NACTA
COLLEGIATE SOILS CONTEST
2008
FOUR YEAR DIVISION

SCORE CARD INSTRUCTIONS

The scorecard consists of four parts: I. Soil Morphology; II. Site and Soil Characteristics; III. Interpretations and IV. Soil Classification. *The Soil Survey Manual*, United States Department of Agriculture Handbook No. 18, 1993; *Soil Taxonomy*, Second Edition, 1999; and *Keys to Soil Taxonomy*, current edition, will be used as guides. Any significant deviations from these references for a contest will be noted in separate correspondence.

I. SOIL MORPHOLOGY - For a complete list of acceptable abbreviations, for use in parts A through E of this section, see Attachment 1. These abbreviations must be used. Any other abbreviations will be marked incorrect. If no entry is needed for any box on the front of the scorecard, it must be marked with a dash "-" and not left blank. Blank boxes will be marked incorrect.

A. HORIZONATION - The official list for standard horizon designations and conventions is found in Chapter 3 of the *Soil Survey Manual*. It is also listed in the latest edition *Keys to Soil Taxonomy*.

1. Master Horizon Columns

a. Parent Material Column - Arabic numerals (e.g. 2,3, etc.) indicate lithologic discontinuities and the prime use for horizons having otherwise identical designations, should be placed in the first column. For contest purposes, discontinuity symbols will be used not only for different geologic materials but also when there are materials of strongly contrasting particle size classes, as described in *Soil Taxonomy*. The "l" for first parent material is understood and should not be entered. Enter a dash "-" instead.

b. Letter Column - Enter the appropriate master horizon designation, i.e., A, E, B, C or R, or combinations of these letters indicating transitional or combination horizons (e.g. AB, BA, E/B, etc).

2. Subordinate Distinction Column - Enter the subordinate distinction(s) of the master horizon. For contest purposes, be familiar with the following subordinate distinctions:

b - buried genetic horizon. Do not use if there is less than 50 cm. of newer soil material. Do not use with C horizons
d – physical root restriction, dense glacial till

g - Strong gleying produced by wetness and reduction
k - accumulation of carbonates
p - tillage or other disturbance
r - weathered or soft bedrock
ss - presence of slickensides
s - accumulations of sesquioxides (Fe and Al) and organic matter
t - accumulations of silicate clay
w – weak development or changes in color or structure
x – fragipan character
y - accumulation of gypsum
z - accumulation of salts more soluble than gypsum
The conventions for ordering multiple subordinate distinctions will be waived for the contest, i.e. Btk = Bkt.

3. Vertical Sequence Number Column - Enter Arabic numerals whenever a horizon identified by a single combination of master and subordinate distinction letters needs to be subdivided. All master and subscript letters must be the same. (i.e. Btkl - Btk2 is correct; Btkl - Btky2 is incorrect; Btkl - 2Btk2 is correct).

4. Lower Depth Column - In order for the students and judges to have a common base, the following guidelines will be used. From four to six horizons will be described within a specified depth. The contestant should determine the depth in cm. from the soil surface to the lower boundary of each horizon. Thus, for a Btl that occurs between 23 and 37 cm. below the surface, the contestant should enter 37 in the Lower Depth Column.

Contest officials will place a blue marker somewhere in the third horizon. Unless otherwise noted on the Site Card, no horizon less than eight cm. thick (no matter how contrasting) will be described. If the Site Card does not indicate a horizon thinner than eight cm. is present and one occurs in the profile, combine it with the adjoining horizon that is most similar. When two horizons combine to a total thickness of eight cm. or more, always describe the properties of the thicker horizon.

Depth measurements should be made in the control zone. The allowed range for answers will depend on the distinctness, and to a lesser degree, the topography of the boundary, as determined by the judges.

If a lithic or paralithic contact occurs anywhere in the exposed control zone (within 150 cm. of the soil surface), it must be considered in answering topics in Part II including: Effective Soil Depth, Permeability and Water Retention Difference, as well as in any rating charts used in Part III. This is true even if the contact is at, or below, the specified description depth, and is not an actual horizon in the contest profile description. If such a situation arises, assume your last horizon's properties

extend to the contact. Be sure to note the contact depth, while in the pit, even if it is below the description depth.

If the contact is within the specified description depth, it should be described as one of your horizons, and the appropriate nomenclature applied (i.e. Cr or R). Morphological features need not be recorded for Cr or R horizons. If they are, graders will ignore them and no points will be deducted.

