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Reductions in trench bottom area (trench length) for non-gravel onsite system drainfield products are based on higher rates of wastewater infiltration from the trench into the underlying soil. Various reasons for higher infiltration rates for non-gravel systems have been proposed including open architecture, reduced soil compaction, and reduced amounts of fine particles from gravel. Results of model simulations suggest that the relative difference in wastewater infiltration rate between non-aggregate and aggregate drainfield products is maximal in aggregate is embedded in the soil and in soils with high saturated hydraulic conductivity. The hydraulic efficiency of non-gravel drainfield products also may be less than expected because of soil properties, drainfield installation methods, and/or wastewater application method.

The rate of wastewater exfiltration from drainfield trenches is only one component of the flow path of wastewater from the drainfield to ground or surface water. The wastewater must move through underlying soil horizons, and if these horizons are hydraulically restrictive, increased loading rates may result in wastewater perching at the surface of these horizons. If the site is nearly level and the water-restrictive horizon is a short distance below the base of the drainfield, perching may result in water mounding above the restrictive horizon and hydraulic failure during high-rainfall periods. Because of higher gradients, mounding would not be expected on sloping sites, but downslope movement and subsequent surfacing of partially-treated wastewater may occur.

The other consequence of reduced drainfield area with non-gravel drainfield products is increased loading of wastewater components to the soil. Rate and extent of biomat formation is related to organic loading to the system, and enhanced biomat formation may lead to reduced system life. In addition, the extent to which the soil is capable of treating wastewater is related to total volume of reactive soil components that the wastewater contacts. Thus, in soils with low amounts of reactive components, primarily clay and iron/aluminum oxides, increased loading rates may overwhelm available sites to immobilize potential contaminants in the wastewater.