

2017

# Understanding Septic Systems and Wells for the Real Estate Professional



NOVEMBER 29, 2017

# Understanding Septic Systems and Wells for the Real Estate Professional

## I. INTRODUCTION

The purpose of a septic tank is to separate the solids from the liquids. Once separated, the tank holds the solids, as well as fats, oils, cooking grease, shampoo, conditioner and soap for digestion and periodic removal. Effluent or the remaining liquid passes to a distribution box and then on to a drain field. Septic tanks are called "septic" because they work in an anaerobic state; meaning they do not require oxygen to operate.

## II. SEPTIC SYSTEM CONSTRUCTION BASICS

Septic systems are soil based systems. A percolation test ("perc test") is performed to determine the absorption rate in the soil. Test holes are dug, then filled with water and the absorption of the water into the soil is determined at a rate per minute. For raw land transactions, a certification letter is issued by the county which guarantees a permit to construct an onsite system based on the number of bedrooms, but it does not guarantee the type of system.

### A. What kind of system?

1. It depends on the soil. Better soil means a less expensive system will be required. It also determines what kind of system (conventional vs. non-conventional/alternative system).
2. Drain field size is based upon the percolation rate of the soils encountered.
3. Conventional technology requires much more area than non-conventional systems.
4. Setbacks to water supplies must be maintained.
5. No minimum lot size is established.
6. If a jurisdiction does not have its own design standards, the applicant will need meet the requirements as directed by the health department.

### B. Setbacks and drain fields

1. Manifolds shall not pass closer than 50 feet to any drinking water source unless pressure tested in place at pump shut-off head. (12 VAC 5-61-592).
2. Under no circumstances shall a manifold come within 10 feet of a drinking water source (12 VAC 5-61-592).
3. Must be 10 feet away from property lines, building foundations, ditch bottoms above seasonal water table, utility lines, and irrigation lines.
4. Must be 20 feet away from basements.
5. Must be 50 feet away from streams, lakes, drainage ditches containing water, Water table depressor system, and movement interceptors.
6. Must be 70 feet away from Shellfish waters, depending on soil type must be 70 feet away from drainage ditches, water depression systems, lateral ground water, and movement interceptors.
7. Must be 100 feet away from cisterns and low point of sink holes when placed within the bowl of the sink hole.
8. Must be 200 feet away from developed springs (up slope).

### III. TYPES OF SEPTIC SYSTEMS

#### A. Individual v. Community

1. Individual septic systems are for single family homes.
2. A community septic system serves more than one single family home and the property owner is responsible for paying into a fund for maintenance of the system or be subject to special assessments in the event something happens that requires repair or maintenance.
3. Both individual and community septic systems require occasional pumping of solids out of the tanks.
4. Community septic systems may have a network of pumps and pipes spread throughout the neighborhood to get all of the effluent to the drain field.
5. Community septic systems are essentially large scale individual septic systems that operate for a neighborhood or small community of properties.

#### B. Conventional v. Non-conventional (Alternative Systems)

1. Conventional systems are defined under the Virginia Code of Regulations 12VAC5-613-10 as “a treatment works consisting of one or more septic tanks with gravity, pumped, or siphoned conveyance to a gravity distributed subsurface drain field.”
2. Conventional septic systems are now known as “Conventional Onsite Sewage Systems”.
3. A non-conventional septic system is referred to as an “Alternative Onsite Sewage System," "AOSS," or "Alternative Onsite System" and means “a treatment works that is not a conventional onsite sewage system and does not result in a point source discharge.”
4. The number of known alternative systems in Northern Virginia continues to increase.
5. Currently, approximately 11.3% of existing systems in Loudoun County are alternative.

### IV. CONVENTIONAL SYSTEMS

In conventional systems, the septic waste drains or flows into the field lines. Conventional field lines are essentially trenches with gravel to allow the water to disperse and be absorbed by the soil.

#### A. Major components

Major components of a conventional septic system are the **septic tank, the distribution box, and the drain field.**

1. The **septic tank** separates solid waste from liquid waste. The solids as well as fats oils and grease from cooking and products like shampoo, soap, and conditioner stay in the tank.
2. The remaining liquid passes into the **distribution box** and ultimately drains into the **drain fields.**

#### B. Required Maintenance Standards

1. Cannot be pressurized.
2. Must be at least 18 inches in depth.

3. All conventional septic tanks must be pumped every five years in Chesapeake Bay Act counties.
4. Pump-outs must be entered in the county web-based system.
5. Filters need to be inspected and cleaned periodically (pending usage, flow, strength, diet, and even medication consumption).

**C. Repair examples**

1. To prevent septic system damage, do not place a drain field near trees and shrubs and plant only grass or shallow-rooted perennials and annuals around a septic system.
2. Notorious septic system cloggers include diapers, baby wipes, paper products other than toilet paper, cat litter, cigarettes, coffee grounds, feminine products, etc.
3. Excess kitchen grease will congeal in the sewer line, causing blockages and backups. Kitchen grease does not break down in the tank – It accumulates, filling the tank quicker, and ultimately shortening the time until it will need to be pumped.

**V. ALTERNATIVE SEPTIC SYSTEMS**

An Alternative Onsite Sewage System (“AOSS”) or Alternative Onsite System is essentially the same as a conventional system, except that a secondary treatment unit or pressure distribution method is added to the system due to soil conditions.

**A. Major components**

1. Systems vary in complexity and design depending on the type.
2. Not many universal components.
3. MAY contain a distribution box as used in conventional systems.

**B. Types of Alternative Systems**

Alternative systems mainly fall within two categories: Treatment Systems and Pressurized Distribution Systems.

