

# Ellsworth County Sanitary Code for Environmental Protection

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**OCT 28 2014**

**Kansas Department of  
Health and Environment**



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KANSAS DEPARTMENT OF  
HEALTH AND ENVIRONMENT

Copy of Ellsworth County Commissioners Resolution for Adoption

State of Kansas Approval

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Health and Environment

**RESOLUTION NO. 2015-R-05**  
**(A Resolution Adopting A New Sanitary Code For**  
**The Unincorporated Areas Of Ellsworth County, Kansas)**

WHEREAS the Board of County Commissioners of Ellsworth County, Kansas, is met in regular session with a quorum present on this date, and

WHEREAS a public hearing has just been held concerning a new, proposed sanitary code, as contemplated by K.S.A. 19-3701, et. seq., and

WHEREAS the proposed sanitary code has been previously approved by the Kansas Department of Health And Environment as of October 28, 2014, and

WHEREAS the Board of County Commissioners has read and considered the new, proposed sanitary code and finds same to be desirable and necessary for the protection of the health and welfare of the public in the unincorporated areas of Ellsworth County, Kansas,


**NOW, THEREFORE, IT IS HEREWITH RESOLVED BY SAID BOARD THAT:**

- 1) The Ellsworth County Sanitary Code, as approved by the Kansas Department of Health and Environment as of October 28, 2014, is hereby adopted by reference.
- 2) Said Code shall apply to all of the unincorporated areas of Ellsworth County, Kansas, including such territory within three (3) miles from the corporate limits of any city.
- 3) Not less than five (5) copies of said Code shall be stamped "Official Copy As Incorporated By Resolution No. 2015-R-05 with a copy of this Resolution attached thereto and said copies will be placed in the Office of the Ellsworth County Clerk, the Ellsworth County Register of Deeds, and the Ellsworth County Attorney, the Ellsworth County Appraiser, and the Ellsworth County Health Department, and shall be made available to the public during business hours, upon reasonable notice.
- 4) This Resolution shall be effective upon its publication in the official County newspaper.

WITNESS OUR HANDS BELOW SET FORTH THIS 9th DAY OF February, 2015.

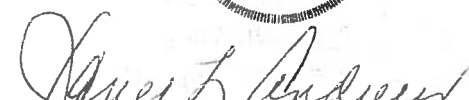
  
Albert Oller, Chairman

  
Kermit Rush, Commissioner

  
Terry Kueser, Commissioner



ATTEST:

  
Janet L. Andrews  
Ellsworth County Clerk

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SANITARY CODE  
FOR ENVIRONMENTAL PROTECTION

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CHAPTER 1

ADMINISTRATIVE PROCEDURES

**1-1 AUTHORITY AND POLICY.**

**1-1.1 Legal Authority.** This code is adopted under the authority granted to the Board of County Commissioners by Kansas Statutes Annotated (K.S.A.) 19-3701 et seq. or K.S.A. 12-3301 et. seq.

**1-1.2 Declaration of Finding and Policy.** The Commissioners find that the provision of adequate and reasonable control over environmental conditions in the county is necessary and desirable. A sanitary code establishes standards to eliminate and/or prevent the development of environmental conditions that are hazardous to health and safety, and promotes the economical and planned development of the land and water resources of the county. For these reasons and objectives, it will be the policy of the Board of County Commissioners to adopt and amend a sanitary code to provide current regulations of practices that effect health and safety.

**1-1.3 Purpose.** The Purpose and intent of this chapter is to prescribe the administrative procedures to be followed in administering this sanitary code or any amendments thereto; and to prescribe rules and regulations for controlling practices to minimize health and safety hazards.

**1-1.4 Title.** The code shall be known and referred to as the Ellsworth County Sanitary Code.

**1-1.5 Applicability.** The procedures prescribed in this chapter shall be followed in administering this code and any amendments thereto.

**1-1.6 Effective Date.** The original sanitary code become effective July 1, 1992. This Code Revision shall become effective from and after the date of adoption by the Board of County Commissioners and publication of notice as required by law.

**1-2 DEFINITIONS.**

The following words, terms and phrases appear in more than one chapter of this Code and thus have general application and usage. Words, terms, and phrases appropriate or applicable to specific chapters within this Code may be found in that particular chapter.

- 1-2.1 **Administrative Agency** means the entity authorized to implement the provisions of this code. The Administrative Agency for Ellsworth County is designated as the agency appointed by the Ellsworth County Commissioners.
- 1-2.2 **Administrative Rules** means those rules and regulations continued in Chapter One of this sanitary code which prescribe general procedures to be followed in the administration of the sanitary code adopted by the county.
- 1-2.3 **Authorized Representative** means any person who is designated by the Administrative Agency to administer this code.
- 1-2.4 **Board of County Commissioners** means the Board of County Commissioners of Ellsworth County, Kansas.
- 1-2.5 **Code** means any model or standard published compilation of rules in a book or pamphlet form which has been prepared by a technical association, a federal agency, this state, or any agency thereof, municipalities of this state or agency or instrumentality and any metropolitan thereof, or regional agency within this state and such codes may be specifically, but shall not be limited to: wastewater disposal, water supply systems, solid waste management, food management, swimming pools, mass gatherings, nonpoint source pollution, and underground storage tanks. (K.S.A. 12-3301)
- 1-2.6 **Dwelling** means any room or group of rooms located within a structure, and forming a single habitable unit with facilities, which are used, or are intended to be used, for living, sleeping, cooking and eating.
- 1-2.7 **Hearing Officer** means an individual, appointed by the Administrative Agency to hear appeals from decisions made by the Administrative Agency relating to the administration of this code.
- 1-2.8 **Person** means an individual, corporation, partnership, association, state, or political subdivision thereof, federal, state agency, municipality, commission, or interstate body or other legal entity recognized by law as the subject of rights and duties.
- 1-2.9 **KDHE** means the Kansas Department of Health and Environment.
- 1-2.10 **Premise** means any lot or tract of land and all buildings, structures, or facilities located thereon.

1-3 **ADMINISTRATIVE POWERS AND PROCEDURES.**

- 1-3.1 **Right of Entry.** Representatives of the Administrative Agency shall have the power and authority to inspect for compliance with the Ellsworth County Sanitary Code.

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**1-3.2 Permit and License.**

- a. **Applications for Permits and Licenses.** Every person required by this sanitary code to obtain a permit or license shall make application for such permit or license to the Administrative Agency.
- b. **Issuance of Permit or License.** After receipt of an application as required by this code, the Administrative Agency shall begin such investigation as deemed necessary to determine whether the permit or license should be issued or denied, and shall issue or deny the permit or license within 30 days of such receipt. If the permit or license is denied, the Administrative Agency shall send the applicant a written notice and state their reasons for rejection.
- c. **Permit Nontransferable.** No permit or license required by this sanitary code shall be transferable, nor shall any fees required and paid therefore be refundable.
- d. **Permit Revocation.** All licenses and permits are subject to revocation for reasons of noncompliance or misrepresentation.
- e. **Standard Fees.** The Administrative Agency shall establish a schedule of fees for all permits and licenses required by the code, and said fees shall be paid into the Administrative Agency. The Administrative Agency shall not process any application for a permit or license until the required fee has been paid. (K.S.A. 19-3702)

**1-4 NOTICES, APPEALS, AND ORDERS.**

**1-4.1 Notice of Violations.** When the Administrative Agency determines that there has been a violation of any provision of the Code, notice of such violation shall be issued to the person responsible. The notice shall:

- (1) Be in writing;
- (2) Include a statement of why the notice is being issued;
- (3) Allow a reasonable period of time for performance of any work required by the notice; and
- (4) Be properly served upon the owner or agent by registered mail to the last known address of the owner or agent.

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1-4.2 **Appeal for Hearing.** Any person aggrieved by any notice or order issued by the Administrative Agency under the provisions of this sanitary code may request, and shall be granted, a hearing on the matter before the Hearing Officer; provided such person shall file with the Administrative Agency within ten working days after the date of issuance of the notice or order, a written petition requesting a hearing and setting forth the grounds upon which the request is made. The filing of the request for a hearing shall operate as a stay of the notice or order. Upon receipt of such petition, the Administrative Agency shall confer with the Hearing Officer and set a time and place for such hearing and shall give the petitioner written notice thereof. At such hearing, the petitioner shall be given an opportunity to show why such notice or order should be modified or withdrawn. The hearing shall be commenced no later than ten working days after the date on which the petition was filed; provided, that upon request of the petitioner, the Administrative Agency may postpone the hearing for a reasonable time beyond such ten-day period, when in the Agency's judgment the petitioner has submitted justifiable reason for such postponement.

1-4.3 **Report of Hearing.** Within ten working days after such a hearing, the Hearing Officer shall submit the findings of the hearing in writing to the Administrative Agency. The findings shall include a recommendation that the order be sustained, modified, or withdrawn. Upon the receipt of the report of the Hearing Officer, the Administrative Agency shall consider the report and issue an order, confirming, modifying or withdrawing the notice or order, and shall notify the appellant in the same manner as is provided for in sec. 1-4.1.

1-4.4 **Emergency Orders.** Whenever the Administrative Agency finds that an emergency exists which required immediate action to protect the public or the environment, the Administrative Agency may issue an order reciting the existence of such an emergency, specifying action to be taken to meet the emergency. Such an order shall be effective immediately. Any person to whom such an order is directed shall comply immediately.

## 1-5 **RECORDS.**

1-5.1 **Permit Applications.** Application for permits or licenses required by this code shall be filed with the Administrative Agency.

1-5.2 **Official Actions.** A written record of all official actions taken on applications for permits and licenses required by the sanitary code shall be kept on file with the Administrative Agency.

1-5.3 **Proceedings of Hearings.** The proceedings of all hearings including findings and decisions of the Hearing Officer, and a copy of every notice and order related thereto shall be filed with the Administrative Agency. Transcripts of the proceedings of hearings need not be transcribed unless a judicial review of the decision is sought.

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**1-6 GENERAL PROVISIONS.**

- 1-6.1 Enforcement Procedure.** The County Attorney shall enforce the provisions of this code per K.S.A. 19-3707.
- 1-6.2 Penalties.** Are established as per K.S.A. 19-3707 and may include court ordered costs.
- 1-6.3 Variance Requirements.** The Administrative Agency shall have the authority to grant exceptions for existing and/or unusual cases where compliance with the requirements of any section of this chapter is not feasible. A variance for new permits must be requested in writing, must justify the exception, and must provide reliable data to show that such a variance does not and will not harm the waters of the state nor threaten public health. When these conditions are met, the Administrative Agency shall have the authority to allow a variance to the requirement of the Sanitary Code, but must obtain permission from KDHE for a variance to the State minimum requirements.
- 1-6.4 Disclaimer of Liability.** This code and other environmental sanitation codes adopted shall not be construed or interpreted as imposing upon the county or its officials or employees (1) any liability or responsibility for damages to any property, (2) any inspection provided under this section shall not constitute nor be deemed a warranty and the Administrative Agency shall not be liable for any future failures of the system or for other claims arising out of the inspection.
- 1-6.5 Separability.** If any clauses, sentences, paragraph, section or subsection of this code shall for any reason be adjudged by any court of competent jurisdiction to be unconstitutional and invalid, such judgment shall not affect, repeal or invalidate the remainder thereof, but shall be confined to the clause, sentence, paragraph, section or subsection thereof so found unconstitutional and invalid. (K.S.A. 19-3708)

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ELLSWORTH COUNTY

SANITARY CODE

FOR ENVIRONMENTAL PROTECTION

CHAPTER 2

ON-SITE WASTEWATER MANAGEMENT

2-1 PURPOSE AND INTENT.

Sewage is a potential source of disease and a hazard to the health, safety, and welfare of the public. It is the purpose of this chapter to provide minimum standards for the location, design, construction, maintenance and use of on-site wastewater systems, and the removal and disposal of materials from such facilities within the legal boundaries of Ellsworth County.

2-2 APPLICABILITY.

The provisions of this chapter shall apply to all unincorporated areas and to any premises under one ownership which is comprised of less than 640 acres in area located in Ellsworth County, Kansas.

2-3 DEFINITIONS.

2-3.1 Accessory Wastewater Treatment System means a sewage system that is designed for a building that is not a dwelling, with limited wastewater flow of under 50 gallons per day.

2-3.2 Alternative Wastewater Disposal System means a private wastewater disposal system, approved by the Administrative Agency, which mechanically and/or effectively pre-treats the wastewater to reduce levels of pollutants before discharge to an approved distribution system. Aerobic treatment units and sand filters are examples. Other approved technologies may be included.

2-3.3 Cesspool means a "drywell" that receives untreated domestic sewage containing human excreta, and sometimes has an open bottom and/or perforated sides.

2-3.4 Commercial and Industrial Wastes means any wastes produced as a byproduct of any commercial or industrial process or operation, other than domestic sewage. Uses involving commercial or industrial wastewater must comply with regulations involving commercial or industrial wastes as approved and permitted by KDHE.

- 2-3.5 **Domestic Sewage** means sewage originating primarily from kitchen, bathroom and laundry sources, including waste from food preparation, dishwashing, garbage-grinding, toilets, baths, showers and sinks.
- 2-3.6 **Nuisance** means conditions or activities which have or threaten to have a detrimental effect on the health of the public or its members.
- 2-3.7 **Pit Privy** means a facility designed for the disposal of non-water carried wastes from the human body into an excavation that is not water tight.
- 2-3.8 **Private Wastewater System** means any system which is not required to hold a Kansas Water Pollution Control Permit pursuant to K.S.A. 65-165. This includes wastewater disposal systems which function by soil absorption, evaporation, transpiration, holding tanks, or any combination of the above.
- 2-3.9 **Sanitary Privy** means a privy with a watertight storage vault sufficient capacity to prevent public health nuisances and discharge of contents to the surface. Vault contents are removed frequently enough to assure adequate storage capacity. Materials removed from the vault are transported and disposed at a publicly owned wastewater treatment facility or other means as approved by local authorities.
- 2-3.10 **Sanitary Service** means the pumping out and/or removal of sewage, sludge, or human excreta from privies, vaults, septic tanks, or private wastewater systems; and the transportation of such material to a point of final disposal.
- 2-3.11 **Seepage Pit** means a “drywell” that receives inadequately treated domestic sewage from a septic tank and has an open bottom and/or perforated sides.
- 2-3.12 **Subdivision** means any tract of land that is or has been subdivided into two or more lots for the purpose of sale or building development, whether immediate or future, including the streets, alleys, or other portions thereof intended to be dedicated for public use, and any re-division of lands.
- 2-3.13 **Vault/Holding Tank** means a watertight receptacle for the retention of sewage, either before, during or after treatment.
- 2-3.14 **Waste Stabilization Pond** means a pond designed specifically to treat sewage by natural stabilization processes under the influence of air and sunlight.
- 2-3.15 **Wastewater System** means any system along with attendant pipes and appurtenances designed and constructed to collect, store, treat, and dispose of domestic, industrial or commercial waste.

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**2-4 PROHIBITED PRACTICES.**

**2-4.1 Use of Non-Approved Private Systems.** No person shall use, or cause to be used, any private wastewater system, or sanitary privy constructed after adoption of this sanitary code until it has been inspected and approved by the Administrative Agency or if it:

- (1) Has been enjoined as a public health nuisance by a court of competent jurisdiction;
- (2) Fails to comply with the provisions of this sanitary code, and written notice thereof has been given by the Administrative Agency;
- (3) Discharges wastewater onto the surface of the ground, or waters of the state;
- (4) Causes vector breeding, produces offensive odors or any condition that is detrimental to health and comfort; or
- (5) Is a pit privy, seepage pit or a cesspool.

**2-4.2 Use of Private Systems Within 400 Feet of Public Sewer.** No private wastewater system shall be constructed within 400 feet of an existing public sewer, unless the Administrative Agency finds that connection to such a sewer is not feasible and that a private wastewater system, meeting the requirements of this code, can be constructed on the property.

**2-4.3 Private Wastewater System Separation Distances.**

**Table 2-1**

| <b>Area</b>   | <b>Minimum Separation Distance</b> |
|---|------------------------------------|
| <b>Septic tank to residence or other building</b>                   | 10 ft                              |
| <b>Soil Absorption System to residence foundation</b>               | 20 ft                              |
| <b>Any part of a private wastewater system to:</b>                  |                                    |
| <b>Public Water Supply Well or Suction Line</b>                     | 100 ft                             |
| <b>Semi-Public or Private Water Supply Well or Suction Line</b>     | 50 ft                              |
| <b>Surface Water Course</b>   | 50 ft                              |
| <b>Public Potable Water Line</b>                                    | 25 ft                              |
| <b>Private Potable Water Line</b>                                   | 10 ft                              |
| <b>Property Lines</b>   | 25 ft                              |
| <b>Groundwater, Bedrock, Impervious Layer or Other restrictions</b> | 4 ft                               |

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2-4.4 **Lot Size of Unplatted Sites.** No private wastewater system shall be constructed hereafter on an unplatted lot or building site that contains less than five acres of land exclusive of roads, streets, or other public rights-of-way. Only one private wastewater treatment system shall be constructed on each unplatted lot or building site except that accessory private wastewater treatment systems can be installed with the approval of the Administrative Agency.

2-4.5 **Non-Conforming Lots.**

- a. **Structure Alteration.** In no case shall a structure served by a private wastewater treatment system and located on a lot that is one acre or less, be altered, replaced, reconstructed or enlarged in such a manner that would enable an increase in the number of persons residing in said structure or otherwise produce an increase in the volume of wastewater.
- b. **Reconstruction Limited.** Repairs, maintenance, or reconstruction of said structure shall be limited to those items necessary to keep the structure in sound condition.
- c. **Change of Usage.** Use of said structure shall not be changed in any manner which increases the volume of wastewater used.
- d. **Case-by-Case Basis.** Each occurrence of repair, reconstruction, usage, or alteration done to structures on non-conforming lots shall be reviewed by the Administrative Agency on a case-by-case basis.

2-4.6 **Use of Private Wastewater System for Disposal of Non-Domestic Waste.** Discharge of industrial or commercial waste to a private wastewater system is prohibited. Any such systems in effect at the time of adoption of this code shall cease and desist immediately.

2-5 **REQUIREMENTS FOR PRIVATE WASTEWATER DISPOSAL SYSTEMS.**

2-5.1 **Approval of Plans.** After adoption of this code no person shall develop any private wastewater system until the plans and specifications for such system have been approved by the Administrative Agency. All onsite wastewater systems shall be designed, constructed and operated in accordance with standards set forth in KHDE Bulletin 4-2 "Minimum Standards for Design and Construction of Onsite Wastewater Systems" published March, 1997, as amended, by KDHE and Kansas State University Agricultural Experiment Station and Cooperative Extension Service, KDHE Bulletin 4-2 is hereby adopted by reference and is included herein as an Appendix 1 to this Code.

2-5.2 **Permit.** No person shall construct or modify, or permit to be constructed or modified, any private wastewater system until a permit has been issued by the Administrative Agency.

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**2-5.3 Suitable Site.** No site shall be approved if:

- (1) Connection to an approved public wastewater system is feasible or the site violates the provisions of Section 2-4.0 of this code;
- (2) The site contains less than five acres of land exclusive of roads, streets, or other public rights-of way or easements; or
- (3) The soil, topography, and geology do not meet the requirements set forth in Section 2-7.

**2-5.4 Construction Approval.** All private wastewater systems developed or modified after the effective date of the sanitary code must be inspected and approved by the Administrative Agency for compliance with the approved plans; and no portion of the system shall be covered or made inaccessible to inspection prior to approval.

**2-5.5 Septic Tank.** All abandoned or unused septic tanks, cesspools, seepage pits or other holes that have received wastewater shall be emptied and plugged according to the procedures found in Kansas State Research and Extension Bulletin MF-2246.

**2-5.6 Additional Maintenance Requirements for Alternative Private Wastewater Disposal Systems.**

- (1) Any person owning or installing an alternative private wastewater disposal system shall obtain an annual operating permit from the administrative agency.
- (2) Any person owning or installing an alternative private wastewater disposal system shall maintain the system in accordance with the manufacturer's instructions and requirements of the Administrative Agency for the life of the system.
- (3) The owner shall sign a maintenance requirement agreement that shall describe the property and private wastewater system, and have a copy filed at the Administrative Agency.
- (4) The owner and all future owners shall contract for the required maintenance with a service representative approved by the Administrative Agency for the life of the system.
- (5) The service representative shall perform maintenance on an alternative private wastewater disposal system at least once a year and shall submit a report to the Administrative Agency within thirty days after maintenance of each system.

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**2-5.7 Proper Maintenance and Operation.** All private wastewater systems shall be maintained in good working condition. Whenever the Administrative Agency find any private wastewater system in violation of this code, the owner shall be ordered to correct the deficiency(s).

**2-5.8 Inspection for Daycare Facility.** Where a private wastewater system serves a daycare, an inspection of the system is required every 5 years.

**2-5.9 Inspection Requirements for Existing Private Sewage Systems.** Whenever any property connected to, or served by, a private wastewater system is offered for or subject to a contract of sale, the Administrative Agency shall inspect the condition of the system, at a fee to be paid to the Administrative Agency. If any system is found to be failing or in need of repairs, it must be corrected prior to closing or appropriate arrangements must be made with the Administrative Agency. When this process is completed and approved, the Administrative Agency will issue the proper permit. Upon discovery by the Administrative Agency that the seller or seller's agent has failed to request a system inspection under this code, the Administrative Agency shall require the seller or seller's agent to arrange an inspection within 14 days of notice of violation. The seller shall be responsible for bringing any violation discovered during the inspection up to code, at his or her expense. Inspection shall not relieve any person of compliance with the requirements of this Code.

**2-6 REQUIREMENTS FOR WASTE STABILIZATION PONDS.**

**2-6.1 Plans.** No person shall construct or modify any waste stabilization pond until the plans and specifications for the proposed construction and/or modification have been approved by the Administrative Agency.

**2-6.2 Site.** Waste stabilization ponds shall be separated from other areas by distances equal to or greater than those shown in Table 2-2.

**Table 2-2**

| Area                                    | Minimum Separation Distance |
|---|-----------------------------|
| House it serves                         | 100 ft.                     |
| Other residential structures            | 250 ft.                     |
| Private water well                      | 50 ft.                      |
| Property lines, including rights of way | 100 ft.                     |
| Public water supply well                | 100 ft.                     |
| Public water transmission lines         | 25 ft.                      |
| Ground water                            | 4 ft.                       |

**2-6.3 Operation.** All waste stabilization ponds must be non-discharging, and free from cattails, floating vegetation, tall vegetation, and trees.

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2-6.4 **Maintenance.** All waste stabilization ponds, regardless of when installed, must be fenced as approved by the administrative agency. Minimum height of required fence is four feet. The fence itself can have no openings larger than eight square inches. A gate must be present and have no openings larger than eight square inches. The gate must have a means to keep it closed.

2-6.5 **Livestock.** If livestock have access to the waste stabilization pond, the fence should be installed on the outside base of the berm. In addition, barbed wire or electric fence should be used to prevent livestock from damaging the lagoon fence.

## 2-7 **MINIMUM STANDARDS FOR SOIL TOPOGRAPHY AND GEOLOGY.**

No private wastewater system which is dependent upon soil absorption for the disposal of wastewater shall be constructed on any lot of any size unless minimum standards for soil loading rate, depth to an impervious layer are met through a soil profile or other methods of current technology. These tests shall be the responsibility of the person applying for the permit. A representative of the Administrative Agency shall determine the soil's suitability for a private wastewater system.

## 2-8 **REQUIREMENTS FOR SANITARY PRIVIES.**

2-8.1 **Approval of Plans.** No person shall construct or modify any sanitary privy until the plans and specifications for the proposed construction and/or modification have been approved by the Administrative Agency.

2-8.2 **Approval of Construction.** No person shall use, or make available for use, any newly constructed or modified sanitary privy until the construction has been inspected by the Administrative Agency for compliance with approved plans.

2-8.3 **Proper Maintenance.** No person shall use, or offer for use, any sanitary privy that is not maintained in a clean and sanitary condition.

### 2-8.4 **Location.**

- (1) No sanitary privy shall be installed less than 50 feet from an existing well.
- (2) No sanitary privy shall be constructed or reconstructed on any premise serviced by a public water supply or on which water is delivered to any building under pressure, unless special permission for use of a sanitary privy is obtained from the Administrative Agency.
- (3) No sanitary privy shall be constructed or reconstructed after adoption of this code unless it has a watertight vault.

