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The East Mountain Area septic system user's guide to the Bernalillo County Wastewater Ordinance : ensuring groundwater sustainability

Michael E. Campana

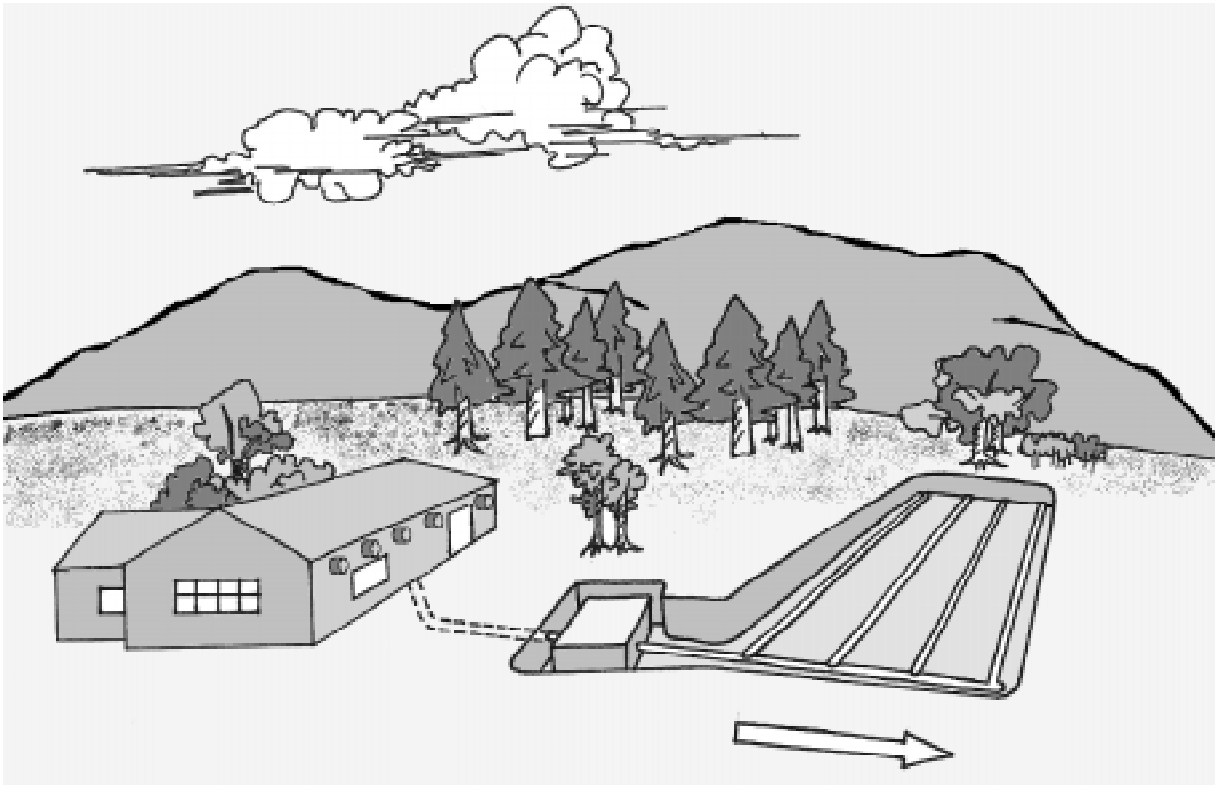
Michele Minnis

The East Mountain Area Septic System User's Guide

to the

Bernalillo County Wastewater Ordinance

Ensuring Groundwater Sustainability



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A Septic System User's Guide to the Bernalillo County Wastewater Ordinance

Ensuring Groundwater Sustainability

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Foreword

On June 29, 2000, Bernalillo County released a draft wastewater ordinance, "Bernalillo County Wastewater Ordinance" for public comment; in the fall of 2000, this ordinance was adopted. The ordinance is intended to protect public health and safety by establishing minimum criteria for the design, installation, inspection, treatment, and management of commercial and domestic wastewater systems. The ordinance is detailed and perhaps difficult to understand for the average homeowner in the East Mountain Area (EMA). It encompasses engineering, permitting, and maintenance requirements for new or modified septic systems in place after the effective date of this ordinance. Without thorough review and understanding of the ordinance, the homeowner could easily jeopardize his/her ability to operate their individual septic systems and/or face serious monetary consequences if their septic systems are not in compliance with the ordinance.

The WR 573 summer 2000 class has prepared a simple, straightforward guidebook for EMA residents of Bernalillo County to use as a tool for understanding and complying with the new ordinance. Topics were researched and discussed within the context of the guidebook to help EMA homeowners fulfill their responsibilities under the ordinance, including inspection, compliance, permitting, and maintenance requirements of their individual septic tank systems. The guidebook is written in question-and-answer format, and each answer builds upon information provided within the guidebook.

The guidebook was written for the average homeowner and is presented in non-technical language. We assumed that most homeowners would be neither qualified for nor desirous of doing most of the work required to bring their systems into compliance and would therefore hire a contractor. The guidebook was written to help the homeowner understand the process; most of the details are left to the contractor. Most of our information was drawn from the ordinance, studies of the East Mountain Area hydrologic system, or discussions with knowledgeable people. As a public-oriented user guide, specific references to documents were eliminated from the body of text. References are included at the end of the guidebook.

The summer 2000 Water Resources 573 class, under the guidance of instructors Dr. Michael Campana and Dr. Michele Minnis, has synthesized our combined research into this guidebook entitled, "East Mountain Area Septic System User's Guide to the 2000 Bernalillo County Wastewater Ordinance." The guidebook will be edited and published as a Water Resources Program publication and copies provided to NOAA and Bernalillo County.

Executive Summary

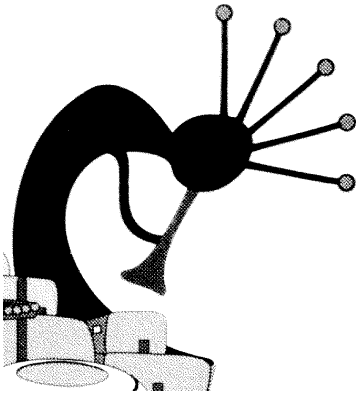
The Bernalillo County Environmental Health Department (BCEHD) recently approved and enacted a new wastewater ordinance. The ordinance will have significant effects on all county homeowners, current and future. New homeowners will be made aware of the impacts of the new ordinance by developers and the County via the regulatory and permitting processes. This guide was created as a service to current homeowners. Due to the complex geology and rapid population growth in the East Mountain Area (EMA) of Bernalillo County, the new ordinance will have a significant impact on those homeowners. Residents and other interested parties are encouraged to review the ordinance by contacting BCEHD at (505) 924-3650 or www.bernco.gov.

The purpose of the wastewater ordinance is to protect both public health and groundwater and surface water by regulating wastewater treatment systems. Wastewater is a mix of water, sewage, chemicals, and any other material disposed of down sinks, toilets, and drains. Typically, this material is applied to the soil surrounding the house for disposal, where it may eventually mix with underground drinking water. Published data indicate this is already occurring in the EMA. The old ordinance was prescriptive and failed to recognize site variability, whereas the new ordinance is based on achieving performance standards for effluent quality based on local conditions. It does not specifiy how those standards are to be achieved. Many treatment options and modifications will be available to the homeowner, from engineering controls to alternative systems. Performance standards vary depending on local site characteristics, lot size and wastewater volume.

All owners of wastewater treatment systems must eventually comply with the ordinance. Small wastewater systems must comply whenever they are modified or replaced, but no later than the year 2015, provided they function properly. Large private wastewater systems, as well as commercial systems, have three years from the enactment of the ordinance to comply, provided they function properly. Failing systems have 30 days to come into compliance. Compliance is based on both achievement of performance standards and permitting. When sewer lines become available within 200 feet of the structure, homeowners must connect to those lines unless they meet the provisions of the ordinance for their onsite system.

Bernalillo County will develop and maintain a program that certifies personnel and contractors for site evaluation, system installation, and system evaluation. Owners of existing systems will work with the County when making modifications to their systems or when performance problems arise. Permits are generally required for changes to an existing system, and before connecting to a sewerage line. They are also required after making such changes, or when pumping your system.