1. **Treatment System.** Conventional Systems become alternative systems when there is treatment of the sewage to a higher quality than a septic tank produces. These types of systems are known as Puraflo, Advantex, Delta, ATU, Ecoflo, etc.
  - a. **Aerobic Treatment Unit (ATU) Septic System:** In residential use, ATUs are pre-packaged septic treatment systems which are in essence a mini-wastewater treatment plant for home use. Waste is fed into a "trash tank" (similar to a septic tank); effluent moves to a clarifier. Air (oxygen) is pumped through the system to provide oxidation and waste treatment using a variety of designs. ATUs are used at sites where a conventional drain field system cannot be employed. A **Puraflo** system does not have a pressure distribution system, but it is alternative because the system uses treatment modules.
2. **Pressurized Distribution System.** Instead of drain field trenches, a pressure distribution method is used as an alternative dispersal system.

These systems are commonly known as Drip, Mound, Pad, Trenches, Chambers, Spray, Filter-bed, low pressure, etc.

- a. **Drip Irrigation System:** Water is slowly distributed evenly through the drainage field, making sure the soil will not become saturated.

**C. Disinfecting a Septic System**

Use chlorination or ultraviolet light (UV) to disinfect wastewater effluent before it is discharged to the environment.

**D. Repair examples**

1. Compaction
2. Slow Percolation Rate
3. Age
4. System failure: Sewage on the ground surface (look for heavy nitrification).
5. Waste Load Issues: Garbage disposals contribute excessive amounts of solids, which do not break down in the septic tank, requiring it to be pumped more frequently.
6. Hydraulic Failure: Hydraulic overloading occurs when too much water enters the septic system at one time, resulting in wastewater backing into drains or effluent surfacing in the yard.
7. Waste Flow Issues: Backing up in the house plumbing.
8. Broken Components: Uncovering of components is key.
9. In 2015 35% of inspected systems were experiencing difficulties although many of these inadequacies did not meet the definition of failure (most could be readily addressed).
10. The majority of the systems that reported failures were drip dispersal systems, followed by low pressure systems (oldest systems in Loudoun County).
11. For drip systems, there are a variety of factors that may cause failure, most commonly: Cut/broken drip lines, broken hydraulic units, severed air relief valves, and pump failures (most were associated with freezing, aggressive mowing, system damage, and installation defects).

**VI. LEGAL REQUIREMENTS**

**A. Legal Requirements for Conventional Systems**

There are no state or local health department regulations that require septic system testing for the sale of real estate. Inspection requirements, if any, are governed by the sales contract and lender requirements. FHA requirements are different in that any repairs must be completed before settlement (conventional lenders may allow funds to be escrowed).

1. Check form contract being used for sale to determine if septic inspection is required.
2. Waivers for non-conforming conventional systems are not transferable and shall be void upon the transfer or sale of property (See Virginia Code 32.1-164.1:1).
3. Virginia now has licensed onsite soil evaluators, licensed onsite sewage system operators and licensed onsite sewage system installers and each of

these licenses has a class – Conventional licenses cover conventional systems and alternative licenses cover conventional or alternative systems.

4. In order to use the title “Certified Septic System Inspector” the inspector must be accredited by the National Sanitation Foundation or equivalent national accrediting organization, which accreditation shall include passage of both a written and practical examination on the principals and practice of septic system inspections.

**B. Legal Requirements for Alternative Systems**

1. Alternative systems installed since July 1, 2009 have a disclosure recorded in the deed stating there is an AOSS and inspections are required.
2. Reporting must be entered into the county web-based system.
3. All existing AOSS systems must be operated by a licensed operator and inspected at least once a year.
4. New alternative systems require a lab sample at 180 days after occupancy and thereafter, every 5 years.
5. Filters need to be inspected and cleaned periodically.

**C. System Review and Research Tools**

1. Most county health departments have records of permits, certifications and denials submitted for review.
2. Submissions performed by an Onsite Soil Evaluator (“OSE”), but not applied for will not be in the file.
3. Site conditions must not be altered or the certification letter or permit can be voided.
4. Expired permits can be renewed. The Loudoun County Health Department will not re-issue “bad” paper.
5. Certification letters can be re-issued as another certification letter or be issued as a permit.
6. Expired permits, certification letters, and subdivision approvals may meet the exceptions to Chapter 1067 of the Loudoun County Regulations (1067.03 (g)(i)(ii)(1)(2)) for the allowance of alternative systems.
7. Permits that have expired, may possibly be renewed for an additional 18 months with no fees.
8. “LaserFiche” and “Septic Search” are digital access options.

**D. Types of Septic Systems Permitted (Loudoun County)**

Loudoun County allows basically all types sewage disposal systems. The most common domestic systems in Loudoun County are **central sewer systems, municipal sewer systems, communal sewer systems, and private sewer systems (septic).**

**VII. WELLS**

**A. Overview**

Like septic systems, well water testing is not required by state or local regulations for the sale of real property. When a well is inspected by the health department, state regulations require water samples to pass a coliform bacteria test. Some counties have local ordinances that require additional tests for new wells, but there are no required tests for existing wells as a general rule.

FHA requires that well water samples pass lead and nitrate tests and some contracts also require lead and nitrate tests. “Acid neutralizing systems are not required.

**B. Unapproved Water Supply Facilities**

The following are unapproved (in Loudon County):

1. Wells below grade; wells in pits with no drain to daylight; wells in structures (other than well houses); non-cased wells; and contaminated wells.
2. Springs are generally unapproved water supplies, unless they have continuous treatment (chlorination or UV); they control the entire watershed upslope from the spring (highly unlikely); or they meet country requirements as listed in 1040.13(d).
3. Cisterns, essentially holding tanks that are filled by rain. Cisterns are very problematic in that they provide no assurance as to the quality or quantity of water; they require a high degree of maintenance to be effective; and are always at risk of contamination. They are also not regulated.

**C. Regulations Governing Wells: Installation and Upgrades**

1. Permit fees are not charged when existing, in-use water supply facilities are being upgraded or replaced.
2. In order for a properly designed system to provide long-term service, it must also be installed properly. Correct installation practices include construction only when soil moisture conditions are right and excavating trench bottoms are level.
3. Other correct installation practices include: Not compacting the soil; not scraping away the upper layers of the soil during lot preparation; and not smearing the infiltrative surfaces.

