steep slopes are present or they expect increases in daily sewage flow.

- **Soil type.** Soil type influences the effluent's ability to percolate through the soil for treatment.
- **Separation distance from the water table.** The location of septic systems should ensure an adequate horizontal separation from surface waters and vertical separation from groundwater. Distances (setbacks) between septic system components and artificial or natural water supplies vary according to local site factors, such as soil percolation rate, grain size and depth to water table. States or local municipalities determine the vertical and horizontal setback requirements for soil absorption fields near building foundations, property boundaries, water supply wells and other surface waters. An individual site assessment before installation is the best way to determine siting distances necessary for efficient on-site wastewater disposal.
- **System size.** To avoid hydraulic overloading, it is necessary to properly size a system. Overloading can cause system backups or force waste through the septic tank before it receives adequate treatment (Perkins, 1989). Overloading can also create anaerobic conditions in the drainfield, reducing the system's ability to treat pathogens, and it might not give solids time to settle out before being pushed through the system.

Many alternatives to conventional septic systems offer improvements in efficiency, treatment capability and footprint. The use of mound or recirculating sand filters can benefit sites with limiting factors such as inadequate lot size, limited separation distances and the presence of problem pollutants like nitrogen. De-nitrification systems or aquaculture systems are useful to control pollutants like nitrogen and phosphorus. Alternating bed systems, mound systems, pressure distribution (low-pressure pipe) systems, sand filter systems or constructed wetlands are useful as retrofits for conventional systems with inadequate siting or size. These different types of systems can handle site-specific problems and decrease the likelihood of septic failure. EPA's decentralized wastewater systems technology fact sheets provide information about many of these alternative systems. In most cases, individual states approve alternative treatment systems. An EPA Web page lists such approvals, organized by state.

Maintenance Considerations

Periodic maintenance of on-site systems ensures their proper functioning. A septic system management program consisting of scheduled pumpouts and regular maintenance is the best way to reduce the possibility of failure. EPA recommends inspecting septic systems every 3 to 5 years. A typical inspection will include (U.S. EPA, 2017):

- Reviewing pumpout and maintenance records.
- Reviewing the age of the system.
- Checking the levels of sludge and scum in the tank.
- Checking for signs of leakage, such as low water levels in the tank.
- Checking for signs of backup, such as staining in the tank above the outlet pipe.
- Checking the integrity of the tank, inlet and outlet pipes.
- Checking the drainfield for signs of system failure like standing water.
- Checking the distribution box to ensure that lines are receiving equal flows.
- Reviewing compliance with local regulations regarding function and location.

Since property owners may not employ routine maintenance practices, agencies may need to establish programs to track pumpout and maintenance requirements. EPA's voluntary guidelines for decentralized on-site wastewater management include five voluntary management models for programs managing on-site and decentralized wastewater systems. The guidance consists of steps of increasing oversight to help communities and programs that regulate septic systems build effective septic system management programs. The programs below are examples of municipalities that have taken on the responsibility of managing septic systems and have included maintenance-tracking in their plans (U.S. EPA, 2012).

Jamestown, Rhode Island

- In 2001, Jamestown adopted an ordinance to better monitor and manage individual wastewater systems. The program consists of routine inspections, maintenance reminders, an online database, siting and installation rules, and designation of a high groundwater table district.
- The ordinance requires routine inspections of all systems every 3 to 5 years.
- The ordinance gives the town the authority to pump septic systems at the owner's expense.
- Property owners pay an annual $30 fee to fund the ordinance.

Monroe County, Florida

- In 1999, Florida adopted new wastewater treatment standards to protect the environmentally sensitive ecosystems of Monroe County (the Florida Keys).
- All wastewater systems in Monroe County must now use advanced treatment technologies with designs to achieve an effluent limit of 10 milligrams per liter or less for nitrogen.
- Septic system owners must renew an operating permit annually at a cost of $100.

Pena Blanca, New Mexico

- Deciding whether to repair or replace 133 of the 185 existing treatment systems or spend $3.1 million on a centralized sewer system, the community of Pena Blanca formed the Pena Blanca Water and Sanitation District in 1990 and developed a wastewater management program with an emphasis on system maintenance. The program features an operating permit and maintenance contract requirements, mandatory tank pumping every 2 years, and maintenance of system records.
- The Water and Sanitation District retains the authority to pump septic tanks every 2 years, with property owners retaining the option to hire an outside pump service.
- The Water and Sanitation District charges a monthly fee that ranges from $9 to $20.

Auburn Lake Trails, California

- In 1985 in response to local soils and topography that had poor suitability for conventional septic tank designs, the community of Auburn Lake Trails authorized the Georgetown Divide Public Utility District to design and manage conventional and advanced individual and clustered wastewater treatment systems. The program consists of operating permit requirements, routine inspection and maintenance requirements, and groundwater and surface water monitoring.
- The district has broad authority to investigate, design, monitor, operate, maintain and repair treatment systems.
- The district charges monthly user fees ranging from $15 to $23.

MS4 programs with septic systems should consider addressing failing septic systems by utilizing field screening to pinpoint areas warranting more detailed on-site inspection surveys by the appropriate regulating authority (see common field tests to the right).

EPA has created a Web site that describes steps for a property owner to take after a system has failed. When a septic system has failed and requires replacement, consider connecting to the local sanitary sewer system. This may not be possible in all parts of the country—but where it is feasible, it may be cheaper than installing a new septic system and provides the highest level of protection to the local environment and public health.

Limitations

Economics affect the ability for a person or a community to repair or replace a failing septic system. Septic owners may not have adequate funding to install new systems. In some cases, rebates or subsidies are available to property owners to replace aging septic systems, install advanced on-site wastewater treatment systems or connect to centralized systems. These

Additional Information

Additional information on related practices and the Phase II MS4 program can be found at EPA's National Menu of Best Management Practices (BMPs) for Stormwater website

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Disclaimer

This fact sheet is intended to be used for informational purposes only. These examples and references are not intended to be comprehensive and do not preclude the use of other technically sound practices. State or local requirements may apply.