

•LEAR •REEK •COUNTY



# Individual Sewage Disposal System Regulations

Adopted July 21, 1995  
Amended: August 20, 1996  
Amended: December 16, 1997  
Amended: June 1, 2004  
Amended: December 21, 2004  
Amended: December 14, 2005  
Amended: August 20, 2008

# Table Of Contents

<b>Section I</b>	<b>Scope and Applicability .....</b>	<b>4</b>
Section A:	Declaration .....	4
Section B:	Purpose .....	4
<b>Section II</b>	<b>Definitions .....</b>	<b>5</b>
<b>Section III</b>	<b>Administration and Enforcement .....</b>	<b>12</b>
Section A:	General Sanitation Requirements .....	12
Section B:	Permit Application Requirements and Procedures.....	12
Section C:	Application Review .....	14
Section D:	Review or Denied Applications or Disapproval of Plans .....	16
Section E:	Inspection Procedures .....	18
Section F:	Regulation of Systems Contractors .....	19
Section G:	Regulation of Systems Cleaners .....	20
Section H:	Notice of Violations .....	22
Section I:	Cease and Desist Order .....	22
Section J:	Sampling .....	22
Section K:	Community Sewers .....	22
Section L:	Subdivisions .....	23
Section M:	General Prohibitions .....	23
Section N:	Prohibition of Systems in Unsuitable Areas .....	24
Section O:	Penalties .....	24
Section P:	Severability .....	25
Section Q:	Saving Clause .....	25
Section R:	Effective Date .....	25
<b>Section IV</b>	<b>General Technical Requirements .....</b>	<b>26</b>
Section A:	Calculation of Sewage Flow .....	26
Section B:	Minimum Distances Between Components of a System and Physical Features .....	26
Table 1:	Minimum Horizontal Distances Requirements .....	28
Section C:	Subsurface Evaluation .....	29
<b>Section V</b>	<b>Component Design Criteria .....</b>	<b>31</b>
Section A:	Common Design Requirements .....	31
Section B:	Design and Construction Criteria for Septic Tanks .....	34
Table 2:	Septic Tank Capacity .....	34
Section C:	Individual Aerobic Wastewater Treatment Plants and Other Mechanical Units Utilizing Mechanical Apparatus for Treatment of Sewage .....	36
Section D:	Distribution Box .....	36
Section E:	Sewage Pumping and Dosing Systems .....	36

Section F:	General Requirements for Disposal of Effluent into an Absorption System .....	37
Table 3:	LTAR's for Wastewater for Soil Absorption Systems .....	38
Section G:	Common Construction Requirements for Seepage Beds and Absorption Systems .....	39
Section H:	Absorption Trench Construction Requirements .....	40
Section I:	Seepage Bed Construction Requirements .....	40
Section J:	Absorption or Seepage Pit Construction Requirements .....	40
Section K:	Serial Distribution System Construction Requirements .....	41
Section L:	Parallel Distribution Systems .....	41
Section M:	Sand Filter Construction Requirements .....	41
Section N:	Mounded Absorption Bed Systems .....	42
Table 4:	Composition of Filter Material for Mounded Systems .....	42
Section O:	Pre-Treatment for Soil Absorption Systems .....	44
Section P:	Constructed Wetland Treatment .....	44
<b>Section VI</b>	<b>Requirements for Alternate Disposal Systems .....</b>	<b>45</b>
Section A:	Grey Water Systems .....	45
Section B:	Vaults .....	45
Section C:	Vault Privy .....	45
Section D:	Incineration Toilets and Chemical Toilets .....	46
Section E:	Composting Toilets .....	46
Section F:	Experimental Systems .....	46
<b>Section VII</b>	<b>Operation and Maintenance of Individual Sewage Disposal Systems .....</b>	<b>49</b>
Section A:	Responsibility .....	49
Section B:	Maintenance and Cleaning .....	49
Table 5:	ISDS Maintenance .....	49
Section C:	Disposal of Waste Material .....	50
<b>Appendices</b>		
Appendix 1:	Quantities of Sewage .....	51
Appendix 2:	Septic Tank Capacities for Various Building Uses .....	54
Appendix 3:	Effective Sidewall Absorption Area of Circular Seepage Pits .....	55
Appendix 4:	Guidelines for Allowing Reductions in the Minimum Separation Distance Requirements Between Wells and Absorption Systems .....	56

**A. Declaration**

In order to preserve the environment and protect public health and safety, to eliminate and control causes of disease, infection, and aerosol contamination, to regulate wastes from dwellings, businesses, industrial and public buildings, 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 individual sewage disposal systems in Clear Creek County, State of Colorado and provide the authority for the administration and enforcement of such minimum standards, rules and regulations.

**B. Purpose**

1. The Clear Creek County Board of Health declares the purpose of these regulations and guidelines as authorized and required by Article 10, Title 25, Colorado Revised Statutes, is to establish minimum standards for the location, construction, design, installation, alteration, repair, performance, use and maintenance of individual sewage disposal systems within Clear Creek County and shall constitute detailed rules and regulations governing: the application for and issuance of permits; the inspection, testing, and supervision of installed systems; the issuance of notice of violation and orders to cease and desist; maintenance and cleaning of systems; and the transportation and final disposal of waste material.
2. These Regulations shall apply throughout Clear Creek County to individual sewage disposal systems and shall be enforced by the Clear Creek County Board of Health.
3. The Clear Creek County Board of Health declares its general policy is to ask private property owners to use community sewer systems whenever and wherever economically and structurally feasible, and to limit the installation of individual sewage disposal systems to areas that are not economically and structurally feasible for community sewers.

## Section II

## Definitions

Absorption System	wastewater disposal field or leaching field and adjacent soils or other system for the treatment of sewage in a System by means of absorption into the ground.
Absorption Trench	one or more trenches not more than three (3) feet in width of varying length and depth, utilizing subsoil and sidewall absorption.
Acceptable Design	a design by a Registered Professional Engineer of the entire System according to site conditions, following the guidelines set forth in these Regulations and accepted by the Department.
Aerobic Sewage Treatment System	a System employing microbiological action which is maintained by the addition of free air or oxygen.
Applicant	any person who submits an application for a permit for a System.
Approved	official consent given in writing by the Department or the Board of Health.
Bedrock	the more or less solid, undisturbed rock in place either at the surface or beneath surficial deposits of sand, gravel or soil or a consolidated rock formation of impervious material which may exhibit jointed, fractured, or deteriorated characteristics.
Board of Health	the Board of County Commissioners of Clear Creek County, Colorado.
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, System tank, or other point of treatment and disposal.
Cesspool	a covered, underground receptacle which receives untreated sewage from a building and permits the untreated sewage to seep into the surrounding soil. Such systems are prohibited in Clear Creek County.

Cistern	a watertight, covered receptacle of non-toxic material which is designed for the storage of potable water.
Colorado Department of Public Health and Environment	the Department of Health of the State of Colorado, created by C.R.S. Section 25-1-102, as amended.
Community Sewer	any sewage treatment system serving more than one household.
Competent Technician	a person designated by the Department who is able to conduct and interpret the results of percolation tests.
Composting Toilet	a unit which consists of a toilet seat and a 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 various wetland plants to provide secondary treatment of wastewater through biological, physical and chemical processes.
Department	the Environmental Health Department of Clear Creek County.
Design Flow	the design flow is 150% of average daily flow as calculated by methods recognized in these Regulations.
Dispersal System	a system for the disposal of effluent after final treatment by a method which does not depend upon or utilize the treatment capability of the soil.
Distribution Box	a watertight chamber which receives effluent from a septic tank or other primary treatment unit and from which effluent is distributed evenly throughout the absorption system.
Division	the Water Quality Control Division of the Colorado Department of Public Health and Environment.
Dosing Tank	a tank which provides for storage of effluent from a septic tank intended to be fed to an absorption area at a high rate periodic discharge.
Domestic Waste	materials typically generated by humans inhabiting a dwelling and not through industrial activities.

Dwelling	a place of residence where people eat and sleep.
Effluent	the liquid waste discharge from a primary treatment tank or from a secondary treatment system.
Exception	a variation of the requirements of these regulations, authorized by the Board of Health where strict enforcement would cause undue hardship to the property owner, in cases where an existing System must be upgraded or repaired. Systems that must be expanded to provide for additional volume are not subject to exception by the Board of Health.
Exemption	a property owner has been released by the Board of Health from having to connect to public sewer or from having to provide public sewer for a proposed subdivision.
Experimental System	a particular design or type of System based upon improvements in the technology of sewage disposal and not otherwise provided for these Regulations.
Final Effluent Discharge Point	the location in the System at which the effluent is discharged to the soil or to a water course.
Floodplain	an area adjacent to a stream which is subject to flooding as the result of the occurrence of a one hundred (100) year flood, and is so adverse to past, current or foreseeable construction or land use as to constitute a significant hazard to public or environmental health and safety or to property or is designated by the Federal Emergency Management Agency (FEMA) or National Flood Insurance Program (NFIP). In the absence of FEMA/NFIP maps, a 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 which 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 FEMA or the NFIP. In the absence of FEMA/NFIP maps, a registered professional engineer shall certify the floodway elevation and location.
Grey Water System	a System designed to collect, treat and dispose only liquid wastes from sinks, lavatories, tubs, showers, and laundries, excluding toilets and garbage disposal units.

Groundwater Table	the upper surface of groundwater in the zone of saturation of geologic formation.
Grouted Well Casing	the section of the exterior of the well casing which follows the Colorado State Engineer procedures for sealing a well.
Health Official	the appointed Health Officer of the Board of County Commissioners of their designated representative.
Individual Sewage Disposal System	and the term “SYSTEM” (where the context so indicates) - an absorption or surface discharge 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.
Leachfield	see “Seepage Bed”.
Liner	a watertight membrane liner of at least 0.01 inch (10Mil) thickness which is used to prevent effluent from entering the soil or groundwater table. Material shall be polyvinylchloride (PVC) or material of equal or greater integrity.
Long Term Acceptance Rate (LTAR)	the minimum absorption area (A) in square feet computed as a function of the design flow (Q) and the rate of soil acceptance over time according to the formula: $A=Q/LTAR$
Malfunction or Malfunctioning System	a System which is not functioning in compliance with the requirements of these Regulations and the design of the System which includes, but is not limited to the following: <ul style="list-style-type: none"> <li>(a) Absorption systems and dispersal systems which seep or flow to the surface of the ground or into the surface waters of the State.</li> <li>(b) Systems which have overflowed from any of their components.</li> <li>(c) Systems which fail to operate in accordance with their designated operation.</li> <li>(d) Systems discharging effluent which does not comply with the applicable discharge standards established by the Colorado State Board of Health or Colorado Water Quality Control Commission.</li> </ul>
Manufacturer	the person or firm that constructs or assembles System components.

