

## **System Type: Spray Irrigation System**

Basic Design: Spray irrigation is an efficient way to nourish plants and apply reclaimed wastewater to the land; however in order to protect public health and reduce odors, the wastewater must be treated to a very high level before being used in this type of system. Treatment is achieved through the use of septic tanks to waste stabilization ponds, or through mechanical pretreatment and disinfection systems. After treatment, filtration, and disinfection, the effluent is sent under pressure through the mains and lines of the spray distribution system at pre-set times and rates. Vegetation and soil microorganisms metabolize most nutrients and organic compounds in the wastewater during percolation through the first several inches of soil. The cleaned water is then absorbed by deep-rooted vegetation, or it passes through the soil to the ground water. The irrigated area must be vegetated and landscaped to minimize runoff and erosion. When properly designed and installed, most spray systems provide uniform distribution to plants and eliminate discharge to streams. Spray irrigation is sometimes permitted as an alternative wastewater disposal method for sites previously considered unsuitable for onsite systems such as difficult sites with slowly permeable soils, with seasonal perched water or shallow ground water or bedrock, or complex topographies.

*Onsite wastewater irrigation system serving a 3-bedroom home at the OSU Molly Caren Agricultural Center near London, Ohio.*



Advantages: Because irrigation systems are designed to deliver wastewater slowly at rates beneficial to vegetation, and because the wastewater is applied either to the ground surface or at shallow depths, irrigation may be permitted on certain sites with high bedrock, perched seasonal water tables or shallow groundwater, or slowly permeable soils. Irrigation systems also can be designed to accommodate sites with complex terrains. Spray irrigation saves on potable water because the wastewater is used for irrigation. Above-ground spray system components are easier to inspect, control, and service than subsurface drip irrigation components.

Disadvantages: Cost is higher than those of conventional systems. Temperature factors in some areas of the country may preclude the use of spray irrigation during certain times of the year. The wastewater may need to be stored in holding tanks during the coldest period of the year, because plant growth is limited and the nitrogen in effluent discharged during this time will be mineralized and unavailable for plant uptake. Sites near surface water or shallow groundwater often are restricted, especially when these are used as drinking water sources. Depending on the level of treatment, spray systems generate aerosols, which can pose a threat to public health; therefore, regulations may require large separation distances or buffer zones that make spray systems inappropriate for small lots. Minimum setbacks of as much as 50 feet of forested buffer or 150 to 500 feet from neighboring residences and water sources are not unusual.

Operation and Maintenance: Recommended – Monthly: walk over spray area and examine for ponding of effluent, bad odors, damage to spray heads, surfacing liquids, vegetation problems, surface soil collapse. Quarterly: Conducted by a qualified operator - proper spray sequence, proper pump function, proper liquid levels. Biannually: erosion, storage unit capacity. Annually: effluent sampling by a certified laboratory, test water supplied to spray irrigation area for pH, total Kjeldahl nitrogen, fecal coliform bacteria, chlorine, TSS, and BOD. A management contract with an approved operator or operations firm is also suggested. O&M estimated at \$300-\$400 annually but may be less depending on the type of pretreatment used.