

# On-Site Wastewater Management Systems

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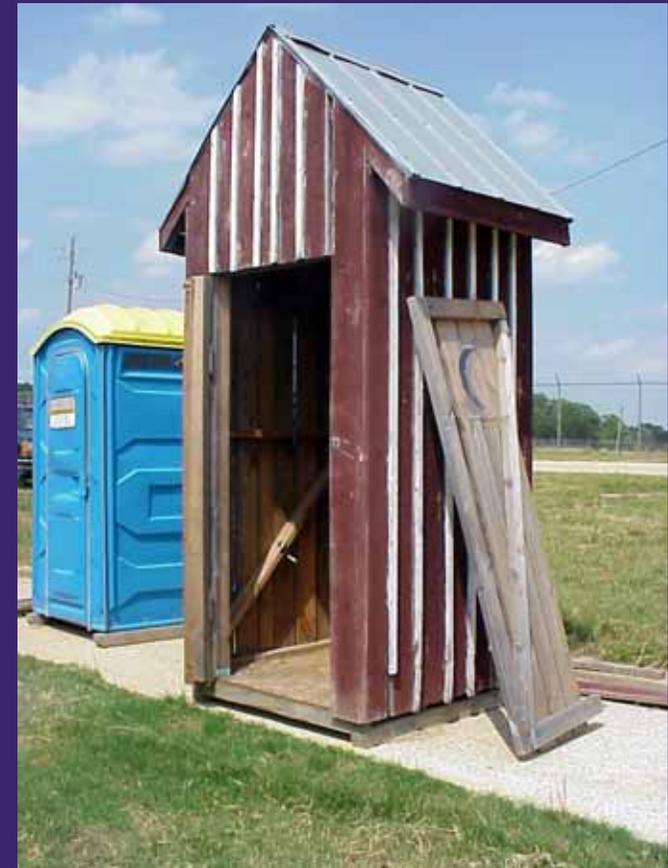
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# Why On-Site Systems?

- Historically
  - Simple wastewater management "system" in rural areas
  - Simple sewer in cities
    - Pipes and ditches to streams
    - Limited treatment
- Today
  - Will the sewer come?
  - Maybe, but probably not soon
    - Cost
    - Time to build
    - Potential environmental degradation
  - On-site systems are a permanent solution for household wastewater
    - Relatively cheap
    - Environmentally benign if properly sited, installed, and maintained
- On-site systems are equally effective as sewer
  - Technology improvements
  - Increased regulation



## A Few Facts

- 25% of homes in the U.S. use on-site systems
  - 40+% in Georgia
  - 75% of new homes
  - 50,000+ systems installed annually
- Rockdale has approximately 20,000 systems installed
- Compare this to one of our neighbors, Gwinnett, they have approximately 100,000 systems installed