Mounded System	an absorption system installed where the top of the effluent distribution pipe is installed above the original grade of the area used for absorption.
Owner	the person who is owner of record of the land or person's legal designated authority on which a System is to be, or is, designed, constructed, installed, altered, extended, or used.
Percolation Test	a subsurface soil test at the depth of a proposed soil absorption system or similar component to determine the water absorption capacity of the soil, the results of which are normally expressed as the rate at which one (1) inch of water is absorbed.
Permit	a document, issued by the Department, authorizing the construction, alteration, installation, repair and/or use of a System.
Person	an individual, partnership, firm, corporation, association, or other legal entity and also the State, any political subdivision thereof, or other government entity.
Pre-Treatment	any treatment of effluent which reduces total nitrogen concentrations to less than 20mg/l average on any annual basis or any Individual Aerobic Wastewater Treatment Plant receiving a Standard 40 Class I rating from the National Sanitation Foundation.
Privy	a structure allowing for the storage of excreta and not transported by a sewer; and which provides privacy and shelter and prevents access to the excreta by insects, rodents, or other animals.
Professional Geologist	a person who is a graduate of an institution of higher education which is accredited by a regional or national accrediting agency, with a minimum of thirty semester (forty-five quarter) hours of undergraduate or graduate work in a field of geology and whose post baccalaureate training has been in the field of geology with a specific record of an additional five years of geological experience to include no more than two years of graduate work.
Registered Professional Engineer	an engineer licensed in the State of Colorado in accordance with C.R.S. Section 12-25-111, as amended.

Regulation	the Clear Creek County Individual Sewage Disposal System Regulations.
Sand Filter	a System which utilizes wastewater filtration and/or absorption and which contains an intermediate layer of sand as filter material.
Seepage Bed or Absorption Bed	a subsurface soil absorption area which is wider than 3 feet, together with a system of approved distribution, through which primary treated effluent may seep, leach or infiltrate into the soil.
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, and in an anaerobic microbiological environment, to settle solids from the liquid, to digest organic matter, and store digested soils through a period of retention and allow the clarified liquids to discharge to other treatment units for final disposal.
Serial Distribution	an arrangement of absorption trenches, seepage pits or seepage beds 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 chemicals, house wastes, human excreta, animal or vegetable matter in suspension or solution and which is discharged from a building, dwelling or other structure.
Sewage Treatment Works	a system or facility for treating, neutralizing, stabilizing, or disposing of sewage, which 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	State of Colorado
State Board	the State Board of Health created by C.R.S. Section 25-1-103, as amended.

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, in treatment works of disposal systems, water 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 from primary treatment by removal of microorganisms and suspended solids before the effluent reaches any highly permeable earth such as joints in bedrock, gravel, or very coarse soils and which meets percolation test requirements and has a vertical thickness of at least four feet below the bottom of the absorption area.
Systems Cleaner	a person engaged in and who holds themselves out as a specialist in the cleaning and pumping of Systems and removal of residues deposited in the operation thereof.
Systems Contractor	a person engaged in and who holds themselves out as a specialist in the installation, renovation, and repair of Systems. For the purpose of this definition and of the Systems Contractor Licensing requirements, a person who installs or repairs more than one System in any twelve month period shall be deemed to be engaged in, and if said person receives compensation of any kind of their services, they shall be deemed to hold themselves out as a specialist in the installation, renovation, and repair of Systems.
UngROUTed Well Casing	any portion of the well casing not meeting the definition of grouted well casing.
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 primary treatment unit and which provides an additional degree of treatment.
Water Quality Control Commission	the commission created by C.R.S. Section 25-8-201, as amended.

**A. General Sanitation Requirements**

1. Approved Sewage Disposal System Required. The owner of any structure or land site where people live, work or congregate shall insure that the structure or land site contains adequate, convenient and sanitary toilet and sewage disposal systems approved by the Department and in good working order. Under no circumstances shall sewage or effluent be permitted to be discharged upon the surface of the ground, or in excavations, or into waters of the State unless it meets the minimum requirements of this Regulation. The property owner shall be responsible for proper maintenance of the system and for abatement of any nuisance arising from its failure.
2. Service by Community Sewer Required. All owners of structures serviced by Systems installed, altered, or requiring a repair permit under these Regulations shall be required to abandon such Systems whenever and wherever it becomes economically and structurally feasible to be served by community sewers, unless specifically exempted by the Board of Health.
3. Enforcement Provision. For the purpose of inspection and enforcing these Regulations and the terms and conditions of any permit issued, the Health Official is authorized to enter upon private property for the purpose of determining if the sewage disposal facilities thereon are in compliance with these Regulations. The owner or occupant of every property having a System shall give the above person free access to the property to conduct required tests, take samples, monitor compliance and make inspections, as authorized by C.R.S Section 25-10-106(i).

**B. Permit Application Requirements and Procedures**

1. General Permit Requirements.
  - a. No person or persons shall install, renovate or repair a system within Clear Creek County, State of Colorado, unless such person holds a valid permit, issued by the Department in the name of the property owner for the specific construction, remodeling, installation, or use proposed at the location described on the permit.
  - b. All applications for permits shall be made in writing, on a form provided by the Department prior to construction, repair, alteration or excavation of any System, to the Health Official who shall issue the permit upon compliance by the applicant with the provisions of these Regulations. Such application shall provide all information called for on the application form and shall be accompanied by a plot plan, drawn to scale, showing the following information:
    - (1) Address and legal description of the property.

- (2) Accurate property boundary measurements with an indication of north direction and ground slope direction.
  - (3) Accurate location of both existing and proposed structures, walks, driveways, and proposed site of the System showing percolation test hole locations.
  - (4) Accurate location and type of domestic water supply with the boundaries of the parcel and the location of domestic water supplies and non-sewage treatment works within 200 feet of the subject property lines, located by measured distance.
  - (5) Accurate location of streams, lakes, irrigation ditches, washes, or other drainage conditions within the boundaries of the parcel and within 100 feet of the subject property line.
  - (6) Accurate soil percolation tests and soil profile data for the site performed by a competent technician.
  - (7) Information shall be furnished on building use, number and type of fixtures, projected water use, and whether or not there is a basement drain and depth of building drain.
  - (8) Type of System.
  - (9) Such other information deemed necessary by the Health Official shall be furnished.
  - (10) For all permit applications, a Best Management Practices plan, where site conditions require the techniques described in the Clear Creek County Manual of Best Management Practices for Water Quality Protection and Erosion Control.
- c. Non-refundable permit application fees for each application shall be assessed according to the following schedule:
- (1) For constructing a new System, as established by the Board of Health.
  - (2) For repairing a failed or malfunctioning System or renovating an existing System, as established by the Board of Health.
  - (3) For vaults, composting toilets or incineration toilets not in conjunction with another type of sewage disposal, as established by the Board of Health. All fees shall be payable to the Department at the time of application.
- d. No permit fee shall be charged for emergency use of an existing system.
- e. If a permit is issued, it shall become void two years from the date of issuance by the Department if installation is not completed by that date. Any change in plans or specifications after the permit has been issued invalidates the permit unless written approval is secured from the Department for such

changes. An unexpired permit may be renewed upon written request if:

- (1) There has been no change in the plans and specifications of the proposed System as set out in the original application; and
  - (2) The surrounding land, its use or zoning, have not changed so as to cause the original application not to be acceptable under these Regulations.
- f. The issuance of a permit and specifications of terms and conditions therein shall not constitute assumption or create a presumption that the Department or its employees may be liable for the failure of any System nor act as a certification that the equipment used in the System or any component thereof used in its operation or that the System for which the permit was issued insures continuous compliance with the provisions of C.R.S. Section 25-10, the rules and regulations adopted there under or any terms and conditions of a permit.
2. Construction Permit. The Department may issue a Construction Permit to the owner of a property on which a System is to be installed or expanded. Application for a Construction Permit shall be made by the owner to the Department and a permit shall be issued by the Department provided the System is designed in compliance with C.R.S. Section 25-10 and all applicable rules and regulations adopted thereunder.
  3. Repair Permit and Emergency Use Permit. The Department may issue a Repair Permit and/or an Emergency Use Permit to the owner of a property on which a System is not functioning properly. Application for a Repair Permit shall be made by the owner to the Department within two business days after receiving notice from the Department that the System is not functioning in compliance with C.R.S. Section 25-10, or applicable rules and regulations adopted thereunder or otherwise constitutes a nuisance or a hazard to public health. The Repair Permit shall provide for a reasonable period of time within which repairs shall be made, not to exceed 30 days, at the end of which the System shall be inspected by the Health Official to insure it is functioning properly. Concurrently with the issuance of a Repair Permit, the Department may issue an Emergency Use Permit authorizing continued use of a malfunctioning System or an emergency basis for a period not to exceed the period stated in the Repair Permit provided the Department determines continued use will not be detrimental to public health or the waters of the State. Such an Emergency Use Permit may be extended, for good cause shown, in the event repairs may not be completed in the period stated in the Repair Permit through no fault of the owner.

### C. Application Review

1. Site Visit. After receiving an application for a permit, plot plan, and set of design plans stamped by a Registered Professional Engineer, unless otherwise approved by the Health Official, the application shall be reviewed by the Department and an inspection shall be made by the Health Official consisting of:
  - a. Inspection of the premises; and
  - b. A determination as to the suitability of the site and of the proposed design based upon verification of the ground water table, suitable soil, depth to bedrock, ground slope and pertinent physical features; and
  - c. On any lot that is less than two acres in size, a screened vault dosing siphon or screened pump shall be installed in the third compartment of the septic tank or a separate dosing tank shall be installed and an effluent filter shall be installed at the tank outlet.
2. Additional Evaluation. When, in the opinion of the Health Official, the Department does not have sufficient information for evaluation of an application, the Health Official may require additional tests or documentation.
3. Additional Hydrological, Geological, Engineering, or Other Information. When specific evidence suggests undesirable subsurface conditions exist, additional hydrological, geological engineering or other information provided by a Registered Professional Engineer or geologist may be required to be submitted by the applicant. This requirement shall not prejudice the right of the Department to develop its own information from its own sources.
4. Permit Conditions. When, in the opinion of the Health Official, the Department does not have sufficient information for evaluation of the performance of the system, the Health Official may require performance testing for a period not to exceed five years following installation.
5. Determination of Compliance. A determination shall be made by the Department after review of the application, site inspection, test results, and other required information, whether the proposed System is in compliance with the requirements of C.R.S. Section 25-10, and the applicable rules and regulations adopted thereunder, after which a permit shall be issued by the Health Official. If the proposed System is determined not to be in substantial compliance with the requirements of C.R.S. Section 25-10, and the applicable rules and regulations adopted thereunder, the permit application shall be denied and the plans of the System disapproved. All existing Systems, repaired or altered under these Regulations, shall meet all design requirements of these Regulations unless otherwise approved by the Board of Health of provided for by Section IV.B.6 of these Regulations.

