of between 10 and 30 minutes per inch, free of heavy sod or other organic matter, trash, frozen material, or debris. Backfill shall be deposited in layers not exceeding 6 inches in thickness, and each layer shall be compacted by means of mechanical tampers, pneumatic rollers, or other similar means. The degree of compaction and density of filled areas shall not exceed ninety percent (90%) of maximum density at optimum moisture content according to the ASTM designation D 609-Method C “Standard” compaction. Water shall be added, if necessary, to bring fill material to optimum moisture content. Compaction test shall be performed, and the results thereof transmitted to BCPH. Following final inspection pursuant to Section 3.07, a layer of untreated building paper or other pervious material approved by BCPH shall be placed over the aggregate in the absorption area in order to prevent entrance of fill soil into the aggregate, and shall be on site for inspection. An impervious covering shall not be used for this purpose. A final cover of soil suitable for vegetation at least twelve (12) inches deep shall be placed from the top of the pervious material to the finished surface grade of the absorption area. The final cover shall be graded to deflect runoff water away from the disposal area. Machine tamping, rolling, or hydraulic compaction of the final cover shall not be permitted. Hand tamping, however, may be done where necessary to stabilize soil to prevent erosion or the intrusion of extraneous water. As soon as climatic conditions permit, the final cover and

supporting fill shall be planted with deep-rooted grasses or other vegetation suitable for stabilizing the soil.

### **6.06 Ripped Base Bed**

Ripped base beds shall be permitted in areas where weathered, decomposed bedrock Or other unsuitable soil or rock is present, and if the excavation of the unsuitable material can be accomplished without blasting. The R.P.E. shall specify the fill material that will comprise the suitable soil. The absorption bed size shall be determined from the original percolation test or from percolation tests of fill soils, whichever is greater. Percolation tests of the fill soils shall be done in accordance with Section 5.03 and the test results must be submitted to BCPH. The design engineer must verify that the compaction of the fill soils is adequate.

### **6.07 Gravelless Soil Absorption Systems**

All gravelless soil absorption systems shall be by the Colorado Department of Public Health and Environment (CDPHE). These systems shall be installed per the manufacturer's specifications.

### **6.08 Alternating Systems:**

A diversion valve or other approved diversion mechanism may be installed on the septic tank effluent line allowing alternating soil absorption systems. Each soil absorption system shall be a minimum of fifty percent (50%) of the total area required. The diversion mechanism shall be readily accessible from the finished grade and shall be switched on at least an annual basis.

### **6.09 Dosing:**

Dosing may be used in conjunction with soil absorption systems. The dosing frequency should be calculated according to the following table:

Dosing Frequencies for Various Soil Textures:

Soil texture	Dosing Frequency
Sand	4 doses / day
Sandy Loam	1 dose / day
Loam	Frequency not critical *
Silty Loam	1 dose / day
Silty Clay Loam	1 dose / day
Clay	Frequency not critical *

- \* Long- term resting provided by alternating fields is desirable and recommended in these soils.

### **6.10 Absorption or Seepage Pit Systems:**

Absorption or seepage pit systems shall be designed by an R.P.E. Absorption or seepage pits having adequate soil absorption may be permitted by BCPH as an alternative, where absorption fields are impracticable, and where the subsurface conditions are otherwise suitable for pit installations. The capacity of the pit shall be computed on the basis of percolation tests made in each stratum penetrated. The weighted average of the results shall be used to obtain a design figure. Soil strata in which the percolation is slower than 30 minutes per inch shall not be used for absorption or seepage. The effective area of the pit is the vertical wall area (based on dug perimeter) of the pervious strata below the inlet. No allowance shall be made for impervious strata or bottom area. Pits shall be separated by a distance equal to 3 times the greatest lateral dimension of the largest pit. For pits over 20 feet in depth, the minimum space between pits shall be 20 feet. Pits shall be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity. Adequate safety protection shall be provided to protect against personal injury during construction or use.

### **6.11 Dry Wells:**

Dry wells may be permitted by BCPH. They shall be filled with clean, graded rock, which may range in size from ½ to 2 ½ inches in diameter. The rock shall extend from the bottom of the pit to at least two (2) inches above the inlet pipe. At least one four (4) inch perforated vertical standpipe will be attached to the end of the distribution line with a tee fitting. It shall extend to the bottom of the dry well and up to the finished grade and fitted with a removable cap to be used as an inspection pipe. The absorption area of the dry well shall be computed on the basis of percolation rates, or the long-term acceptance rates of each stratum penetrated. The weighted average of the results shall be used to obtain a design value. The effective area of the pit will be calculated by adding the area of the sidewalls below the horizontal inlet line and the area of the bottom of the pit, excluding any impermeable stratum penetrated. Dry wells so sized may only be permitted in soils with a percolation rate faster than sixty (60) minutes per inch. Dry wells shall be separated by a distance equal to the depth of the excavation or ten (10) feet, which ever is greater.

