Kansas Department of Health and Environment
Bureau of Environmental Field Services
Watershed Management Section
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Private Well Maintenance and Protection
Technical Guidance Document WMS 19-2396

This publication provides help for users in understanding the importance of wellhead protection as well as information about separation distances between a well and its sources of contamination.

According to the 2017 U.S. Census American Housing Survey, more than 13 million households rely on private wells for drinking water. Unlike public water systems regulated by the Federal Safe Drinking Water Act or state laws, individuals are responsible for maintaining and monitoring their private well water quality. In a study of 2,100 domestic wells conducted by U.S. Geological Survey (USGS), nearly one in five wells contained one or more contaminants at a concentration harmful to human health. Primary reasons for poor condition of water quality from private wells include the following:

- Well is down slope or near contamination sources.
- Well is not constructed to current standards.
- Well is inadequately maintained and serviced.
- Well is not protected from activities that risk contamination.

Wellhead Protection

Well location with respect to potential contamination sources is the most important factor for protection of water quality. Every well needs a wellhead protection plan to assure safe water quality, especially wells used for human consumption. The wellhead protection plan indicates site vulnerability to groundwater contamination and rates the risk of activities within 500 feet of the well.

The first priority is the location must meet a recommended separation distance between the well and its sources of contamination as shown in Table 1. Over time, groundwater contamination and well-water quality deterioration risk can increase and may become permanent.

Table 1. Minimum Separation Distances for Private Wells

This table gives minimum separation distances between a well and its potential sources of pollution as required in Kansas Department of Health and Environment regulations K.A.R. 28-30-2(w) and 28-30-8. Whenever possible, increase separation distances as these minimum requirements do not guarantee contamination will not reach the well.

Potential Source of Pollution	Separation Distances (in feet)	
	Minimum Required	Recommended
Watertight sewer line (cast-iron, PVC, etc.)	10	50
Non-watertight sewer line (clay tile, etc.)	50	>400
Septic tanks (watertight)	50	>100
Wastewater absorption field (septic lateral lines)	50	>400
Pit privies	50	>400
Stables, livestock pens, lagoons and manure piles	50	>400
Streams, lakes and ponds	50	>100
Silage pits, fertilizer and fuel storage (above or below ground)	50	>400
Seepage pits (or rat holes) prohibited after May 1996	50	>400
Pump pit, including valve box for lawn sprinkler	2	4
All other wastewater systems	50	>100
Property line	25	> 50
Public water supply sources (i.e., wells)[1]	100	>100
Building/structure (termite treatment)[2]	50	>100
Pesticide storage, mixing and disposal areas, or areas of repeated pesticide use	50	>400

[1]Required by Policies, General Consideration and Design Requirements for Public Water Supply Systems in Kansas [K.S.A. 65-162a (b)].
[2]Not required by K.A.R. 28-30-8 but is required when injecting liquid pesticides into the soil.

A good wellhead protection plan involves careful planning, and may include primary and secondary protection areas as they relate to activities that may threaten wellhead protection (see Table 2). In the primary protection area, all high-risk situations and activities are avoided, and moderate risk activities are managed carefully. The radius for the primary protection area should be a minimum of 100 feet, with 300 feet or more preferred.

In the secondary protection area, high-risk situations and activities are managed so they become low or moderate risks. The radius for the secondary protection area should be a minimum of 200 feet, with 400 feet or more preferred.

Figure 1 on page 4 provides an illustration of a good wellhead protection plan. Additional information about local wellhead plans and a list of technical assistance providers can be found in the Kansas Wellhead Protection Program.

Operation Needs

Each year many wells are threatened or damaged by accidents that occur near them such as a fuel tank springing a leak, fertilizer nurse tank losing its contents or damage to a parked sprayer causing a pesticide spill. The impact of these activities can be eliminated or minimized with diligent management decisions. By simply moving these activities far away from the well, impact to the well can be prevented or delayed. Permanent contamination of groundwater ultimately means loss of property value and may involve liability. Replacing the hose on a fuel tank when it is deteriorated and providing secondary containment are management actions that add protection inexpensively.

Liquids that can contaminate water should be managed carefully to avoid possible damaging accidents. Plan all storage locations, including temporary ones, outside the primary protection area and when reasonable, outside the secondary area as well. State law requires accidental spillage of any materials that cause pollution be reported to KDHE at 785-291-3333 or email the spill response program at kdhe.SpillHotline@ks.gov.