6. Notice of Denial. Written notice of the denial of a permit or disapproval of plans shall be given to the applicant by personal service or registered or certified mail, return receipt requested. Service shall be complete as to the date of the certificate of mailing, or hand delivery, or posting in a conspicuous place on the premises, noting the hour and day.

#### **D. Review of Denied Applications or Disapproval of Plans**

##### 1. Appeals

- a. Board of Health Appeals. The Board of Health shall, upon request of an applicant, review an application for which the Health Official has denied a permit or has imposed conditions. The Board of Health shall hear and decide appeals where it is alleged by the appellant there is an error in any denial or condition made by the Health Official in granting a permit.
- b. Deadline for Appeal. Every appeal must be filed within 60 days from the date of denial or issuance of the permit.
- c. Finality of Denial or Conditions. Denial or conditions shall become final upon the expiration of time for filing an appeal, or when final action is taken upon an appeal.

##### 2. Variances.

- a. The Board of Health may grant variances from the design criteria, construction specifications, or administrative provisions of these Regulations where it is necessary to provide a functional System if the following findings are made:
  1. Granting the variance does not endanger public health, safety and welfare;
  2. Granting the variance does not result in substantial impairment of these Regulations; and
  3. By reason of exceptional topographic conditions or other extraordinary and exceptional situation or condition of such piece of property, the strict application of such regulation would result in peculiar and exceptional practical difficulties to, or exceptional and undue hardship upon, the owner of such property.
- b. Requests must be accompanied by:
  1. Site specific request identifying the specific criteria from which a variance is being requested;
  2. Technical justification by a Colorado Registered Professional Engineer or Professional Geologist, which indicates the specific conditions which exist and/or the measures which will be taken to result in no greater risk than that associated with compliance with the requirements of the regulation. Examples of conditions which exist, or measures which might be taken, include but are not limited to the following: evidence of a

- natural or physical barrier to the movement of effluent to or toward the feature from which the variance is requested; placement of a manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested; soil 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.
3. A discussion of alternatives considered in lieu of the requested variance.
  4. Technical support for selected alternative, which may include a testing program, which confirms that the variance does not increase the risk to public health and to the environment; and
  5. A statement of hardship, which creates the necessity for the variance. No variance will be allowed solely for economic reasons.
- c. The applicant has the burden of proof that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting the standard being varied.
- d. The Board of Health may impose conditions on any variance granted.
- e. Outcome of the Variance Proceeding. The variance, and any conditions thereon, shall be recorded on the deed to the property and any expenses associated with that recording shall be the responsibility of the applicant.
- f. Prohibitions on the Granting of Variance Requests.
1. No variance will be issued to mitigate an error in construction involving any element of property improvements.
  2. No variance will be issued where the property can accommodate a conforming ISDS.
  3. No variance will be issued which will result in minimum horizontal distances to an offsite physical feature which do not conform to the minimum horizontal distance requirements defined in these Regulations.
  4. No variance will be issued which reduces the 4-foot separation to ground water or bedrock.
  5. 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.
6. No variance will be issued for systems that must be expanded to provide for additional volume.
  - g. Procedures for Requesting Variances.
    1. Every application for a variance shall be made to the Board of Health on forms provided by the Department, and shall include the data required in such forms as well as that required above so as to supply all of the information necessary for clear understanding and intelligent action by the Board of Health.
    2. An application fee, as established by the Board of Health, shall accompany all applications.
    3. After an application is received, the Board of Health shall conduct a hearing at a regularly scheduled meeting to consider the application. All adjacent property owners shall be mailed written notice of the hearing at least 20 days before the hearing.
    4. The Board of Health shall take action by resolution to approve, approve with conditions, or deny a request. The required findings and any conditions imposed by the Board of Health on an approval, and the reasons for a denial, shall be stated in the resolution. A copy of the resolution shall be mailed to the applicant.

#### **E. Inspection Procedures**

1. Stages Requiring Inspection. The permit issued shall specify the stage of: construction, installation, renovation, or repair when the Department will require an inspection. The owner of the System or Licensed System Contractor will provide the Department with notice that the progress of the work has been sufficiently completed to allow inspection before the System is placed in use to determine compliance of the System with C.R.S. Section 25-10 and the rules and regulations adopted thereunder. One inspection shall be performed for each stage that requires an inspection as specified in the permit. Any additional inspections, unless required by the Health Official, shall be charged as an additional inspection fee established by the Board of Health. In all cases, at least one final inspection is required prior to backfilling any component of a System.
2. Field Inspection Card. The Card shall be conspicuously posted at the job site. Inspection will not be made and a \$25.00 fine will be imposed if card is not posted.
3. Inspection Notice. When each required inspection stage of a System has been completed, notification must be given to the Department at least 24 hours prior to inspection. Inspections will be conducted on

Tuesdays and Thursdays with exception that inspections will not be conducted on holidays.

4. Failure of Department to Inspect. If an inspection has not been completed by the Department after receipt of notice on the next regular inspection day or at a later designated time, the Licensed Systems Contractor may proceed to cover or complete the installation only after a documented inspection is performed by the Registered Professional Engineer for the System. A copy of that document shall be provided to the Health Official prior to final approval for use of the System.
5. Final Inspection. If, upon final inspection of the System, the Health Official finds it installed in accordance with these Regulations and the permit, the Health Official shall issue final approval for the completed System and the initial Use Permit. If the inspection discloses any significant departure from the description or design of the System as stated in the application and permit, or if any aspect of the System fails to comply with these Regulations, approval shall be withheld.
6. Notice of Deficiencies. Written notice of deficiencies causing the disapproval shall be given to the owner and Licensed Systems Contractor. Upon correction of the deficiencies and proper notification, another inspection shall be conducted by the Health Official to determine compliance of the System with these Regulations.
7. Reinspection Fees. A reinspection fee established by the Board of Health will be assessed for each inspection or reinspection when such portion of work for which the inspection is called is not complete or when the corrections called for are not made.

#### **F. Regulation of Systems Contractors**

1. No person engaged in the business of installing Systems as defined in Section II (Systems Contractor) shall install, renovate, or repair a System unless they hold a valid Systems Contractor License from the County of Clear Creek, State of Colorado. Employees of a Licensed Systems Contractor shall not be required to be licensed. License fees, as established by the Board of Health, shall accompany all license applications. Licenses shall expire on December 31 each year and an annual fee shall be paid. A license which lapses because of failure to renew, or revocation, shall be subject to the fee established for a new license upon reapplication.
2. A suspension or revocation of a Systems Contractor License by the Board of Health shall prohibit the Systems Contractor from constructing, installing, altering or repairing a System during the applicable suspension or revocation period. A Systems Contractor License shall be reinstated to the Systems Contractor by the Board of Health upon termination of the suspension period. Such suspension period shall not exceed six months.

3. Standards of Performance.
  - a. Applications for Systems Contractor Licenses or renewals shall be made on forms provided by the Department.
  - b. Prior to the issuance of a license or renewal of an expired license, the Department shall require the applicant to demonstrate adequate knowledge of the requirements set forth in these Regulations.
  - c. Installation, renovation, or repair of any System shall be in compliance with these Regulations and with the conditions set forth in the System application and permit.
  - d. A License holder shall have in possession the approved permit at the time construction begins. Construction shall begin when the ground is broken for the System.
4. License Revocation or Suspension.
  - a. A Systems Contractor License may be revoked or suspended for failure to comply with these Regulations. Revocation or suspension specifying the violations shall take place only after a hearing by the Board of Health not less than ten days after notice of the hearing has been given to the License holder. Such notice shall specify the violations pertinent to the action to be taken and the time and place of the hearing. Written notice shall be give to the License holder by personal service or registered or certified mail, return receipt requested. Service shall be complete as to the date of the certificate of mailing or hand delivery or posting in a conspicuous place on the premises, noting the hour and day.
  - b. If the Board of Health determines the Systems Contractor License shall be revoked or suspended, the Department shall issue written notice of revocation or suspension specifying the violations to the License holder. Such notices shall be given to the License holder by personal service or registered or certified mail, return receipt requested. Service shall be complete as to the date of the certificate of mailing or hand delivery or posting in a conspicuous place on the premises, noting the hour and day.

#### **G. Regulation of Systems Cleaners**

1. No persons engaged in the cleaning of Systems or the transportation of sewage to a disposal site as defined in Section II (Systems Cleaners) shall perform such activities unless they hold a valid Systems Cleaner License from the County of Clear Creek, State of Colorado. Employees of a Licensed Systems Cleaner shall not be required to be licensed. License fees, as established by the Board of Health, shall accompany all license applications. Licenses shall expire on December 31 each year and a renewal fee shall be paid. A license which lapses

because of failure to renew, or revocation, shall be subject to the fee established for a new license upon reapplication.

2. A suspension or revocation of a Systems Cleaner License by the Board of Health shall prohibit the Systems Cleaner from engaging in the cleaning of Systems or the transportation of sewage within Clear Creek County during the applicable suspension or revocation period. A Systems Cleaner License shall be reinstated to the Systems Cleaner by the Board of Health upon termination or the suspension period. Such suspension period shall not exceed six months.

3. Standards of Performance.

a. A license holder, when cleaning a septic tank or aeration tank, shall remove the liquid, sludge and scum from all compartments leaving no more than a three-inch depth of sewage in any compartment of the tank.

b. A license holder shall maintain his equipment so as to insure no spillage of sewage will occur during transportation, and employees are not subject to undue health hazards.

c. A license holder shall dispose of the sewage only at an acceptable site as determined by the Colorado Solid Waste Disposal Act or discharge to a permitted wastewater treatment plant.

d. A license holder shall supply a receipt to the property owner clearly stating the date and actual volume pumped as well as an estimate of the capacity of the tank.

e. Prior to issuance of a license or renewal of an expired License, the Department may require the applicant to demonstrate adequate knowledge of the requirements set forth in these Regulations.

f. For each septic tank, vault or other unit cleaned and/or pumped, a Systems Cleaner shall maintain a record of the street address of the location serviced and the volume of septage pumped. Systems Cleaners shall maintain the pumping records required under this section for a period of two years and shall produce said pumping records within thirty (30) days of a written request of the Department.