### **6.12 Serial Distribution Systems:**

A serial distribution system may be used in all situations where a soil absorption system is permitted and shall be used where the ground slope does not allow for suitable installation of a single level absorption field, unless a distribution box or

dosing chamber is used. The horizontal distance from the side of the absorption system to the surface of the ground shall be adequate to prevent lateral flow and surfacing of effluent above ground. When a serial distribution system is used, the following design and construction procedures shall be followed:

- A. The bottom of each absorption field and its distribution line shall be level.
- B. There shall be a minimum of 10 inches of ground cover over the gravel fill.
- C. An absorption field or trench shall follow approximately the ground surface contours so variation in absorption field or trench depth will be minimized.
- D. There shall be a minimum of 6 feet (horizontal measurement) of undisturbed earth between adjacent absorption field trenches and between the septic tank or other treatment unit and the nearest absorption field.

Adjacent absorption fields shall be connected with a relief line or a drop box arrangement such that each trench fills with effluent to the top of the gravel before flowing to succeeding trenches.

### **6.13 Evapotranspiration Systems:**

An evapotranspiration system may be used where soil absorption of effluent is not possible due to high water table, high bedrock, fractured rock, or highly pervious or impervious soil.

#### **A. Design and Construction:**

An evapotranspiration system shall be designed by a Registered Professional Engineer who shall furnish a design which includes calculations for the rate of evapotranspiration (not to exceed .07 gallons/square foot/day), the sizing of the evapotranspiration bed, and the design load, along with pertinent data used in these calculations. The following specifications shall also be furnished:

1. Liner material
2. Method for protection of liner
3. Soil Analyses
4. Grain size
5. Soil description
6. Provision for vegetation cover

Septic tanks and aeration tanks included in an evapotranspiration system shall meet the requirements set forth in Section 6 of these Regulations. When high groundwater table, bedrock, fractured rock, or highly pervious material (percolation faster than 5 minutes per 1 inch) endanger the underground water, a durable and impermeable liner shall be installed to prevent the sewage effluent from entering the underlying formation or groundwater table.

Liners of evapotranspiration systems shall be impervious to chemical reaction and passage of sewage. Domestic polyvinylchloride plastic lining of 10 mil thickness, butyl rubber, or other non-toxic equivalent material approved by BCPH shall be used as liners. Matrix material in the bed shall be resistant to chemical decomposition and the formation of colloidal particles. The matrix shall be well-graded and properly sized to meet design requirements. The content of fine particles shall be limited to prevent inhibition of capillary action or permeability. The matrix shall penetrate through the rock material to the bottom of the bed equal to 10% to 15% of the bed surface area. Adjacent distribution lines in evapotranspiration systems shall be located no more than twenty (20) feet apart.

A. Minimizing Sizing:

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

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

2. As an alternative, a system may be designed on the basis of a month water balance for the system. Such a design would provide for total storage of average daily flows for all periods in which evapotranspiration is not shown to occur. Adequate surface area shall be provided to evaporate/transpire total annual average daily flows at a rate equivalent to local net lake evaporation over the remaining period of the year.

B. Installation: An evapotranspiration system shall be located in an open area where there is maximum exposure to sunshine. The liner shall be sealed at all openings to the bed, and shall completely underlie the matrix of the evapotranspiration system. Seams shall be bonded tightly and imperviously. Any damage to the liner shall be repaired to insure the integrity of the liner, using the proper solvent or mastic and a patch of the same material as the liner. The matrix shall be install with care so that the liner is not perforated. The surface of the matrix shall be convex, so as to permit runoff of rainwater and to increase the air turbulence over it, and shall be provided with a cover of grass or other vegetation specified by the design. The owner shall maintain the surface as designed. A berm or drainage ditch shall be provided for the control of surface water. The bed shall be protected from vehicular, pedestrian, and livestock traffic. Sand utilized in evapotranspiration systems for cover shall meet the following gradation requirements and be approved by the design engineer:

Sieve Size	Percent (%) Passing
4	100%

40	50-55%
200	<15

**6.14 Combination Absorption and Evapotranspiration Systems:**

- A. Installation: Combination absorption/evapotranspiration systems shall be designed by an R.P.E., and may be permitted where water table elevations or soil conditions permit an absorption system, but percolation rates are not satisfactory or acceptable. Distribution lines in such systems shall be spaced no further than six (6) feet apart and shall otherwise meet the requirement for distribution lines in an absorption systems as stated in Section 6.05 B and D. The absorption/evapotranspiration systems may be partially lines and excavation shall be performed in accordance with Section 6.05A.
- B. Minimum sizing: Calculations submitted for the rate of effluent disposal shall include both the anticipated absorption rate and the anticipated evapotranspiration rate. For the purpose of absorption/evapotranspiration systems, the sizing formula shall be the following:
  - 1. If percolation rates are greater than 60 minutes per inch (mpi) but less than 120 mpi, calculate the ratio of 60 to the actual percolation rate at the site. The resulting ratio is the percentage of maximum daily flow ( $Q_{max}$ ) to be used in the formula for absorption. The remainder of the maximum daily flow is used in the formula for evapotranspiration systems.

Thus, 75% of 720 gpd is used in the formula for evapotranspiration systems. The percolation rate reported will be used in the absorption formula (80, in example).

