IEHA Wastewater Management Committee
Guidance Document
Interpretation of Soil Reports – Subsurface Septic Systems – 09/09/2005

"Subsurface soil absorption systems are the systems of choice".

Sometimes when faced with a soil report (on-site evaluation), local Health Department staff may have questions on how to proceed. This document will provide guidance when those occasions arise. When you interpret a soil report, your goals are to:

1. Assign a soil loading rate in gallons per day per square foot to each soil layer.
2. Determine the depth of the limiting layer, i.e., the one below which little or no useful wastewater absorption or treatment will take place.
3. Locate the level of the seasonal high water table.

Soil report formats vary; as a model, we will use the "Soil and Landscape Report for Onsite Sewage Evaluation."* All references are to this form.

Loading Rates: To assign a loading rate, you will need to consider each soil horizon's depth, texture, and structure. Depths are self-explanatory (Column 1). Texture describes the types of soil particles (gravel, sand, silt, clay, and various combinations thereof) and separates them into coarse, medium, and fine classes (Column 5). Structure describes the degree to which the soil particles have formed into larger units, called *peds*. The structure is generally identified as weak, moderate, or strong (Column 6). Most soil scientists use a consistent nomenclature, but abbreviations are common. Modify the existing Table V, in the 410 I.A.C. 6-8.1 in the following manner:

1.) Attach the following abbreviation to the table in the left hand margin, top to bottom.

GR= gravel	LVFS= loamy very fine sand	SICL= silty clay loam
COS= coarse sand	SL= sandy loam	CL= clay loam
LCOS= loamy coarse sand	COSL= coarse sandy loam	SC= sandy clay
S= medium sand	FSL= fine sandy loam	SIC= silty clay
FS= fine sand	VFSL= very fine sandy loam	C= clay
LS= loamy sand	SCL= sandy clay loam	
LFS= loamy fine sand	L= loam	
VFS= very fine sand	SIL= silt loam	

2.) Attach the structural grades of 3= strong, 2= moderate, and 1= weak, to the appropriate columns.

Using the combination of soil texture and soil structure, assign a loading rate to each soil layer. Be sure to differentiate "granular" and "platy" structures from others in the same soil texture classes, as they will have different loading rates.

Limiting Layers: Table V identifies specific soil structure classes that can be called limiting layers. If a soil horizon has either an extremely high (>1.2 gpd/sq. ft.) or low (<0.25 gpd/sq. ft.) loading rates, then that horizon is the limiting layer. Other designations in the soil report chart also help in this identification. For example, "C" horizons (Column 3) that are massive, structureless, and compact (Column 6) are limiting layers. (By general agreement, "BC" horizons directly above such "C" horizons are also considered limiting layers, even if they have some

structure.) If the soil sample effervesces when treated with acid (Column 10), this also indicates that it is probably from a limiting horizon. (There are a few cases where effervescence does not define a limiting layer, so look at the soil structure to make sure.)

Occasionally, Table V does not lead you to the correct soil loading rate. Such cases are fairly rare, but include the following possibilities:

1. If a sample contains more than 35% rock fragments (Column 9), then it is considered a limiting layer because it will act as a poor effluent filter. The nature of the remaining soil does not affect this classification.
2. If fine and medium sands are mixed, and fine sand makes up >25% of the mixture, use the "Fine Sand" row in Table 5 to determine loading rate.
3. "Fill" is not listed as a soil class, but it has a loading rate of zero. No septic system may be installed in fill.
4. Platy soil structure caused by compaction, as opposed to a natural platy structure, also has a loading rate of zero. Otherwise good soils can be ruined by heavy equipment, moisture, and bad judgment.

Seasonal High Water Table: Soil scientists generally identify the level of the seasonal high water table. However, you should verify that the reported water level agrees with the soil data. Use the soil color and presence of mottling to do so. Soil mottles, otherwise known as "redoximorphic features," with color values of four or more and chroma values of two or less indicate wetness; in sandy soils, a chroma of three may also do so. For example, if a soil layer contains redox depletions (Column 4) reported as 10YR 5/2, then this layer is wet during part of the year.

When in doubt, always ask for more information. Never base your recommendations on a single boring – soil scientists generally provide at least three, and you should require three in the area of the absorption field as a minimum. If the results are not consistent from hole to hole, make your recommendations based on the most restrictive aspects of the borings. There may be substantial differences among the results, such that one boring might require a mound system, while the others would permit an in-ground system. In such a case, it is best to request additional borings, in order to establish accurately where the break between the soil systems occurs. Keep in mind that, if you are unable to use an in-ground system because of soil limitations and therefore specify an above-ground system, the loading rates for the same soils will be different when you use Table VI, "Loading Rates for Above Ground Systems."

*Franzmeier, D.P., G.C. Steinhardt, and D.G. Schulze, 2004, Indiana Soil and Landscapes Evaluation Manual, p. 51, Purdue University