**D. Well Yield and Potability Standards**

1. Minimum yield is one gallon per minute. A gallon of water may not be enough depending on: Water use/conservation at the property; static water level; recovery time and rate; depth of the well and water column; and storage capacity in the structure.
2. Potability standards are that the water must be free of contaminants such as e-coli and coliform.

**E. Minimum Construction Standards**

1. The design and construction of all central and communal water supply and distribution systems shall be in strict compliance with the county design manual. Municipal water supply and distribution systems to be operated and maintained by incorporated towns shall be designed and constructed in conformance with the standards and requirements of the town having responsibility for the system. Where such jurisdiction does not have its own design standards, the applicant will meet the requirements as directed by the Health Director.
2. New water wells for potable water shall be designed in accordance with the local county ordinance.

3. Water distribution systems associated with central and municipal water systems must include a provision for fire protection and must be designed in accordance with the local county ordinance.

#### **VIII. WELL AND SEPTIC CONTRACT ADDENDUM (NVAR Form)**

Please refer to the attached NVAR form PRIVATE WELL AND/OR SEPTIC SYSTEM ADDENDUM (attached).

#### **Check Boxes and Blanks:**

##### **1. WELL**

- A. Water Quality Test – Parties decide who will pay.** Regardless of who pays for the water quality test, seller is obligated remediate any water contamination caused by coliform bacteria. Seller also is required to deliver to buyer on or before settlement a report issued by a Virginia laboratory indicating that the well water is free from contamination by coliform bacteria.
  
- B. Inspection of the Well - Parties decide if well inspection will be a contingency.** If well inspection is a contingency, buyer pays for the inspection and buyer must deliver inspection report and list of repairs by the deadline. Failure of one party to respond to a counter-offer or remove the Contingency within the required response period will result in the contract becoming void at the expiration of that response period.

##### **2. SEPTIC**

- A. Septic Inspection – Parties decide who will pay for the inspection.** Parties also decide what kind of inspection will be performed:
  1. Walk-over visual inspection of the drain field with probing
  2. Pumping and inspection of all tanks
  3. Excavation and visual inspection of all distribution boxes or systems
  4. Visual inspection of the alternative treatment unit(s) if present
  
- B. Alternative System Maintenance Contract (if applicable)**
  
- C. Septic Repairs – Parties decide how many days for inspection and delivery of report and how many days to deliver request for repairs or replacement in the event of malfunction.**

If there is evidence of septic malfunction, purchaser may request repairs or replacement; seller may elect to remedy, make a counter-offer or not respond. Buyer then has a certain period of time to respond and accept, respond with a counter-offer or take septic in present condition. If buyer does nothing, the contract will become void.

#### **Questions & Answers**



Dulles Area Association of Realtors  
Northern Virginia Association of Realtors

## Understanding Septic Systems & Wells

Conventional Onsite Sewage Systems  
Alternative Onsite Sewage Systems  
Private Water Wells  
NVAR Septic & Well Addendum

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### Onsite Sewage System Common Components

Source: Joubert et al. (2005)

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### Ordinances, Regulations Governing Conventional Onsite Sewage Systems

**12-VAC-5-610 – Sewage Handling and Disposal Regulations** – govern the design, and installation of a Conventional Onsite Sewage System (COSS). This is a **Prescriptive** regulation which dictates minimum sizing of tanks, based on maximum occupancy, minimum size of absorption fields based on soil and peak / maximum anticipated sewage flows, type of pipe to use, etc.

**12-VAC-5-613 – Regulations for Alternative Onsite Sewage Systems** govern the design, installation, and maintenance for alternative onsite sewage systems. These systems often include pressure distribution systems and/or treatment beyond a septic tank. These Regulations also require annual inspections by a licensed operator and reporting to VDH.

**Federal – Chesapeake Bay Total Maximum Daily Load Regulations (TMDL)** – Set limits on the pounds of nitrogen, phosphorus, and sediment that can be added to the Chesapeake Bay annually.

**State** - The Chesapeake Bay Preservation Act: Requires septic tanks be inspected/pumped out a minimum of once every five years. What office administers the program varies from county to county. Some local ordinances do not provide for inspection as an option to comply.

**Local Ordinances** may require additional tankage, access risers, installation of effluent screens, mandatory septic tank pump out and more restrictions on soil conditions and landscape types. Loudoun and Fairfax have very comprehensive local ordinances.

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**Permits & Certification Letters**

A. Permits to construct or repair an onsite sewage system.

- I. Issued to a single owner, not transferrable between owners.
- II. Valid for 18 months
- III. Can be extended once for an additional 18 months.
- IV. All work must be complete before extension expires.

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**Permits & Certification Letters**

A. Certification Letters & Subdivision Approvals

- I. Issued to a single owner
- II. Are transferrable between owners
- III. Do not expire
- IV. Guaranty a system can be installed with a defined capacity.
- V. Does not guarantee system type
- VI. Can be null and void if property lines change or site certified is disturbed.

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**Maintenance**

**THESE ITEMS ARE CONSIDERED MAINTENANCE**

- I. Pump replacement
- II. Media replacement (Peat Moss from Puraflor)
- III. Blower replacement and maintenance
- IV. Filter replacement and maintenance
- V. Repairs to drip system components
- VI. Repairs or replacement of control panels
- VII. Minor adjustments in performance that do not increase capacity or lower treatment levels
- VIII. Sludge Removal ( Septic Tank Pumping)

All maintenance needs to be recorded in the owners log and some things must be reported electronically in the health department database at the State or local level.

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## System Definitions & Numbers

- **Conventional systems** are defined under the Virginia Code of Regulations 12VAC5-613-10 as "a treatment works consisting of one or more septic tanks with gravity, pumped, or siphoned conveyance to a gravity distributed subsurface drain field."
- **Conventional systems** are also now known as "Conventional Onsite Sewage Systems".
- **A non-conventional septic system** is referred to as an "Alternative Onsite Sewage System," "AOSS," or "Alternative Onsite System" and means "a treatment works that is not a conventional onsite sewage system and does not result in a point source discharge."
- The number of known alternative systems in Northern Virginia continues to increase. Currently, approximately 12% of existing systems in Northern Virginia are alternative.
- There are approximately 75,000 septic systems total in Northern Virginia

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## What onsite system will work?

