

Clackamas River Water Providers Septic Systems 101

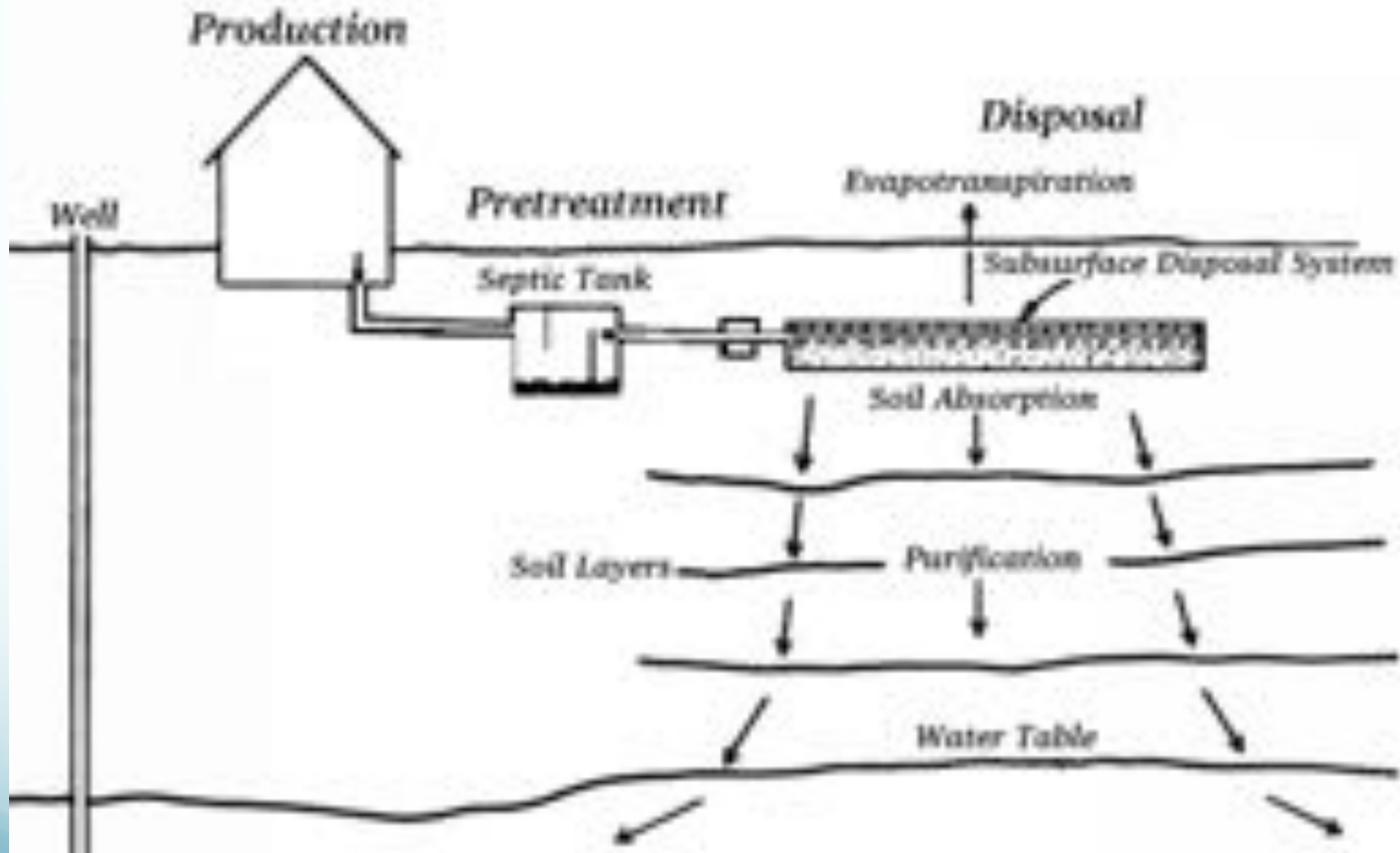
Brannon Lamp, REHS



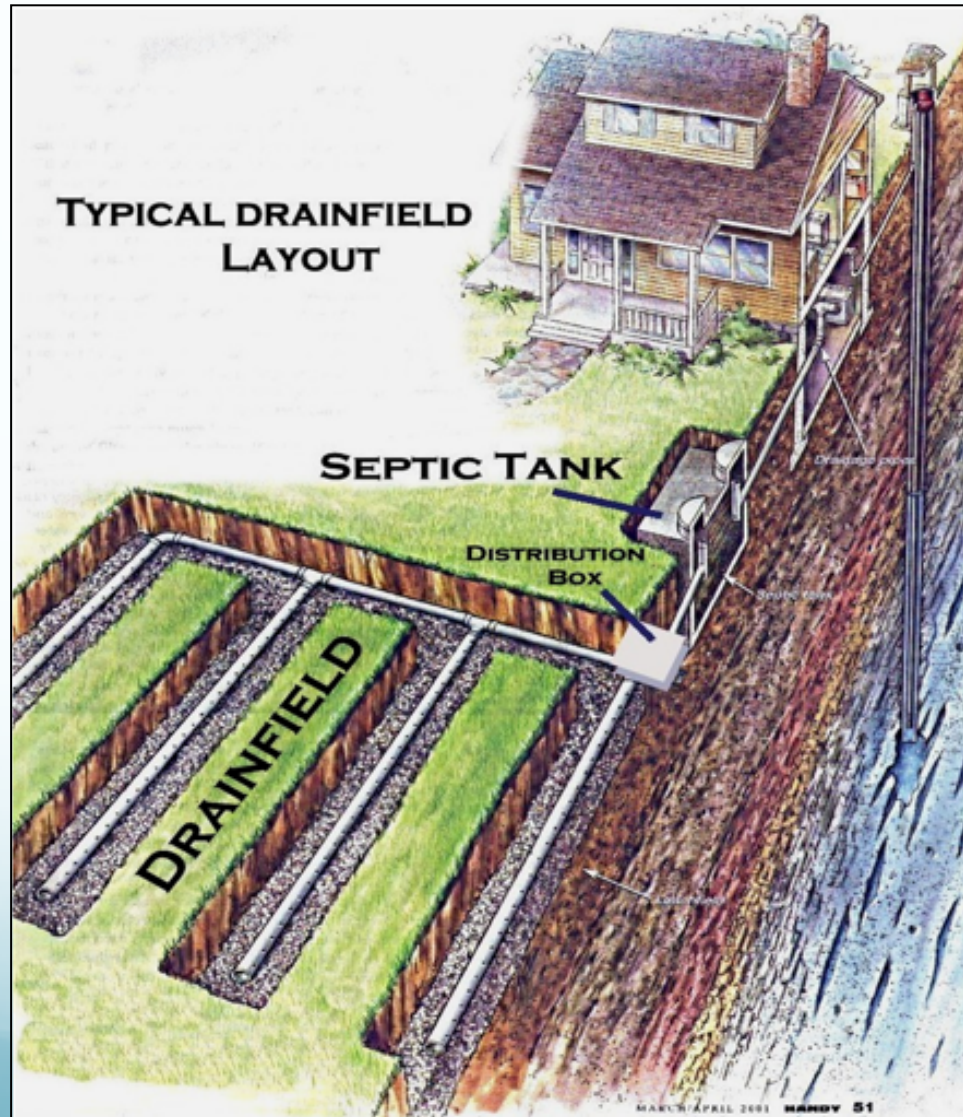
What is a Septic System?

