

# **NASIS GUIDEBOOK FOR VIRGINIA**



**VERSION 1.0**

**July 2001**

**Compiled by:  
Pamela Thomas  
Soil Scientist  
USDA-NRCS  
Richmond, VA 23229**

# POPULATING DATA

## For RUSLE2 (RV's)

Component name	Kf (Kw?)
Component percent	Hydrologic group
Total sand for surface horizon	Slope gradient
Total silt for surface horizon	Surface fragment cover
Total clay for surface horizon	T factor
Organic matter	

Notes:

The calculation "Particle Size Estimator" will provide values for Total Sand and Total Silt.

## For WEPS (RV's for each horizon)

Slope gradient	15 bar water
Total sand	Ksat
Total clay	Dry soil albedo for surface horizon
1/3 bar or 1/10 bar bulk density	Organic matter content
Oven dry bulk density	1:1 H <sub>2</sub> O pH
Rock fragments by volume	CEC7 and ECEC
Coarse sand	Taxonomic order
Medium sand	
Fine sand	
Very fine sand	

Notes:

1. The calculation "Particle Size Estimator" will provide values for Very coarse sand, Coarse sand, Medium sand, Fine sand, and Very fine sand.
2. The calculation "Water Content" will provide values for Oven dry bulk density and 15 bar water.
3. Dry soil albedo (component table) is calculated by the formula:  
$$\text{Albedo} = (\text{Value} + 2)^2 / 100$$

e.g., For moist value of 5

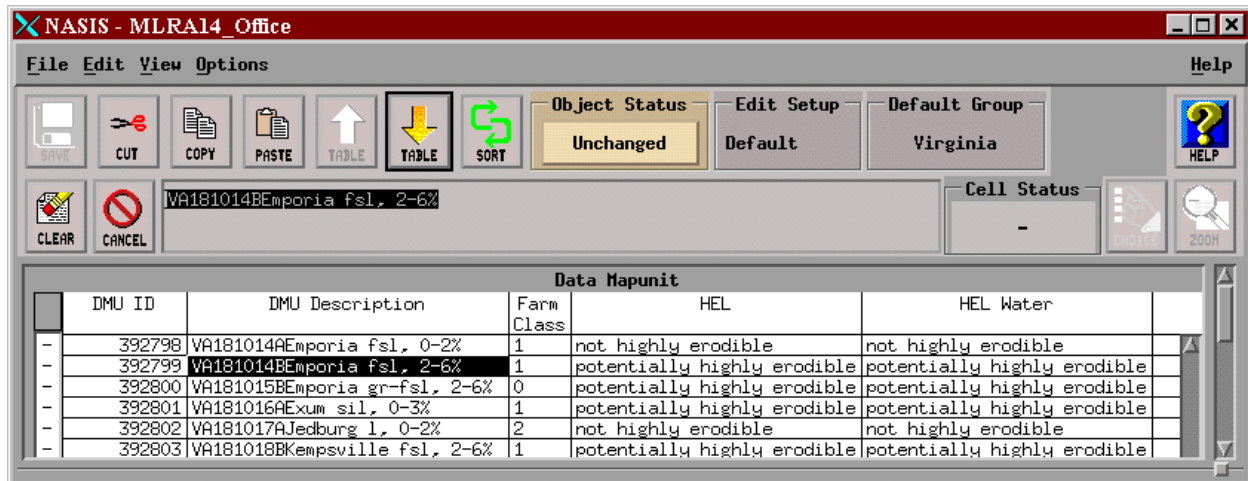
$$\text{Albedo} = (5+2)^2 / 100 = 0.49$$
4. CEC7 and ECEC can be estimated from clay content and mineralogy (see Appendix A; Excel spreadsheet with calculations available for to calculate CEC for other clay and organic matter percentage combinations).

## Other Data Elements

### DMU TABLE

Prime farmland

Highly erodible land



Data Mapunit						
	DMU ID	DMU Description	Farm Class	HEL	HEL Water	
-	392798	VA181014AEmporia fsl, 0-2%	1	not highly erodible	not highly erodible	
-	392799	VA181014BEmporia fsl, 2-6%	1	potentially highly erodible	potentially highly erodible	
-	392800	VA181015BEmporia gr-fsl, 2-6%	0	potentially highly erodible	potentially highly erodible	
-	392801	VA181016AExum sil, 0-3%	1	potentially highly erodible	potentially highly erodible	
-	392802	VA181017AJedburg 1, 0-2%	2	not highly erodible	not highly erodible	
-	392803	VA181018BKempville fsl, 2-6%	1	potentially highly erodible	potentially highly erodible	

### COMPONENT TABLE

Populate low, RV, and high cells where applicable

Major component (yes or no)

Component %

Slope gradient

T factor

WEI

WEG

Erosion class if applicable

Hydric condition if applicable

Drainage class

Elevation

Aspect if applicable

Albedo

Mean annual air temperature (MAAT)

Mean annual precipitation (MAP)

Frost-free days

Non-irrigated Land Capability Class

Non-Irrigated Land Capability Subclass

Frost action

Hydrologic group

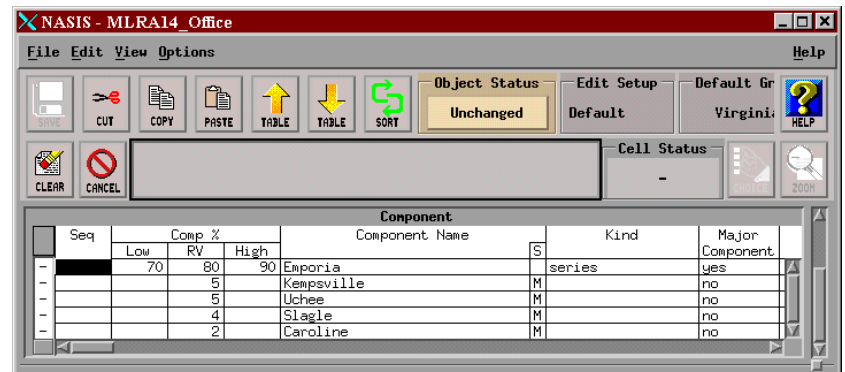
Corrosion steel

Corrosion concrete

All taxonomy cells as applicable

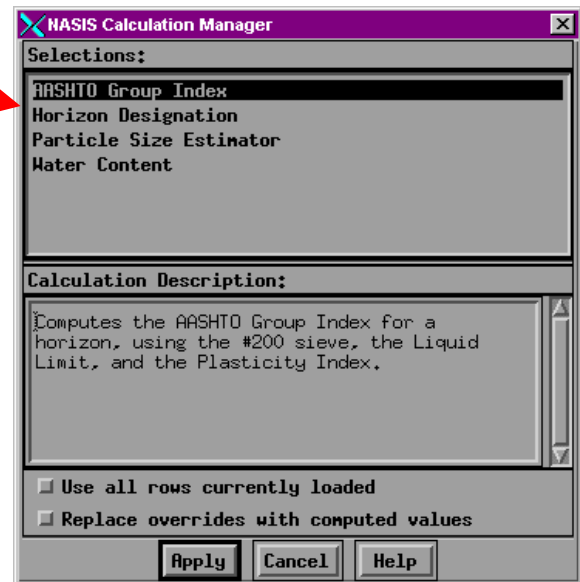
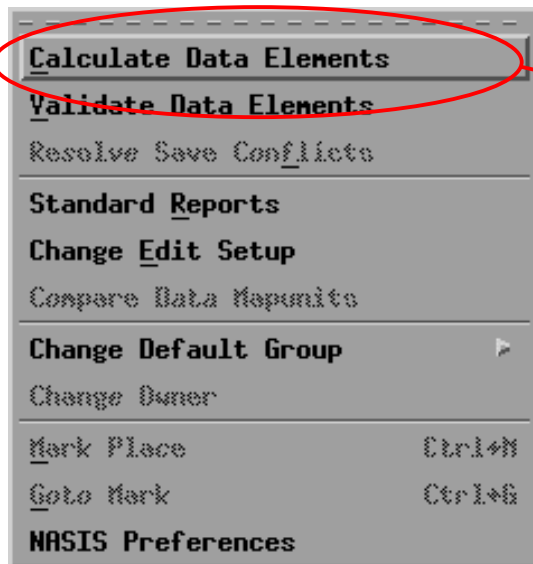
Keys to Soil Taxonomy used

VA Soil Management Group (Appendix B)

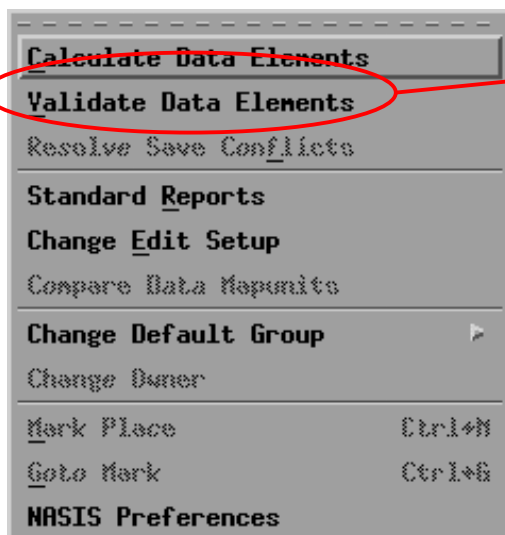


Seq	Comp %			Component Name	S	Kind	Major Component
	Low	RV	High				
-	70	80	90	Emporia		series	yes
-		5		Kempville	M		no
-		5		Uchee	M		no
-		4		Slagle	M		no
-		2		Caroline	M		no

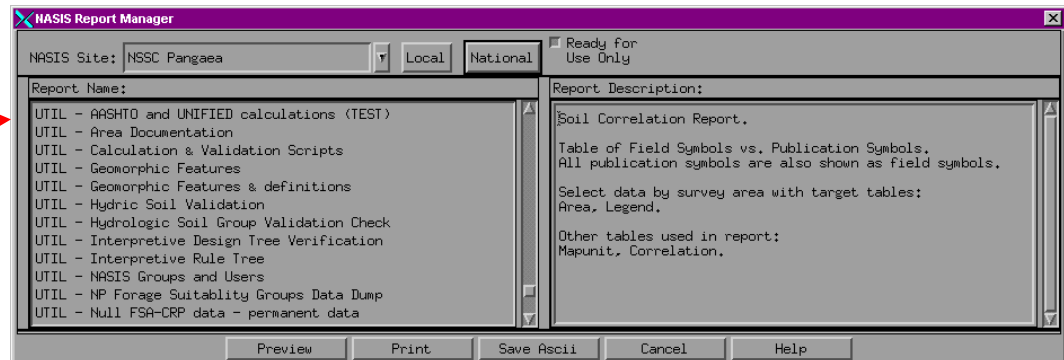
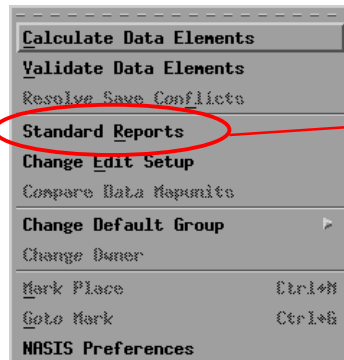
## CALCULATIONS



## VALIDATIONS



## VALIDATIONS AND CHECKS FROM STANDARD REPORTS



### NSSC PANGAEA

UTIL – various utility scripts

MUG – Map Unit Generator (best check for missing data)

### MO2

Atterburg calculations

### MO3

MUG – NV – Runoff calculations

MUG – Parent Material sorted by group name

SDQ – Kf and Kw comparison

### MO5

CHECK – Component

CHECK – Component Restrictions

### MO9

CHECK – Climate, Landscape, Parent Material by SSA

CHECK – Component frags on surface

CHECK – Component with Hydrologic Group

CHECK – Slopes by mapunit and component

CHECK – T Factor Check

KS - CHECK – Permeability sorted by map unit and component

### MO10

MN – NARSIS Elements for CRP

Manuscript Review (about 50 manuscript review reports)

### MO11

Check AWC

### MO13

CHECK – CEC Activity vs CEC and Clay Ration

CHECK – Runoff Class

CHECK – Excavation Class

### MO14

Hydric soils list (manuscript)

OR – Land capability

RUSLE factors

### MO15

CORR – MO15: Horizon Data Check (extensive check)

## APPENDIX A

### CEC 8.2, CEC7, and ECEC values based on mineralogy, % clay, and % organic matter

- NASIS only contains data elements for CEC7 and ECEC.
- Enter high, low, and RV based on % clay and % organic matter high, low, and RV values.
- CEC7 and ECEC allow only one decimal place.