4. Revocation or Suspension.

a. A Systems Cleaners License may be revoked or suspended for failure to comply with these Regulations. Revocation or suspension specifying the violations shall take place only after a hearing by the Board of Health not less than ten days after notice of the hearing has been given to the License holder. Such notice shall specify the violations pertinent to the action be taken and the time and place of the hearing. Written notice shall be given to the License holder by personal service or registered or certified mail, return receipt requested. Service shall be complete as to the date of the certificate or mailing or

hand delivery or posting in a conspicuous place on the premises, noting the hour and day.

- b. If the Board of Health determines the Systems Cleaners License shall be revoked or suspended, the Department shall issue written notice of revocation or suspension specifying the violations to the License holder. Such notices shall be given to the License holder by personal service or registered or certified mail, return receipt requested. Service shall be complete as to the date of the certificate of mailing or hand delivery or posting in a conspicuous place on the premises, noting the hour and day.

#### **H. Notice of Violations**

1. Whenever the Health Official determines there has been a violation of any provision of these Regulations, the Health Official shall give notice of such violation to the responsible person or persons. Such Notice of Violation shall be in writing, and shall specify the violations, provide a reasonable time for correction, and be addressed to the owner of the property concerned. Service of such Notice of Violation shall be as provided by the Colorado Rules of Civil Procedure, or by registered or certified mail, return receipt requested, deliverable to addressee only. Service by mail shall be complete as the date of the certificate of mailing, or hand delivery, or posting in a conspicuous place on the premises, noting the hour and day.
2. If service is made by posting the Notice of Violation in a conspicuous place, the Health Official shall include in the record a statement as to why the posting was necessary.

#### **I. Cease and Desist Order**

1. The Health Official may issue an order to Cease and Desist from the use of any System which is found by the Health Official not to be functioning in compliance with these Regulations or which otherwise constitutes a nuisance or hazard to the public health and which has not received timely repairs in accordance with the provisions of Section III.B.3. Such a Cease and Desist Order may be issued only after a hearing which shall be conducted by the Board of Health not less than 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 or without counsel, and be heard. The Cease and Desist Order shall require the owner to bring the System into compliance or eliminate the nuisance or hazard within a reasonable period of time, not to exceed 30 days, or thereafter cease and desist from the use of the System.
2. A Cease and Desist Order issued by the Health Official shall be reviewable in Clear Creek County District Court wherein the System is

located and upon petition filed no later than ten days after the Cease and Desist Order is issued.

**J. Sampling**

Effluent Samples may be taken at any appropriate time when necessary to implement the provisions of the Notice of Violation or Cease and Desist Order.

**K. Community Sewers**

1. Permits to construct, extend, or replace a System shall be denied if municipal or Sanitation District sewers exist within 400 feet of the applicants' dwelling, place of business, or institution, if the Sanitation District agrees to provide sewer service and such property is within the Sanitation District.
2. The Department will consider applications for on-site sewage disposal systems servicing more than one household, provided the total average daily flow does not exceed 2000 gallons. Any application for systems serving more than one household must be accompanied by appropriate documentation ensuring adequate system maintenance and repair will be provided and continuing use by all existing or future property owners will be permitted.

**L. Subdivisions**

All subdivisions of land into parcels of less than five (5) acres occurring after May 14, 1990, shall be provided with central sewage treatment works. As used herein, "subdivision" excludes boundary line adjustments, combinations of lots, and exemptions by resolution as provided in the County's subdivision regulations. The Health Official may require applicants for land subdivision to submit additional engineering and geologic reports or data, including a study of the economic feasibility of central sewage treatment works utilization.

**M. General Prohibitions**

1. No city or Clear Creek County official shall issue to any person a permit to construct or remodel a building or structure which is not served by a sewage treatment works until a permit for a System has been approved by the Department.
2. No city or Clear Creek County occupancy permit shall be issued to any person for the use of a building which is not served by a sewage treatment works until a final inspection of the System has been made by the Department as provided for in C.R.S. Section 25-10-106(i)(h), and the installation has received the approval of the Department as specified in Section III.E.4. of these Regulations.
3. No System presently in use which does not comply with the provisions of C.R.S. Section 25-10-106(i)(h), regarding minimum separation between the maximum seasonal level of the groundwater table and the

bottom of the absorption system, shall be permitted to remain in use without compliance with this article and the rules and regulations adopted thereunder.

4. The construction or use of cesspools, pit privies, silt trenches, or aerosol disposal systems is prohibited.
5. Not more than one dwelling, commercial business, institutional or industrial unit shall be connected to the same System unless such multiple connection was specified in the application submitted and in the permit issued for the System.
6. No person shall construct or maintain any dwelling or other occupied structure or any place of work or employment, organized recreation, or public gathering of more than four hours duration which is not equipped with adequate facilities approved by the Department for the sanitary disposal of sewage.
7. No new or expanded System shall be installed in a floodway. When a System is installed in a 100-year floodplain then the new or repaired System shall meet or exceed the requirements of the NFIP. The System as approved by the Health Official shall be designed to minimize or eliminate infiltration of flood waters into the System, and discharge of the system into the flood waters.

#### **N. Prohibition of Individual Sewage Disposal Systems in Unsuitable Areas**

The Board of Health may conduct a public hearing, after written notice to all affected property owners as shown in the records of the County Assessor and publication of notice in a newspaper of general circulation, at least ten (10) days prior to the hearing, to consider the prohibition of permits for Individual Sewage Disposal Systems in defined areas that contain or are subdivided for a density of more than two dwelling units per acre. The Board of Health may order such prohibition upon finding that the construction and use of additional Individual Sewage Disposal Systems in the defined area will constitute a hazard to the public health or water quality. In such a hearing, the Board of Health may request affected property owners to submit engineering and geological reports concerning the defined area and to provide a study of the economic feasibility of constructing a sewage treatment works.

#### **O. Penalties**

Any person who commits any of the following acts or violates any of the provisions of these Regulations or of C.R.S. Section 25-10, commits a Class 1 petty offense as defined in C.R.S. Section 18-1-107:

1. Constructs, alters, installs or permits the use of any System without first having applied for and received a permit as provided for in Section III.B. of these Regulations, and C.R.S Section 25-10-106;
2. Constructs, alters or installs a System in a manner which involves a knowing and material variation from the terms or specifications contained in the application or permit;

3. Violates the terms of a Cease and Desist Order which has become final under the terms of Section III.I. of these Regulations and C.R.S. Section 25-10-106(i)(h);
4. Willfully violates the conditions of Sections III.A.1. and III.L.6 of these Regulations in allowing a person or persons to live in a dwelling owned by them without an approved System and/or allows excreta, sewage, or effluent to be discharged upon the ground or into the waters of the State;
5. Conducts business as a Systems Contractor or Systems Cleaner without a valid license issued by Clear Creek County; or
6. Willfully fails to submit proof of proper maintenance and cleaning of a System as required by the rules and regulations adopted pursuant to C.R.S. Section 25-10-106.

**P. Severability**

If any regulation adopted hereunder or its application to any person or circumstances is held invalid, unconstitutional, void or inoperative, such holding shall not affect other provisions or application of the regulations adopted hereunder. The Board of Health hereby declares in these regards the regulations adopted hereunder are severable, and the Board of Health would have adopted the remaining regulations hereof notwithstanding such holding.

**Q. Saving Clause**

The repeal of any regulation adopted hereunder shall not deny any right, or cause of action, which arose under existing regulations.

**R. Effective Date**

These Regulations shall become effective 45 days after final adoption.

**A. Calculation of Sewage Flow**

1. To calculate the average flow for dwellings, use a figure of 3 ½ people per dwelling unit or at least two person per bedroom, whichever is greater.
2. In no event may the System be designed for a lesser capacity than the anticipated maximum daily sewage flow (150 percent of average flow) or treatment requirements of the sewage or wastes in the System.
3. For Systems utilizing a separation of sewage flows for design, the sum of the residential use figures of Appendix 1 shall be considered as the average daily flow by the type of fixture.
4. Where the 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. This allows local health officials to require installation of a meter located to measure flow into the Individual Sewage Disposal System.

**B. Minimum Horizontal Distances Between Components of A System and Physical Features**

1. 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, cut banks or fill material, and property lines shall be in accordance with Table 1.
2. New wells, springs, or potable water supply suction lines and all other constructed units listed in Table 1 shall be installed or located in accordance with the minimum distance requirements provided in this table.
3. The minimum horizontal distance required from manmade cut banks and fill material areas to System components discharging effluent into the surrounding soil shall be four 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 geologist that a mechanical or natural barrier will prevent lateral effluent surfacing.
4. If the natural grade at or within thirty-five (35) feet of the absorption system is greater than thirty percent (30%), then the absorption system shall conform to the following specifications:
  - a. A twenty (20) millimeter liner shall be placed on each end and on the down slope side of the absorption system excavation to a depth of a minimum of 6' below grade unless otherwise approved by the Health Officer, in a manner such that all exposed soils are covered;
  - b. A berm shall be constructed upslope of the absorption system to divert surface water run off from the absorption system; and

- c. All disturbed areas shall be seeded after completion of the absorption system installation.
5. The minimum horizontal distance required from all slopes in excess of 40 percent shall be 35 feet except as provided for by Section IV.B.3.
6. The minimum distances shown in Table 1 shall be maintained between the System components and the physical features described. Where soil, geological, hydrogeological, or other conditions warrant, greater distances may be required by the Board of Health or by the State Water Quality Control Commission pursuant to C.R.S. Section 25-8-206, in accordance with the authority prescribed by law and rules and regulations implemented of said statute. Where soil conditions warrant, lesser distances shall be allowed as provided in Appendix 4. For repair or alteration of existing Systems where the size of the lot or location of existing physical features precludes adherence to these distances, the repaired or altered facility shall not be closer to water supply components than the existing facilities. Expansion of existing Systems or the replacement of Systems currently prohibited under these Regulations shall be termed new Systems and shall comply with all of the requirements of these Regulations.