While residents and property owners are encouraged to use this guide as a starting point, the County shall be the final authority on these matters. Through education, public outreach and financial assistance, the County seeks voluntary compliance with the new ordinance. Fines and jail time will be used to enforce compliance when necessary. Contaminated drinking water will produce formidable financial costs and health risks for generations to come. The financial sacrifices resulting from the new ordinance are a prudent investment for the future of the EMA.



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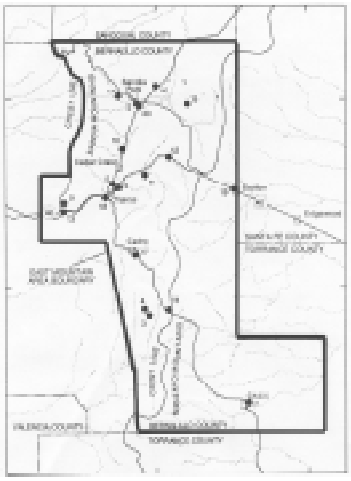


Introduction

Most families in the East Mountain Area (EMA) of Bernalillo County rely on groundwater as their drinking water source. For this reason, sustainability of groundwater supplies is a major concern. Because the EMA is remotely located and because of its rugged terrain, there are few wastewater collection and treatment facilities, and most homes dispose of their liquid waste through onsite wastewater (septic) systems. The effluent from onsite wastewater systems has been identified as the major contributor to water quality degradation in this area. A septic system removes and retains the solids from the wastewater and slowly releases the liquid portion, called effluent, into the surrounding soil. Under the right conditions, natural processes in the soil clean the effluent before it reaches the aquifer. However, EMA soils are often too thin or too porous to properly treat the effluent, and it can reach the water table untreated. Compounding the problem, the population of the EMA is expected to double in 20 years. As more and more people move into the area and the number of septic tanks grows, the potential to contaminate the aquifer will increase. In fact, contamination has already been found in the area.

See the section, "How does my septic system work?" for a description of conventional septic systems.

To contend with the problem of groundwater contamination from septic systems and to improve the conditions for the long-term sustainability of groundwater quality in the EMA, Bernalillo County (the County) instituted a new wastewater ordinance. The old ordinance was a "one-size-fits-all" regulation that addressed neither the quality of the effluent leaving a septic system, nor the particular conditions on the site in which the septic system was to be installed. The new ordinance is performance-based so that the level of treatment required from an onsite wastewater system is determined by both the physical conditions found on the site and the potential risk that the effluent will contaminate the groundwater. This risk is dependent on a number of factors, including the thickness and quality of the soil, the depth to the water table, and the slope and size of the lot.

A septic system retains solids and passes the liquid waste to a drain field where bacteria in the soil feast on the contaminants and make them harmless. The bacteria, however, need sufficient contact time with the waste to do their job.

This guidebook was written for homeowners living in the EMA within Bernalillo County who own conventional septic systems. The intent of the guidebook is to help you understand how the new wastewater ordinance will affect you and offer guidance on how to bring your wastewater system into compliance. It is presented in a simple question-and-answer format, and each answer builds on information provided by previous questions. It is recommended that you read through the entire body of the guidebook in order to fully understand your roles and responsibilities. A series of appendices are also included that describe in more detail some of the processes outlined in the ordinance. The ambitious or curious homeowner is encouraged to read through the appendices. However, please note that most of the work required by the ordinance to evaluate or upgrade your wastewater system requires a licensed professional, usually a contractor that you hire. This guidebook

will describe both your roles and responsibilities and those of the contractor you hire to help you meet the requirements of the ordinance.

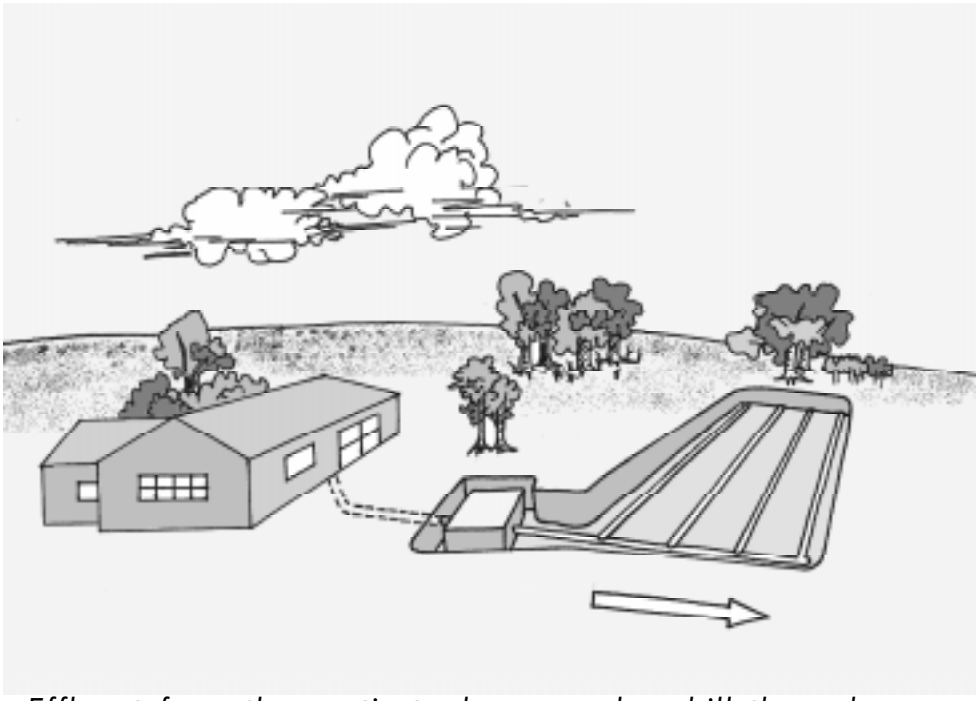
The questions addressed in this guidebook are:

1. What's the difference between this ordinance and the old one?
2. How does my septic tank work?
3. Why is there a problem in the EMA?
4. How does the ordinance affect me, the homeowner?
5. How do I know if my system is functioning properly?
6. Help! I need to replace or modify my system. What's involved?
7. What alternatives are available to conventional systems?
8. Is there a way to operate and maintain my existing system better and protect groundwater?
9. What happens if I don't comply?
10. What can I expect to pay for all of this?

Liquid waste, also called wastewater, comes from sinks, toilets, showers, laundry facilities, and dishwashers.

"Sustainable" refers not only to quantity of water, but also its quality.

An aquifer is an underground geologic formation that allows the storage and movement of water in sufficient quantities to supply wells. The depth below land surface at which the soil or rock is saturated with water is called the water table.



Effluent from the septic tank moves downhill through a pipe to the absorption field.

What's the difference between this ordinance and the old one?

For further discussion on these characteristics and the performance standards, refer to the section, "How do I know if my system will need upgrading or replacing when 2015 rolls around?"

The biggest difference between the new wastewater ordinance and its predecessor is that the allowable quality of effluent entering your drain field now depends on the particular characteristics of your lot, including:

- Lot size
- Wastewater volume and quality
- Depth of soil to the water table or bedrock
- Drainage and other characteristics of soil
- Slope

See the section, "How does the new ordinance affect me…?" for more information on what you can expect.

These characteristics determine how "clean" the effluent flowing out of your treatment system into the soil must be. Generally, small lots and lots with thin soils require a greater degree of treatment (also called a performance standard) than large lots and lots with thick, well-developed soils.

Other major differences include:

Lead time: The old ordinance required all homeowners to upgrade immediately once the ordinance was adopted. The new ordinance grants homeowners with functioning septic systems 15 years to bring their systems into compliance. On January 1, 2015, all onsite wastewater systems will have to comply with the ordinance.

Maintenance contract: The old ordinance did not require a maintenance contract, but the new one does. The maintenance contract, made with a certified wastewater maintenance contractor, ensures that your system will receive the proper periodic maintenance and inspections. The maintenance and inspection requirements are based on the management plan written by the manufacturer for your system.