OR

- 2. If percolation rates are greater than 60 minutes per inch, the system may be designed using a month water balance method.

**6.15 Sand Filter Systems**

- A. Sand filter systems shall be designed by an R.P.E. and may be designed to function with or without an underdrain system. If no underdrain system is used, the design engineer shall verify that the surrounding soil is sufficiently permeable to receive the effluent from the sand filter.
- B. The filtering material shall be clean, coarse sand; all passing a screen having four (4) meshes to the inch. The sand shall have an effective size between 0.25 and 0.6 mm. The uniformity coefficient shall be 4.0 or less.

- C. The sand shall be at least two (2) feet deep below the distribution lines. The depth of sand and depth of suitable soil combined must total 4 feet. The distributors and underdrain, if required, shall be surrounded by coarse, screened gravel or crushed stone.

Underdrain effluent must then be discharged via a soil absorption system or be further treated as necessary to meet the standards of Section 7.

All of the gravel or stone shall pass a 2 ½-inch screen and shall be retained on a ¾-inch screen. Fine gravel ¼ inch size or less may be used above and around the coarse material, both at the distributor and underdrains. The separating distance between parallel distribution lines shall not exceed 6 feet, and a distribution line shall be located within 3 feet of each filter sidewall. Pipe for gravity distribution shall be no less than 4 inches in diameter. The slope of the distributors shall be 0.4 percent where dosing tanks are not used, and the slope of the underdrains 0.5 to 1.0 percent. The sand must be thoroughly settled by flooding or other means before the distributors are placed at the final grade. The distributor and underdrains shall be constructed of polyvinylchloride or other material approved by BCPH.

The top of the sand bed shall be no less than four (4) feet above the high groundwater table for installations in which effluent percolates downward through the soil.

- D. The minimum area for a sand filter shall be computed as a function of the maximum daily sewage flow and the application rate shall not exceed .95 gallons per square foot per day.
- E. A dosing tank shall be provided where the total filter area exceeds 1,800 square feet. The size of the dose, or the net capacity of the dosing tank, shall be at least 75 percent of the volume of the distributors.

#### **6.16 Mound/Raised Systems:**

A mound/raised soil absorption system shall be designed by an R.P.E., and the design shall be site-specific and include specifications for fill material, basal area size calculations, absorption area calculations, distribution networks, cap, topsoil, final grading, and other pertinent information to the construction of the system as may be requested by BCPH.

- A. The distribution system shall be designed for uniform effluent application throughout the mound.
- B. The effluent distribution system shall be graded to drain back to the dosing chamber or buried below frost line.

- C. The final slope of the mound backfill shall be no greater than 3 to 1 (three [3] feet horizontally to one [1] foot vertically).
- D. The mound shall be planted with suitable vegetative cover.

### **6.17 Constructed Wetland Treatment Systems**

- A. A constructed wetland treatment system shall be designed by an R.P.E. The design shall be site-specific and include specifications for: loading; length, width and depth; capacity; effluent distribution; liner material; mechanism for water level control; filter media; density and species of plant material; effluent level; and final discharge type. The design shall include estimates of effluent quality at the inlet and outlet.
- B. At minimum, a two-compartment septic tank is required and shall be in compliance with Section 6.02. Loading will be determined according to Section 5.01 and Appendix A. If design flow is less than 3,000 gallons per day, the wetland must be designed as a subsurface flow constructed wetland. Sampling ports or some other means of effluent sampling to demonstrate compliance with Section 7 of these Regulations shall be required if effluent is not discharged into four (4) feet of suitable soil. All sampling and testing costs will be assumed by the property owner.

### **6.18 Wastewater Ponds**

- A. A wastewater pond shall be designed by an R.P.E., reviewed by BCPH, and may be used to provide an additional degree of treatment following first stage treatment. Unless otherwise approved by BCOH, the first stage treatment shall be an aeration unit or equivalent treatment device. The pond shall be designed for a loading not to exceed 0.46 pounds of BOD<sub>5</sub> per 1,000 square feet of water surface area. Special design shall be required in each case in which non-domestic kinds of onsite wastewater system wastes will be received.
- B. Maximum water depth in the pond shall not exceed three (3) feet. The inside slope of the pond, dike, or embankment shall not be steeper than 3:1, (3 feet measured horizontally for each foot measured vertically). A center inlet shall be provided.
- C. Unless four (4) feet of unsaturated soil exists beneath the bottom of the pond, said pond shall be constructed in impervious soil or be sealed to prevent excess seepage of wastewater. Only ponds exhibiting an exfiltration rate of  $1 \times 10^{-6}$  cm/sec. Or less shall be deemed adequate to prevent excess seepage.
- D. Adequate safety protection shall be provided, such as fencing and signs, to protect against personal injury.

- E. Surface runoff shall be diverted away from the pond except where controlled by design.

### **6.19 Grey Water Systems**

A grey water system shall meet at least all minimum design and construction standards for a septic tank system. Loading will be based on average daily flow of 50 gallons/person/day or as approved by BCPH. Garbage disposals shall not be plumbed to grey water systems. There shall be no surface discharge of effluent unless it meets the requirements of Section 7.