# KAOLINITIC

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	0.7	0.5	0.4	5	1.5	1.1	0.8	5	2.3	1.6	1.2	5	3.1	2.2	1.6	5	3.9	2.7	2.1
6	0.9	0.6	0.4	6	1.7	1.2	0.9	6	2.5	1.7	1.3	6	3.3	2.3	1.7	6	4.1	2.8	2.1
7	1.0	0.7	0.5	7	1.8	1.3	1.0	7	2.6	1.8	1.4	7	3.4	2.4	1.8	7	4.2	2.9	2.2
8	1.1	0.8	0.6	8	1.9	1.4	1.0	8	2.8	1.9	1.4	8	3.6	2.5	1.9	8	4.4	3.0	2.3
9	1.3	0.9	0.7	9	2.1	1.5	1.1	9	2.9	2.0	1.5	9	3.7	2.6	1.9	9	4.5	3.1	2.4
10	1.4	1.0	0.8	10	2.2	1.6	1.2	10	3.0	2.1	1.6	10	3.8	2.7	2.0	10	4.6	3.2	2.4
11	1.6	1.1	0.8	11	2.4	1.7	1.2	11	3.2	2.2	1.7	11	4.0	2.8	2.1	11	4.8	3.3	2.5
12	1.7	1.2	0.9	12	2.5	1.8	1.3	12	3.3	2.3	1.7	12	4.1	2.9	2.2	12	4.9	3.4	2.6
13	1.9	1.3	1.0	13	2.7	1.9	1.4	13	3.5	2.4	1.8	13	4.3	3.0	2.2	13	5.1	3.5	2.7
14	2.0	1.4	1.0	14	2.8	2.0	1.5	14	3.6	2.5	1.9	14	4.4	3.1	2.3	14	5.2	3.6	2.7
15	2.1	1.5	1.1	15	2.9	2.1	1.6	15	3.8	2.6	2.0	15	4.6	3.2	2.4	15	5.4	3.7	2.8
16	2.3	1.6	1.2	16	3.1	2.2	1.6	16	3.9	2.7	2.0	16	4.7	3.3	2.5	16	5.5	3.8	2.9
17	2.4	1.7	1.3	17	3.2	2.3	1.7	17	4.0	2.8	2.1	17	4.8	3.4	2.5	17	5.6	3.9	3.0
18	2.6	1.8	1.4	18	3.4	2.4	1.8	18	4.2	2.9	2.2	18	5.0	3.5	2.6	18	5.8	4.0	3.0
19	2.7	1.9	1.4	19	3.5	2.5	1.8	19	4.3	3.0	2.3	19	5.1	3.6	2.7	19	5.9	4.1	3.1
20	2.9	2.0	1.5	20	3.7	2.6	1.9	20	4.5	3.1	2.3	20	5.3	3.7	2.8	20	6.1	4.2	3.2
21	3.0	2.1	1.6	21	3.8	2.7	2.0	21	4.6	3.2	2.4	21	5.4	3.8	2.8	21	6.2	4.3	3.3
22	3.1	2.2	1.6	22	3.9	2.8	2.1	22	4.8	3.3	2.5	22	5.6	3.9	2.9	22	6.4	4.4	3.3
23	3.3	2.3	1.7	23	4.1	2.9	2.2	23	4.9	3.4	2.6	23	5.7	4.0	3.0	23	6.5	4.5	3.4
24	3.4	2.4	1.8	24	4.2	3.0	2.2	24	5.0	3.5	2.6	24	5.8	4.1	3.1	24	6.6	4.6	3.5
25	3.6	2.5	1.3	25	4.4	3.1	2.3	25	5.2	3.6	2.7	25	6.0	4.2	3.1	25	6.8	4.7	3.6
26	3.7	2.6	1.9	26	4.5	3.2	2.4	26	5.3	3.7	2.8	26	6.1	4.3	3.2	26	6.9	4.8	3.6
27	3.9	2.7	2.0	27	4.7	3.3	2.4	27	5.5	3.8	2.9	27	6.3	4.4	3.3	27	7.1	4.9	3.7
28	4.0	2.8	2.1	28	4.8	3.4	2.5	28	5.6	3.9	3.0	28	6.4	4.5	3.4	28	7.2	5.0	3.8
29	4.1	2.9	2.2	29	4.9	3.5	2.6	29	5.8	4.0	3.0	29	6.6	4.6	3.4	29	7.4	5.1	3.9
30	4.3	3.0	2.2	30	5.1	3.6	2.7	30	5.9	4.1	3.1	30	6.7	4.7	3.5	30	7.5	5.2	3.9
31	4.4	3.1	2.3	31	5.2	3.7	2.8	31	6.0	4.2	3.2	31	6.8	4.8	3.6	31	7.6	5.3	4.0
32	4.6	3.2	2.4	32	5.4	3.8	2.8	32	6.2	4.3	3.2	32	7.0	4.9	3.7	32	7.8	5.4	4.1
33	4.7	3.3	2.5	33	5.5	3.9	2.9	33	6.3	4.4	3.3	33	7.1	5.0	3.7	33	7.9	5.5	4.2
34	4.9	3.4	2.6	34	5.7	4.0	3.0	34	6.5	4.5	3.4	34	7.3	5.1	3.8	34	8.1	5.6	4.2

# KAOLINITIC

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
35	5.0	3.5	2.6	35	5.8	4.1	3.0	35	6.6	4.6	3.5	35	7.4	5.2	3.9	35	8.2	5.7	4.3
36	5.1	3.6	2.7	36	6.0	4.2	3.1	36	6.8	4.7	3.5	36	7.6	5.3	4.0	36	8.4	5.8	4.4
37	5.3	3.7	2.8	37	6.1	4.3	3.2	37	6.9	4.8	3.6	37	7.7	5.4	4.0	37	8.5	5.9	4.5
38	5.4	3.8	2.8	38	6.2	4.4	3.3	38	7.0	4.9	3.7	38	7.8	5.5	4.1	38	8.6	6.0	4.5
39	5.6	3.9	2.9	39	6.4	4.5	3.4	39	7.2	5.0	3.8	39	8.0	5.6	4.2	39	8.8	6.1	4.6
40	5.7	4.0	3.0	40	6.5	4.6	3.4	40	7.3	5.1	3.8	40	8.1	5.7	4.3	40	8.9	6.2	4.7
41	5.9	4.1	3.1	41	6.7	4.7	3.5	41	7.5	5.2	3.9	41	8.3	5.8	4.3	41	9.1	6.3	4.8
42	6.0	4.2	3.2	42	6.8	4.8	3.6	42	7.6	5.3	4.0	42	8.4	5.9	4.4	42	9.2	6.4	4.8
43	6.1	4.3	3.2	43	7.0	4.9	3.6	43	7.8	5.4	4.1	43	8.6	6.0	4.5	43	9.4	6.5	4.9
44	6.3	4.4	3.3	44	7.1	5.0	3.7	44	7.9	5.5	4.1	44	8.7	6.1	4.6	44	9.5	6.6	5.0
45	6.4	4.5	3.4	45	7.2	5.1	3.8	45	8.0	5.6	4.2	45	8.8	6.2	4.6	45	9.6	6.7	5.1
46	6.6	4.6	3.4	46	7.4	5.2	3.9	46	8.2	5.7	4.3	46	9.0	6.3	4.7	46	9.8	6.8	5.1
47	6.7	4.7	3.5	47	7.5	5.3	4.0	47	8.3	5.8	4.4	47	9.1	6.4	4.8	47	9.9	6.9	5.2
48	6.9	4.8	3.6	48	7.7	5.4	4.0	48	8.5	5.9	4.4	48	9.3	6.5	4.9	48	10.1	7.0	5.3
49	7.0	4.9	3.7	49	7.8	5.5	4.1	49	8.6	6.0	4.5	49	9.4	6.6	4.9	49	10.2	7.1	5.4
50	7.1	5.0	3.8	50	8.0	5.6	4.2	50	8.8	6.1	4.6	50	9.6	6.7	5.0	50	10.4	7.2	5.4
51	7.3	5.1	3.8	51	8.1	5.7	4.2	51	8.9	6.2	4.7	51	9.7	6.8	5.1	51	10.5	7.3	5.5
52	7.4	5.2	3.9	52	8.2	5.8	4.3	52	9.0	6.3	4.7	52	9.8	6.9	5.2	52	10.6	7.4	5.6
53	7.6	5.3	4.0	53	8.4	5.9	4.4	53	9.2	6.4	4.8	53	10.0	7.0	5.2	53	10.8	7.5	5.7
54	7.7	5.4	4.0	54	8.5	6.0	4.5	54	9.3	6.5	4.9	54	10.1	7.1	5.3	54	10.9	7.6	5.7
55	7.9	5.5	4.1	55	8.7	6.1	4.6	55	9.5	6.6	5.0	55	10.3	7.2	5.4	55	11.1	7.7	5.8
56	8.0	5.6	4.2	56	8.8	6.2	4.6	56	9.6	6.7	5.0	56	10.4	7.3	5.5	56	11.2	7.8	5.9
57	8.1	5.7	4.3	57	9.0	6.3	4.7	57	9.8	6.8	5.1	57	10.6	7.4	5.5	57	11.4	7.9	6.0
58	8.3	5.8	4.4	58	9.1	6.4	4.8	58	9.9	6.9	5.2	58	10.7	7.5	5.6	58	11.5	8.0	6.0
59	8.4	5.9	4.4	59	9.2	6.5	4.8	59	10.0	7.0	5.3	59	10.8	7.6	5.7	59	11.6	8.1	6.1
60	8.6	6.0	4.5	60	9.4	6.6	4.9	60	10.2	7.1	5.3	60	11.0	7.7	5.8	60	11.8	8.2	6.2



## KAOLINITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	4.7	3.3	2.5	5	5.5	3.9	2.9	5	6.3	4.4	3.3	5	7.1	5.0	3.8	5	10.4	7.2	5.4
6	4.9	3.4	2.6	6	5.7	4.0	3.0	6	6.5	4.5	3.4	6	7.3	5.1	3.8	6	10.5	7.3	5.5
7	5.0	3.5	2.6	7	5.8	4.1	3.1	7	6.6	4.6	3.5	7	7.4	5.2	3.9	7	10.6	7.4	5.6
8	5.2	3.6	2.7	8	6.0	4.2	3.1	8	6.8	4.7	3.6	8	7.6	5.3	4.0	8	10.8	7.5	5.7
9	5.3	3.7	2.8	9	6.1	4.3	3.2	9	6.9	4.8	3.6	9	7.7	5.4	4.0	9	10.9	7.6	5.7
10	5.4	3.8	2.9	10	6.2	4.4	3.3	10	7.0	4.9	3.7	10	7.9	5.5	4.1	10	11.1	7.7	5.8
11	5.6	3.9	2.9	11	6.4	4.5	3.4	11	7.2	5.0	3.8	11	8.0	5.6	4.2	11	11.2	7.8	5.9
12	5.7	4.0	3.0	12	6.5	4.6	3.4	12	7.3	5.1	3.8	12	8.1	5.7	4.3	12	11.4	7.9	6.0
13	5.9	4.1	3.1	13	6.7	4.7	3.5	13	7.5	5.2	3.9	13	8.3	5.8	4.3	13	11.5	8.0	6.0
14	6.0	4.2	3.2	14	6.8	4.8	3.6	14	7.6	5.3	4.0	14	8.4	5.9	4.4	14	11.6	8.1	6.1
15	6.2	4.3	3.2	15	7.0	4.9	3.7	15	7.7	5.4	4.1	15	8.6	6.0	4.5	15	11.8	8.2	6.2
16	6.3	4.4	3.3	16	7.1	5.0	3.7	16	7.9	5.5	4.2	16	8.7	6.1	4.6	16	11.9	8.3	6.3
17	6.4	4.5	3.4	17	7.2	5.1	3.8	17	8.0	5.6	4.2	17	8.8	6.2	4.6	17	12.1	8.4	6.3
18	6.6	4.6	3.5	18	7.4	5.2	3.9	18	8.2	5.7	4.3	18	9.0	6.3	4.7	18	12.2	8.5	6.4
19	6.7	4.7	3.5	19	7.5	5.3	4.0	19	8.3	5.8	4.4	19	9.1	6.4	4.8	19	12.4	8.6	6.5
20	6.9	4.8	3.6	20	7.7	5.4	4.0	20	8.5	5.9	4.4	20	9.3	6.5	4.9	20	12.5	8.7	6.6
21	7.0	4.9	3.7	21	7.8	5.5	4.1	21	8.6	6.0	4.5	21	9.4	6.6	5.0	21	12.6	8.8	6.6
22	7.2	5.0	3.8	22	8.0	5.6	4.2	22	8.8	6.1	4.6	22	9.6	6.7	5.0	22	12.8	8.9	6.7
23	7.3	5.1	3.8	23	8.1	5.7	4.3	23	8.9	6.2	4.7	23	9.7	6.8	5.1	23	12.9	9.0	6.8
24	7.4	5.2	3.9	24	8.2	5.8	4.3	24	9.0	6.3	4.8	24	9.8	6.9	5.2	24	13.1	9.1	6.9
25	7.6	5.3	4.0	25	8.4	5.9	4.4	25	9.2	6.4	4.8	25	10.0	7.0	5.2	25	13.2	9.2	6.9
26	7.7	5.4	4.1	26	8.5	6.0	4.4	26	9.3	6.5	4.9	26	10.1	7.1	5.3	26	13.4	9.3	7.0
27	7.9	5.5	4.1	27	8.7	6.1	4.6	27	9.5	6.6	5.0	27	10.3	7.2	5.4	27	13.5	9.4	7.1
28	8.0	5.6	4.2	28	8.8	6.2	4.6	28	9.6	6.7	5.0	28	10.4	7.3	5.5	28	13.6	9.5	7.2
29	8.2	5.7	4.3	29	9.0	6.3	4.7	29	9.8	6.8	5.1	29	10.6	7.4	5.6	29	13.8	9.6	7.2
30	8.3	5.8	4.4	30	9.1	6.4	4.8	30	9.9	6.9	5.2	30	10.7	7.5	5.6	30	13.9	9.7	7.3
31	8.4	5.9	4.4	31	9.2	6.5	4.9	31	10.0	7.0	5.3	31	10.9	7.6	5.7	31	14.1	9.8	7.4
32	8.6	6.0	4.5	32	9.4	6.6	4.9	32	10.2	7.1	5.3	32	11.0	7.7	5.8	32	14.2	9.9	7.5
33	8.7	6.1	4.6	33	9.5	6.7	5.0	33	10.3	7.2	5.4	33	11.1	7.8	5.8	33	14.4	10.0	7.5

## KAOLINITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
34	8.9	6.2	4.7	34	9.7	6.8	5.1	34	10.5	7.3	5.5	34	11.3	7.9	5.9	34	14.5	10.1	7.6
35	9.0	6.3	4.7	35	9.8	6.9	5.2	35	10.6	7.4	5.6	35	11.4	8.0	6.0	35	14.6	10.2	7.7
36	9.2	6.4	4.8	36	10.0	7.0	5.2	36	10.8	7.5	5.6	36	11.6	8.1	6.1	36	14.8	10.3	7.8
37	9.3	6.5	4.9	37	10.1	7.1	5.3	37	10.9	7.6	5.7	37	11.7	8.2	6.2	37	14.9	10.4	7.8
38	9.4	6.6	5.0	38	10.2	7.2	5.4	38	11.0	7.7	5.8	38	11.9	8.3	6.2	38	15.1	10.5	7.9
39	9.6	6.7	5.0	39	10.4	7.3	5.5	39	11.2	7.8	5.9	39	12.0	8.4	6.3	39	15.2	10.6	8.0
40	9.7	6.8	5.1	40	10.5	7.4	5.5	40	11.3	7.9	6.0	40	12.1	8.5	6.4	40	15.4	10.7	8.1
41	9.9	6.9	5.2	41	10.7	7.5	5.6	41	11.5	8.0	6.0	41	12.3	8.6	6.4	41	15.5	10.8	8.1
42	10.0	7.0	5.3	42	10.8	7.6	5.7	42	11.6	8.1	6.1	42	12.4	8.7	6.5	42	15.6	10.9	8.2
43	10.2	7.1	5.3	43	11.0	7.7	5.8	43	11.8	8.2	6.2	43	12.6	8.8	6.6	43	15.8	11.0	8.3
44	10.3	7.2	5.4	44	11.1	7.8	5.8	44	11.9	8.3	6.2	44	12.7	8.9	6.7	44	15.9	11.1	8.4
45	10.4	7.3	5.5	45	11.2	7.9	5.9	45	12.0	8.4	6.3	45	12.9	9.0	6.8	45	16.1	11.2	8.4
46	10.6	7.4	5.6	46	11.4	8.0	6.0	46	12.2	8.5	6.4	46	13.0	9.1	6.8	46	16.2	11.3	8.5
47	10.7	7.5	5.6	47	11.5	8.1	6.1	47	12.3	8.6	6.5	47	13.1	9.2	6.9	47	16.4	11.4	8.6
48	10.9	7.6	5.7	48	11.7	8.2	6.1	48	12.5	8.7	6.6	48	13.3	9.3	7.0	48	16.5	11.5	8.7
49	11.0	7.7	5.8	49	11.8	8.3	6.2	49	12.6	8.8	6.6	49	13.4	9.4	7.0	49	16.6	11.6	8.7
50	11.2	7.8	5.9	50	12.0	8.4	6.3	50	12.8	8.9	6.7	50	13.6	9.5	7.1	50	16.8	11.7	8.8
51	11.3	7.9	5.9	51	12.1	8.5	6.4	51	12.9	9.0	6.8	51	13.7	9.6	7.2	51	16.9	11.8	8.9
52	11.4	8.0	6.0	52	12.2	8.6	6.4	52	13.0	9.1	6.8	52	13.9	9.7	7.3	52	17.1	11.9	9.0
53	11.6	8.1	6.1	53	12.4	8.7	6.5	53	13.2	9.2	6.9	53	14.0	9.8	7.4	53	17.2	12.0	9.0
54	11.7	8.2	6.2	54	12.5	8.8	6.6	54	13.3	9.3	7.0	54	14.1	9.9	7.4	54	17.4	12.1	9.1
55	11.9	8.3	6.2	55	12.7	8.9	6.7	55	13.5	9.4	7.1	55	14.3	10.0	7.5	55	17.5	12.2	9.2
56	12.0	8.4	6.3	56	12.8	9.0	6.7	56	13.6	9.5	7.2	56	14.4	10.1	7.6	56	17.6	12.3	9.3
57	12.2	8.5	6.4	57	13.0	9.1	6.8	57	13.8	9.6	7.2	57	14.6	10.2	7.6	57	17.8	12.4	9.3
58	12.3	8.6	6.5	58	13.1	9.2	6.9	58	13.9	9.7	7.3	58	14.7	10.3	7.7	58	17.9	12.5	9.4
59	12.4	8.7	6.5	59	13.2	9.3	7.0	59	14.0	9.8	7.4	59	14.9	10.4	7.8	59	18.1	12.6	9.5
60	12.6	8.8	6.6	60	13.4	9.4	7.0	60	14.2	9.9	7.4	60	15.0	10.5	7.9	60	18.2	12.7	9.6

# MIXED/KAOLINITIC

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec
5	1.8	1.2	0.9	5	2.6	1.8	1.4	5	3.4	2.4	1.8	5	4.2	2.9	2.2	5	5.0	3.5	2.6
6	2.1	1.5	1.1	6	3.0	2.1	1.6	6	3.8	2.6	2.0	6	4.6	3.2	2.4	6	5.4	3.8	2.8
7	2.5	1.8	1.3	7	3.3	2.3	1.7	7	4.1	2.9	2.2	7	4.9	3.4	2.6	7	5.7	4.0	3.0
8	2.9	2.0	1.5	8	3.7	2.6	1.9	8	4.5	3.1	2.3	8	5.3	3.7	2.8	8	6.1	4.2	3.2
9	3.2	2.2	1.7	9	4.0	2.8	2.1	9	4.8	3.4	2.5	9	5.6	3.9	3.0	9	6.4	4.5	3.4
10	3.6	2.5	1.9	10	4.4	3.1	2.3	10	5.2	3.6	2.7	10	6.0	4.2	3.1	10	6.8	4.8	3.6
11	3.9	2.8	2.1	11	4.7	3.3	2.5	11	5.5	3.9	2.9	11	6.3	4.4	3.3	11	7.1	5.0	3.8
12	4.3	3.0	2.2	12	5.1	3.6	2.7	12	5.9	4.1	3.1	12	6.7	4.7	3.5	12	7.5	5.2	3.9
13	4.6	3.2	2.4	13	5.4	3.8	2.9	13	6.2	4.4	3.3	13	7.0	4.9	3.7	13	7.9	5.5	4.1
14	5.0	3.5	2.6	14	5.8	4.1	3.0	14	6.6	4.6	3.5	14	7.4	5.2	3.9	14	8.2	5.8	4.3
15	5.4	3.8	2.8	15	6.2	4.3	3.2	15	7.0	4.9	3.7	15	7.8	5.4	4.1	15	8.6	6.0	4.5
16	5.7	4.0	3.0	16	6.5	4.6	3.4	16	7.3	5.1	3.8	16	8.1	5.7	4.3	16	8.9	6.2	4.7
17	6.1	4.2	3.2	17	6.9	4.8	3.6	17	7.7	5.4	4.0	17	8.5	5.9	4.4	17	9.3	6.5	4.9
18	6.4	4.5	3.4	18	7.2	5.1	3.8	18	8.0	5.6	4.2	18	8.8	6.2	4.6	18	9.6	6.8	5.1
19	6.8	4.7	3.6	19	7.6	5.3	4.0	19	8.4	5.9	4.4	19	9.2	6.4	4.8	19	10.0	7.0	5.2
20	7.1	5.0	3.8	20	8.0	5.6	4.2	20	8.8	6.1	4.6	20	9.6	6.7	5.0	20	10.4	7.2	5.4
21	7.5	5.2	3.9	21	8.3	5.8	4.4	21	9.1	6.4	4.8	21	9.9	6.9	5.2	21	10.7	7.5	5.6
22	7.8	5.5	4.1	22	8.7	6.1	4.6	22	9.5	6.6	5.0	22	10.3	7.2	5.4	22	11.1	7.8	5.8
23	8.2	5.8	4.3	23	9.0	6.3	4.7	23	9.8	6.9	5.2	23	10.6	7.4	5.6	23	11.4	8.0	6.0
24	8.6	6.0	4.5	24	9.4	6.6	4.9	24	10.2	7.1	5.3	24	11.0	7.7	5.8	24	11.8	8.2	6.2
25	8.9	6.2	4.7	25	9.7	6.8	5.1	25	10.5	7.4	5.5	25	11.3	7.9	6.0	25	12.1	8.5	6.4
26	9.3	6.5	4.9	26	10.1	7.1	5.3	26	10.9	7.6	5.7	26	11.7	8.2	6.1	26	12.5	8.8	6.6
27	9.6	6.8	5.1	27	10.4	7.3	5.5	27	11.2	7.9	5.9	27	12.0	8.4	6.3	27	12.9	9.0	6.8
28	10.0	7.0	5.2	28	10.8	7.6	5.7	28	11.6	8.1	6.1	28	12.4	8.7	6.5	28	13.2	9.2	6.9
29	10.4	7.2	5.4	29	11.2	7.8	5.9	29	12.0	8.4	6.3	29	12.8	8.9	6.7	29	13.6	9.5	7.1
30	10.7	7.5	5.6	30	11.5	8.1	6.0	30	12.3	8.6	6.5	30	13.1	9.2	6.9	30	13.9	9.8	7.3
31	11.1	7.8	5.8	31	11.9	8.3	6.2	31	12.7	8.9	6.7	31	13.5	9.4	7.1	31	14.3	10.0	7.5
32	11.4	8.0	6.0	32	12.2	8.6	6.4	32	13.0	9.1	6.8	32	13.8	9.7	7.2	32	14.6	10.2	7.7
33	11.8	8.2	6.2	33	12.6	8.8	6.6	33	13.4	9.4	7.0	33	14.2	9.9	7.4	33	15.0	10.5	7.9

