

Evaluation of Soil Properties as Potential Indices of Suitability for On-site Septic Systems
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The North Carolina (NC) Department of Environmental and Natural Resources (NCDENR) uses a number of predictive indices in the determination of site suitability and long term acceptance rates (LTAR) for On-Site septic systems (15A NCAC 18A .1941 3, B. 2002). This study was conducted to determine the accuracy of these predictive indices, the relativeness of these indices, and how other factors exclusive of these indices relate to hydraulic conductivity (ksat) and therefore to LTAR. The Bt(max) horizons of eight (group III and IV) NC piedmont soil series were sampled and analyzed by various field and laboratory methods to determine the relationship of soil texture, structure, mineralogy and other various physical tests to ksat. Four replications were used from each of the eight soil series for a total of 32 samples. Ksat correlated with Apparent CEC the strongest ($r = -0.62$). Bulk density and total porosity were also highly correlated with Ksat ($r = -0.52$ and 0.52 respectively). Other variables that correlated with Ksat were penetration resistance, microporosity, and clay content. The strong correlation found between the Apparent CEC and Ksat relates to the mineralogical composition of the soils used. The eight soils used were selected with a predominance of mixed mineralogy (kaolinite – montmorillonite) and kaolinitic mineralogy. However, soil texture is the major indice used to determine the LTAR by DEHNR. The results of this study points out that the soil properties that relate to mineralogy and structure may prove to be stronger indicators of suitability and LTARs than texture.