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**2-9 SANITARY SERVICES.**

- 2-9.1 License Required.** No person shall remove or transport any wastes from any private wastewater system, pit privy or sanitary privy, unless that person holds a valid license from the Administrative Agency.
- 2-9.2 Contracting with Unlicensed Person Prohibited.** No person responsible for operating a private wastewater system pit privy or sanitary privy shall contract with any person for sanitary service unless that person holds a valid license.
- 2-9.3 Minimum Standards for Sanitary Service Equipment.** All equipment used for rendering of sanitary service shall be of watertight construction and maintained in good working condition. This ensures that all materials removed from private wastewater systems pit privy or sanitary privies will be transported to an approved point of disposal without spillage of the waste.
- 2-9.4 Required Procedures for Domestic Sewage Disposal.** Disposal of domestic sewage must be according to procedures described in the KDHE document titled "Kansas EPA 503 Land Application of Septage" found in Appendix 2.

**2-10 WASTEWATER SYSTEM INSTALLER AND MAINTENANCE LICENSURE.**

- 2-10.1 License Required.** No person shall repair or install a private wastewater system unless they hold a valid Wastewater System Installer and Maintenance License from the Administrative Agency. Property owners are exempt from the license requirements, but are not exempt from code requirements.
- 2-10.2 Application, Class, and Examination.** Every person wishing to obtain a Wastewater System Installer and Maintenance License shall make application for a license at the Administrative Agency. The applicant will be notified of the next class and exam date. A fee shall be paid to the Administrative Agency for the Wastewater System Installer and Maintenance Exam. A license shall be issued upon completion of the exam with a score of 70% or higher.
- 2-10.3 License Fee.** An annual fee shall be paid to the Administrative Agency by January 31 of each year, following the initial issuance of the Wastewater System Installer and Maintenance License.
- 2-10.4 Continuing Education.** Requirements for continuing education hours shall be set by the Administrative Agency for renewal of a Wastewater System Installer & Maintenance License. The Licensee must complete the required continuing education hours approved by the Administrative Agency and the continuing education must be pertinent and related to wastewater treatment. Continuing Education Units (CEU's) must be submitted to the Administrative Agency.
- 2-10.5 Liability Requirements.** Before a license can be issued, the applicant must provide a Certificate of Insurance for liability coverage.

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- 2-10.6 **Revocation of License.** A license issued under the provisions of this Chapter may be revoked for violation of any of the terms of this Code. No license shall be revoked until the license holder has been given notice in writing of the violation and reasonable opportunity to comply with the provisions of this Code.
- 2-10.7 **Reciprocity with Other Licensing Programs.** Licensure in other counties shall be reciprocal with licensure in Ellsworth County if training, exam, and passing scores are equal to or greater than those required for licensure in Ellsworth County.
- 2-10.8 **Contracting with Unlicensed Persons Prohibited.** No property owner or property representative shall contract with any person to modify or install a private wastewater system-unless that person holds a valid wastewater treatment system installer's license from the Administrative Agency.

2-11 **ALTERNATIVE WASTEWATER TREATMENT SYSTEM INSTALLER LICENSURE.**

- 2-11.1 **License Required.** No person shall repair or install an alternative wastewater treatment system unless they hold a valid Alternative Wastewater Treatment System Installer License from the Administrative Agency.
- 2-11.2 **Exam Required.** Before applying for an Alternative Wastewater Treatment System Installer License the applicant must first have taken and passed the Alternative Wastewater Treatment System Installer exam. They shall make application for a license at the Administrative Agency. The applicant will be notified of the next exam date. A fee shall be paid to the Administrative Agency for the Alternative Wastewater Treatment System Installer Exam. A license shall be issued upon completion of the exam with a score of 70% or higher, paying an exam fee, and meeting all training requirements.
- 2-11.3 **Prior Training Required.** Before the Administrative Agency shall approve an applicant to take the Alternative Wastewater Treatment System Installer Exam the applicant must have completed training for each brand of system they will install. The training shall include a minimum of two onsite installations with a qualified representative from the manufacturer at the site during the entire installation. Each manufacturer will provide documentation of installation training that includes the name of the manufacturer and representative who supervised the training of the installations, and the contact hours.
- 2-11.4 **License Fee.** An annual fee shall be paid to the Administrative Agency by January 1 of each year, following the initial issuance of the Alternative Wastewater Treatment System Installer License.

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- 2-11.5 Continuing Education.** Requirements for continuing education hours shall be set by the Administrative Agency for renewal of an Alternative Wastewater Treatment System Installer License. The Licensee must complete the required continuing education hours approved by the Administrative Agency and the continuing education must be pertinent and related to wastewater treatment. Continuing Education Units (CEU's) must be submitted to the Administrative Agency.
- 2-11.6 Liability Requirements.** Before a license can be issued, the applicant must provide a certificate of insurance for liability coverage as approved by the Administrative Agency.
- 2-11.7 Revocation of License.** A license issued under the provisions of this Chapter may be revoked for violation of any of the terms of this Code. No license shall be revoked until the license holder has been given notice in writing of the violation and reasonable opportunity to comply with the provisions of this Code.
- 2-11.8 Reciprocity with Other Licensing Programs.** Licensure in other counties shall be reciprocal with licensure in Ellsworth County if training, exam, and passing scores are equal to or greater than those required for licensure in Ellsworth County.
- 2-11.9 Contracting with Unlicensed Persons Prohibited.** No property owner or property representative shall contract with any person to install or modify an alternative wastewater system unless that person holds a valid Alternative Wastewater Treatment System Installer License from the Administrative Agency.

**2-12 ALTERNATIVE WASTEWATER MAINTENANCE AND REPAIR LICENSURE.**

- 2-12.1 License Required.** No person shall perform maintenance or repair on an alternative wastewater treatment system unless they hold a valid Alternative Wastewater Maintenance and Repair License from the Administrative Agency.
- 2-12.2 Exam Required.** Before applying for an Alternative Wastewater Maintenance and Repair License the applicant must first have taken and passed the Alternative Wastewater Maintenance & Repair exam. They shall make application for a license at the Administrative Agency. The applicant will be notified of the next exam date. A fee shall be paid to the Administrative Agency for the Alternative Wastewater Maintenance and Repair Exam. A license shall be issued upon completion of the exam with a score of 70% or higher, paying an exam fee, and after meeting all training requirements.

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- 2-12.3 **Prior Training Required.** Before the Administrative Agency shall approve an applicant to take the Alternative Wastewater Maintenance and Repair Exam the applicant must have completed training for each brand of system they will maintain. The training shall include a minimum of two onsite maintenance and repair calls with a qualified representative from the manufacturer at the site during the entire maintenance and repair call, or company approved contact hours of training. Each manufacturer will provide documentation of maintenance and repair training that includes the name of the manufacturer and representative who supervised the training of the maintenance and repair, and the contact hours.
- 2-12.4 **License Fee.** An annual fee shall be paid to the Administrative Agency by January 1 of each year, following the initial issuance of the Alternative Wastewater Maintenance and Repair License.
- 2-12.5 **Continuing Education.** Requirements for continuing education hours shall be set by the Administrative Agency for renewal of an Alternative Wastewater Maintenance and Repair License. The Licensee must complete the required continuing education hours approved by the Administrative Agency and the continuing education must be pertinent and related to wastewater treatment. Continuing Education Units (CEU's) must be submitted to the Administrative Agency.
- 2-12.6 **Liability Requirements.** Before a license can be issued, the applicant must provide a certificate of insurance for liability coverage as approved by the Administrative Agency.
- 2-12.7 **Revocation of License.** A license issued under the provisions of this Chapter may be revoked for violation of any of the terms of this Code. No license shall be revoked until the license holder has been given notice in writing of the violation and reasonable opportunity to comply with the provisions of this Code.
- 2-12.8 **Reciprocity with Other Licensing Programs.** Licensure in other counties shall be reciprocal with licensure in Ellsworth County if training, exam, and passing scores are equal to or greater than those required for licensure in Ellsworth County.
- 2-12.9 **Contracting with Unlicensed Persons Prohibited.** No property owner or property representative shall contract with any person for maintenance or repair services unless that person holds a valid Alternative Wastewater Maintenance and Repair License from the Administrative Agency.

**APPROVED** 2-13 **REQUIREMENTS FOR SUBDIVISION DEVELOPMENT.**

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After adoption of this code, no person shall develop any subdivision until plans and specifications for on-site wastewater provision and/or protection have been approved by the Administrative Agency.

## 2-14 REQUIREMENTS FOR SMOKY HILL VILLAGE.

**Purpose and Intent.** Smoky Hill Village was established July 10, 1961 in the SE/4 of Section 21-T16S-R6W, Ellsworth County, before adoption of the Ellsworth Sanitary Code for Environmental Protection. When developed, lot size was established at 50'X100'. The area is sited over Meadin and Jansen soils that are gravely, coarse, single-grain sand. Water wells in the subdivision reach groundwater at between 20' and 25'. The purpose of this section is to reduce and minimize groundwater contamination from excessive wastewater effluent and poor treatment from sandy soils.

2-14.1 **Applicability.** Unincorporated land in Smoky Hill Village shall be subject to the standards contained in this article and to all other regulations in this code. In the event of a conflict, the more restrictive standard shall apply.

### 2-14.2 **Onsite Wastewater Management.**

- a. **From One to Four Continuous Lots.** All lots built on after July 1, 1995 that comprise of between one and four continuous lots must install sewage holding tanks or an approved alternative system.
- b. **Five or More Continuous Lots.** All lots built on after July 1, 1995 that comprise of five or more continuous lots may install an onsite wastewater system.
- c. **Sewage Holding Tanks Installation.** Installation of sewage holding tanks must include two septic tanks in series, with a minimum tank size of 1,000 gallons. Location of tanks must be accessible to septage pumping trucks. A minimum of one riser per tank must be brought to the surface for ease of pumping. All sewage holding tanks must remain water-tight and not discharge into the ground.

2-14.3 **Onsite Well Location.** All wells drilled after July 1, 1995 must be 50' from a sewage holding tank and 100' from an onsite wastewater system on the property where the well is drilled or on adjoining properties.

## 2-15 REQUIREMENTS FOR LAKE SIDE ACRES SUBDIVISION.

**Purpose and Intent.** Lake Side Acres Subdivision was established August 28, 1989 in the SW/4 of Section 10-T16S-R6W, Ellsworth County, before adoption of the Ellsworth Sanitary Code for Environmental Protection. When developed, lot size was established at one (1) acre. The area is sited over Lancaster soils that often contain shale and clay layers, sometimes requiring waste stabilization ponds or large areas for wastewater disposal. The purpose of this section is to provide enough acreage to install adequate wastewater disposal and space for dwellings and water wells.

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**2-15.1 Applicability.** Unincorporated land in Lake Side Acres Subdivision shall be subject to the standards contained in this article and to all other regulations in this code. In the event of a conflict, the more restrictive standard shall apply

**2-15.2 Lake Side Acres Lots Development and Water Supply.**

- a. **Lake Side Acres Lots with a Water Well.** If a lot has water provided by a private well, three lots or a total of three acres shall be required to develop a house and wastewater disposal system.
- b. **Lake Side Acres Lots with Rural Water.** If a lot has water provided by a public water supply, one or two lots may be developed if a variance is obtained from the Administrative Agency. Issuing a variance will depend on the type of system to be installed, location of dwellings, and lot configuration and features. Building on all lots may not be possible.

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**ELLSWORTH COUNTY**

**SANITARY CODE**

**FOR ENVIRONMENTAL PROTECTION**

**CHAPTER 3**

**NON-PUBLIC WATER SUPPLIES**

**3-1 PURPOSE AND INTENT.**

The provisions of this chapter are for the purpose of regulating and controlling the construction and maintenance of all water supplies other than public water supplies in Ellsworth County, Kansas, in order that public health will be protected and the contamination and pollution of the water resources of the county will be prevented.

**3-2 APPLICABILITY.**

The provisions of this chapter shall apply to all unincorporated areas and to any premises under one ownership which is comprised of less than 640 acres in area located in Ellsworth County, Kansas.

**3-3 DEFINITIONS.**

**3-3.1 Maximum Contaminant Level** means the maximum permissible level of a contaminant in water, which is delivered to any user of a public water supply system as set by the Environmental Protection Agency.

**3-3.2 Non-Public Water Supply** means a water supply system that does not meet the definition of a Public Water Supply and serves two to nine connections.

**3-3.3 Private Water Supply** means a water supply for domestic purposes which is provided and used by no more than one family in a single structure which is designed or intended for occupancy by one family only.

**3-3.4 Public Water Supply** means a system that has at least ten (10) service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. (K.S.A. 65-162a)

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### 3-4 REQUIREMENTS FOR NON-PUBLIC WATER SUPPLIES.

3-4.1 **Permit to Construct.** No person shall develop any non-public water supply subject to regulations of this Code until they have obtained a permit from the Administrative Agency.

3-4.2 **Minimum Water Testing Standards for Non-Public Water Supplies.** Non-public water supplies shall be tested semi-annually for total coliform or fecal coliform or both, annually for nitrate, and annually for sodium. Results of the testing shall be submitted to the Administrative Agency. The Administrative Agency shall reserve the right to require further tests if, in their opinion, a potential exists for other contamination. If either coliform bacteria are present or nitrate exceeds the MCL, the following must occur:

- (1) The end users of the non-public water supply shall be notified in writing in a letter approved by the Administrative Agency, to their residence within 10 days of receipt of results, and
- (2) The non-public water supply shall be treated in accordance to requirements set by the Administrative Agency.

3-4.3 **Approval of Plans.** No person shall construct, after adoption of this Code, any non-public water on any property subject to the provisions of this Code until the plans and specifications have been submitted to, and approved in writing by the Administrative Agency.

### 3-5 REQUIREMENTS FOR PRIVATE WATER SUPPLIES.

3-5.1 **Permit.** No person shall develop any private water supply subject to regulations of this Code until a permit has been obtained from the Administrative Agency.

3-5.2 **Approved Plans.** No permit to develop a private water supply subject to the regulations of this code shall be issued until the plans have been approved by the Administrative Agency.

3-5.3 **Inspections for Transfer of Property.** Whenever any property connected to, or served by, a private well is offered for or subject to a contract of sale, the Administrative Agency shall evaluate the wellhead and well water, at a fee to be paid to the Administrative Agency. Any inspection provided under this section shall not constitute nor be deemed a warrant, relieve any person of compliance with the requirements of this Code and neither the Administrative Agency nor any official of the Board of Health shall be liable for any future failures of the system or of other claims arising out of the inspection.

3-5.4 **Water Testing for Daycare Facilities.** Where a well serves a daycare, a water sample shall be screened annually for bacteria and nitrate.

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**3-6 COMPLIANCE IN REAL PROPERTY OR CONVEYANCE.**

**3-6.1 Documentation.** No sale or conveyance of any real property shall be completed until all abandoned wells on said real property are in accordance with K.A.R. 28-30-1 et seq. as amended.

**3-7 MINIMUM STANDARDS FOR GROUNDWATER SUPPLIES.**

**3.7-1 Location.** New Private and Non-Public Water Supply wells used as sources of water for domestic uses shall be separated from the specified sources of pollution by distances equal to or greater than those shown in Table 3-1, and existing water supplies should be separated from the specified sources of pollution by distances equal to or greater than those shown in Table 3-1. Such distances may be increased by the Administrative Agency to provide assurance that the well will not be contaminated.

**Table 3-1**

| <b>Source of Pollution</b>   | <b>Minimum Separation Distance</b> |
|--|------------------------------------|
| <b>Subsurface absorption field for septic tank effluent</b>                    | 50 ft.                             |
| <b>Pit privy</b>   | 50 ft.                             |
| <b>Septic Tank</b>   | 50 ft.                             |
| <b>Barnyards, stables, manure piles, animals pens, etc.</b>                    | 50 ft.                             |
| <b>Streams, lakes and ponds</b>  | 50 ft.                             |
| <b>Sewer lines, not constructed of cast iron or equally tight construction</b> | 50 ft.                             |
| <b>Sewer lines, constructed of cast iron or equally tight construction</b>     | 25 ft.                             |
| <b>Lagoons</b>   | 50 ft.                             |
| <b>Property lines</b>  | 25 ft.                             |
| <b>Petroleum and fertilizer</b>  | 50 ft.                             |
| <b>House/outbuildings</b>  | 25 ft.                             |

**3-7.2 Construction.** The enforcement of this section of the sanitary code shall be regulated in accordance with K.A.R. 28-30-1 et seq. Recommended standards for design, construction and location; and practices consistent with current approved technology shall be followed.

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**3-8 REQUIREMENTS FOR SUBDIVISION DEVELOPMENT.**

After adoption of this code, no person shall develop any subdivision until the plans and specifications for water supply provision and/or protection have been approved by the Administrative Agency.

**3-9 WATER WELL PUMP INSTALLER AND MAINTENANCE LICENSURE.**

**3-9.1 License Required.** No person shall repair or install a water well pump unless they hold a valid Water Well Pump Installer and Maintenance License from the Administrative Agency. Property owners are exempt from the license, but not exempt from provisions of the code. A person holding a Water Well Pump Installer and Maintenance License issued by the Administrative Agency may not modify the water well casing unless they also hold a Water Well Contractor License issued by KDHE.

**3-9.2 Application, Class, and Examination.** Every person wishing to obtain a Water Well Pump Installer and Maintenance License shall make application for a license at the Administrative Agency. The applicant will be notified of the next class and exam date. A fee shall be paid to the Administrative Agency for the Water Well Pump Installer and Maintenance Exam. A license shall be issued upon completion of the exam with a score of 70% or higher.

**3-9.3 License Fee.** An annual fee shall be paid to the Administrative Agency by January 1 of each year, following the initial issuance of the Water Well Pump Installer and Maintenance License.

**3-9.4 Continuing Education.** Requirements for continuing education hours shall be set by the Administrative Agency for renewal of a Water Well Pump Installer and Maintenance License. The Licensee must complete the required continuing education hours approved by the Administrative Agency and the continuing education must be pertinent and related to water wells. Continuing Education Units (CEU's) must be submitted to the Administrative Agency.

**3-9.5 Liability Requirements.** Before a license can be issued, the applicant must provide a Certificate of Insurance for liability coverage.

**3-9.6 Revocation of License.** A license issued under the provisions of this Chapter may be revoked for violation of any of the terms of this Code. No license shall be revoked until the license holder has been given notice in writing of the violation and reasonable opportunity to comply with the provisions of this Code.

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- 3-9.7 Reciprocity with Other Licensing Programs.** Licensure in other counties shall be reciprocal with licensure in Ellsworth County if training, exam, and passing scores are equal to or greater than those required for licensure in Ellsworth County.
- 3-9.8 Contracting with Unlicensed Person Prohibited.** No property owner or property representative shall contract with any person to repair or install a water well pump unless that person holds a valid Water Well Pump Installer and Maintenance License from the Administrative Agency.

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**SANITARY CODE**  
**FOR ENVIRONMENTAL PROTECTION**

**CHAPTER 4**

**PUBLIC HEALTH NUISANCES**

**4-1 PURPOSE AND INTENT.**

The purpose and intent of this article is to outline those conditions that constitute a public nuisance and are deemed hazardous to the public health.

**4-1.1 General Procedure.** The Administrative Agency shall have the authority and power to examine all nuisances, sources of filth and causes of sickness that in its opinion may be injurious to the health of the inhabitants within the county. Whenever any such nuisance, source of filth or cause of sickness shall be found to exist on any private property or upon any watercourse in this county, the Administrative Agency shall have the power and authority to order, in writing, the owner or occupant thereof at his own expense to remove the nuisance, source of filth, or cause of sickness within 24 hours, or within such reasonable time thereafter as the administrative agency may order. Public nuisances shall include but shall not be restricted to the following:

- (1) Any pit privy, privy vault, or other place used for the deposit of human excreta which permits animals or insects access to the excreta; which produces foul or objectionable odors; or is located so as to make pollution of any water supply probable.
- (2) The collection or accumulation of any organic materials such as swill, meat scraps, dead fish, shells, bones, decaying vegetables, tree waste, dead carcasses, human or animal excrements, or any kind of offal that may decompose and create an attraction or breeding place for insects or rodents.
- (3) Any animal pen that pollutes a water supply, underground water-bearing formation, or stream in a manner that is hazardous to human health or is maintained in a manner that creates an attraction or insect breeding place, or is a rodent harborage or breeding place.
- (4) Solid waste which is stored, collected, transported, processed, treated or disposed of contrary to the rules and regulations, standards or orders of the administrative agency, or in such a manner as to create a public nuisance.

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**4-1.2 Inoperable Vehicles.** It shall be unlawful for any person either as a lessee, tenant, or occupant of any real property within the county to park, store, or deposit, or permit to be parked, stored, or deposited thereon more than five inoperable vehicles if the property is 10 acres or larger, or more than three inoperable vehicles if the property is less than 10 acres. All inoperable vehicles must be located within an enclosed building, screened from any public road or residence by an opaque screening fence or existing vegetative barrier.

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APPENDIX 1

KDHE Bulletin 4-2: Minimum Design Standards for Onsite Wastewater Systems

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APPENDIX 2  
KDHE EPA 503: Land Application for Septage

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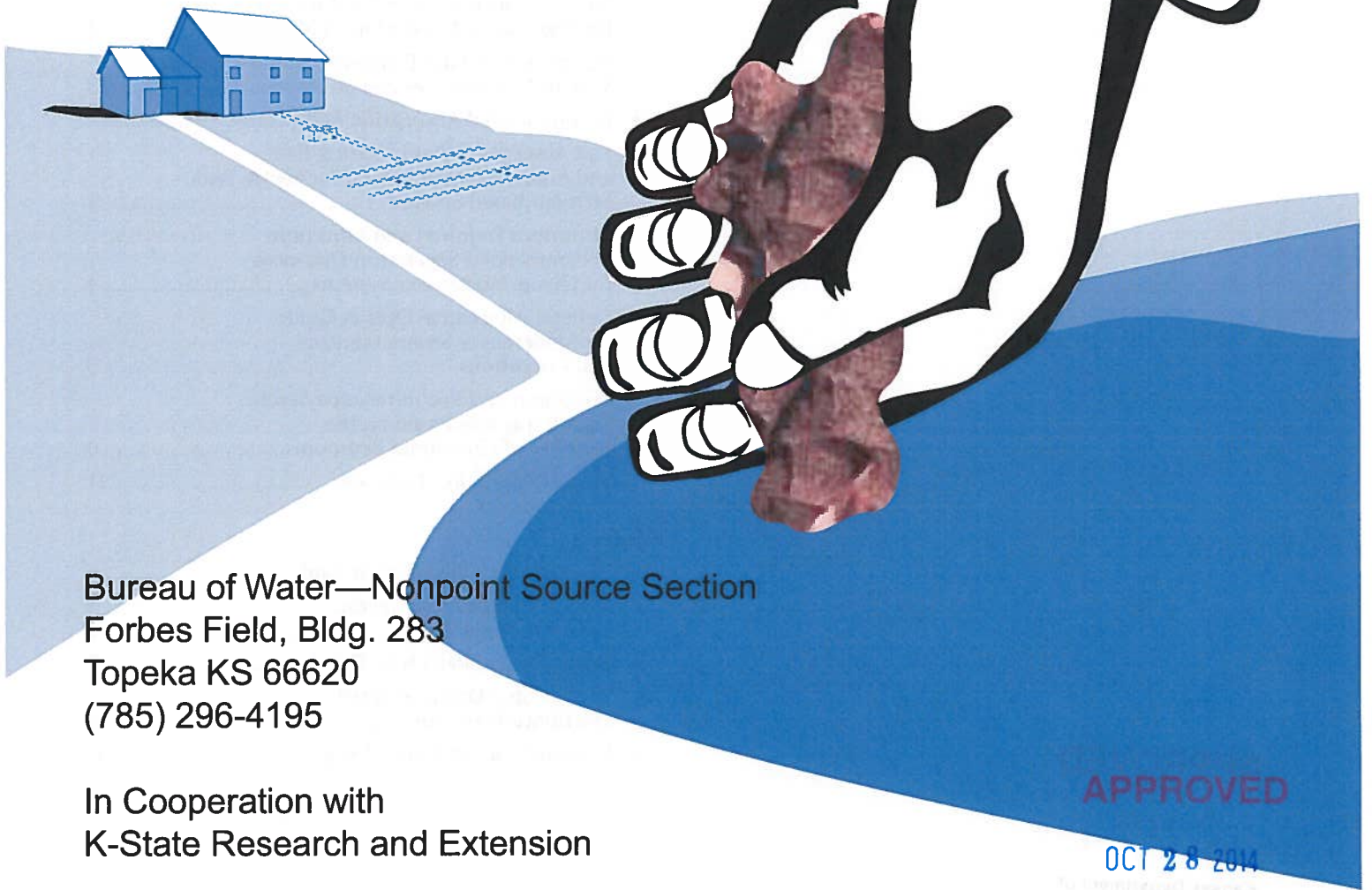
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**Kansas Department of  
Health and Environment**

**State of Kansas  
Department of Health  
and Environment**

*Bulletin 4-2, March 1997*

**MINIMUM STANDARDS  
FOR DESIGN AND  
CONSTRUCTION OF ONSITE  
WASTEWATER SYSTEMS**



Bureau of Water—Nonpoint Source Section  
Forbes Field, Bldg. 283  
Topeka KS 66620  
(785) 296-4195

In Cooperation with  
K-State Research and Extension

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## Introduction

Kansas Administrative Regulations (K.A.R. 28-5-6 to 9) authorize the Kansas Department of Health and Environment (KDHE) to establish minimum standards for septic tank–lateral fields. KDHE bulletin 4-2: *Minimum Standards for Design and Construction of Onsite Wastewater Systems* fulfills that purpose. The minimum standards presented in this document are intended to ensure domestic wastewater is managed so that:

- Quality of surface and groundwater is protected for drinking water, recreation, aquatic life support, irrigation, and industrial uses.
- A breeding place or habitat will not be created for insects, rodents, and other vectors that may later contact food, people, pets, or drinking water.
- Wastewater will not be exposed on the ground surface where it can be contacted by children and/or pets, creating a significant health hazard.
- State and federal laws and local regulations governing water pollution or wastewater disposal will be met.
- Nuisance conditions or obnoxious odors and unsightliness will be avoided.