## MIXED/KAOLINITIC

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
34	12.1	8.5	6.4	34	13.0	9.1	6.8	34	13.8	9.6	7.2	34	14.6	10.2	7.6	34	15.4	10.8	8.1
35	12.5	8.8	6.6	35	13.3	9.3	7.0	35	14.1	9.9	7.4	35	14.9	10.4	7.8	35	15.7	11.0	8.2
36	12.9	9.0	6.8	36	13.7	9.6	7.2	36	14.5	10.1	7.6	36	15.3	10.7	8.0	36	16.1	11.2	8.4
37	13.2	9.2	6.9	37	14.0	9.8	7.4	37	14.8	10.4	7.8	37	15.6	10.9	8.2	37	16.4	11.5	8.6
38	13.6	9.5	7.1	38	14.4	10.1	7.6	38	15.2	10.6	8.0	38	16.0	11.2	8.4	38	16.8	11.8	8.8
39	13.9	9.8	7.3	39	14.7	10.3	7.7	39	15.5	10.9	8.2	39	16.3	11.4	8.6	39	17.1	12.0	9.0
40	14.3	10.0	7.5	40	15.1	10.6	7.9	40	15.9	11.1	8.3	40	16.7	11.7	8.8	40	17.5	12.2	9.2
41	14.6	10.2	7.7	41	15.4	10.8	8.1	41	16.2	11.4	8.5	41	17.0	11.9	9.0	41	17.9	12.5	9.4
42	15.0	10.5	7.9	42	15.8	11.1	8.3	42	16.6	11.6	8.7	42	17.4	12.2	9.1	42	18.2	12.8	9.6
43	15.4	10.8	8.1	43	16.2	11.3	8.5	43	17.0	11.9	8.9	43	17.8	12.4	9.3	43	18.6	13.0	9.8
44	15.7	11.0	8.2	44	16.5	11.6	8.7	44	17.3	12.1	9.1	44	18.1	12.7	9.5	44	18.9	13.2	9.9
45	16.1	11.2	8.4	45	16.9	11.8	8.9	45	17.7	12.4	9.3	45	18.5	12.9	9.7	45	19.3	13.5	10.1
46	16.4	11.5	8.6	46	17.2	12.1	9.0	46	18.0	12.6	9.5	46	18.8	13.2	9.9	46	19.6	13.8	10.3
47	16.7	11.8	8.8	47	17.6	12.3	9.2	47	18.4	12.9	9.7	47	19.2	13.4	10.1	47	20.0	14.0	10.5
48	17.1	12.0	9.0	48	18.0	12.6	9.4	48	18.8	13.1	9.8	48	19.6	13.7	10.3	48	20.4	14.2	10.7
49	17.5	12.2	9.2	49	18.3	12.8	9.6	49	19.1	13.4	10.0	49	19.9	13.9	10.4	49	20.7	14.5	10.9
50	17.9	12.5	9.4	50	18.7	13.1	9.8	50	19.5	13.6	10.2	50	20.3	14.2	10.6	50	21.1	14.8	11.1
51	18.2	12.8	9.6	51	19.0	13.3	10.0	51	19.8	13.9	10.4	51	20.6	14.4	10.8	51	21.4	15.0	11.2
52	18.6	13.0	9.8	52	19.4	13.6	10.2	52	20.2	14.1	10.6	52	21.0	14.7	11.0	52	21.8	15.2	11.4
53	18.9	13.2	9.9	53	19.7	13.8	10.4	53	20.5	14.4	10.8	53	21.3	14.9	11.2	53	22.1	15.5	11.6
54	19.3	13.5	10.1	54	20.1	14.1	10.6	54	20.9	14.6	11.0	54	21.7	15.2	11.4	54	22.5	15.8	11.8
55	19.6	13.8	10.3	55	20.4	14.3	10.7	55	21.2	14.9	11.2	55	22.0	15.4	11.6	55	22.9	16.0	12.0
56	20.0	14.0	10.5	56	20.8	14.6	10.9	56	21.6	15.1	11.3	56	22.4	15.7	11.8	56	23.2	16.2	12.2
57	20.4	14.2	10.7	57	21.2	14.8	11.1	57	22.0	15.4	11.5	57	22.8	15.9	12.0	57	23.6	16.5	12.4
58	20.7	14.5	10.9	58	21.5	15.1	11.3	58	22.3	15.6	11.7	58	23.1	16.2	12.1	58	23.9	16.8	12.6
59	21.1	14.8	11.1	59	21.9	15.3	11.5	59	22.7	15.9	11.9	59	23.5	16.4	12.3	59	24.3	17.0	12.8
60	21.4	15.0	11.2	60	22.2	15.6	11.7	60	23.0	16.1	12.1	60	23.8	16.7	12.5	60	24.6	17.2	12.9

## MIXED/KAOLINITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	5.8	4.1	3.1	5	6.6	4.6	3.5	5	7.4	5.2	3.9	5	8.2	5.8	4.3	5	11.4	8.0	6.0
6	6.2	4.3	3.2	6	7.0	4.9	3.7	6	7.8	5.4	4.1	6	8.6	6.0	4.5	6	11.8	8.2	6.2
7	6.5	4.6	3.4	7	7.3	5.1	3.8	7	8.1	5.7	4.3	7	8.9	6.2	4.7	7	12.1	8.5	6.4
8	6.9	4.8	3.6	8	7.7	5.4	4.0	8	8.5	5.9	4.4	8	9.3	6.5	4.9	8	12.5	8.8	6.6
9	7.2	5.1	3.8	9	8.0	5.6	4.2	9	8.8	6.2	4.6	9	9.6	6.8	5.1	9	12.9	9.0	6.8
10	7.6	5.3	4.0	10	8.4	5.9	4.4	10	9.2	6.4	4.8	10	10.0	7.0	5.2	10	13.2	9.2	6.9
11	8.0	5.6	4.2	11	8.8	6.1	4.6	11	9.6	6.7	5.0	11	10.4	7.2	5.4	11	13.6	9.5	7.1
12	8.3	5.8	4.4	12	9.1	6.4	4.8	12	9.9	6.9	5.2	12	10.7	7.5	5.6	12	13.9	9.8	7.3
13	8.7	6.1	4.6	13	9.5	6.6	5.0	13	10.3	7.2	5.4	13	11.1	7.8	5.8	13	14.3	10.0	7.5
14	9.0	6.3	4.7	14	9.8	6.9	5.2	14	10.6	7.4	5.6	14	11.4	8.0	6.0	14	14.6	10.2	7.7
15	9.4	6.6	4.9	15	10.2	7.1	5.3	15	11.0	7.7	5.8	15	11.8	8.2	6.2	15	15.0	10.5	7.9
16	9.7	6.8	5.1	16	10.5	7.4	5.5	16	11.3	7.9	6.0	16	12.1	8.5	6.4	16	15.4	10.8	8.1
17	10.1	7.1	5.3	17	10.9	7.6	5.7	17	11.7	8.2	6.1	17	12.5	8.8	6.6	17	15.7	11.0	8.2
18	10.4	7.3	5.5	18	11.2	7.9	5.9	18	12.0	8.4	6.3	18	12.9	9.0	6.8	18	16.1	11.2	8.4
19	10.8	7.6	5.7	19	11.6	8.1	6.1	19	12.4	8.7	6.5	19	13.2	9.2	6.9	19	16.4	11.5	8.6
20	11.2	7.8	5.9	20	12.0	8.4	6.3	20	12.8	8.9	6.7	20	13.6	9.5	7.1	20	16.8	11.8	8.8
21	11.5	8.1	6.0	21	12.3	8.6	6.5	21	13.1	9.2	6.9	21	13.9	9.8	7.3	21	17.1	12.0	9.0
22	11.9	8.3	6.2	22	12.7	8.9	6.7	22	13.5	9.4	7.1	22	14.3	10.0	7.5	22	17.5	12.2	9.2
23	12.2	8.6	6.4	23	13.0	9.1	6.8	23	13.8	9.7	7.3	23	14.6	10.2	7.7	23	17.9	12.5	9.4
24	12.6	8.8	6.6	24	13.4	9.4	7.0	24	14.2	9.9	7.4	24	15.0	10.5	7.9	24	18.2	12.8	9.6
25	13.0	9.1	6.8	25	13.8	9.6	7.2	25	14.6	10.2	7.6	25	15.4	10.8	8.1	25	18.6	13.0	9.8
26	13.3	9.3	7.0	26	14.1	9.9	7.4	26	14.9	10.4	7.8	26	15.7	11.0	8.2	26	18.9	13.2	9.9
27	13.7	9.6	7.2	27	14.5	10.1	7.6	27	15.3	10.7	8.0	27	16.1	11.2	8.4	27	19.3	13.5	10.1
28	14.0	9.8	7.4	28	14.8	10.4	7.8	28	15.6	10.9	8.2	28	16.4	11.5	8.6	28	19.6	13.8	10.3
29	14.4	10.1	7.6	29	15.2	10.6	8.0	29	16.0	11.2	8.4	29	16.8	11.8	8.8	29	20.0	14.0	10.5
30	14.7	10.3	7.7	30	15.5	10.9	8.2	30	16.3	11.4	8.6	30	17.1	12.0	9.0	30	20.4	14.2	10.7
31	15.1	10.6	7.9	31	15.9	11.1	8.3	31	16.7	11.7	8.8	31	17.5	12.2	9.2	31	20.7	14.5	10.9
32	15.4	10.8	8.1	32	16.2	11.4	8.5	32	17.0	11.9	9.0	32	17.9	12.5	9.4	32	21.1	14.8	11.1
33	15.8	11.1	8.3	33	16.6	11.6	8.7	33	17.4	12.2	9.1	33	18.2	12.8	9.6	33	21.4	15.0	11.2