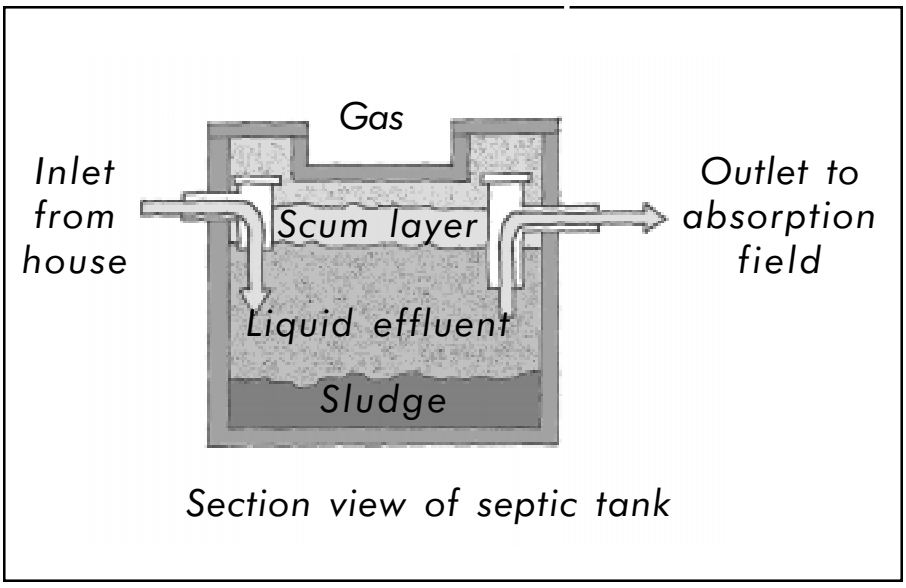
Operator's permit: Another new requirement of the ordinance is the operator's permit. In 2015, whether you need to upgrade your system or not, you will need to get an operator's permit. The County issues the permit after you have completed a maintenance contract and your maintenance contractor has instructed you on the use and care of your system.

How does my septic system work?

A properly functioning conventional septic system will achieve Class 1 performance standards as defined in Table 1 of the ordinance. See the table in Appendix B, Table B-3.

In a conventional onsite sewage treatment system, household waste flows through pipes into a two-part system. The first part is the septic tank; the second is the absorption field, or drain field. The septic tank is a simple collecting tank where solids heavier than water sink to the bottom and solids lighter than water, such as oil and grease, rise to the top. These settleable and floatable solids, called sludge and scum, are retained in the tank where bacteria decompose them and reduce their volume. This is called primary treatment. The volume, however, is never reduced to zero, and the remaining residue must be cleaned out of the tank every one to three years on average, depending on the tank capacity, number of occupants, and usage.

A septic tank is watertight, so when a gallon of sewage enters from a toilet flush, a gallon of effluent must flow out of the tank and into the second part of the onsite sewage treatment system, the absorption, or drain field. Effluent flows downhill from the septic tank through a pipe to the absorption field where harmful bacteria and other microbes in the wastewater die because there is a lack of nutrients in the soil. As the wastewater seeps further into the ground, other bacteria in the soil use contaminants from the effluent as food. This transforms the chemicals in the wastewater effluent into harmless substances. In a properly functioning absorption system, the liquid eventually is sanitized and won't contaminate ground or surface water. Although some bacterial digestion occurs in the septic tank, the most important action occurs in the absorption field.



Section view of septic tank

A properly installed and maintained septic system is sanitary and unobtrusive. However, for the entire wastewater treatment process to work as stated, the system must be in good working order and the site conditions within the drain field must be favorable for the removal of microbes and chemical transformations. The physical elements important for proper onsite treatment include soil thickness and drainage characteristics, geology, slope, and depth to groundwater and bedrock. The new ordinance requires that these physical characteristics be professionally assessed before any system is approved, designed, or installed.

Sustainability and Growth

Projected growth in the EMA is a major concern. The current population in the EMA is approximately 17,000, with population expected to double by the year 2020. As the area grows, so will the pressure on the soils to handle waste. It is estimated that of about 30,000 platted lots, only 6,000 are currently developed. Although plans for future development address the problems of liquid waste by using community sewers, the multitude of existing, sometimes faulty, septic systems are the cause for immediate concern. If the current levels of growth are imposed on the current evidence of septic system leakage, the EMA will face serious challenges in sustaining the drinking water supply in the near future.

Year	*EMA Population*
1970	*4,055*
1980	*7,360 (81.5% increase)*
1990	*12,480 (69.6% increase)*

Why is there a problem in the EMA?

Wastewater may contain many pollutants that are harmful to human health. Raw sewage contains microorganisms such as bacteria, viruses and protozoa that are potential pathogens. These can cause sickness and disease including diarrhea, dysentery, cholera, hepatitis and typhoid. Raw sewage may also contain household cleaners and solvents, many of which contain carcinogenic solvents. Prescription drugs and their bodily byproducts are known to disrupt human hormones. Others are direct DNA toxins and some create antibody-resistant bacteria. In addition, both solid and liquid human waste is generally rich in nitrogen. Under certain conditions, nitrogen can be converted into a form called nitrate that poses health risks to infants and toddlers. This condition has been named, "blue baby syndrome." For these reasons, it is very important that untreated sewage not contaminate drinking water.

The reader will recall from the previous section that a septic system retains solids and passes the liquid waste to a drain field where bacteria in the soil render the contaminants harmless. But to do this, bacteria need sufficient contact time with the waste. If the soil is not porous, wastewater makes a pond on top of it or runs downhill. If the soil is too porous, wastewater flows too quickly through it for bacteria to neutralize contaminants. The soil is the key buffer zone between contaminated wastewater near the surface and the clean drinking water underground.

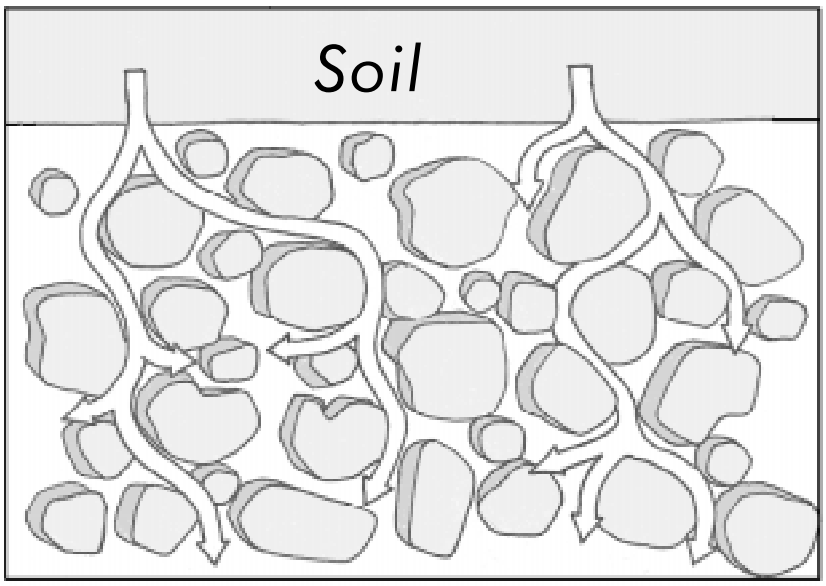
The EMA is a desirable place to live for increasing numbers of people. Difficult site conditions found on the forested mountains of the EMA often limit the functioning of septic systems. The majority of housing lots are located on steep slopes between 15 and 25 percent that make poor locations for septic system drain fields. Steep slopes cause unequal distribution of effluent and premature clogging of the system. Additionally, wastewater may be drawn by gravity from uphill septic systems to downhill drinking water wells. Soil development on steep slopes is usually minimal and depth to bedrock can be very shallow. As a consequence, wastewater can infiltrate to underground drinking water without proper treatment or move along the surface and contaminate surface water.

The geology below the ground surface further complicates the problem. Up to 75 percent of the EMA sits on top of the Madera Limestone, an aquifer that can yield large amounts of water due to the many fractures in the rock. Fractures are faults, joints, cracks, and fissures, in rock that transmit water and contaminants readily. The

fractures become pipelines that allow wastewater to move quickly into drinking water supplies. In fact, published data already indicates nitrate contamination in the Tijeras Canyon area, and locally high levels have been found in Sandia Park, Chilili, and along the major geologic faults as well. See Appendix A for a map of contaminated areas.

The geology of the EMA is a substantial hurdle to the use of individual septic tank systems. In the face of such natural challenges, homeowners must recognize their key role in maintaining their systems properly. See the section, "Is there a better way to operate and maintain my current system?"

