Overview of Onsite Sewage Treatment and Disposal Systems

Bureau of Environmental Health
Division of Disease Control and Health Protection
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What is an OSTDS?

- Onsite sewage treatment and disposal system
- Includes septic systems (septic tank and drainfield) but also includes systems capable of greater treatment
Septic Systems and “Advanced” Systems

Septic tanks provide basic treatment
  • Removal of solids and fats, oils and greases

“Advanced” systems provide greater treatment
  • Removal of degradable organic material
  • Removal of nutrients
OSTDS are recognized as low-cost and long-term approaches to wastewater treatment. They are effective and protective when properly designed, installed, operated, and maintained.
Modern OSTDS in Florida protect Public Health and the Environment

- About 2.4 million OSTDS serve a third of the state
- OSTDS are effective alternative to central sewer
  - Less environmentally disruptive in some areas
  - Less than 40% of OSTDS in environmentally sensitive areas
- Construction standards and setback distances protective
  - Primarily protect public from waterborne illness
  - More than 90% of drinking water in FL comes from groundwater
  - The drainfield further breaks down viruses/pathogens from septic tank; can reduce nitrogen by 10-50%
- Florida can and does establish policies for additional protection of sensitive environmental areas
Septic Tank and Drainfield
(A Conventional OSTDS)
Modern septic tanks are water tight.
Collect solids and consume a third to half of biodegradable material (carbonaceous biochemical oxygen demand after 5 days [CBOD5]).
How Does a Drainfield Work?

• Liquid that comes from septic tank drains into soil
• Soil/Air/Water combination:
  • Removes/filters pathogens, suspended solids in the area above groundwater
  • Converts ammonia to nitrate (removes 10-50% of nitrogen)
Modern Drainfield Design Protects the Environment

Separation to wet season water table important for treatment

- 6 inch between top of drainfield and ground surface
- Drainfield thickness (12 inch for gravel)
- 2 feet between bottom of drainfield and wet season water table required to provide air and soil treatment
Mound As Alternative Drainfield

A system can be elevated (Mound system) to protect environment

- Wet season water table too high
- Prohibited soils (e.g., rock) exist
Options for Nutrient Reduction

To limit OSTDS-contribution of nutrients (in general or for specific areas)

- Lower the number of OSTDS
  - Sewer
  - County ordinances (lot size, setback)
  - Existing statute density-limitations (Sections 381.0065(4)(a)-(g), Florida Statutes)
- Require higher treatment by OSTDS
Aerobic Treatment Unit (ATU)

ATU certification based on certain performance standard

All ATUs certified to meet standard NSF 40; some are also certified to meet a 50% nitrogen-reduction standard (NSF 245)
Performance-Based Treatment System (PBTS)

Specialized onsite sewage treatment and disposal system

In many cases, includes an ATU

Designed and certified by professional engineer to achieve specific and measurable established performance standards for:

- Carbonaceous biochemical oxygen demand,
- Total suspended solids,
- Total nitrogen,
- Total phosphorus,
- Fecal coliforms
PBTS Based on Nitrogen-Reducing ATU

- One example of a nitrogen-reducing ATU
- Field evaluations show about 50% nitrogen reduction
- More complex technologies with higher treatment effectiveness are becoming available
Two-Stage Nitrogen Reduction Process

Example

In-tank Nitrogen Reduction Biofilter - PBTS

Wastewater

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Septic Tank

Pretreatment

Stage 1 Biofilter

Nitrification

Stage 2 Biofilter

Denitrification

Ground Surface

Drainfield

Note: In flat landscapes may need a single pump.
In-ground Nitrogen-Reducing Biofilter

A nitrate-reducing layer below drainfield; material reacts with nitrate
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