1. **Conventional System with Conventional Reserve**
2. **Conventional System with Alternative Reserve**
3. **Alternative System with Alternative Reserve**
4. **Conventional or Alternative System with no Reserve**



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## System Type Selection

1. Soil type, permeability, depth and available area are the primary factors that determine system type.
2. Property with soils that are deep, permeable and have a large area can use conventional systems.
3. Take any one of these away and you could be looking at an alternative system or a system with less capacity.
4. Capacity is based on 75 gallons per person and 2 people per bedroom.  
4 bedroom house is 8 people or 600 gallons per day



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## Interpreting the receiving environment



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## Site and soil evaluation

- **Design boundaries**
  - Restrictive horizons
  - Perched water
  - Water table
  - Drinking water conduits
  - Property boundaries
- **Soil capacity**
  - Depth
  - Soil color
  - Structure and texture (residence time)
  - Permeability
  - Consistence
  - Moisture content



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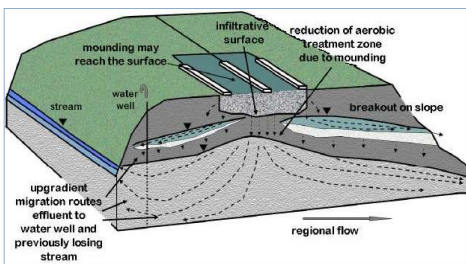
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## Siting and design considerations



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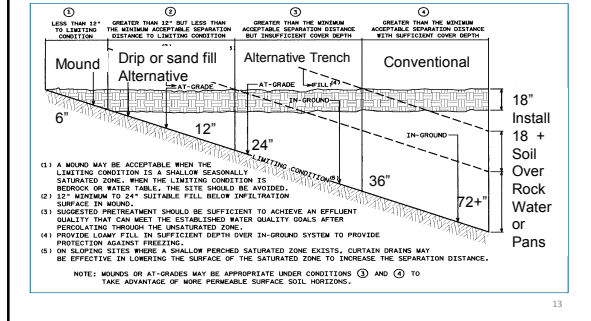
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## How / Why the system was selected




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## Set Backs To Septic Systems

- A. 100 feet or 50 feet from septic tanks and drain fields to any drinking water well depending on the type of well and its depth of casing and grouting.
- B. 50 feet to streams, ponds or rivers
- C. 200 feet to developed springs used for water supplies
- D. 70 feet away from Shellfish waters, depending on soil type




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## Set Backs To Septic Systems

- A. 10 feet to Utility lines or Utility easements
- B. 5 feet or 10 feet to property lines
- C. 20 feet to basements
- D. 10 feet to foundations (non basement)
- E. 20 feet to force mains and sewer lines




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### Part I Questions

1. Regulations
2. Permits
3. Certification Letters / Subdivision Approvals
4. Maintenance
5. Soil Evaluations
6. Why Conventional? / Why Alternative?
7. General set Backs from septic systems



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### Conventional Systems

1. Conventional Onsite Sewage System (COSS)
  1. Treatment consists of 1 or multiple septic tanks only, no alternative treatment systems.
  2. Effluent can be pumped from a lower location to a higher location.
  3. Pumped effluent cannot be dispersed to the drainfield under pressure like drip irrigation or low pressure.
  4. Pressure distributing manifolds are allowed on conventional systems but must be designed by a Professional Engineer.



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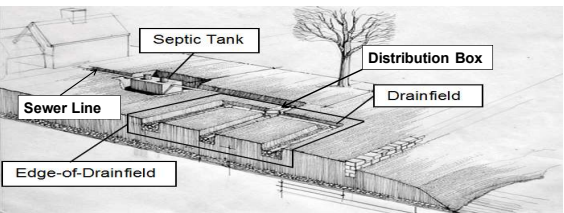
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### Basic Conventional Septic System



Source: Joubert et al. (2005)



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### Septic Tank

- Water tight containers
  - Concrete
  - Plastic/ Fiberglass
- Gravity separation/ detention time
  - Heavy sinks
  - Lighter floats
  - 150-200% daily flow
- Screen assisted
- Anaerobic digestion

The diagram shows a cross-section of a septic tank. On the left, an 'Inlet Tee' pipe enters the tank. In the center, a 'Riser' pipe extends above the ground. On the right, an 'Outlet Tee' pipe exits the tank. Inside the tank, there is a layer of 'Scum' at the top, a 'Screen or Filter' at the bottom, and a layer of 'Sludge' at the very bottom. Blue arrows indicate the flow of wastewater from left to right through the tank.

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### Distribution Box

The photograph shows a distribution box system installed in a field. A concrete 'Box' is connected to a 'Header' pipe, which then branches into several 'Trenches' for effluent distribution.

The most common form of distribution is the "Distribution Box" ... This may be concrete, or plastic, and is used to evenly distribute the effluent to each absorption lateral equally.

When a pump station is used to push the effluent to the absorption field, we may see one D-Box used as a "surge box" to reduce turbulence and provide a more even flow to the primary Distribution Box

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### Absorption Lines or Drainfield Trenches

For dispersal to the soil we utilize a series of trenches in "parallel". Each trench is typically 3' in width and a minimum of 50' ft length, not to exceed 100' in length.

Material may be gravel and pipe, or a number of "Gravel less" / Chamber style systems that have been approved for use.

Minimum trench bottom depth is eighteen (18) inches to meet the required 18" standoff to restrictions.

The photograph shows a construction site where materials for absorption lines are being prepared. There are several large black corrugated pipes and piles of gravel on the ground. A yellow excavator is visible in the background.