**Table 1**

**Minimum Horizontal Distances Requirements (In Feet)**

	Springs, Wells Suction lines	Potable Water Lines	Potable Water Storage	Dwelling or Other Occupied Storage	Property Lines	Subsoil Drains	Lake, Water Course, Irrigation Ditch	Dry Gulches	Cutback or Fill Material	Septic Tank
Building sewer or effluent lines	50 <sup>2</sup>	10 <sup>2</sup>	25 <sup>2</sup>	0	10 <sup>2</sup>	10 <sup>2</sup>	50 <sup>2</sup>	10 <sup>2</sup>	10	-
Septic tanks, treatment plants, dosing tanks	50 <sup>2</sup>	10 <sup>2</sup>	25	5 <sup>1</sup>	10	10	50	10	10	-
Absorption trench, seepage bed, sand filter, or subsurface disposal system	100 <sup>4</sup> 200 <sup>3</sup>	25 <sup>2</sup>	25	20	10	25	50 <sup>3</sup>	25 <sup>3</sup>	See Sec. IV.B.3.	6
Seepage Pit	100 <sup>4</sup> 200 <sup>3</sup>	50 <sup>2</sup>	25	20	25	25	50 <sup>3</sup>	25 <sup>3</sup>	See Sec. IV.B.3.	6
Pre-treatment system discharging into an absorption trench, seepage bed, sand filter, or subsurface disposal system	100 <sup>4</sup>	25 <sup>2</sup>	25	20	10	10	25 <sup>4</sup>	25 <sup>4</sup>	See Sec. IV.B.3.	6
Grey water absorption trench, seepage bed, sand filter, or subsurface disposal system	100 <sup>4</sup>	25 <sup>2</sup>	25	20	10	10	50 <sup>4</sup>	25 <sup>4</sup>	See Sec. IV.B.3.	6
Lined wastewater pond	60	10 <sup>2</sup>	25	15	10	10	25	10	20	5
Unlined sand filter in soils with a percolation rate slower than 60 minutes per inch	100 <sup>4</sup> 200 <sup>3</sup>	25 <sup>2</sup>	25	15	10	25	25	15	See Sec. IV.B.3.	10
Unlined or partially lined wastewater pond	100 <sup>4</sup> 200 <sup>3</sup>	25 <sup>2</sup>	25	15	10	25	25	15	See Sec. IV.B.3.	10
Lined sand filter	60	10 <sup>2</sup>	25	15	10	10	25	10	20	5
Vault privy or vault	50	10 <sup>2</sup>	25	15	10	10	25	10	10	-

<sup>1</sup>Distance shown shall not apply to treatment plants or effluent lines where recycling is permitted.

<sup>2</sup>Crossings or encroachments may be permitted at the points as noted above provided that the water or wastewater conveyance pipe is encased for a minimum distance of ten 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 or wastewater 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.

<sup>3</sup>Add 8 feet additional distance for each 100 gallons per day of design flow over 1000 gallons per day as specified in the table.

<sup>4</sup>The distance indicated shall be considered as the straight line distance between the nearest ungrouted point along the well casing and the final effluent discharge point.

## **C. Subsurface Evaluation**

### **1. Percolation Test.**

- a. Location. Soil percolation tests shall be performed in at least three test holes in an area in which the absorption system is to be located, spaced uniformly over the proposed site, except there shall be no less than three test holes in any 1200 square foot area of the absorption system.
- b. Dimensions.
  1. The percolation test holes shall be 12 inches in width or diameter, and shall be terminated at the depth of the proposed absorption system.
  2. One soil profile test hole, at least 8 feet deep or to bedrock, whichever is shallower, must be completed to give an indication of the soil condition in the area including area soil zone at least 4 feet below the bottom of the proposed absorption system.
- c. Procedure. Percolation test holes shall be filled with water to a depth of 14 inches or more at least eight hours but not more than 24 hours prior to conducting the water percolation test, and shall be refilled with water, if necessary, to a depth of at least 14 inches prior to final measurement. Measure the time for the water to drop 1 inch within the lower 25 percent depth of the percolation test hole. The percolation rate shall be reported in minutes of time per inch drop.
- d. Calculation. The field percolation rate shall be the average rate of the percolation tests after the rate has stabilized in all the test holes observed in the proposed absorption area. A percolation rate of between five and sixty minutes per inch is required. A field percolation rate determined by the test shall be used in

calculating the absorption area required for the proposed System.

e. Performance of Percolation Tests.

1. The percolation test shall be performed by or under the supervision of a Registered Professional Engineer and the results thereof submitted with the application for the permit.
  2. If the applicant demonstrates to the satisfaction of the Health Official the System is completely independent of all soil absorption, the requirement for percolation tests may be waived.
2. Alternative Percolation Test. Alternative percolation test or other soil test procedures may be approved by the Health Official providing the test results of alternate procedures meet or exceed those determined using the Percolation Test procedure detailed in this section.
3. Water Table. A test hole evaluation showing a dry condition at least 4 feet below the bottom of a proposed soil absorption system during high seasonal runoff, or July 1, of each year may be considered as primary evidence the groundwater table will be sufficiently below the bottom of the proposed absorption system. The Department may also consider the following as evidence in evaluating the location of high seasonal groundwater table:
- a. Observation of soil in a trench of at least 8 foot depth for evidence of crystals of salts left by the groundwater table; or chemically reduced iron in the soil, reflected by a dull grey or mottled coloring.
  - b. Soil moisture tests indicating water saturation.
  - c. Determination of the piezometric surface by the hydraulic gradient.

**A. Common Design Requirements**1. General Design Features.

- a. Reliability. Systems shall be designed and constructed such that each 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 insects and rodents and to prevent the creation of nuisances and public health hazards and shall provide for efficient operation and maintenance.
  - b. Plumbing Codes. Plumbing fixtures, grease traps, building sewers, vents, sewer lines and other appurtenances shall be designed, operated and maintained so as to comply with the minimum Clear Creek County Plumbing codes in force on the date of the System installation.
  - c. Electrical Equipment. All electrical work, equipment and materials if used, shall comply with the requirements of the National Electrical Code in force in the State of Colorado on the date the System was installed.
  - d. Identification and Data Marketing. A permanent type plate or other indelible marking on major components, not constructed on site, shall be provided, so inscribed as to be easily read and visible for the purposes of inspection. Said inscription shall include the following: the name of manufacturer; model or serial number designation; and the maximum design capacity of the unit and unit of measurement.
2. Instructions. The manufacturer shall provide clear, concise instructions covering the unit which, when followed, will assure proper installation and safe and satisfactory operation.
  3. 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 the System or component is not operating, or is operating but malfunctioning. This indication or warning shall be in the form of a visual and/or audible signal. All components such as pumps, lift stations and mechanical aerators shall be required to conform with this Section as specified on the permit.
  4. 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.

5. 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 cleaned.
6. Surface Activity. The surface of the ground over the System or any part thereof, must be restricted to activity of use which will allow the System to function as designated 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.
7. 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. All watertight tanks, vaults, or other units shall have a watertight certification document from the product manufacturer. The Department may require a water tightness test prior to approval of the System.
8. Accessibility for Inspection and Maintenance. Each System tank shall be equipped with an access manhole no greater than eight inches below finished grade 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.
9. Structural Integrity. All System components shall be constructed and installed so as to withstand earth and hydrostatic pressure when full and when empty. All metal surfaces exposed to moisture shall be properly coated to prevent corrosion.
10. Pipe Standards. All wastewater lines used in 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 D 3034, SDR35, or equivalent. Perforated distribution pipe surrounded by rock within a soil absorption system shall have a minimum wall thickness conforming to ASTM Standard 2729. 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 Systems.
11. Tank Anchoring. In locations where groundwater may cause instability problems to the septic tank, pumping chamber, vault or other tanks in the 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 approved by the Health Official prior to installation. The Health Official may require the design of the anchoring system to be prepared by a Registered Professional Engineer.

12. Building Sewer and Effluent Line.

- a. The building sewer and effluent line shall be laid with a minimum fall of 1/8 inch per foot, 1/4 inch to 1/2 inch is recommended. Bends shall be limited to 45-degree ells, or long sweep quarter-bends. If 90-degree bends cannot be avoided, two 45-degree ells shall be used.
- b. Schedule 40 PVC, or pipe of equivalent strength is required whenever the building sewer or effluent lines are located under a road or driveway. The sewer and effluent lines shall be insulated with two inches of styrofoam or other insulating material approved by the Department above the line under driveways and all other well-traveled areas.
- c. The crown of the sewer or effluent line pipe shall be a minimum of 18 inches below finished grade, unless approved by the Department.
- d. The sewer and effluent lines shall be constructed of solid wall, watertight pipe to the absorption area or distribution box.
- e. Cleanouts shall be provided as specified below for the building sewer and effluent lines, unless otherwise approved by the Department:
  1. Size. Cleanouts shall be of the same nominal size as the pipes up 4 inches and not less than 4 inches nominal for larger piping.
  2. Location. Cleanouts shall be not more than 75 feet apart in horizontal drainage systems of 3-inch nominal diameter or less and not more than 100 feet apart for larger pipes. The cleanout plugs shall be brought to finished grade.
  3. Direction of Flow. Every cleanout shall be installed so the cleanout opens opposite the direction of the flow of the drainage system or a U-type double cleanout fitting shall be used.
  4. Change of Direction. Cleanouts shall be installed at each change of direction of the drainage system greater than 45 degrees except not more than one shall be required in every 40 feet of run.
  5. Building Sewer-Junction with Main Drain. There shall be a cleanout near the junction of the building drain and building sewer. This cleanout may be either inside or outside the building wall, provided it is brought up to finish grade or to the lowest floor level.

13. Revegetation. All earth disturbance related to the construction or repair of a System shall be revegetated so as to comply with the minimum Clear Creek County Site Development Department codes in force on the date of System installation.

**B. Design and Construction Criteria for Septic Tanks**

1. Materials.

- a. Concrete tanks shall meet ASTM “Standard Specifications for Precast Concrete Septic Tanks”.
- b. The manufacturer’s name and size of tank shall be case in the lid of the tank.
- c. Other material such as fiberglass and polyethylene which result in an adequate and durable construction and which resist excessive corrosion or decay may be approved. Metal and steel septic tanks are prohibited for installation on new sewage disposal systems.

2. Minimum Capacities.

- a. A septic tank shall be constructed to permit detention of incoming sewage for a minimum of 30 hours. Except for grey water systems, the effective liquid capacity of any septic tank shall be no less than 750 gallons.
- b. The minimum liquid capacity for one and two-family residences shall be as established in Table 2.

