APPENDIX A
SOIL PROFILE TERMINOLOGY

A. General

The relative amounts of the sizes of mineral particles in a soil are referred to as soil texture. All soils are comprised of sand, silt and clay. The soil texture classification set forth in this section is based upon the U.S. Department of Agriculture twelve soil textural classes. However, for the purpose of this code, a site evaluator can adequately describe soil texture based upon the twelve general soil textural classes described in Figure A-1.

B. Mottling

Mottling terms: The site evaluator shall estimate the abundance, size, and contrast of mottling using the volume estimation charts provided in Munsell charts and using the following terms in (Mottle abundance) and (Mottle contrast).

- Mottle abundance: Mottle abundance means the percentage of the exposed soil surface occupied by mottles and is described as follows:

- Few: Mottle abundance is "few" where the mottles color occupies less than two percent of the exposed soils surface

- Common: Mottle abundance is "common" where the mottles color occupies from two to twenty percent of the exposed soil surface.

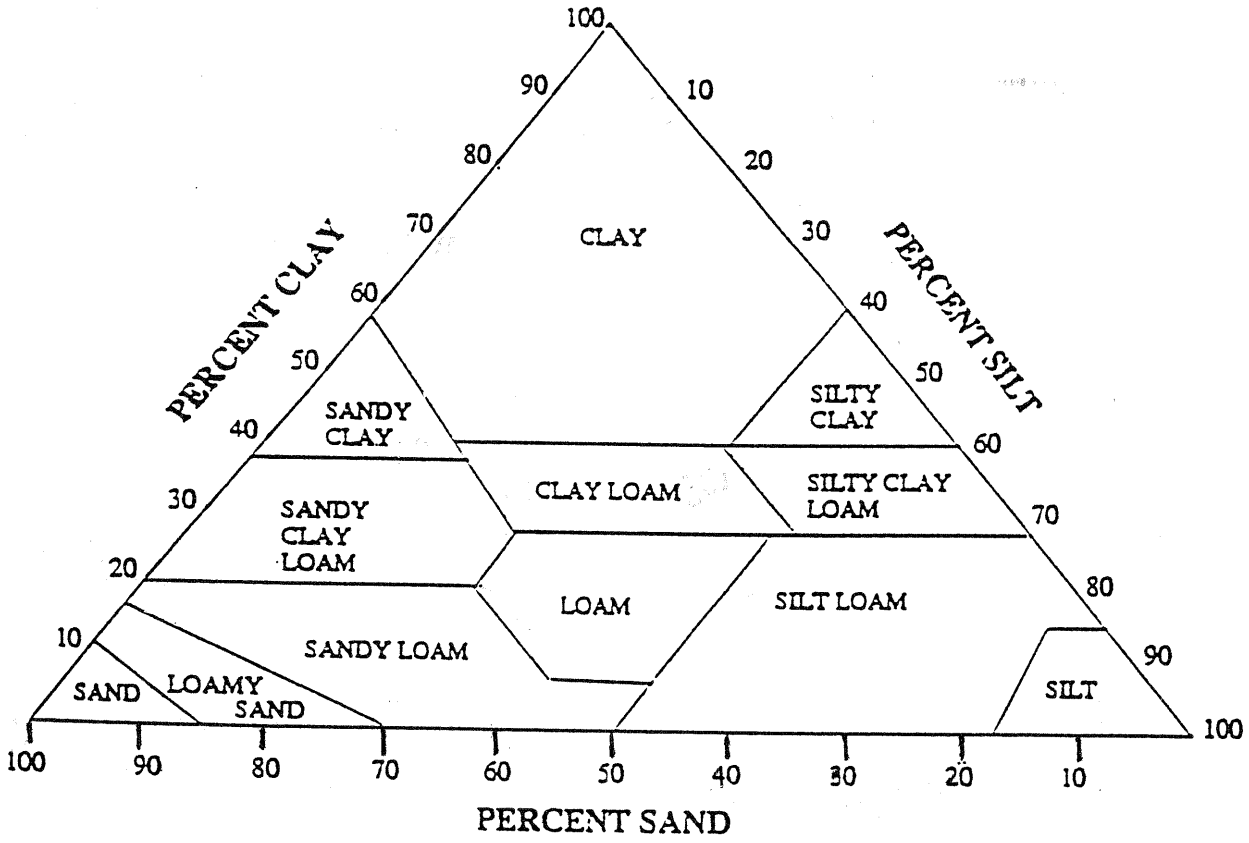
- Many: Mottle abundance is "many" where the mottles color occupies more than twenty percent of the exposed surface.