# MIXED/KAOLINITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec
34	16.2	11.3	8.5	34	17.0	11.9	8.9	34	17.8	12.4	9.3	34	18.6	13.0	9.8	34	21.8	15.2	11.4
35	16.5	11.6	8.7	35	17.3	12.1	9.1	35	18.1	12.7	9.5	35	18.9	13.2	9.9	35	22.1	15.5	11.6
36	16.9	11.8	8.9	36	17.7	12.4	9.3	36	18.5	12.9	9.7	36	19.3	13.5	10.1	36	22.5	15.8	11.8
37	17.2	12.1	9.0	37	18.0	12.6	9.5	37	18.8	13.2	9.9	37	19.6	13.8	10.3	37	22.9	16.0	12.0
38	17.6	12.3	9.2	38	18.4	12.9	9.7	38	19.2	13.4	10.1	38	20.0	14.0	10.5	38	23.2	16.2	12.2
39	18.0	12.6	9.4	39	18.8	13.1	9.8	39	19.6	13.7	10.3	39	20.4	14.2	10.7	39	23.6	16.5	12.4
40	18.3	12.8	9.6	40	19.1	13.4	10.0	40	19.9	13.9	10.4	40	20.7	14.5	10.9	40	23.9	16.8	12.6
41	18.7	13.1	9.8	41	19.5	13.6	10.2	41	20.3	14.2	10.6	41	21.1	14.8	11.1	41	24.3	17.0	12.8
42	19.0	13.3	10.0	42	19.8	13.9	10.4	42	20.6	14.4	10.8	42	21.4	15.0	11.2	42	24.6	17.2	12.9
43	19.4	13.6	10.2	43	20.2	14.1	10.6	43	21.0	14.7	11.0	43	21.8	15.2	11.4	43	25.0	17.5	13.1
44	19.7	13.8	10.4	44	20.5	14.4	10.8	44	21.3	14.9	11.2	44	22.1	15.5	11.6	44	25.4	17.8	13.3
45	20.1	14.1	10.6	45	20.9	14.6	11.0	45	21.7	15.2	11.4	45	22.5	15.8	11.8	45	25.7	18.0	13.5
46	20.4	14.3	10.7	46	21.2	14.9	11.2	46	22.0	15.4	11.6	46	22.9	16.0	12.0	46	26.1	18.2	13.7
47	20.8	14.6	10.9	47	21.6	15.1	11.3	47	22.4	15.7	11.8	47	23.2	16.2	12.2	47	26.4	18.5	13.9
48	21.2	14.8	11.1	48	22.0	15.4	11.5	48	22.8	15.9	12.0	48	23.6	16.5	12.4	48	26.8	18.8	14.1
49	21.5	15.1	11.3	49	22.3	15.6	11.7	49	23.1	16.2	12.1	49	23.9	16.8	12.6	49	27.1	19.0	14.2
50	21.9	15.3	11.5	50	22.7	15.9	11.9	50	23.5	16.4	12.3	50	24.3	17.0	12.8	50	27.5	19.2	14.4
51	22.2	15.6	11.7	51	23.0	16.1	12.1	51	23.8	16.7	12.5	51	24.6	17.2	12.9	51	27.9	19.5	14.6
52	22.6	15.8	11.9	52	23.4	16.4	12.3	52	24.2	16.9	12.7	52	25.0	17.5	13.1	52	28.2	19.8	14.8
53	23.0	16.1	12.0	53	23.8	16.6	12.5	53	24.6	17.2	12.9	53	25.4	17.8	13.3	53	28.6	20.0	15.0
54	23.3	16.3	12.2	54	24.1	16.9	12.7	54	24.9	17.4	13.1	54	25.7	18.0	13.5	54	28.9	20.2	15.2
55	23.7	16.6	12.4	55	24.5	17.1	12.8	55	25.3	17.7	13.3	55	26.1	18.2	13.7	55	29.3	20.5	15.4
56	24.0	16.8	12.6	56	24.8	17.4	13.0	56	25.6	17.9	13.4	56	26.4	18.5	13.9	56	29.6	20.8	15.6
57	24.4	17.1	12.8	57	25.2	17.6	13.2	57	26.0	18.2	13.6	57	26.8	18.8	14.1	57	30.0	21.0	15.8
58	24.7	17.3	13.0	58	25.5	17.9	13.4	58	26.3	18.4	13.8	58	27.1	19.0	14.2	58	30.4	21.2	15.9
59	25.1	17.6	13.2	59	25.9	18.1	13.6	59	26.7	18.7	14.0	59	27.5	19.2	14.4	59	30.7	21.5	16.1
60	25.4	17.8	13.4	60	26.2	18.4	13.8	60	27.0	18.9	14.2	60	27.9	19.5	14.6	60	31.1	21.8	16.3

# **MIXED/SMECTITIC**

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	2.5	1.8	1.3	5	3.3	2.3	1.7	5	4.1	2.9	2.2	5	4.9	3.4	2.6	5	5.7	4.0	3.0
6	3.0	2.1	1.6	6	3.8	2.7	2.0	6	4.6	3.2	2.4	6	5.4	3.8	2.8	6	6.2	4.4	3.3
7	3.5	2.4	1.8	7	4.3	3.0	2.3	7	5.1	3.6	2.7	7	5.9	4.1	3.1	7	6.7	4.7	3.5
8	4.0	2.8	2.1	8	4.8	3.4	2.5	8	5.6	3.9	2.9	8	6.4	4.5	3.4	8	7.2	5.0	3.8
9	4.5	3.2	2.4	9	5.3	3.7	2.8	9	6.1	4.3	3.2	9	6.9	4.8	3.6	9	7.7	5.4	4.0
10	5.0	3.5	2.6	10	5.8	4.1	3.0	10	6.6	4.6	3.5	10	7.4	5.2	3.9	10	8.2	5.8	4.3
11	5.5	3.8	2.9	11	6.3	4.4	3.3	11	7.1	5.0	3.7	11	7.9	5.5	4.2	11	8.7	6.1	4.6
12	6.0	4.2	3.2	12	6.8	4.8	3.6	12	7.6	5.3	4.0	12	8.4	5.9	4.4	12	9.2	6.4	4.8
13	6.5	4.6	3.4	13	7.3	5.1	3.8	13	8.1	5.7	4.3	13	8.9	6.2	4.7	13	9.7	6.8	5.1
14	7.0	4.9	3.7	14	7.8	5.5	4.1	14	8.6	6.0	4.5	14	9.4	6.6	4.9	14	10.2	7.2	5.4
15	7.5	5.2	3.9	15	8.3	5.8	4.4	15	9.1	6.4	4.8	15	9.9	6.9	5.2	15	10.7	7.5	5.6
16	8.0	5.6	4.2	16	8.8	6.2	4.6	16	9.6	6.7	5.0	16	10.4	7.3	5.5	16	11.2	7.8	5.9
17	8.5	6.0	4.5	17	9.3	6.5	4.9	17	10.1	7.1	5.3	17	10.9	7.6	5.7	17	11.7	8.2	6.2
18	9.0	6.3	4.7	18	9.8	6.9	5.2	18	10.6	7.4	5.6	18	11.4	8.0	6.0	18	12.2	8.6	6.4
19	9.5	6.6	5.0	19	10.3	7.2	5.4	19	11.1	7.8	5.8	19	11.9	8.3	6.2	19	12.7	8.9	6.7
20	10.0	7.0	5.2	20	10.8	7.6	5.7	20	11.6	8.1	6.1	20	12.4	8.7	6.5	20	13.2	9.2	6.9
21	10.5	7.4	5.5	21	11.3	7.9	5.9	21	12.1	8.5	6.4	21	12.9	9.0	6.8	21	13.7	9.6	7.2
22	11.0	7.7	5.8	22	11.8	8.3	6.2	22	12.6	8.8	6.6	22	13.4	9.4	7.0	22	14.2	10.0	7.5
23	11.5	8.0	6.0	23	12.3	8.6	6.5	23	13.1	9.2	6.9	23	13.9	9.7	7.3	23	14.7	10.3	7.7
24	12.0	8.4	6.3	24	12.8	9.0	6.7	24	13.6	9.5	7.1	24	14.4	10.1	7.6	24	15.2	10.6	8.0
25	12.5	8.8	6.6	25	13.3	9.3	7.0	25	14.1	9.9	7.4	25	14.9	10.4	7.8	25	15.7	11.0	8.2
26	13.0	9.1	6.8	26	13.8	9.7	7.2	26	14.6	10.2	7.7	26	15.4	10.8	8.1	26	16.2	11.4	8.5
27	13.5	9.4	7.1	27	14.3	10.0	7.5	27	15.1	10.6	7.9	27	15.9	11.1	8.4	27	16.7	11.7	8.8
28	14.0	9.8	7.4	28	14.8	10.4	7.8	28	15.6	10.9	8.2	28	16.4	11.5	8.6	28	17.2	12.0	9.0
29	14.5	10.2	7.6	29	15.3	10.7	8.0	29	16.1	11.3	8.5	29	16.9	11.8	8.9	29	17.7	12.4	9.3
30	15.0	10.5	7.9	30	15.8	11.1	8.3	30	16.6	11.6	8.7	30	17.4	12.2	9.1	30	18.2	12.8	9.6
31	15.5	10.8	8.1	31	16.3	11.4	8.6	31	17.1	12.0	9.0	31	17.9	12.5	9.4	31	18.7	13.1	9.8
32	16.0	11.2	8.4	32	16.8	11.8	8.8	32	17.6	12.3	9.2	32	18.4	12.9	9.7	32	19.2	13.4	10.1
33	16.5	11.6	8.7	33	17.3	12.1	9.1	33	18.1	12.7	9.5	33	18.9	13.2	9.9	33	19.7	13.8	10.4



# **MIXED/SMECTITIC**

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec
34	17.0	11.9	8.9	34	17.8	12.5	9.4	34	18.6	13.0	9.8	34	19.4	13.6	10.2	34	20.2	14.2	10.6
35	17.5	12.2	9.2	35	18.3	12.8	9.6	35	19.1	13.4	10.0	35	19.9	13.9	10.4	35	20.7	14.5	10.9
36	18.0	12.6	9.4	36	18.8	13.2	9.9	36	19.6	13.7	10.2	36	20.4	14.3	10.7	36	21.2	14.8	11.1
37	18.5	13.0	9.7	37	19.3	13.5	10.1	37	20.1	14.1	10.6	37	20.9	14.6	11.0	37	21.7	15.2	11.4
38	19.0	13.3	10.0	38	19.8	13.9	10.4	38	20.6	14.4	10.8	38	21.4	15.0	11.2	38	22.2	15.6	11.7
39	19.5	13.6	10.2	39	20.3	14.2	10.7	39	21.1	14.8	11.1	39	21.9	15.3	11.5	39	22.7	15.9	11.9
40	20.0	14.0	10.5	40	20.8	14.6	10.9	40	21.6	15.1	11.3	40	22.4	15.7	11.8	40	23.2	16.2	12.2
41	20.5	14.4	10.8	41	21.3	14.9	11.2	41	22.1	15.5	11.6	41	22.9	16.0	12.0	41	23.7	16.6	12.4
42	21.0	14.7	11.0	42	21.8	15.3	11.4	42	22.6	15.8	11.9	42	23.4	16.4	12.3	42	24.2	17.0	12.7
43	21.5	15.0	11.3	43	22.3	15.6	11.7	43	23.1	16.2	12.1	43	23.9	16.7	12.6	43	24.7	17.3	13.0
44	22.0	15.4	11.6	44	22.8	16.0	12.0	44	23.6	16.5	12.4	44	24.4	17.1	12.8	44	25.2	17.6	13.2
45	22.5	15.8	11.8	45	23.3	16.3	12.2	45	24.1	16.9	12.7	45	24.9	17.4	13.1	45	25.7	18.0	13.5
46	23.0	16.1	12.1	46	23.8	16.7	12.5	46	24.6	17.2	12.9	46	25.4	17.8	13.3	46	26.2	18.4	13.8
47	23.5	16.4	12.3	47	24.3	17.0	12.8	47	25.1	17.6	13.2	47	25.9	18.1	13.6	47	26.7	18.7	14.0
48	24.0	16.8	12.6	48	24.8	17.4	13.0	48	25.6	17.9	13.4	48	26.4	18.5	13.9	48	27.2	19.0	14.3
49	24.5	17.2	12.9	49	25.3	17.7	13.2	49	26.1	18.3	13.7	49	26.9	18.8	14.1	49	27.7	19.4	14.6
50	25.0	17.5	13.1	50	25.8	18.1	13.6	50	26.6	18.6	14.0	50	27.4	19.2	14.4	50	28.2	19.8	14.8
51	25.5	17.8	13.4	51	26.3	18.4	13.8	51	27.1	19.0	14.2	51	27.9	19.5	14.6	51	28.7	20.1	15.1
52	26.0	18.2	13.6	52	26.8	18.8	14.1	52	27.6	19.3	14.5	52	28.4	19.9	14.9	52	29.2	20.4	15.3
53	26.5	18.6	13.9	53	27.3	19.1	14.3	53	28.1	19.7	14.8	53	28.9	20.2	15.2	53	29.7	20.8	15.6
54	27.0	18.9	14.1	54	27.8	19.5	14.6	54	28.6	20.0	15.0	54	29.4	20.6	15.4	54	30.2	21.2	15.9
55	27.5	19.2	14.4	55	28.3	19.8	14.9	55	29.1	20.4	15.3	55	29.9	20.9	15.7	55	30.7	21.5	16.1
56	28.0	19.6	14.7	56	28.8	20.2	15.1	56	29.6	20.7	15.5	56	30.4	21.3	16.0	56	31.2	21.8	16.4
57	28.5	20.0	15.0	57	29.3	20.5	15.4	57	30.1	21.1	15.8	57	30.9	21.6	16.2	57	31.7	22.2	16.6
58	29.0	20.3	15.2	58	29.8	20.9	15.6	58	30.6	21.4	16.1	58	31.4	22.0	16.5	58	32.2	22.6	16.9
59	29.5	20.6	15.5	59	30.3	21.2	15.9	59	31.1	21.8	16.3	59	31.9	22.3	16.8	59	32.7	22.9	17.2
60	30.0	21.0	15.8	60	30.8	21.6	16.2	60	31.6	22.1	16.6	60	32.4	22.7	17.0	60	33.2	23.2	17.4