Regular pumping of the settling tank every one to three years can prevent clogging of the drain field by scum or solids that overflow the tank. Homeowners should also regularly check the flows of inlet and outlet lines to ensure the continued proper functioning of the system. Even with regular maintenance, septic tank systems have a finite useful life of about 20 years depending on size, site conditions, and use.



The many paths of moving water. Aquifers, contrary to popular thought, are not underground lakes. In a typical aquifer, water fills the spaces between soil, rocks and other aquifer materials. A typical aquifer normally does not provide an easy path for water, or contaminants, to follow.

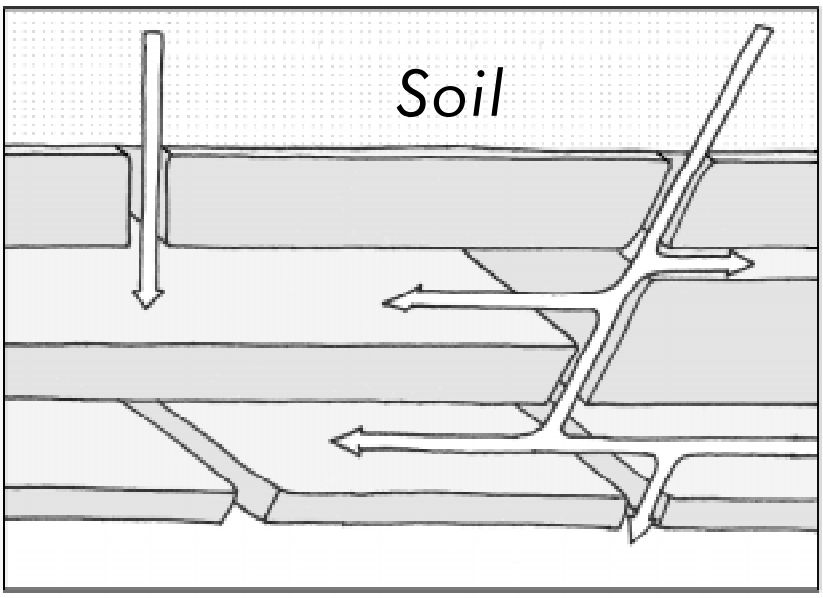
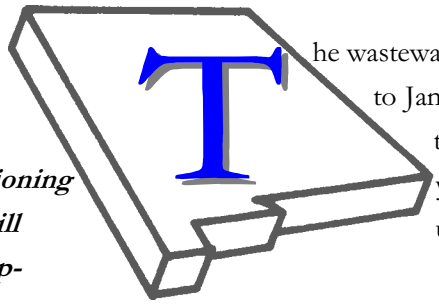


Diagram of a fractured aquifer. In this type of aquifer, fractures provide direct paths for contaminants to follow. Most of the EMA sits on fractured bedrock.

How does the ordinance affect me, the homeowner?



The wastewater ordinance states that functioning wastewater systems installed prior to January 11, 2000 that receive 2000 gallons or less of domestic wastewater per day must comply with the ordinance by January 1, 2015. If your current system is functioning properly, you will not have to upgrade or replace your system to meet the new ordinance until 2015.

If your current system is functioning properly, you will NOT have to upgrade or replace your system to meet the new ordinance UNTIL 2015.

There are, however, some exceptions, if:

- you replace or modify your system;
- your septic system begins to fail or is failing;
- you sell your home, or;
- a sewerage line becomes available.

To perform any of these modifications, you'll need a permit from the County. Refer to the section, "Help! I need to replace or upgrade my system. What's involved?" for guidelines on the application process.

Modifying or Replacing Existing Systems

If you are planning any major modification to, or repair or replacement of, your current system, you will be required to meet the performance standards set forth by the new ordinance. Some examples of major modifications are:

- A modification of the system to accommodate an increase or decrease in the wastewater design flow. For example, the addition of a new bedroom may require that you increase the holding tank capacity.
- The replacement or addition of a major component such as a treatment, holding, or disposal component.

You will not have to upgrade your system to meet the new standards if the modification is minor, such as replacing a mechanical or electrical component with a similar one. If you are unsure as to whether a modification or repair you are planning is major or minor, contact the County for advice at 505-924-3650.

If you know your system has failed, refer to the section "How do I know if my system needs upgrading?" to begin the process of upgrading or replacing your existing system.

Failing Systems

A failing system must be repaired, upgraded or replaced to meet the performance standards of the new ordinance within 30 days of the failure.

Selling Your Home

The only consideration to make regarding your wastewater system is if a community sewerage system becomes available. If this is the case, your onsite wastewater system must connect to the community system within 30 days of the change in ownership of the prop-

erty. This is the responsibility of the buyer; however, the buyer may request that you pay for the connection as a condition of the sale.

Sewerage Lines

If at any time a community sewerage collection system becomes available, you will be required to hook up to the sewerage system. Availability of a sewerage system means that a sewer line or other component is within 200 feet of your property line and the appropriate easements or rights-of-way are in place. Both of these conditions are the responsibility of the County, not the homeowner. Once these conditions are met, though, you will have one year to connect your wastewater outlet to the sewerage system. There are two exceptions to this rule:

1. If your current system begins to fail before the 365-day connection period ends, you must connect to the sewerage system within 30 days.
2. If your current system meets the performance standards set forth in the new ordinance without any modification, you are not required to connect to the sewerage system. Refer to the next section, "How do I know if my system needs upgrading ... ?" to determine whether your existing system meets the performance standards.

Note that when you connect to the sewerage system, you are required to appropriately abandon your onsite system. This means getting an abandonment permit from the County and hiring a contractor to take measures necessary to ensure that the abandoned system will not pose a hazard in the future.

A Note about Graywater, Water Softeners, and Wastewater Discharge

Some homes have been designed to allow graywater (not to be confused with blackwater) to be discharged to the surface for use as irrigation water. Graywater is water that is generated from the laundry facilities, showers, and non-kitchen sink in your home. Blackwater is water that comes from toilets, urinals, kitchen drains and utility sinks. The new ordinance now prohibits surface discharge of graywater. Graywater can however, be discharged through a drip irrigation system buried beneath the soil. You must comply with this provision by January 1, 2015.

As the groundwater in the EMA is quite hard, many of you use water softeners. The new ordinance now prohibits discharge to the septic system of the brine solution used in some water softeners. The salts in the brine solution can kill the bacterial colonies that help break down the effluent in both your septic tank and drainfield. Furthermore, excess sodium can damage the soil structure of your drain field and cause septic tank effluent to pool on the surface. You must comply with this provision by January 1, 2015.

How do I know if my system is functioning properly?

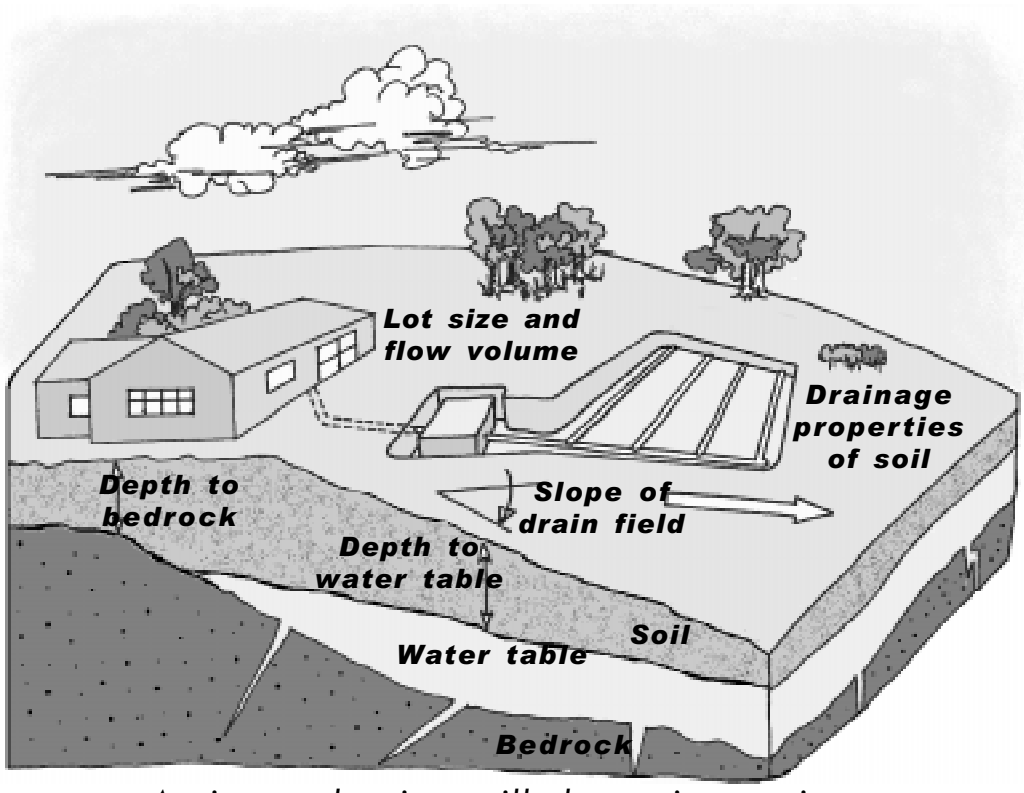
Some of the signs that indicate that your system is failing are:

