

Title: Investigation of Large Scale Subsurface Soil Absorption Systems (Study No. 39)

Investigators: Principal Investigator

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Period of Contract: November 13, 1986 through June 30, 1987

Objectives: To evaluate the performance of two large scale subsurface soil absorption systems and the impact on groundwater from the discharge of septic tank effluent.

Background/Need: There are over 150 large scale soil absorption systems in the state, many of which have been in operation for less than five years and very little is known about their impacts on groundwater. The mound system and absorption bed system evaluated in this study are the two predominant types of large scale systems currently used in Wisconsin.

Methods: Groundwater from monitoring wells and grab samples of septic tank effluent were collected from a mound system at the Village of Wyeville and an absorption bed system at the Town of Scott. Samples were taken for analyses at each site on ten occasions between November of 1986 and June of 1988. Field data gathered during sampling included pH, temperature and specific conductance. The State Lab of Hygiene analyzed the samples for the following characteristics: biological oxygen demand (BOD₅), chlorides, total dissolved solids (TDS), total suspended solids, ammonia-N, nitrate+nitrite-N and total kjeldahl-N.

Results: Both systems were being hydraulically loaded well below the design loading rates. The systems appeared to be capable of functioning hydraulically at the current loading rates, though groundwater mounding did occur. Elevated levels of chlorides, TDS and nitrogen compounds downgradient from discharge points were observed and comprise the most significant impacts on groundwater. The Village of Wyeville has exceedances of the enforcement standard (ES) for nitrate+nitrite-N and preventive action limit (PAL) exceedances for TDS, conductivity, total nitrogen and ammonia-N. The Town of Scott system had exceedances of the ES for nitrate+nitrite-N and TDS, and exceeded the PAL for chloride, total nitrogen and ammonia-N.

Conclusions: The investigator concluded that hydraulically the systems at both locations functioned adequately, however they do not appear to be capable of meeting the groundwater quality standards based on the parameters measured during this study.

**Recommendations/
Implications:**

The investigator specifies a need for a better understanding of the functioning of these systems including development of pollutant transport models and design criteria to better meet groundwater standards, along with the evaluation of alternative systems.

Availability of Report:

This report is available for viewing and loan at:

The Water Resources Center
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Publication 050871

Key Words:

Ammonium-nitrogen, chloride, mound system, nitrate-nitrogen, septic systems, soil absorption, total dissolved solids, wastewater

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