Backflow of contamination into the water system or well can easily result from a loss in pressure due to pump failure, line break or power interruption. These accidents can be hazardous or fatal to people and animals. The most common backflow hazard results from a hose placed into a tank or container. Use of a backflow prevention device is the best way to avoid this type of contamination. However, if a backflow preventer is not installed, a reliable and inexpensive way to eliminate this hazard is to maintain an air gap above the lip of the receptacle. Instead of putting the hose into the tank, use a holder to support it above the container lip.

Table 2. Risks Associated with Activities Near Wells

High Risk

- Abandoned water well
- Polluting liquids without secondary containment such as fuel, solvent and chemicals (fertilizer, pesticide, etc.)
- Liquid waste (sewage, manure, etc.)
- Water-soluble materials such as fertilizer and pesticides
- Livestock lots, abandoned livestock lots and other wastes
- Buildings and areas where the above materials are used, transferred, mixed, stored or cleaned up (such as shop or sprayer fill/clean-up area)
- No backflow prevention for the water system

Moderate Risk

- Intensive cropland, especially irrigated land where chemicals (fertilizer or pesticide) are applied, garden, home and yard
- Powered equipment storage (tractor, truck, auto, etc.)
- Garage, grain storage and silo
- Livestock buildings with minimum liquids
- Mechanical backflow prevention used for water systems.

Low Risk

- Pasture rangeland, woodland and low-intensity (low or no chemical) cropland
- Non-powered machine storage
- Windbreak
- Low-use buildings
- Organic garden and organic cropland
- Liquid storage with full secondary containment and careful management
- Water-soluble materials with full spill protection, cleanup and careful management
- Air gap maintained for all filling operations; backflow prevention used throughout the water system

Well Maintenance Needs

Maintenance is required to assure private wells with good location and construction continue to be safe. The following 12-point checklist is recommended for annual private well maintenance.

At least once a year —

- Make sure the well casing is free of cracks or other leaks from the water table to at least one foot above the ground surface or highest flood level.

- Make sure the sanitary seal is secure and watertight, and is a KDHE-approved type.
- Make sure the ground slopes away from the well for at least 15 feet in all directions.
- Shock chlorinate the well and water system.
- Test the water and file the results with other records and information about the well.

Always —

- Hire a licensed well contractor to do all work on the well, or a knowledgeable landowner may work on his or her own well. Make sure the well meets all current construction standards.
- Find and fix the cause of any change in water color, taste or odor. Shock-chlorinate the well.
- Maintain 50 feet (100 preferred) of open space between the well and any buildings, waste system, parked vehicle, equipment, compost or other contamination source.
- Store chemicals such as fertilizer, pesticide, oil, fuel, paint or solvent at least 100 feet down slope from the well.
- Properly plug all abandoned wells and other holes not used in the last two years, and plug all unused cesspools and septic tanks.
- Prevent backflow and back-siphoning by maintaining an air gap above the container you are filling, or by using an adequate backflow-prevention device.
- Shock-chlorinate the well after any service work on the pump, well or water system.

Important Well Records

A well is an important long-term investment to a homesite or farmstead. All information regarding its construction, modification, maintenance and water testing should be kept in a safe, accessible place.

Well Record

Since 1974, well drillers have been required to file a water well record with KDHE. The well log gives important information about well construction including well depth, geologic layers penetrated, well casing, well screen, grouting, water depth and well yield. A copy of the well log, construction costs and other information pertinent to the well should be kept together. Pump papers including cost, model and serial numbers, and warranty information should also be kept.

Well Service

Like other equipment, a well needs maintenance. A record of well service, repairs and improvements should be kept with well records, including details about what was done, who did the work and the cost. A sample recordkeeping log is provided in Table 3. This record of well service is a convenient way to chart well maintenance and service.