Bulletin 4-2 is not intended to provide an in-depth discussion of the rationale for these standards. For more information, see the *Environmental Health Handbook* and resources identified therein as well as other references in Appendix B (page 16). Most county health departments have a copy of this handbook, or copies are available at cost from Kansas State University, Extension Biological and Agricultural Engineering (see Appendix B).

Local governments have the authority to adopt minimum requirements (codes) for onsite wastewater management systems, to approve individual plans, to issue permits for construction, to issue permits for operation, and to grant variances. County sanitary (environmental) codes specify local design and permitting requirements. Compliance with these requirements helps prevent illness caused by environmental contamination and protects surface and groundwater.

**Some local requirements, such as those in wellhead protection or sensitive groundwater areas, may be more stringent than those established in Bulletin 4-2. Often, these stricter requirements provide greater protection of public health and the environment, especially where water resources are vulnerable to contamination.**

Sanitary codes are adopted and administered by local government usually through county health departments. The local administering authority should always be contacted before any time or money is invested in system design, plans, installation, or repairs.

If there is no local code, landowners are required to comply with Kansas Administrative Regulations (K.A.R.) 28-5-6 to 9 and minimum standards in this bulletin. If no assistance is available from the health department or other local authority, contact your county Extension Office or KDHE, Bureau of Water, phone (785) 296-4195, or the nearest KDHE District Office (see inside back cover).

K.A.R. 28-5-6 stipulates that all domestic wastewater shall be discharged to an approved sewage collection system or an approved lagoon, septic system, or alternative system. Domestic wastewater means all waterborne wastes produced at family dwellings in connection with ordinary living including kitchen, toilet, laundry, shower, and bath tub wastewater. It also includes similar type wastewater, produced at businesses, churches, industrial, and commercial facilities or establishments.

Wastewater from a home shall be discharged to a properly designed and maintained septic tank–soil absorption field or wastewater pond, an approved alternative treatment and disposal system, or a permitted sewage treatment plant. Seepage pits, cesspools, and dry wells (rat holes) are not permitted. This bulletin provides information on conventional soil absorption fields, wastewater ponds, and alternatives that may be considered when conventional absorption fields or ponds are not suitable.

Bulletin 4-2 covers five basic elements of proper septic tank–lateral field system design:

1. wastewater flow,
2. soil and site evaluation,
3. septic tank standards, for design, construction and installation,
4. lateral field design and construction, and
5. system maintenance.

This bulletin also addresses basic principles for wastewater ponds.

This bulletin is intended to provide information on treatment of domestic wastewater. Domestic wastewater excludes surface runoff from roof, paved areas, or other surfaces; subsurface drainage from springs, foundation drains, and sump pump; or cooling water. Industrial or commercial wastewater (from shops, manufacturing, car washes, etc.) is not permitted to be discharged to an onsite soil absorption system, so it shall not be mixed with domestic wastewater.

By following the standards established in Bulletin 4-2 and your county's sanitary code, you actively contribute to protecting the environment and quality of life for your family, your neighbors, your community, and other Kansans. Your contribution is appreciated!

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## Wastewater Flows

One major concern in the design of household wastewater systems is the quantity of wastewater generated daily. The system must have enough capacity to accommodate and treat this total flow. Normal contributions to this flow will come from bathroom, kitchen, and laundry facilities. Kansas regulations require that all domestic wastewater be treated and disposed through the onsite system. Surface runoff from roofs and paved areas, subsurface drainage from footing drains and sump pumps and cooling water are not domestic wastewater and must be excluded from soil absorption systems. Such water may be used to help maintain the operating water level in wastewater ponds.

Design flow is estimated by multiplying the number of household bedrooms by 150 gallons per day (gpd). This is based on 75 gallons per person per day for two people in each bedroom<sup>1</sup>. This accounts for the number of people that can occupy the home for extended periods rather than how many actually live there when the system is installed. Houses frequently experience a change in ownership or occupancy over the life of the wastewater system. When calculating wastewater flow, note that a water softener may increase water use by as much as 10 gallons per capita per day or possibly more where water is very hard.

## Site and Soil Evaluation

Although the septic tank is important for removing solids from the wastewater, more of the wastewater treatment is provided by the soil. Microorganisms living in the soil profile feed on organic matter in the wastewater, treating and purifying the water as they grow. Four feet of aerated soil below the bottom of the absorption field is necessary to ensure adequate treatment of the wastewater before it reaches the water table or flows laterally due to a restrictive condition.

In sandy soil, it is recommended that as much vertical separation as possible be provided. An understanding of the soil is necessary to assess the ability of the site to provide good wastewater treatment. Soil must absorb the septic tank effluent, treat the wastewater, and transmit treated wastewater away from the soil absorption areas.

The site evaluation begins by reviewing available information such as a published soil survey and then evaluating the soil on site. County soil survey reports are usually available from the local Natural Resource Conservation Service (NRCS, formerly Soil Conservation Service). Contact your local NRCS office, county conservation district or Extension office for a copy of the report.

The soil survey provides general information and serves as a guide to the soil conditions. Sites characterized by slow permeability, restrictive subsoil layer, shallow soil over rock, high groundwater, poor drainage, or steep slopes, as identified in the soil survey, have moderate to

TABLE 1—Soil Limitation Ratings Used by NRCS For Wastewater Absorption Fields

| Property  | LIMITS            |          |                   |   |
|---|-------------------|----------|-------------------|---|
|   | Slight            | Moderate | Severe            | Restriction or Feature  |
| USDA Texture                                      | —                 | —        | Ice               | Permafrost (not found in Kansas)  |
| Flooding  | None, Protected   | Rare     | Common            | Flood water inundates site  |
| Depth to Bedrock (in.)                            | > <sup>2</sup> 72 | 40-72    | < <sup>3</sup> 40 | Bedrock or weathered bedrock restricts water movement or reduces treatment capacity |
| Depth to Cemented Pan (in.)                       | > 72              | 40-72    | < 40              | Reduces water and air movement  |
| Depth to High Water Table, (ft. below surface)    | > 6               | 4-6      | < 4               | Saturated soil, poor aeration, anaerobic soil, restricted movement                  |
| Permeability, (in./hr.)                           |                   |          |                   |   |
| 24-60 in. layers                                  | 2.0-6.0           | 0.6-2.0  | < 0.6             | Slow perc rate, poor drainage   |
| less than 24 in. layers                           | —                 | —        | > 6.0             | Poor filter   |
| Slope, (percent)                                  | 0-8               | 8-15     | > 15              | Difficult to construct and hold in place  |
| Large stones greater than 3 in., (percent by wt.) | < 25              | 25-50    | > 50              | Restricted water and air movement results in reduced treatment capacity             |

<sup>1</sup>The 150 gallons per bedroom, or 75 gallons of wastewater produced daily by each person, assumes at least some water using appliances such as clothes washer, dishwasher, water softener, etc.

<sup>2</sup>> means greater than

<sup>3</sup>< means less than

severe restrictions for conventional septic tank–soil absorption systems and other options may be preferred or required.

A site and soil evaluation should be completed in order to locate the area to be used for the absorption field, to verify the soil characteristics, and to size the system. Areas with slopes steeper than about 20 percent will cause considerable difficulty during construction and are not recommended for lateral field installations. Rock outcroppings warn of shallow soils and may suggest the probable direction of groundwater flow. The range of values for each of several properties that cause the soil to be placed in slight, moderate, and severe limitation rating for soil absorption systems is shown on Table 1.

The wastewater system area should be chosen prior to any construction on a site and should be an integral part of the homesite design and development. A soil profile analysis is highly recommended to ensure suitability of the area and to establish the loading rate so that adequate space is available for the absorption field and its replacement.

To perform a soil profile analysis, an excavator is usually used to open a pit, which exposes the soil profile. The soil evaluation, performed by a trained and qualified person<sup>4</sup>, includes examining the soil profile, determining the soil texture, structure, color, consistency, measuring soil depth, and looking for evidence of a high or perched water table or other restrictions. The soil profile should be analyzed to a depth of at least 4 feet below the bottom of the absorption area or at least 6 feet below the surface.

Because OSHA regulations require shoring for trenches deeper than 5 feet for some soils, it is recommended that the pit be constructed so a person is not required to go deeper. Soil below 5 feet can be examined from cuttings, observation from a distance, and by shovel or auger without entering a deeper pit.

At least three pits should be dug surrounding the area to establish the range of soil characteristics that are present on the site, and to determine the best location for the absorption field. Sanitarians, usually through local health or environmental departments, or environmental health specialists, are available to assist in the site and soil

**TABLE 2—Design Septic Tank Effluent Loading Rates for Various Soil Textures and Structures**

| Group | Soil Characteristics  | Wastewater Loading   |          |                        |
|-------|---|--|----------|------------------------|
|       |   | (in/day)   | (cm/day) | (gpd/ft <sup>2</sup> ) |
| I.    | Gravelly coarse sand and coarser.   | Not Recommended for conventional soil absorption system <sup>5</sup> |          |                        |
| II.   | Coarse sands (not cemented).  | 1.8  | 4.6      | 1.1                    |
| III.  | Medium sand with single grain structure and loose to friable consistence (not cemented).  | 1.5  | 3.7      | 0.9                    |
| IV.   | Other sands and loamy sands with single grain or weak structure (not extremely firm or cemented consistence).<br>Sandy loams, loams and silt loams with moderate or strong structure (except platy and loose to friable consistence).                             | 1  | 2.5      | 0.6                    |
| V.    | Sandy loams, silt loams and loams with weak structure (not of extremely firm or cemented consistence).<br>Sandy clay loams, clay loams and silty clay loams with moderate to strong structure (not of platy, of firm, or of cemented consistence).                | 0.7  | 1.7      | 0.4                    |
| VI.   | Sandy clay loams, clay loams and silty clay loams with weak structure (not massive, not of firm, or of cemented consistence).<br>Some sandy clays, clays and silty clays with moderate and strong structure (not platy, not of firm, or of cemented consistence). | 0.4  | 1        | 0.25                   |
| VII.  | Other soils of high clay content with weak or massive structure, extremely firm or cemented consistence or platy, clay pan, fragipan, and caliche soils.  | Not Recommended for conventional soil absorption system <sup>6</sup> |          |                        |

NOTE: The above descriptions are estimates and assume that the soil does not have large amounts of swelling clays. Soils with platy structure, massive, compacted or high density should be used with extreme caution or avoided.

<sup>4</sup>A trained and qualified person would include a soil scientist, such as one working for NRCS, environmental health specialist, sanitarian, or other person who has received appropriate soil training and through experience is competent.

<sup>5</sup>Soil is too coarse for conventional soil absorption designs, use pressure distribution dosing or other alternative system to prevent too rapid infiltration.

<sup>6</sup>Soils with these conditions may be acceptable for wastewater stabilization ponds or possibly other alternative systems. (See Table 6).



evaluations. A few consultants, either engineers or design/installation contractors, also provide this service.

Table 2 gives the recommended loading rates based on soil texture, structure, and consistence information. These loading rates are based on research that has shown that soil characteristics provide a strong basis for wastewater system design loading rate. Results show system design should be based on the most limiting soil texture found in the first 4 feet of soil below the bottom of the proposed absorption lateral.

Once the wastewater flow (number of bedrooms) and loading rate for the soil are known, the absorption field area needed for the lateral system can be calculated. It is highly recommended that the absorption field and an equal area reserved for future use be marked and fenced so they will not be disturbed during construction. Required setback distances to property lines, wells, surface water, and buildings must be checked and included in the site plan.

Where evaporation substantially exceeds precipitation, as in central and western Kansas, a reduction in soil absorption area may be used when the soil is well suited to wastewater absorption. A well suited soil has medium to coarse texture, perc rates less than 45 minutes per inch and

**TABLE 3—Recommended Absorption Reductions**

|                                     | Western Kansas | Central Kansas | Eastern Kansas |
|-------------------------------------|----------------|----------------|----------------|
| Actual absorption area (in percent) | 65             | 80             | 100            |
| Recommended reduction (in percent)  | 35             | 20             | 0              |

wastewater loading rates of 0.5 gallons per square foot per day or more. For marginal, high clay, soil that has low loading rates, no reduction should be used regardless of location in Kansas. Recommended allowable soil absorption system reductions and percent of total absorption area for central and western Kansas is shown on Table 3.

Since about 1970 considerable research about onsite wastewater systems has occurred. New information, including design procedures, operating characteristics, and many new products, has been and continues to be developed to help improve onsite wastewater systems.

The soil profile evaluation provides a comprehensive assessment of soil characteristics and is the preferred

**TABLE 4—Soil Absorption Field Loading Rate and Area Recommendation for Septic Tank Effluent Based on Perc**

| Perc Rate (minutes/inch) | Recommended Absorption Area (ft <sup>2</sup> /bedroom)               | Loading Rate (gpd/ft <sup>2</sup> ) |
|--------------------------|--|-------------------------------------|
| Less than 5 minutes      | Not recommended for conventional soil absorption system <sup>5</sup> |                                     |
| 5-10 minutes             | 165  | 0.91                                |
| 11-15 minutes            | 190  | 0.79                                |
| 16-30 minutes            | 250  | 0.6                                 |
| 31-45 minutes            | 300  | 0.5                                 |
| 46-60 minutes            | 330  | 0.45                                |
| Greater than 60 minutes  | Not recommended for conventional soil absorption system <sup>6</sup> |                                     |

**TABLE 5—Minimum Required and Minimum Recommended Separation Distances for Onsite Wastewater Systems**

| Separation Distances                                  | Minimum Distance (ft.) |                          |
|---|------------------------|--------------------------|
|   | Required               | Recommended <sup>7</sup> |
| Septic Tank to foundation of house or other buildings | 10                     | 10                       |
| Soil Absorption System to dwelling foundation         | 20                     | 50                       |
| Any part of a wastewater system to:                   |                        |                          |
| public potable water line                             | 25 <sup>8</sup>        | 25                       |
| private potable water line                            | 10                     | 25                       |
| property line   | 10                     | 50                       |
| public water supply well or suction line              | 100 <sup>9</sup>       | 200                      |
| private water supply well or suction line             | 50 <sup>9</sup>        | 100                      |
| surface water course                                  | 50                     | 100                      |
| Wastewater Lagoons to:                                |                        |                          |
| property line   | 50 <sup>10</sup>       | 200                      |
| dwelling foundation                                   | 50 <sup>10</sup>       | 200                      |

<sup>5</sup>Soil is too coarse for conventional soil absorption designs, use pressure distribution dosing or other alternative system to prevent too rapid infiltration.

<sup>6</sup>Soils with these conditions may be acceptable for wastewater stabilization ponds or possibly other alternative systems. (See Table 6).

<sup>7</sup>These recommended separation distances help assure a minimum of problems, but are no assurance that problems will not result.

<sup>8</sup>The minimum distance specified by KDHE guidelines for public water supplies

<sup>9</sup>The minimum distance required by KAR 28-30-8(a).

<sup>10</sup>When lot dimension, topography, or soil condition make maintaining the required 50 feet separation distance impossible, a written variance from the affected property owners shall be obtained and filed with deeds.

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method for determining the suitability of the soil to accept and treat wastewater and establish the design loading.

Some local sanitary codes require the perc test and other codes require both a perc test and a soil profile evaluation. "Perc" is short for percolation and has become the preferred term for this test to evaluate soil suitability to accept wastewater. Percolation means water movement through a soil. Since the driving force is gravity, most of the movement will be downward. The perc test really measures an infiltration rate for water into a wet but unsaturated soil at the depth of expected system placement. The procedure for doing a perc test is described in Appendix A (page 14). Once the perc rate is known, refer to Table 4 to determine the loading rate and absorption field area, or use another method specified by the local sanitary code.

Separation of the soil absorption field from buildings, structures, and boundaries is essential to maintain system

performance, to permit repairs, to maintain required separation from wells, and to reduce undesirable effects of underground wastewater flow and dispersion. The structures and boundaries to consider include easements, buildings, property lines, utilities, wells, and components of the wastewater disposal system. Minimum required and recommended separation distances for private wastewater systems are given in Table 5.

Many soils, especially in eastern Kansas, have properties that restrict their suitability for soil absorption fields. When limiting properties occur in the soil profile, a variation of conventional laterals, wastewater ponds or alternative treatment systems may be used to compensate for the limiting condition. Variations and alternatives that may be considered are summarized in Table 6. When possible, sites with these restrictive conditions should be avoided due to higher cost, larger land area, and greater maintenance requirements for the alternative systems.

**TABLE 6—General Alternative Option Guide for Moderate or Severe Limiting Soil Conditions**

|  |  |
|--|--|
| <p>I. Shallow Permanent, Perched or Seasonal Groundwater</p> <ul style="list-style-type: none"> <li>• Subsurface drainage system at least 50 feet from the soil absorption area to lower the water table—suitable for moderate or more permeable soil conditions. This alternative creates drainage that must be discharged away from the area</li> <li>• Variation of conventional lateral trench               <ul style="list-style-type: none"> <li>- Shallow in-ground trench—suitable for groundwater at 4¾ feet or deeper</li> <li>- At-grade lateral system—suitable for groundwater at 4 feet or deeper</li> </ul> </li> <li>• Enhanced wastewater treatment<sup>11</sup> by rock-plant filter<sup>12</sup>, sand filter<sup>13</sup>, or aerated tank<sup>14</sup> or other equivalent system<sup>15</sup> followed by shallow soil absorption or wastewater pond</li> <li>• Wisconsin (engineered) mound—suitable for groundwater or other restriction at 1 foot or deeper</li> <li>• Rock-plant filter<sup>12</sup>—suitable for ground water at 1 foot or deeper followed by soil absorption</li> </ul> |  |
| <p>II. Shallow Bedrock</p> <ul style="list-style-type: none"> <li>• Wastewater pond—suitable for sites with bedrock at any depth when overexcavated and at least 1½ feet of compacted clay lining is installed</li> <li>• Variation of conventional lateral trench               <ul style="list-style-type: none"> <li>- Shallow in-ground trench system— suitable for bedrock at 4¾ feet or deeper</li> <li>- At-grade lateral system—suitable for bedrock at 4 feet or deeper</li> </ul> </li> <li>• Enhanced wastewater treatment<sup>11</sup> options (see I above) followed by shallow soil absorption</li> <li>• Wisconsin (engineered) mound—suitable for bedrock at 1 foot or deeper</li> </ul>   |  |
| <p>III. Rapid Perc Rate (&lt; 5 mpi) or very permeable soil (&gt; 20 in/hr)</p> <ul style="list-style-type: none"> <li>• Pressurized distribution dosing system to uniformly distribute wastewater throughout the absorption field</li> <li>• One foot lining using loam soil to bottom and sides of the trench to limit water absorption rate</li> </ul>  |  |
| <p>IV. Slow Perc Rate (60 to 120 mpi) or "slow" soil permeability (0.2-0.6 in/hr)</p> <ul style="list-style-type: none"> <li>• Dual shallow lateral systems in permeable surface soils (each with 60% to 80% of conventional lateral area) with a diversion valve and alternating use of systems</li> <li>• Wastewater pond provided sufficient site area is available to meet all setback requirements</li> <li>• Wisconsin (engineered) mound—suitable for nearly level sites with more permeable surface soil</li> <li>• Enhanced wastewater treatment<sup>11</sup> options (see I above) followed by shallow soil absorption into permeable surface soil</li> </ul>  |  |
| <p>V. Very Slow Perc Rate Soil (&gt; 120 mpi), "very slow" soil permeability (&lt; 0.2 in/hr)</p> <ul style="list-style-type: none"> <li>• Wastewater pond—suitable for sites with enough site area to meet all setback requirements</li> <li>• Wisconsin (engineered) mound—suitable for level sites with permeable surface soil</li> <li>• Enhanced wastewater treatment<sup>11</sup> options (see I above) followed by shallow soil absorption into permeable surface soil</li> </ul>   |  |

<sup>11</sup>Enhanced treatment is higher quality than septic tank effluent and may be equivalent to secondary treatment in wastewater treatment terminology, or in some cases even higher quality, comparable to advanced wastewater treatment

<sup>12</sup>Rock-plant filter provides a higher level of treatment than septic tanks. Due to higher quality effluent, the soil absorption field size may be smaller than for a conventional absorption field system.

<sup>13</sup>Sand filters provide a very high level of treatment. Due to this high quality effluent, the soil absorption field may be smaller than that required for a conventional absorption field.

<sup>14</sup>Aerobic tanks have poor operating records so an operating/maintenance agreement with a reliable supplier is strongly recommended to ensure system performance.

<sup>15</sup>Promising technology is underdevelopment that may meet enhanced treatment requirements.



## Septic Tank

The septic tank separates the settleable and floatable solids, contains an anaerobic environment where bacteria partially decompose the solids, and provides storage for the accumulated sludge and scum. The septic tank is sized so that wastewater flow through the tank takes at least 24 hours even with sludge and scum accumulation. This detention time permits the settling of solids heavier than water and allows scum, grease and other materials lighter than water to float to the surface before the water is discharged to the absorption field.

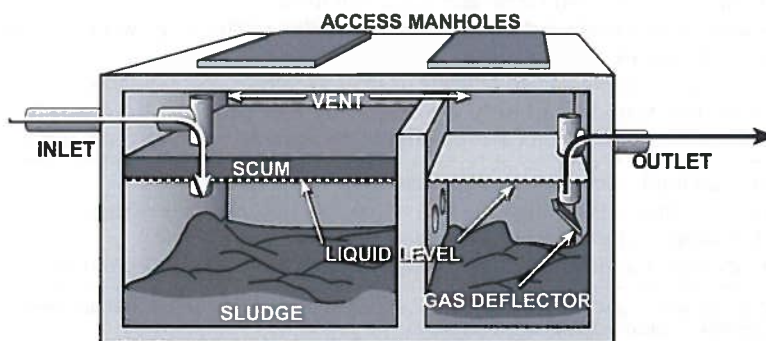
Septic tanks are designed to handle all the daily flow a household will normally produce and must have sufficient capacity for the minimum recommended volume of at least two times the daily wastewater flow. Larger capacity tanks usually mean less carryover of solids, resulting in prolonged life of the soil absorption field. Larger tanks require less frequent cleaning and allow for future expansion of the home or times when guests visit. They also have a good cost-benefit return. Table 7 gives minimum and recommended capacities for sizing septic tanks.

Less solids exiting the septic tank helps extend the life of the soil absorption field because less clogging of the soil pores will occur. Septic tank effluent filters are effective in reducing solids and providing an added measure of protection for the soil absorption field so their use is highly recommended.

**TABLE 7—Minimum and Recommended Septic Tank Capacities Based on the Number of Household Bedrooms.<sup>16</sup>**

| Number of Bedrooms | Septic Tank Capacity (gallons) <sup>17</sup> |                     |             |
|--------------------|--|---------------------|-------------|
|                    | 150 gpd/bedroom                              | Minimum             | Recommended |
| 1-3                |  | 1,000 <sup>18</sup> | 1,350       |
| 4                  |  | 1,200               | 1,800       |
| 5                  |  | 1,500               | 2,250       |

**Figure 1—Compartmentalized Septic Tank**



Two compartment tanks or two tanks in series also may help. If a multiple compartment tank is used, the first compartment shall be sized to contain from one-half to two-thirds of the total tank capacity. The total tank capacity is important and should be sized to retain at least two-to-three times the total daily wastewater flow as shown in Table 7. Figure 1 shows a design concept for a two compartment septic tank.

Tanks shall never be closer than 50 feet from any water supply and greater distances are preferred if possible. However, a 100-foot separation is required if the water source serves a public water supply. The septic tank shall not be located closer than 10 feet from any building, in swampy areas, or in areas located within the 100 year flood plain. Table 5 gives minimum required and recommended separation distances for onsite wastewater systems.