# **MIXED/SMECTITIC**

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	6.5	4.6	3.4	5	7.3	5.1	3.8	5	8.1	5.7	4.3	5	8.9	6.2	4.7	5	12.1	8.5	6.4
6	7.0	4.9	3.7	6	7.8	5.5	4.1	6	8.6	6.0	4.5	6	9.4	6.6	5.0	6	12.6	8.8	6.6
7	7.5	5.3	4.0	7	8.3	5.8	4.4	7	9.1	6.4	4.8	7	9.9	7.0	5.2	7	13.1	9.2	6.9
8	8.0	5.6	4.2	8	8.8	6.2	4.6	8	9.6	6.7	5.0	8	10.4	7.3	5.5	8	13.6	9.6	7.2
9	8.5	6.0	4.5	9	9.3	6.5	4.9	9	10.1	7.1	5.3	9	10.9	7.6	5.7	9	14.1	9.9	7.4
10	9.0	6.3	4.7	10	9.8	6.9	5.2	10	10.6	7.4	5.6	10	11.4	8.0	6.0	10	14.6	10.2	7.7
11	9.5	6.7	5.0	11	10.3	7.2	5.4	11	11.1	7.8	5.8	11	11.9	8.4	6.3	11	15.1	10.6	8.0
12	10.0	7.0	5.3	12	10.8	7.6	5.7	12	11.6	8.1	6.1	12	12.4	8.7	6.5	12	15.6	11.0	8.2
13	10.5	7.4	5.5	13	11.3	7.9	5.9	13	12.1	8.5	6.4	13	12.9	9.0	6.8	13	16.1	11.3	8.5
14	11.0	7.7	5.8	14	11.8	8.3	6.2	14	12.6	8.8	6.6	14	13.4	9.4	7.0	14	16.6	11.6	8.7
15	11.5	8.1	6.0	15	12.3	8.6	6.5	15	13.1	9.2	6.9	15	13.9	9.8	7.3	15	17.1	12.0	9.0
16	12.0	8.4	6.3	16	12.8	9.0	6.7	16	13.6	9.5	7.2	16	14.4	10.1	7.6	16	17.6	12.4	9.3
17	12.5	8.8	6.6	17	13.3	9.3	7.0	17	14.1	9.9	7.4	17	14.9	10.4	7.8	17	18.1	12.7	9.5
18	13.0	9.1	6.8	18	13.8	9.7	7.3	18	14.6	10.2	7.7	18	15.4	10.8	8.1	18	18.6	13.0	9.8
19	13.5	9.5	7.1	19	14.3	10.0	7.5	19	15.1	10.6	7.9	19	15.9	11.2	8.4	19	19.1	13.4	10.0
20	14.0	9.8	7.4	20	14.8	10.4	7.8	20	15.6	10.9	8.2	20	16.4	11.5	8.6	20	19.6	13.8	10.3
21	14.5	10.2	7.6	21	15.3	10.7	8.0	21	16.1	11.3	8.5	21	16.9	11.8	8.9	21	20.1	14.1	10.6
22	15.0	10.5	7.9	22	15.8	11.1	8.3	22	16.6	11.6	8.7	22	17.4	12.2	9.2	22	20.6	14.4	10.8
23	15.5	10.9	8.2	23	16.3	11.4	8.6	23	17.1	12.0	9.0	23	17.9	12.6	9.4	23	21.1	14.8	11.1
24	16.0	11.2	8.4	24	16.8	11.8	8.8	24	17.6	12.3	9.2	24	18.4	12.9	9.7	24	21.6	15.2	11.4
25	16.5	11.6	8.7	25	17.3	12.1	9.1	25	18.1	12.7	9.5	25	18.9	13.2	9.9	25	22.1	15.5	11.6
26	17.0	11.9	8.9	26	17.8	12.5	9.4	26	18.6	13.0	9.8	26	19.4	13.6	10.2	26	22.6	15.8	11.9
27	17.5	12.3	9.2	27	18.3	12.8	9.6	27	19.1	13.4	10.0	27	19.9	14.0	10.5	27	23.1	16.2	12.2
28	18.0	12.6	9.5	28	18.8	13.2	9.9	28	19.6	13.7	10.3	28	20.4	14.3	10.7	28	23.6	16.6	12.4
29	18.5	13.0	9.7	29	19.3	13.5	10.1	29	20.1	14.1	10.6	29	20.9	14.6	11.0	29	24.1	16.9	12.7
30	19.0	13.3	10.0	30	19.8	13.9	10.4	30	20.6	14.4	10.8	30	21.4	15.0	11.2	30	24.6	17.2	12.9
31	19.5	13.7	10.2	31	20.3	14.2	10.7	31	21.1	14.8	11.1	31	21.9	15.4	11.5	31	25.1	17.6	13.2
32	20.0	14.0	10.5	32	20.8	14.6	10.9	32	21.6	15.1	11.4	32	22.4	15.7	11.8	32	25.6	18.0	13.5
33	20.5	14.4	10.8	33	21.3	14.9	11.2	33	22.1	15.5	11.6	33	22.9	16.0	12.0	33	26.1	18.3	13.7

## MIXED/SMECTITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec
34	21.0	14.7	11.0	34	21.8	15.3	11.5	34	22.6	15.8	11.9	34	23.4	16.4	12.3	34	26.6	18.6	14.0
35	21.5	15.1	11.3	35	22.3	15.6	11.7	35	23.1	16.2	12.1	35	23.9	16.8	12.6	35	27.1	19.0	14.2
36	22.0	15.4	11.6	36	22.8	16.0	12.0	36	23.6	16.5	12.4	36	24.4	17.1	12.8	36	27.6	19.4	14.5
37	22.5	15.8	11.8	37	23.3	16.3	12.2	37	24.1	16.9	12.7	37	24.9	17.4	13.1	37	28.1	19.7	14.8
38	23.0	16.1	12.1	38	23.8	16.7	12.5	38	24.6	17.2	12.9	38	25.4	17.8	13.4	38	28.6	20.0	15.0
39	23.5	16.5	12.4	39	24.3	17.0	12.8	39	25.1	17.6	13.2	39	25.9	18.2	13.6	39	29.1	20.4	15.3
40	24.0	16.8	12.6	40	24.8	17.4	13.0	40	25.6	17.9	13.4	40	26.4	18.5	13.9	40	29.6	20.8	15.6
41	24.5	17.2	12.9	41	25.3	17.7	13.3	41	26.1	18.3	13.7	41	26.9	18.8	14.1	41	30.1	21.1	15.8
42	25.0	17.5	13.1	42	25.8	18.1	13.6	42	26.6	18.6	14.0	42	27.4	19.2	14.4	42	30.6	21.4	16.1
43	25.5	17.9	13.4	43	26.3	18.4	13.8	43	27.1	19.0	14.2	43	27.9	19.6	14.7	43	31.1	21.8	16.4
44	26.0	18.2	13.7	44	26.8	18.8	14.1	44	27.6	19.3	14.5	44	28.4	19.9	14.9	44	31.6	22.2	16.6
45	26.5	18.6	13.9	45	27.3	19.1	14.3	45	28.1	19.7	14.8	45	28.9	20.2	15.2	45	32.1	22.5	16.9
46	27.0	18.9	14.1	46	27.8	19.5	14.6	46	28.6	20.0	15.0	46	29.4	20.6	15.4	46	32.6	22.8	17.1
47	27.5	19.3	14.4	47	28.3	19.8	14.9	47	29.1	20.4	15.3	47	29.9	21.0	15.7	47	33.1	23.2	17.4
48	28.0	19.6	14.7	48	28.8	20.2	15.1	48	29.6	20.7	15.6	48	30.4	21.3	16.0	48	33.6	23.6	17.7
49	28.5	20.0	15.0	49	29.3	20.5	15.4	49	30.1	21.1	15.8	49	30.9	21.6	16.2	49	34.1	23.9	17.9
50	29.0	20.3	15.2	50	29.8	20.9	15.7	50	30.6	21.4	16.1	50	31.4	22.0	16.5	50	34.6	24.2	18.2
51	29.5	20.7	15.5	51	30.3	21.2	15.9	51	31.1	21.8	16.3	51	31.9	22.4	16.8	51	35.1	24.6	18.4
52	30.0	21.0	15.8	52	30.8	21.6	16.2	52	31.6	22.1	16.6	52	32.4	22.7	17.0	52	35.6	25.0	18.7
53	30.5	21.4	16.0	53	31.3	21.9	16.4	53	32.1	22.5	16.9	53	32.9	23.0	17.3	53	36.1	25.3	19.0
54	31.0	21.7	16.3	54	31.8	22.3	16.7	54	32.6	22.8	17.1	54	33.4	23.4	17.6	54	36.6	25.6	19.2
55	31.5	22.1	16.6	55	32.3	22.6	17.0	55	33.1	23.2	17.4	55	33.9	23.8	17.8	55	37.1	26.0	19.5
56	32.0	22.4	16.8	56	32.8	23.0	17.2	56	33.6	23.5	17.6	56	34.4	24.1	18.1	56	37.6	26.4	19.8
57	32.5	22.8	17.1	57	33.3	23.3	17.5	57	34.1	23.9	17.9	57	34.9	24.4	18.3	57	38.1	26.7	20.0
58	33.0	23.1	17.3	58	33.8	23.7	17.8	58	34.6	24.2	18.2	58	35.4	24.8	18.6	58	38.6	27.0	20.3
59	33.5	23.5	17.6	59	34.3	24.0	18.0	59	35.1	24.6	18.4	59	35.9	25.2	18.9	59	39.1	27.4	20.6
60	34.0	23.8	17.9	60	34.8	24.4	18.3	60	35.6	24.9	18.7	60	36.4	25.5	19.1	60	39.6	27.8	20.8