- Definition of 'Septic': Infected with Bacteria. Sounds nice. Hmmm...
- What does a Septic System Do?
 - Treatment
 - ~~Disposal~~ Dispersal
 - Recycling
- So, is the term 'Septic System' accurate?

What is a Septic System?



What is a Septic System?



What is a Septic System?

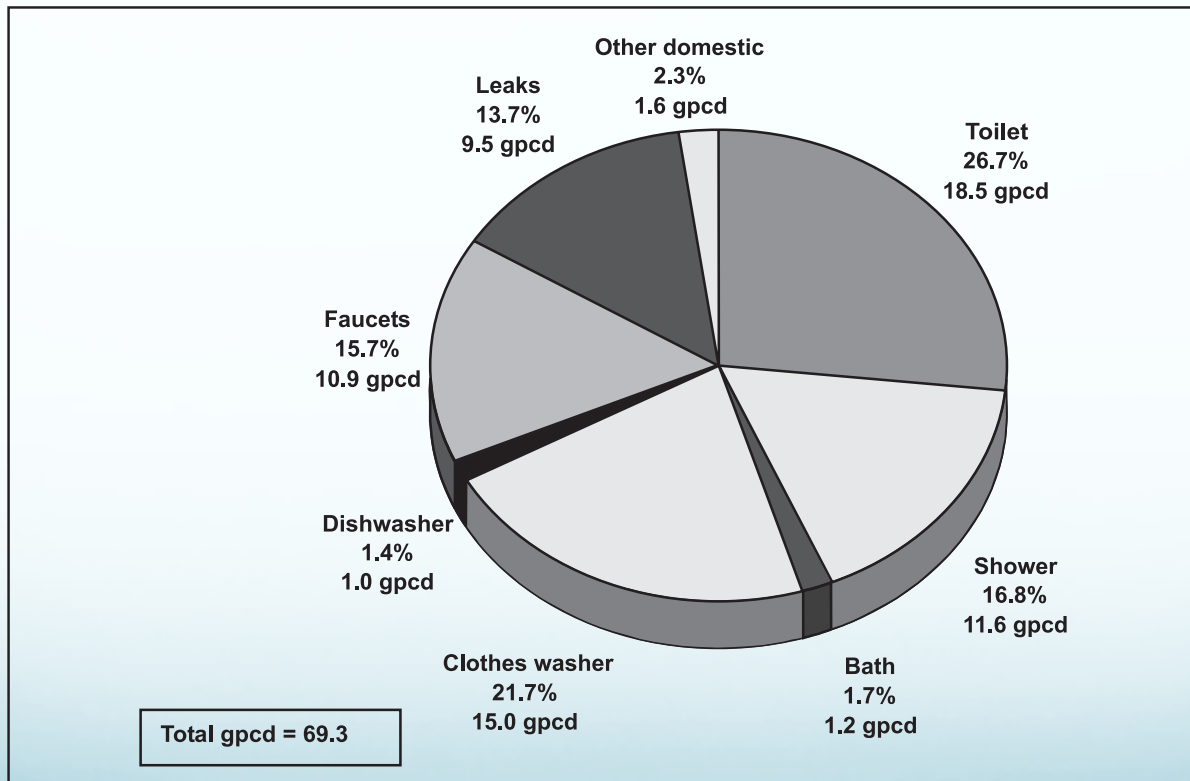
- What is sewage?
- What different kinds of sewage are there?
 - Blackwater
 - Greywater
- Your household generates sewage. Guess how much?
 - Generally 50-90 gallons per person per day

Question

- What is the most common reason that a septic system might fail?

What is a Septic System?

- Household Sewage Generation



^a gpcd = gallons per capita (person) per day
Source: Mayer et al. 1999.

How much water?

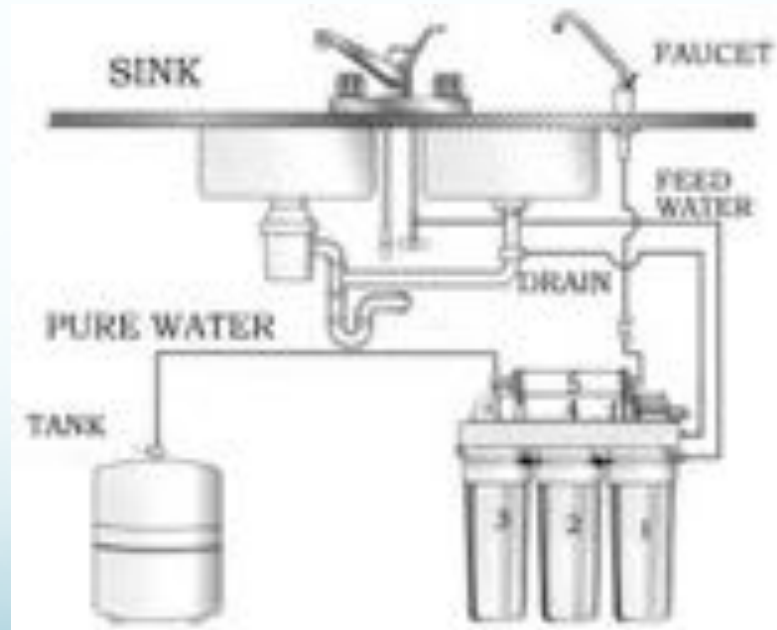


How much water?