Well Water Tests

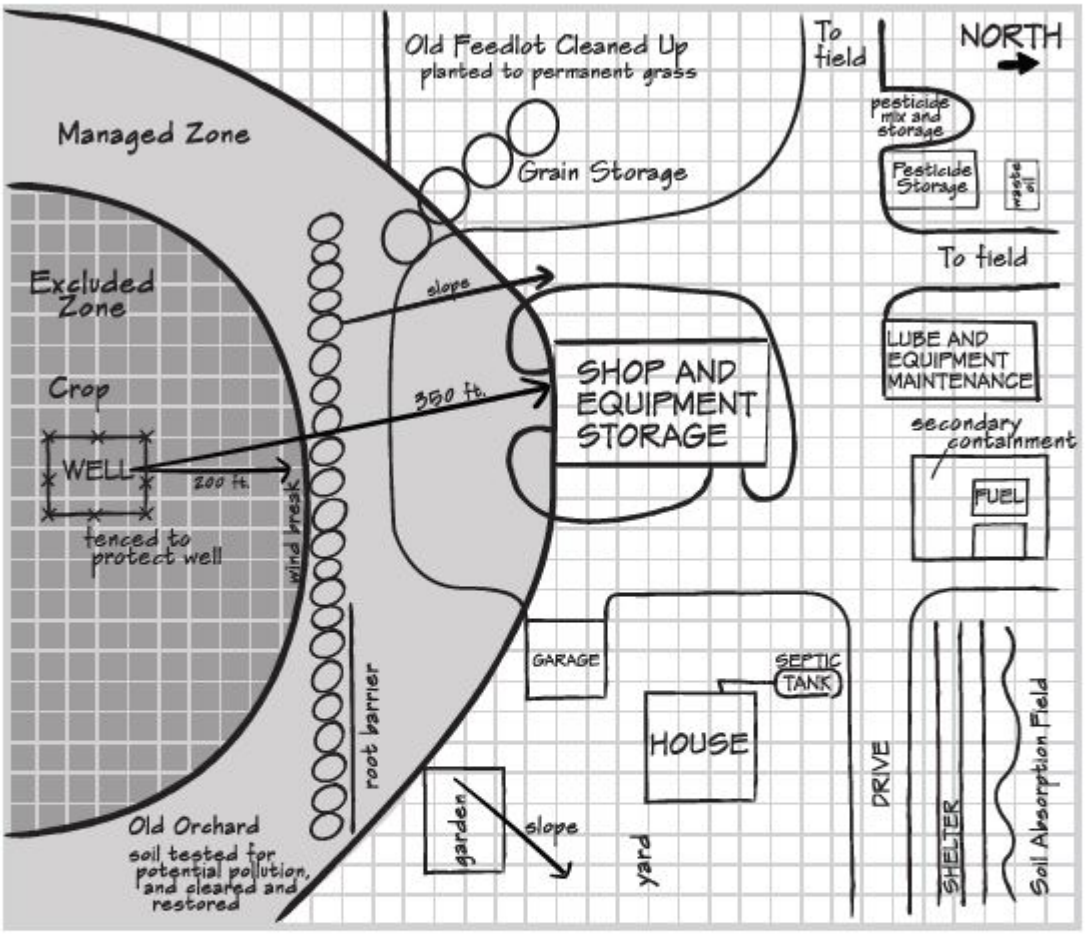
KDHE recommends well water tests be carried out every one to three years, but annual testing for coliform bacteria and nitrates is a good practice. Retain all water tests and compare results with previous and subsequent tests. Charting a graph makes it easy to observe when report values change significantly. Does the record show a trend that suggests a specific source of impact to water quality? Does the record fluctuate with the time of year, suggesting a seasonal effect? The more testing data available, the greater the confidence in the record. When water test results show significant change over a short or long period of time, a contributing source may be nearby or the well may be in the path of a pollutant plume. The WMS document 19-912, "Understanding Your Water Testing Report," helps interpret a water test report, and also provides insight on what tests to order.

Table 3. Annual Maintenance Check and Service Record Form – Use this form to record well service, repairs and improvements including details about what was done, who did the work and the cost.

Date of Service:			
Casing checked, no holes or cracks, watertight			
Casing is one foot above ground surface and base flood level			
KDHE-approved sanitary well seal vented and watertight			
Ground slopes away from well, surface water does not accumulate within 50 feet			
Water tested and results report filed			
Well and water system disinfected			
Backflow prevention is used			
Wellhead protection plan is followed			
No abandoned wells within 400 feet			
Name of service provider, maintenance check results filed			

Date October 1996 Modified January 1998

Name Dean and Jane Site Plan and Wellhead Protection Plan



Scale: 1" = 50' 1"= 100 other _____

EXCLUDED ZONE - 200 foot radius

Protection Principles

- ☐No liquid Storage
- ☐Dry material discouraged; if used has secondary containment
- ☐No buildings
- ☐Potential contamincation sources to be carefully managed

Other protection action

- ☐Backflow protection for tank fill

MANAGED ZONE - 350 foot radius

Protection Principles

- ☐Liquid storage is protected by secondary containment
- ☐Dry material is managed carefully (any spill is carefully cleaned up)
- ☐No new buildings
- ☐No new potential polluting activities
- ☐Existing potential polluting activities are carefully managed

Figure 1. Well Site and Wellhead Protection Plan