- ***Foul odor around the septic tank or drain field***
- ***Toilets or other plumbing fixtures backing up***
- ***Appearance of water on the surface of your or the neighboring property***

The best way to ensure you have a properly functioning system is to have a certified maintenance contractor inspect the system. The fee for an inspection is usually $50 to $100. To avoid system failures, periodic tank pumping and maintenance inspections are not only crucial, but required by the new wastewater ordinance. For more information on how to properly operate and maintain your system, refer to the section, "Is there a better way to operate and maintain my current system...?" on page 20.

How do I know if my system will need upgrading or replacing when 2015 rolls around?

By now you've established that your current wastewater system is working fine, and unless it fails, won't need replacing or upgrading until 2015. But how do you know if you'll need to upgrade or replace your system at that time? The site evaluation is what determines the level of treatment your wastewater system will require. The site evaluation includes an assessment of:



A site evaluation will determine various characteristics of your sewage system.

- Lot size
- Anticipated wastewater flow
- Anticipated wastewater strength
- Soil drainage characteristics
- Depth to water table
- Depth to bedrock
- Presence of impermeable soil layers
- Slope of the drain field

A certified contractor approved by the County must perform the site evaluation; most homeowners are not qualified to do so. Fortunately, most existing lots in Bernalillo County with homes built on them have already had a site evaluation. The information is part of the permit for your existing septic system. Call the County to get a copy of yours at 505-924-3650. If no site evaluation has been done, contact a certified contractor approved by the County.

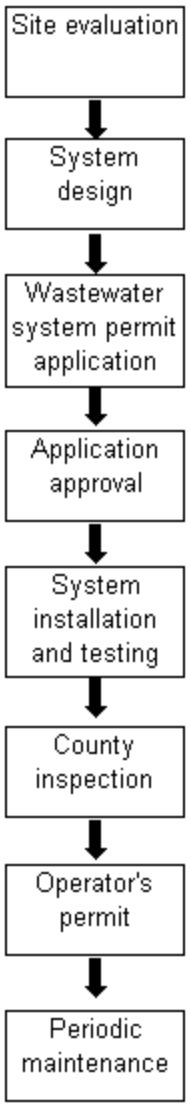
The level of treatment required, also called a performance standard for your lot under the new ordinance can be determined with the information contained in the site evaluation and a series of charts and tables included in the ordinance. The performance standards are described in Table 1 on the next page, along with the site characteristics that mandate them. An example of how the performance standard is calculated is included in Appendix B along with the requisite charts and tables. You may do this yourself for your home, but keep in mind that in order for the County to accept your results, you must either get

certified by the County to make this determination or hire a contractor to verify your results.

Please note that even if your current system complies with the effluent standards of the new ordinance, there is still some action you will need to take by January 1, 2015. First, you will need to get an operating permit from the County. Refer to the section, "Help! I need to replace or modify my septic system. What's involved?" for more information on the operating permit. You will also have to install an effluent filter in your septic tank. The effluent filter prevents clogging of the absorption field by keeping large particles from exiting the septic tank. An effluent filter costs approximately $100-$200, not including installation. A certified contractor must install it.

Table 1: Performance standards under the new ordinance, including site characteristics that require treatment of wastewater to each standard.

Performance standard	Description	Site characteristics
Class 1	Minimal treatment. Conventional septic systems meet this standard	Required for lots greater than 3/4 acre with well-drained soils at least 4 feet deep; slope must be less than 15 degrees.
Class 2	Higher degree of treatment than Class 1; more contaminants removed from wastewater	Required for lots 1/3-3/4 acres with well-drained soils no less than 4 feet deep or for lots greater than 3/4 acre with well-drained soils no less than 2 feet deep; in both cases, slope must be less than 15 degrees.
Class 3	Higher degree of treatment than Class 2; more contaminants removed from wastewater	Required for all lots less than 1/3 acre regardless of soil thickness and all lots with soils no less than 1 foot thick regardless of lot size; soils must be well-drained; slope must be less than 15 degrees.
Disinfection	Additional treatment for Class 3 systems; injection of a chemical that kills bacteria and viruses.	Required in addition to Class 3 performance standards for all lots with well-drained soils no less than 1 foot thick; slope must be less than 15-degrees.
Non-discharging	A system that does not discharge effluent into the surrounding soil. Requires frequent pumping to remove wastewater and solids.	Required for all lots with less than one foot of soil, poorly- or excessively-drained soils, or having slopes exceeding 15 degrees.



Help! I need to replace or modify my septic system. What's involved?

Your first step is to hire a County-certified contractor to design, install, and test your new or upgraded wastewater system. Your contractor will also help you through the permit application process. Full service contractors can perform the site evaluation, design the system, and install and test it. Some also perform maintenance service. Before the installation can proceed, though, you'll need to get a wastewater system permit from the County.

The wastewater system permit allows you to modify, upgrade, or replace your wastewater system. The application for the permit allows the County to ensure that your system will meet the requirements of the ordinance. You and your contractor will submit a package to the County that will contain the following items:

- Two sets of plans and specifications for the proposed system
- Two sets of the site plan
- A site evaluation
- A management plan for the proposed system
- A maintenance contract
- The permit application

Plans and specifications

Your contractor draws these up. They show the layout of the system and the design of the various components and how they are interconnected.

Site plan

You must provide, on a separate sheet of paper, a detailed site plan showing your lot and all surrounding lots, as well as the location of proposed/existing wells, modified/new wastewater systems, water lines, arroyos, canals, and easements. Actual setback distances must also be shown. Usually, your contractor will draw this.

Site evaluation

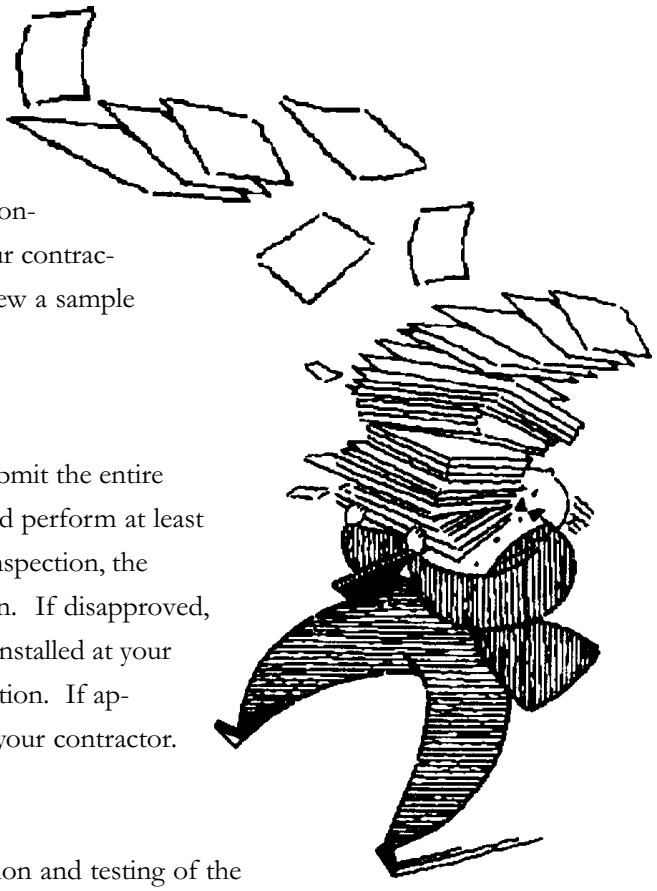
Most existing homes will have had site evaluations already done. Your contractor can help you transfer the information onto the wastewater system permit application.