5. Distinctness of Boundary Column - The distinctness of each horizon boundary is to be evaluated.

The distinctness of the lower boundary of the last horizon is not to be determined. Enter a dash "-" in the box on the scorecard.

The topography, or shape, of the boundaries will not be directly considered, but it could influence contest officials.

As a guide, the following system will relate lower depth and distinctness of boundary. When scoring answers for the lower depth there is an adjustment for the distinctness of the boundary. For full credit the lower depth must be within the following ranges for each of the distinctness of boundary classes.

Distinctness	Abbreviation	Lower Depth Range From Official Description
Abrupt	A	± 1 cm.
Clear	C	± 3 cm.
Gradual	G	± 8 cm.
Diffuse	D	± 15 cm.

Contest officials may modify this method of determining full credit on a given site.

B. TEXTURE

1 and 2. Sand and Clay Columns - Estimates of percent sand and percent clay should be made for each horizon, and entered in the appropriate columns. Answers within plus or minus five of the actual values will be given full credit. Partial credit may be given at the discretion of the contest officials. Actual contents of sand and clay will be determined by laboratory analysis on selected horizons. These estimates will also be used as "tie breakers" in scoring.

3. Coarse Fragment Column - Modification of textural classes is made in the Coarse Fragment Column when the soil contains more than 15 percent, by volume, coarse fragments. For the purposes of this contest, the following modifiers will be used when the volume of rock fragments is between 15 and 35 percent.

Coarse Fragment	Abbreviation	Size	Example
Gravelly	GR	0.2 – 7.6 cm.	Very coarse sand to apple size
Cobbly *(includes stones and boulders)*	CB	7.6 – 25 cm. and larger	Apple to large cantaloupe size and larger
Channery	CH	0.2 – 15 cm.	Long and flat; up to size of a hand
Flaggy *(includes stones and boulders)*	FL	15 – 38 cm. and larger	Long and flat, hand to length of a forearm and larger

If the volume of coarse fragments is between 35 and 60%, prefix the appropriate modifier with the word "very." If the volume is greater than 60%, use the prefix "extremely." Enter the correct abbreviation from Attachment 1 for the coarse fragment modifier in the Coarse Fragment Column. Do not enter percent values for coarse fragments. If coarse fragment modifiers are not needed, enter a dash in the space on the scorecard.

4. Class Column - The textural class for the less than 2 mm. fraction of each horizon is to be entered in the Class Column. Any deviation from the standard nomenclature (e.g., silty loam or loamy clay) will be incorrect. Acceptable abbreviations are given in Attachment 1. For sand, loamy sand, and sandy loam textures, modifiers must be used if needed (i.e., very fine, fine, or coarse).

C. COLOR - Designate moist color using Munsell color book notation according to the columns on the scorecard for **Hue**, **Value** and **Chroma**. Color names will not be accepted. Partial credit may, at the discretion of the judges, be given for colors close to the official answers. In the case of surface horizons, determine color on crushed samples. The color recorded for any other horizon, including a mottled horizon, should be the dominant color.

D. STRUCTURE - Record the dominant **Grade** and **Shape** of structure for the horizon. If different kinds of structure are present in a horizon, give the shape and grade of the structure that is most common. If the most common structure is compound (one kind breaking to another), describe the one having the stronger grade. If the structural peds are of equal grade then enter the shape and grade of the larger peds. If the horizon has no structural arrangement, use structureless and enter a zero “0” in the grade column and single grained or massive in the shape column.

The following abbreviations will be accepted:

Grade	Abbreviation
Structureless	0
Weak	1
Moderate	2
Strong	3

Shape	Abbreviation
Granular	GR
Platy	PL
Prismatic	PR
Columnar	CO
Angular blocky	ABK
Subangular blocky	SBK
Massive	MA
Single Grained	SGR

E. CONSISTENCY - Soil strength at field moisture capacity (moist consistency) should be determined on samples from each horizon. Moist consistency classes and abbreviations are as follows:

Consistency	Abbreviation
Loose	L
Very Friable	VFR
Friable	FR
Firm	FI
Very Firm	VFI
Extremely Firm	EFI

F. MOTTLES - Give the **Abundance** and **Contrast** of any mottles that are present. For this contest, mottles will be considered as subdominant colors (high or low chroma) in ped interiors, or on ped surfaces that are the result of oxidation-reduction. The following features will not be considered mottles: clay skins, skeletans, or other ped coatings, concretions, nodules, krotovinas, rock fragment colors, roots, and mechanical mixtures of horizons, such as B materials in an Ap horizon.