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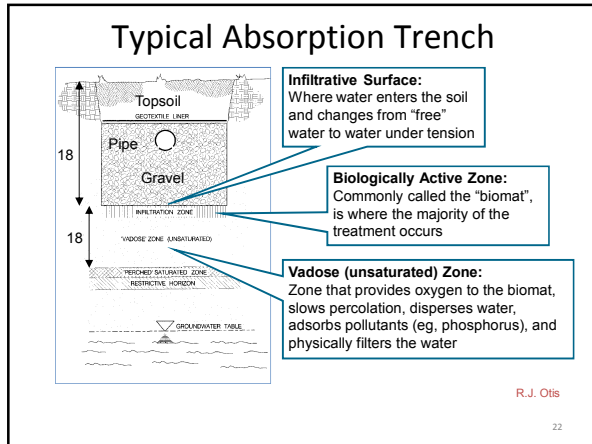
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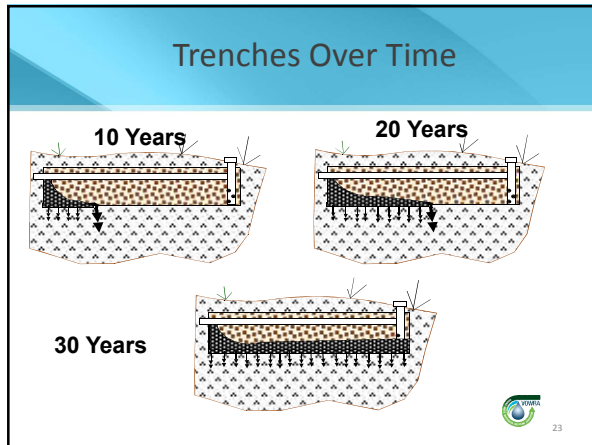
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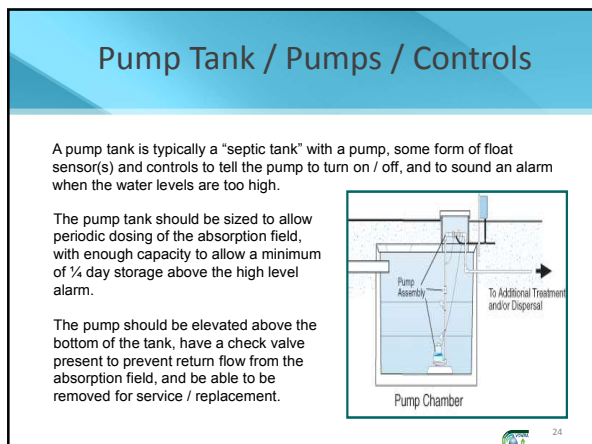
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## Alternative Onsite Sewage Systems

### 1. Alternative Onsite Sewage Systems (AOSS)

1. Treat to a higher level than septic effluent

**Or**

2. Utilize Pressure Distribution
3. Can have both better treatment and pressure distribution

Do not have to have alternative treatment and pressure distribution, either one makes the system alternative.



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## Basic Alternative Treatment Unit



People Caring About Water

- Commonly referred to as an ATU
- Passive system
  - Settled solids passing through the bottom opening
- Active system
  - Settled solids blanket below the outlet baffle
  - Requires forced Air



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## Examples of Alternative Treatment



People Caring About Water



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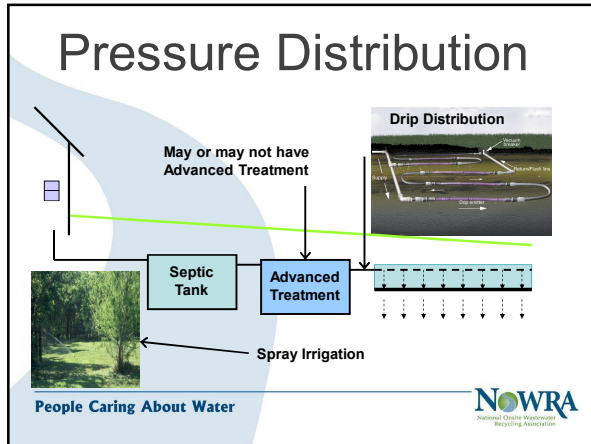
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## Other Alternative System FAQs

1. Treatment Levels:
  - TL-2 is 85% - 90% cleaner than septic tank effluent
  - TL-3 is 90% - 95% cleaner than septic tank effluent
  - TL-3 plus disinfection is the same as TL-3 but reduces viruses and other bacteria to near swimming pool limits
2. New AOSS in Chesapeake Bay Reduce Nitrogen by 50%.
3. How much smaller is the area required?

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## Why an Alternative when Conventional will work?

1. Capacity:
  - a) Use of an alternative system can increase the capacity of a conventional system by 200%
2. Clearing Costs / Tree Preservation
  - a) Alternative system could save 1/2 of the clearing costs and preserve desired trees.
3. System depth, deep trench excavations
  1. Installing 1/2 the number of trenches with alternative treatment could be less expensive than twice the number of deep conventional trenches.

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## Alternative Discharge Systems

1. Alternative Discharging Systems
  1. Treatment consists of any unit or combination of units that treat effluent to a higher standard than septic quality.
  2. After treatment, effluent is then disinfected and discharged into a river , stream or ditch.
  3. Not typically permitted for new construction in Northern Virginia
  4. Requires more frequent inspection and sampling.



