The Onsite Wastewater Industry and Our Carbon Footprint

Jessica Kautz – Project Engineer
Infiltrator Water Technologies, LLC
START WITH WHY

HOW GREAT LEADERS INSPIRE EVERYONE TO TAKE ACTION

SIMON SINEK
Home

Commercial – Industrial – Residential

Looking for someone to take care of your dirty work? Why hire a company that will overcharge you for service that is far under par? Call the professionals at __________

We are a licensed septic tank company that has been in business since 1929. Since then we have been consistently providing a high level of quality service to the entire __________ area. From inspections to installations, let our staff show you how expertise and dedication can prove beneficial in the end by yielding results nothing short of exemplary.

Call us anytime! We answer our phones 24 hours a day!

- Backhoe Work and Lots Cleared
- Septic Tank Repairs and Installations
- Lift Stations
- Certified Subsurface Operator
why?
why?
What problems are we facing?
What problems are we facing?

- Fiscal Recession
- Ozone Depletion
- Natural Resource Consumption
- Trace Organics
- Climate Change
- Aquifer Depletion
- Waterbody Contamination
- Fossil Fuel Depletion
- Housing Market Crash
- Large Rain Events
Current Wastewater Treatment

- 75% Centralized
- 25% Decentralized
Current Wastewater Treatment

25% Decentralized

Is this our best solution?
Is this best for the environment?
National CSO discharges are estimated at 1.26 trillion gallons per year from 772 treatment plants.
Is this best for the budget?

Porous sewer system to cost Carlisle million in repairs

By Eric Veronikis | everonikis@pennlive.com
Email the author | Follow on Twitter
on October 30, 2014 at 5:43 PM

Carlisle typically treats 3 million gallons of water per day at its sewer plant.

But, when there is a major rainstorm, that figure can reach 12 million gallons because stormwater is seeping into the sewer system, Borough Council President Perry Heath said.

The borough hired an engineering firm to find out why its sewer system is so porous and what could be done to fix it.

And after a six-month review, the firm, Herbert, Rowland and Grubic Inc., recently recommended the borough spend $30 million to 50 million to replace old pipes, some of which are 100 years old and are made of terra-cotta, and complete other improvements to plug up the sewer system, Heath said.

"The system is so porous, and since no major maintenance has been done for years, we wanted to get an assessment of piping and the system," Heath said of what triggered the study. "A large portion of the sewer system was built in 1914. We can’t afford to ignore it."
GOALS

Determine the resource consumption of:
GOALS

Determine the resource consumption of:

1. *Decentralized vs. centralized* wastewater infrastructure
GOALS

Determine the resource consumption of:

1. *Decentralized vs. centralized* wastewater infrastructure

2. *Conventional vs. recycled thermoplastic* decentralized products
Resource Consumption

1. Embodied Energy
2. Embodied Carbon
3. Capital
Resource Consumption

1. Embodied Energy
2. Embodied Carbon
3. Capital

The total primary energy consumed [carbon released] over a life cycle, including extraction, manufacturing, and transportation.
- Southwest Virginia Regional Wastewater Study (2005)
- 40 sewer extension projects
**Centralized**

- Southwest Virginia Regional Wastewater Study (2005)
- 40 sewer extension projects

**Decentralized**

- 3-bedroom home
- Precast septic tank and stone and pipe drainfield
Average per Connection Resource Consumption

- EE (MJ) 75%: 157,563
- EC (kg CO2) 73%: 7,006
- Cost (USD) 68%: 18,590
- EE (MJ) 40,025
- EC (kg CO2) 1,908
- Cost (USD) 5,954

Centralized vs Decentralized
AVERAGE PER CONNECTION RESOURCE CONSUMPTION

- **117,538 MJ Energy Savings**
### Average per Connection Resource Consumption

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- **117,538 MJ Energy Savings** = the energy equivalency of 969 gallons of gasoline
117,538 MJ Energy Savings

- the energy equivalency of 969 gallons of gasoline
- 2,093 cars off the road for 1 day
• 117,538 MJ Energy Savings  
  = the energy equivalency of 969 gallons of gasoline  
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• 5,099 kg CO₂ Carbon Savings
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- **117,538 MJ Energy Savings**
  - The energy equivalency of 969 gallons of gasoline
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- **5,099 kg CO₂ Carbon Savings**
  - 133 lamps switched to CFLs

Centralized: 75%, Decentralized: 73%.
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- **$12,636 USD Savings**
  - 3 decentralized systems for every 1 centralized connection

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This is how we have always done it!
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This is how we have always done it!
Earliest known septic management?
Earliest known septic management?

“You shall have a place outside the camp, and you shall go out to it...sit down outside...dig a hole with it and turn back and cover up your excrement.”

Dt. 23:12-13 ESV
History of the septic system
1700 BC – Neolithic Drainage
History of the septic system
Movement from water = street sewers
History of the septic system
Outhouses and Cesspools
History of the septic system
EPA Got involved!