There shall be no permanent structure (patio, building, driveway, etc.) over the tank, lateral or other part of an onsite wastewater system. Consideration should also include easy access of trucks and equipment for pumping, maintenance, and repair. To avoid damage to the system, heavy equipment should not have to cross any portion of the wastewater system when servicing the septic tank.

A sketch of the wastewater disposal system as constructed, showing measurements should be made and delivered to the homeowner for future reference, and filed with the permit at the county health department. Figure 3 shows an example septic system reference sketch.

Septic tanks and soil absorption systems are an expensive and long-term investment. Material selection, design, and construction should be done with long life in mind. When located in suitable soil, well designed, properly constructed, and adequately maintained, they should last several decades.

All abandoned or unused septic tanks, cesspools, seepage pits or other holes that have received wastewater shall be emptied and plugged following procedures described in K-State Research and Extension bulletin MF-2246.

<sup>16</sup>For each additional bedroom, add 300 gallons to the minimum value and 450 gallons to the recommended value.

<sup>17</sup>Volume held by the tank below the liquid level (invert of the outlet pipe).

<sup>18</sup>Minimum tank size is 1,000 gallons.

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# Septic Tank Design/Construction Specifications<sup>19</sup>

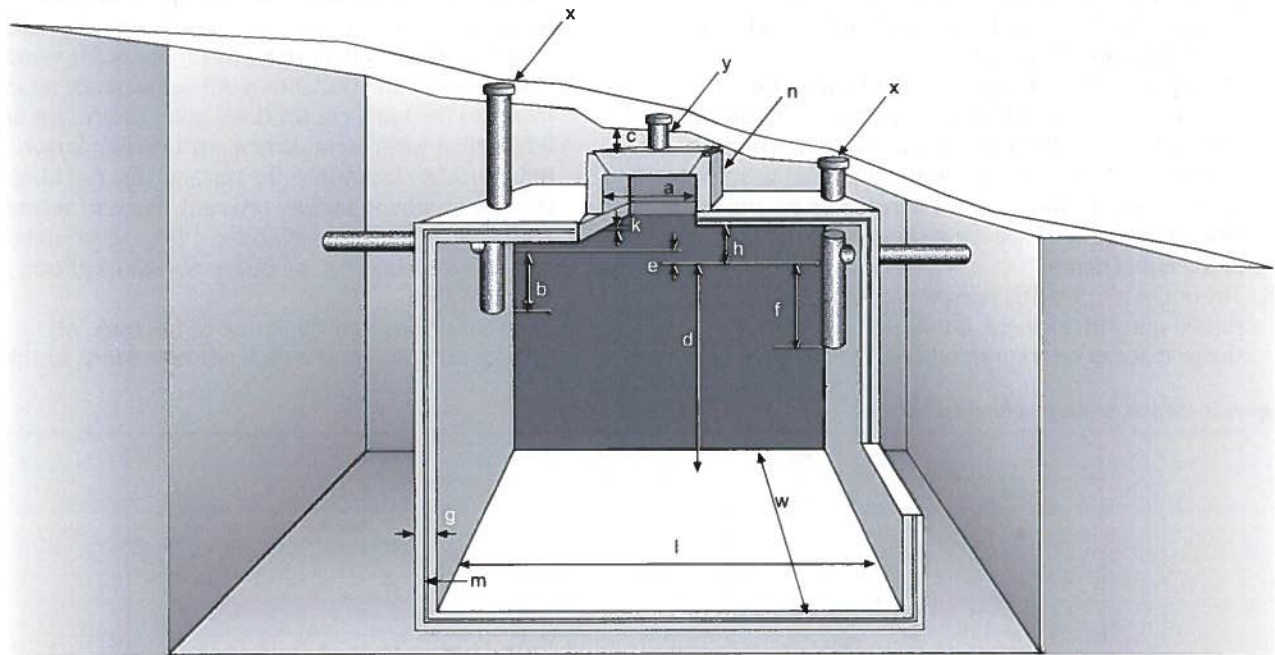
## General Requirements

Figure 2 shows the dimensions included in this section for a typical precast concrete septic tank. The following factors are required of all septic tanks regardless of the construction material:

- A. The septic tank including all extensions to the surface shall be watertight to prevent leakage into or out of the tank. It shall be structurally sound and made of materials resistant to corrosion from soil and acids produced from septic tank gasses. Because of corrosion, steel tanks are not acceptable.
- B. The tank liquid depth (distance from outlet invert to bottom of tank) shall be at least 3 feet but shall not exceed 6½ feet. The effective inside length of tanks shall not be less than 1.5 nor greater than four times the effective inside width.

- C. The minimum septic tank capacity is two times the daily wastewater flow using 150 gallons per bedroom or 1,000 gallons, whichever is larger. See Table 7 for minimum tank sizes. Tanks sized at three times daily flow are recommended and shall be required when garbage disposals are used.
- D. The top of all tanks shall be designed and constructed to support a minimum uniform load of 400 pounds per square foot plus 2,500 pound axle load. When buried more than 2 feet deep, the tank, especially the top, shall support an additional 100 pounds per square foot for each foot of soil or portion thereof in excess of 2 feet.
- E. If the tank is placed in an area subject to any vehicular traffic it shall be certified to meet H-20 highway loading by a Kansas licensed structural engineer.
- F. Space above the liquid line is required for that portion of the scum that floats above the liquid. For vertical sidewall tanks, the distance between the top of the tank and the outlet invert should be at least 15 percent of the liquid depth with a minimum

Figure 2—Design Details for a Precast Concrete Septic Tank



| Name                   | Measurement             | Min.      | Max.    | Name                                    | Measurement                | Min. | Max.      |
|------------------------|-------------------------|-----------|---------|---|----------------------------|------|-----------|
| a. access manhole      | smallest dimension      | 20"       | —       | h. open space                           | outlet invert to top       | 7"   | 0.15 × d  |
| b. inlet baffle        | penetration             | 8"        | 0.2 × d | k. space                                | gap                        | 1"   | —         |
| c. cover <sup>20</sup> | surface to manhole      | surface   | 12"     | l. tank length                          | inside of walls            | 6'   | 4 × w     |
| d. liquid depth        | outlet to tank bottom   | 3'        | 6½'     | m. reinforcement                        | per engineering design     |      | as needed |
| e. difference          | inlet to outlet inverts | 3"        | 4"      | n. extension riser length <sup>20</sup> | to ≤ 1' from surface grade |      |           |
| f. outlet baffle       | outlet to bottom        | 0.35 × d. | —       | w. tankwidth                            | inside of walls            | 4'   |           |
| g. thickness           | wall                    | 2½"       | —       | x. inspection riser                     | inside diameter            | 6"   |           |
|                        |                         |           |         | y. location riser                       | inside diameter            | 1½"  |           |

<sup>19</sup>Where locally available products cannot presently meet these requirements, manufacturers will have until July 1, 2002 to comply.

<sup>20</sup>If tank is deeper than 12" add extension riser as shown so top of riser is no more than 12" from surface

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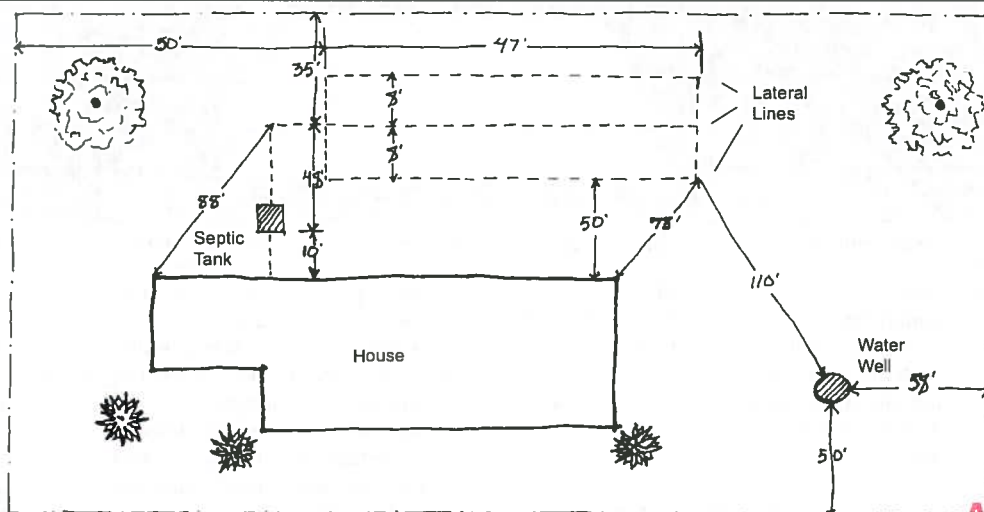
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- of 7 inches. In horizontal, cylindrical tanks, an area equal to approximately 12½ percent of the total volume should be provided above the liquid level. This condition is met if the space above the liquid level (distance from outlet invert to top of tank) is 15 percent of the tank diameter .
- G. Sewage lines carrying solids from the source to the tank should have sufficient slope to maintain velocities that keep solids moving. For household size lines, a slope of between 1 percent (1/8 inch per foot) and 2 percent (1/4 inch per foot) is usually best. The last 15 feet of sewer line preceding the tank shall not slope more than 2 percent (1/4 inch per foot).
  - H. The inlet and outlet baffle or tee and compartment baffle should extend above the liquid level to one inch below the top of the tank. This space at the top of the tank is essential to allow gas to escape from the tank through the house stack vent.
  - I. The invert of the inlet pipe shall be located at least 3 inches above the invert of the outlet when the tank is level. This space allows for temporary rise in liquid level during discharges to the tank, and prevents liquid from standing in the sewer line between the house and the septic tank, which may cause stoppage or backup.
  - J. The septic tank or pumping tank inlet shall be a sanitary tee, elbow or long sweep elbow with low head inlet or baffle to direct incoming sewage downward and prevent flow from disturbing the floating scum layer. It should extend at least 8 inches below the liquid level, but should not penetrate deeper than 20 percent of the liquid depth.
  - K. The outlet tee or baffle prevents scum from being carried out with effluent, but limits the depth of sludge that can be accommodated. The outlet device

- should generally extend below the liquid surface a distance equal to 35 percent of the liquid depth. For horizontal, cylindrical tanks, this distance should be reduced to 30 percent of liquid depth.
- Example:** Horizontal cylindrical tank 60 inches in diameter, liquid depth = 52 inches, outlet tee penetrates  $52 \times .30 = 15.6$  inches below liquid level.
- L. Inlet and outlet openings shall be designed and constructed to be water tight for at least a 20-year life of the system.
  - M. The dividing baffle in two compartment tanks shall extend from the bottom of the tank to at least 6 inches above the liquid line. The opening in the dividing baffle may be any shape and shall be at least 2 inches minimum dimension with a total area of at least 12 square inches. The baffle opening is to be centered 35 percent of liquid depth (30 percent for cylindrical tanks) below the liquid level.
  - N. Septic tanks shall have an access manhole with 20 inches minimum dimension for each compartment. If the manhole does not extend to surface grade, a small diameter (at least 1½ inch diameter) pipe shall extend to surface from the cover to mark the location of the manhole. This pipe shall not penetrate the lid of the tank. Inspection risers at least 6 inch diameter shall extend to surface grade centered over the inlet and outlet tees. All below grade attachments to the tank, connections, riser, extensions and lid shall be water tight. When any opening larger than 8 inches extends to the surface, that opening shall be child and tamper resistant. Ways to accomplish this include lids weighing at least 65 pounds, locks, or anchors that are not removable without special tools .
  - O. The sewer line from the house to the tank, all fittings and pipe in the tank, all extensions to the

Figure 3—Septic System Reference Sketch



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- surface from the top of the tank and the first 10 feet exiting the tank shall be schedule 40 pipe or heavier.
- P. Septic tanks shall be designed for at least a 20-year life. They shall be designed and constructed to withstand extremes in loads resulting from adverse conditions without excessive deflection, deforming, creep, cracking or breaking. Change in shape shall be limited to 5 percent. Loads shall be based on 62.4 pounds per cubic foot for water and water saturated soil. Top loads for design shall be in uniform 400 pounds per square foot plus 2,500 pound axle point load. Design shall be based on a 2 foot placement depth to top of the tank. If the tank will be placed deeper than 2 feet or subject to vehicular traffic over the tank, a design by Kansas licensed structural engineer shall be done for the specific conditions.

### Special Considerations for Concrete Tanks

The anaerobic environment of a septic tank produces gases that combine with moisture to produce acids. Concrete above the liquid level is subject to corrosion and deterioration from these acids. This corrosion is best resisted by high quality concrete mix. Concrete septic tanks shall meet the following requirements in addition to those above:

- A. The concrete design mix shall be for a compressive strength of at least 4,000 pounds per square inch at 28 day cure. The water-cement ratio shall not exceed 0.45.
- B. Baffles or other interior concrete units shall not be used for precast or poured in place concrete septic tanks unless they are cast or built into the tank wall at the time the tank is constructed.
- C. Air entrainment additives shall be added to 5 percent volume. Other chemical admixtures are encouraged to reduce water content, improve cement placement in forms and wet handling of incompletely cured concrete.
- D. Concrete tanks and lids shall receive proper care during the hydration (hardening) period by: 1) monitoring and controlling temperature of the concrete and gradients (i.e. maintain 50 to 90 degrees Fahrenheit for conventional cure and up to 140 degrees Fahrenheit under low pressure steam cure.) 2) monitoring and controlling humidity to prevent adverse moisture loss from fresh concrete (i.e. prevent or replenish loss of essential moisture during the early relatively rapid stage of hydration.)
- E. Reinforcing steel shall be placed as designed by a Kansas licensed structural engineer to ensure floor, wall, and top do not crack from moisture, frost, soil load, water loads, axle loads, or other stresses. Loads as specified above shall be used for the design condition. Reinforcing steel shall be covered by a minimum of 1 inch of concrete and shall be placed within  $\pm \frac{1}{4}$  inch.

- F. Pouring the floor and walls of the septic tank at the same time (monolithic pour) is the preferred construction procedure. Very large tanks are often cast in 2 pieces and assembled in the field. All tanks shall meet the same structural strength standard as specified earlier. Two piece tanks shall have permanently sealed structurally sound joints and shall be water tested after assembly. A Kansas Licensed structural engineer shall determine if the tank meets the strength specification.
- G. In areas of high sulfate water (greater than 250 mg/L) more acid producing gases are likely and additional corrosion resistance is appropriate. Recommended measures include ASTM C150 Type II cement (moderate sulfate resisting), ASTM C150 Type V cement (highly sulfate resisting), or coating interior concrete surfaces above the water line. Coatings that provide additional protection of the concrete include asphalt, coal tar, or epoxy. The product used should be acid resistant and provide a moisture barrier coating for the concrete. The product must not bleed into the water and thus risk groundwater contamination.
- H. Manufacturers are strongly urged to follow guidelines and meet standards of American Concrete Institute, National Precast Concrete Association, and American Society for Testing and Materials. Manufacturers should identify and advertise their products that meet applicable standards.

### Special Considerations for Fiberglass, Fiberglass Reinforced Polyester, and Polyethylene Tanks

- A. All tanks shall be sold and delivered by the manufacturer completely assembled.
- B. Tanks shall be structurally sound and support external forces as specified above when empty and internal forces when full. Tanks shall not deform or creep resulting in deflection more than 5 percent in shape as a result of loads imposed.
- C. Tanks and all below grade fittings and connections shall be water tight.

### Septic Tank Placement Specifications

- A. During the process of placing the septic tank, avoid causing compaction in the absorption field by not entering the absorption field area.
- B. Where natural soil is not suitable tanks shall be placed on a bed of at least 4 inches of sand, pea gravel, or crushed granular noncorrosive material for proper leveling and bearing. Material shall be no larger than 2 inches in diameter and bed depth shall be at least four times the largest material diameter.

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- C. Access manholes should be at surface grade, but shall not be more than 12 inches below surface grade. Where top of the tank must be more than 12 inches below surface grade, a water tight extension collar shall be added as required to raise the cover. Inspection openings placed over inlet and outlet tees or baffles shall be at least 6 inches in diameter and extend to the surface to permit easy tank inspection, cleaning of effluent filter, checking condition of tee or baffle and sludge accumulation.
- D. Septic tanks should not be placed into the water table (including perched or seasonal water table) because of the tendency of the tank to float, especially when empty, as when pumped for maintenance. In any area subject to high water table or seasonally high water table, plastic and fiberglass tanks shall not be used unless precautions are taken to drain groundwater.
- E. Septic tanks shall be water tight. An adequate test for water tightness is to fill the tank with water and let it stand for 8 hours to allow concrete to absorb water and plastic tanks to adjust. Then the tank is topped off and an initial measurement made with a hook gauge with vernier scale. After an hour, another measurement is made. Any loss is cause to reject the tank. Observations

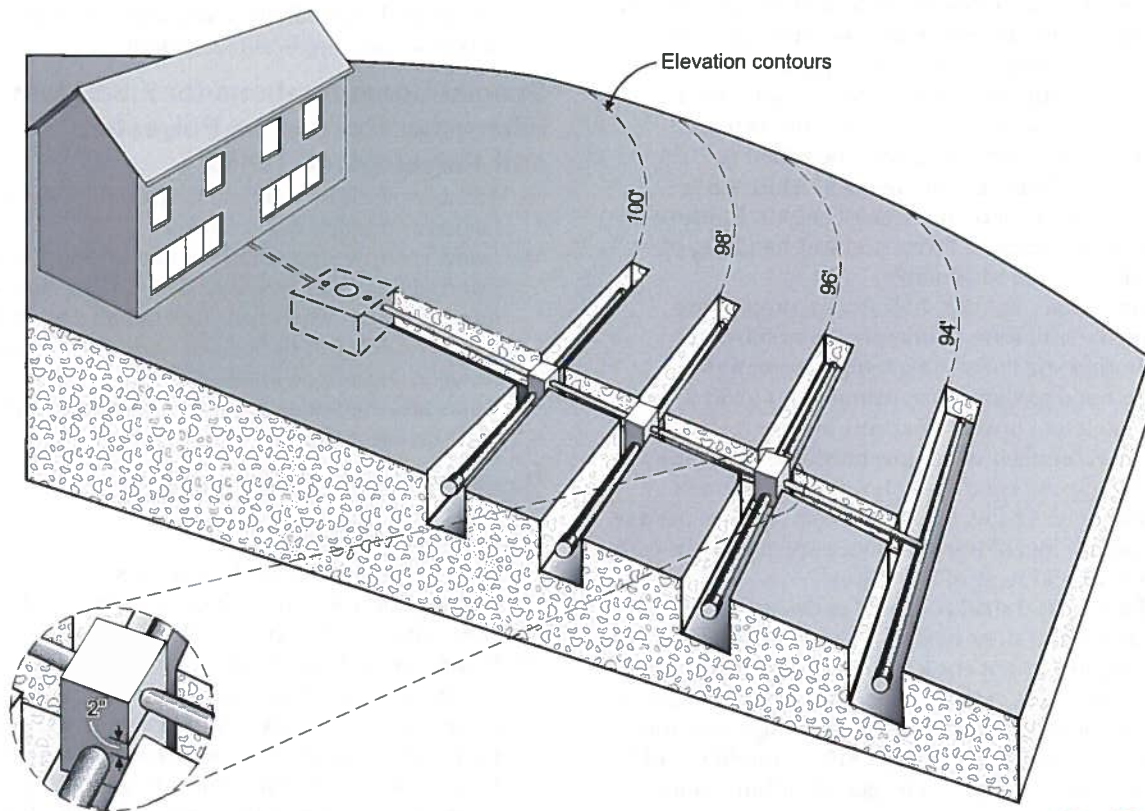
of the outside of the tank can also give clues about leakage losses. Any trickle, ooze, or exterior wet spot is reason to reject the tank. Precast one piece tanks are best tested at the plant before delivery. Two piece tanks that are assembled on-site must be tested following placement but before back filling.

- F. The hole that the tank is placed into shall provide ample space around the tank for access to do compaction. Backfill shall be in uniform, compacted layers not exceeding 2 feet thick and surrounding the tank. Because of potential soil collapse, it is unsafe and may be illegal for a person to enter a trench deeper than 5 feet without adequate shoring. Compaction should be done from the surface without entering trenches deeper than 5 feet.

### Absorption Field Size

Absorption field area is dependent on two factors: wastewater flow and soil loading rate. The wastewater design flow is based on the number of bedrooms allowing 150 gpd per bedroom (75 gpd per person) as discussed previously. The wastewater flow assumes the house is fully occupied with two persons per bedroom.

Figure 4. Typical Step Down or Serial Distribution System



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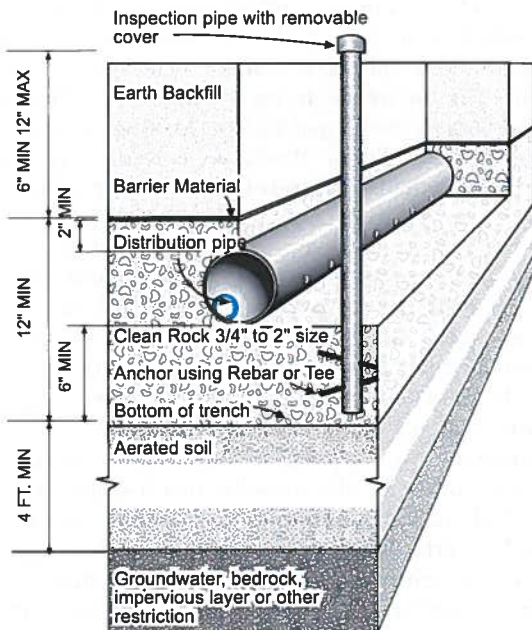
The site and soil evaluation previously discussed in that section is essential for good design. The loading rate is determined from the soil profile using Table 2 or from the perc rate using Table 4 or by using another method as specified in the local code. The soil absorption area is obtained by dividing the wastewater flow in gallons per day (gpd) by the loading rate (gpd per square foot (ft<sup>2</sup>)).

The maximum gravity lateral run shall not exceed 100 feet and preferably should be less than 60 feet. If a lateral is supplied from the center, the total length shall not exceed 200 feet (100 feet to each side) and a maximum of 120 feet is preferred. Lateral systems on level sites with all laterals on the same elevation shall be connected at each end with a level manifold or connector pipes as shown in Figure 3 so there are no dead ends.

**Table 8—Trench Separation Distances**

| Trench Width (inches) | Recommended Minimum Distance Between Trench Centerline (feet) |
|-----------------------|---|
| 18-24                 | 8.0   |
| 24-30                 | 8.5   |
| 30-36                 | 9.0   |

**Figure 5—Standard Lateral Trench Design**



**Loading rate example**

The following example illustrates how to choose and use the loading rate for design:

- four-bedroom home
- Harney soil. Light silty clay loam with medium subangular blocky structure at 17 to 40 inches
- greater than 6 feet to restrictions of rock or perched water table
- perc rate 40 minutes per inch
- trench width 3 feet
- undisturbed soil width between trenches is 6 feet

**Wastewater flow**

Size of house (number of bedrooms) × flow rate (gpd) per bedroom = total daily wastewater production  
 4 bedrooms × 150 gpd/bedroom = 600 gpd

**Loading rate**

From soil evaluation Table 2 = 0.4 gpd/ft<sup>2</sup> and from perc test using Table 4 = 0.5 gpd/ft<sup>2</sup>

Use the smaller of these or 0.4 gpd/ft<sup>2</sup> for design.

**Absorption Area**

Wastewater flow + loading rate = absorption area

$$\frac{600 \text{ gpd}}{0.4 \text{ gpd/ft}^2} = \frac{600 \text{ ft}^2}{0.4} = 1,500 \text{ ft}^2$$

**Trench Length**

Absorption area + trench width = length of trench

$$\frac{1,500 \text{ ft}^2}{3 \text{ feet}} = 500 \text{ lineal feet of trench length}$$

**Field Area**

Only the bottom area of the trench is considered in determining absorption area. The absorption trench width should be 18 to 36 inches, preferably 24 inches. For 3 feet wide trenches as in this example, the total lateral length needed is 500 feet. If trenches are 2 feet wide, the total lateral trench length is 750 feet. Assuming that a 3 feet wide trench will be used and 100 feet is the length of each trench, 5 trenches, 100 feet long will be needed for 1,500 ft<sup>2</sup> total trench bottom. To calculate the total area necessary for the field, include the minimum 6 feet of undisturbed soil between trenches. For this example the total width is (5 × 3 ft) + (4 × 6 ft) = 15 ft + 24 ft = 39 feet. The total field area is 39 × 100 or 3,900 ft<sup>2</sup>. An area equal to this same size should be reserved for future expansion and/or replacement.

For sites that slope more than about 1 percent, a level lateral system installed without shaping the surface often requires more than a half foot difference in soil cover from one side of the area to the other. On slopes greater than 1½ percent there is enough slope to use a step down (or serial) distribution. This results in the top lateral

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being filled before effluent builds up and flows to the next lateral down slope. Step down or serial distribution as shown in Figure 4 is recommended for all sites that slope 1½ percent or more and/or result in more than 6 inches difference in cover for a level lateral system.