### **6.20 Vaults**

Vaults may be permitted by BCPH for existing structures limited in use to 60 days per year, served by liquid carriage sewer lines, and on property for which a sewage treatment system is not physically or operationally feasible. Vaults shall meet the same construction and installation standards required for septic tanks, except there shall be no effluent outlet and two-compartment construction shall not be required. Vaults shall have a minimum 1,000-gallon effective capacity. Vaults shall be located in an area which is accessible to pumping and shall be equipped with a conspicuously located visual or audio device to signal when filled to 65-80% of capacity. Vaults shall be pumped by a Licensed Systems Cleaner prior to reaching capacity, and all receipts shall be retained and provided to BCPH upon request.

### **6.21 Vault Privies**

A vault privy may be permitted by BCPH and shall be built to include: fly-tight construction, a superstructure affording complete privacy, an earth mound around the top of the vault and below floor level which slopes downward away from the superstructure base, a floor and riser of concrete or other impervious material, and with seats and hinged covers of easily cleanable, impervious material. All venting shall be fly-proofed with No. 16 or tighter mesh screening. Effective capacity of the vault shall be no less than 400 gallons. Application for a vault privy for residential use shall include plans for the disposal of grey water.

### **6.22 Incineration Toilets**

- A. An incineration toilet shall be designed and installed in accordance with all applicable federal, state, and local air pollution requirements.

- B. Incineration toilets must bear the seal of approval of the National Sanitation Foundation (NSF) or equivalent testing program.
- C. Incineration toilets shall be installed and operated according to manufacturer's specifications.
- D. Applications for systems utilizing incineration toilets shall include plans for the disposal of grey water.

### **6.23 Chemical Toilets**

A portable chemical toilet shall have a superstructure which meets the requirements of the Section 6.23. Use of a portable chemical toilet in permanently occupied buildings shall be prohibited except during construction or under emergency circumstances as determined by BCPH.

### **6.24 Composting Toilets**

- A. Deposits of feces, urine, and readily decomposable household garbage that are not diluted with water or other fluids may be retained in a compartment, in which aerobic composting will occur. The compartment may be located, subject to applicable regulations or codes, within a dwelling or building provided the unit complies with the applicable requirements of these Regulations, and provided the installation will not result in conditions considered to be a health hazard as determined by BCPH. The effective volume of the receptacle must be sufficient to accommodate the number of persons served.
- B. Adequate additional volume shall be provided for the use of composting materials which shall not be toxic to the process or hazardous to persons and which shall be used in sufficient quantity to assure proper decomposition.
- C. Compartment and appurtenances related to the unit shall include fly-tight construction and exterior ventilation as required by the plumbing code.
- D. When the available effective volume is filled to seventy-five (75%) percent of capacity, residue from the unit shall be properly disposed of by acceptable solid waste practices.
- E. If a system will be installed where low temperature may be a factor, design shall compensate for the effects of the low temperature.
- F. Composting toilets shall bear the seal of approval of the National Sanitation Foundation or an equivalent testing program. Composting toilets shall be operated according to manufacturer's specifications.

- G. Applications for systems utilizing composting toilets shall include plans for disposal of grey water.

**6.25 Business, Commercial, Industrial, Institutional, or Multi-Family Dwelling Waste Systems**

- A. Performance criteria and construction standards for a system which will service commercial, business, institutional, or industrial property, or multi-family dwellings shall conform to these guidelines.
- B. Such systems shall be designed by an R.P.E. Systems shall receive only such biodegradable wastes for treatment and disposal as are compatible with those biological treatment processes indicated in submitted design.
- C. If anticipated wastes are other than domestic-type, an application for such system shall be reviewed by the Board of Health.

**6.26 Systems for which data on design, operation, and maintenance, based upon use in Colorado, are limited or undetermined**

- A. Systems, which recycle, treated wastewater for non-potable purposes such as flushing water closets or urinals:
  - 1. That portion of the wastewater recycled for non-potable purposes, such as flushing water closets or urinals, must meet the treatment requirements of Section 7 of these guidelines for effluent in which the possibility exists for occasional direct humans contact.
  - 2. No cross-connection to a pipe, fixture, or supply containing potable water shall be permitted.
- B. Systems, which recycle, treated wastewater for potable purposes:
  - 1. No system shall be permitted which will recycle wastewater for potable purposes except a system which shall consistently meet all of the sanitation and maximum contaminant level requirements of rules, regulations, and standards of the Colorado Department of Public Health and Environment and of the Board of Health.

**Section 7. Effluent Discharge Standards**

**7.01 General**

Those systems which will discharge effluent directly to the atmosphere, the ground surface, or below ground, or which employ aerobic principles of sewage treatment or a dispersal system, may be permitted only if designed by a Registered Professional Engineer. This Section 7 shall not apply to a system discharging below ground to suitable soil, evapotranspiration system, sand filter system, or to a non-discharging system.