Mottle contrast: Mottle contrast means the difference in color between the soil mottle and the background color of the soil and is described as follows:

- Faint: Mottle contrast is "faint" where mottles are evident but only recognizable under close examination.

- Distinct: Mottle contrast is "distinct" where mottles are readily seen but not striking.

- Prominent: Mottle contrast is "prominent" where mottles are obvious and mottles are one of the outstanding features of the soil horizon.



SAND - 2.0 TO 0.05 MM. DIAMETER
SILT - 0.05 TO 0.002 MM. DIAMETER
CLAY - SMALLER THAN 0.002 MM. DIAMETER

FIGURE A.1
UNITED STATES DEPARTMENT OF AGRICULTURE TEXTURAL CLASSIFICATION CHART

C. Soil Texture

A standard procedure to report soil texture is presented in this section.

Sandy loam texture: The texture is "sandy loam" where the soil contains much sand, but has enough silt and clay to make it somewhat sticky. Individual sand grains can be readily seen and felt.

- Dry: Dry soil aggregates are easily crushed. Squeezed when dry, it will form a cast that will fall apart. Very faint velvety feeling initially but as rubbing is continued, the gritty feeling of sand dominates.

- Moist: If squeezed when moist, a cast can be formed that will bear careful handling without falling apart. Does not form a ribbon between the thumb and forefinger.

Loam texture: The texture is "loam" where the soil has a relatively even mixture of sand, silt and clay. A loam feels somewhat gritty, yet fairly smooth and highly plastic.

- Dry: Dry soil aggregates are crushed under moderate pressure; clods can be quite firm. When pulverized, loam has a velvety feel that becomes gritty with continued rubbing.

- Moist: Squeezed when moist, it will form a cast that can be handled quite freely without breaking. Very slight tendency to ribbon between the thumb and forefinger. The ribbon surface is rough.

Silt loam texture: The texture is "silt loam" where the soil is medium-textured soil.

- Dry: Dry soil aggregates are firm but may be crushed under moderate pressure. Clods are firm to hard. Silt loam may appear cloddy, but the clods are readily broken. It will form casts that can be handled freely without breaking. When pulverized, smooth, flour-like feel dominates.

- Moist: Squeezed when moist, it will form casts that can be handled freely without breaking. Slight tendency to ribbon between the thumb and forefinger. The ribbon has a broken effect or rippled appearance.

Silt texture: The texture is "silt" where the soil is medium textured and feels floury when dry and nonsticky when moist.

Silty clay loam: The texture is "silty clay loam" when the soil is a fine-textured soil.

- Dry: Dry soil aggregates are very firm. Silty clay loams usually breaks into clods or lumps that are hard when dry.

- Moist: Squeezed when moist, it will form a thin ribbon that will break readily, barely sustaining its own weight. The moist soil is plastic and will form a cast that will stand considerable handling. When hand kneaded it does not crumble readily, but tends to become a heavy, compact mass. It is sticky when moist.

Silty clay texture: The texture is "silty clay" where the soil is fine-textured.

- Dry: Usually forms very hard clods or lumps when dry.

- Moist: Squeezed when moist, it will form a long flexible ribbon. A silty clay soil leaves a "slick" surface when rubbed with a long stroke and firm pressure. Silty clay tends to hold the thumb and forefingers together, due to its stickiness. When placed between the teeth silty clay has a smooth slick feeling.

- Wet: Quite plastic when wet. It can be very sticky when wet.

D. Rock Fragments

Intent: This section provides a standard procedure to modify the soil texture description based upon the size of rock fragments and the volume percentage of rock fragments in the soil profile and on the surface of the site.

General: Where the soil profile contains fifteen to thirty-five percent by volume of rock fragments, the soil texture description shall be modified using the appropriate adjectives set forth in Soil Survey manual.