What is a Septic System?

- Water Use
- “You learn something new every day”
 - 3-9 gallons used in addition to each gallon treated!



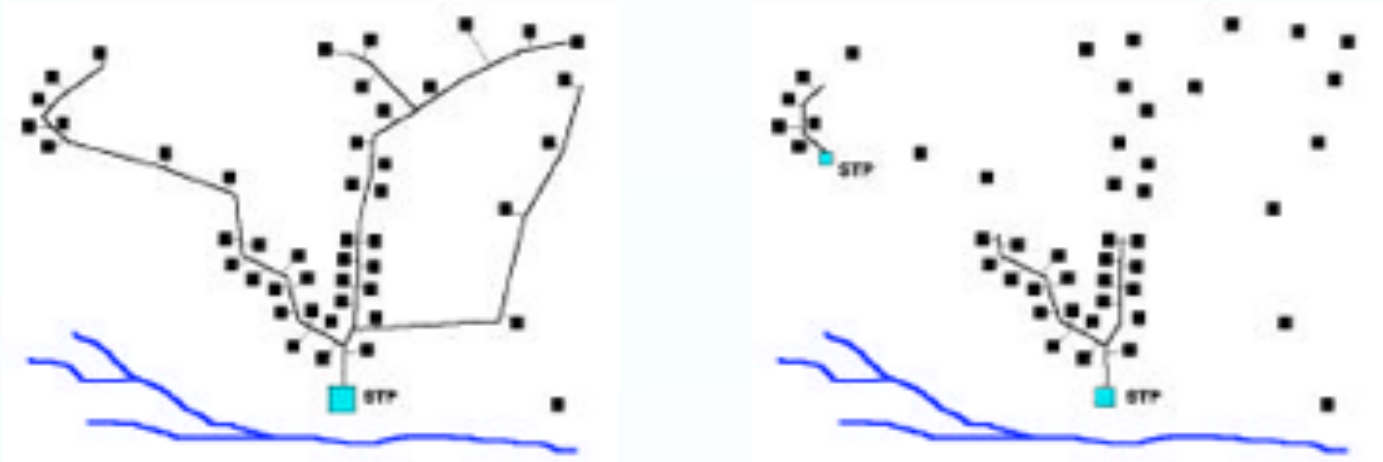
What is a Septic System?

- What are the primary contaminants of concern in sewage?
 - Pathogens-bacteria & viruses
 - Nutrients-Nitrogen & Phosphorous
 - Nitrate is of particular concern for water quality
 - Residual chemicals/toxics/pharmaceuticals
 - Whatever goes down the drain becomes sewage

What is a Septic System?

- What are the main concerns regarding Septic Systems?
 - Public Health
 - Environmental Health
- Common Perceptions/Drawbacks
 - Pollution—Yuck factor
 - Land Development
- What are the benefits of Septic Systems?
 - Decentralized Concept
 - Cost effectiveness
 - Environmentally friendly?
 - Hydrology

Why a Septic System?



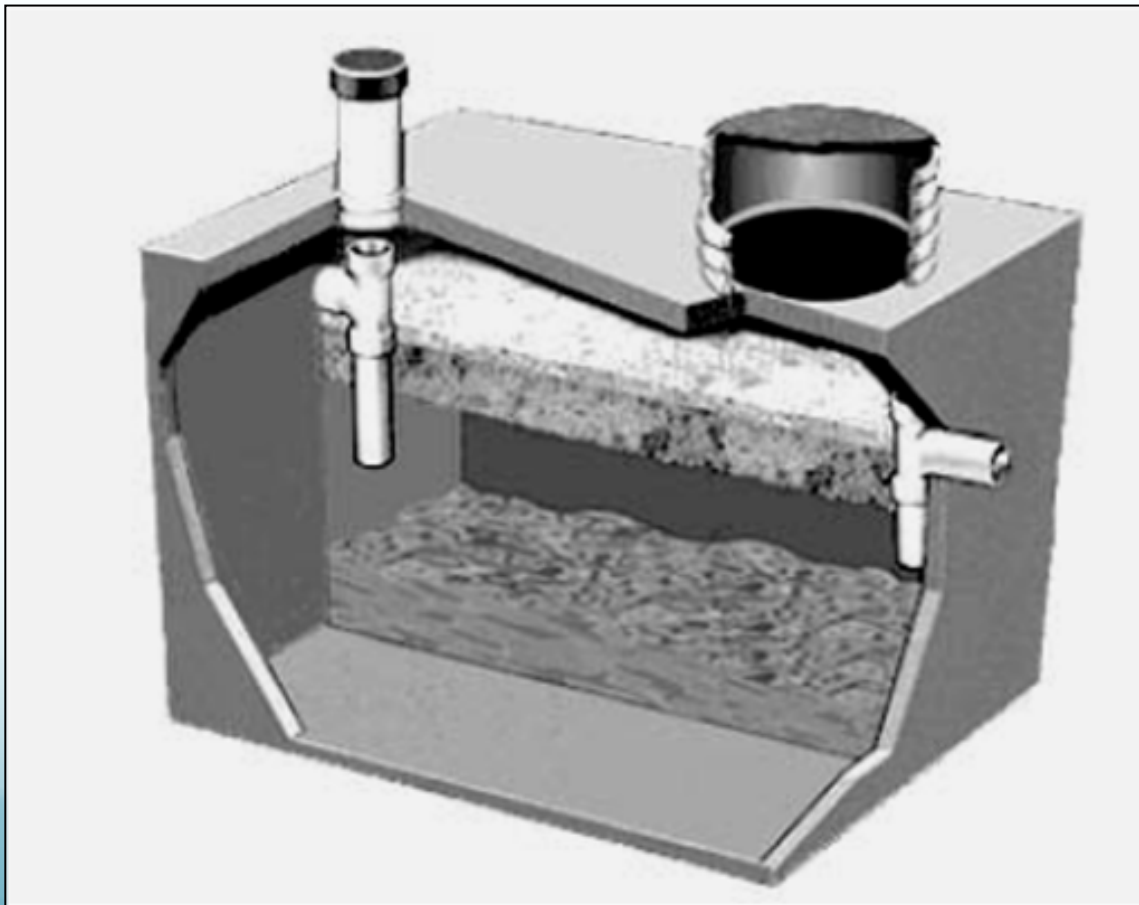
- Wastewater Treatment Plant Capacity
- System Development Charges
- Sewer Construction Costs
- Land Use Regulations
- Economies of Scale (\$\$\$)