**7.02 Minimum performance criteria required for all systems pursuant to this Section 7**

- A. If effluent discharge is made into the atmosphere or upon the ground surface in areas in which the possibility exists for occasional direct human contact with the effluent discharge, the effluent at the point of sampling shall meet each of the following standards:
  - 1. The geometric mean of the fecal coliform density shall not exceed twenty-five (25) per one hundred (100) milliliters when averaged over any five (5) consecutive samples, and no single sample result for fecal coliform shall exceed two hundred (200) per one hundred (100) milliliters.
  - 2. The arithmetic mean of the standard 5-day biochemical oxygen demand (BOD<sub>5</sub>) shall not exceed twenty (20) milligrams per liter when averaged over any three (3) consecutive samples.
  - 3. The arithmetic mean of the total suspended solids shall not exceed forty (40) milligrams per liter when averaged over any three (3) consecutive samples.
  
- B. If the effluent discharge is made into the atmosphere or upon the ground surface in an area so restricted as to protect against the likelihood of direct human contact with the discharged effluent, the effluent at the point of sampling shall meet each of the following standards:
  - 1. The geometric mean of the fecal coliform density shall not exceed five hundred (500) per one hundred (100) milliliters when averaged over any five (5) consecutive samples, and no single sample shall exceed five thousand (5,000) fecal coliform per one hundred (100) milliliters.
  - 2. The arithmetic mean of the standard 5-day biochemical oxygen demand (BOD<sub>5</sub>) shall not exceed twenty (20) milligrams per liter when averaged over any three (3) consecutive samples.
  - 3. The arithmetic mean of the total suspended solids shall not exceed forty (40) milligrams per liter when averaged over any three (3) consecutive samples.

- C. If effluent discharge is made beneath the surface of the ground and discharge will not be made through suitable soil, either existing or constructed, or through a sand filter, the following standards shall be met:
1. There shall be at least four (4) feet of soil between the maximum seasonal high water table and the depth of effluent discharge.
  2. There shall be at least two (2) feet of suitable soil between fractured bedrock and the depth of the effluent discharge.
  3. The arithmetic mean of the standard 5-day biochemical oxygen demand (BOD<sub>5</sub>) shall not exceed sixty (60) milligrams per liter when averaged over any three (3) consecutive samples.
  4. The arithmetic mean of the total suspended solids shall not exceed one hundred (100) milligrams per liter when averaged over any three (3) consecutive samples.
- D. To determine compliance with the standards contained in this Section 7, samples shall be taken at least once per week, but no more frequently than once per day.

### **7.03 Methods of Analysis – Sampling Points**

All effluent samples shall be analyzed according to the methods prescribed in the current edition of Standard Methods for the Examination of Water and Wastewater (American Public Health Association). Copies of the analytical methods allowed may be obtained, upon request, from the Onsite Wastewater System Program Coordinator, Colorado Department of Public Health and Environment. The point of sampling shall be a location that is representative of final discharge from the system.

## **Section 8. Manufactured Units Utilizing Mechanical Apparatus for Treatment of Sewage**

### **8.01 Minimum Requirements**

Onsite wastewater systems utilizing mechanical apparatus and furnished for installation in Colorado shall comply with the minimum requirements of criteria and construction standards set forth in these guidelines.

### **8.02 Responsibility for Efficient Operation**

No such unit utilizing mechanical apparatus and which is designed for discharge either upon the ground or beneath the ground surface, or which may adversely affect state waters, shall be permitted unless:

- A. The system is installed within a geographic area wherein a public, quasi-public, or private entity, or political subdivision is continually responsible for the efficient operation and maintenance of said unit.

OR

- B. The operator of the system insures an efficient operation of all mechanical and electrical component parts provided prior to and during continuing use.

## **Section 9. Approval of Systems Employing New Technology**

### **9.01 Definition.**

For purposes of this Section 9, a system employing new technology is a system based on improvements and developments in technology of sewage disposal and not otherwise provided for in Section 25-10-105 (1)(e) through (k), C.R.S., 2006.

### **9.02 Certification.**

Such systems may be considered by the Board of Health provided they have been certified by the Department of Public Health and Environment, according to Section XI of the Colorado Department of Public Health and Environment's Guidelines on Onsite Wastewater Systems, as adopted in 2000.

## **Section 10. Experimental Systems**

The Board of Health shall consider applications for onsite wastewater systems which employ means of sewage treatment or disposal not otherwise provided for in these regulations and not certified by the Colorado Department of Public Health and Environment pursuant to Section 25-10-108, C.R.S. 2006, as amended, under the following conditions:

- A. The system shall be designed by an R.P.E. to include such design specifications and testing data as the Board of Health shall require, in order to evaluate the proposed system.
- B. The applicant shall agree to conduct, at the applicant's expense, such field testing of the proposed system as the Board of Health shall require to ensure that the system functions properly and creates no hazard to the public health.
- C. The design shall provide for the installation of a back-up system of a type described in these regulations or certified by the Colorado Department of Public Health and Environment, pursuant to Section 25-10-106 (1) (e) through (k),

C.R.S. 2006, as amended, which the applicant shall agree to install in the event that the Health Officer determines that the proposed system, once installed, is not functioning properly or is otherwise creating a hazard to the public health.