Terms for reporting rock fragment size: The rock fragment size terms for modifying the soil texture description are as follows:

Gravelly: "Gravelly" is used where the rock fragments range from 0.1 to 3.0 inches in diameter (i.e. gravelly sandy loam, gravelly loam, etc.)

Cobbly: The "cobbly" is used where the rock fragments range from 3 to 10 inches in diameter (i.e. cobbly sandy loam, stony loam, etc.).

Bouldery: "Bouldery" is used where rock fragments are larger than 10 inches in diameter.

E. Terms for Reporting the Percentage of Rock Fragments

The rock fragment abundance terms for modifying the soil texture description are as follows:

Very: Where the soil profile contains thirty-six to sixty percent by volume of rock fragments, the word "very" is used along with the appropriate rock fragment size term is to be incorporated with the textural name (i.e. Very gravelly sandy loam, very cobbly sandy loam, very stony sandy loam, etc.)

Extremely: Where the soil profile contains sixty-one to ninety percent by volume of rock fragments, the word "extremely" is used along with the appropriate rock fragment size terms is to be incorporated with the textural name (i.e. extremely gravelly sandy loam, extremely cobbly sandy loam, extremely stony sandy loam, etc.).

Surface stones: Where the surface of the site contains more than fifty percent by area of large stones if not proposed to be removed, the site shall be considered excessively coarse and require the disposal field to be the stones.

F. Soil Consistence

Intent: This section provides a standard procedure to report soil consistence in the field. For the purposes of this code, however, consistence describes the resistance a soil horizon presents to a pocket penetrometer. This is described as "consistence in place". It is not unusual for a soil to be described as "firm in place" but to be friable when crushed between the thumb and forefinger. The soil that is firm in place will restrict the downward movement of septic tank effluent, even though it may be friable when removed. It is important to note that dry soils may exhibit greater resistance to a pocket penetrometer than when moist. If possible, soil consistence should be measured in a moist state. Soil consistence shall be described based upon:

Loose soil: The consistence is "loose" where a soil horizon has a single grain structure and offers resistance to a pocket penetrometer of less than 0.25 ton per square foot. Soil does not adhere when pressed together.

Friable soil: The consistence is "firm" where a soil horizon has a platy, prismatic or massive structure. Resistance to a pocket penetrometer is 0.75 to 1.5 ton per square foot. Soil coheres when pressed together.

Firm soil: The consistence is "firm" where a soil horizon has a platy, prismatic or massive structure. Resistance to a pocket penetrometer is 0.75 to 1.5 ton per square foot.

Very firm soil: The consistence is "very firm" where a soil horizon has a platy, prismatic or massive structure. Resistance to a pocket penetrometer is greater than 1.5 ton per square foot.

Cemented soil: The consistence is "cemented" where a soil horizon has a hard consistence caused by some cementing substance other than clay minerals, such as carbonate, silica, or oxide or salts or iron and aluminum. Cementation is usually altered very little by wetting.

G. Soil Structure

Intent: This section provides a standard procedure to define soil structure. Soil structure refers to the shape of the natural soil aggregates. Soil structures are:

Spherical structure: The structure is "spherical" where the soil aggregates have more or less equal dimensions and lack sharp corners, sharp edges or well defined faces. This term includes crumb and granular structure as defined by the U.S. Department of Agriculture.

Subangular structure: The structure is "subangular blocky" where soil aggregates have more or less equal dimensions and possess well defined flat or somewhat curved faces, sharp corners and sharp edges.

Prismatic structure: The structure is "prismatic" where soil aggregates have one axis distinctly longer than the other two and are oriented with the long axis in an upright vertical position.

Platy structure: The structure is "platy" where soil aggregates have one axis distinctly shorter than other two and are oriented with the short axis in an upright vertical position.

Massive structure: The structure is "massive" where the soil consists of dense, compact mass and shows no recognizable natural soil aggregates or structural faces.

Single grain structure: The structure is "single grain" where the soil consists of loose individual sand grains that will not bind together into recognizable soil aggregates.

H. Saprolite

Saprolite is derived from a German word meaning rotten rock. It is soft, highly weathered material that many thousands of years ago was bedrock. Today it may have somewhat the appearance of bedrock, however it behaves like soil in treating effluent. It can be crushed with finger pressure, has clay skins, has moderate permeability, and usually contain roots. In this manual, saprolite is considered as soil.