Why a Septic System?

- You are not alone
 - Nationwide statistics indicate that 25% of the U.S. is served by Onsite Systems
 - 30% of Oregon's population is served by Onsite Systems
- Can I get rid of my Septic System and voluntarily opt-in for sewer service? Probably not.

Septic System Components

- All Septic Systems in Oregon have a Septic Tank (well, almost all)

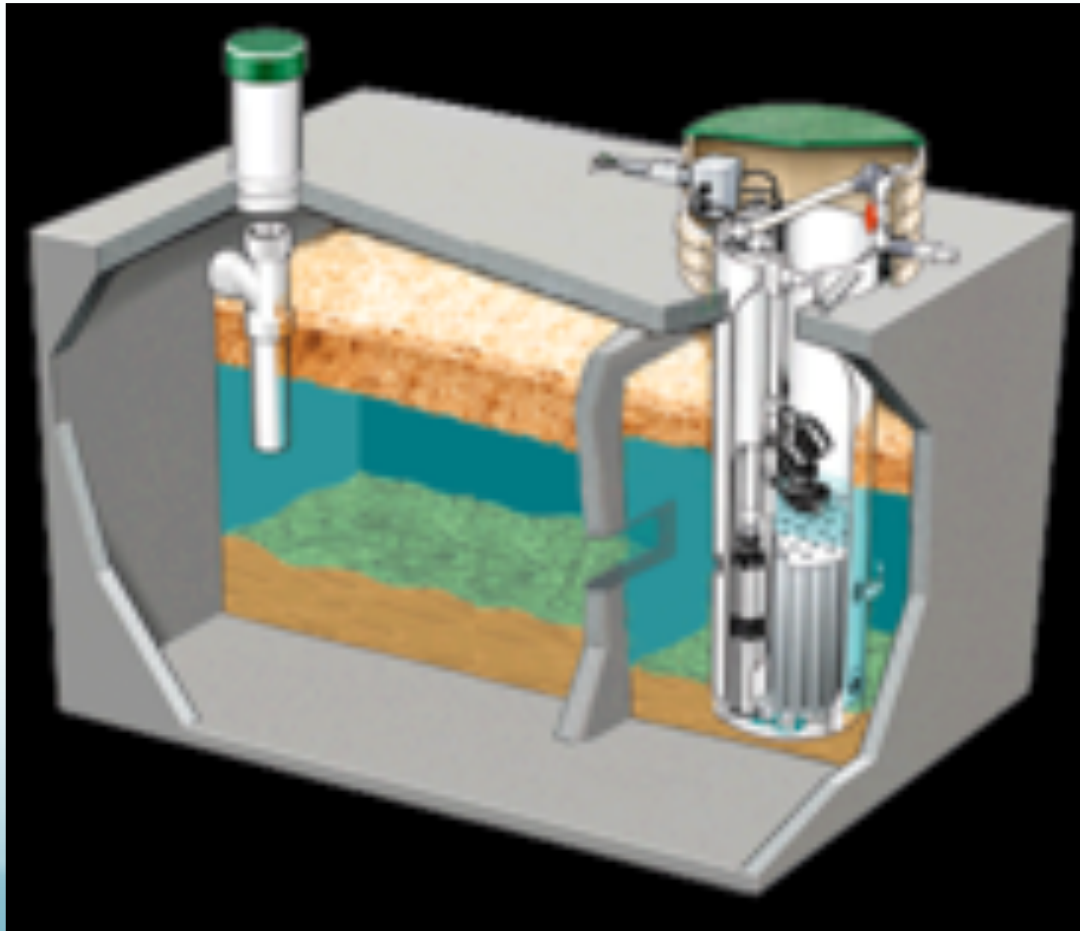


Septic System Components

- To recap, what does a septic tank do?
 - Mechanical separation of solids (specific gravity)
 - Flow attenuation
 - Provides PRIMARY (anaerobic) treatment of sewage
 - Reduces waste strength, generally by 50-70%
 - Allows for periodic removal of solids
- What is the one magical thing a septic tank can't do that people often think that it can?