Table 2

Septic Tank Capacity One and Two-Family Residences Based Upon Number of Bedrooms	
# of Bedrooms	Minimum Effective Liquid Tank Capacity (gallons)
2 or less	750
3	1000
4	1250
Each additional bedroom	250

- c. For buildings other than one and two-family residences, the liquid capacity of a septic tank shall be increased above the 750 gallon minimum as established in Appendix 2. For such buildings having kitchen and/or laundry waste, the tank capacity shall be increased to receive the anticipated volume for a 30-hour period from the kitchen and/or the laundry.

3. Design Criteria.

- a. The inlet invert shall be 3 inches higher than the outlet invert.
- b. The inlet invert shall be provided with tee or baffle to divert incoming sewage downward.
- c. The outlet shall be fitted with a tee or baffle. The 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, but shall not exceed one-half the

liquid depth. The distance from the outlet invert to the underside of the tank top shall be at least 10 inches.

- d. A septic tank shall have two or more compartments, or more than one tank may be used in a series to provide the following capacity arrangement. The first compartment of the septic tank shall hold no less than one-half and not more than two-thirds of the required effective capacity, or other capacity arrangements approved by the Department.
- e. 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.
- f. At least one access no less than 20 inches across shall be provided for each compartment of the tank.
- g. Plans and specifications must be submitted and approved for all tanks fabricated on site.

4. Installation.

- a. Tanks are to be installed on a solid base and shall be level.
- b. Roof drains, foundation drains, area drains or cistern overflows are not to enter the tank or any part of the treatment system.
- c. The inlet and outlet pipes and any tank seams shall be grouted and sealed with waterproof materials, such as foundation sealer or roof tar, 3 inches around each seam or connection and on the inside and outside of the septic tank.
- d. Backfilling around a septic tank shall be accomplished in a manner to prevent settlement and avoid undue strain on the tank and pipes entering and leaving the tank.
- e. Pipe meeting or exceeding ASTM Standard D 3034 shall extend from the septic tank for a minimum distance of at least 5 feet from the inlet and outlet ends and must be adequately supported to prevent failure as a result of settling.
- f. The opening cover of a septic tank manhole, inspection port of sampling access shall be no deeper than eight (8) inches below the finished grade, and made of materials resistant to degradation from moisture or sewer gases. All tank opening covers and access ports shall be clearly and permanently marked at grade.
- g. All manhole riser joints on concrete risers and manhole covers shall be tongue-and-groove or shiplap type, and sealed watertight using neat cement, mortar, bituminous compound or other approved material. All methods of attaching glass-fiber and polyethylene riser shall be watertight and approved by the Department.
- h. Abandoned septic tanks and vaults shall be pumped and filled with soil, or they shall be removed.

**C. Individual Aerobic Wastewater Treatment Plants and Other Manufactured Units Utilizing Mechanical Apparatus for Treatment of Sewage.**

1. General. Individual sewage disposal units utilizing mechanical apparatus and furnished for installation in Clear Creek County shall comply with the minimum requirements of National Sanitation Foundation Standard No. 40 and either be listed as meeting this standard or equivalent testing program.
2. Maintenance. The user will be responsible for maintaining and operating the plant in accordance with these Regulations and manufacturer's specifications. The user shall notify the manufacturer's representative and the Department of any failure of the System within three days from its identification.

**D. Distribution Box**

1. A distribution box, if used, shall be of sufficient size to equally distribute effluent to the lateral lines and constructed of watertight material.
2. The distribution box shall be constructed with the inlet invert at least one inch above the level of the outlet invert.

**E. Sewage Pumping and Dosing Systems**

1. 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.
2. The dosing or pumping chamber construction shall meet the same materials and fabrication criteria as required for septic tanks, and shall be watertight.
3. The engineered plans for a System utilizing sewage dosing or pumping chamber shall specify the chamber size, dosing quantities, and periods for sewage effluent pumping.
4. Pump Specifications.
  - a. The pump capacity of an effluent pump shall be adequate to provide a minimum of at least 2 feet of head at the distal end of all lateral lines in the absorption area.
  - b. The capacity of grinder pumps shall conform to manufacturer's specification.
  - c. Pumps, piping and fittings shall be of materials such as bronze, stainless steel, or durable plastic so as to be resistant to acidic conditions and corrosion.
  - d. Non-clog pump opening shall have at least 2 inch diameter solids handling capacity where raw sewage is pumped or not have more than ½ inch diameter solids handling capacity if previously settled effluent is pumped.

- e. Pump check valves shall be removed so manifold and pipes are able to drain back into the pumping chamber at the end of the discharge cycle.
- 5. A pump pedestal, a minimum of 8 inches from the bottom of the pumping chamber, is required on all effluent pumping systems. This pedestal shall provide a solid base for the pump and elevate the pump intake above the sludge layer.
- 6. Automatic liquid level controls shall be provided to start and shut off pumps. Solid state mercury or mechanical alarm switches are required. Pressure diaphragm switches are prohibited for use in pumping chambers.
- 7. A high water alarm switch shall be provided for all pumping systems with a clear audible and/or visual warning to alert the occupants of mechanical failure. The alarm system may consist of a bell, a buzzer, or a light located in the structure being served by the System. This system shall be on a separate circuit from the pump.
- 8. Electrical controls shall be mounted outside the pumping chamber or in an approved watertight box.
- 9. Inlet, Discharge and Distribution Lines.
  - a. The entire pumping system shall be sloped to drain completely to the pumping chamber and/or absorption area.
  - b. Pressure pipe shall be of sufficient strength to accommodate pump discharge pressure and the pipe shall be sized to maintain a velocity of at least 2 feet per second.
  - c. Automatic air release valves shall be installed at high points in the pressure line.

**F. General Requirements for Disposal of Effluent into an Absorption System**

- 1. Unless designed by a Registered Professional Engineer and approved by the Board of Health or the Department, no soil absorption system shall be permitted.
- 2. The excavation for a soil absorption system shall terminate at least 4 feet above the groundwater table.
- 3. Unless approved in the permit, blasting to create an absorption area is prohibited.
- 4. Minimum Absorption Areas.
  - a. The minimum absorption area in square feet (A) for a System shall be computed as a function of the design flow (Q) and the Long Term Acceptance Rate (LTAR) according to the formula:  

$$A = (Q/LTAR)$$

Table 3

LTAR's for Wastewater for Soil Absorption Systems		
Percolation Rate (minutes/inch)	Typical Soil Textures	Maximum Loading 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	.72
21-30	Loam	.50
31-40	Loam to Silty Loam*	.40
41-60	Clay Loam to Clay*	.30
over 60	Silty Clay Loam/Silty Clay	.20**
* Soils without highly expansive clays ** Engineer determined for specific area		

- b. The length of an absorption trench may be calculated by allowance for the sidewall area of additional depth of gravel in excess of nine (9) inches below the bottom of the distribution pipe according to the following formula:

$$L_1 = L_2 \times \frac{(W + 2)}{(W + 1 + 2d)}$$

L<sub>1</sub> = Adjusted Length

L<sub>2</sub> = Length Required Prior to Adjustment

W = Width of Trench in Feet

d = Depth of gravel Below Distribution Pipe in Feet

- c. Flow reduction for the use of permanently installed devices may be allowed at the discretion of the Health Official, but in no case shall the maximum daily flow used for design purposes allow greater than 20% reduction.
  - d. If dosing is used in conjunction with an absorption trench or seepage bed system, a reduction of 25% may be allowed.
  - e. The maximum reduction from all combined alternatives shall be no greater than 50% of the standard required soil absorption area.
5. The ground surface shall be graded to deflect precipitation or other surface drainage from the disposal area. The absorption area shall be protected against erosion.

## **G. Common Construction Requirements for Seepage Beds and Absorption Trenches**

1. The bottom of the absorption trench or bed shall be level.
2. Plastic perforated distribution pipe shall be required for all absorption trenches and seepage beds. The distribution piping for gravity systems shall be a minimum four-inch internal diameter. The maximum length of any distribution line shall be 100 feet. Perforated plastic distribution lines shall be fitted with tight joints and shall be so laid that a relatively even distribution of effluent will occur along the length of the line. In all seepage beds, and wherever possible in seepage trenches, the distal ends of the distribution lines shall be connected.
3. Fresh air inlets of pipe of approved strength shall be provided and connected to the perforated distribution pipe with an approved fitting or junction box and shall be placed so as to assure a free flow of air throughout the entire installation. The vent pipes shall be at least 4 inches in diameter and extend at least 12 inches above the final grade and terminate with an approved vent cap. Fresh air inlets shall be located at least 25 feet from any window, door, or air intake of any building used for human habitation. A maximum of four distribution pipelines may be served by one common four-inch vent when interconnected by a common header pipe.
4. The bottom of the absorption area shall be excavated a minimum of 72 inches into the natural soil at all points unless otherwise approved by the Health Official.
5. Seepage trenches or beds shall not be excavated when the soil has a plastic consistency during moist or wet conditions.
6. All smeared or compacted surfaces in the seepage trench or bed shall be scarified to the depth of the compactor and the loose material removed.
7. A 12-inch layer of 1 inch to 2 ½ inches washed gravel shall be distributed evenly over the entire trench or bed, with distribution lines set at a depth to insure at least 6 inches of gravel below and 2 inches of gravel above each line.
8. The top of the gravel shall be covered with a six-inch layer of uncompacted hay or straw, a two-inch layer of unlined fiberglass insulation material, untreated building paper overlapped a minimum of 6 inches, or any of the synthetic fiber matting materials approved by the Health Official to prevent the gravel from becoming clogged by the earth backfill. An impervious covering shall not be used, as this interferes with evapotranspiration at the surface.
9. A final cover of soil suitable for vegetation, at least 10 inches deep, shall be placed from the top of the straw, hay, or similar pervious material to the finished surface grade of the absorption area.
10. Machine tamping, rolling or hydraulic compaction of final cover shall not be permitted, however, hand-tamping may be allowed where necessary to stabilize the soil.

#### **H. Absorption Trench Construction Requirements**

1. At least two trenches of near-equal length shall be constructed with a length not exceeding 100 feet; a width not exceeding 3 feet, unless approved by the Health Official.
2. Trench excavations shall be spaced so there is a minimum of 6 feet of undisturbed soil between sidewalls.

#### **I. Seepage Bed Construction Requirement**

1. Seepage beds shall be constructed with a length not exceeding 100 feet and a width no less than 3 feet, unless approved by the Health Official.
2. The outermost disposal lines in the bed shall be placed no less than 18 inches and no more than 36 inches from the outside bedwalls. For each 6 feet or part thereof in bed width, there shall be one distribution line extending the length of the bed. Such pipelines shall be spaced evenly between 3 feet and 6 feet apart so as to distribute the effluent evenly over the entire be area.
3. Distribution lines shall be level.