Management plan

The management plan is simply a prescribed plan for maintaining your system according to the manufacturer's specifications. It describes the operation, maintenance and monitoring required for your particular system. Usually, the vendor of your system writes the management plan, but your contractor can also write it.

Maintenance contract

This is a contract between you and a County-certified wastewater system maintenance contractor to perform regularly scheduled maintenance according to the management plan. Contact the County Environmental Health Department at 505-924-3650 to get a current list of certified maintenance contractors. Your design and installation contractor may also be able to provide maintenance services. The maintenance contractor draws up the contract, and both you and the maintenance contractor sign it.



Permit application

The permit application summarizes much of the information contained in the other documents in your application package. Your contractor will help you fill out the form. Refer to Appendix C to review a sample form and for directions on how to complete it.

Permit approval

Once you've completed the application, you must sign it and submit the entire package to the County. The County will review the package and perform at least one site visit. Based on the information submitted and the site inspection, the County will either approve or disapprove the system and design. If disapproved, the County may designate a different class system that must be installed at your site and you must then resubmit the application for reconsideration. If approved, the County will send the wastewater system permit to your contractor.

County inspection

Once approved, your contractor may proceed with the installation and testing of the new system or upgrades to the old. Before the completed system is covered with soil, the County will inspect the system to ensure that it meets the requirements of the ordinance. If the system passes the inspection, the County will issue a "Final Inspection Approval" tag. If it does not, the County will notify you and provide you with a corrective action list.

It may seem like a lot of paper, but don't panic. If you follow the guide and get the help you need, you can be sure your system will be in compliance with the new ordinance.

Operators permit

The final step in the process is to obtain an Operator's Permit. The permit effectively indicates that you understand how to operate the wastewater system and will, with your maintenance contractor, maintain the system in accordance with the system's management plan. Two things must happen in order for the County to issue you an operator's permit:

- You must have a maintenance contract with a certified wastewater maintenance contractor. This should already have been done in the course of getting your wastewater system permit.
- The maintenance contractor must train you on the proper operation of your system.

Is there a way to operate and maintain my current system better to protect groundwater?

The life and efficiency of your existing conventional septic tank are direct results of how well you operate and maintain it. Septic systems have been used for decades to treat domestic wastewater. They do an effective job when operated and maintained properly. You can do a few simple things to help extend the life of your septic system, make it operate better and protect your drinking water supply. Listed below are some simple things to do and not to do when operating and maintaining your conventional septic system. These pertain primarily to conventional systems, but apply to alternative systems as well. Be sure that when you upgrade or replace your system to comply with the ordinance you carefully read the management plan for your system.

Water Conservation is Cool!

Don't take excessively long showers. A 20-minute shower can use up to 100 gallons of water!

Don't let plumbing leaks continue to drip, drip and drip. Fix them promptly!

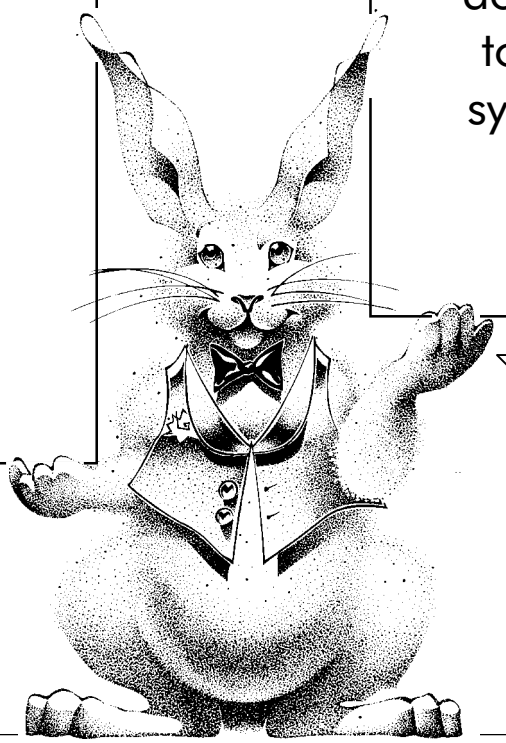
Don't use your automatic dishwasher unless it's completely full.

Don't let the water run when brushing your teeth or getting a cold drink of water. Keep a container of cold water in the refrigerator for drinking.

1) Send all your household wastewater to your septic tank.
2) Dispose of all cooking grease and oil in a separate container.
3) Pump your septic tank out once a year if you use a garbage disposal.
4) Compost, incinerate or haul away any solid wastes that you might otherwise put down a garbage disposal.
5) Use high quality toilet tissue that breaks up easily in water such as Charmin® or Scott®. Avoid use of colored or scented toilet tissue.
6) Clean your septic system every 1 to 3 years. Rule of thumb: once every 3 years for a 1,000 gallon tank serving a 3-bedroom home with 4 residents and a garbage disposal.
7) Have your septic system cleaned by a trained professional. Make sure solids are pumped out through the manhole, not the inspection pipe.
8) Inspect tank baffles at every cleaning and replace when necessary.
9) Use good quality liquid laundry detergent and minimize the amount of detergent used for each load of wash.
10) Make sure your home contains no leaking faucets or other plumbing fixtures.
11) Install a water meter and keep tabs on the amount of water you use on a regular basis.
12) Install "low flow" toilets, faucets and showerheads.
13) Know the capacity of your septic tank and don't overload it.
14) Make sure a copy of the maintenance contract for your septic system is on file with the Bernalillo County Environmental Health Department.

Getting the most out of your septic system

What NOT to do if you want to keep your system tip-top



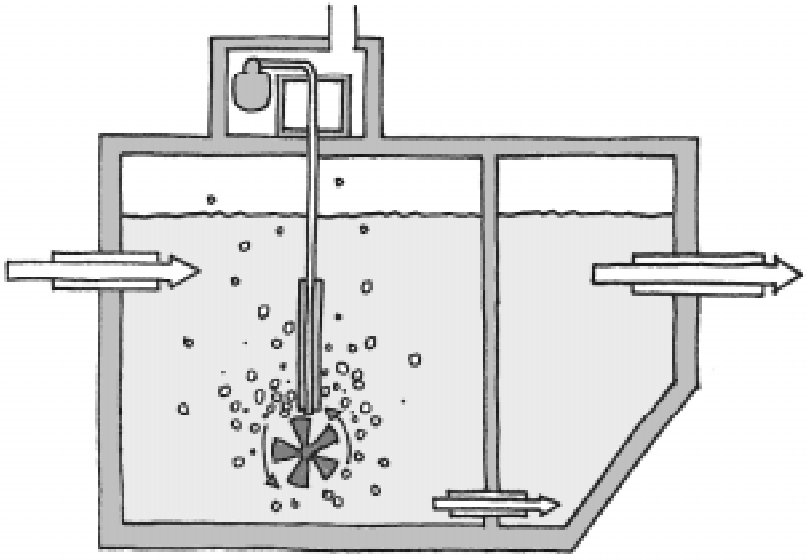
1) Don't use a "starter" to get bacterial action started in your septic system. Plenty of bacteria will be present in the materials deposited into the tank.
2) Don't send graywater directly to your drain field. Soap scum will plug soil pores and shorten the life of your drain field.
3) Don't use excess amounts of household chemicals such as drain cleaners, bleach and degreasers. Normal amounts are okay.
4) Don't pour cleaning water from latex paint down your drain.
5) Don't deposit coffee grounds, oils, grease, paper towels, disposable diapers, facial tissue, cigarette butts or other non-biodegradable materials into your septic system.
6) Don't use a garbage disposal.
7) Don't waste water. It's a very valuable resource and needs to be conserved.
8) Don't try to "get by" for another year without pumping your septic tank. The solids in the tank will build up and eventually overflow into your drain field.
9) Don't assume your septic system will take care of itself – it won't!
10) Don't try to avoid not complying with the wastewater ordinance. You'll be caught through either an inspection or complaint.