- D. In the case of manufactured units or systems, the Board of Health shall issue permits for no more than ten (10) systems utilizing any one specific manufacturer and model of experimental equipment.
- E. Permits issued for experimental systems shall be valid for one (1) year and may be renewed for no more than one (1) additional year.

## **Section 11 – PROPERTY TRANSFER CERTIFICATES**

The purpose of a property transfer certificate is to, at the time of property transfer (i.e. sale of property), verify the adequacy of the existing onsite wastewater system (OWS) if it was previously approved and permitted, or assure that an unapproved OWS will be permitted and approved within one year of the property transfer. At the time of property transfer, properties with an approved OWS (i.e. septic system) will need to pass another inspection to ensure that the OWS continues to operate properly. If the OWS does not pass this inspection, the property owner will be required to obtain a repair permit to correct deficiencies or obtain an agreement signed by the new owners acknowledging they have accepted responsibility for repairing the deficiencies.

### **11.0 Applicability**

- A. Effective September 1, 2008, prior to the sale or transfer of ownership of a property served by an onsite wastewater system (OWS, or septic system), the owners of the dwelling or occupied building shall obtain, or have in their possession, a property transfer certificate and subsequent certificate of operation for that system unless exempted or waived as noted below.
- B. If the onsite wastewater system serving the dwelling or structure was installed and given final approval by Boulder County Public Health (BCPH) ten (10) years or less prior to the date of closing on the property sale, a property transfer certificate shall not be required.
- C. A property transfer certificate and certificate of operation will be issued to any owner of a property with an OWS upon completion of a property transfer application and submission of the required documents verifying compliance with these regulations.
- D. All properties must have an existing approved OWS permit from BCPH. Property owners without an existing permitted and approved OWS will need to go through a verification process and/or apply for a repair permit, and therefore would not need to obtain a property transfer certificate. Verification and repair of an unapproved OWS are both done by way of a major repair permit. In order to be exempt from these property transfer certificate requirements, owners of a property with an unapproved OWS must apply for a major repair permit to either verify that the OWS works adequately or have it replaced.

- E. Property owners that have a permit for their OWS but did not receive final approval from BCPH will need to contact BCPH to determine the necessary steps to obtain the OWS approval.
- F. The following additional situations will not require a property transfer certificate:
  1. The change in ownership is solely to include or exclude a spouse.
  2. The transfer is creating or ending a joint ownership if at least one person is an original owner of the property and/or his/her spouse.
  3. The transfer of property contains a building or buildings connected to an OWS that will be demolished (or already has been), and the building/buildings will not be occupied after the property transfer.
  4. The transfer of property is to a trust.
  5. The transfer of property is to effect foreclosure or forfeiture of real property.
  6. The owner of the property or the person acquiring title has signed an enforceable agreement with BCPH to upgrade the system.
  7. The owner of the property will connect the dwelling or occupied building to a sanitary sewer or a shared system within the next two years following the transfer of title, provided that such agreement has been disclosed to and is binding on the subsequent owner(s).
  8. The property owner is part of a community plan or management district for his/her onsite wastewater system that has been approved in writing by BCPH, and the system has been inspected as required by the plan.

### **11.1 Application Requirements**

- A. Applications for a property transfer certificate shall be made on the appropriate form furnished by BCPH and shall include:
  1. Name, address, and phone number of current owner.
  2. *Name, address, and phone number of current occupant, if different from owner.*
  3. Address of the property.
  4. Legal description of the property.
  5. Size of the property in acres, rounded to the nearest tenth acre (1/10).
  6. Type of water supply.
  7. *Type of existing building or structure (if commercial, list all uses or tenants).*
  8. Number of bedrooms in the dwelling.
  9. *Statement from the current property owner regarding the present operational status of the onsite wastewater system.*
  10. A non-refundable certificate fee, as established by BCPH.
  11. *A septic tank pumping receipt from a licensed cleaner and a BCPH OWS inspection report form from a certified inspector (as identified in #13 below).*
  12. Where required, a copy of a maintenance contract and inspection report dated not more than thirty (30) days prior to the date of application if the system contains any mechanical components, such as an aeration or secondary treatment system, and an inspection report from the service provider.
  13. A report on the appropriate form provided by BCPH from an inspector who has been certified under the National Sanitation Foundation (NSF) Onsite Wastewater Inspector Accreditation Program, the National Association of Wastewater Transporters (NAWT) Onsite Wastewater Inspector Program, or equivalent level of

training and experience as established by BCPH. The form cannot be dated more than ninety (90) days prior to the date of the property transfer certificate application and must contain the following:

- a) A drawing showing the location of the dwelling or structure with two-point triangulated distance measurements to the septic tank lid(s) or global positioning system (GPS) coordinates. This requirement may be waived if such a drawing or data is already on file with BCPH.
  - b) An inspection report for the onsite wastewater system which states whether each component is in good repair and proper working order, and that the inspection was conducted to meet all BCPH requirements, as outlined in guidance provided by BCPH.
  - c) Any other information as required by BCPH.
  - d) If vacant, a statement of when the vacancy occurred.
- B. All reports shall be submitted on Boulder County Public Health onsite wastewater system inspection report forms that have been provided by BCPH.
- C. Unless a property transfer permit is issued, applications shall become void ninety (90) days from the date of application or at the time of closing on the property.