I. Bedrock

Intent: This section provides a standard procedure to recognize the presence of bedrock. Bedrock affects the ability of a system to treat septic tank effluent, thus plays a significant role in the performance of a disposal system.

Recognition criteria: Criteria for the recognition of bedrock shall include, but shall not be limited to any solid and continuous body of rock, with or without fractures.

J. Excessively Course Soil Horizons

Intent: This section provides a standard procedure for the recognition and reporting of excessively coarse soil horizons. Excessively coarse soil horizons provide less opportunity for the treatment of septic tank effluent and thus, these soil horizons play a significant role in the performance of a disposal system.

Recognition criteria: Criteria for the recognition of excessively coarse soil horizons are as follows:

Greater than fifty percent rock fragments: Soil horizons that have a rock fragment content greater than fifty percent by volume shall be considered excessively coarse.

Coarse to very coarse sands: Sandy textured soil horizons that are composed primarily of coarse to very coarse sand (from one-half to two millimeters in diameter) and lack detectable amounts of two percent or more) fines as defined by U.S. Department of Agriculture.

If in doubt: When doubt exists as to whether a soil horizon should be considered excessively coarse, the soil horizon shall be considered excessively coarse.

K. Hydraulically Restrictive Soil Horizons

Intent: This section provides a standard procedure to recognize and report hydraulically restrictive soil horizons. Hydraulically restrictive soil horizons slow down the vertical movement of septic tank effluent and thus these soil horizons play a significant role in the performance of a disposal system.

Recognition criteria: Criteria for recognition of hydraulically restrictive soil horizons shall include, but not be limited to any soil horizon which can not accept two gallons per square foot·day.

Cemented horizons: Any cemented soil horizon that remains hard when soaked in water shall be considered hydraulically restrictive.

L. Seasonal Groundwater Table

Intent: This section provides a standard procedure to recognize seasonal groundwater tables.

General: The two most widely recognized features that reflect prolonged wetness in soils when soil temperatures are above biologic zero are gleying and mottling. Simply described, gleyed soils are predominately neutral gray in color and occasionally greenish or bluish gray.

Continuous saturated soils: In gleyed soils, the distinctive colors result from a process known as gleization. Prolonged saturation of mineral soil converts iron from its oxidized (ferric) form to its reduced (ferrous) state. Soils that are always saturated are uniformly gleyed throughout the saturated zone. These soils often show evidence of oxidizing conditions only along root channels.

Alternately saturated and aerated: Soils that are alternately saturated and aerated during the year are usually mottled in part of the soil that is seasonally wet. Mottles are spots or blotches of different colors or shades of colors interspersed with the dominant (matrix) color. The abundance, size and color of the mottles usually reflect the duration of the saturation period. Mineral soils

predominantly grayish with brown or yellow with gray mottles are saturated for shorter periods. Mineral soils that are never saturated are usually bright colored and are not usually mottled.

Recognition criteria: Criteria for the recognition of seasonal groundwater table shall include, but not be limited to any soil horizon within or below a soil profile that exhibits common drainage mottling, shall be considered a seasonal groundwater table. The upper limit of the seasonal groundwater table shall be determined by one of the following means:

Common mottling: The highest level at which common drainage mottling is observed.

M. Disturbed Ground

Intent: This section provides a standard procedure to recognize disturbed ground.

General: When placement of a disposal field is proposed in an area of disturbed ground, the type and depth to the most limiting soil horizons as well as a variety of additional factors must be considered. Types of soil disturbance include, but are not limited to, filled areas, excavated areas, re-graded areas, artificially drained areas and pre-existing disposal fields.

Recognition criteria: A site shall be considered disturbed ground when any of the following conditions are present:

Displaced or man-made objects: Displaced or man-made objects, such as tree stumps, branches, plant stems, leaves, building debris or trash of man-made origin, are observed below the ground surface in the profile pits.

Unexplained soil horizons: Soil horizons are absent or mixed in a manner that cannot be explained as a result of natural processes.

Buried "A" or "O" horizons: Observation holes reveal A-horizons or O-horizons that are buried by layers of soil or other material. (Note: Natural buried soil horizons may occur.)