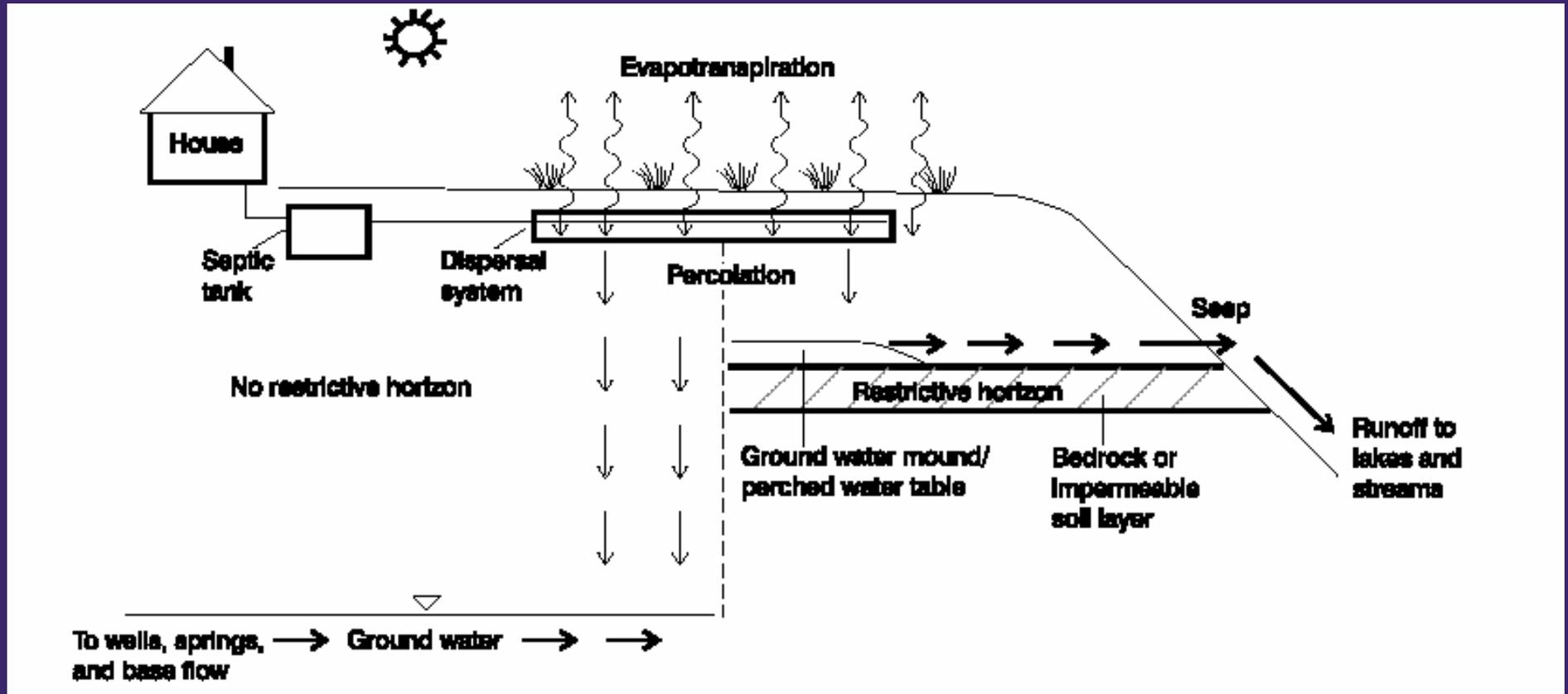
# Function of On-Site System

- Distribute wastewater from the home into the soil
- Renovate the wastewater
  - Immobilize inorganic constituents
  - Dilute concentrations of mobile constituents
    - Dilution is the solution to pollution
  - Decompose organic components
  - Disinfect the wastewater
    - Immobilize, remove, or disable pathogens

# Household Wastewater

- Waste generated in the home includes that from the toilet, bath, kitchen, and laundry.
- On-site systems designed for 150 gal/bedroom/day
- Water conservation is important to longevity and performance of a system

# On-Site System Components



# Function of Components

## ● Septic tank

- Removal of large solids
- Limited organic decomposition
- Protect absorption field from clogging

## ● Absorption field

- Distribute wastewater into the soil

## ● Soil

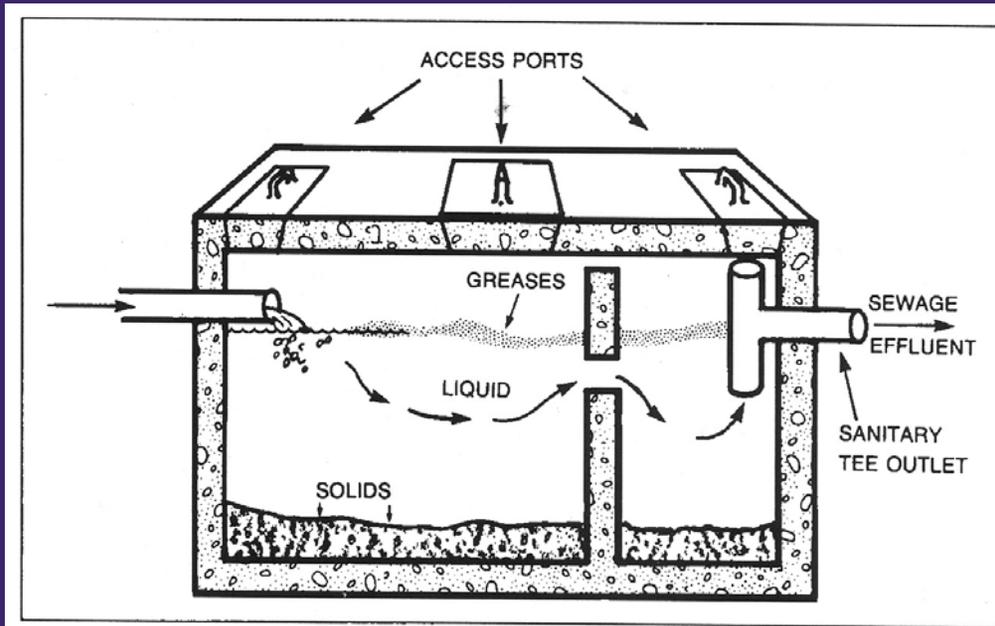
- Transmit wastewater from absorption field to ground or surface water
- Renovate wastewater

