

Evolution of Wastewater Management

Presentation Overview

- What do I do with this Wastewater?
 - Evolution of the goals
- What is an Onsite Wastewater Treatment System?
- Wastewater Infrastructure
- Environmental health ultimately determines public health
- Pilot study of systems

Evolution of wastewater treatment goals

- From outdoor plumbing to water reuse

Outdoor plumbing: the pit privy

- Goal: designated place
- No carrier needed to convey waste
- Waste applied directly to the soil
- Public health concerns addressed
- Management: relocate



Indoor plumbing

- Convenience
- Water carrier to convey waste out of facility
- 'Collection system'
- Public health and pathogens
- Management: keep pipe flowing



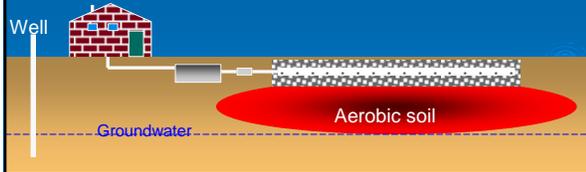
Disposal

- Goal: limit human contact
- Keep wastewater below ground
- Disposal options
- Public health
 - "Disposing" of pathogens
 - Treatment?
- Management: install, flush and forget



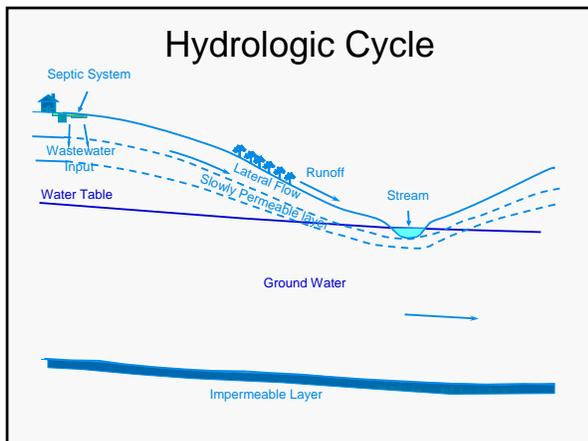
Septic tank and soil treatment area

- Evolving goal:
 - Disposal: effluent goes away versus
 - Dispersal: TREATMENT
- Public health AND environmental issues addressed
- Management:
 - Disposal: often none at all;
 - Dispersal: System management is critical



Goal: TREATMENT AND DISPERSAL

- Starting to address both environmental concerns in addition to public health concerns
- Technological advancements now allow removal of:
 - Pathogens
 - Solids
 - Nutrients
- System management is vital to treatment
- Goal is now DISPERSAL
 - Hydrologic cycle



Reuse

- Goal: careful use of a valuable resource
- Wastewater vs. water
- Potable vs. Non-potable uses
 - Landscape reuse
 - Toilet flushing
 - Some areas are looking at it as potable
- Management: O&M is even more critical



Varying rates of evolution

- Vary across the country
- Driving forces for change
 - Limited water resources
 - Environmental concerns
 - TMDL program
 - CZMP program
 - Source water protection
 - Watershed Protection Plans

Changes in Goals means:

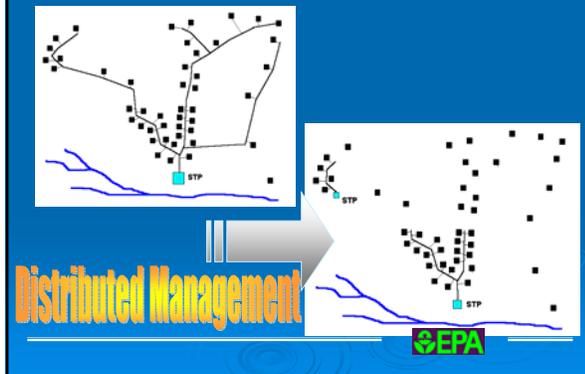
- Approach must also change
 - Siting requirements
 - Choice of components and systems
 - System O&M
 - Management program
 - Industry needs

Education

Decentralized wastewater treatment system:

- Collection, treatment, and dispersal/reuse of wastewater from individual homes, clusters of homes, isolated communities, industries, or institutional facilities, at or near the point of waste generation.