1. Maintains the structure of the excavation.

2. Exposes the applied wastewater to more infiltrative surface.

3. Provides storage space for the wastewater between the void fractions.

Source: USEPA Onsite Wastewater Treatment Systems Manual
Is this our best solution?
CONVENTIONAL
• 1000-gal, precast concrete septic tank

RECYCLED THERMOPLASTIC
• IM-1060 septic tank
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<td>• 1000 sf drainfield</td>
<td>• Equivalent drainfield sizing</td>
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Processes

1. Raw Material Production
2. Product Manufacturing
3. Transportation to Field Site

Mining, molding, and moving – oh my!
Resources

- Electricity
- Fuel
- Water
- Carbon Emissions
• Enter any distance and any equivalency sizing
  • Examples:
    – Nashville, TN
      • 235 mi
      • 4.3 sf/lf (Quick4 Standard)
    – Orlando, FL
      • 812 mi
      • 3 sf/lf (Quick4 Equalizer 36)
    – Taunton, MA
      • 890 mi
      • 6.96 sf/lf (Quick4 Standard)

• Examine any part of the process
  • Examples:
    – Material production
    – Drainfield vs Tank
Winchester, KY → Taunton, MA

- Electricity (kWh): 8,383 (92%) vs. 6,674 (76%) for Conventional vs. Recycled Thermoplastic
- Fuel (kBtu): 1,618 vs. 1,043 (98% vs. 23%)
- Water (gal): 503 vs. 193 (62% vs. 38%)

Legend:
- Blue: Conventional
- Green: Recycled Thermoplastic
Winchester, KY → Taunton, MA

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<td>Electricity (kWh)</td>
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<td>Water (gal)</td>
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<td>Carbon Emissions (kg C)</td>
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92%  76%  98%  62%
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
  - = **910 people off the grid for a day**
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
  - = 910 people off the grid for a day
- **5,056 kBtu Fuel Savings**

![Graph showing energy savings and efficiency improvements.](image)
Winchester, KY → Taunton, MA

- 7,727 kWh Electricity Savings = 910 people off the grid for a day
- 5,056 kBtu Fuel Savings = 44 gal gasoline
Winchester, KY → Taunton, MA

- 7,727 kWh Electricity Savings
  = 910 people off the grid for a day

- 5,056 kBtu Fuel Savings
  = 44 gal gasoline
  = 39 people off the roads for a day
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
  = 910 people off the grid for a day

- **5,056 kBtu Fuel Savings**
  = 44 gal gasoline
  = 39 people off the roads for a day

- **1,020 gal Water Savings**
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
  = 910 people off the grid for a day

- **5,056 kBtu Fuel Savings**
  = 44 gal gasoline
  = 39 people off the roads for a day

- **1,020 gal Water Savings**
  = 18 people off the water grid for a day
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
  - = 910 people off the grid for a day

- **5,056 kBtu Fuel Savings**
  - = 44 gal gasoline
  - = 39 people off the roads for a day

- **1,020 gal Water Savings**
  - = 18 people off the water grid for a day

- **310 kg Carbon Savings**

Data shows a comparison of conventional and recycled thermoplastic materials in terms of energy and carbon emissions savings between two locations.
Winchester, KY → Taunton, MA

- **7,727 kWh Electricity Savings**
  = 910 people off the grid for a day

- **5,056 kBtu Fuel Savings**
  = 44 gal gasoline
  = 39 people off the roads for a day

- **1,020 gal Water Savings**
  = 18 people off the water grid for a day

- **310 kg Carbon Savings**
  = 1.25 trees
Looking for a septic company that operates sustainably, providing high-performing systems while saving natural resources wherever possible? Why hire a company that is depleting natural resources and increasing your carbon footprint for an equal or lesser service? Call the professionals at Autry Septic Tank Service!

We are a licensed septic tank company that has been in business since 1929. As a company, we believe septic systems provide the most passive, environmentally-safe form of wastewater treatment and have worked tirelessly to ensure legislation continues to support the use of septic systems.

In addition, we believe it is our responsibility to ensure the products and companies we support are using sustainable materials. We provide the most state-of-the-art, environmentally-sound technology at the lowest possible prices. From inspections to installations, let our staff show you how expertise and dedication can yield exemplary, responsible, and sustainable results.

Call us anytime! We answer our phones 24 hours a day!

- Backhoe Work and Lots Cleared
- Septic Tank Repairs and Installations
- Lift Stations
- Certified Subsurface Operator
Thank you!

Jessica L. Kautz, E.I.T.
jkautz@infiltratorwater.com
(860) 577-7081
Our products are easy to transport to your site without heavy equipment.
Study Limitations

- Based on data and construction practices of Southwest Virginia
- Covers sewer extensions, not new plant construction
- Assumes full replacement of centralized projects with decentralized
- Uses only one type of decentralized septic system
- Does not include operational or longevity data, the effects of I&I, tank pumping, etc.
Maintenance & Awareness

• Both centralized and decentralized wastewater treatment systems required a level of maintenance and awareness from users:
  • Improper use
  • Failure to maintain
  • Chemicals
• Education is key!