# Septic Tank

1,000 to 1,500 water tight tank (concrete, polyethylene, other)

Collect large solids

Limited decomposition of organic material (about 30% does not decompose)

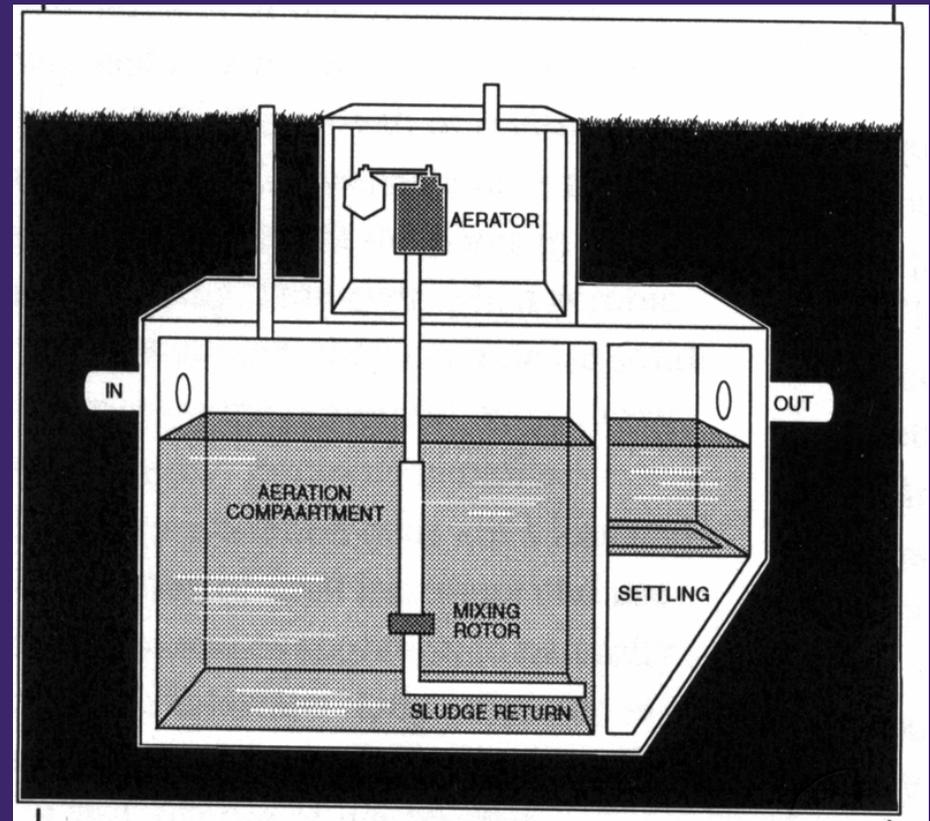


Pictures of a  
concrete septic  
tank and a  
plastic septic  
tank



# Advanced Treatment Systems

- Similar to secondary treatment at waste treatment plant
  - Aerobic treatment to lower BOD and suspended solids
- Used to overcome soil and site limitations
- Should extend life of system
  - Reduced solids to clog soil pores
- Additional maintenance requirements
  - Pumps, timers, and valves
  - Contract service
- Additional expense