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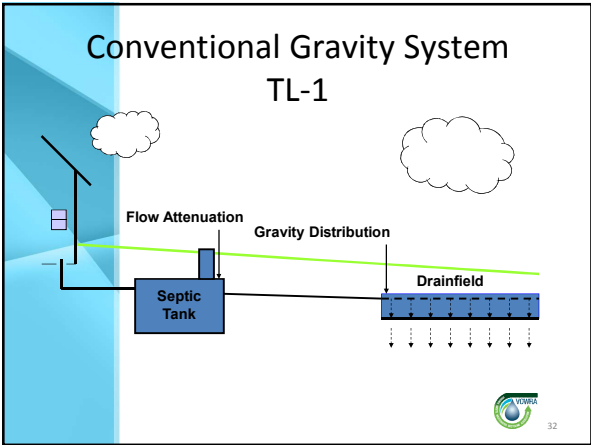
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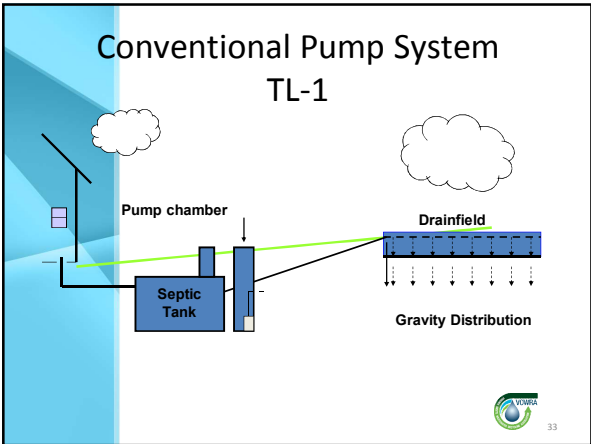
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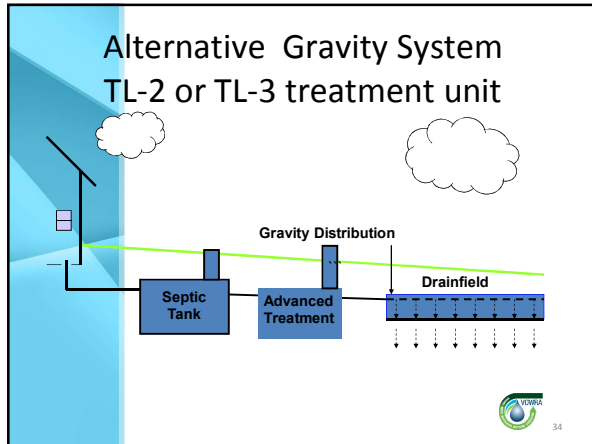
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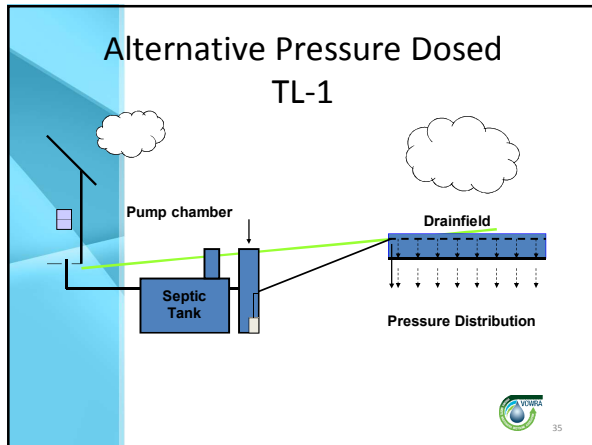
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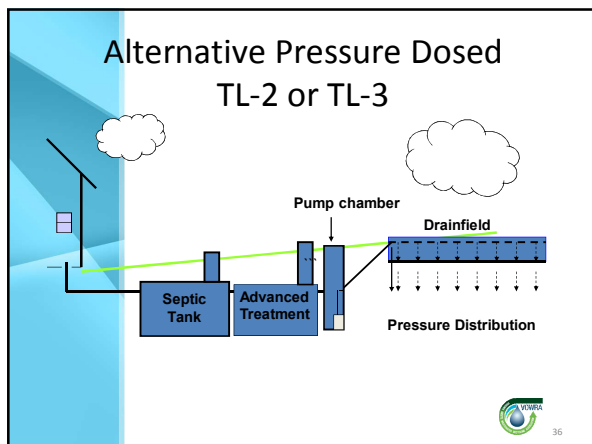
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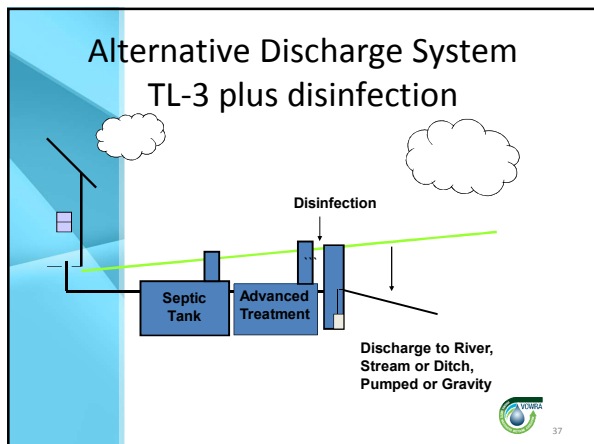
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### Questions Part 2

1. Conventional Systems
2. Alternative Systems
3. Alternative Discharge Systems

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### Communal vs Individual

1. Similarities
  - a. Both can have only 1 owner
  - b. Both have a sewer line
  - c. Both have primary treatment (Some have Alternative)
  - d. Both have a dispersal field
  - e. Both must be operated and maintained by the owner
2. Differences
  - a. Communal Systems serve multiple users
  - b. Communal usually owned and operated by an HOA or Utility Company. More than 50, must be utility.

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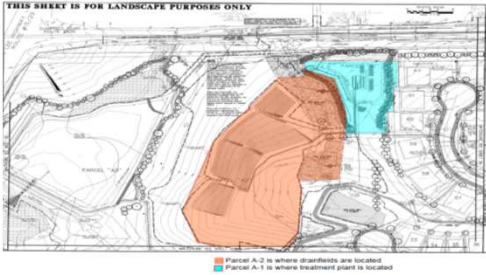
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### Communal System Example

**RAYMOND FARM, 66 HOUSES WARRENTON VIRGINIA**

THIS SHEET IS FOR LANDSCAPE PURPOSES ONLY



Parcel A-2 is where drainfields are located  
Parcel A-1 is where treatment plant is located