Adjacent absorption field trenches should be separated by at least 6 feet of undisturbed soil. Table 8 shows the minimum spacing for trench widths ranging from 18 to 36 inches. Individual trenches should be constructed on contour with the surface grade and with a level trench bottom to keep the trench cover a uniform thickness.

A minimum of 6 inches of rock or gravel shall be placed in the trench under the distribution pipe, followed by enough gravel to cover the pipe by 2 inches. The soil cover over the trench should not be less than 6 inches to provide adequate water holding capacity for grass nor more than 12 inches to maximize water and nutrient use by vegetation. Generally, the total trench depth should be as shallow as possible, but not less than 18 inches. Perforated distribution pipe shall be used and, where pressure dosing is not required, 4-inch diameter pipe is adequate. See standard lateral trench design and dimensions shown in Figure 5. Where pressure dosing is required, the pipe size should be just large enough to avoid excessive pressure loss (no more than 10 percent) in the distribution lines.

Variations from the standard lateral design described above allow the designer additional flexibility in some restrictive soil situations and are discussed in the site and soil evaluation section and included in Table 6. Many soils in eastern Kansas have a friable, moderately permeable surface soil layer of up to 15 to 18 inches in thickness. Many subsoils have high clay contents and a very restricted permeability. Laterals placed into the tight, very slowly permeable subsoil frequently do not perform satisfactorily.

Shallow in-ground laterals dug 6 to 12 inches into the surface soil layer and covered with imported topsoil may be a viable option to achieve a workable soil absorption system for some soil conditions. Shallow in-ground systems may overcome marginal conditions such as groundwater or rock over 4½ feet but less than 6 feet required for conventional laterals.

The shallow, rock-filled trench shall be covered with a synthetic geotextile barrier material (at least 3 ounce nylon or 5 ounce polypropylene nonwoven filter fabric) before the lateral and interval between laterals is covered with top soil brought to the site.

In soils with still more restrictive or shallow soil conditions (4 to 4½ feet to restrictions) an at-grade lateral system may be an option. The at-grade lateral involves preparing the soil surface on a level contour in strips much as the first step in constructing a Wisconsin

mound. The rock, normally placed in a trench, is placed on the surface. Pressure dosing distribution is used to ensure even water distribution and help prevent horizontal flow at the natural soil surface resulting from temporary ponding in the lateral. The rock lateral shall be covered with barrier material before the lateral and interval space is covered with top soil brought to the site.

Loading rates and other design criteria are basically the same for shallow in-ground and at-grade systems as for conventional lateral trenches. The at-grade lateral requires tilling the soil strip under the lateral on a level contour. A pressure dosing system shall be included as a part of the at-grade design. Distribution lateral line pressure should not exceed 5 feet of head. Orifices in the pipe shall be sized and spaced to evenly distribute flow throughout the lateral system. If the area is too large to pressurize the entire system, a multizone design and sequencing valve shall be used to dose zones in sequence.

The use of an effluent filter on the septic tank outlet is strongly encouraged to prevent solids from plugging the absorption field. This will prolong the life of the absorption field and improve performance of the system. It also helps reduce the strength of wastewater effluent.

## Absorption Field Material Specifications

Rigid PVC or corrugated polyethylene plastic pipe meeting American Society for Testing and Materials (ASTM) standard ASTM D2729-93 and ASTM F405-93 or latest edition respectively meet minimum standards for use as solid or perforated gravity distribution lines. All materials used in the plumbing, wastewater line, and lateral fields shall meet standards specified by ASTM. In gravity lateral pipes, perforations are circular, ½ inch diameter and are placed at 4 and 8 o'clock positions on the pipe circumference. In no circumstance is slotted pipe acceptable as the narrow slot openings plug easily.

Washed gravel or crushed stone is commonly used as the porous media for the trench. The media gradation shall be ¾ inches to 2 inches in diameter, with the smaller sizes preferred to reduce masking of the infiltration surface. Uniform size is preferred because more void space is created. Rock having a hardness of three or more on the Moh's Scale of Hardness is required. Rock that can scratch a penny without crumbling or flaking generally meets this criterion. Larger diameter and smaller diameter material, or soft aggregate such as calcite limestone are not acceptable and shall not be used.

Fines should be eliminated as much as possible. Fines shall not exceed 5 percent by volume, so unwashed material is generally unacceptable. A simple test is to wash a volume of material into a clear container of the same diameter and measure fines (5 inches of gravel should produce no more than ¼" of fines).

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When suitable rock or gravel is not locally available, is expensive, or access to the site is restricted, gravelless chambers are good choices for laterals. They have the advantage of more liquid storage capacity, reducing the effect of high flows or loadings on weekends or holidays. Chamber systems are lightweight making installation easier at sites with restricted heavy equipment access. Chambers also may be recovered for reuse in the future. Before using chambers, consult the local authority to identify requirements.

Chunks of recycled tires are a suitable substitute for rock. Ninety percent of the pieces should be 1/2 to 4 inches in size with no fines. Wire strands shall not extend more than 1/2 inch from the pieces.

The porous media shall be covered with a filter fabric (at least 3 ounce nylon or 5 ounce polypropylene) before backfilling to prevent soil from sifting through the media. Traditional untreated building paper or 3-inch layer of straw are inferior second choices or are not recommended. Filter fabric is required when tire pieces are used as the porous media. Materials relatively impermeous to air and moisture are not permitted.

## Field Construction Specifications

Protection of the absorption field area begins before any activity on the site. The site and soil evaluation identifies the best lateral field area and reserve area. Heavy equipment, such as loaded trucks, should be kept away from the absorption field by marking the site. The weight of such equipment can permanently alter soil characteristics due to compaction. Excessive equipment or foot traffic can compact even relatively dry soils.

Construction of septic tank-lateral field systems when the soil is too wet causes compaction and smearing of the soil structure, greatly reducing the water absorption and treatment efficiency of the system. A good test for this is to work the soil into a ball and roll between the hands. If it can be rolled out into a soil wire 1/4 inch in diameter or smaller without falling apart, it is too wet and construction should not proceed.

Before beginning construction, contours should be determined and level lateral locations should be marked by flags or stakes on the contour. Trenches shall not be excavated deeper than the design depth or wider than the design width. Following excavation, the trench sides and bottom shall be raked to remove any smearing and graded to assure a bottom with no more than 1 inch difference in elevation along the entire lateral length or the complete field for a level system. The lateral pipe and rock cover shall not vary more than 1 inch in elevation along the lateral length using a surveyor level or laser.

The trench bottom should then be immediately covered with at least 6 inches of rock or the chamber. Distribution pipes are carefully placed on the rock,

and leveled with perforations at 4 o'clock and 8 o'clock positions. Rock is placed around and over the pipe to a cover depth of at least 2 inches.

After rock and pipe have been placed in the trench the filter fabric or other barrier shall be placed to protect from soil movement into the rock. Finally, earth backfill shall be carefully placed to fill the trench cavity. The backfill shall be mounded above the trench about 20 percent of the soil fill height to allow for settling. If a variation in the trench depth is used, topsoil also must be placed between laterals as well as over the lateral to level the site.

## Maintaining Onsite Wastewater Systems

The homeowner's responsibility for onsite wastewater treatment and disposal does not end when the backfill is placed over the trench lines and wastewater introduced. Maintenance of the system is a critical factor to ensure long life and continued effectiveness of the system. Minimum annual maintenance criteria include:

- check the sludge and scum in the tank to determine pumping requirements; tanks need to be pumped regularly depending on wastewater flow and tank size, (often 3 to 5 years),
- check the baffles or tees to ensure they are intact, secure, and in good condition,
- check the septic tank and soil absorption area monthly for indications of leaks or failure,
- check observation ports in each lateral to ensure effluent is reaching all parts of the system,
- check effluent filter and clean as needed.

Refer to K-State Research and Extension bulletins listed at the end of this document for additional information. A file containing records of repairs, pumping, site plan of the system, annual checklist, and other pertinent information should be maintained for easy reference and for information when ownership changes.

## Wastewater Stabilization Ponds

Wastewater ponds, sometimes called lagoons, are a viable sewage treatment method and should be considered for individual household wastewater where soil conditions have severe limitations for conventional lateral absorption field systems. Single family wastewater ponds should not be considered if septic tank-lateral field systems are feasible as determined by local requirements or recommendations contained in this bulletin. Wastewater ponds are especially applicable on sites with very restrictive permeability, high clay subsoil, (i.e. slow perc rates) or shallow bedrock where adequate area is available.

A wastewater pond is a small pond with a maximum 5-foot operational water depth, which receives domestic wastewater. Size, as in a soil absorption field, is deter-

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mined by the number of occupants and thus the wastewater flow, the soil, and evaporation.

Wastewater enters the pond by a pipe outlet near the bottom close to the center of the lagoon. All private wastewater ponds must be nondischarging and must be fenced. Wastewater ponds require a sizable area, including water surface, embankment, and separation distances. Maintenance is required to remove vegetation at the water's edge, to mow vegetation on embankments, and to remove trees that will shade the pond. Odors from a properly designed, installed, and maintained pond are infrequent and minimal.

Individuals considering wastewater ponds for sewage treatment should first check with county or other local authorities to determine requirements. Proceed with any private sewerage facility only when public sewers are not available and all applicable local requirements are met. Refer to K-State Research and Extension bulletins on wastewater ponds for more information and guidance.

## Alternative Systems Guidelines

Kansas Administrative Regulations (K.A.R. 28-5-9) authorize county health departments, or other authorized local agency, in counties that have local codes, to grant a variance for alternative onsite wastewater treatment and disposal systems. Most county codes contain a variance clause that authorizes the local administrative agency to grant requests for variances provided that certain conditions are met. The request for variance is filed with the county administrative agency. The local agency can consult with KDHE for technical assistance in evaluating the system, but has the authority to issue the variance locally if there is a local code.

### **No private onsite wastewater system shall have a surface discharge.**

When there is no local code KDHE is authorized by regulation to grant a variance. Onsite wastewater treatment options that might be considered for variance include enhanced wastewater treatment options such as aerated tank, sand or media filter, rock-plant filter, or other equivalent system. Design, construction, operation, and maintenance criteria or guidelines are planned but are not yet available for use in Kansas.

Some county codes require that design and specifications for alternative systems be completed by a licensed professional engineer. Engineers should be adequately trained or have experience under adequate supervision, before designing alternative systems. Results show that design by an inexperienced engineer can not produce a more reliable or long life alternative than conventional systems. Some alternative systems involve complex design and specific construction criteria that can result in dramatic failure when violated.

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## Appendix A

### Conducting a Perc Test

Water movement through soil in response to gravity is called percolation. For wastewater soil absorption field evaluation, the absorption of water from a post-type hole is a method for the evaluation for soil suitability and loading rate design. The absorption of water from this hole involves water movement in 3 dimensions and forces other than gravity. The term "perc" test is applied to this evaluation. The purposes of this test include:

- Obtaining the rate at which wet, unsaturated soil will absorb water,
- Helping assess suitability of soil on a specific site to absorb septic tank effluent,
- Helping select from among alternative onsite sewage systems and establish a design loading rate.

To ensure the best evaluation, all available soil information should be utilized. This would include assessment of restrictive conditions such as high water table, perched water table, shallow depth of soil, and restrictive layers such as clay pan; soil profile evaluation from the site, including history of high water tables; and description of soil profiles from county soil surveys.

#### Brief Description

A minimum of four to six holes are placed throughout the proposed site of the absorption field and at the depth of the proposed laterals and soaked with water until the clay is swelled, usually for at least 24 hours. The perc rate is measured in each hole and reported as the number of minutes it takes for an inch of water to be absorbed in the hole. The optimum time to conduct a perc test is in the spring when the soil is normally wet. An accurate perc test during a dry period when the soil is cracked may not be possible.

#### Materials Needed to Conduct the Perc Test

1. Site plan including proposed absorption field and location of tests. Dimensions help ensure the test holes are properly located in and around the field.
2. One batter board—1 inch by 2 inch board of 18 inches long for each perc test hole.
  - A. Number each board so that each test hole will be distinguishable.
  - B. Mark a center line on the side of each batter board. This will provide a consistent reference point for the measuring device.
3. Durable measuring device (1 to 2 feet long) and a way to reproducibly locate the water surface, such as a pointed hook or float on a stiff wire or rod.
4. An adequate supply of water to soak the hole and conduct the test. Water usually has to be transported to the site. Two hundred to 300 gallons is usually adequate.



## Procedure

- 1. Identify Proposed Site of Absorption Field**—The site preferably should be located downslope from the septic tank. If effluent will not flow by gravity, an effluent pump may be used to move effluent to a suitable absorption field. For new homesites, the proposed area reserved for future use should also be checked for suitability.
- 2. Number and Location of Tests**—Locate a minimum of four to six holes uniformly over the proposed absorption field site. If the site is sloping, it is especially important to have test holes at all elevations to be used so that any differences in soil will be evaluated.
- 3. Type of Test Hole**—Dig or bore each hole to the depth of the proposed trench (usually 18 to 24 inches) and with a consistent diameter (8 inches is recommended). All test holes shall be the same size to help ensure consistency in results.
- 4. Prepare the Test Hole**—Scratch the sides and bottom of the hole to eliminate any smeared or compacted soil surfaces and remove loose material from the hole. Place 2 inches of washed gravel in the bottom of the hole. The gravel can be contained in a mesh bag for easy removal and reuse at other sites. This gravel protects the bottom of the hole from erosion, scouring, and sediment as water is introduced.
- 5. Wet Hole to Allow for Soil Swelling**—Saturation means that the voids between the soil particles are filled with water. This happens fairly quickly for soil immediately surrounding the portion submerged in water. Swelling is caused by intrusion of water into the clay particles and can take many hours and possibly days when the soil is quite dry.
  - A. Carefully add 12 to 14 inches of water. Using a hose will prevent soil washing down from the sides of the hole.
  - B. Maintain the water level for at least 24 hours to allow for swelling to occur. In most cases it will be necessary to add water periodically from a reservoir. A float supplied by a hose from a reservoir simplifies the procedure.
  - C. If the soil appears to be sandy or initially very dry, plan to check the condition of the hole wetting after 12 hours or overnight. If there is no water left in the hole and the reservoir is dry, refill the reservoir and holes. After the full 24 hours have passed since soaking was initiated, begin measuring as described in #6.
- 6. Perc Measurement**
  - A. Remove the apparatus used to add water to the hole.
  - B. Place the batter board across the top of each hole and secure with weights, spikes or attach

to stakes. Be sure that the centerline mark is centered over the hole and each board is numbered.

- C. Align the measuring rule with mark on the board and use the hook gauge or the float and rod to read the level when it just touches the water surface. Record the measurement and time. Fill the hole to about 6 inches over the rock and make the initial measurement.
  - D. Measure at 30-minute intervals (does not have to be exact) recording both level and time. If the water level in the hole drops too rapidly, it will be necessary to reduce the time interval for measurement. The time interval should be short enough that the water level should not drop more than 25 percent of the wetted hole depth.
- Note:** If the water drops more than 1 to 2 inches in 30 minutes, it will be necessary to add water to the hole after each reading until it is the same depth as recorded initially. Be sure to record the measurement of the refilled perc hole.
- 7. Calculate Perc Rate.** Divide time interval by drop in water level to find the perc rate in minutes per inch (mpi).

Examples:

If the drop is  $\frac{5}{8}$  inches in 25 minutes:

$$\frac{25}{\frac{5}{8}} = 25 \times \frac{8}{5} = 40 \text{ mpi}$$

If the drop is  $1\frac{1}{2}$  inches in 12 minutes:

$$\frac{12}{1\frac{1}{2}} = \frac{12}{\frac{3}{2}} = \frac{12 \times 2}{3} = 8 \text{ mpi}$$

- A. Continue measurements until each of three consecutive calculated rates varies by no more than 10 percent from the average of the three rates. Use the average of three rates as the value for that hole

Example:

Rates of 26.0, 28.0, and 30.5 mpi average 28.2 mpi

- B. Measure and calculate the rate for each hole in the application field. Average the rates for all holes as the value to use for loading rate and bottom area sizing.
- 8. Compare with Permeability in the NRCS Soil Survey.** The field measured perc (mpi) should be no smaller than about one third the inverse of the permeability rate shown in the table of physical and chemical properties of soils in the soil survey report. If it is, suspect a problem with the perc test, soil mapping or other cause. A well aggregated, undisturbed soil may have a good perc rate.

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## Appendix B

### Sources of Additional Information

Kansas State University, Agricultural Experiment Station and Cooperative Extension Service Bulletins<sup>21</sup> (except as noted)

#### Wastewater Systems and Related Information

*Design of Submerged Flow Wetlands*, Special Report 457, Missouri Small Flows Education and Research Center, Agricultural Experiment Station, University of Missouri, Columbia, MO 65211

*Environmental Health Handbook*, First Edition, Aug 1992, Kansas Association of Sanitarians, KDHE, and K-State Research and Extension cooperating, available from K-State, Extension Biological and Agricultural Engineering, Cost: \$20.00<sup>22</sup>

*Get to Know Your Septic System*, MF-2179

*How to Run a Percolation Test*, FO-0583-C, (Revised 1993), Minnesota Extension Service, University of Minnesota, St. Paul, MN 55108

*Onsite Domestic Sewage Disposal Handbook*, MWPS-24, Midwest Plan Service, Iowa State University, available from K-State, Extension Biological and Agricultural Engineering, Cost: \$6.00<sup>22</sup>

*Plugging Cisterns, Cesspools, Septic Tanks, and Other Holes*, MF-2246

*Rock-Plant Filter Design and Installation*, expected 1997  
*Rock-Plant Filter Operation, Maintenance and Repair*, expected 1997

*Septic Tank Maintenance*, MF-947

*Septic Tank—Soil Absorption System*, MF-944

*Soil Evaluation for Home Septic Systems*, MF-945

*Wastewater Pond Design and Construction*, MF-1044

*Wastewater Pond Operation, Maintenance, and Repair*, MF-2290

*Why Do Septic Systems Fail?* MF-946

*Your Wastewater System Owner/Operator Manual*, S-90 For sale bulletin, cost 35¢

#### Other Helpful Bulletins

*Kinds and Types of Levels*, LR-17<sup>22</sup>

*Land Judging and Homesite Evaluation*, S-34

*Operating, Checking and Caring for Levels*, LR-101<sup>22</sup>

*Safe Domestic Wells*, MF-970

*Soil Water Measurements: An Aid to Irrigation Water Management*, L-795

*Using a Level*, AF-19<sup>22</sup>

#### Standards Related to Onsite Wastewater System Materials and Procedures

ACI<sup>23</sup>212.3R Chemical Admixtures for Concrete  
ACI 350R Environmental Engineering Concrete Structures  
ASTM<sup>24</sup>C150-95 Standard Specification for Portland Cement. Vol. 04.01

ASTM C267-82 Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing. Vol 04.05

ASTM C452-95 Standard Test Method for Potential Expansion of Portland Cement—Cement Mortars Exposed to Sulfate. Vol. 04.01

ASTM C890-91 Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures. Vol. 04.05

ASTM C1227-94 Standard Specification for Precast Concrete Septic Tanks. Vol. 04.05

ASTM D1600-94 Standard Terminology for Abbreviated Terms Relating to Plastics. Vol. 08.04

ASTM D2321-89 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications. Vol. 08.04

ASTM D2729-93 Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings. Vol. 08.04

ASTM F481-94 Standard Practice for Installation of Thermoplastic Pipe and Corrugated Tubing in Septic Tank Leach Fields. Vol. 08.04

ASTM F405-93 Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings. Vol. 08.04

ASTM F412-94a Standard Terminology Relating to Plastic Piping Systems. Vol. 08.04

ASTM F449-93 Standard Practice for Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control. Vol. 08.04

ASTM D3385-94 Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer. Vol. 04.08

ASTM F789-89 Standard Specification for Type PS-46 Poly(Vinyl Chloride) (PVC) Plastic Gravity Flow Sewer Pipe and fittings. Vol. 08.04

ASTM F810-93 Standard Specification for Smoothwall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields. Vol. 08.04

ASTM F949-93a Standard Specification for Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings. Vol. 08.04

NPCA<sup>25</sup> Durable, Watertight Precast Concrete, TECH notes, April 1996

NPCA Septic Tank Manufacturing: A Best Practices Manual. Anticipated by Summer 1998

NPCA Underground Watertight Systems (video)

<sup>21</sup>Production Services/Distribution, Kansas State University, 28 Umberger Hall, Manhattan, KS 66506-3402, Phone: (785) 532-1150

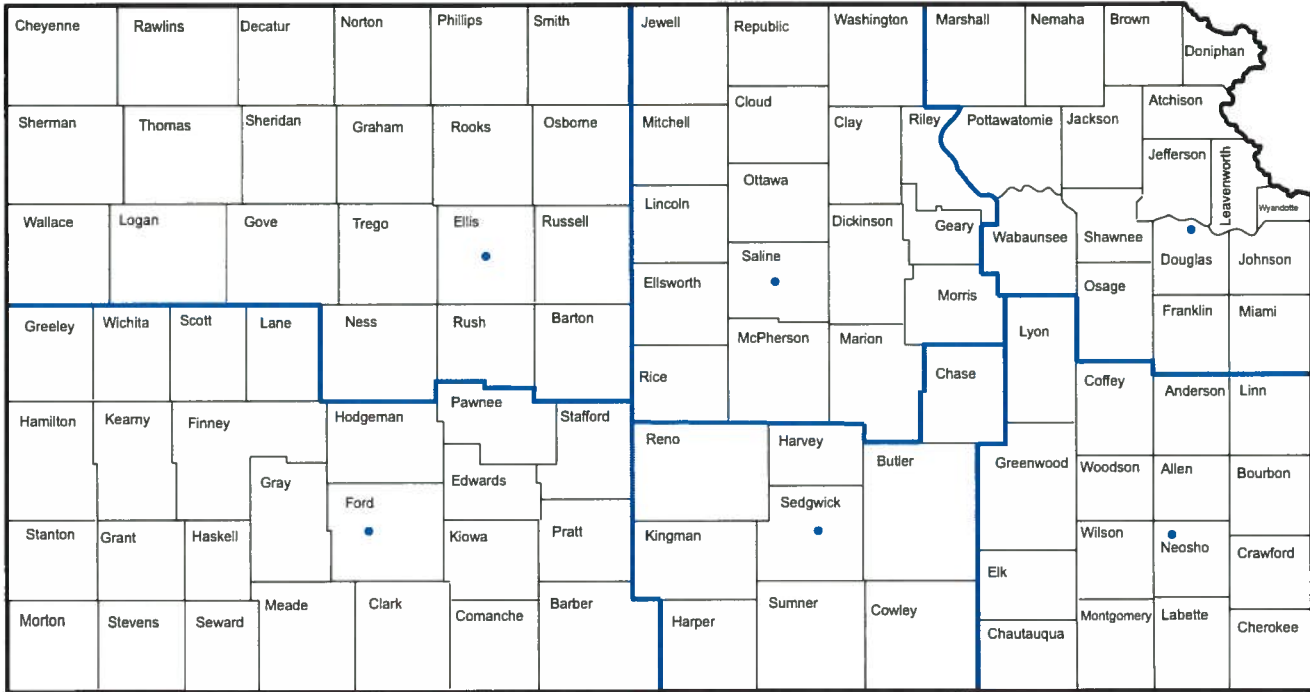
<sup>22</sup>Available through Extension Biological and Agricultural Engineering, Kansas State University, 237 Seaton Hall, Manhattan, KS 66506-2917, Phone: (785) 532-5813

<sup>23</sup>American Concrete Institute, P.O. Box 9094 Farmington Hills, Michigan 48333, Phone: (810) 848-3808

<sup>24</sup>American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 Phone (610) 832-9500

<sup>25</sup>National Precast Concrete Association, 10333 North Meridian Street, Suite 272, Indianapolis, Indiana 46290 Phone (317) 571-9500

## KDHE District Boundries and District Offices



KDHE, Division of Environment, Nonpoint Source Section  
 Forbes Field, Bldg. 283  
 Topeka, Kansas 66620  
 (785) 296-4195

### KDHE District Offices

Kansas Dept Health & Environment  
 Northwest District Office  
 2301 E. 13th Street  
 Hays, KS 67601-2651  
 (785) 625-5663

Kansas Dept Health & Environment  
 North Central District Office  
 2501 Market Place, Suite D  
 Salina, KS 67401  
 (785) 827-9639

Kansas Dept Health & Environment  
 Northeast District Office  
 800 W. 24th Street  
 Lawrence, KS 66046-4417  
 (785) 842-4600

Kansas Dept Health & Environment  
 Southwest District Office  
 302 W. McArtor Road  
 Dodge City, KS 67801-6098  
 (316) 225-0596

Kansas Dept Health & Environment  
 South Central District Office  
 130 S. Market, 6th Floor  
 Wichita, KS 67202-3802  
 (316) 337-6020

Kansas Dept Health & Environment  
 Southeast District Office  
 1500 W. 7th Street  
 Chanute, KS 66720-9701  
 (316) 431-2390

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November 1997

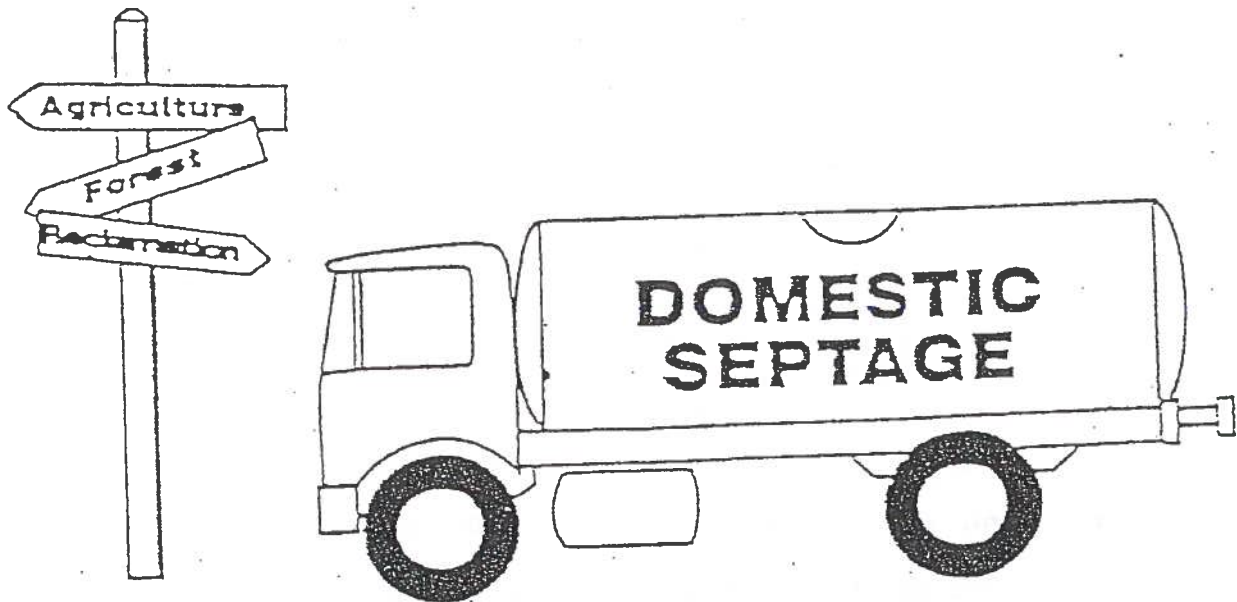
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# LAND APPLICATION OF SEPTAGE



Prepared by: Don Chisam, KDHE Local Environmental Protection Specialist

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## OVERVIEW

After February 19, 1994, all septage haulers operating in the United States will be required to fully comply with all provisions of EPA 503 rules governing disposal of domestic septage.

