Decentralized Wastewater Management

- Collection, Treatment, and in-ground reuse **NEAR** the point of generation.

- Minimizes wastewater:
  - Volumes
  - Infrastructure
  - Costs

- Facilitates “smart growth” concepts

- Enhances property value and “livability”
A Hybrid Sewer System

- Septic tanks for solids removal
- Small diameter sewer lines
  - (2”-4” PVC pipe)
- Low O&M treatment system serving multiple homes
- In-ground disposal/reuse
  - (UIC permit)
- Minimizes capital and O&M costs
Decentralized Wastewater Management.

- Is a perfect fit for...
  - Watershed protection
  - Minimization of wastewater infrastructure and costs
  - Smart growth
  - Property value enhancement
  - Community Pride
Key Concepts of Decentralized Systems

- Minimization of collection system
- Use of simple, low O&M treatment technologies
- Minimization of solids handling
- Use of localized disposal and/or reuse of the treated wastewater
Public and Private Utilities, Nationwide are Implementing Decentralized Systems

- Mobile, AL (2 utilities)
- Jefferson Co., AL (Birmingham Area)
- Oregon, Illinois, Washington, Missouri, Tennessee, Massachusetts, etc.
Decentralized Sewer Model...

- Pretreatment – interceptor tanks
- Collection – short length, small diameter
- Treatment – simple, low O&M
- In-ground reuse

- **Regulated Utility Managed (ADEM Permitted)**
  - Construction specs
  - Treatment system operation
  - Long-Term collection and treatment system maintenance, including septage management
  - Billing
Traditional "Centralized" Sewer
Traditional “Centralized” Sewer

- **Characterized by....**
  - Long lengths of pipe
  - Large diameter pipes
    - To handle large flows and solids
  - Subject to infiltration and inflow (rain water)
  - Large, complex treatment plants
  - Discharge of effluents to surface waters
  - **Costly $$$$**
Decentralized Sewer
“Decentralized” Sewer

Characterized by....

- Smaller volumes
- Shorter lengths of pipe
- Small diameter pipes
  - Smaller flows, little or no solids
- Simple treatment plants
  - Little or no solids handling, high quality effluents
- In-ground disposal or reuse of effluents
- More cost-effective
- Utility Managed!
Mobile, AL

- **13 “cluster” systems in operation**
  - Commercial, residential, and schools
  - 10,000 gpd to 60,000 gpd
  - 45 to 270 homes (each system)
  - 1665 home equivalent (total)

- Owned and Operated by 3 different public utilities
Mobile Systems Consist of:

- **Effluent Sewer**
  - interceptor tanks
  - Collection...short lengths, small diameter

- **Treatment** – simple, attached growth, low O&M

- In-ground disposal or reuse
  - UIC Permits (State EPA...>10,000 gpd)

- Utility management
  - Construction specs
Cluster System
Effluent Sewer
(one type of alternative collection)

- Septic tank at each home removes solids (and liquifies)
- Liquids only are transported in the sewer
- Small-diameter (2” to 4” pvc) sewers are the norm

Source: Orenco Systems, Inc.
Johnson Road Home

Control panel

Septic tank in front yard
Septic Tank

(Showing Effluent Filter and Pump)
In-tank effluent filter and pump vault
Treatment System Technologies

*(many types available)*

- Highly efficient
- Small Footprint
- Low solids production
- Cost effective

**Lotus “Active-Cell”** (by Aquapoint)

Fluidized, fixed-film reactor
Lotus “Active-Cell”
Aerobic Basin and Fluidized Media Bed
Aquapoint Bioclere

Attached Growth
Bioclere O&M

1. **What equipment is required for typical operation & maintenance?**

   - **A Sludge Judge** will allow you to determine the depth of the sludge blanket in any tank where sludge is stored.
   
   - **A Bottle Brush** is required for Bioclere operations and is used to clean the dosing array spray nozzles.
   
   - **An Amp Meter** will allow you to check pump amperage to ensure their functionality without having to pull them out of the Bioclere, Lotus or other Aquapoint treatment equipment.
   
   - **A pH, Ammonia, Nitrate and Alkalinity kit** will help you perform quick field tests to determine influent and effluent wastewater conditions.
   
   - **A small Spare Parts inventory** is recommended so that if a piece of equipment needs to be replaced it can be done in a timely manor.
2. **How often do I pump the primary or septic tank?**

   The primary tank should be pumped once the sludge has reached 1/3 the liquid depth. Sludge depth can be determined using a sludge judge. Sludge accumulation and pumping frequency depends on the tank volume and the organic loading to the treatment system.

3. **How often do I clean the Bioclere spray nozzles?**

   Nozzle cleaning frequency is a function of organic and hydraulic loading to the plant. Cleaning the nozzles once a month is usually sufficient for most applications.
Biomicrobics FAST

Aerated Fixed-Film
Delta Biopod

*aerated fixed-film*
Recirculating Sand Filter Module Schematic

To subsurface Disposal

In from Septic tank

Discharge effluent quality
BOD≤10 mg/L
TSS≤10 mg/L

Schematic Courtesy of Orenco Systems
INSTALLATION OF RECIRCULATION TANKS
(2-30,000 GALLONS)

LEVELING OF RECIRCULATION TANKS
Recirculating Sand Filter (Wastewater Treatment)
Textile Media Filter Treatment
(an inside look)

Ball valves (for flushing)

Orifice and splash cap
Champion Hills WWTF – 30,000 gpd
Simple, Textile Media Treatment
(30,000 gpd...150 homes)
Copeland Island Residential Development

(West Mobile, AL...220+ homes on decentralized sewer)

Dauphin Environmental Equipment, LLC
Subsurface Drip Irrigation
(Small amounts of Treated Effluent Supplied to Plant Roots)
Subsurface Drip Reuse...Parks
Subsurface Drip Reuse…
Landscaping & Trails
Decentralized Cluster System

O&M Costs

$20-$22/month per home  (actual O&M cost)
$35-$40/month per home  (sewer fee)

Power (20,000 gpd...~90 homes)  $70/ mo.

Weekly/ Monthly sampling

Upkeep (grass mowing)

Personnel (part-time employee...1 day/ week)

Tank solids management (once every 7 years on average)
Utility Management Model

- **Developer**
  - Pays utility $500 to $3000 per lot—for WWTF
  - Deeds land for WWTF to utility
  - Installs sewer main in development (2”-4” line)
  - Pays “tap fee” ($1700-$3200) as each house is sold
  - For STEP or STEG system, onsite

- **Utility**
  - Builds and operates WWTF
  - Installs and maintains STEP or STEG systems onsite

- **Homeowner**
  - Pays a monthly sewer fee ($30-$40/month)
Decentralized Wastewater Management

Summary

- Smaller scale wastewater management
- Lesser infrastructure and cost
- Protects public health & the environment
- Can enhance property values and livability
- Follows “smart growth” ideals