Decentralized Approach

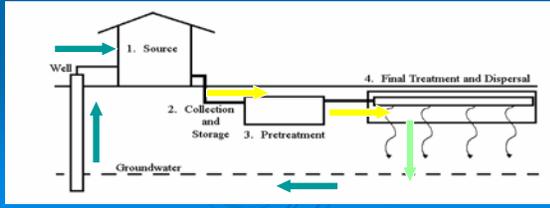


Distributed management:

- Method used to manage wastewater infrastructure where a responsible management entity (RME) combines onsite, cluster and centralized treatment in a cost effective and sustainable structure.

What is an Onsite Wastewater Treatment System?

1. Wastewater Source
2. Collection and Storage
3. Pretreatment components
4. Final Treatment and Dispersal components



Wastewater source

- > User
 - Domestic
 - Commercial
 - Industrial



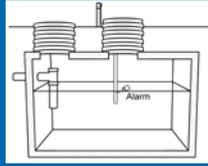
Collection

- > Piping from facility with cleanout
 - Blackwater
 - Graywater



Collection

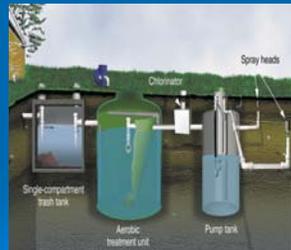
- Holding tanks
- Composting toilets
- Incinerating toilets



Courtesy of Dioxus Matrum

Pretreatment

- Septic tanks
- Aerobic treatment units
- Media filters
- Constructed wetlands
- Membrane bioreactors
- Disinfection



Final treatment and dispersal

- Trench and bed distribution

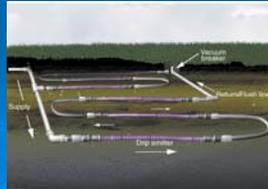


Final treatment and dispersal

- Low pressure distribution
- Subsurface drip distribution



Choice should be determined by effluent quality and site conditions



Key Terms for Management

- Clear communication
- Identify key issues



Oak Trail Shores

- Septic system evaluation
- August 21-24, 2007
- Dye study
- Water surface



Dye Study

- Five homes
- Bright Dyes
 - Red
 - Yellow/Green
- 10 tablets in one gallon of water
- Poured into sink
- Added water to system



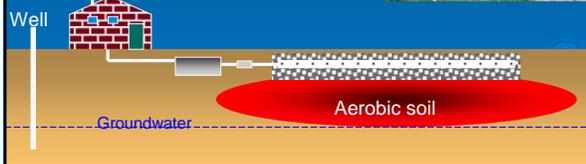
Check for Dye

- Walk over evaluation of the site
- Visual check of water in the canal
- Portable testing system
- No dye found over three days



- Wastewater treatment
- Soil acceptance
 - Water enters soil
- Soil treatment
 - Aerobic soil
 - Separation to groundwater
- Percolation test

Soil



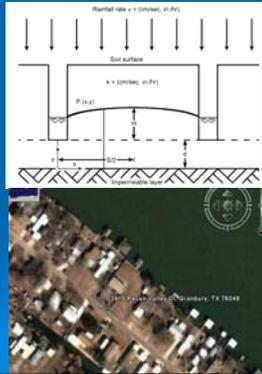
Soil Water Acceptance

- Percolation test
- Excavated a 4 inch diameter hole
- 30 inch depth
- Measured drop over 19 hour period
- 84 minutes per inch



Saturated Water Surface

- Water level controlled by lake surface and canal
- Assume water level greater below the land between water bodies



Soil Profile Evaluation

- Three homes
 - Uphill of canal
 - Across the island of canal
- Soil profile
 - Red color
 - Some mixed material near lake
 - Tree roots to a depth of six feet
 - Texture?



Saturated Zone

- Excavated a hole to saturated zone
- Measured water surface
- Approximately 8 feet up side of canal
- Approximately 5.5 feet on island between canal



Residence

- Septic tank and trench soil treatment system
- Broken septic tank lid
- Homeowner concerns regarding stormwater
- Replaced lid



General Concerns

- Age of systems:
 - Acceptance of water from home
 - Stormwater infiltration
 - Tank structural integrity
- Plan for wastewater infrastructure
- Point of sale inspection
- Economics

Summary

- Decentralized management will play a vital role in our future infrastructure needs.
- Technologies are available for meeting our needs.
- Environmental regulations will continue to be more stringent.
- Environmental health is ultimate form of public health protection.

Questions?