#### **J. Absorption or Seepage Pit Construction Requirements**

1. Absorption or seepage pits having adequate soil absorption may be permitted as an alternative when absorption fields are impracticable, and where the subsurface conditions are otherwise suitable for pit installations.
2. The capacity of the seepage pit shall be computed on the basis of percolation tests made in each vertical stratum penetrated. The weighed average of the results shall be computed to obtain a design figure. Soil strata in which the percolation rates are in excess of 30 minutes per inch shall not be included in computing the absorption area.
3. The effective area of the seepage pit is the vertical wall area (based on dug diameter) of the pervious strata below the inlet. No allowance shall be made for impervious strata below the inlet or bottom area. The minimum absorption area shall be equivalent to a two-bedroom dwelling.
4. Seepage pits shall be separated by a distance equal to three times the diameter of the largest pit. For all pits over 20 feet in depth, the minimum space between pits shall be 20 feet.
5. The walls shall be made of concrete block, brick, perforated concrete rings, or other suitable masonry material. Mortar shall be used in the horizontal joints only. The annular space between the excavation and the outside wall and the bottom one foot of the pit should be filled with clean, coarse gravel from 1 inch to 2 ½ inches in diameter.
6. Where two or more seepage pits are provided, they shall be connected in parallel and fed by a distribution system equalizing flow.

7. Seepage pits shall be provided with both vertical sidewalls and a top supporting integrity. Adequate safety protection shall be provided to protect against personal injury during construction and/or use.
8. Each seepage pit shall be provided with a 24-inch manhole, extending within 6 inches of the ground surface, and a four-inch fresh air inlet which shall meet the requirements of section V.G.3.
9. Excavation and scarifying shall be in accordance with Section V.G.6.
10. Appendix 3 shall be used for determining the effective sidewall absorption area of circular seepage pits.

**K. Serial Distribution System Construction Requirements**

1. 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. The minimum horizontal distance between trenches shall be 6 feet.
2. An absorption trench shall follow approximately the ground surface contours so the variation in absorption field depth will be minimized.
3. Adjacent absorption trenches 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.

**L. Parallel Distribution 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 50% of the total area required excluding the reductions given for dosing. The diversion mechanism shall be readily accessible from the finished grade and shall be switched on an annual basis. Reductions in absorption field area are not applicable to alternating systems; flow reductions may be taken where applicable.

**M. Sand Filter Construction Requirements**

1. The filtering material shall be clean, coarse sand, all passing a screen having four 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.
2. The sand shall be at least 2 feet deep below the distribution lines. The distributors and underdrain shall be surrounded by coarse screened gravel and or crushed stone.

**N. Mounded Absorption Bed Systems**

1. Soil and Site Characteristics.
  - a. Installation of mounded Systems on slopes of 0 to 6 percent may be allowed if the natural soil percolation rate is between 5 and 60 minutes per inch.

- b. Installation of mounded Systems on slopes of 6 to 12 percent may be allowed if the natural soil percolation rate is between 5 and 29 minutes per inch.
  - c. Mounded Systems shall not be installed on slopes in excess of 12 percent.
2. Filter Material.
- a. The filter material used in the construction of mounded Systems shall be a sand of the composition as established in Table 4.

Table 4

COMPOSITION OF FILTER MATERIAL FOR MOUNDED SYSTEMS	
Standard Sieve Size	Percent by Weight Passing Sieve
3/4"	100%
No. 4	60-100%
No. 50	10-30%
No. 100	0-10%
No. 200	0-3%

- b. An aggregate-filled seepage bed shall be constructed within this filter.
  - c. A minimum of two feet of filter material shall be provided between the bottom of the seepage bed and the natural soil surface.
  - d. The edge of the filter material shall be considered the edge of the absorption field when measuring minimum distances.
3. Seepage Bed in Mound.
- a. The seepage bed shall be constructed of aggregate of the composition as established in Section V.G.7.
  - b. A distribution system shall be constructed within the seepage bed to provide uniform application of the effluent.
  - c. A layer of aggregate shall be spread over the bed such that a minimum of 9 inches of aggregate are below the distribution system and a minimum of 2 inches above the distribution system.
  - d. The bottom and top of the seepage bed shall be level.
  - e. A 2 inch layer of hay or straw shall be placed over the seepage bed before the bed is covered with soil.
  - f. The minimum size of the seepage bed shall be determined by the percolation rate of the natural soil. Where the natural soil

percolation rate is from less than 1 to 30 minutes per inch, the rate of application to the seepage bed shall not exceed 0.4 gallons per square foot per dose. Where the natural soil percolation rate is from 31 to 60 minutes per inch, the rate of application to the seepage bed shall not exceed .25 gallons per square foot per dose. The minimum size of the seepage bed shall be calculated using the following formula:

$$\text{Area of Bed (sq.ft.)} = \frac{(\text{Quantity of Sewage Flow/Dose})}{(\text{Application Rate/Dose})}$$

- g. In areas where the groundwater is within 2 feet of the natural soil surface maximum seepage bed width shall not be greater than 10 feet.
4. Size and Shape of Mound.
- a. A minimum of 2 feet of soil shall be placed over the seepage bed and a minimum of 1 foot of soil shall be placed over the fill material surrounding the bed.
  - b. Side slopes of the mound should be sufficiently steep to promote runoff, but should not exceed 3:1 (3 feet horizontal to each 1 foot vertical rise).
  - c. The toe of the mound shall blend gradually into the natural slope of the terrain with no sharp slope changes.
  - d. The shape of the mound shall be at the Registered Professional Engineer's discretion, with square or rectangular shapes preferred.
  - e. Rectangular mounds shall be placed with the long axis perpendicular to the natural slope of the terrain.
5. Method of Effluent Application.
- a. A pressurized distribution system shall be required. Pressurization may be obtained by pumping or gravity flow.
  - b. A solid pressurized main line with perforated laterals attached to it shall be used as the distribution system.
  - c. The lateral lines shall not be longer than 100 feet as measured from the pressurized main line to the end of the lateral line.
  - d. The ends of the lateral lines shall be capped or looped.
  - e. The lateral lines shall be level.
  - f. Spacing and diameter of the perforations in lateral lines shall be at the discretion of the Registered Professional Engineer, but shall provide uniform application of the effluent.
6. Revegetation.
- a. A layer of good quality topsoil shall be placed over the entire mound.
  - b. The layer of topsoil shall have a minimum thickness of 6 inches.

- c. The topsoil shall be planted with a mixture of seed as specified by the Registered Professional Engineer.
- d. The seed mixture shall contain plant species which have good soil stabilizing characteristics, provide maximum transpiration rate, do not have tap roots, and will compete well with primary successional species.

**O. Pre-Treatment for Soil Absorption Systems**

1. Effluent discharged from the septic tank may be pre-treated prior to final disposal into a soil absorption system. An engineer-designed pre-treatment system may be utilized for the purpose of reducing total nitrogen concentrations to less than 20mg/l annual average loading to the soil absorption system, or any Individual Aerobic Wastewater Treatment Plant receiving a Standard 40 Class I rating from the National Sanitation Foundation.
2. A system utilizing a pre-treatment system shall be constructed in accordance with the standards herein contained and shall be designed to ensure compliance with the associated effluent standards.
3. All Pre-Treatment Systems shall be maintained under a third party maintenance agreement with an authorized agent for the routine and periodic maintenance, emergency service and repair of the Treatment Plant. The contents of the service agreement must be approved by the Clear Creek County Environmental Health Department before system is permitted. The service agreement shall remain in effect until the treatment plant is abandoned and the property is feasibly served by public sewer or until the treatment plant is replaced with another type of approved system.
4. The Registered Professional Engineer shall supply the adequate documentation to substantiate compliance with required effluent standards. When, in the opinion of the Health Official, the Department does not have sufficient information for evaluation of an application, the Health Official may require additional tests, including effluent sampling not to exceed five years.

**P. Constructed Wetland Treatment**

A constructed wetland treatment system shall be designed by a Registered Professional Engineer and the design shall be site specific and include specifications for: loading, capacity, liner material, filter media, density and species of plant material, effluent level, final discharge type and other pertinent information as requested by the Health Official. The design shall include estimates of effluent quality at the inlet and outlet. Sampling ports, or some other means of effluent sampling, shall be provided. Sampling, as required in the permit, shall be paid for by the owner.

## Section VI Requirements for Alternate Disposal Systems

### A. Grey Water Systems

Grey Water Systems shall be designed and constructed in accordance with standards for septic tanks and soil absorption systems except the flow rate used in their design shall be 40 gallons per person per day for residential uses or shall be calculated as the total volume by type of fixture for all other proposed uses. Building sewer lines carrying grey water to the septic tank shall have a maximum diameter of 2 inches.

### B. Vaults

1. Vaults may be permitted for limited use occupancy structures with water carriage sewage systems and shall have a minimum 1,000 gallon effective capacity. All vaults shall be equipped with an signal device indicating with visual or audible alarm when the vault has reached 85 percent capacity.
2. All vaults shall be equipped with a tripping device which when activated shall effectively eliminate the water supply to the building being served by the vault. Such device shall be approved by the Department and shall be activated at no greater than 95 percent capacity.
3. All receipts from a Licensed Systems Pumper shall be retained and available to the Department upon request.
4. Vaults shall meet the same installation and construction standards as septic tanks except they shall be single compartment and have no effluent outlet.

### C. Vault Privy

1. A vault privy shall be built to include: insect-tight construction, a superstructure affording complete privacy, an earth mound around 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 seats and covers of easily cleanable, non-absorbent material, hinged, self-closing and insect proof. All venting shall be insect proof with No. 16 or tighter mesh screening.
2. Effective capacity of a vault privy shall be no less than 400 gallons.
3. Vault privies shall meet the same installation and construction standard as septic tanks except they shall be single compartment and have no effluent outlet.
4. The vault privy shall be pumped when full by a Licensed Systems Pumper. All pumping receipts shall be retained and available to the Department upon request.
5. Vault privies may be allowed at the discretion of the Health Official but shall be prohibited for residential uses.

#### **D. Incineration Toilets and Chemical Toilets**

1. Incineration or chemical toilets may be permitted at the discretion of the Health Official.
2. Incineration and chemical toilets shall be designed and installed in accordance with all applicable Colorado Safety Codes and shall have a National Sanitation Foundation Certificate.
3. The use of portable chemical toilets in permanently occupied buildings shall be prohibited except during construction or under emergency circumstances.