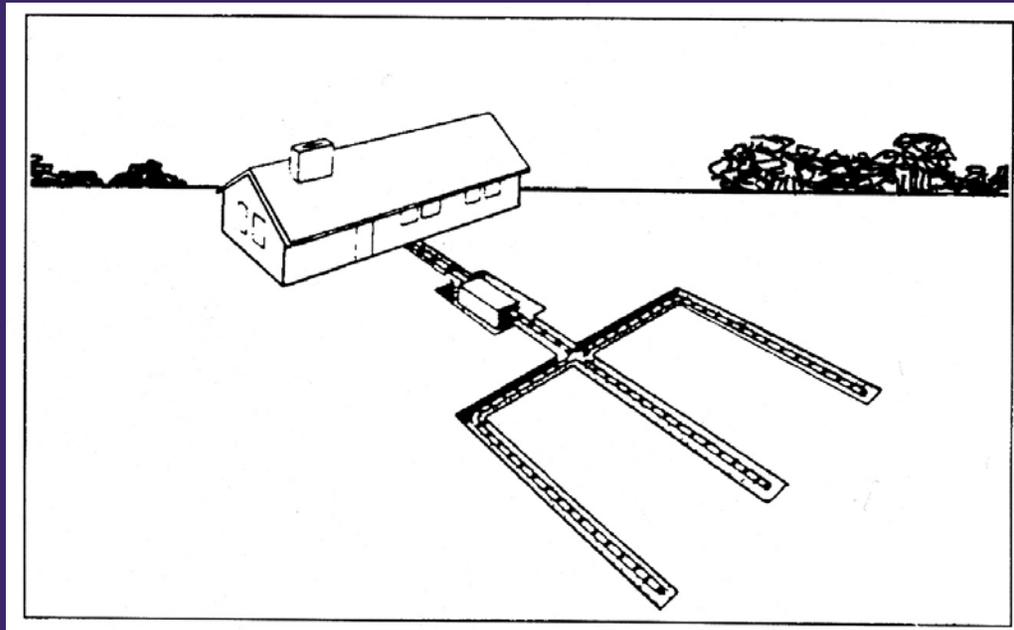


# Absorption Field

System to distribute wastewater from the septic tank into the soil

Pipe and gravel

Numerous other technologies

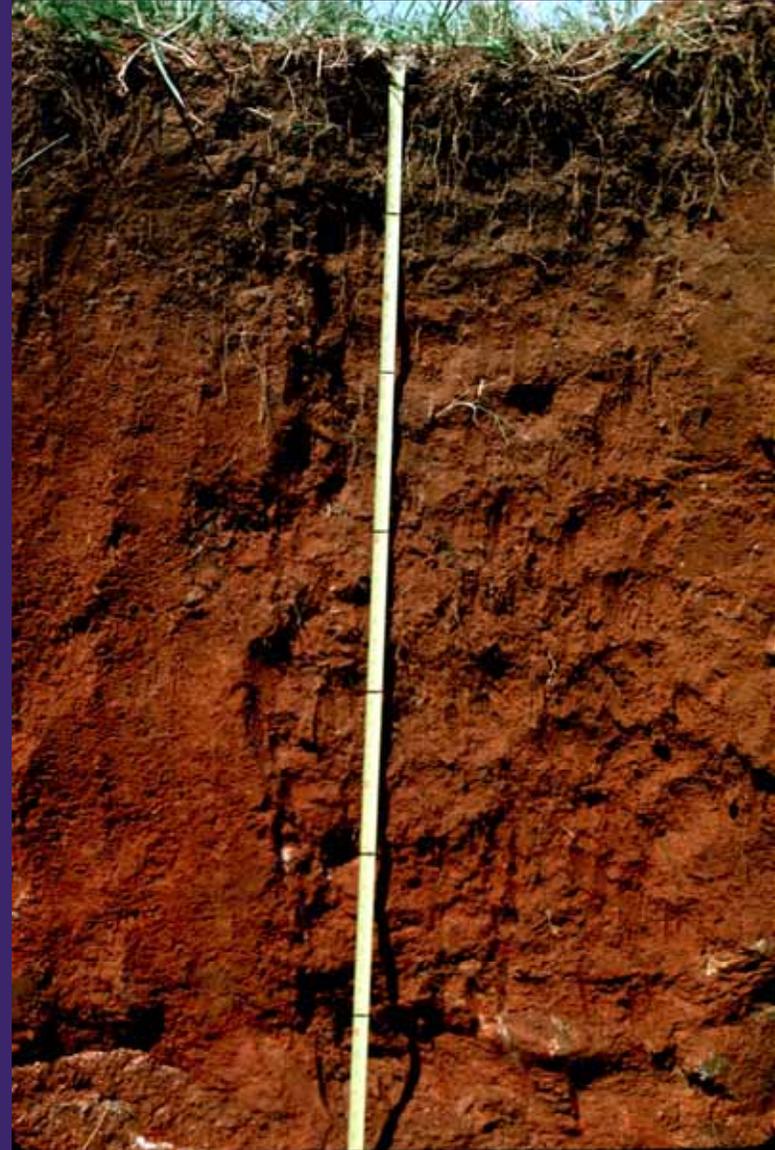




Pictures of  
absorption fields

# Soil

The treatment media:  
Natural processes  
purify wastewater



# Will an on-site system fail?

Yes!!!!