If there are mottles of more than one color, use the most abundant kind in making abundance and contrast determinations. If bi-colored mottles are equally abundant, then use the most contrasting one. If no mottles are present, then enter a dash "-" in both boxes. For all contrast determinations, compare the mottle color to the dominant color that you determined in part C.

The judges will use the following guidelines and abbreviations for mottles. Enter abbreviations only on scorecard.

Abundance	Abbreviation	Amount
Few	F	< 2%
Common	C	2 – 20%
Many	M	> 20%

Contrast	Abbreviation	Required Differences in Munsell Units	
		Hue	Value Chroma
Faint	F	0	≤ 2 and ≤ 1
Distinct	D	0	3 to 4 or 2 to 4
		1	≤ 2 and ≤ 1
Prominent	P	0	> 4 or > 4
		1	> 2 or > 1
		2	≥ 0 or ≥ 0

II. SITE AND SOIL CHARACTERISTICS

A. LOCAL LANDFORM - Select the local landform of the site from the choices on the scorecard. In a situation where two parent materials are present, the landform will be selected on the basis of the process that controls the shape of the landscape. In most cases, this will be the lower parent material. Only one landform is to be identified at each site. Select the one that best describes the situation. Dual or partial credit may be awarded.

a. **Local Landforms**

Floodplain - Land bordering on an active stream, builds up sediment from overflow of a stream. Although flooding may or may not occur frequently, this landform is subject to inundation, when the stream is at flood stage. The parent material is alluvium.

Stream terrace - A landform in a stream or river valley, below the upland and above the current floodplain, consisting of a nearly level surface, and hill slope leading downward from the surface.

Upland – A landform reserved for soils developed on residuum. There may be a surface deposit such as loess but the shape of the overall landscape is controlled by bedrock. The major factor sculpting the land is running water and erosion. The parent material is residuum.

B. PARENT MATERIAL - Mark the appropriate parent material(s) found in the soil on the scorecard. At least 25 cm. of a parent material must be present to be recognized as a separate parent material. If more than one parent material is present record all of them with an Arabic number on the front of the scorecard and mark the type of parent material(s) found on the parent material section on the back of the scorecard. Parent materials, like soils, do not always lend themselves to easy classification, so the contest officials may need to take the complexity of the situation into account in scoring alternative interpretations. The following are definitions of parent materials.

Alluvium - Unconsolidated sediments that have been deposited by streams in floodplains. Stratification in alluvium may, or may not be evident. Soil formation is limited to no more than some development of soil structure, and this is not always present.

Old Alluvium – parent material for stream terraces.

Residuum – the unconsolidated and partially weathered mineral materials accumulated by disintegration of bedrock including depressions and sinkholes in karst areas. This material has been thought to be weathered in place, but some interpretations would call for significant movement prior to the onset of soil formation.

C. SLOPE - Stakes will be located at each site, indicating where slope is to be determined. The slope ranges and classes are listed on the scorecard. Each contestant should have an instrument to measure slope. Contestants must measure the actual slope between the stakes, regardless of height.

D. DEGREE OF EROSION - Degree of previous erosion will be judged according to the guidelines below.

None to slightly eroded (Class 1) - The plow layer exhibits characteristics of the A and/or E horizon, and has less than 25 percent of B horizon mixed into the plow layer. If the soil has not been plowed, assume none to slightly eroded.

Moderately eroded (Class2) - The plow layer exhibits characteristics of both the A and underlying B horizons. It contains 25 to 75 percent of the original A and/or E horizon. The remainder of the plow layer is derived from underlying B horizon material.

Severely eroded (Class 3) - The plow layer has lost more than 75 percent of the original A and E material, but some remains. The remainder of the surface is made up of underlying B horizon material.

Very severely eroded (Class 4) - The plow layer has lost all of the original A and E material. The current plow layer is entirely made up of the underlying B horizon material.

Deposition - A surface accumulation of 30 to 50 cm. of "recent" mineral material that has been deposited on the original soil. The surface material usually has a different texture and/or color, from that directly underneath it. If the "recent" deposit is 50 cm. thick, or greater, it is considered a new profile, and none to slightly eroded should be checked.