Septic System Components

- Some Septic Tanks have a pump system



Septic System Components

- A septic tank 'in the wild'



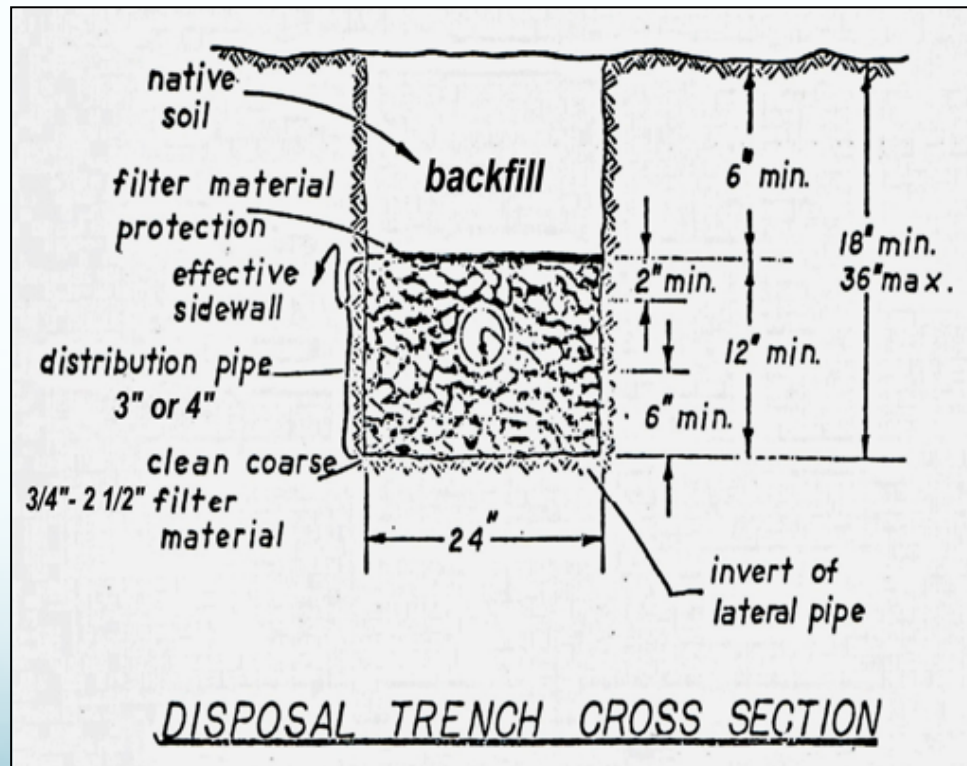
Septic System Components

- Green and yellow or yellow and green?



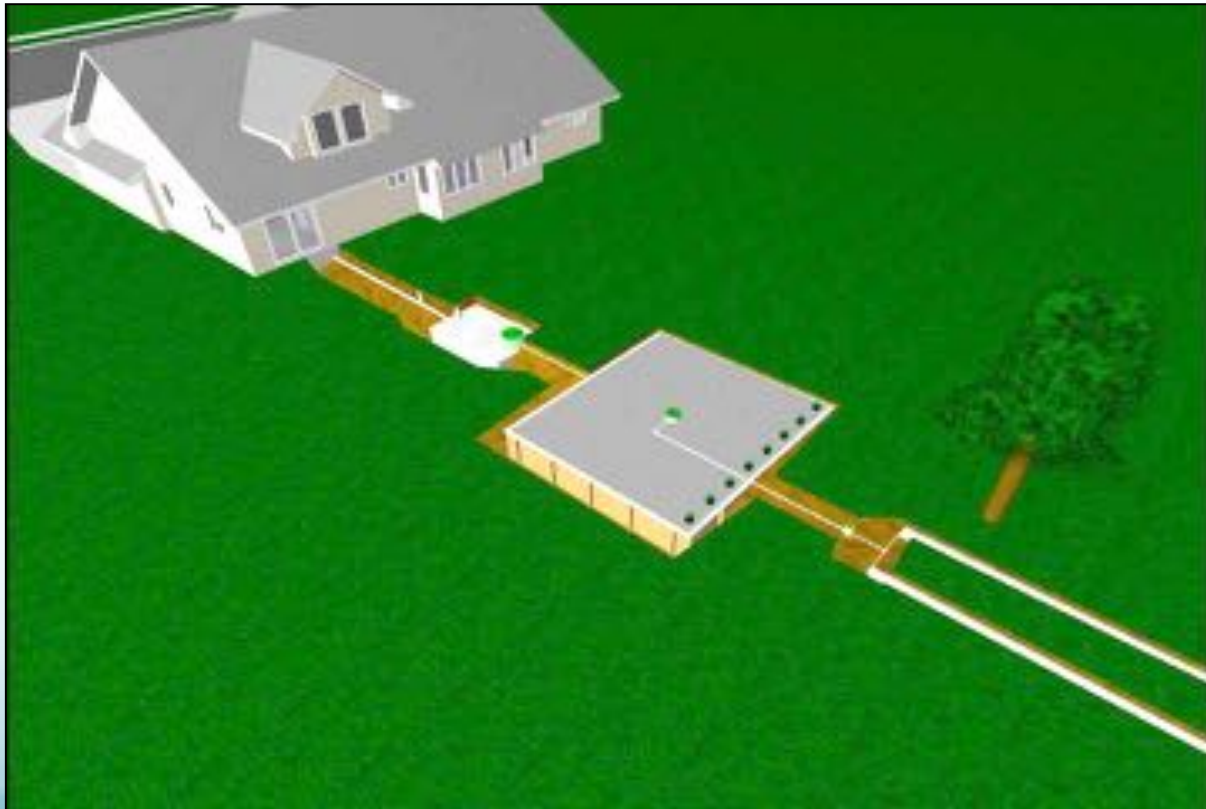
Septic System Components

- All Septic Systems in Oregon have a Drainfield (well, almost all)



