FINAL REPORT
for the
COASTAL MANAGEMENT PROGRAM
entitled
A STUDY OF PRIVATE SEWAGE SYSTEM REGULATIONS AND THEIR APPLICABILITY TO THE LAKE SUPERIOR CLAYEY TILL PLAIN

Submitted by Sandra Dee Schultz, County Conservationist
Ashland, Bayfield, Douglas and Iron Counties Land Conservation Department

Forward: *This project is a result of personal experience with replacing a failed septic system. Through this process, it became apparent that there was a lack of understanding of the clayey till soils found on the Lake Superior clay plain. Through the Land Conservation Department's association with the USDA-Natural Resources Conservation Service (NRCS)/Soil Survey Project in Ashland, we were able to develop a program to address this need. The opportunity to improve the knowledge, skills and professionalism of the Certified Soil Testers-Morphologic in Northern Wisconsin, is one that will be appreciated by those desiring to locate homes or businesses in northern Wisconsin as well as those who already enjoy our unique quality of life. Special Thanks to Kim Goerg, Soil Survey Project Leader; Carl Lippert, DILHR Wastewater Specialist; Lad Strzok, CSTM; Dave Lee, former Bayfield County Zoning Administrator; and the Ashland Agricultural Research Station for use of the facilities.*

S592.367 .S38 1995

PROJECT JUSTIFICATION

Current evaluation techniques to determine suitability of clayey till soils for private sewage systems are inadequate due to the need for soil morphology training, insufficient understanding of permeability, and inconsistent application of the current regulations governing private sewage systems. This misunderstanding of red clayey till soils causes undo expense to landowners replacing or constructing private sewage facilities and causes a potential source of pollution by limiting the method of waste treatment along the Lake Superior clayey till plain.

PROJECT LOCATION

Clayey till soils found along the Lake Superior Clayey Till Plain. (See Figure 1 & 1A).

EXPECTED RESULTS

This project was designed to:

1. demonstrate the need for laboratory analysis of the physical properties of soil samples taken for the purpose of recommending and constructing private sewage systems; and
2. demonstrate the need for additional specialized training in determining the morphology of clayey till soils, to include horizonation, structure and mottling; and
3. recommend modifications to the existing approved mound system design; and
4. develop criteria to identify rural septage as nonpoint source pollution and thereby eligible for cost-sharing through the Wisconsin Priority Watershed Program.

WORK PRODUCTS

1. Written evaluations of the educational workshop to determine the need for future similar workshops.
2. Written report of the comparison of hand-textural analysis completed by a CSTM vs laboratory ysis results of the same samples.

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592.367
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1995

commendation to DILHR for reevaluating current soil testing procedures as they pertain to ils found along the Lake Superior Till Plain.

commendation outlining alternatives and/or modifications to the existing approved mound n.

Phase I Soil Analysis

METHODOLOGY OF SOIL ANALYSIS

1. Certified Soil Testers-Morphologic (CSTMs) collected soil samples from private lands designated for home construction or replacement of failed septic systems.
2. CSTMs labeled samples and identified results of hand texturing the sample.
3. Samples were received by the Land Conservation Department and submitted to the UW Soil and Forage Analysis Laboratory in Marshfield for physical analysis.
4. Samples were submitted in one batch to insure consistency in analysis procedures.

RESULTS OF COMPARISON OF HAND-TEXTURING vs LABORATORY PHYSICAL ANALYSIS - *Refer to Figure 2 for a visual comparison*

Although 23% of the samples matched both hand texturing and laboratory results, the remaining 77% were educated guesses at best. Even USDA Soil Scientists, when classifying soils by texture, rely heavily on laboratory physical analysis for final textural classification when dealing with clay till soils.

As indicated in Figure 2, most of the samples lie near the boundaries between textural classes. According to the Soil and Site Evaluation Handbook, published by DILHR (p.18;publ. SBD-9046-P(R.02/93)) and intended as a guide for completing soil evaluations for private sewage systems:

> *Field estimates are subject to error. They need to be checked against laboratory determinations of particle-size distribution, and the field criteria should be adjusted as necessary. The soil scientist should not attempt to estimate texture with greater precision than is justified by the reliability of field estimates.* ***For most soils, for example, attempting to distinguish loam from silt loam is futile if the textures of the samples are near the boundary between the classes.***

These statements outline the need to verify field evaluations by including supporting laboratory data in the final Soil and Site Evaluation Report (Figure 3). Because textural class, expressed numerically, is one component used in determining the breakpoint as to the type and size of systems that can be used, it is important to represent the sample accurately. By including these results, more accurate recommendations would be made.