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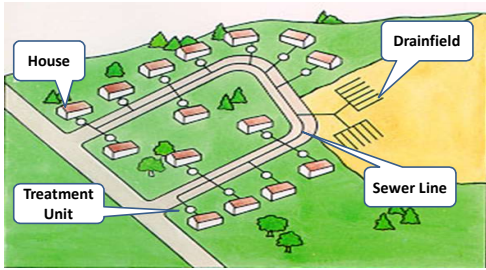
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### Communal System Example

**Illustration of Individual Treatment**



House  
Treatment Unit  
Sewer Line  
Drainfield

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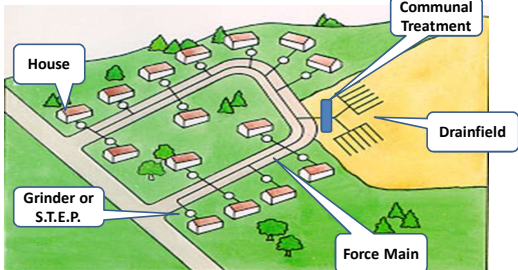
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### Communal System Example

**Illustration of a Communal Treatment**



House  
Grinder or S.T.E.P.  
Force Main  
Drainfield  
Communal Treatment

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## Routine Maintenance

<p><b>Conventional System</b></p> <p>Should:</p> <ol style="list-style-type: none"> <li>1. Inspect annually</li> <li>2. Pump tank as needed</li> <li>3. Replace pump &amp; clean outlet filter as needed</li> <li>4. Check distribution boxes every 5 – 10 yrs.</li> <li>5. <b>MUST PUMP TANK EVERY 5 YEARS IN LOUDOUN, FAIRFAX &amp; PRINCE WILLIAM</b></li> </ol>	<p><b>Alternative System</b></p> <p>MUST:</p> <ol style="list-style-type: none"> <li>1. Inspect annually</li> <li>2. Sample @ 180 days</li> <li>3. Sample Every 5 years</li> <li>4. Have licensed operator</li> <li>5. Report when necessary</li> <li>6. Keep System Log</li> <li>7. Have O&amp;M Manual</li> <li>8. 5 year Pumpout</li> </ol>
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## Homeowner Do's and Dont's

**DO:**

1. Use water wisely
2. Scrape off plates into trash cans
3. Use soaps and shampoos wisely
  - a) They contain fats that have the same effect as flushing cooking grease
4. Use cleaning products wisely and avoid heavy use of bleach and anti-bacterial soap.
  - a) You need bacteria to treat sewage.
5. Keep the area around your septic tank and drainfield maintained and clear for maintenance
6. Have your system inspected frequently and pumped out or serviced as recommended by a licensed operator or required by Law.



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## Homeowner Do's and Don'ts

**DON'Ts:**

1. Use excessive amounts of water
2. Route water treatment discharges into septic system,
3. Park vehicles, dig, disturb, plant trees or vegetable gardens over septic fields.
4. Place sheds, patios, pools or decks over or within 20 feet of tanks and drainfield.
5. Flush medicine or large amounts of food, beer, wine or cleaning products down the drain.
6. Flush any type of wipe down the toilet.
7. Allow leaky toilets or water faucets to continue to run. Have them repaired quickly.



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### Water Well Basics

Well Cap

Electrical Conduit

Well Casing

Submersible Pump Below Ground

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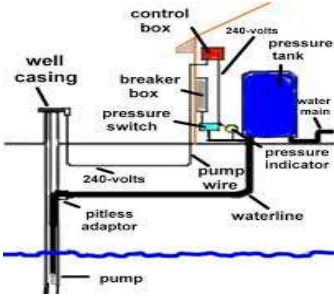
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### Water System



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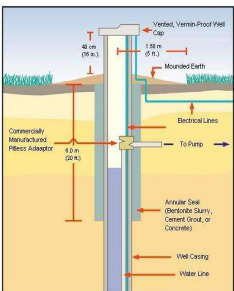
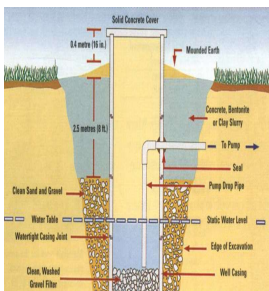
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### Drilled & Bored Well Diagram

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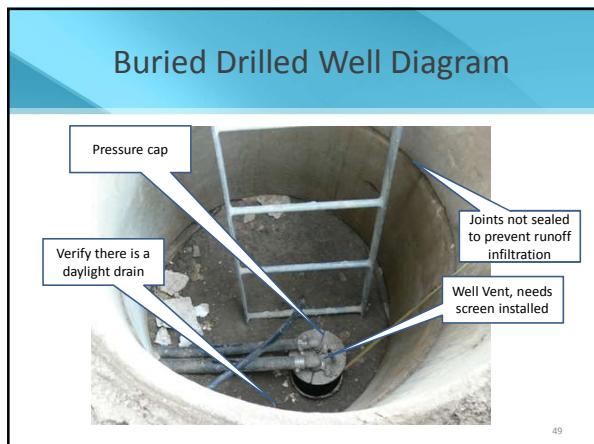
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- ### Water Testing Standards
1. Coliform Bacteria is State Standard
    - a) No other local standards
  2. New wells in Loudoun County require full chemical analysis, but not on re-sale.
  3. FHA requires meet primary drinking water standards.
  4. Don't confuse safe water with good water
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- ### Failing Samples, What to do?
1. Coliform Bacteria test failed
    - a) Disinfect well and water system
    - b) Re-test
  2. Fairfax County Health Department
    - a) Requires 2 passing tests without disinfection in-between after failing coliform test.
  3. Still failing
    - a) Add continuous disinfection system
      1. UV light
      2. Continuous Chlorination
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**Part 3 Questions**

1. Communal vs Individual Onsite System
2. Homeowner Do's and Don'ts
3. Water Wells



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**Home Sale Septic & Well Inspections**

Currently there are **NO REGULATIONS** governing what a "septic inspector" needs to look at, document, or report, or **HOW** an inspection should be conducted.

This is a true – **BUYER BEWARE** - you get what you pay for!