### **11.2 Issuance of a Property Transfer Certificate**

- A. When the conditions in Section 11.1 have been met, BCPH shall approve the property transfer certificate and issue a certificate of operation, setting forth the terms and conditions of approval, including:
1. The existence of any permits in BCPH files.
  2. Determination of size, type, and capacity of the system.
  3. Evidence of past failures or malfunctions within the previous three years, as shown in BCPH records.
  4. Any circumstances, such as lack of occupancy, snow coverage, or other factors, that may have affected the ability of the inspector to evaluate the system.
  5. Any other information as deemed appropriate by BCPH.
- B. The property transfer certificate shall remain valid for a period of four (4) years from the date of issuance.

### **11.3 Waiver of Property Transfer Certificates**

If it is determined that an onsite wastewater system does not meet any of the requirements in Section 11.2, the requirement for a property transfer certificate may be waived, provided that:

- A. The buyer has executed a written agreement with BCPH agreeing to repair or replace the onsite wastewater system within one (1) year of the closing date of the sale or transfer of the property.

### **11.4 Revocation of a Property Transfer Certificate**

The health officer may revoke a property transfer certificate based upon a determination that the onsite wastewater system is no longer functioning in accordance with these regulations, or if any of the requirements noted in Section 11.2 are subsequently violated, or if false or misleading material statements were made on the application or inspection reports.

**Section 12. Miscellaneous**

**12.01 Jurisdiction.** These rules and regulations are promulgated by the Boulder County Board of Health, under the authority of Section and 25-10-101 et seq, C.R.S. 2006.

**12.02 Severability.** If any regulation adopted hereunder or its application to any person or circumstance is held invalid, unconstitutional, void, or inoperative, such holding shall not affect the validity of the remaining provisions or applications of these regulations.

**12.03 Saving Clause.** The repeal of any prior existing regulations shall not deny any right, action, or cause of action which arose under prior regulations.

**12.04 Effective Date.** These regulations shall become effective forty-five (45) days after final adoption.

**12.05 Repeal.** The present INDIVIDUAL SEWAGE DISPOSAL SYSTEM REGULATIONS of the Boulder County Board of Health is hereby repealed, effective the effective date of these regulations.

## APPENDIX A

### QUANTITIES AND BOD STRENGTH OF SEWAGE

<b>TYPE OF ESTABLISHMENT</b>	<b>GALLONS/PERSON/DAY (AVERAGE)(UNLESS OTHERWISE STATED)</b>	<b>LBS. BOD<sub>5</sub>/PERSON/DAY (UNLESS OTHERWISE STATED)</b>
<b><u>Residential</u></b>		
Single-family dwellings (two people per bedroom)	75	.20
Hotels & Motels- per room (without private baths)	50	.15
Hotels & Motels – per room (with private baths)	75	.15
Multiple-family dwellings or apartments	75	.20
Boarding & Rooming houses	50	.15
Mobile Home Parks (per space)	75 300	.20 .80
<b><u>Flows per Fixture – Residential Use</u></b>		
Bath/Shower	14.7	.014
Diswasher	1.8	.002
Kitchen Sink	4.4	.045
Garbage Disposal	1.4	.052
Laundry Washer	19.5	.037
Lavatory	8.4	.021
Water closer	24.8	.029
<b><u>Commercial</u></b>		
Airports (per passenger)	5	.02
(per employee)	10	.06
Barber & Beauty Shops (per chair)	100	.70*
Bowling Alleys (per lane-toilet wastes only)	5	.03*
Bus Service areas (not including food)	5	.02
Country Clubs (per member)	30	.02
(per employee)	20	0.6
Dentists' Offices (per non-wet chair)	50	.14*

Doctors' office (per doctor)	250	.80*
Fairgrounds (per person attending)	5	.02
Kennels (per dog)	30	.20
Laundries, self-service (per commercial washer)	400	.75
Office Buildings (per employee per 8-hour shift)	15	.06
Service Stations (per toilet fixture)	250	.50*

<b>TYPE OF ESTABLISHMENT</b>	<b>GALLONS/PERSON/DAY (AVERAGE) (UNLESS OTHERWISE STATED)</b>	<b><u>LBS. BOD<sub>5</sub>/PERSON/DAY</u> (UNLESS OTHERWISE STATED)</b>
Stores & Shopping Centers per square ft. of Retail Space	.1	.01*
Stadiums, Racetracks, Ballparks (per seat)	5	.02
Theaters (Movie, Indoor, or Auditorium)	5	.02
Work or Construction Camps (semi-permanent-with flush toilets)	50	.17
Work or Construction Camps (semi-permanent-without flush toilets)	35	.02
<b>Factories and Plants</b> (exclusive of industrial wastes)		
per employee per 8-hour shift- no showers provided	20	.05
per employee per 8 hour shift-showers provided	35	.08
<b>Food Service Establishment</b> (per seat)		
Restaurant open 1 or 2 meals	50	.06/meal served
24-Hour Restaurant	75	.07/meal served
Restaurant w/paper service only	25	.01/meal served
Add'l for bars & cocktail lounges	30	.02
Drive-In Restaurant (per car space)	50	.02
<b>Institutional</b> ( does not include kitchen wastewater flows)		
Churches (not including food)	5	.01
Hospitals (per bed space)	250	.20
Nursing homes (per bed space)	100	.17
Schools, Boarding	100	.17
Schools, Day (without gym, cafeteria or showers)	15	.04
(with cafeterias, no gym or showers)	20	.08
(with cafeterias, gym & showers)	25	.10
Add'l for school workers	15	.06