What alternatives are available to a conventional septic system?

See the section, "How does my tank work?" for a discussion of how conventional systems are designed.

An alternative system is any onsite sewage disposal system or portion of a system that is designed, constructed or operated differently than a conventional septic tank system. Generally, alternative systems provide enhanced treatment to that of conventional septic systems. Conventional septic systems are able to treat wastewater to Class 1 performance standards while most alternative systems treat wastewater to Class 2 or better. The new ordinance requires alternative systems where site conditions make groundwater especially vulnerable to contamination or are not appropriate for conventional septic tank systems. The new ordinance requires product approval for all systems, certification of installers, and additional conditions for custom and experimental systems.

Alternative systems include various types of systems, including increasingly available proprietary systems that can be purchased "off the shelf." Appendix D provides a description of the design, operation, and cost of some alternative systems now on the market. Some of the major differences between conventional and alternative systems may include one or more of the following:



An example of an aerobic treatment unit. Pre-treated wastewater undergoes biological treatment in an aeration compartment. After further clarification, the treated effluent is disposed of in the drain field.

- Addition of one or more treatment components
- Addition of filtration
- Denitrification
- Disinfection
- Different type of disposal system
- Complete lack of disposal (non-discharging systems)

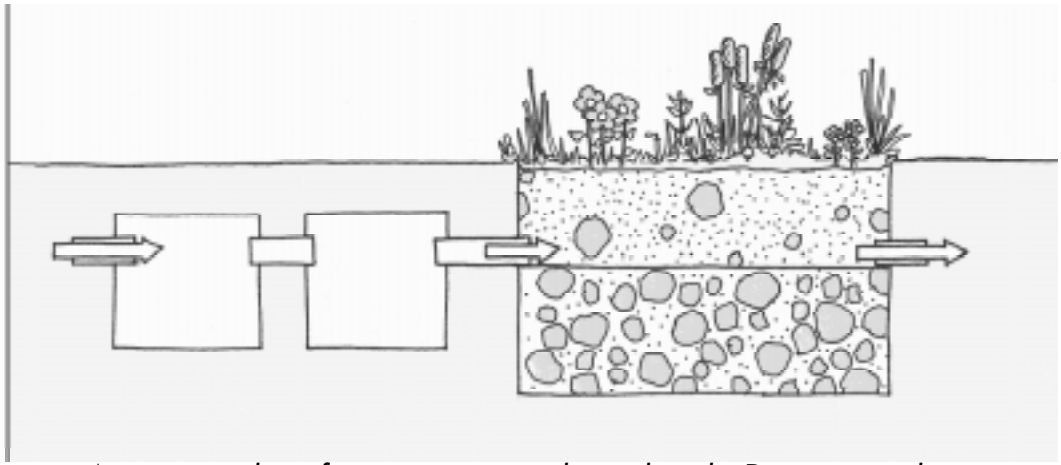
Generally, higher levels of treatment are obtained when systems promote aerobic and anaerobic biological processes and sufficient time is allowed for these processes to occur and for absorption fields to rest and regenerate.

Aerobic describes a process that involves oxygen. Anaerobic describes a process that doesn't involve oxygen.

Finding the appropriate alternative system depends on the performance standard requirements, costs, operation and maintenance considerations, and feasibility. Your contractor can help you find the most economical system to meet the treatment requirements for your lot.

The cost of an alternative system will depend on the manufacturer, the installer, the site conditions, and characteristics of the wastewater such as estimated flow, treatment unit and disposal capacities, and setback requirements. Costs range from $5,000 - $20,000+ for a complete system, which includes initial costs only and does not consider operation, maintenance, and repair costs. Keep in mind, however, that conditions on some sites will only allow for an alternative system. Also, the cost of a conventional system in some applications can far exceed the cost of an alternative system.

Refer to the section, "What can I expect to pay for all this?" and Appendix D for more information on costs.



An example of a constructed wetland. Pre-treated wastewater flows to a bed of rocks planted with reeds. Used for additional treatment or where soils are not suitable for absorption.

What happens if I don't comply?

See the next section, "What can I expect to pay for all this?"

The wastewater ordinance requires that all homeowners comply by January 1, 2015 and persons violating the ordinance will face stiff fines, even imprisonment. But don't panic! The wastewater ordinance has been carefully developed to allow homeowners plenty of time to come into compliance, and there is financial assistance available to those who may not have the money to comply with the ordinance.

Existing and new septic systems must achieve compliance by January 1, 2015. The County has the right to inspect your septic system, without prior notice, for proper operation, maintenance and installation. Your system may also be inspected to make sure it is meeting effluent quality criteria. The following are some important things to remember concerning existing and new septic system and compliance with the wastewater ordinance:

- All new systems must be inspected and approved before placed into operation.
- All complaints of failing systems will be investigated.
- A copy of the maintenance contract for your septic system must be on file with the County.
- Repairs or upgrades may be required for existing systems not in compliance.
- A "Final Inspection Approval Notice" is required before a new or upgraded system can be placed into service.
- A permit must be obtained from the County before any modifications can be made to existing systems.
- Metering of flow and monitoring for effluent quality may be conducted on your system to help ensure its compliance.

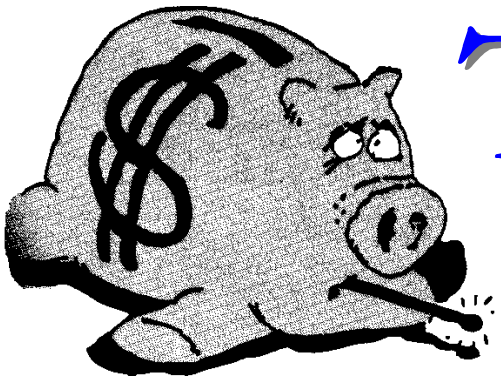
It's not worth trying to get away with a non-compliant system. You'll get caught either by a complaint or an inspection. Besides, you'll be polluting your own drinking water and jeopardizing the environment where you live. Please seek help if you need it! The County has financial and technical assistance available. This ordinance is not meant to be a "thorn in the side" of county residents. It is intended to help sustain groundwater quality and make the East Mountain Area a better place to live for everyone.

The County expects current and future homeowners to comply with the wastewater ordinance by the designated date and will provide assistance to those who need it. A septic system out of compliance is considered a public nuisance, and anyone operating it is creating a public health hazard. A 30-day grace period is allowed to achieve compliance before enforcement measures are taken. After that, a court order or injunction may be issued to the homeowner requiring him or her to cease operation of his septic system. Finally, as a last resort, any persons found openly violating the wastewater ordinance are subject to the following:

- Fine not exceeding $300
- Jail sentence of no more than 90 days
- Combined $300 fine and jail sentence

Remember each day of a violation may be considered a separate offense!

What can I expect to pay for all this?



The total range cost of making the needed improvements to a property will be between $5,000 and $20,000, depending on your system, site conditions, and goals. In addition to the installation of the unit, this range includes fees, permit costs, maintenance contracts, plans and specification costs, and other miscellaneous costs. The range for septic units alone will be anywhere from $2,000 to $9,000. The average yearly cost of the maintenance contract for an alternative system is $10 to $25 a month.

So that people without sufficient means are able to comply with the mandates of the new ordinance, and to ensure that all residents of Bernalillo County, regardless of income, have a safe drinking water supply, the County has a financial assistance program called PIPE, or Partners in Improvement and Protection of the Environment. If you are a family of four with an income of $36,000 or less, you may qualify for a grant. Call the Bernalillo County Environmental Health Department at 505-924-3650 for more information on the program.

A Final Note

Bernalillo County has adopted the new liquid waste ordinance in order to help sustain groundwater quality and contend with the problem of groundwater contamination from existing and future septic systems. Ample time has been given to allow both existing and future homeowners to comply with the ordinance. Protection of public health and the environment, most importantly groundwater supplies, are of the utmost concern and it is up to you, the homeowner, to do your part. The County will make every effort to assist those who feel they cannot meet the requirements of the ordinance. Please seek help if you feel you need it.

This guide was created to help you understand the ordinance and the importance of compliance. It is our sincere hope that everyone will do their part to protect our precious water supplies, keep our environment clean and make this a better place to live.

