Why Decentralized/Distributed Systems are Popular Alternative Treatment

On-site treatment systems benefit homeowners, developers, and the environment.

By Robert K. Rebori and Jennifer Cisneros

A city's wastewater treatment infrastructure is part of the groundwork for the organization of an entire community. This is one of the most costly endeavors for the community and using a centralized system is often not an environmental benefit.

There is conclusive evidence centralized sewer collection systems are leaking and causing treatment plant overflows during strong wet weather events. Leakage into streams and ground water are a common occurrence in many places and a significant problem in many communities across the U.S. A study in Albuquerque, New Mexico, concluded that leakage of wastewater from sewer pipes amounted to 10 percent of average daily wastewater flow at their treatment plant, or 5 million gallons per day. Due to cost and these types of overflow issues, alternative ways of providing wastewater service in suburban areas are gaining increasing attention.

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In many situations, a decentralized/distributed system is the better way to go. Often seen as suitable only in low-density, rural situations and then only as temporary solutions, decentralized wastewater treatment systems are not usually thought of as an option for more than one home. However, with proper design, installation, and operation, the advantages of decentralized systems are many. Decentralized/distributed systems can reduce the time, amount of water, and energy involved with treating wastewater with a higher pollutant removal rate. By collecting, treating, and reusing or disposing of wastewater from individual homes, buildings, and/or cluster systems near the point of generation, the benefits are not only for the developers and homeowners, but also for the environment.

BENEFITS FOR DEVELOPERS

Developers who look into alternatives to sewer or center-collection systems actually see plenty of reasons to choose decentralized/distributed systems for their homes. For example, a developer who is looking to build 50 suburban homes can have his project delayed up to 5 years while the city works to extend the existing sewer lines to the homes. Plus, the developer is likely going to pay significant sewer tap fees and substantial fees for the cost of extending sewer lines so that current sewer customers will not have to see their rates increase. If the developer is charged more, chances are the developer will charge the residents more. Additionally, especially in places like coastal areas, small lots and heavy regulation can tie the developer's hands if the developer is trying to put in a sewer. The 5-year (or whatever was given) time line is likely to stretch even further.

Because these decentralized/distributed systems are typically composed of modular, interconnected, and easily replaceable parts, installation and maintenance is simple. It only takes a matter of days or weeks to install and start up a decentralized system. The savvy developer does not have to plan as extensively in comparison to building a neighborhood with a sewer. The developer may also decide to use these systems instead of building out from the central infrastructure because they require less time and money to obtain permits. But one of the major benefits of these systems is the developer can build out slowly and add to the treatment system as needed to maintain treatment meaning the upfront costs are significantly lower.

BENEFITS FOR RESIDENTS

Homeowners generally don't think about their sewage treatment. Quite frequently, a neighborhood near a large municipal treatment plant will be irritated by its smell, noise, or appearance without reaping any immediate water reuse benefits. Residents will be

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happy to know that with decentralized/distributed systems, they are typically almost undetectable whether not seen nor smelled. The systems usually are installed in the ground with the blower as the only moving part. Best of all, the water is treated on-site and available for reuse without the use of additives or harmful chemicals.

LOUSY REPUTATION FOR SEPTIC SYSTEMS

Frequent system failures are associated with the various types of conventional septic systems. When developers contract with a company or individual to install on-site systems, they are looking to minimize costs by adhering to the minimum standards instead of looking to protect the environment. Sometimes they are simply unaware that other options exist. Usually, the failures are characterized by very unpleasant events affecting an entire development of homes where the systems were not designed or installed properly. These events are things like untreated wastewater surfacing on the ground or backing up into the houses. Thus, many have assumed that on-site systems simply cannot be reliable. However, looking deeper into the situation, the problems of on-site systems diminish considerably when a system utilizing proven technology (such as the MicroFAST® systems), is designed, installed, and maintained correctly, and given no harsh chemicals to treat.

ENVIRONMENTALLY CONSCIOUS

Decentralized/distributed systems have less environmental impact compared to centralized sewage systems, especially were nitrogen reduction is a major concern. Since the treatment happens in the tank, on-site residential treatment systems, certified by the NSF® (National Sanitation Foundation) 40, Class 1 and 245, meets or exceeds most worldwide regulatory requirements consistently delivering very high performance levels (as with the example of the MicroFAST® system, an average of 95 percent BOD5 and up to 70 percent total nitrogen reduction). The systems offer flexibility in estate planning by reducing or eliminating the land constraints of the traditional drain field or difficult soil sites.

As a push to build green, the reclaimed water adheres to water efficiency standards in the Coding Guidelines for most "Green" building certification programs (such as USGBC®, LEED®, or others). The USGBC (US Green Builder's Council) defines Innovative Wastewater Technologies as having two options, but three choices. *"The intent of this credit is to reduce the amount of potable water used for flush fixtures and to minimize the amount of wastewater conveyed to the municipal system. For credit compliance, you have two options: Option 1: Reduce the quantity of potable water used for flush fixtures (water closet and urinals only) by 50 percent. You have two ways to make this reduction: use low-flow fixtures or use non-potable water sources. Option 2: Use an on-site wastewater treatment system to treat at least 50 percent of wastewater onsite to tertiary standards and absorbs into the ground or reuse the treated water."*

Properties can avoid the costly issues that often occur from a centralized system: untreated water getting disposed to the environment—whether due to aging infrastructure, water main breaks, flooding, or poor operation. A properly designed, installed, and operated decentralized/distributed wastewater systems benefit all those who want to improve the property and reduce energy costs while maintaining high levels of performance. ■