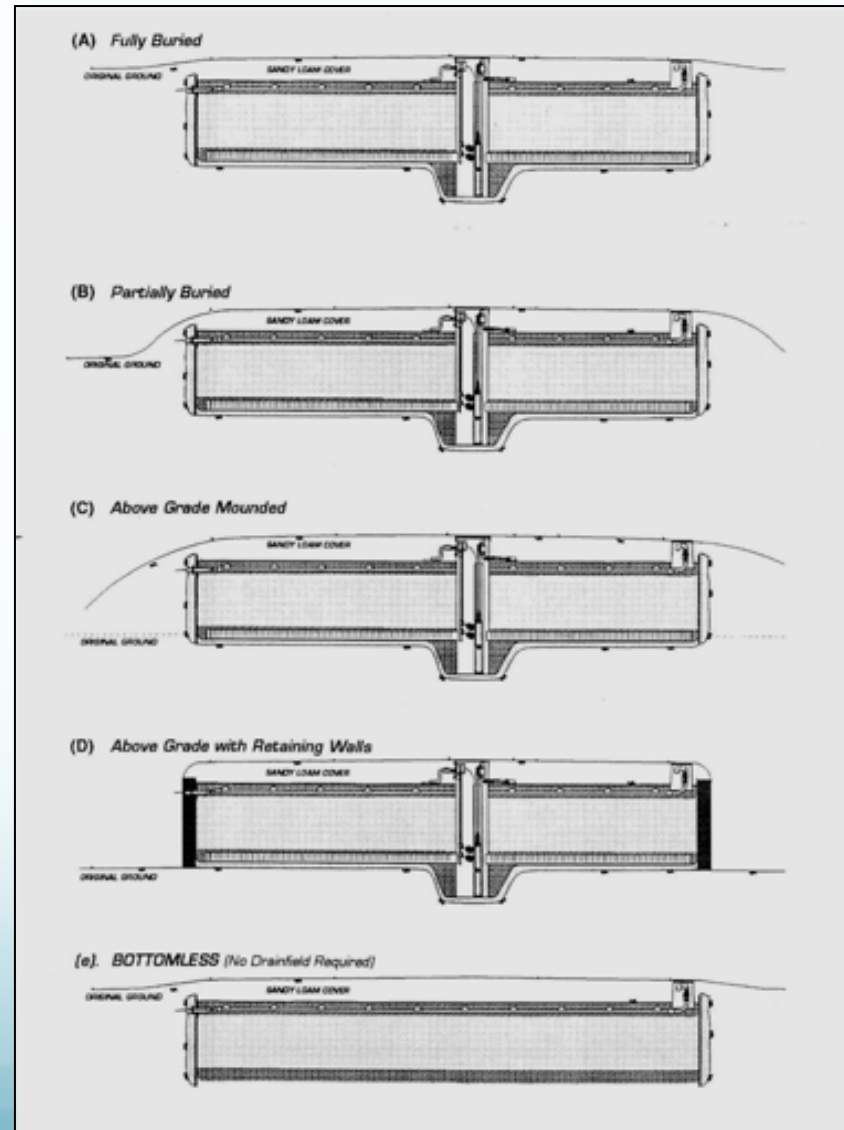
Septic System Components

- Some septic systems in Oregon have a SECONDARY treatment component



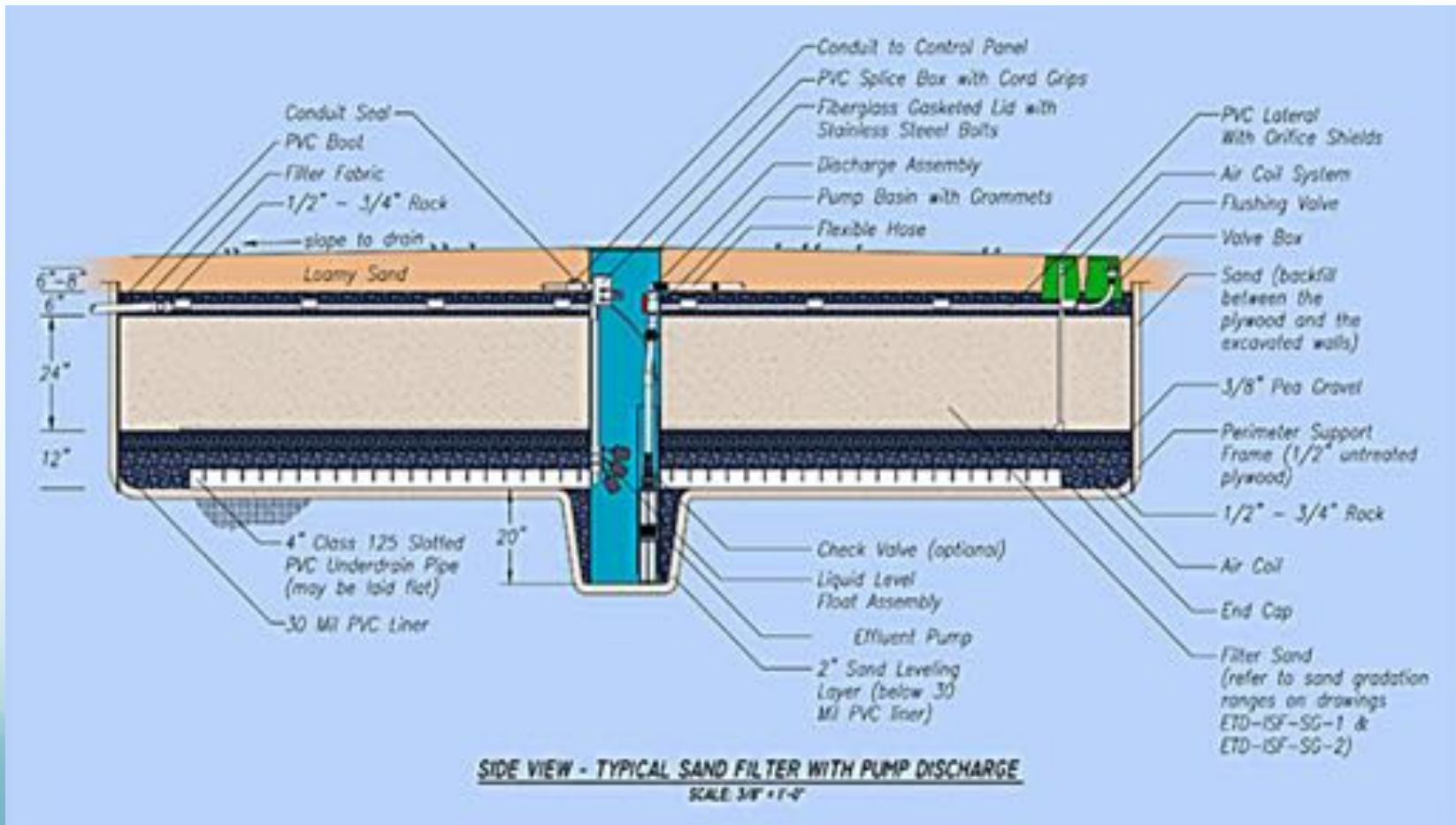
Sand Filters

- Sand Filter types



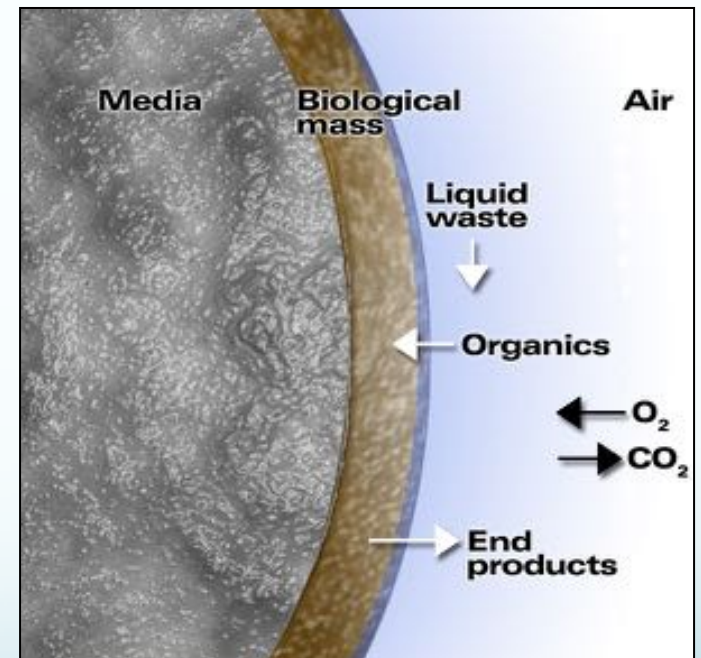
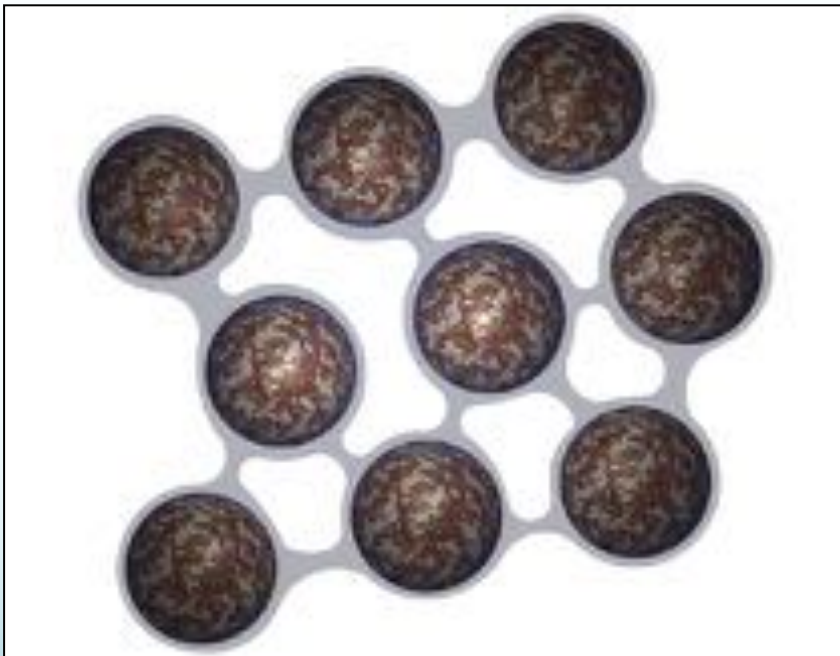
Sand Filters

- Typical Sand Filter cross-section



Sand Filters

- How does treatment occur?
 - Thin film flow



Sand Filters



Sand Filters



Septic System Components

- Other Secondary Treatment System examples



Using a Septic System

- So, you're on a septic system. Does it work?
- I've learned over the years that there are actually two definitions of work:
 - Definition 1: "My septic system works great! We've lived here for 30 years, raised 3 kids, and it's always worked. By golly, we've never even had to have it pumped!"
 - Definition 2: "My septic system works great! It provides sufficient treatment of sewage, disperses effluent, and does not pollute surface or groundwater, and recharges the aquifer."

Using a Septic System

- Per DEQ rules:
 - "Failing System" means any system that discharges untreated or incompletely treated sewage or septic tank effluent directly or indirectly onto the ground surface or into public waters or that creates a public health hazard.
- What are public waters?
 - "Water" or "the waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

Using a Septic System

- Failing Drainfields



Using a Septic System

- What can I do to operate my septic system properly?
 - Conserve water
 - Repair any and all leaking fixtures
 - Again, what is the one thing a Septic System can't do?