E. SURFACE RUNOFF - Runoff is the water that flows over the surface of the soil, without infiltrating. Soil characteristics, management practices, climatic factors, vegetative cover, and topography determine the rate and amount of runoff. In this contest, six runoff classes will be used. Correct answers will consider the combined effects of hydraulic conductivity of the surface and slope on runoff rate. For contest purposes, vegetation is not considered. Treat each site as if it were a plowed field. The following guidelines will be used:

Slope	**Hydraulic Conductivity of the Surface Horizon**		
High	**Moderate**		**Low**
concave	negligible	negligible	negligible
< 1%	negligible	low	medium
1 - 4.9%	very low	medium	high
5 – 20%	low	high	very high
> 20%	medium	very high	very high

F. NATURAL SOIL DRAINAGE CLASS - In this contest, only four drainage classes will be used: Well Drained, Moderately Well Drained, Somewhat Poorly Drained and Poorly Drained. For contest purposes, both Excessively and Somewhat Excessively are included with the Well Drained class, and Very Poorly Drained is included in the Poorly Drained class.

Excessively Drained-Water is removed very rapidly. The soils are usually coarse-textured and have very high hydraulic conductivity, or are very shallow. Include this class with Well Drained.

Somewhat Excessively Drained-Water is removed from the soil rapidly. The soils are usually coarse-textured, and have high-saturated hydraulic conductivity, or are very shallow. Include this class with Well Drained.

Well Drained - Water is removed from the soil readily, but not rapidly. Water is available to plants throughout the growing season. Wetness does not inhibit root growth for significant periods. These soils are free of wetness features (gray mottles) above 100 cm.

Moderately Well Drained - Water is removed from the soil somewhat slowly during some periods of the year, but not rapidly. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic plants are affected. These soils have features that are related to wetness (gray mottles) at a depth between 50 and 100 cm.

Somewhat Poorly Drained - Water is removed slowly, so that the soil is wet at a shallow depth for significant periods, during the growing season. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. These soils have wetness features (gray mottles) at a depth above 50 cm. but the dominant color of the soil to 50 cm. is brown.

Poorly Drained - Water is removed so slowly that the soil is wet at a shallow depth periodically during the growing season, during much of the growing season, or remains wet for long periods. Free water is common at or near the surface for long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. This soil is not continuously wet directly below the plow layer. These soils have wetness features (gray mottles) at a depth above 50 cm. and the dominant color of the soil to 50 cm. is gray.

Very Poorly Drained - Water is removed from the soil so slowly that free water remains at, or near, the ground surface during much of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Include this class with Poorly Drained

G. EFFECTIVE SOIL DEPTH - For this contest, effective soil depth is considered to be the depth of soil to a root limiting layer, as defined in *Soil Taxonomy* (i.e. duripan, fragipan, petrocalcic, lithic, or paralithic contact). The various depth classes are listed on the scorecard. Refer to the Lower Depth Column discussion for the handling of lithic or paralithic contacts below judging depth.

H and I. HYDRAULIC CONDUCTIVITY - In this contest, we will estimate the hydraulic conductivity of the surface horizon and the most limiting horizon. As previously discussed under the Lower Depth Column, consider a lithic or paralithic contact, regardless of whether or not it is within the specified judging depth. In this contest, such a contact will be considered to have very low

permeability. We will consider primarily texture, as it is the soil characteristic that exerts the greatest control on permeability.

We will combine very low, and low into the **Low** class; moderately low, moderate and moderately high into the **Moderate** class; and high and very high into the **High** class.

The seven general permeability classes will relate to texture according to NRCS as:

Class	μm/sec	Textures
Very low	0.00 – 0.42	R, Cr, Cd, Fragipan or Natric horizons
Low	0.42 – 1.41	Sandy clay, silty clay or clay
Moderately low	1.41 - 4.23	Silty clay loam, clay loam or sandy clay loam
Moderate	4.23 – 14.11	Very fine sandy loam, loam, silt loam, silt
Moderately high	14.11 – 42.34	Sandy loams except very fine sandy loam
High	42.34 – 141.14	Sand, except coarse sand, or loamy sand
Very high	> 141.14	Coarse sand

J. WATER RETENTION DIFFERENCE - Water retention difference refers to the amount of water, in cm., a soil is capable of holding within the upper 1.5 m., or above a lithic or paralithic contact, whichever is shallower. We will use the following four classes as listed on the scorecard.