- But the waste treatment plant may also fail without proper design, installation, and maintenance
- Proper design, installation, and maintenance are the keys to long-term success of either system

# On-Site System Failure

- Partially treated wastewater rising to the soil surface
  - Health hazard
  - Odor
  - Overland flow to surface water?
- Wastewater backs up into house
- Inadequate treatment before entering groundwater
  - Commonly not considered - "If toilet will flush, the system is working"

# Common Causes of Early Failure

## ● Unsuitable soils

- Slow perc rates
- Seasonal water tables
- Shallow rock
- Water restrictive soil horizons

## ● Construction faults

- System not at proper grade
- Damaged components
- System inspection should discover these

## ● Site water management

- Gutter downspouts
- Runoff from paved areas and/or upslope areas



## Soil and Installation Problems are Being Addressed

- Soils at site must be evaluated by certified soil classifier, PE, or PG
- Contractor certification
- Installation inspections
- Homebuilder certification?
- Lists of certified on-site system contractors available from County Health Department (Environmental Section)

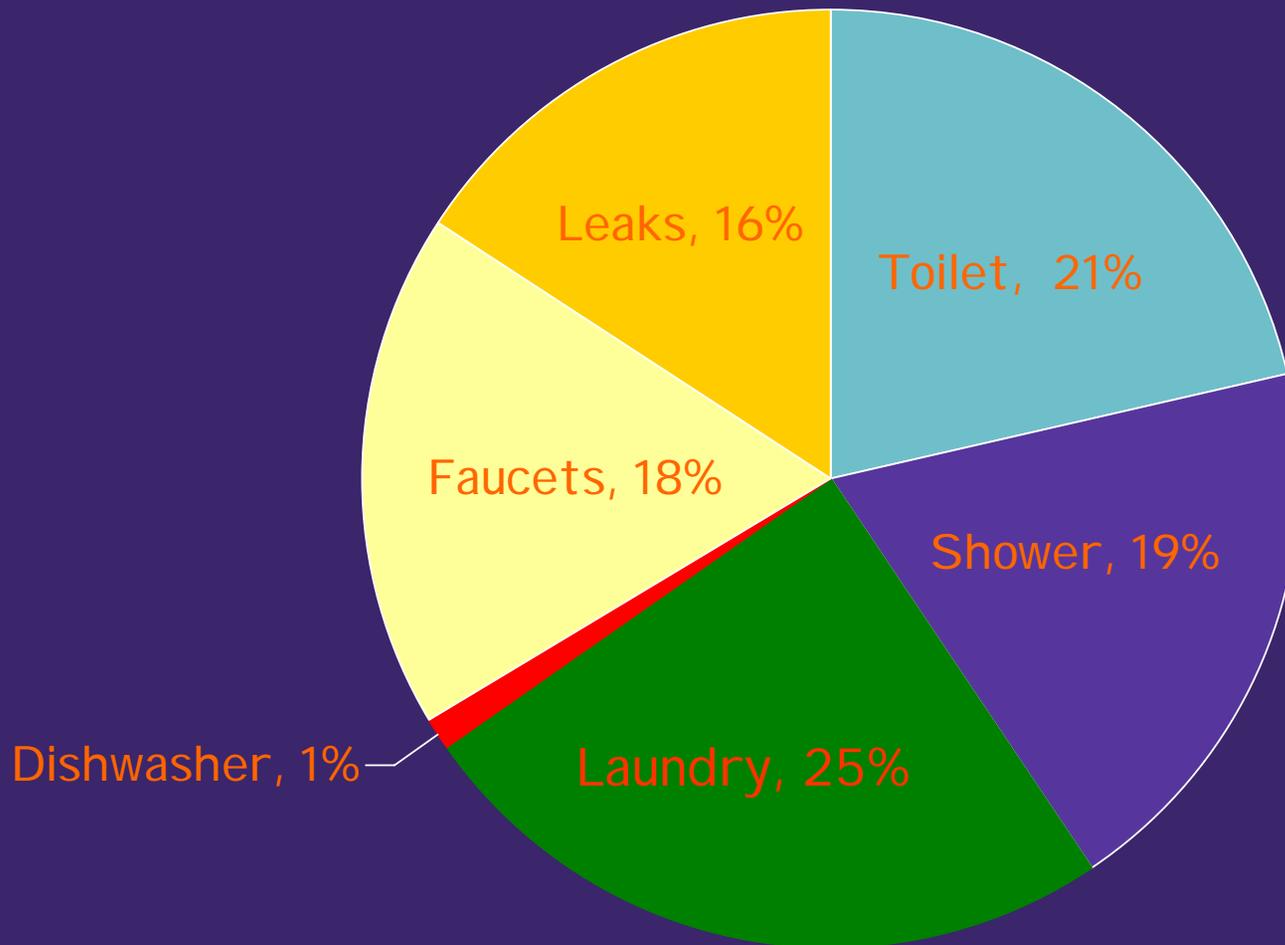
# Common Causes of Longer-term Failure

- Under-designed system
  - Bedroom addition
  - Abnormally high water use
    - Leaky plumbing
- Lack of homeowner understanding and maintenance
- Nothing lasts forever
  - Properly sited, sized, and maintained system should last 20-30+ years

# Extending Life of On-Site System

- Water Conservation
- Graywater Separation
- Reduce Contaminate Loads in Wastewater

# Reduce Water Use (or at least be aware of amount used)



# Water Conservation

- First step is to fix leaks
  - Leaking toilet can add 10-50 gpd to on-site system
- Use water saving fixtures
- Wash only full loads in the dishwasher and washing machine
- Don't allow faucets to run while completing task
- Reduce water pressure

# Graywater Separation

- Separation of wastewater from sinks, showers, and laundry (graywater; 65%) from toilet and kitchen waste (blackwater)
  - Separate management systems
- Surface discharge of graywater (sprinkler system) prohibited in GA
  - Contains appreciable concentrations of bacteria and potential pathogens
  - Regulations may change in the future
  - 2008 "hand watering" with graywater allowed

# Reduce Contaminant Loads in Wastewater

- Do not dispose of household waste (cleaners, cosmetics, pesticides, preservatives, etc.) by flushing down the toilet or sink