The rules will be easy to comply with if you keep a few factors in mind:

1. You will be required to keep a complete record of every load of septage; noting the location of where it was pumped, how it was handled and the location where it was disposed. Sample record keeping forms are displayed in Appendix A on page 12.
2. If you dispose of septage at a municipal wastewater treatment plant your record keeping responsibility ends once the load is accepted at the plant.
3. If you land apply septage, additional duties and record keeping requirements are incurred:
  - A. You must meet Pathogen Reduction and Vector Attraction Reduction requirements by selecting one of the three alternatives noted below:
    - i. Injecting septage into the soil  
OR
    - ii. Surface apply and incorporate (plow or disk) within six hours  
OR
    - iii. pH treat - Thoroughly mix 50 pounds of hydrated lime into 1,000 gallons of septage and then surface apply.

Discussion of these options are noted on page 8.

- B. You must calculate the amount of septage you can apply annually to a parcel of ground. This requires knowing what crop will be planted on that land and its corresponding nitrogen requirement. This is discussed on pages 5 and 6. If you need assistance your county agent or sanitarian can help you with this calculation.

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## SECTION 1

### PURPOSE

The information in this domestic septage guidance is provided to help the users and disposers of septage understand and follow a new governing Federal rule called "Standards for the Use or Disposal of Sewage Sludge". These are commonly called 503 rules. Outlined in this bulletin are the requirements for persons who apply domestic septage to non-public contact sites (sites not frequently visited by the public). By carefully following these rules in your land application process you will help to significantly reduce potential contamination of surface and groundwater in your area.

### INTRODUCTION

1. To meet the Federal requirements for application of domestic septage to non-public contact sites, the land applier must first assure that he/she has only domestic septage according to the 503 rules.

DOMESTIC SEPTAGE AS DESCRIBED IN THE FEDERAL PART 503 REGULATION IS THE LIQUID OR SOLID MATERIAL REMOVED FROM A SEPTIC TANK CESSPOOL, PORTABLE TOILET, TYPE III MARINE SANITATION DEVICE, OR A SIMILAR SYSTEM THAT RECEIVES ONLY HOUSEHOLD, NON-COMMERCIAL, NON-INDUSTRIAL SEWAGE.

2. Domestic septage may be applied only to sites that are not frequently visited by the public, called non-public contact sites in the Federal rule.

Non-public Contact Sites include  
agriculture land, forests, and reclamation sites

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3. The land applier must manage the domestic septage so that pathogens (disease-causing organisms) are reduced.
4. The land applier must manage the domestic septage so that its attractiveness to vectors is reduced. Vectors are insects and rodents that can carry pathogens in or on their bodies and therefore transmit disease.
5. The owner of the land where domestic septage has been applied must adhere to crop harvesting, animal grazing, and site access restrictions.
6. The land applier must certify that pathogen and vector attraction reduction requirements have been met, including crop harvesting, animal grazing, and site access restrictions.
7. The number of gallons of domestic septage applied per acre of land may not be more than needed to supply the nitrogen required by the crop being grown.
8. The person who land applies domestic septage has choices about how to meet the pathogen and vector attraction reduction requirements.

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## SECTION 2

### SEPTAGE MANAGEMENT

A. GOAL:

Septage must be treated and disposed of in a manner which reduces the potential for contamination and human disease caused by contaminants in the septage.

B. WHAT IS DOMESTIC SEPTAGE?

1. It is the liquid and solid material pumped from septic tanks or other devices during cleaning. It does not include commercial or industrial septage or grease from grease traps.

C. CHARACTERISTICS

1. Sixty to seventy percent of the solids found in domestic wastewater is retained in the septic tank.
2. There are approximately nine times more nitrogen and phosphorus in septage than in domestic wastewater.
3. Large numbers of disease causing micro organisms - including bacteria, viruses and pathogenic human parasites are present in septage.

D. SEPTAGE DISPOSAL OPTIONS

1. Disposal at a municipal wastewater plant is preferred and highly recommended for the following reasons:
  - a. EPA 503 defined requirements for the septage hauler for a specific load end once the septage is properly discharged and accepted by the municipal plant operator. The municipal plant then assumes responsibility for compliance.
  - b. Best option to insure pathogens are destroyed as well as providing significantly better protection of surface and groundwater from excessive loading of nutrients and other contaminants.

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- c. Significantly reduces paperwork requirements for the septage hauler.

Recommendations:

Septage hauler should contact municipal wastewater plant(s) in his or her service area to determine if they accept domestic septage and to acquire knowledge of the various dumping requirements and fees set forth by that plant.

Kansas Department of Health and Environment recommends that septage not be disposed of at a public or private wastewater treatment lagoon or sludge lagoon.

- 2. Land application is the spraying or spreading of domestic septage on to the land surface or the incorporation or injection of domestic septage into the soil so that the sewage sludge can condition the soil and fertilize the vegetation grown in that soil.

To legally land apply septage the following requirements must be met and documented.

- a. Determine the Annual Application Rate for nitrogen for the planned crop. This amount shall be calculated and the nitrogen amount provided by septage shall not exceed that crop requirement.
- b. Provisions implemented for Pathogen Reduction.
- c. Provisions implemented for Vector Attraction Reduction.
- d. Records for all EPA 503 land application requirements shall be retained by the applier for five years.

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### SECTION 3

## LAND APPLICATION - STEP BY STEP INSTRUCTIONS ON HOW TO COMPLY

**A. DETERMINING THE ALLOWED ANNUAL RATE FOR LAND APPLICATION SEPTAGE.**

1. The maximum volume of domestic septage that may be applied to any site depends on the pounds of nitrogen required per acre by the planned crop for a specific projected yield.
  - a. This information is listed for all Kansas grown crops in KSU Bulletin C-509, (SOIL TEST INTERPRETATIONS AND FERTILIZER RECOMMENDATIONS).
  - b. Secure this bulletin from your county extension office. The agent will gladly assist you in using this bulletin. A partial page 5 is illustrated in Figure (1).

| Figure 1: | NITROGEN RECOMMENDATIONS |                                |                    |             |           |
|-----------|--------------------------|--------------------------------|--------------------|-------------|-----------|
| Crop      | Area of State            | Medium and Fine Textured Soils |                    | Sandy Soils | Irrigated |
|           |                          | Fallowed                       | Continuous Cropped |             |           |
|           |                          | Pounds of                      | Nitrogen Per       | Acre        |           |
| Corn      | Entire                   |                                | 100-200            | 100-200     | 160-220   |
| Wheat     | Eastern                  |                                | 40-70              | 40-70       | 50-80     |
|           | Central                  | 20-40                          | 30-60              | 40-60       | 50-80     |
|           | Western                  | 0-40                           |                    | 25-50       | 50-80     |

The maximum volume of septage is calculated by the following formula:

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$$\text{Annual Application Rate (gallons/acre/year)} = \frac{\text{Annual Pounds of Nitrogen Required for the Crop \& Yield}}{0.0026}$$


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As an example, if 60 pounds of nitrogen per acre is required to grow a 60 bushel per acre crop of wheat, then the annual application rate of domestic septage would be 23,077 gallons per acre.

---

$$\text{Annual Application Rate} = \frac{60}{0.0026} = 23,077 \text{ gallons/acre/year}$$

---

The primary reason for this annual rate calculation is to prevent the application of nitrogen in excess of crop needs and its potential movement through soil to groundwater.

(B) PATHOGEN REDUCTION/CROP AND SITE RESTRICTION REQUIREMENTS

Domestic septage must be managed so that pathogens (disease-causing organisms) are appropriately reduced. The Part 503 Regulation offers two alternatives from which you can pick to meet this requirement. The first alternative (no treatment) and its restrictions are presented in Figure 2; the requirements of the second option (pH 12 for a minimum of 30 minutes i.e. mixing 50 pounds of hydrated lime/1,000 gallons of septage) are listed in Figure 3.

Please note that both of the pathogen reduction alternatives impose crop harvesting restrictions. However, site access controls are only required when the soil incorporation alternative for pathogen reduction has been used. Remember that you are required to inform the owner/operator of the land where the domestic septage has been applied about these crop harvesting and site access restriction requirements. This notification is required because you, the applier of the domestic septage, must certify that these conditions are met.

NOTE: Part 503 regulations do not restrict access to the site by the persons working the land. These regulations assume these persons as well as the applier are aware of and will follow appropriate hygiene practices to minimize any problems with domestic septage.

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Figure 2: PATHOGEN REDUCTION ALTERNATIVE 1 for Domestic Septage applied to Non-Public Contact Sites

Domestic septage is pumped from the septic tank or holding tank and land applied without treatment i.e. septage is injected OR spread on soil and incorporated within six hours.

Crop Restrictions:

- i) Food crops with harvested parts that touch the septage/soil mixture and are totally above ground shall not be harvested for 14 months after application of domestic septage. Examples - melons, or strawberries.
- ii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage. Examples - potatoes, onions, and radishes.
- iii) Animal feed, fiber and those food crops that do not touch the soil surface shall not be harvested for 30 days after application of the domestic septage. Example - wheat, corn, peaches, and hay.
- iv) Turf grown on land where domestic septage is applied shall not be harvested for one year after application of the domestic septage when the harvested turf is placed on either land or a lawn with a high potential for public exposure unless otherwise specified by the permitting authority.

Grazing Restriction:

- i) Animals shall not be allowed to graze on the land for 30 days after application of domestic septage.

Site Access Restrictions:

- i) Public access to land with a low potential for public exposure shall be restricted for 30 days after application of domestic septage. Examples of restricted access include remoteness, posting with no trespassing signs, and/or simple fencing.

Figure 3: PATHOGEN REDUCTION ALTERNATIVE 2 for Domestic Septage (with pH treatment) applied to Non-Public Contact Land

The domestic septage pumped from the septic tank or holding tank has had its pH raised to 12 or higher by the addition of alkali such as hydrated lime and, without adding more alkali, the domestic septage remains at a pH of 12 or higher for at least 30 minutes prior to being land applied. To accomplish this goal 50 pounds of hydrated lime shall be mixed and thoroughly agitated in each 1,000 gallons of septage.

Crop Restrictions:

- i) Food crops with harvested parts that touch the septage/soil mixture and are totally above ground shall not be harvested for 14 months after application of domestic septage. Examples - melons or strawberries.
- ii) Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of domestic septage when the domestic septage remains on the land surface for four months or longer prior to incorporation into the soil. Examples - potatoes, onions and radishes.
- iii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage when the domestic septage remains on the land surface for less than four months prior to incorporation into the soil. Examples - potatoes, onions, and radishes.
- iv) Animal feed, fiber, and those food crops whose harvested parts do not touch the soil surface shall not be harvested for 30 days after application of the domestic septage. Examples - wheat, corn, peaches, and hay.
- v) Turf grown on land where domestic septage is applied shall not be harvested for one year after application of the domestic septage when the harvested turf is placed on either a lawn or land with high potential for public exposure, unless otherwise specified by the permitting authority.

Grazing Restrictions: None

Site Access Restrictions: None

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C. VECTOR ATTRACTION REDUCTION ALTERNATIVES

To comply with this requirement you must either:

1. Inject septage immediately below the soil surface.

OR

2. Apply septage to the land surface and incorporate into the soil surface plow layer within six hours.

OR

3. Raise the pH of the septage to 12 or above and hold above 12 for 30 minutes.
4. A 50 pound bag of hydrated lime per 1,000 gallons of septage is the suggested procedure.

D. PROCEDURE - RAISING pH WITH HYDRATED LIME

1. Agitate septic tank contents with truck vacuum hose.
2. Withdraw 200-400 gallons of septage from septic tank.
3. Add 50 pounds of hydrated lime to the septage through the vacuum hose. The dry lime (available at hardware stores and lumber yards) can be emptied into five-gallon buckets or can be vacuumed directly from the original paper bag.
4. The balance of the 1,000 gallons of septage should then be vacuumed into the truck.
5. Agitate septage/lime mixture for 15 minutes by frequent opening and closing of main hose vacuum valve. The air bubbling through the mixture as well as the sloshing of the material inside the truck tank during transport to the field disposal site will accomplish adequate mixing.
6. Thirty minutes after the lime was added, the mixture can then be surface spread on the soil.
7. This example illustrates a 1,000 gallon mix. If you have a 500 gallon truck use 25 pounds of lime. Similarly a 1,500 gallon tank will require 75 pounds of hydrated lime to do the job.
8. Follow all label safety instructions printed on the lime package i.e. wear rubber boots, gloves and eye protection.

E. CERTIFICATION

1. You must complete and sign for each application site the certification listed in Figure 5, about your meeting pathogen and vector attraction reduction requirements.

## SECTION 4

### EPA 503 RECORD KEEPING REQUIREMENTS

You must retain records for five years after any application of domestic septage to a site, but you are not required to report this information under the 503 regulations. However, local authorities may require reporting certain information to them. These required records may be requested for review at any time by the permitting or enforcement authority. The retained records must include the information shown in Figure 4 and a written certification (see Figure 5). Appendix A contains sample forms which can be used to organize your record keeping. You are not required to use these forms, but they may be helpful.

Figure 4: RECORD KEEPING REQUIREMENTS

- 1) The location of the site where domestic septage is applied: Provide the legal description and if available the street address, the longitude and latitude of the site (available from the U.S. Geological Survey maps).
- 2) The number of acres to which domestic septage is applied at each site.
- 3) The date and time of each domestic septage application.
- 4) The nitrogen requirement for the crop or vegetation grown on each site during the year. Indicate the expected crop yield to help establish the nitrogen requirement on form.
- 5) The gallons of septage which are applied to the site during the specified 365-day period.
- 6) The certification shown in Figure 5.
- 7) A description of how the pathogen requirements are met for each batch of domestic septage that is land applied.
- 8) A description of how the vector attraction reduction requirement is met for each batch of domestic septage that is land applied.

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Figure 5:

CERTIFICATION STATEMENT

I certify under penalty of law, that the pathogen requirement shown on form for each site (specify restrictions on harvesting and public access or pH treatment) and the vector attraction reduction requirements shown on form for each site (specify injection, incorporation, or pH treatment) have been met. This determination has been made under by direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

TITLE\*: \_\_\_\_\_

\* e.g., owner or employee of Joe's Septic Pumping Service

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## SECTION 5

### ADDITIONAL REQUIREMENTS FOR SEPTAGE LAND APPLICATION

1. Consult with county sanitarian about local land application requirements.
2. If county does not have more restrictive limits then the requirements noted below apply.
  - Septage may not be applied within 100 feet of a public or private water supply well.
  - Septage shall not be applied within a 100 year flood plain.
  - Septage shall not be applied within 33 feet of any surface water.

## GLOSSARY

1. pH - a numerical measure of the acidity or alkalinity of a liquid (example - septage) or a solid substance such as soil.

2 <----- 7 -----> 14  
(very acid) neutral (very alkaline)

2. Pathogen Reduction - one important goal of EPA 503 rules is to reduce the number of disease causing organisms commonly found in septage when that septage is land applied.
3. Vector Attraction Reduction - EPA 503 requires the land applier to manage domestic septage so that its attractiveness to vectors is reduced. Vectors are insects and rodents that carry pathogens in or on their bodies and therefore transmit disease.
4. Annual Application Rate - The maximum volume of domestic septage that may be applied to any site during a 365 day period. This is determined by the amount of nitrogen required by the planned crop and the yield.

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## APPENDIX A

There are two forms that may be helpful to you for keeping your records. The first of these forms (Form 1) is for recording information that pertains to the different fields onto which you apply domestic septage. The second form (Form 2) is an example of a daily log that might be kept in the truck as domestic septage is pumped.

Samples of both of these forms have been filled in as an example of the type of information you might actually record.

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(FORM 1)

SECTION 503 RECORD FORM

LAND APPLICATION OF DOMESTIC SEPTAGE AT NON-PUBLIC CONTACT SITES

Kansas Department of Health and Environment

All records must be maintained by the septage hauler for five (5) years.

PART 1: BUSINESS AND LAND APPLICATION SITE INFORMATION

REPORT YEAR \_\_\_\_\_ DATE \_\_\_\_\_

SEPTAGE HAULER

NAME: \_\_\_\_\_

ADDRESS; \_\_\_\_\_

COUNTY LICENSE OR PERMIT NUMBER: \_\_\_\_\_

LAND APPLICATION SITE

OWNER: \_\_\_\_\_

LOCATION: \_\_\_\_\_

(street address and/or legal location)

SITE NUMBER OR NAME: \_\_\_\_\_

TOTAL ACRES AT SITE: \_\_\_\_\_

SITE OWNER'S SIGNATURE: \_\_\_\_\_

PART 2: ANNUAL APPLICATION RATE AND PUBLIC CONTACT INFORMATION

PUBLIC ACCESS CONTROL (check all that apply)

(1) Site remotely located \_\_\_\_\_

(2) Signs are posted \_\_\_\_\_

(3) Property is fenced \_\_\_\_\_

ANNUAL APPLICATION RATE (AAR)     AAR =  $\frac{\text{Nitrogen requirement of crop}}{0.0026}$

| CROP(S) | EXPECTED YIELD<br>(bushels/acre) | NITROGEN REQUIREMENT<br>(pounds N/year) | AAR<br>(gal/acre/year) |
|---------|----------------------------------|---|------------------------|
| CROP 1  | _____                            | _____                                   | _____                  |
| CROP 2  | _____                            | _____                                   | _____                  |
| CROP 3  | _____                            | _____                                   | _____                  |

PLANTING/HARVESTING SCHEDULE

PLANTING DATE

HARVEST DATE

CROP 1 \_\_\_\_\_

CROP 2 \_\_\_\_\_

CROP 3 \_\_\_\_\_



LAND APPLICATION SITE:  
RECORD YEAR:

| NAME & ADDRESS WHERE SEPTAGE WAS PUMPED | DATE OF APPLIC. TO SITE | GALLONS APPLIED TO SITE | TOTAL GALS APPLIED Y.T.D. | WAS SEPTAGE INCORP.? hours* | WAS SEPTAGE INJECTED? | IF SEPTAGE WAS pH TREATED, INDICATE**<br>pH 12 held for 30 min. |
|---|-------------------------|-------------------------|---------------------------|-----------------------------|-----------------------|---|
| L.                                      |                         |                         |                           | yes no<br>hours*            | yes no                | yes no  |
|   |                         |                         |                           | yes no<br>hours*            | yes no                | yes no  |
|   |                         |                         |                           | yes no<br>hours*            | yes no                | yes no  |
|   |                         |                         |                           | yes no<br>hours*            | yes no                | yes no  |
|   |                         |                         |                           | yes no<br>hours*            | yes no                | yes no  |
|   |                         |                         |                           | yes no<br>hours*            | yes no                | yes no  |

\* If septage was incorporated, how many hours after it was applied to the site?  
\* \* Type means what kind of alkaline material was used, e.g. lime.

Amount means how many pound were added.

How mixed means how did you mix the alkaline material into the septage.

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# EXAMPLE FORM COMPLETION

(Form 2)

LAND APPLICATION SITE: Jones Farms, SE/4, Section 6, Township 7N, Range 3 West - Rural Route 3, Hays, KS 67601  
 RECORD YEAR: 1994

| NAME & ADDRESS WHERE SEPTAGE WAS PUMPED | DATE OF APPLIC. TO SITE | GALLONS APPLIED TO SITE | TOTAL GALLS APPLIED Y.T.D. | WAS SEPTAGE INCORP.? hours* | WAS SEPTAGE INJECTED? Yes no | IF SEPTAGE WAS pH TREATED, INDICATE**<br>type amount how mixed | pH 12 held for 30 min<br>Yes no |
|---|-------------------------|-------------------------|----------------------------|-----------------------------|------------------------------|--|---------------------------------|
| Willis Brown<br>231 Wilson<br>Hays, KS  | 3/25/94                 | 1,000                   | 5,000                      | No<br>hours*                | No<br>Yes no                 | Hydrated Lime<br>50 lbs.<br>Agitated with vacuum valve         | Yes no                          |
|   |                         |                         |                            | Yes no<br>hours*            | Yes no                       |  | Yes no                          |
|   |                         |                         |                            | Yes no<br>hours*            | Yes no                       |  | Yes no                          |
|   |                         |                         |                            | Yes no<br>hours*            | Yes no                       |  | Yes no                          |
|   |                         |                         |                            | Yes no<br>hours*            | Yes no                       |  | Yes no                          |
|   |                         |                         |                            | Yes no<br>hours*            | Yes no                       |  | Yes no                          |

\* If septage was incorporated, how many hours after it was applied to the site?

\*\* Type means what kind of alkaline material was used, e.g. Lime.

Amount means how many pound were added.

How mixed means how did you mix the alkaline material into the septage.

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APPENDIX 3

KDHE Article 30: Water Well Contractor's License; Water Well Construction

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# STATE OF KANSAS



## ARTICLE 30 WATER WELL CONTRACTOR'S LICENSE; WATER WELL CONSTRUCTION

**EFFECTIVE JUNE 7, 2013**

Bureau of Water - Geology Section  
1000 S. W. Jackson St., Ste. 420  
Topeka, Kansas 66612-1367  
785/296-5524

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**ARTICLE 30--WATER WELL CONTRACTOR'S LICENSE  
WATER WELL CONSTRUCTION AND ABANDONMENT**

**(Note that Article 30 regulations 28-30-2, 28-30-3, 28-30-4, 28-30-5 and 28-30-6 were amended and became effective on June 7, 2013. The changed regulations appear in smaller font and double columns as they appear in the Kansas Register.**

This article regulates the construction, reconstruction, treatment and plugging of water wells and sets forth procedures for the licensing of water well contractors as required by K.S.A. 82a-1201 to 82a-1215 and amendments thereto.