## SMECTITIC

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	3.6	2.5	1.9	5	4.4	3.1	2.3	5	5.2	3.6	2.7	5	6.0	4.2	3.1	5	6.8	4.7	3.6
6	4.3	3.0	2.2	6	5.1	3.6	2.7	6	5.9	4.1	3.1	6	6.7	4.7	3.5	6	7.5	5.2	3.9
7	5.0	3.5	2.6	7	5.8	4.1	3.0	7	6.6	4.6	3.5	7	7.4	5.2	3.9	7	8.2	5.7	4.3
8	5.7	4.0	3.0	8	6.5	4.6	3.4	8	7.3	5.1	3.8	8	8.1	5.7	4.3	8	8.9	6.2	4.7
9	6.4	4.5	3.4	9	7.2	5.1	3.8	9	8.0	5.6	4.2	9	8.8	6.2	4.6	9	9.6	6.7	5.1
10	7.1	5.0	3.8	10	8.0	5.6	4.2	10	8.8	6.1	4.6	10	9.6	6.7	5.0	10	10.4	7.2	5.4
11	7.9	5.5	4.1	11	8.7	6.1	4.6	11	9.5	6.6	5.0	11	10.3	7.2	5.4	11	11.1	7.7	5.8
12	8.6	6.0	4.5	12	9.4	6.6	4.9	12	10.2	7.1	5.3	12	11.0	7.7	5.8	12	11.8	8.2	6.2
13	9.3	6.5	4.9	13	10.1	7.1	5.3	13	10.9	7.6	5.7	13	11.7	8.2	6.1	13	12.5	8.7	6.6
14	10.0	7.0	5.2	14	10.8	7.6	5.7	14	11.6	8.1	6.1	14	12.4	8.7	6.5	14	13.2	9.2	6.9
15	10.7	7.5	5.6	15	11.5	8.1	6.0	15	12.3	8.6	6.5	15	13.1	9.2	6.9	15	13.9	9.7	7.3
16	11.4	8.0	6.0	16	12.2	8.6	6.4	16	13.0	9.1	6.8	16	13.8	9.7	7.3	16	14.6	10.2	7.7
17	12.1	8.5	6.4	17	13.0	9.1	6.8	17	13.8	9.6	7.2	17	14.6	10.2	7.6	17	15.4	10.7	8.1
18	12.9	9.0	6.8	18	13.7	9.6	7.2	18	14.5	10.1	7.6	18	15.3	10.7	8.0	18	16.1	11.2	8.4
19	13.6	9.5	7.1	19	14.4	10.1	7.6	19	15.2	10.6	8.0	19	16.0	11.2	8.4	19	16.8	11.7	8.8
20	14.3	10.0	7.5	20	15.1	10.6	7.9	20	15.9	11.1	8.3	20	16.7	11.7	8.8	20	17.5	12.2	9.2
21	15.0	10.5	7.9	21	15.8	11.1	8.3	21	16.6	11.6	8.7	21	17.4	12.2	9.1	21	18.2	12.7	9.6
22	15.7	11.0	8.2	22	16.5	11.6	8.7	22	17.3	12.1	9.1	22	18.1	12.7	9.5	22	18.9	13.2	9.9
23	16.4	11.5	8.6	23	17.2	12.1	9.0	23	18.0	12.6	9.5	23	18.8	13.2	9.9	23	19.6	13.7	10.3
24	17.1	12.0	9.0	24	18.0	12.6	9.4	24	18.8	13.1	9.8	24	19.6	13.7	10.3	24	20.4	14.2	10.7
25	17.9	12.5	9.4	25	18.7	13.1	9.8	25	19.5	13.6	10.2	25	20.3	14.2	10.6	25	21.1	14.7	11.1
26	18.6	13.0	9.8	26	19.4	13.6	10.2	26	20.2	14.1	10.6	26	21.0	14.7	11.0	26	21.8	15.2	11.4
27	19.3	13.5	10.1	27	20.1	14.1	10.6	27	20.9	14.6	11.0	27	21.7	15.2	11.4	27	22.5	15.7	11.8
28	20.0	14.0	10.5	28	20.8	14.6	10.9	28	21.6	15.1	11.3	28	22.4	15.7	11.8	28	23.2	16.2	12.2
29	20.7	14.5	10.9	29	21.5	15.1	11.3	29	22.3	15.6	11.7	29	23.1	16.2	12.1	29	23.9	16.7	12.6
30	21.4	15.0	11.2	30	22.2	15.6	11.7	30	23.0	16.1	12.1	30	23.8	16.7	12.5	30	24.6	17.2	12.9
31	22.1	15.5	11.6	31	23.0	16.1	12.0	31	23.8	16.6	12.5	31	24.6	17.2	12.9	31	25.4	17.7	13.3
32	22.9	16.0	12.0	32	23.7	16.6	12.4	32	24.5	17.1	12.8	32	25.3	17.7	13.3	32	26.1	18.2	13.7
33	23.6	16.5	12.4	33	24.4	17.1	12.8	33	25.2	17.6	13.2	33	26.0	18.2	13.6	33	26.8	18.7	14.1

## SMECTITIC

0% organic matter				0.25% organic matter				0.5% organic matter				0.75% organic matter				1% organic matter			
% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec	% clay	cec8.2	cec7	ecec
34	24.3	17.0	12.8	34	25.1	17.6	13.2	34	25.9	18.1	13.6	34	26.7	18.7	14.0	34	27.5	19.2	14.4
35	25.0	17.5	13.1	35	25.8	18.1	13.6	35	26.6	18.6	14.0	35	27.4	19.2	14.4	35	28.2	19.7	14.8
36	25.7	18.0	13.5	36	26.5	18.6	13.9	36	27.3	19.1	14.3	36	28.1	19.7	14.8	36	28.9	20.2	15.2
37	26.4	18.5	13.9	37	27.2	19.1	14.3	37	28.0	19.6	14.7	37	28.8	20.2	15.1	37	29.6	20.7	15.6
38	27.1	19.0	14.2	38	28.0	19.6	14.7	38	28.8	20.1	15.1	38	29.6	20.7	15.5	38	30.4	21.2	15.9
39	27.9	19.5	14.6	39	28.7	20.1	15.0	39	29.5	20.6	15.5	39	30.3	21.2	15.9	39	31.1	21.7	16.3
40	28.6	20.0	15.0	40	29.4	20.6	15.4	40	30.2	21.1	15.8	40	31.0	21.7	16.3	40	31.8	22.2	16.7
41	29.3	20.5	15.4	41	30.1	21.1	15.8	41	30.9	21.6	16.2	41	31.7	22.2	16.6	41	32.5	22.7	17.1
42	30.0	21.0	15.8	42	30.8	21.6	16.2	42	31.6	22.1	16.6	42	32.4	22.7	17.0	42	33.2	23.2	17.4
43	30.7	21.5	16.1	43	31.5	22.1	16.6	43	32.3	22.6	17.0	43	33.1	23.2	17.4	43	33.9	23.7	17.8
44	31.4	22.0	16.5	44	32.2	22.6	16.9	44	33.0	23.1	17.3	44	33.8	23.7	17.8	44	34.6	24.2	18.2
45	32.1	22.5	16.9	45	33.0	23.1	17.3	45	33.8	23.6	17.7	45	34.6	24.2	18.1	45	35.4	24.7	18.6
46	32.9	23.0	17.2	46	33.7	23.6	17.7	46	34.5	24.1	18.1	46	35.3	24.7	18.5	46	36.1	25.2	18.9
47	33.6	23.5	17.6	47	34.4	24.1	18.0	47	35.2	24.6	18.5	47	36.0	25.2	18.9	47	36.8	25.7	19.3
48	34.3	24.0	18.0	48	35.1	24.6	18.4	48	35.9	25.1	18.8	48	36.7	25.7	19.3	48	37.5	26.2	19.7
49	35.0	24.5	18.4	49	35.8	25.1	18.8	49	36.6	25.6	19.2	49	37.4	26.2	19.6	49	38.2	26.7	20.1
50	35.7	25.0	18.8	50	36.5	25.6	19.2	50	37.3	26.1	19.6	50	38.1	26.7	20.0	50	38.9	27.2	20.4
51	36.4	25.5	19.1	51	37.2	26.1	19.6	51	38.0	26.6	20.0	51	38.8	27.2	20.4	51	39.6	27.7	20.8
52	37.1	26.0	19.5	52	38.0	26.6	19.9	52	38.8	27.1	20.3	52	39.6	27.7	20.8	52	40.4	28.2	21.2
53	37.9	26.5	19.9	53	38.7	27.1	20.3	53	39.5	27.6	20.7	53	40.3	28.2	21.1	53	41.1	28.7	21.6
54	38.6	27.0	20.2	54	39.4	27.6	20.7	54	40.2	28.1	21.1	54	41.0	28.7	21.5	54	41.8	29.2	21.9
55	39.3	27.5	20.6	55	40.1	28.1	21.0	55	40.9	28.6	21.5	55	41.7	29.2	21.9	55	42.5	29.7	22.3
56	40.0	28.0	21.0	56	40.8	28.6	21.4	56	41.6	29.1	21.8	56	42.4	29.7	22.3	56	43.2	30.2	22.7
57	40.7	28.5	21.4	57	41.5	29.1	21.8	57	42.3	29.6	22.2	57	43.1	30.2	22.6	57	43.9	30.7	23.1
58	41.4	29.0	21.8	58	42.2	29.6	22.2	58	43.0	30.1	22.6	58	43.8	30.7	23.0	58	44.6	31.2	23.4
59	42.1	29.5	22.1	59	43.0	30.1	22.6	59	43.8	30.6	23.0	59	44.6	31.2	23.4	59	45.4	31.7	23.8
60	42.9	30.0	22.5	60	43.7	30.6	22.9	60	44.5	31.1	23.3	60	45.3	31.7	23.8	60	46.1	32.2	24.2

## SMECTITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
5	7.6	5.3	4.0	5	8.4	5.9	4.4	5	9.2	6.4	4.8	5	10.0	7.0	5.2	5	13.2	9.2	6.9
6	8.3	5.8	4.4	6	9.1	6.4	4.8	6	9.9	6.9	5.2	6	10.7	7.5	5.6	6	13.9	9.7	7.3
7	9.0	6.3	4.7	7	9.8	6.9	5.2	7	10.6	7.4	5.6	7	11.4	8.0	6.0	7	14.6	10.2	7.7
8	9.7	6.8	5.1	8	10.5	7.4	5.5	8	11.3	7.9	6.0	8	12.1	8.5	6.4	8	15.4	10.7	8.1
9	10.4	7.3	5.5	9	11.2	7.9	5.9	9	12.0	8.4	6.3	9	12.9	9.0	6.8	9	16.1	11.2	8.4
10	11.2	7.8	5.9	10	12.0	8.4	6.3	10	12.8	8.9	6.7	10	13.6	9.5	7.1	10	16.8	11.7	8.8
11	11.9	8.3	6.2	11	12.7	8.9	6.7	11	13.5	9.4	7.1	11	14.3	10.0	7.5	11	17.5	12.2	9.2
12	12.6	8.8	6.6	12	13.4	9.4	7.0	12	14.2	9.9	7.4	12	15.0	10.5	7.9	12	18.2	12.7	9.6
13	13.3	9.3	7.0	13	14.1	9.9	7.4	13	14.9	10.4	7.8	13	15.7	11.0	8.2	13	18.9	13.2	9.9
14	14.0	9.8	7.4	14	14.8	10.4	7.8	14	15.6	10.9	8.2	14	16.4	11.5	8.6	14	19.6	13.7	10.3
15	14.7	10.3	7.7	15	15.5	10.9	8.2	15	16.3	11.4	8.6	15	17.1	12.0	9.0	15	20.4	14.2	10.7
16	15.4	10.8	8.1	16	16.2	11.4	8.5	16	17.0	11.9	9.0	16	17.9	12.5	9.4	16	21.1	14.7	11.1
17	16.2	11.3	8.4	17	17.0	11.9	8.9	17	17.8	12.4	9.3	17	18.6	13.0	9.8	17	21.8	15.2	11.4
18	16.9	11.8	8.9	18	17.7	12.4	9.3	18	18.5	12.9	9.7	18	19.3	13.5	10.1	18	22.5	15.7	11.8
19	17.6	12.3	9.2	19	18.4	12.9	9.7	19	19.2	13.4	10.1	19	20.0	14.0	10.5	19	23.2	16.2	12.2
20	18.3	12.8	9.6	20	19.1	13.4	10.0	20	19.9	13.9	10.4	20	20.7	14.5	10.9	20	23.9	16.7	12.6
21	19.0	13.3	10.0	21	19.8	13.9	10.4	21	20.6	14.4	10.8	21	21.4	15.0	11.2	21	24.6	17.2	12.9
22	19.7	13.8	10.4	22	20.5	14.4	10.8	22	21.3	14.9	11.2	22	22.1	15.5	11.6	22	25.4	17.7	13.3
23	20.4	14.3	10.7	23	21.2	14.9	11.2	23	22.0	15.4	11.6	23	22.9	16.0	12.0	23	26.1	18.2	13.7
24	21.2	14.8	11.1	24	22.0	15.4	11.5	24	22.8	15.9	12.0	24	23.6	16.5	12.4	24	26.8	18.7	14.1
25	21.9	15.3	11.5	25	22.7	15.9	11.9	25	23.5	16.4	12.3	25	24.3	17.0	12.8	25	27.5	19.2	14.4
26	22.6	15.8	11.9	26	23.4	16.4	12.3	26	24.2	16.9	12.7	26	25.0	17.5	13.1	26	28.2	19.7	14.8
27	23.3	16.3	12.2	27	24.1	16.9	12.7	27	24.9	17.4	13.1	27	25.7	18.0	13.5	27	28.9	20.2	15.2
28	24.0	16.8	12.6	28	24.8	17.4	13.0	28	25.6	17.9	13.4	28	26.4	18.5	13.9	28	29.6	20.7	15.6
29	24.7	17.3	13.0	29	25.5	17.9	13.4	29	26.3	18.4	13.8	29	27.1	19.0	14.2	29	30.4	21.2	15.9
30	25.4	17.8	13.4	30	26.2	18.4	13.8	30	27.0	18.9	14.2	30	27.9	19.5	14.6	30	31.1	21.7	16.3
31	26.2	18.3	13.7	31	27.0	18.9	14.2	31	27.8	19.4	14.6	31	28.6	20.0	15.0	31	31.8	22.2	16.7
32	26.9	18.8	14.1	32	27.7	19.4	14.5	32	28.5	19.9	15.0	32	29.3	20.5	15.4	32	32.5	22.7	17.1
33	27.6	19.3	14.5	33	28.4	19.9	14.9	33	29.2	20.4	15.3	33	30.0	21.0	15.8	33	33.2	23.2	17.4

## SMECTITIC

1.25% organic matter				1.5% organic matter				1.75% organic matter				2% organic matter				3% organic matter			
% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec	% clay	cec8.2	cec7	eccec
34	28.3	19.8	14.9	34	29.1	20.4	15.3	34	29.9	20.9	15.7	34	30.7	21.5	16.1	34	33.9	23.7	17.8
35	29.0	20.3	15.2	35	29.8	20.9	15.7	35	30.6	21.4	16.1	35	31.4	22.0	16.5	35	34.6	24.2	18.2
36	29.7	20.8	15.6	36	30.5	21.4	16.0	36	31.3	21.9	16.4	36	32.1	22.5	16.9	36	35.4	24.7	18.6
37	30.4	21.3	16.0	37	31.2	21.9	16.4	37	32.0	22.4	16.8	37	32.9	23.0	17.2	37	36.1	25.2	18.9
38	31.2	21.8	16.4	38	32.0	22.4	16.8	38	32.8	22.9	17.2	38	33.6	23.5	17.6	38	36.8	25.7	19.3
39	31.9	22.3	16.7	39	32.7	22.9	17.2	39	33.5	23.4	17.6	39	34.3	24.0	18.0	39	37.5	26.2	19.7
40	32.6	22.8	17.1	40	33.4	23.4	17.5	40	34.2	23.9	18.0	40	35.0	24.5	18.4	40	38.2	26.7	20.1
41	33.3	23.3	17.5	41	34.1	23.9	17.9	41	34.9	24.4	18.3	41	35.7	25.0	18.8	41	38.9	27.2	20.4
42	34.0	23.8	17.9	42	34.8	24.4	18.3	42	35.6	24.9	18.7	42	36.4	25.5	19.1	42	39.6	27.7	20.8
43	34.7	24.3	18.2	43	35.5	24.9	18.7	43	36.3	25.4	19.1	43	37.1	26.0	19.5	43	40.4	28.2	21.2
44	35.4	24.8	18.6	44	36.2	25.4	19.0	44	37.0	25.9	19.4	44	37.9	26.5	19.9	44	41.1	28.7	21.6
45	36.2	25.3	19.0	45	37.0	25.9	19.4	45	37.8	26.4	19.8	45	38.6	27.0	20.2	45	41.8	29.2	21.9
46	36.9	25.8	19.4	46	37.7	26.4	19.8	46	38.8	26.9	20.2	46	39.3	27.5	20.6	46	42.5	29.7	22.3
47	37.6	26.3	19.7	47	38.4	26.9	20.2	47	39.2	27.4	20.6	47	40.0	28.0	21.0	47	43.2	30.2	22.7
48	38.3	26.8	20.1	48	39.1	27.4	20.5	48	39.9	27.9	21.0	48	40.7	28.5	21.4	48	43.9	30.7	23.1
49	39.0	27.3	20.5	49	39.8	27.9	20.9	49	40.6	28.4	21.3	49	41.4	29.0	21.8	49	44.6	31.2	23.4
50	39.7	27.8	20.9	50	40.5	28.4	21.3	50	41.3	28.9	21.7	50	42.1	29.5	22.1	50	45.4	31.7	23.8
51	40.4	28.3	21.2	51	41.2	28.9	21.7	51	42.0	29.4	22.1	51	42.9	30.0	22.5	51	46.1	32.2	24.2
52	41.2	28.8	21.6	52	42.0	29.4	22.0	52	42.8	29.9	22.4	52	43.6	30.5	22.9	52	46.8	32.7	24.6
53	41.9	29.3	22.0	53	42.7	29.9	22.4	53	43.5	30.4	22.8	53	44.3	31.0	23.2	53	47.5	33.2	24.9
54	42.6	29.8	22.4	54	43.4	30.4	22.8	54	44.2	30.9	23.2	54	45.0	31.5	23.6	54	48.2	33.7	25.3
55	43.3	30.3	22.7	55	44.1	30.9	23.2	55	44.9	31.4	23.6	55	45.7	32.0	24.0	55	48.9	34.2	25.7
56	44.0	30.8	23.1	56	44.8	31.4	23.5	56	45.6	31.9	24.0	56	46.4	32.5	24.4	56	49.6	34.7	26.1
57	44.7	31.3	23.5	57	45.5	31.9	23.9	57	46.3	32.4	24.3	57	47.1	33.0	24.8	57	50.4	35.2	26.4
58	45.4	31.8	23.9	58	46.2	32.4	24.3	58	47.0	32.9	24.7	58	47.9	33.5	25.1	58	51.1	35.7	26.8
59	46.2	32.3	24.2	59	47.0	32.9	24.7	59	47.8	33.4	25.1	59	48.6	34.0	25.5	59	51.8	36.2	27.2
60	46.9	32.8	24.6	60	47.7	33.4	25.0	60	48.5	33.9	25.4	60	49.3	34.5	25.9	60	52.5	36.7	27.6



# APPENDIX B

Data elements for VALUES (Virginia Agronomic Land Use and Evaluation System)

VALUES data tables attached (from Soil Test and Liming Recommendations for Virginia, Virginia Cooperative Extension Report).

Data elements added in several tables.

## Component and Component Crop Yield Tables

VA Soil Management Group entered for each component in **Component** Table.

The screenshot shows the NASIS - MLRA14 Office software interface. The main window displays three tables: Data Mapunit, Component, and Component Crop Yield. The Component table has columns for various soil properties, including 'VA Soil Mgmt Grp'. The Component Crop Yield table has columns for crop yields, including 'Yields' and 'VA Soil Prod Grp'. A red arrow points from the text 'VA Soil Management Group entered for each component in Component Table.' to the 'VA Soil Mgmt Grp' column in the Component table. A blue circle highlights the 'Yields' column in the Component Crop Yield table. A purple circle highlights the 'VA Soil Prod Grp' column in the Component Crop Yield table.

DMU ID	DMU Description	Farm Class	HEL	HEL Water	HEL Wind
392798	VA181014AEmoria fsl, 0-2%	1	not highly erodible	not highly erodible	

CA Story Index	FL Eco1 Comm #	FL HE	FL PHE	FL Leach Pot	FL Runoff Pot	FL Temik	FL Triumph	IN Drainage Grp	IN NO3 Leach Index	MI Soil Mgmt Grp	VA Soil Mgmt Grp	SIR #	Rec ID
1st edition										R	VA0202		850927

Seq	Crop Name	Units	Low	RV	High	Low	RV	High	Prod Index	VA Soil Prod Grp
1	corn	bushels		120,00						IIIa
2	peanuts	pounds		4000,00						II
3	soybeans	bushels	30,00	40,00	40,00					II
4	wheat	bushels	56,00	56,00	70,00					II
5	cotton lint	pounds		650,00						II
6	grass-legume hay	tons		4,00						II
7	pasture	animal unit months		10,00						II

Yields and VA Soil Productivity Group entered in **Component Crop Yield** Table.

## Data Mapunit Crop Yield

Yields also entered for mapunit in **Data Mapunit Crop Yield** Table.

The screenshot shows the NASIS - MLRA14 Office application window. The menu bar includes File, Edit, View, Options, and Help. The toolbar contains icons for Save, Cut, Copy, Paste, Table (up/down arrows), Sort, Object Status (Unchanged), Edit Setup (Default), Default Group (Virginia), Cell Status, and a Help icon. Below the toolbar is a status bar with CLEAR, CANCEL, and a zoom control. The main data area is divided into two sections. The top section, titled 'Data Mapunit', contains a table with columns: DMU ID, DMU Description, Farm Class, HEL, HEL Water, and HEL Wind. The bottom section, titled 'Data Mapunit Crop Yield', contains a table with columns: Seq, Crop Name, Units, Low, Nirr Yield, High, Low, Irr Yield, High, and Rec ID. A red circle highlights the 'Nirr Yield' column for the 'corn' entry (Seq 1).

Data Mapunit					
DMU ID	DMU Description	Farm Class	HEL	HEL Water	HEL Wind
392798	VA181014AEmoria fsl, 0-2%	1	not highly erodible	not highly erodible	

Data Mapunit Crop Yield									
Seq	Crop Name	Units	Nirr Yield			Irr Yield			Rec ID
			Low	RV	High	Low	RV	High	
1	corn	bushels		120,00					998207
2	peanuts	pounds		4000,00					998208
3	soybeans	bushels		40,00					998209
4	wheat	bushels		56,00					998210
5	cotton lint	pounds		650,00					998211
6	grass-legume hay	tons		4,00					998212
7	pasture	animal unit months		10,00					998213