Class	Cm. of water
Very low	< 7.5
Low	7.5 – 14.9
Moderate	15.0 – 22.5
High	> 22.5

Texture is an important factor influencing moisture retention, and the following estimated relationships will be used:

cm. water / cm. soil	**Textures**
0.05	Sand, loamy coarse sand, loamy sand
0.10	Loamy fine sand, loamy very fine sand, coarse sandy loam
0.15	Sandy loam, fine sandy loam, sandy clay loam, sandy clay, clay and silty

	clay
0.20	Very fine sandy loam, loam, silt loam, silt, silty clay loam, clay loam

For the lithic or paralithic contact, you are to assume that no water retention occurs below the contact. If the contact is below the specified judging depth, but above 1.5 m., assume that the properties of the lowest horizon extend to the contact for water retention calculations. If a profile is not exposed to 1.5 m. and no lithic or paralithic contact is visible, assume the properties of the lowest horizon extend to 1.5 m.

Coarse fragments are considered to have negligible (assume zero) moisture retention; as a consequence it is necessary to adjust the moisture estimates accordingly. An adjustment however is made only for coarse fragment content of 15 percent or greater.

For fragipans and dense glacial till the moisture storage is considered one-half of the normal for the fragipan or dense till and any lower horizons.

Below is an example of a moisture calculation using these rules. Soil profile description is for illustration.

Soil Profile Description			
Horizon	**Lower Depth (cm.)**	**Texture**	**Coarse Fragments**
Ap	0 –18	L	2% gravel
A	18 - 27	GRCL	15% gravel
Bt1	27 – 40	GRCL	20% gravel
Bt2	40 – 75	C	10% gravel
Btx	75 – 99	CL	5% gravel
BC	99 – 140	VGRCL	55% gravel
Cr	150 cm.+		Weathered limestone

Water Retention Calculations		
Horizon	**Depth x Moisture x Adjustment Factors**	**Water Retention**
Ap	18 cm. x 0.20 cm/cm	3.60 cm.
A	9 cm. x 0.20 cm/cm x 0.85*	1.53 cm.
Bt1	13 cm. x 0.20 cm/cm x 0.80*	2.08 cm.
Bt2	35 cm. x 0.15 cm/cm	5.25 cm.
Btx	24 cm. x 0.20 cm/cm x 0.50**	2.40 cm.
BC	41 cm x 0.20 cm/cm x 0.45* x 0.50**	1.84 cm.
Cr	10 cm x 0.00 cm/cm***	0.00 cm.

** correction for the volume of coarse fragments above 15%* *** correction for Fragipan* **** correction for bedrock*	**16.70 cm = moderate**

III. SOIL INTERPRETATIONS

A. Roadfill – The guidelines for the suitability of a soil for Roadfill are contained in Attachment 2.

B. Septic Tank Absorption Fields - The guidelines for the suitability of a soil for Septic Tank Absorption Fields are contained in Attachment 2.

C. Sewage Lagoons - The guidelines for the suitability of a soil for Sewage Lagoons are contained in Attachment 2.

Guidelines in Attachment 2 for suitability of soils for Roadfill, Septic Tank Absorption Fields, and Sewage Lagoons are adapted from the *National Soils Handbook* of the Natural Resources Conservation Service. Contestants will be supplied with these rating tables.

Where depths are critical they are taken from the control zone. The soil properties, and their restrictive features are listed in descending order of importance on the tables in Attachment 2. On the scorecard, check the most severe limitation, or worst suitability, and list the first restrictive feature that gives the soil that rating. This is the one that is closest to the top of the table.

When soil has only slight or good ratings on the table, check slight or good, and list "none" for the restrictive feature.

When two or more properties give a soil the same rating (i.e., moderate-flooding and moderate-wetness), list as the restrictive feature the one that is closest to the top of the table. A severe (or poor) rating always takes precedence over a moderate (or fair) one.

IV. SOIL CLASSIFICATION

A. Epipedon – Select the appropriate epipedon and place an X in the proper blank. Definitions are given in *Soil Taxonomy*. There can be only one answer for epipedon.

Unless otherwise given organic carbon data at a specific site, color will serve as a substitute for organic carbon. A horizon that has mollic colors is assumed to have >0.6% organic carbon. Unless otherwise noted, the base saturation of epipedons with mollic colors will be assumed to be >50% in the epipedon and in all lower horizons.

B. Subsurface Horizon/Feature – Select the appropriate subsurface horizons or features. Select all that are appropriate for the soil profile. Definitions are given in *Soil Taxonomy*. Unless otherwise noted, an argillic horizon is assumed to have a base saturation of >35 percent.

