

## 15A NCAC 18A .1941 SOIL CHARACTERISTICS (MORPHOLOGY)

(a) The soil characteristics which shall be evaluated by the local health department are as follows:

(1) Texture - The relative proportions of sand, silt, and clay sized mineral particles in the fine-earth fraction of the soil are referred to as soil texture. The texture of the different horizons of soils shall be classified into four general groups and 12 soil textural classes based upon the relative proportions of sand, silt, and clay sized mineral particles.

- (A) SOIL GROUP I - SANDY TEXTURE SOILS. The sandy group includes the sand and loamy sand soil textural classes and shall be considered SUITABLE with respect to texture.
- (B) SOIL GROUP II - COARSE LOAMY TEXTURE SOILS. The coarse loamy group includes sandy loam and loam soil textural classes and shall be considered SUITABLE with respect to texture.
- (C) SOIL GROUP III - FINE LOAMY TEXTURE SOILS. The fine loamy group includes silt, silt loam, sandy clay loam, clay loam, and silty clay loam textural classes and shall be considered PROVISIONALLY SUITABLE with respect to texture.
- (D) SOIL GROUP IV - CLAYEY TEXTURE SOILS. The clayey group includes sandy clay, silty clay, and clay textural classes and shall be considered PROVISIONALLY SUITABLE with respect to texture.
- (E) The soil textural class shall be determined in the field by hand texturing samples of each soil horizon in the soil profile using the following criteria:
  - (i) Sand: Sand has a gritty feel, does not stain the fingers, and does not form a ribbon or ball when wet or moist.
  - (ii) Loamy Sand: Loamy sand has a gritty feel, stains the fingers (silt and clay), forms a weak ball, and cannot be handled without breaking.
  - (iii) Sandy Loam: Sandy loam has a gritty feel and forms a ball that can be picked up with the fingers and handled with care without breaking.
  - (iv) Loam: Loam may have a slightly gritty feel but does not show a fingerprint and forms only short ribbons of from 0.25 inch to 0.50 inch in length. Loam will form a ball that can be handled without breaking.
  - (v) Silt Loam: Silt loam has a floury feel when moist and will show a fingerprint but will not ribbon and forms only a weak ball.
  - (vi) Silt: Silt has a floury feel when moist and sticky when wet but will not ribbon and forms a ball that will tolerate some handling.
  - (vii) Sandy Clay Loam: Sandy clay loam has a gritty feel but contains enough clay to form a firm ball and may ribbon to form 0.75-inch to one-inch long pieces.
  - (viii) Silty Clay Loam: Silty clay loam is sticky when moist and will ribbon from one to two inches. Rubbing silty clay loam with the thumbnail produces a moderate sheen. Silty clay loam produces a distinct fingerprint.
  - (ix) Clay Loam: Clay loam is sticky when moist. Clay loam forms a thin ribbon of one to two inches in length and produces a slight sheen when rubbed with the thumbnail. Clay loam produces a nondistinct fingerprint.
  - (x) Sandy Clay: Sandy clay is plastic, gritty, and sticky when moist and forms a firm ball and produces a thin ribbon to over two inches in length.
  - (xi) Silty Clay: Silty clay is both plastic and sticky when moist and lacks any gritty feeling. Silty clay forms a firm ball and readily ribbons to over two inches in length.
  - (xii) Clay: Clay is both sticky and plastic when moist, produces a thin ribbon over two inches in length, produces a high sheen when rubbed with the thumbnail, and forms a strong ball resistant to breaking.
- (F) The Department may substitute laboratory determination of the soil textural class as defined in these Rules by particle-size analysis of the fine-earth fraction (less than 2.0 mm in size) using the sand, silt, and clay particle sizes as defined in these Rules for field testing when conducted in accordance with ASTM (American Society for Testing and Materials) D-422 procedures for sieve and hydrometer analyses which are hereby adopted by reference in accordance with G.S. 150B-14(c). For fine loamy and clayey soils (Groups III and IV), the dispersion time shall be increased to 12 hours. Copies may be inspected in and copies obtained from the Department of

Environment, Health, and Natural Resources, Division of Environmental Health, P.O. Box 27687, Raleigh, North Carolina 27611-7687.

- (2) Soil Structure - The following types of soil structure shall be evaluated:
- (A) CRUMB AND GRANULAR SOIL STRUCTURE - Soils which have crumb or granular structure shall be considered SUITABLE as to structure.
  - (B) BLOCK-LIKE SOIL STRUCTURE - Block-Like Soil Structure with peds 2.5 cm (1 inch) or less in size shall be considered PROVISIONALLY SUITABLE as to structure. Block-like soil structure with peds greater than 2.5 cm (1 inch) in size within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.
  - (C) PLATY SOIL STRUCTURE - soils which have platy soil structure within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.
  - (D) PRISMATIC SOIL STRUCTURE - Soils which have prismatic soil structure within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.
  - (E) ABSENCE OF SOIL STRUCTURE - Soils which are single grained and exhibit no structural aggregates shall be considered SUITABLE as to structure. Soils which are massive and exhibit no structural peds within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.
  - (F) Structure shall be evaluated using Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(c). Copies may be inspected in, and copies obtained from, the Department of Environment, Health, and Natural Resources, Division of Environmental Health, P.O. Box 27687, Raleigh, NC 27611-7687.
- (3) Clay Mineralogy - Along with soil texture, the mineralogy of the clay-sized fraction determines the degree to which some soils swell when wetted and thereby affects the size and number of pores available for movement of sewage effluent through the soil. There are two major types of clays, including the 1:1 clays, such as Kaolinite, which do not shrink or swell extensively when dried or wetted; and the 2:1 clays, including mixed mineralogy clays, such as clays containing both Kaolinite and Montmorillonite that will shrink and swell when dried and wetted. The type of clay minerals in the clay-sized fraction shall be determined by a field evaluation of moist soil consistence or of wet soil consistence using Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(c). The Department may substitute laboratory determination of the expansive clay mineralogy as defined in these Rules for field testing when conducted in accordance with ASTM D-4318, procedures A and B, for the determination of liquid limit, plastic limit, and plasticity index of soils. These procedures are hereby adopted by reference in accordance with G.S. 150B-14(c). If the liquid limit exceeds 50 percent and the plasticity index exceeds 30, the soil shall be considered as having an expansive clay mineralogy. Copies may be inspected in, and copies obtained from, the Department of Environment, Health, and Natural Resources, Division of Environmental Health, P.O. Box 27687, Raleigh, NC 27611-7687.
- (A) SLIGHTLY EXPANSIVE CLAY MINERALOGY - Soils which have loose, very friable, friable or firm moist soil consistence, or have slightly sticky to sticky or nonplastic, slightly plastic to plastic wet soil consistence, are considered to have predominantly 1:1 clay minerals and shall be considered SUITABLE as to clay mineralogy.
  - (B) EXPANSIVE CLAY MINERALOGY - Soils which have either very firm or extremely firm moist soil consistence, or have either very sticky or very plastic wet soil consistence, are considered to have predominantly 2:1 clay minerals (including mixed mineralogy clays) and shall be considered UNSUITABLE as to clay mineralogy.
- (4) Organic Soils - Organic soils shall be considered UNSUITABLE.
- (b) Where the site is UNSUITABLE with respect to structure or clay mineralogy, it may be reclassified PROVISIONALLY SUITABLE after an investigation indicates that a modified or alternative system may be installed in accordance with Rule .1956 or Rule .1957 of this Section.

*History Note: Authority G.S. 130A-335(e);  
Eff. July 1, 1982;  
Amended Eff. January 1, 1990.*