  - May contaminate water and/or
  - upset biological treatment processes
- Do not
  - Use “every flush” toilet bowl cleaners
  - Flush unwanted medicines down toilet
  - Drain chlorine-treated water into on-site systems
- Use recommended amounts of cleaners, bleach, detergents, drain cleaners, etc.
- Minimize use of garbage disposal
  - Increased amounts of fats and oils
  - Increased solids

# Additives

- Have not been shown conclusively to enhance on-site system performance and are not generally recommended
- Household waste contains large numbers and many types of microorganisms, enzymes, and other biological substances
  - Amount added is minor
- Enhanced decomposition may result in abnormal amounts of suspended solids added to drainfield
  - Clog soil pores and cause hydraulic failure

# Maintenance

- Untrained and often uninformed system owners assume responsibility for operation and maintenance
  - “I have sewer at my house”
- Two components of conventional on-site system maintenance
  - Pump septic tank
    - Every 3-5 years
    - Wastewater residence time in tank
    - Minimizes addition of solids to drainfield and soil clogging
  - Inspection
    - Wastewater on soil surface during the wet season and/or periods of high use
- Do not ignore problems

# How to Choose an On-Site Contractor

- Ask friends and co-workers for references
- Contact the Environmental Health Department to learn how to obtain a list of licensed contractors
- Consult the Better Business Bureau for complaints
- Investigate both independent contractors as well as large companies
- Gain working knowledge of an on-site system and your current on-site system
- Obtain an on-site permit

# The Future?

- Increased use of advanced treatment systems
  - Enhanced nitrogen and phosphorus removal
  - Disinfection systems?
- Mandatory maintenance and periodic inspection
  - Used in many states and a few areas of GA
  - Government
  - Private
    - Warrantees?

# Summary

- On-site sewage management systems are an economical and environmentally benign alternative to centralized waste treatment if
  - soils are favorable,
  - the system is suitable for the site and properly installed, and
  - the system is properly and regularly maintained
- Maintenance is the key
  - Simple, but it must be done
- New technologies are becoming available to improve performance

# Additional Information Sources

[www.rockdalehealth.com](http://www.rockdalehealth.com)

[www.georgiaeh.us](http://www.georgiaeh.us)