B. Order - Indicate the order of the soil profile by placing an X in the proper blank. The key to the Soil Order classification is given in *Soil Taxonomy*.

ATTACHMENT 1

ABBREVIATIONS FOR SOIL MORPHOLOGY

Distinctness of Boundary:

Abrupt =A Clear=C Gradual=G Diffuse=D

Textural Classes:

Coarse sand = COS Sandy clay loam = SCL
Sand = S Loam = L
Fine sand = FS Clay loam = CL
Very fine sand = VFS Silt = SI
Loamy coarse sand = LCOS Silt loam = SIL
Loamy sand = LS Silty clay loam = SICL
Loamy fine sand = LFS Silty clay = SIC
Loamy very fine sand = LVFS Sandy clay = SC
Coarse sandy loam = COSL Clay = C
Sandy loam = SL
Fine sandy loam = FSL
Very fine sandy loam = VFSL

Coarse Fragments:

Gravelly = GR Channery = CH
Very gravelly = VGR Very channery = VCH
Extremely gravelly = EGR Extremely channery = ECH
Cobbly = CB Flaggy = FL
Very cobbly = VCB Very flaggy = VFL
Extremely cobbly = ECB Extremely flaggy = EFL

Structure, Grade:

Structureless = 0 Weak = 1 Moderate = 2 Strong = 3

Structure, Shape

Granular = GR Angular blocky = ABK
Platy = PL Subangular blocky = SBK
Prismatic = PR Single grain = SGR
Columnar = CPR Massive = MA

Consistence

Loose = L Firm = FI
Very Friable = VFR Very Firm = VFI
Friable = FR Extremely Firm = EFI

Mottles:

Abundance Few <2% = F Contrast Faint = F
Common 2-20% = C Distinct = D
Many >20% = M Prominent = P

ATTACHMENT 2

NACTA Rating Guide for **ROADFILL**

Property	Good	Fair	Poor	Feature
Depth to bedrock	> 150 cm.	100 -150 cm.	< 100 cm.	Depth to Rock
Depth to cemented pan	> 150 cm.	100 – 150 cm.	< 100 cm.	Cemented Pan
Shrink Swell	< 8 cm. clay	8 – 16 cm. clay	> 16 cm. clay	Shrink Swell
Texture (avg. 25 – 100 cm.)	S, LS, SL	L, SCL	all others	Low Strength
% >8 cm. stones, 0 to 40 cm.	< 25%	25 – 50%	> 50%	Large Stones
Depth to high water table	> 90 cm.	30 – 90 cm.	< 30 cm.	Wetness
Slope	< 15%	15 – 25%	> 25%	Slope

NACTA Rating Guide for **SEPTIC TANK ADSORPTION FIELDS**

Property	Slight	Moderate	Severe	Feature
Flooding	none	rare	freq. / occas.	Flooding
Depth to bedrock	> 180 cm.	100 – 180 cm.	< 100 cm.	Depth to Rock
Depth to cemented pan	> 180 cm.	100 – 180 cm.	< 100 cm.	Cemented Pan
Ponding	no	-------	yes	Ponding
Depth to high water table	> 180 cm.	120 – 180 cm.	< 120 cm.	Wetness
Permeability (60 – 150 cm.)	S, LS, SL	SCL, L, SIL, SI	all others	Percs Slowly
Permeability (60 – 150 cm.)	all others	------	S, LS	Poor Filter
Slope	< 8%	8 – 15%	> 15%	Slope
% > 8 cm. stones, 0 to 40 cm.	< 25%	25 – 50%	> 50%	Large Stones

NACTA Rating Guide for **SEWAGE LAGOONS**

Property	Slight	Moderate	Severe	Feature
Permeability (30 – 150 cm.)	all others	SCL, L, SIL, SI	S, LS, SL	Seepage
Depth to bedrock	> 150 cm.	100 – 150 cm.	< 100 cm.	Depth to Rock
Depth to cemented pan	> 150 cm.	100 – 150 cm.	< 100 cm.	Cemented Pan
Flooding	none, rare	------	occas., freq.	Flooding
Slope	< 2%	2 – 7%	> 7%	Slope
Ponding	no	------	yes	Ponding
Depth to high water table	> 150 cm.	110 – 150 cm.	< 110 cm.	Wetness
% >8 cm. stones, 0 to 40 cm.	< 20%	20 – 35%	> 35%	Large Stones