Mounds or depressions: Mounded areas or depressions in the land surface are observed that do not conform with the surrounding topography and that show signs of recent disturbance such as lack of vegetation, weedy vegetation, severe erosion, wheel ruts, etc.

Subsurface drains: Subsurface drains or their remnants are observed in profile pits or in the outlets of drains are observed at the surface.

Disposal systems: Components of an existing disposal system, or remnants of an abandoned disposal system are present below the site of a proposed first time disposal system.

Determination of the pre-existing natural ground surface: When evidence is found that the surface of the ground may have been modified by a disturbance such as addition of fill material, removal

of soil horizons or regrading, the pre-existing natural ground surface shall be identified based on the following criteria:

Buried "A" or "O" horizons: When a buried A-horizon or O-horizon is present, the pre-existing natural ground surface shall be taken as the top of the A-horizon or the bottom of the O-horizon.

Extrapolation: When a buried A-horizon or O-horizon is not present, the level of the pre-existing natural ground surface shall be determined by extrapolation from adjacent areas beyond the limit of soil disturbance. When this method is relied upon, the nature of the pre-existing topography as well as the nature of the ground disturbance shall be described, using topographic contour maps and soil profiles where appropriate.

Suitability of disturbed ground: In cases where disturbed soil or other fill material are present at the site, the suitability of this material shall be evaluated based upon the following criteria and characteristics, fill or disturbed soils must be relatively free of foreign materials and may contain only trace amounts of the following materials or any other materials that are subject to disintegration or change in volume in order to be considered suitable: tree stumps, plant stems, leaves, food or animal remains or wastes, wood chips, sawdust or any organic materials that may be subject to decay; trash, discarded furniture, buildings or demolition debris or any bulky objects containing large voids or subject to collapse or reorientation; or cans, bottles, drums or any containers that are empty or filled with liquids.

Existing subsurface groundwater drains: Ground containing subsurface groundwater drainage systems or the remnants of abandoned subsurface groundwater drainage systems is unsuitable for the installation of a disposal field, unless the groundwater drains are removed, the outlets of the groundwater drainage system are permanently sealed, or adequate separation can be maintained.

N. Soil Color

Intent: To provide a standard procedure for the evaluation of soil colors.

General: Soil colors often reveal much about a soil's wetness. Site evaluators examining the soil shall report the approximate soil color in accordance with the Munsell soil color chart. The standardized Munsell soil colors are identified by three components: hue, value and chroma. The hue is related to one of the main spectral colors: red, yellow, green, blue or purple, or various mixtures of these principal colors. The value refers to the degree of lightness, while the chroma notation indicated the color strength or purity. In the Munsell soil color book, each hue has its own page, each of which is further subdivided into units of value (on the vertical axis) and chroma (on the horizontal axis). Because accurate reproductions of soil colors are expensive, the Munsell soil color book contains a limited number of hues, values and chromas. The soil matrix or mottle colors are determined by comparing the soil with individual color chips in the soil color book.

Recognition criteria: Color is best determined in soils that are or have been moistened. The colors of the topsoil are valuable in determining the drainage condition of a site.

Gleying: Gleying (bluish, greenish, or grayish colors) immediately below the A-horizon is an indication of a saturated soil. Gleying can occur in both mottled and unmottled soils. Gleyed soil conditions can be determined by using the gley page of the "Munsell Soil Color Charts" (Caution: Gleyed conditions normally extend throughout saturated soils. Beware of soils with gray E-horizons due to leaching and not to saturation; these latter soils can often be recognized by bright-colored layers below the E-horizon.

Matrix chromas of two or less: Matrix chromas of two or less are considered low chromas and are often diagnostic of soils saturated for long periods. They are used to establish water tables.

Iron and manganese concretions: During the oxidation-reduction process, iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses. Manganese concretions are usually black or dark brown, while iron concretions are usually yellow, orange or reddish brown.

Sandy and gravelly soils: Soil color in saturated sandy soils may not follow the color patterns just described.

Bright colored mottles and a low chroma matrix: Soils that have brightly colored mottles and a low chroma matrix are indicative of alternating saturated and unsaturated soil conditions.