**28-30-1.** (Authorized by K.S.A. 1979 Supp. 82a-1202, 82a-1205; effective E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; revoked May 01, 1980)

**28-30-2. Definitions.** In addition to the definitions in K.S.A. 82a-1203 and amendments thereto, each of the following terms shall have the meaning assigned in this regulation:

- (a) "Abandoned water well" means a water well determined by the department to meet at least one of the following conditions:
  - (1) Use of the water well has been permanently discontinued.
  - (2) Pumping equipment has been permanently removed from the water well.
  - (3) The water well either is in such disrepair that it cannot be used to supply water or has the potential for transmitting surface contaminants into the aquifer, or both.
  - (4) The water well poses potential health and safety hazards.
  - (5) The water well is in such a condition that it is not an active well or cannot be placed in inactive status.
- (b) "Above-grade surface completion" means the termination of a water well or boring if the casing being used is at least 12 inches above the surrounding ground surface.
- (c) "Active well" means a water well that is operating and is used to withdraw water or to monitor or observe groundwater conditions.

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- (d) “Annulus” means the space between the casing and the boring or the space between two or more strings of casing.
- (e) “Aquifer” means an underground formation that contains and is capable of transmitting groundwater.
- (f) “At-grade surface completion” means the termination of a monitoring well or boring if the casing is at the surrounding ground surface.
- (g) “Cased test hole” means any test hole in which casing has been installed and grouted.
- (h) “Confined aquifer” means an aquifer overlain and underlain by impermeable layers. Groundwater in a confined aquifer is under pressure greater than atmospheric pressure and will rise in a water well above the point at which groundwater is first encountered.
- (i) “Department” means Kansas department of health and environment.
- (j) “Designated person” means the individual designated by a water well contractor who is the contact person for compliance issues and who is responsible for submitting water well records and for earning the units of approved continuing education credits required by K.A.R. 28-30-3. The designated person may be the water well contractor.
- (k) “Drill rig” means an apparatus operated to create a hole or shaft in the ground in which a water well is constructed.
- (l) “Drill rig license number” means the numbers and letters assigned by the department that are affixed to each drill rig operated by or for a water well contractor.
- (m) “Drilling fluid” means any fluid, including water, that is added during the drilling process to help increase the drilling efficiency.
- (n) “Fresh groundwater” means water containing not more than 1,000 milligrams of total dissolved solids per liter and 500 milligrams of chloride per liter.
- (o) “Groundwater” means the part of the subsurface water that is in the zone of saturation.
- (p) “Grout” means bentonite clay grout, cement grout, neat cement grout, or other material approved by the secretary used to create a permanent

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impervious, watertight bond between the casing and the undisturbed formation surrounding the casing or between two or more strings of casing.

- (1) “Bentonite clay grout” means a mixture of water and either commercial grouting or plugging sodium Bentonite clay, including sodium bentonite clay manufactured under the trade name “volclay grout,” or an equivalent approved by the department according to the following:
  - (A) The mixture shall be prepared according to the manufacturer’s recommendations to achieve a weight of at least 9.4 pounds per gallon of mix. Weighting agents may be added according to the manufacturer’s recommendations.
  - (B) Sodium bentonite pellets, tablets, or granular sodium bentonite may also be used if these additives or materials meet the specifications listed in paragraph (p)(1).
  - (C) Sodium bentonite products that are designed for drilling purposes or contain organic polymers shall not be used.
- (2) “Cement grout” means a mixture of one 94-pound bag of portland cement, an equal volume of sand having a diameter no larger than two millimeters, and five to six gallons of clean water.
- (3) “Neat cement grout” means a mixture of one 94-pound bag of portland cement and five to six gallons of clean water.
- (q) “Grout tremie pipe” and “grout pipe” mean a steel or galvanized steel pipe or similar pipe having equivalent structural soundness that is used to pump grout to a point of selected emplacement during the grouting of a casing or plugging of an abandoned water well or test hole.
- (r) “Heat pump hole” means a hole drilled to install piping for an earth-coupled water source heat pump system, also known as a vertical closed-loop system.
- (s) “Inactive status” means a water well that is not presently operating but is maintained so that the water well can be put back in operation with minimum effort.
- (t) “Monitoring well” means a water well used to monitor, obtain, or collect hydrologic, geologic, geophysical, chemical, or other technical data pertaining to groundwater, surface water, or other hydrologic conditions. A monitoring well is also known as an “observation well.”

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- (u) “Pitless well adapter or unit” means an assembly of parts installed below the frost line that permits pumped groundwater to pass through the wall of the casing or the extension of the casing and prevent the entrance of contaminants.
- (v) “Public water-supply well” means a water well that meets both of the following conditions:
  - (1) Provides groundwater to the public for human consumption; and
  - (2) has at least 10 service connections or serves an average of at least 25 individuals daily for at least 60 days during a calendar year.
- (w) “Pump pit” means a watertight structure that meets both of the following conditions:
  - (1) Is constructed as follows:
    - (A) At least two feet away from the water well; and
    - (B) below ground level to prevent the freezing of pumped groundwater; and
  - (2) houses the pump or pressure tank, distribution lines, electrical controls, or other appurtenances.
- (x) “Reconstructed water well” means an existing water well that has been deepened or has had the casing replaced, repaired, added to, or modified in any way for the purpose of obtaining groundwater.
- (y) “Sand point” has the meaning specified in K.S.A. 82a-1203, and amendments thereto.
- (z) “Sanitary well seal” means a manufactured seal installed at the top of the casing that, when installed, creates an airtight and watertight seal to prevent contaminated or polluted water from gaining access to the groundwater supply.
- (aa) “Static water level” means the highest point below or above ground level that the groundwater in the water well reaches naturally.
- (bb) “Test hole” and “hole” mean any excavation constructed for the purpose of determining the geologic, hydrologic, and water quality characteristics of underground formations.
- (cc) “Treatment” means the stimulation of the production of groundwater

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from a water well through the use of hydrochloric acid, muratic acid, sulfamic acid, calcium or sodium ypochlorite, polyphosphates or other chemicals, and mechanical means, to reduce or remove iron and manganese hydroxide and oxide deposits, calcium and magnesium carbonate deposits, and slime deposits associated with iron or manganese bacterial growths that inhibit the movement of groundwater into the water well.

- (dd) “Uncased test hole” means any test hole from which casing has been removed or in which casing has not been installed.
- (ee) “Unconfined aquifer” means an aquifer containing groundwater at atmospheric pressure. The upper surface of the groundwater in an unconfined aquifer is the water table.
- (ff) “Water well” has the meaning specified in K.S.A. 82a-1203, and amendments thereto. (Authorized by K.S.A. 82a-1205 and 82a-1213; implementing K.S.A. 82a-1202, 82a-1205, and 82a-1213; effective, E-74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1987; amended Nov. 22, 1993; amended June 7, 2013.)

**28-30-3. Licensing.**

- (a) Eligibility. To be eligible for a water well contractor’s license, each applicant shall meet the following requirements:
  - (1) Submit a complete license application on a form provided by the department;
  - (2) submit a water well contractor application fee of \$10.00;
  - (3) (A) Pass the water well contractor examination conducted by the department or employ a designated person who has passed the water well contractor examination; and  
(B) submit a license fee of \$100.00 if the applicant or designated person passes the water well contractor examination; and
  - (4) submit a complete registration form on a form provided by the department for each drill rig operated by or for the applicant and a registration fee of \$25.00 for each drill rig operated by or for the applicant.

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- (b) License renewal.
- (1) Each licensee shall submit an application for renewal of license and drill rig registrations before July 1 of each year by filing the proper renewal forms provided by the department and by meeting the following requirements:
- (A) Paying the annual license fee and a drill rig registration fee for each drill rig to be operated in the state;
  - (B) filing all records for each water well constructed, reconstructed, or plugged by the licensee in accordance with K.A.R. 28-30-4 during the previous licensure period;
  - (C) filing a report, on a form approved by the department, of all approved continuing education units earned by the licensee or designated person during the previous licensure period;
  - (D) meeting the continuing education requirements in subsection (c); and
  - (E) providing any remaining outstanding information or records requested that existed before the issuance or revocation of a license.
- (2) Failure to comply with the requirements of this subsection shall be grounds to revoke the existing license and terminate the license renewal process.
- (c) Continuing education requirements. Each water well contractor or the contractor's designated person shall earn at least eight units of continuing education approved by the secretary. This requirement shall apply each year beginning with the first full year of licensure or the renewal period. One unit of continuing education shall equal 50 minutes of approved instruction except for trade shows and exhibitions, which shall be counted as one unit for each approved trade show or exhibition attended. (d) Employment requirements. If the designated person who has passed the water well contractor examination under paragraph (a)(3)(A) leaves the contractor's employment, the contractor shall employ a designated person who shall take, within 90 days, and be required to pass the water well contractor examination. (Authorized by K.S.A. 82a-1205, K.S.A. 2012 Supp. 82a-1206, and K.S.A. 82a-1207; implementing K.S.A. 82a-1202, K.S.A. 82a-1205, K.S.A. 2012 Supp. 82a-1206, K.S.A. 82a-1207, K.S.A. 82a-1209, and K.S.A. 82a-1212; effective, E-74-34, July 2, 1974; effective May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987; amended Nov. 22, 1993; amended June 7, 2013.)

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**28-30-4. General operating requirements.**

- (a) Water well record.
  - (1) Within 30 days after construction or reconstruction of a water well, each water well contractor shall submit a report to the department and to the landowner on the water well record form provided by the department.
  - (2) Each contractor shall report to the department and to the landowner on the water well record form provided by the department and attachments any polluted or other noncompliant conditions that the contractor was able to correct and any conditions that the contractor was unable to correct.
  - (3) Each contractor shall report to the department and to the landowner the plugging of any abandoned water well on the water well record form provided by the department.
  - (4) Each landowner who constructs, reconstructs, or plugs a water well that will be or was used by the landowner for farming, ranching, or agricultural purposes or is located at the landowner's residence shall submit a report to the department on the water well record form provided by the department within 30 days after the construction, reconstruction, or plugging of the water well. No fee shall be required from the landowner for the record.
- (b) Artificial recharge and return. Each contractor who constructs an artificial recharge well or a freshwater return well shall comply with all regulations applicable to these wells specified in article 46.
- (c) Water well tests. Results of a pumping test shall be reported on the water well record form provided by the department or a copy of the contractor's record of a pumping test shall be attached to the water well record form.
- (d) Water samples. Within 30 days after the department's receipt of the water well record form provided by the department, the contractor or landowner who constructs or reconstructs any water well may be requested by the department to submit a sample of water from the water well for chemical analysis. The sample shall be submitted within 30 days after the department's request.
- (e) Water well construction fee. Each contractor shall pay a \$5.00 fee to the department for each water well constructed. The construction fee shall be paid when the contractor requests a water well record form provided by

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the department or shall accompany the water well record form submitted as specified in this regulation.

- (f) License number. Each drill rig operated by or for a contractor shall prominently display the drill rig license number assigned by the department in letters and numbers at least two inches tall. Decals, paint, or other permanent marking materials shall be used. (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202, 82a-1205, 82a-1212, and 82a-1213; effective, E-74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1987; amended June 7, 2013.)

**28-30-5. Construction regulations for public water-supply wells.** All activities involving public watersupply wells shall meet the requirements of K.S.A. 65-163a, and amendments thereto, and regulations of the department, including K.A.R. 28-15-16. (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202 and 82a-1205; effective, E-74-34, July 2, 1974; effective May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987; amended June 7, 2013.)

**28-30-6. Construction regulations for all water wells not included under K.A.R. 28-30-5.**

- (a) Each water well shall be constructed to minimize the potential for contamination of the delivered or obtained groundwater and to protect groundwater aquifers from pollution and contamination.
- (b) The following requirements for grouting shall be met:
  - (1) Each constructed water well and each reconstructed water well shall be sealed by grouting the annulus between the casing and the boring from ground level to at least 20 feet or to at least five feet into the first clay or shale layer if one is present, whichever is greater. If a pitless well adapter or unit is being installed, the grouting shall start below the point at which the pitless well adapter or unit attaches to the casing and shall continue at least 20 feet below this point or to at least five feet into the first clay or shale layer, whichever is greater.
  - (2) The diameter of the drilled boring shall be at least three inches greater than the maximum outside diameter of the casing.
  - (3) Water from two or more separate aquifers shall be separated from each other in the boring by sealing the annulus between the aquifers with grout.

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- (c) If groundwater is encountered at a depth less than the minimum grouting requirement, the grouting requirement may be modified by the secretary to meet local conditions.
- (d) A well vent shall be used and shall terminate at least one foot above the ground surface. The well vent shall be screened with brass, bronze, copper screen, or other screen materials approved by the secretary that are 16-mesh or greater and turned down in a full 180-degree return bend to prevent the entrance of contaminating materials.
- (e) Before the completion of a constructed water well or a reconstructed water well, the water well shall be cleaned of mud, drill cuttings, and other foreign matter to make the water well suitable for pump installations.
- (f) Casing shall meet the following requirements:
  - (1) Each water well shall have durable watertight casing from at least one foot above the finished ground surface to the top of the producing zone of the aquifer. The watertight casing shall extend at least 20 feet below the ground level. Exceptions to either of these requirements may be granted by the secretary if warranted by local conditions.
  - (2) Each water well shall be an above-grade surface completion, except that an at-grade surface completion may be used if all requirements of subsection (s) are met. Casing may be cut off below the ground surface to install a pitless well adapter or unit.
  - (3) No opening shall be made through the casing, except for the installation of a pitless well adapter or unit designed and fabricated to prevent soil, subsurface, and surface water from entering the water well.
  - (4) The casing shall meet the requirements of the department's document titled "approved water well casing: water well casing for water wells other than public watersupply wells," dated November 7, 2012, which is hereby adopted by reference. Used, reclaimed, defective, or contaminated pipe shall not be used for casing any water well.
- (g) Each water well, when unattended during construction, reconstruction, treatment, or repair or during use as a cased test hole or as an observation or monitoring well, shall have the top of the casing securely capped in a watertight manner.
- (h) During construction, reconstruction, treatment, or repair and before its first

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use, each water well producing water for human consumption or food processing shall be disinfected according to K.A.R. 28-30-10.

- (i) The top of the casing shall be sealed by installing a sanitary well seal when the water well is completed.
- (j) Each groundwater-producing zone that is known or suspected to contain natural or man-made pollutants shall be cased and grouted in accordance with subsection (b) during construction of any water well to prevent the movement of groundwater to either overlying or underlying fresh groundwater zones.
- (k) Toxic material shall not be used in the construction, reconstruction, treatment, or plugging of a water well, unless the material is flushed from the water well before use.
- (l) The pipe from the pump or pressure tank in the pump pit to the water well shall be sealed in a watertight manner where the pipe passes through the wall of the pump pit.
- (m) A water well shall not be constructed in a pit, basement, garage, or crawl space. Each existing water well that is reconstructed, abandoned, or plugged in a basement shall conform to the requirements specified in this article, except that the finished grade of the basement floor shall be considered ground level.
- (n) Drilling fluid used during the construction or reconstruction of each water well shall be initially disinfected by mixing sodium hypochlorite with water to produce at least 100 milligrams per liter (mg/l) of available chlorine.
- (o) Natural organic or nutrient-producing material shall not be used during the construction, reconstruction, or treatment of a water well, unless this material is flushed from the water well and the groundwater aquifer or aquifers before the water well is completed. Natural organic or nutrient-producing material shall not be added to a grout mix used in the annulus to grout the water well.
- (p) Each water well pump shall meet the following requirements:
  - (1) Each pump installed directly over the casing shall be installed to form an airtight and watertight seal between the top of the casing and the gear or pump head, pump foundation, or pump stand.
  - (2) A sanitary well seal shall be installed between the pump column pipe or pump suction pipe and the casing if the pump is not

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mounted directly over the casing and the pump column pipe or pump suction pipe emerges from the top of the casing.

- (3) An airtight and watertight seal shall be provided for the cable conduit if submersible pumps are used.
- (q) Each sand point constructed, replaced, or reconstructed shall meet the following requirements:
- (1) Each sand point shall be constructed by drilling or boring a pilot hole at least three feet below ground surface. The pilot hole shall be at least three inches greater in diameter than the maximum outside diameter of the drive pipe or blank casing if the casing method is used.
  - (2) Each sand point shall be completed using one of the following methods:
    - (A) Casing method.
      - (i) Water well casing that meets the requirements of the department's document titled "approved water well casing: water well casing for water wells other than public water-supply wells," as adopted by reference in paragraph (f)(4), shall be set from at least three feet below the ground surface to at least one foot above the ground surface. The casing shall be sealed between the casing and the pilot hole with grouting material approved by the secretary from the bottom of the casing to ground surface.
      - (ii) The drive pipe shall be considered the pump drop pipe and shall be capped with a solid cap.
      - (iii) For underground discharge completions, a "T" joint shall be used.
      - (iv) A sanitary well seal and a well vent shall be installed on the top of the casing in accordance with subsections (d) and (i).
    - (B) Drive pipe method.
      - (i) A sand point may be installed without a casing for aboveground discharge completions only. In these completions, the drive pipe shall terminate at least one foot above finished ground level.

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- (ii) The annulus between the drive pipe and the pilot hole shall be sealed from the bottom of the pilot hole to ground surface with grout. The top of the drive pipe shall be sealed airtight and watertight with a solid cap of the same material as that of the drive pipe.
    - (iii) A well vent shall not be required.
  - (C) Other methods. Other methods may be approved by the secretary on a case-by-case basis using the appeal procedure specified in K.A.R. 28-30-9.
- (r) Upon abandonment of a sand point, the contractor or landowner shall pull the drive pipe or leave it in place.
  - (1) If the drive pipe is left in place, the sand point shall be plugged from the bottom of the well to three feet below the ground surface with approved grouting material. The sand point constructed by the drive pipe method shall be cut off three feet below the ground surface, and the remaining three-foot-deep hole shall be backfilled with surface soil.
  - (2) If the drive pipe is completely pulled, the remaining hole shall be plugged with approved grouting material from the bottom of the remaining hole to three feet below the ground surface. The hole shall be backfilled with surface soil from three feet to ground surface.
- (s) Each monitoring well shall be an above-grade surface completion, unless the monitoring well is located on a roadway, sidewalk, driveway, parking lot, or other heavily trafficked area that requires an at-grade surface completion monitoring well. The following requirements shall be met for each at-grade surface completion:
  - (1) The location of each monitoring well shall be identified by a unique well number marked on a scaled map that shows latitude and longitude coordinates. The water well contractor shall submit the scaled map and coordinates to the department with the water well record form provided by the department.
  - (2) The construction method for each monitoring well shall meet the requirements of the department's procedure document titled "flush-mount well construction detail," dated May 23, 2012, which is hereby adopted by reference. (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202 and 82a-1205; effective, E-

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74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987; amended June 21, 1993; amended June 7, 2013.)

**28-30-7. Plugging of abandoned wells, cased and uncased test holes.**

- (a) All water wells abandoned by the landowner on or after July 01, 1979, and all water wells that were abandoned prior to July 01, 1979 which pose a threat to groundwater supplies, shall be plugged or caused to be plugged by the landowner. In all cases, the landowner shall perform the following as minimum requirements for plugging abandoned wells.
- (1) The casing shall be cut off three feet below ground surface and removed.
  - (2) All wells shall be plugged from bottom to top using volumes of material equaling at least the inside volume of the well.
  - (3) Plugging top of well:
    - (A) For cased wells a grout plug shall be placed from six to three feet below ground surface.
    - (B) For dug wells, the lining material shall be removed to at least five feet below ground surface, and then sealed at five feet with a minimum of six inches of concrete or other materials approved by the department. Compacted surface silts and clays shall be placed over the concrete seal to ground surface.
  - (4) Any groundwater displaced upward inside the well casing during the plugging operation shall be removed before additional plugging materials are added.
  - (5) From three feet below ground level to ground level, the plugged well shall be covered over with compacted surface silts or clays.
  - (6) Compacted clays or grout shall be used to plug all wells from the static water level to six feet below surface.
  - (7) All sand and gravel used in plugging abandoned domestic or public water supply wells shall be chlorinated prior to placement into a well.
- (b) Abandoned wells formerly producing groundwater from an unconfined aquifer shall be plugged in accordance with the foregoing and in addition

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shall have washed sand, and gravel or other material approved by the department placed from the bottom of the well to the static water level.

- (c) Abandoned wells, formerly producing groundwater from confined and unconfined aquifers or in confined aquifers only, shall be plugged according to K.A.R. 28-30-7(a) and by using one of the following additional procedures:
- (1) The entire well column shall be filled with grout, or other material approved by the department, by use of a grout tremie pipe.
  - (2) A 10 foot grout plug shall be placed opposite the impervious formation or confining layer above each confined aquifer or aquifers by use of a grout tremie pipe; and
    - (A) The space between plugs shall be filled with clays, silts, sand and gravel or grout and shall be placed inside the well so as to prevent bridging.
    - (B) A grout plug at least 20 feet in length shall be placed with a grout pipe so at least 10 feet of the plug extends below the base of the well casing and at least 10 feet of the plug extends upward inside the bottom of the well casing.
    - (C) A grout plug at least ten feet in length shall be placed from at least 13 feet below ground level to the top of the cut off casing.
  - (3) Wells that have an open bore hole below the well casing, and where the casing was not grouted into the well bore when the well was constructed, shall be plugged by (1) or (2) above, except that the top 20 feet of well casing shall be removed or perforated with the casing ripper or similar device prior to plugging. If the well is plugged according to part (2) of this subsection, the screened or perforated intervals below the well casing shall be grouted the entire length by use of a grout tremie pipe.
- (d) Plugging of abandoned holes. If the hole penetrates an aquifer containing water with more than 1,000 milligrams per liter, mg/l, total dissolved solids or is in an area determined by the department to be contaminated, the entire hole shall be plugged with an approved grouting material from the bottom of the hole, up to within three feet of the ground surface using a grout tremie pipe or similar method. From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays; otherwise, the hole shall be plugged in accordance with the following paragraphs.

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- (1) Plugging of abandoned cased test holes. The casing shall be removed if possible and the abandoned test hole shall be plugged with an approved grouting material from the bottom of the hole, up to within three feet of the ground surface, using a grout tremie pipe or similar method. From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays.

If the casing cannot be removed, in addition to plugging the hole with an approved grouting material the annular space shall also be grouted as described in K.A.R. 28-30-6 or as approved by the department.

- (2) Abandoned uncased test holes, exploratory holes or any bore holes except seismic or oil field related exploratory and services holes regulated by the Kansas Corporation Commission under K.A.R. 82-3-115 through 82-3-117. A test hole or bore hole drilled, bored, cored or augered shall be considered an abandoned hole immediately after the completion of all testing, sampling or other operations for which the hole was originally intended. The agency or contractor in charge of the exploratory or other operations for which the hole was originally intended is responsible for plugging the abandoned hole using the following applicable method, within three calendar days after the termination of testing other operations.

- (A) The entire hole shall be plugged with an approved grouting material from bottom of the hole, up to within three feet of the ground surface, using a grout tremie pipe or similar method.

- (B) From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays.

- (C) For bore holes of 25 feet or less, drill cuttings from the original hole may be used to plug the hole in lieu of grouting material, provided that an aquifer is not penetrated or the bore hole is not drilled in an area determined by the department to be a contaminated area.

- (3) Plugging of heat pump holes drilled for closed loop heat pump systems. The entire hole shall be plugged with an approved grouting material from bottom of the hole, to the bottom of the horizontal trench, using a grout tremie pipe or similar method approved by the department.

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- (e) Abandoned oil field water supply wells. A water well drilled at an oil or gas drilling site to supply water for drilling activities shall be considered an abandoned well immediately after the termination of the oil or gas drilling operations. The company in charge of the drilling of the oil or gas well shall be responsible for plugging the abandoned water well, in accordance with K.A.R. 28-30-7(a), (b), and (c), within 30 calendar days after the termination of oil and gas drilling operations.

Responsibility for the water well may be conveyed back to the landowner in lieu of abandoning and plugging the well but the well must conform to the requirements for active or inactive status. The transfer must be made through a legal document, approved by the department, advising the landowner of the landowner's responsibilities and obligations to properly maintain the well, including the proper plugging of the well when it is abandoned and no longer needed for water production activities. If a transfer is to be made, the oil or gas drilling company shall provide the department with a copy of the transfer document within 30 calendar days after the termination of oil or gas drilling operations. Within 30 calendar days of the effective date of the transfer of the well the landowner shall notify the department of the intended use and whether the well is in active status or inactive status in accordance with K.A.R. 28-30-7(f).