Glossary

Absorption field – A field in which effluent from the septic tank is gravity-fed from a pipe. This is where bacteria and other microbes break down the effluent using nutrients in the soil before it reaches the water table. Also known as a drain field or leach field.

Aerobic – A process that involves oxygen. Aerobic bacteria use oxygen as part of their metabolic process. Aerobic reactions occur under conditions that provide oxygen.

Alternative system - Any onsite sewage disposal system or portion of a system that is designed, constructed or operated differently than a typical septic tank system.

Anaerobic – A process that does not involve oxygen. Anaerobic bacteria can live without oxygen. Anaerobic reactions occur without the presence of oxygen.

Aquifer – An aquifer is an underground, geologic formation that includes rock, soil, and water. It allows the storage and movement of water in sufficient quantities to supply wells. Aquifers are not underground lakes.

Blackwater - Wastewater that is high in nutrients, usually generated by toilets, urinals, kitchen drains, and utility sinks.

Blue baby syndrome – A potentially fatal condition that limits the blood's ability to carry oxygen. Also called methemoglobinemia. Infants, the elderly, and people with compromised immune systems are particularly susceptible.

Carcinogenic – Cancer causing.

Contaminants – Substances in water or soil caused by human or natural activities, usually considered undesirable, sometimes considered unhealthy or toxic in sufficient quantities.

Conventional septic system – A type of wastewater system that collects treats and disposes of human waste from the home, consisting of a septic tank and an absorption field.

Denitrification – The process that changes nitrate found in streams and groundwater to nitrogen gas that is often released to the open air.

Drain field – See absorption field.

Effluent – Wastewater that drains from the septic tank or the last component in a wastewater treatment system to the absorption field.

EMA – An abbreviation for East Mountain Area.

Geochemistry – The field of chemistry that involves the interactions between soil, rocks and water.

Graywater - Wastewater that is low in nutrients, usually generated by laundry facilities, bathroom sinks, bathtubs and showers.

Groundwater – Water that can be found below the ground surface.

Leach field – See absorption field.

Performance Standards – Those conditions set by the County that must be achieved by the end product (effluent) of your septic system.

Scum – The component of wastewater that floats at the top of the septic tank, such as oils and grease.

Septic tank - A watertight collecting tank where solids heavier than water sink to the bottom and solids lighter than water, such as oil and grease, rise to the top.

Sludge – The component of wastewater that settles to the bottom of the septic tank, such as fecal matter and food waste.

Sustainability – The long-term, management of a resource to assure its quality and quantity in the future.

Wastewater ordinance – Refers to the new wastewater ordinance that regulates and controls the disposal of liquid waste in Bernalillo County.

Wastewater treatment system – A general term for any type of system that collects, stores, and treats wastewater. It may or may not release the treated effluent to an absorption field.

Water quality – A measure of water's chemical, biological, and physical characteristics to determine if the water is suitable for its intended use.

Water table - The depth below land surface at which soil or rock is saturated and from which water can be pumped.

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Web Sites

Barnstable County Department of Health and the Environment: Alternative Septic System Information Center
http://www.capecod.net/alternativeseptic/

City of Austin, Texas: Alternative Wastewater Management Project
http://www.ci.austin.tx.us/wri/altern.htm

Consortium of Institutes for Decentralized Wastewater Treatment: On-Site Wastewater Alternatives
http://www.is.dal.ca/~cwrs/altern/table.htm

EPA Office of Wastewater Management: Onsite/Decentralized Wastewater Systems
http://www.epa.gov/owm/decent/decent.htm

National Small Flows Clearinghouse
http://www.estd.wvu.edu/nsfc/nsfc_homepage.html

North Carolina State University [WATERSHEDS]
http://www.h2osparc.wq.ncsu.edu/estuary/rec/septic.html#sm

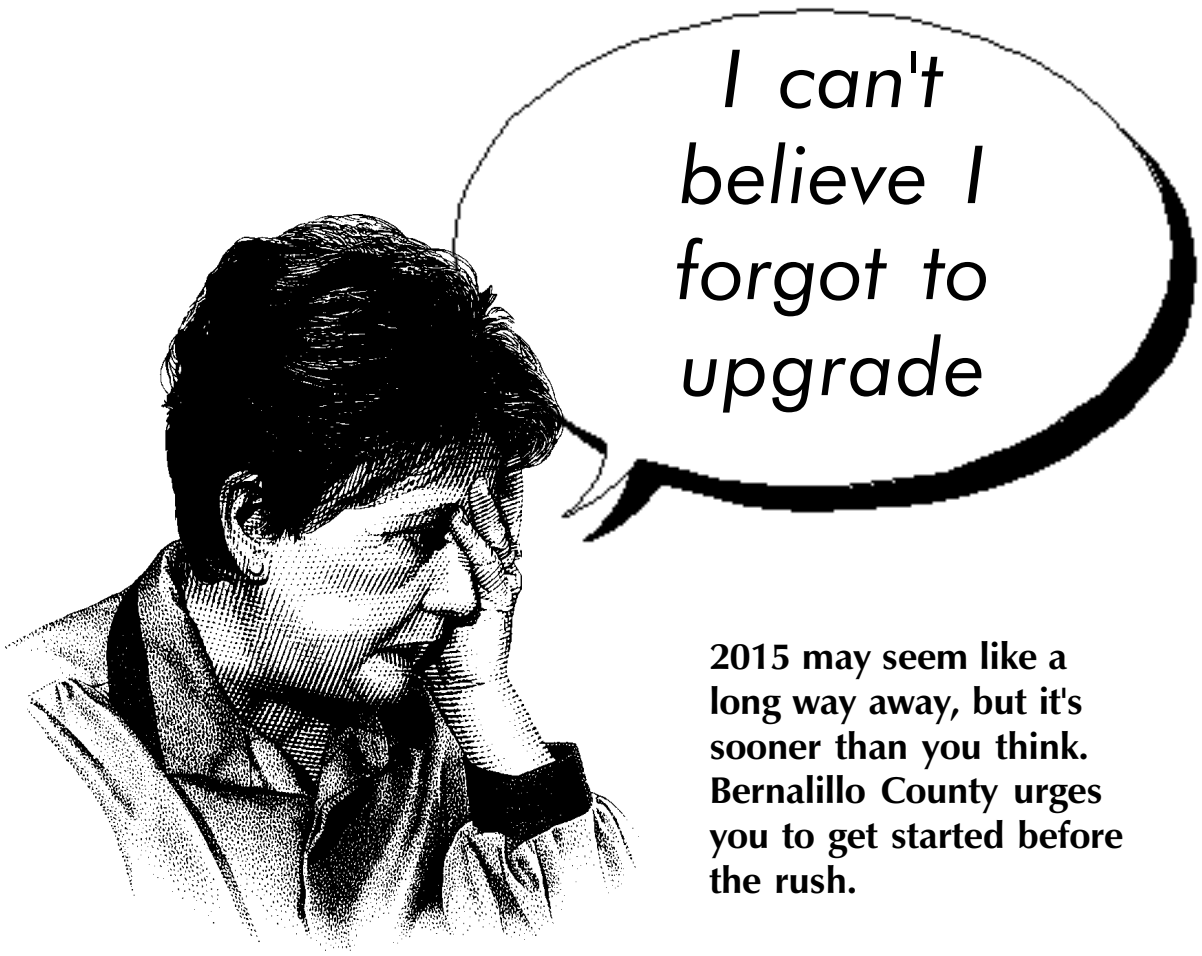
NSFC Environmental Technology Initiative
http://www.estd.wvu.edu/nsfc/NSFC_ETI.html

Septic Information Website
http://www.inspect-ny.com/septbook.htm

Texas On-Site Wastewater Treatment Research Council
http://www.towtrc.tamu.edu/

University of Minnesota: Get to Know Your Septic Tank http://www.geocities.com/RainForest/Vines/5240/machmeier/Machmeier_Get_To_Know.html

Wayne County Combined General Health District: Septic Tanks/Onsite Waste Water Treatment Systems (links)
http://www.wayne-health.org/wc_wastewater_tx.html



2015 may seem like a long way away, but it's sooner than you think. Bernalillo County urges you to get started before the rush.

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