Using a Septic System

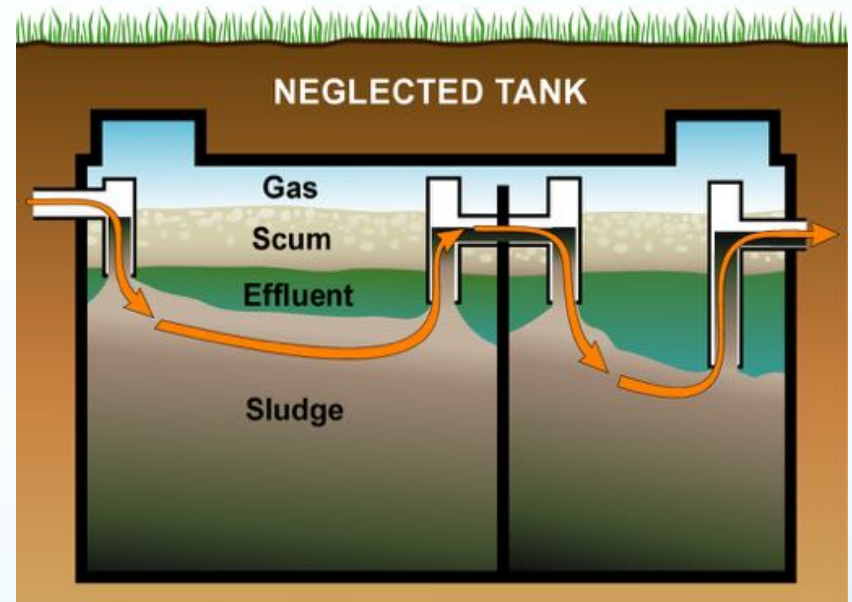
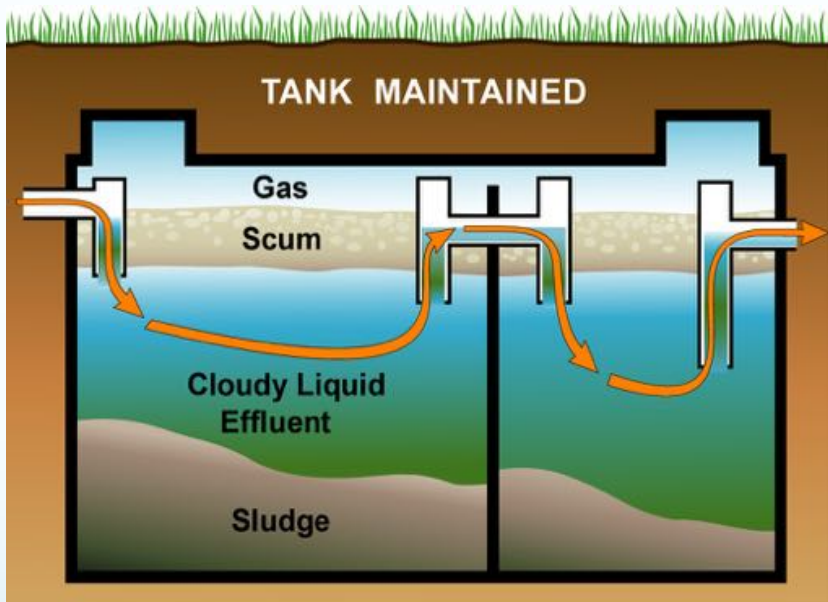
- What can I do to operate my septic system properly?
 - Be conscientious as to what you should and should not put down the drain. Common sense prevails.
 - Do not damage the drainfield area by vehicular or large animal traffic. Do not add or remove soil or otherwise alter the drainfield area. Do not over-irrigate in the drainfield area.
 - Should I use additives? (This question comes up often, and the answer is always...)

Maintaining a Septic System

- It is the responsibility of the property owner to make certain that their septic system is adequately maintained
 - Under normal use, Standard Gravity flow systems should be inspected every 3 years at a minimum (this does not necessarily mean it should be pumped out every 3 years, but...)
 - Any system that utilizes a pump should be inspected at least annually
 - Any system that utilizes a Secondary Treatment component should be inspected at least annually, or as per that system's manufacturer recommendations/requirements

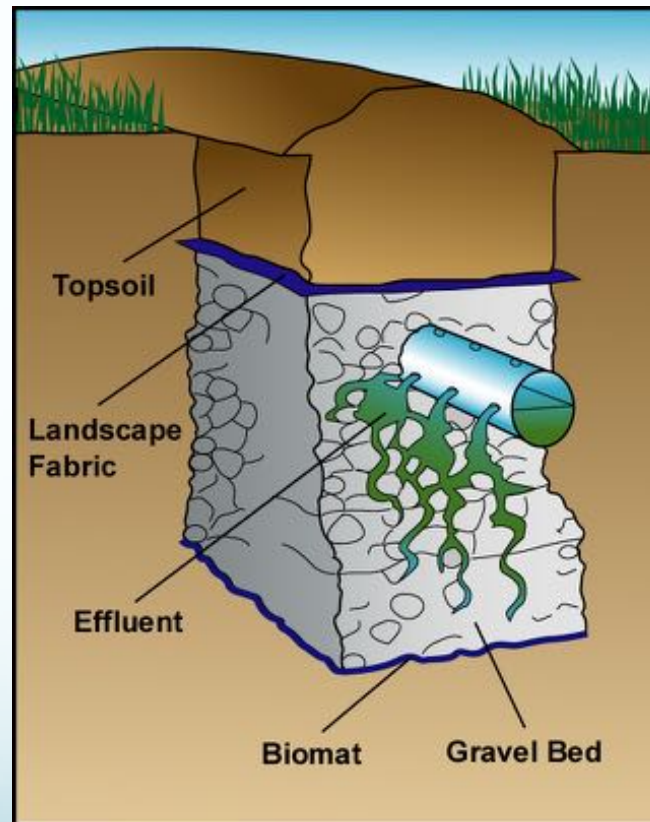
Maintaining a Septic System

- Septic Tank Pumping



Maintaining a Septic System

- Septic Tank Pumping



Maintaining a Septic System

- Septic Tank Pumping Interval (not very scientific)

Inhabitants

Tank Size (gallons)	1	2	3	4	5	6
1000	12	6	4	3	2	2
1250	16	8	5	3	3	2
1500	19	9	6	4	3	3

Years between pumpings

Maintaining a Septic System

- Septic system 'Big 5'
 - A Septic System will work (Definition 2) indefinitely if success is achieved with each and every one of the following 5 items:
 1. Siting: The system must be sited properly on the landscape. Site, soil, and groundwater conditions must be conducive to the system parameters. All prudent setbacks must be maintained.

Maintaining a Septic System

- Septic system 'Big 5'

2. Design. The system must be designed with the appropriate components and within the limits of any constraints of the site.

3. Construction. The system must be constructed as per the appropriate siting criteria and system design. Construction defects can easily compromise the system's function or longevity.

Maintaining a Septic System

- Septic system 'Big 5'

4. Operation. The system must be operated as per the site and design constraints. This includes appropriate sewage quantity and quality loading, and ensuring that the system is not damaged or otherwise adversely affected.

5. Maintenance. The system must receive proper maintenance (including inspection and repairs as needed) on a consistent basis.

- Conclusion: If all 5 of these items are in place, your system will function (and will WORK-Def. #2) indefinitely. The good news is that the system user only needs to be concerned with items #4 & #5!