- (f) Inactive status. Landowners may obtain the department's written approval to maintain wells in an inactive status rather than being plugged if the landowner can present evidence to the department as to the condition of the well and as to the landowner's intentions to use the well in the future. As evidence of intentions, the owner shall be responsible for properly maintaining the well in such a way that:

- (1) The well and the annular space between the hole and the casing shall have no defects that will permit the entrance of surface water or vertical movement of subsurface water into the well;
- (2) the well is clearly marked and is not a safety hazard;
- (3) the top of the well is securely capped in a watertight manner and is adequately maintained in such a manner as to prevent easy entry by other than the landowner;
- (4) the area surrounding the well shall be protected from any potential sources of contamination within a 50 foot radius;
- (5) if the pump, motor or both, have been removed for repair, replacement, etc., the well shall be maintained to prevent injury to people and to prevent the entrance of any contaminant or other foreign material;

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- (6) the well shall not be used for disposal or injection of trash, garbage, sewage, wastewater or storm runoff; and
- (7) the well shall be easily accessible to routine maintenance and periodic inspection.

The landowner shall notify the department of any change in the status of the well. All inactive wells found not to be in accordance with the criteria listed in lines one through seven above shall be considered to be abandoned and shall be plugged by the landowner in accordance with K.A.R. 28-30-7(a) through (c). (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202, 82a-1205, 82a-1212, 82a-1213; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987.)

**28-30-8. Pollution sources.** Well locations shall be approved by municipal and county governments with respect to distances from pollution sources and compliance with local regulations. The following minimum standard shall be observed.

- (a) The horizontal distances between the well and the potential source of pollution or contamination such as sewer lines, pressure sewer lines, septic tanks, lateral fields, pit privy, seepage pits, fuel or fertilizer storage, pesticide storage, feed lots or barn yards shall be 50 feet or more as determined by the department.
- (b) Proper drainage in the vicinity of the well shall be provided so as to prevent the accumulation and ponding of surface water within 50 feet of the well. The well shall not be located in a ravine or any other drainage area where surface water may flow into the well.
- (c) When sewer lines are constructed of cast iron, plastic or other equally tight materials, the separation distance shall be 10 feet or more as determined by the department.
- (d) All wells shall be 25 feet or more from the nearest property line, allowing public right-of-ways to be counted; however, a well used only for irrigation or cooling purposes may be located closer than 25 feet to an adjoining property where:
  - (1) such adjoining property is serviced by a sanitary sewer and does not contain a septic tank system, disposal well or other source of contamination or pollution; and
  - (2) the property to be provided with the proposed well is served by both a sanitary sewer and a public water supply. (Authorized by

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and implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02, 1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1980; amended May 01, 1987.)

**28-30-9. Appeals.**

- (a) Requests for exception to any of the foregoing rules and regulations shall be submitted to the department in writing and shall contain all information relevant to the request.
  - (1) Those requests shall specifically set forth why such exception should be considered.
  - (2) The department may grant exceptions when geologic or hydrologic conditions warrant an exception and when such an exception is in keeping with the purposes of the Kansas groundwater exploration and protection act.
- (b) Appeals from the decision of the department shall be made to the secretary, who after due consideration may affirm, reverse or modify the decision of the department. (Authorized by K.S.A. 82a-1205; implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02, 1974; effective May 01, 1975; amended May 01, 1980; amended May 01, 1983; amended May 01, 1987.)

**28-30-10 Water well disinfection for wells constructed or reconstructed for human consumption or food processing.**

- (a) Gravel for gravel-packed wells shall be disinfected by immersing the gravel in a chlorine solution containing not less than 200 milligrams per liter, mg/l, of available chlorine before it is placed in the wells annular space.
- (b) Constructed or reconstructed wells shall be disinfected by adding sufficient hypochlorite solution to them to produce a concentration of not less than 100 mg/l of available chlorine when mixed with the water in the well.
- (c) The pump, casing, screen and pump column shall be washed down with a 200 mg/l available chlorine solution.
- (d) All persons constructing, reconstructing, or treating, a water well and removing the pump or pump column, replacing a pump, or otherwise performing an activity which has potential for contaminating or polluting the groundwater supply shall be responsible for adequate disinfection of the well, well system and appurtenances thereto. (Authorized by and implementing K.S.A. 82a-1202, 82a-1205; effective, E-74-34, July 02,

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1974; modified, L. 1975, ch. 481, May 01, 1975; amended May 01, 1080; amended May 01, 1987.)

**28-30-200. Definitions.** In addition to the definitions in K.A.R. 28-30-2, the following definitions shall apply to the Equus Beds groundwater management district no. 2:

- (a) “Bedrock” means shale, limestone, sandstone, siltstone, anhydrite, gypsum, salt, or other consolidated rock that can occur at the surface or underlie unconsolidated material.
- (b) “Board” means the board of directors constituting the governing body of the Equus Beds groundwater management district no. 2.
- (c) “Borehole” means any hole that is drilled, cored, bored, washed, driven, dug, or otherwise excavated, in which the casing and screen have been removed or in which the casing has not been installed.
- (d) “Contaminate” means to engage in any act or omission causing the addition or introduction of substances to freshwater in concentrations that alter the physical, chemical, biological, or radiological properties of the freshwater, making the water unfit for beneficial use.
- (e) “District” means the Equus Beds groundwater management district no. 2, which is organized for groundwater management purposes pursuant to K.S.A. 82a-1020 et seq., and amendments thereto.
- (f) “Fluid” means any material or substance that flows or moves in a semisolid, liquid, sludge, gas, or any other form or state.
- (g) “Free-fall” means a method used to place grout in a water well or borehole that meets all of the following conditions:
  - (1) The total grouting depth below ground level does not exceed 75 feet.
  - (2) The grouting interval is free of fluids.
  - (3) The diameter of the water well casing or borehole is sufficient to allow the unobstructed flow of grout throughout the entire grouting interval.
  - (4) Grout is poured or discharged into the water well or borehole at a controlled rate.
- (h) “Fresh groundwater” means water containing not more than 1,000 milligrams of total dissolved solids per liter and 500 milligrams of chloride per liter.

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- (i) “Grout” has the meaning specified in K.A.R. 28-30-2.
- (j) “Grout seal” means grout that is installed, placed, pumped, or injected to create a permanent, impervious watertight bond in a well casing, annular space, geologic unit, or any other apertures or apparatuses associated with a water well or borehole.
- (k) “Inactive well” means a water well that meets the following conditions:
  - (1) Is not operational;
  - (2) is properly constructed as specified in K.A.R. 28-30-5 or K.A.R. 28-30-6;
  - (3) is equipped with a watertight seal; and
  - (4) is maintained in good repair until the water well is returned to service as an active water well.
- (l) “Licensed geologist” means a geologist licensed to practice geology in Kansas by the Kansas board of technical professions.
- (m) “Licensed professional engineer” means a professional engineer licensed to practice engineering in Kansas by the Kansas board of technical professions.
- (n) “Monitoring well” means a water well used to monitor, obtain, or collect hydrologic, geologic, geophysical, chemical, or other technical data pertaining to groundwater, surface water, or other hydrologic conditions.
- (o) “Test borehole” means a borehole used to obtain or collect hydrologic, geologic, geophysical, chemical, or other technical data pertaining to groundwater, surface water, or other hydrologic conditions by means of placing sampling, logging, testing, casing, screen, or associated tools or equipment in the borehole for fewer than 30 days. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028 and K.S.A. 82a-1213; effective P-September 30, 2005)

**28-30-201. Plugging operations; notification; report.**

- (a) All plugging operations shall be supervised by one of the following:
  - (1) A water well contractor licensed by the department;
  - (2) a licensed professional engineer or licensed geologist; or

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- (3) the water well or borehole owner, or the landowner of the property on which the water well or borehole is located.
- (b) Each water well or borehole owner, or the landowner of the property on which the water well or borehole is located, shall notify the district within 48 hours before any plugging operations occur.
- (c) Within 30 days after the plugging operation is completed, one of the following requirements shall be met:
  - (1) The water well contractor, licensed professional engineer, or licensed geologist that supervised the water well or borehole plugging operations shall submit a completed report of the work on the department's plugging record form WWC-5P or WWC-5 to the department, the district, and the landowner.
  - (2) The water well or borehole owner, or the landowner of the property on which the water well or borehole is located, shall submit a completed report of the work on the department's plugging record form WWC-5P or WWC-5 to the department and the district. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028 and K.S.A. 82a-1213; effective P-September 30, 2005)

**28-30-202. Plugging operations for an abandoned water well or borehole; responsibility.**

- (a) Each water well or borehole shall be considered abandoned if at least one of the following conditions exists:
  - (1) The water well or borehole was not completed.
  - (2) The water well or borehole threatens to contaminate fresh groundwater.
  - (3) The water well or borehole poses a safety or health hazard.
  - (4) Uncontrolled fluid flow is encountered or present in the water well or borehole.
  - (5) The use of the water well or borehole has ceased.
  - (6) The borehole testing, sampling, or other operations are completed within 30 days of completion of the borehole drilling.
  - (7) The water well or borehole owner has not demonstrated the intention to use the water well or borehole.

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- (8) The water well can not be maintained in an active or inactive status.
  - (9) The water well or borehole is not operational or functional for the intended use.
- (b) Each water well or borehole owner or the landowner of the property shall plug or cause an abandoned water well or borehole to be plugged as required in subsection (c) of this regulation.
- (c) Except as specified in subsection (e), the minimum plugging operations for an abandoned water well or borehole shall include the following:
- (1) Before plugging operations begin, the following water well or borehole data shall be recorded as follows:
    - (A) The legal description of the water well or borehole location, to the nearest 10-acre tract and, if available, the geographic coordinates consisting of the latitude, longitude, and base datum;
    - (B) the diameter of the water well or borehole;
    - (C) the static water level; and
    - (D) the total depth of the water well or borehole.
  - (2) The materials used to plug a water well or borehole shall be clean, free of defects, properly prepared, and installed according to the manufacturers specifications.
  - (3) All plugging material that forms a bridge, entraps air or other fluids, or forms a blockage in the water well or borehole shall be freed or removed before continuing plugging operations.
  - (4) All pumping, sampling, logging, and related equipment and any other material or debris in the water well or borehole shall be removed from the water well or borehole.
  - (5) The annular space of the water well shall be grouted as specified in K.A.R. 28-30-203.
  - (6) Before plugging operations begin and when plugging operations are suspended or interrupted, the opening of the water well or borehole shall be secured to prevent fluids from entering the water well or borehole.

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- (7) Before placement of any plugging material, the water well or borehole shall be disinfected as specified in K.A.R. 28-30-205.
  - (8) Except as specified in subsection (d) of this regulation, all of the following minimum grouting requirements shall be met:
    - (A) The water well or borehole shall be grouted from the bottom to three feet below ground level.
    - (B) Each water well meeting the requirements of subsection (d) shall be grouted from the top of the sand or gravel plugging material to three feet below ground level.
    - (C) Grout shall be placed in the water well or borehole using one of the following:
      - (i) A grout tremie pipe;
      - (ii) free-fall; or
      - (iii) a grouting procedure recommended by the grout manufacturer.
    - (D) Grout shall be allowed to cure as recommended by the grout manufacturer.
  - (9) Except as required by K.A.R. 28-30-203, the water well casing shall be cut off at a minimum of three feet below land surface and removed.
  - (10) From three feet below land surface to land surface, the water well or borehole shall be backfilled with clean, compacted topsoil and sloped so that drainage or runoff is directed away from the plugged water well or borehole.
- (d) Any water well or borehole owner, landowner of the property, water well contractor, licensed geologist, or licensed professional engineer may utilize coarse sand or fine gravel to plug a water well by filling the water well casing to the static water level or six feet below ground level, whichever is the greater distance below ground level, if both of the following water well conditions are present:
- (1) The water well is cased.
  - (2) The water well is completed in a single unconfined aquifer.

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- (e) Drill cuttings from the original borehole may be used to plug a borehole that meets all of the following conditions:
  - (1) The depth of the borehole is less than the highest historical groundwater level.
  - (2) The depth of the borehole is 25 feet or less below ground level.
  - (3) The borehole is not located in a contaminated area. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028 and K.S.A. 82a-1213; effective P-September 30, 2005)

**28-30-203. Annular space grouting procedures.**

- (a) Each water well or borehole owner or landowner of the property with an abandoned water well that was constructed on or after May 1, 1983 shall have the water well's annular space grouted as follows:
  - (1) From three feet below ground level to a minimum of 20 feet below ground level; or
  - (2) below the point at which a pitless well adapter attaches to the well casing to a minimum of 20 feet below the pitless well adapter.
- (b) The annular space of each abandoned water well in which the water well was constructed before May 1, 1983 shall be grouted as follows:
  - (1) If the annular space does not contain grout or gravel pack and is free of debris, the grout shall be placed in the annular space in the following manner:
    - (A) From three feet below ground level to 20 feet below ground level; or
    - (B) below the point at which a pitless well adapter attaches to the well casing to a minimum of 20 feet below the pitless well adapter.
  - (2) If the annular space contains gravel pack or other material, all of the following requirements shall be met:
    - (A) The well casing shall be removed to a depth of four feet below ground level.
    - (B) The annular space shall be freed of gravel pack, any other material, and fluid from the top of the casing to six feet below the top of the well casing.

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- (C) The grout shall be placed in the annular space from six feet below the top of the well casing to one foot above the top of the well casing.
- (c) From three feet below ground level to ground level, the water well or borehole shall be backfilled with clean, compacted topsoil and sloped so that the drainage or runoff is directed away from the plugged water well or borehole.
- (d) If groundwater is encountered at a depth less than the minimum grouting requirement, the annular space grouting requirement may be modified by requesting a variance from the district as specified in K.A.R. 28-30-208. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028 and K.S.A. 82a-1213; effective P-September 30, 2005)

**28-30-204. Inactive well; application; construction and extension.**

- (a) Each owner of an inactive water well shall meet the following requirements:
  - (1) Submit a completed, signed, and notarized inactive water well agreement, on a form provided by the district, to the district manager 30 days before placing the well on inactive status. The form shall include a statement that the water well does not pose a public health or safety hazard and does not threaten to contaminate the groundwater;
  - (2) remove all pumping equipment from the water well;
  - (3) construct the water well and the annular space as specified in K.A.R. 28-30-6;
  - (4) seal and maintain the water well and the annular space to prohibit the entrance of surface fluids and materials and the vertical movement of subsurface water into the well and to prevent damage;
  - (5) post a sign that meets the following conditions within three feet of the water well:
    - (A) Has a minimum height of three feet above land surface;
    - (B) is easily visible;
    - (C) is continually maintained; and

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- (D) is constructed with the words “Inactive Water Well” and a legal description consisting of the 10-acre tract, section, township, and range description printed legibly; and
- (6) securely install a watertight seal or cap on the water well casing opening a minimum of one foot above land surface that consists of one of the following:
  - (A) Steel plating that is a minimum of 1/4 inch thick and is welded to the casing opening;
  - (B) a polyvinylchloride cap glued to the water well casing opening, with a minimum standard dimension ratio (SDR) of 21 or less on well casing less than four inches in diameter and a minimum SDR of 26 or less on well casing four or more inches in diameter. The SDR shall be calculated by dividing the casing's outside diameter (OD) by its minimum wall thickness (MWT); or
  - (C) any other seal or cap that is approved by the district manager.
- (b) Each water well owner shall repair all damage to the water well within 30 days, unless the district manager determines that the water well poses a public health or safety hazard, in which case the district manager shall set the time period for fewer than 30 days.
- (c) Each water well owner shall notify the district within 30 days after the water well is returned to service as an active water well.
- (d) The district manager or a staff member of the district may inspect any inactive water well.
- (e) Each water well owner shall be responsible for properly maintaining the water well in the inactive status.
- (f) A radius of 50 feet around the inactive well shall be free of contamination.
- (g) An inactive water well shall not be used for disposal or injection of any fluids or materials.
- (h) Each inactive water well shall be easily accessible for routine maintenance and inspection.
- (i) Each water well owner shall notify the district manager of any change in the condition of the water well.

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- (j) Each inactive water well that does not meet the requirements of these regulations shall be deemed abandoned and shall be plugged in accordance with these regulations.
- (k) The expiration date of the inactive water well period may be extended beyond the date authorized in the approved inactive water well agreement or the date of any extension authorized by the district manager, if the water well is in good repair and meets the requirements of these regulations. The extension of time shall not exceed one year beyond the expiration date of the inactive well agreement or the date of any authorized extension.
- (l) Each approved inactive water well request and each approved extension of time shall be reported by the district to the department, in writing, within 30 days of approval on a form provided by the district. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028 and K.S.A. 82a-1213; effective P-September 30, 2005)

**28-30-205. Disinfection of an abandoned water well or borehole.**

- (a) Except at specified in subsection (b), the following minimum quantities of sodium hypochlorite with 5.25 percent to 6.0 percent strength, manufactured under trade names including Clorox, Purex, Sno-White, and Topco, and other bleach products with similar properties, shall be used to disinfect each abandoned water well or borehole:

| Water well casing or hole diameter<br>(inches) | Sodium hypochlorite<br>(fluid ounces per foot of water column) |
|--|--|
| 1.25   | 0.015  |
| 1.5  | 0.023  |
| 2  | 0.041  |
| 2.5  | 0.064  |
| 3  | 0.094  |
| 3.5  | 0.127  |
| 4  | 0.165  |
| 5  | 0.259  |
| 6  | 0.381  |
| 8  | 0.660  |
| 10   | 1.036  |
| 12   | 1.490  |
| 14   | 2.031  |
| 16   | 2.650  |
| 18   | 3.354  |
| 24   | 5.966  |
| 30   | 9.317  |

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- (b) Any concentration of sodium hypochlorite not specified in subsection (a) or any combination of calcium hypochlorite may be used to disinfect an abandoned water well or borehole, if a minimum concentration of 100 milligrams of chlorine solution per liter per foot of water column in the water well or borehole is produced. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028 and K.S.A. 82a-1213; effective P-September 30, 2005.)

**28-30-206. Administrative appeal to the board.**

- (a) Any owner of a water well or borehole or any person whose legal rights, duties, privileges, immunities, or other legal interests are affected by an order issued by the district may request an appeal hearing with the board.
- (b) The request for hearing shall be filed with the board within 30 days after service of the order on the owner or owners of the water well or borehole or any person whose legal rights, duties, privileges, immunities, or other legal interests are affected by the order. The request for hearing shall state the basis for requesting a hearing and shall be accompanied by documentation supporting the request.
- (c) During the hearing, the board may take into consideration any relevant information or data, including information and data from any person whose legal rights, duties, privileges, immunities, or other legal interests may be affected by the order.
- (d) After consideration of all information and data presented, the board shall issue one of the following:
  - (1) An order remanding the case to the district manager with instructions for additional investigation; or
  - (2) a final order that contains findings of fact and conclusions of law.
- (e) Within 15 days of the service of a final order, the owner or owners of the water well or borehole or any person whose legal rights, duties, privileges, immunities, or other legal interests are affected may file a written petition for reconsideration to the board. The petition for reconsideration shall state the basis and contain any facts and conclusions of law that are in dispute.
- (f) The board shall render a written order denying the petition for reconsideration, granting the petition for reconsideration and modifying the final order, or granting the petition for reconsideration and setting the matter for further proceedings. After further proceedings, the petition for reconsideration may be denied or granted in whole or in part.

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- (g) Unless clear and convincing evidence is presented to the board, the board shall not render a written order if the order would result in any of the following:
  - (1) The impairment of an existing groundwater use;
  - (1) an adverse effect on public health, safety, or the environment;
  - (3) the threat of groundwater contamination;
  - (4) an adverse effect on the public interest; or
  - (5) the impairment of the board=s ability to apply and enforce these regulations or the management program specified in K.S.A. 82a-1029, and amendments thereto.
- (h) Any owner or owners or any person whose legal rights, duties, privileges, immunities, or other legal interests are affected by a final order or order rendered upon reconsideration may seek judicial review pursuant to the act for judicial review and civil enforcement of agency actions specified in K.S.A. 77-601 et seq., and amendment thereto.
- (i) Each order issued by the board shall be mailed to the owner or owners; any person whose legal rights, duties, privileges, immunities, or other legal interests are affected by the order; and the department. Service shall be deemed complete upon mailing. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028; effective P-September 30, 2005)

**28-30-207. Variance; extension of time.**

- (a) If an individual or party wants a variance from any of the regulations contained in K.A.R. 28-30-200 through K.A.R. 28-30-206 or an extension of time pursuant to K.A.R. 28-30-204, the individual or party shall submit a request, in writing, to the district.
  - (1) Each request shall include the following:
    - (A) The name, address, telephone number, and contact person of the individual or party requesting the variance or extension of time;
    - (B) the specific legal description of the site location to which the variance or extension of time would apply;
    - (C) the specific regulation from which the variance is sought or the amount of time requested; and

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- (D) the reason for requesting the variance or extension of time and any supporting data.
- (2) A variance or extension of time may be granted by the district manager if the variance or extension is in keeping with the purposes of the Kansas groundwater exploration and protection act and the groundwater management district act.
- (c) Each variance or extension of time granted by the district manager shall be reported by the district to the department within 30 days of approval.
- (d) Each individual or party who wants an extension of time for the inactive water well period shall submit the request at least 30 days before the expiration date on a form provided by the district. (Authorized by and implementing K.S.A. 2004 Supp. 82a-1028; effective P-September 30, 2005.)

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Effective May 01, 1980

Kansas Department of Health and Environment  
Approved Water Well Casing  
(Authorization K.A.R. 28-30-6(h))

Water Well Casing for Water Wells Other Than Public  
Water Supply and Reservoir Sanitation Zone Water Wells

**STEEL AND WROUGHT IRON**

| Dept of<br>Casing in Feet | Nominal Diameter, (in inches) |      |      |      |      |      |      |      |      |      |
|---------------------------|-------------------------------|------|------|------|------|------|------|------|------|------|
|                           | 04                            | 06   | 08   | 10   | 12   | 14   | 16   | 18   | 24   | 30   |
|                           | Minimum Wall Thickness*       |      |      |      |      |      |      |      |      |      |
| 0-100                     | 10                            | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 7    | .219 |
| 100-200                   | 10                            | 10   | 10   | 10   | 10   | 7    | 7    | 7    | .219 | .219 |
| 200-400                   | 10                            | 10   | 10   | 10   | 7    | 7    | 7    | .219 | .250 | .250 |
| 400-600                   | 7                             | 7    | 7    | 7    | 7    | 7    | .219 | .250 | .312 | .312 |
| 600 +                     | 7                             | .219 | .219 | .219 | .219 | .219 | .250 | .375 | .375 | .375 |

\*Decimal numbers indicate thickness in inches. Whole numbers indicate the United States standard gage (10 gage=0.141 inches and 7 gage=.0179 inches.)

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**THERMAL PLASTIC WATER WELL CASING**

For Polyvinyl Chloride (PVC), Styrene Rubber (SR)  
 which is the same as Rubber Modified Polystyrene (RMP)  
 and Acrylonitrile - Butadiene Styrene (ABS)

Minimum Wall Thickness (inches) and Tolerances (inches) made in  
 Standard Dimension Ratios (SDR)

| Normal<br>Pipe Size | SDR 26 |       | SDR 21 |       | SDR 17 |       | SDR 13.5 |       |
|---------------------|--------|-------|--------|-------|--------|-------|----------|-------|
|                     | Min.   | Tol.  | Min.   | Tol.  | Min.   | Tol.  | Min.     | Tol.  |
| 2                   | -----  | ----- | 0.113  | 0.020 | 0.140  | 0.020 | 0.176    | 0.021 |
| 2.5                 | -----  | ----- | 0.137  | 0.020 | 0.169  | 0.020 | 0.213    | 0.026 |
| 3                   | -----  | ----- | 0.167  | 0.020 | 0.206  | 0.025 | 0.259    | 0.031 |
| 3.5                 | -----  | ----- | 0.190  | 0.023 | 0.235  | 0.028 | 0.296    | 0.036 |
| 4                   | 0.173  | 0.021 | 0.214  | 0.026 | 0.265  | 0.032 | 0.333    | 0.040 |
| 5                   | 0.214  | 0.027 | 0.265  | 0.032 | 0.327  | 0.039 | 0.412    | 0.049 |
| 6                   | 0.255  | 0.031 | 0.316  | 0.038 | 0.390  | 0.047 | 0.491    | 0.058 |
| 8                   | 0.332  | 0.040 | 0.410  | 0.049 | 0.508  | 0.061 | -----    | ----- |
| 10                  | 0.413  | 0.050 | 0.511  | 0.061 | 0.632  | 0.076 | -----    | ----- |
| 12                  | 0.490  | 0.059 | 0.060  | 0.073 | 0.750  | 0.090 | -----    | ----- |
| 14                  | 0.539  | 0.065 |        |       |        |       |          |       |
| 16                  | 0.616  | 0.074 |        |       |        |       |          |       |

The minimum is the lowest wall thickness of the wall casing pipe at any cross section. All tolerances are on the plus side of the minimum requirement.

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 c:/waterwellsection/waterwellarticles&packets/Article\_30\_AMENDED\_2013  
 6/25/2013

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