

**Biological and Chemical Renovation of Wastewater**  
**with a**  
**Soil Infiltrator Low-Pressure Distribution System**

By

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**BIOLOGICAL AND CHEMICAL RENOVATION OF WASTEWATER WITH A  
SOIL INFILTRATOR LOW-PRESSURE DISTRIBUTION SYSTEM**

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(ABSTRACT)

An alternative on-site wastewater treatment and disposal system (OSWTDS) consisting of a soil infiltrator with low pressure distribution was evaluated in a soil that was unsuitable for a conventional OSWTDS under current Commonwealth of Virginia Sewage Handling and Disposal Regulations, due to a shallow seasonally perched water table and low hydraulic conductivity. The absorption field consisted of two subsystems numbered as 1 and 2 with effluent design loading rates of 5.1 and 10.2 Lpd/m<sup>2</sup>, respectively (actual loading rates of 2.4 and 4.9 Lpd/m<sup>2</sup>, respectively).

Soil matric potentials compared seasonally for each subsystem and indicated that both provided similar hydraulic performance. Background water quality was generally improved by subsurface movement through the absorption fields.

A bacterial tracer was found in shallow (45.7 cm) and deep (213.4 cm) sampling wells within 24 h in the two subsystems (but in low numbers) over both summer and winter sampling periods. A viral tracer was detected within 48 h in both shallow and deep wells, but only in subsystem 2 in the winter. In evaluating denitrification potential, the addition of glucose to soil core samples did increase quantitatively, although not

significantly, nitrous oxide production in each subsystem, at each depth, during each season.

Overall, the performance of both subsystems was very similar. The soil infiltrator functioned very well, as designed for the site and soil limitations. It appears to be a potential alternative OSWTDS for use in problem soils.