As to who may conduct an inspection? – Anyone can unless:

*§ 59.1-310.9. Requirements for accredited septic system inspectors. In order to use the title of "accredited septic system inspector" in connection with any real estate transaction, including refinance, an applicant shall be accredited by the National Sanitation Foundation or an equivalent national accrediting organization, which accreditation shall include the passage of both a written and practical examination on the principles and practice of septic system inspections.*



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**The Nitty Gritty of an Inspection**

Most often an inspector is asked to determine if the system is malfunctioning.

I guess there is an assumption that if its not malfunctioning then it is functioning and maybe that's enough. Maybe that is the standard that should be set for the sale of a home.

Part of that lies in the definition in the regulations of what a "Failure" is:

12VAC5-610-350 – "For the purpose of requiring correction of a malfunctioning sewage disposal system the presence of raw or partially treated sewage on the ground's surface or in adjacent ditches or waterways or exposure to insects, animals or humans is prima facie evidence of such system failure and is deemed a violation of these regulations. Pollution of the groundwater or backup of sewage into plumbing fixtures may also indicate system failure."



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In short, sewage on the ground surface or backing up in the residence is what is considered a "Failure".


So when the "Inspector" runs that bathtub full of water down the drain and it doesn't back up into the residence, and he walks over the absorption field, and there is no wetness, then the system is **NOT IN** Failure and he/she approves it.

Does it mean the system is functioning as designed? **NO**

Does it mean the system is in compliance with the design or is functioning properly? **NO**

Does it mean that the components of the system (Septic tank, pump tank, pumps, controls, distribution box) are intact and functioning as designed? **NO**

All it means is that the system did not backup into the residence and the absorption field didn't have water surfacing.




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### So what constitutes an "Inspection"?

Here is that "Slippery Slope"!

There is **NOTHING** in the regulations from the Health Department, Department of Professional Occupational Regulation, etc. that dictates or says **WHAT** constitutes a proper inspection of an onsite sewage system for a property transfer.

The only reference we find in code or regulation is the one quoted at the beginning of this part of the presentation about accredited septic system inspectors.




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### Septic Tanks

Septic tanks need to be opened and inspected! The inspector should look at the tank(s) before they are pumped out if possible. What he/she is looking for is:

1. Are the inlet and outlet baffles intact.
2. Is the effluent level equal to the invert of the Outlet.
3. Is there a developed scum level in the tank.
4. Is the tank structurally sound?
5. Is there evidence of groundwater intrusion?


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### Pump Chamber Inspection

Here are some examples of bad wiring, leaking junction boxes and broken pump lines found during an inspection of a pump tank.



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### Pump Chamber Inspection

Here are some examples of bad wiring, leaking junction boxes and broken pump lines found during an inspection of a pump tank.



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### Distribution Boxes

Here are some examples of distribution box troubles that have not resulted in a malfunction, YET!



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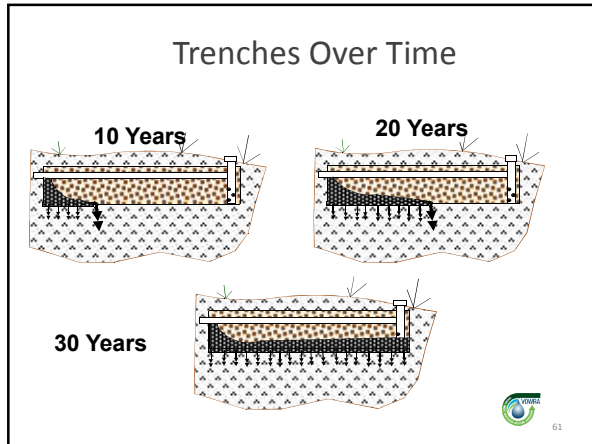
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**So, What Should Be Required?  
WATER QUALITY**

1. Water Quality

- a) Seller or Purchaser at who's expense?
- b) Lab report not older than 180 days
  - a) What if FHA or VA Loan?
- c) Free from contamination by coliform bacteria
- d) Contamination remediated by the seller
- e) Re-inspected (tested) at sellers expense
- f) Does not allow for an out if seller refuses to remediate.

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**So, What is Required?  
WELLS**

1. Well Inspection Contingency

- a) Contract is or is not contingent
- b) Purchaser selects inspector and pays
- c) Professional, insured inspector?
- d) If deficiencies found, seller may or may not chose to remediate.
- e) Contract may expire if not addressed or resolved in the time frame provided

2. What constitutes a Well Inspection?

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**So, What is Required?  
Septic System**

1. Septic Inspection

- a) Seller at his risk and expense or Purchaser at his risk and expense.
- b) Report within time allotted in contract and not older than 180 days.
- c) Inspected by local health department or licensed insured septic system installer, contractor or repair firm?
- d) Indication whether there is any evidence of malfunction of the private septic or alternative system

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**So, What is Required?  
Septic System**

- Walk-over visual inspection of the drainfield with probing
- Pumping and inspection of all tanks
- Excavation and visual inspection of all distribution boxes or systems
- Visual inspection of the alternative treatment unit(s)

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**My opinion!**

- The disclosure document puts septic inquiry on the purchaser.
- If that's the case, the purchaser should look hard to know what they are getting
- Should probably be a higher standard than not failing for property transfers
- Not malfunctioning may not meet the standard for Safe, Adequate and Proper required by the building officials for decks or additions
- None of the boxes address searching health records or evaluating capacity, (i.e. 4 bdr house on 3 bdr system)

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## Bedrooms & Capacity

- Nothing in the addendum addresses capacity
- Bedroom = 2 people full time @ 75 gallons per person/day
- 4 bedroom house is 8 people @ 75 gpp = 600 gals/day
- What if there are 5 bedrooms on a 4 bedroom drainfield
- None of the boxes address searching health records or evaluating capacity, (i.e. 4 bdr house on 3 bdr system)
- Is a den or office with a closet a bedroom?
- How do we upgrade the bedrooms or what other options are there?

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## Final Chance for Questions!

THANK YOU

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