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### **Recreational and Seasonal**

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Camps, day (no meal served)	15	.12
Luxury Resort	125	.17
Resort (night & day)	50	.12
Campground(seasonal occupancy - per unit)**	50	.12
Public Park (during hours when park is open)		
-Flush toilet (per fixture per hour)	36	.04 lbs./fixture
-Urinal (per fixture per hour)	10	.01 lbs./fixture
-Shower(per fixture per hour)	100	.10 lbs./fixture
Faucet (per fixture per hour)	15	.04 lbs./fixture

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TYPE OF ESTABLISHMENT	GALLONS/PERSON/DAY (AVERAGE)(UNLESS OTHERWISE STATED)	LBS. BOD <sub>5</sub> /PERSON/DAY (UNLESS OTHERWISE STATED)
Swimming pools & Bathhouses	10	.06
Travel Trailer Parks (with individual water & sewage hookup-per unit)**	50	.12
Travel Trailer Parks (without individual water & sewage hookup-per unite)**	50	.12

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\* BOD Levels needing further verification

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

## APPENDIX B

**TABLE OF MINIMUM HORIZONTAL DISTANCES IN FEET BETWEEN COMPONENTS OF AN ONSITE WASTEWATER SYSTEM INSTALLED AFTER SEPTEMBER 28, 1995 AND PERTINENT PHYSICAL FEATURES**

	Spring, Wells, Suction Lines	Potable Water Supply Line	Potable Water Supply Cistern	Dwelling or Occupied Building	Property Lines, Piped or Lined Irrigation Ditch	Lake, Water Course, Irrigation Ditch, Stream or Wetland	Dry Gulches, Subsoil Drains, Intermittent Irrigation Ditch	Septic Tank
Dispersal System Utilizing Aerosol Methods	100 <sup>3</sup>	10 <sup>2</sup>	50	125	10	25 <sup>3</sup>	10 <sup>3</sup>	10
Seepage Pit	100 <sup>3</sup>	50 <sup>2</sup>	25	20	25	50 <sup>3</sup>	25 <sup>3</sup>	6
Absorption System, Drywell, Sub-surface Dispersal	100 <sup>3</sup>	25 <sup>2</sup>	25	20	10	50 <sup>3</sup>	25 <sup>3</sup>	6
Sand Filter	100 <sup>3</sup>	25 <sup>2</sup>	25	20	10	50 <sup>3</sup>	25	10
Unlined sand filter in soil with a percolation rate slower than 60 minutes per inch	100	25 <sup>2</sup>	25	15	10	25	15	10
Unlined or Partially Lined Evapotranspiration System Wastewater Pond, or Surface Disposal System Other than Aerosol	100	25 <sup>2</sup>	25	15	10	25	15	10
Lined Evapotranspiration Field, Lined Wastewater Pond, or Lined Sand Filter	60	10 <sup>2</sup>	25	15	10	25	10	5
Vault Privy	50	10 <sup>2</sup>	25	15	10	25	10	--
Septic Tanks, Treatment Plants, Dosing Tanks, Vaults	50 <sup>2</sup>	10 <sup>2</sup>	25	5 <sup>1</sup>	10	50	10	--
Building Sewer or Effluent Lines	50 <sup>2</sup>	10 <sup>2</sup>	25 <sup>2</sup>	0	10 <sup>2</sup>	50 <sup>2</sup>	10 <sup>2</sup>	--

NOTE: The minimum distances shown above shall be maintained between the system components and the physical features described. Where soil, geological or other conditions warrant, greater distances may be required by BCPH. Components which are not water-tight should not extend into areas of the root system of nearby trees. For repair of or addition to approved existing systems where the size of lot precludes adherence to these distances, repaired facility shall not be closer to potable water supply components than the existing facilities.

Replacement of systems currently prohibited under these Regulations shall be termed new systems and shall comply with all setback requirements.

1. Distance shown shall not apply to treatment plants or effluent lines where recycling is permitted.
2. Crossings or encroachments may be permitted at the points as noted above provided that the water conveyance pipe is encased for a minimum distance of ten (10) feet 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 water conveyance. Ridged 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 lowermost section of the ridged cap so that the conveyance pipe rests on the bottom of the encasement pipe. The area in which the pipe passes through the endcaps shall be sealed with an approved underground sealant compatible with the piping used. Where applicable, potable water pipe shall be above sewer pipe.
3. Add 8 feet additional distance for each 100 gallons per day of design flow over 1000 gallons per day as specified in the table .

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