#### **E. Composting Toilets**

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 other applicable regulations or codes, within a dwelling or building provided the unit complies with NSF standards and provided the installation meets manufacturer's specifications. The effective volume of the receptacle must be sufficient to accommodate the number of persons served.

#### **F. Experimental Systems**

Except for designs or types of Systems that have been approved by the Division pursuant to C.R.S. 25-10-108 (1), the Department may approve an application for a type of System not otherwise provided for in paragraphs (e) to (k) of subsection (1) of Section 25-10-105, only if the System has been designed by a Registered Professional Engineer, and only if the application provides for the installation of a backup System, of a type described in said paragraphs or previously approved by the Division under subsection (1) of Section 25-10-108, in the event of failure of the primary system. The backup system need not be installed until there is a failure of the primary system. The Department shall not arbitrarily deny any person the right to consideration of an application for such a System and shall apply reasonable performance standards in determining whether to approve such an application.

#### **G. Treatment Systems Other Than Those Discharging Through a Soil Absorption or Sand Filter System and Non-Discharging Systems**

1. 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 shall not apply to Systems discharging below ground through a soil absorption or sand filter system or to a non-discharging system.
2. Review of Application. The Board of Health shall review all applications for such Systems which may result in discharge or

drainage of effluent from the property of origin. No permit shall be issued for such a System if the Board of Health determines a potential health hazard or private or public nuisance or undue risk of contamination exists. The Department may review applications and issue permits for Systems which do not permit the drainage of effluent off the property of origin.

3. The following minimum performance criteria shall be required for all Systems pursuant to this section:
  - 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 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) millileters 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 result shall exceed five thousand (5000) 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 standard shall be met:

1. There shall be at least four (4) feet of soil between the maximum seasonal high water table and the level of effluent discharge.
  2. 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.
  3. 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, samples shall be taken at least once per week but no more frequently than once per day.
4. Methods of Analysis and Sampling Points. All effluent samples shall be independently analyzed according to the methods prescribed in the 18<sup>th</sup> Edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association). The point of sampling shall be a location that is representative of the final discharge from the System.

## Section VII

# Operation and Maintenance of Individual Sewage Disposal Systems

### A. Responsibility

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

### B. Maintenance and Cleaning

1. To ensure proper functioning of a System, the System shall be maintained by the owner or occupant. The Board of Health may, on request, require proof of proper maintenance and cleaning to be submitted to the Board of Health by the owner of the System.
2. For treatment plants utilizing mechanical apparatus or under a service policy, a clearly visible, permanently attached label or plate giving instructions for obtaining service shall be placed at a conspicuous location.
3. In order to ensure good working order, the minimum schedule shall apply to all Systems as established in Table 5.

Table 5

INDIVIDUAL SEWAGE DISPOSAL SYSTEM MAINTENANCE		
Type of Component	Recommended Inspection Period	Required Cleaning or Pumping
Septic Tanks	Annual	When Inspection Reveals : 1. The bottom of the scum layer is within 3 inches of the bottom of the outlet device; or 2. The top of the sludge layer is within 8 inches of the bottom of the outlet device.
Vaults, Vault Privies	Every Four Years	At 85 percent capacity
Aeration Plants	Every Six Months	As necessary/as recommended by the manufacturer
Pumps and Pumping Chambers	Every Six Months	As necessary
Experimental systems shall meet such conditions as are set out in the permit.		

**C. Disposal of Waste Materials**

Disposal of waste materials removed from a System in the process of maintenance or cleaning shall be accomplished at a designated site in a manner which does not create a hazard to the public health, a nuisance or an undue risk of pollution and which complies with State and local rules and regulations.

QUANTITIES OF SEWAGE	
Type of Establishment	gal/person/day (average) (unless otherwise stated)
<b>Residential</b>	
Hotels and motels without private baths - per room	50
Hotels and motels with private baths - per room	75
Multiple family dwellings or apartments	75
Rooming House	50
Single Family Dwellings	75
<b>Commercial and Miscellaneous</b>	
Bus service areas (not including food)	05
Country clubs (not including food)	30
Day workers at offices	15
Factories and plants (excluding industrial wastes)	35
Laundries, self-service	400 gal/washer/day
Food service estab. (toilet and kitchen wastes)	50 gal/seat
Food service estab. (with paper service)	25 gal/seat
Additional for bars and cocktail lounges	30 gal/seat
Movie theaters and churches (not including food)	5 gal/seat/day
Stores and Shopping Centers	0.1 gal/ft <sup>2</sup> of retail space
Work or construction camps (semi-permanent with flush toilets)	50
Work or construction camps (semi-permanent without flush toilets)	35
Travel trailer parks with individual water and sewage hookups	50 gal/bed/day
Travel trailer parks without individual water and sewage hookups	50 gal/unit/day

QUANTITIES OF SEWAGE	
Type of Establishment	gal/person/day (average) (unless otherwise stated)
<b>Institutional</b>	
Hospital	250 gal/bed space/day
Institutions other than hospitals	100 gal/bed/day
Mobile home parks Per space	75 300
Schools, boarding	100
Schools, day (without cafeteria, gym or showers)	15
Schools, day (with cafeteria, gym and showers)	25
<b>Recreational &amp; Seasonal</b>	
Camps, day (no meal served)	15
Camps (luxury resort)	125
Camps, resort (night and day) with limited plumbing	50
Camps, tourist trailer, or campground (seasonal occupancy)	50 gal/unit/day
Cottages and small dwellings (seasonal occupancy)	75 gal/person/day
Public parks (when park is open) toilet urinal shower faucet	36 gal/fixture/hour 10 gal/fixture/hour 100 gal/fixture/hour 15 gal/fixture/hour
Swimming pools and bathhouses	10

QUANTITIES OF SEWAGE	
Type of Establishment	gal/person/day (average) (unless otherwise stated)
<b>Separate Flow-Residential Use</b>	
Bath/shower (5 gal/min)	14.7
Dishwasher	1.8
Kitchen sink	4.4
Additional for garbage grinder	1.4
Laundry washer	19.5
Lavatory	8.4
Water closet (4.8 gal/flush)	24.8

## Appendix 2

## Septic Tank Capacities for Various Building Uses

SEPTIC TANK CAPACITIES FOR VARIOUS BUILDING USES	
Building	Capacity (gallons)
Apartment buildings (per bedroom)	200
Assembly hall (per person, no kitchen)	2
Bars and cocktail lounges (per person space)	9
Campgrounds and camping resorts (per camp space)	100
Campground sanitary dump stations (per camp space; omit camp spaces with sewer connection)	15
Camps, day use only, no meals served (per person)	15
Camps, day and night (per person)	40
Condominiums (per bedroom)	200
Dog kennels (per animal enclosure)	20
Hospitals (per bed space)	200
Hotels or motels and tourist rooming house (per room-2 persons per room)	100
Medical offices, clinics, and dental offices	
1) Doctors, nurses, medical staff (per person)	75
2) Office personnel (per person)	20
3) Patients (per person)	10
Mobile home parks, homes with bathrooms (per site)	300
Parks, toilet wastes only (per person, 75 persons per acre)	5
Parks, with showers and toilet wastes (per person, 75 persons per acre)	10
Restaurant	
1) Kitchen and toilet wastes (per seating space)	30
2) 24-hour (per seat)	60
3) Dishwasher and/or faucet waste disposer per seat	3
4) 24-hour with dishwasher and/or food washer per seat	6
Retail store, customers (10 sq. ft. per person)	1.5
Schools	
1) per classroom (25 pupils per classroom)	450
2) meals served (per classroom)	600
3) meals served and showers provided (per classroom)	750

## Appendix 3

## Effective Sidewall Absorption Area of Circular Seepage Pits

EFFECTIVE SIDEWALL ABSORPTION AREA OF CIRCULAR SEEPAGE PITS								
Diameter of Seepage Pit (ft.)	Effective Strata Depth Below Inlet							
	5 feet	6 feet	7 feet	8 feet	9 feet	10 feet	11 feet	12 feet
6	94	113	132	151	170	188	207	226
7	110	132	154	176	198	220	242	264
8	126	151	176	201	226	251	276	302
9	141	170	198	226	254	283	311	339
10	157	188	220	251	283	314	346	377
11	173	207	242	276	311	346	380	415
12	188	226	264	302	339	377	415	452
13	204	245	286	327	368	408	449	490
14	220	264	308	352	396	440	484	528
15	236	283	330	377	424	471	518	565
16	251	302	352	402	452	503	553	603
17	267	370	374	427	481	534	587	641
18	283	339	396	452	509	565	622	679

## Guidelines for Allowing Reductions in the Minimum Separation Distance Requirements Between Wells and Absorption Systems

### Part I – Conditions for Approval of Distance Requirements

#### 1.0 Demonstration of Suitable Soil

- A. If the onsite investigation documents the presence of eight (8) feet of suitable soil as defined in these Regulations, a distance separation of not less than one hundred (100) feet between wells and absorption systems shall be permitted.
- B. Blasting to install the system shall not be permitted.

### Part II – Guidelines for Preparing a Geologic Report

#### 2.0 On-Site Investigation

- A. An on-site surface and subsurface geological report is required in support of a request for a minimum separation between wells and absorption systems of less than two hundred (200) feet.
- B. A minimum of one (1), eight (8) foot deep excavation is required. All excavations shall be suitably barricaded or covered to prevent a safety hazard. All excavations shall remain open for inspection by the Health Officer unless previously arranged.

#### 2.1 Written Report Requirements

- A. A written report in support of the proposed distance reduction shall be prepared by, or under the supervision of, a professional geologist, and submitted to the Department at the time of application for a permit to install an individual sewage disposal system.
- B. The report shall detail all site-specific surface and subsurface geologic information and relate such information to regional geology and hydrology. This information shall include, at a minimum:
  - 1. The location of the site as it appears on the United States Geologic Survey (USGS) quadrangle geologic map, or on a 7.5 minute USGS topographic map if a geologic map is not available, and referenced by section, township and range;
  - 2. A description of the thickness and characteristics of surficial deposits;
  - 3. A scaled geologic log of the highest wall of the open excavation, showing surficial and bedrock units, weathering zones, and fracture or joint sets;

4. A description of the characteristics of the bedrock, especially the lithology and mineralogy, particularly as they relate to absorption field suitability, including suitability of the proposed filter material and suitability of the weathered portion of the soil horizon for the treatment of sewage.