Recommendation: *As part of the application process,* ***require*** *supporting laboratory analysis of the physical composition of red clayey till soil samples determined by hand-texturing to be on or near the boundary between textural classes.*

Phase II Training Session

RESULTS OF TRAINING SESSION

A training workshop entitled "Soils Training Workshop For Certified Soil Testers-Morphologic" was held on Friday July 21, 1995 at the Ashland Agricultural Research Station (see Figure 4). The workshop was designed to:

1. Provide CSTMs with an opportunity to conduct soils investigations on red clayey till soils (practice pits).
2. Provide CSTMs with information regarding proposed modifications to the existing regulations governing private sewage facilities.
3. Offer CSTMs specialized training in the morphologic evaluation of red clayey till soils found on the Lake Superior till plain and specifically targeting permeability, texture and structure.

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

The workshop was attended by twenty-five CSTMs and local Zoning Officials from around the Lake Superior area and from the Lake Michigan area. Program agenda included:

-Early morning discussion included updates on proposed rule changes regarding private sewage systems by Carl Lippert/DILHR Wastewater Specialist;

-Mid morning field exercise evaluating soils in Test Pits 1, 2 and 3 by all;

-Late morning classroom discussion of test pits and properties of red clayey till soils by Kim Goerg/USDA-NRCS/Soil Survey Project Leader.

Structure, texture and permeability of red clayey till soils were topics covered during the late morning session. Each of these characteristics is a critical component in the determination of the type of treatment system allowable on site and also dictates how raw sewage disposal is handled.

Structure: Red clayey till soils, for the purpose of private sewage facilities, were thought to have massive structure. This criterion alone would prohibit the use of any sewage system except the holding tank, under Wisconsin Administrative Code.

If Lake Superior clayey till soils are evaluated at their optimum moisture content, moderate to strong structure is apparent (optimum moisture is *MOIST for clay soils*). This clarification will allow for mound systems and other alternative treatment systems and reduce the waste disposal problems from pumping holding tanks.

Permeability/Hydraulic Conductivity: Permeability is a function of both texture and structure. For many soils, texture alone has considerable impact on the degree of permeability. To determine the permeability class, compare the textural classification with permeability, then review other factors to make the final determination (i.e. structure, density, pore size, organic matter, clay mineralogy, or other factors within the pedon).

Table 1 identifies the various hydraulic conductivity classes and Figure 17 lists maximum wastewater infiltration rates for soil absorption systems (both table 1 and figure 17 are from the Soil and Site Evaluation Handbook, SBD-9046-P (R.02/93), DILHR, pp. 41 & 73-75). Table 1 is used to determine soil properties and Figure 17, once soil properties are determined, is used to identify the filter bed loading rates. These reference material appear to directly conflict. High and low clay content need to be defined as to their position on the textural triangle and supporting laboratory physical analysis should be provided to determine the hydraulic conductivity class and the soil absorption system loading rate. As this handbook is written, the breakpoints between the categories for both table 1 and figure 17 are ambiguous.

Questions also arise how clayey soils (soils with greater than 40% clay content) could possibly be considered to support a filter bed for a conventional system. This clay content alone would indicate reduced permeability and an increased risk of failure. The information contained in the tables should be revisited to determine clarity and accurateness.

The information provided by USDA-NRCS/Soil Survey (copies provided in Appendix B) aids in making field evaluations of soils based on location in the landscape, location in MLRA 92 (see figure 1A), and proximity to Lake Superior. Until supporting laboratory data is required for certified soil tests, this information can be used to infer if a site has adequate permeability for the selected private sewage systems. This information can also be valuable in making determinations whether sewage sludge can be spread on certain soil types, thereby reducing runoff potential from cropped fields.

Texture: As discussed on previously.

PROGRAM EVALUATION

The response to the Training Workshop was very positive. Appendix A, at the back of this report, contains written responses regarding the training course.

Program Evaluation, cont.

Recommendation: *Repeat this training course at a future date. A similar course could also be offered at various locations. DILHR should work with local USDA-NRCS/Soil Survey Projects to coordinate region specific agendas. UW-Extension or Land Conservation Departments should help to coordinate the programs. Additional training should help to improve the knowledge and skills of the certified soil testers and ultimately help reduce the amount of untreated sewage being pumped by* ***utilizing*** *the natural red clayey till soil filters for treatment (under mound systems). Ultimately, this should help to reduce the risk of runoff of sludge spread on fields, reduce the number of failing septic systems by offering alternatives to a monthly pumping fee, and reduce the number of overflowing holding tanks in the Lake Superior Clayey Till Plain (MLRA 92).*

Items Not Addressed Under This Grant

The scope of the project became very focused after beginning the work. Items outlined as expected results but were not addressed as part of this project due to time constraints or new information:

Expected Result #3 - Recommending modifications to the existing mound system design. DILHR is currently reviewing alternative sanitary treatment systems through their regular program evaluation.

Expected Result #4 - No criteria were developed to identify rural seepage as nonpoint source pollution and thereby eligible through the Wisconsin Priority Watershed Program for cost-share dollars. A program called the Wisconsin Fund already exists. Recommendations were made to the Priority Watershed Program, however, for each Management Plan to discuss the importance of properly functioning private sewage systems and the role they play in fight for clean water.

FIGURE 1
PROJECT LOCATION MAP

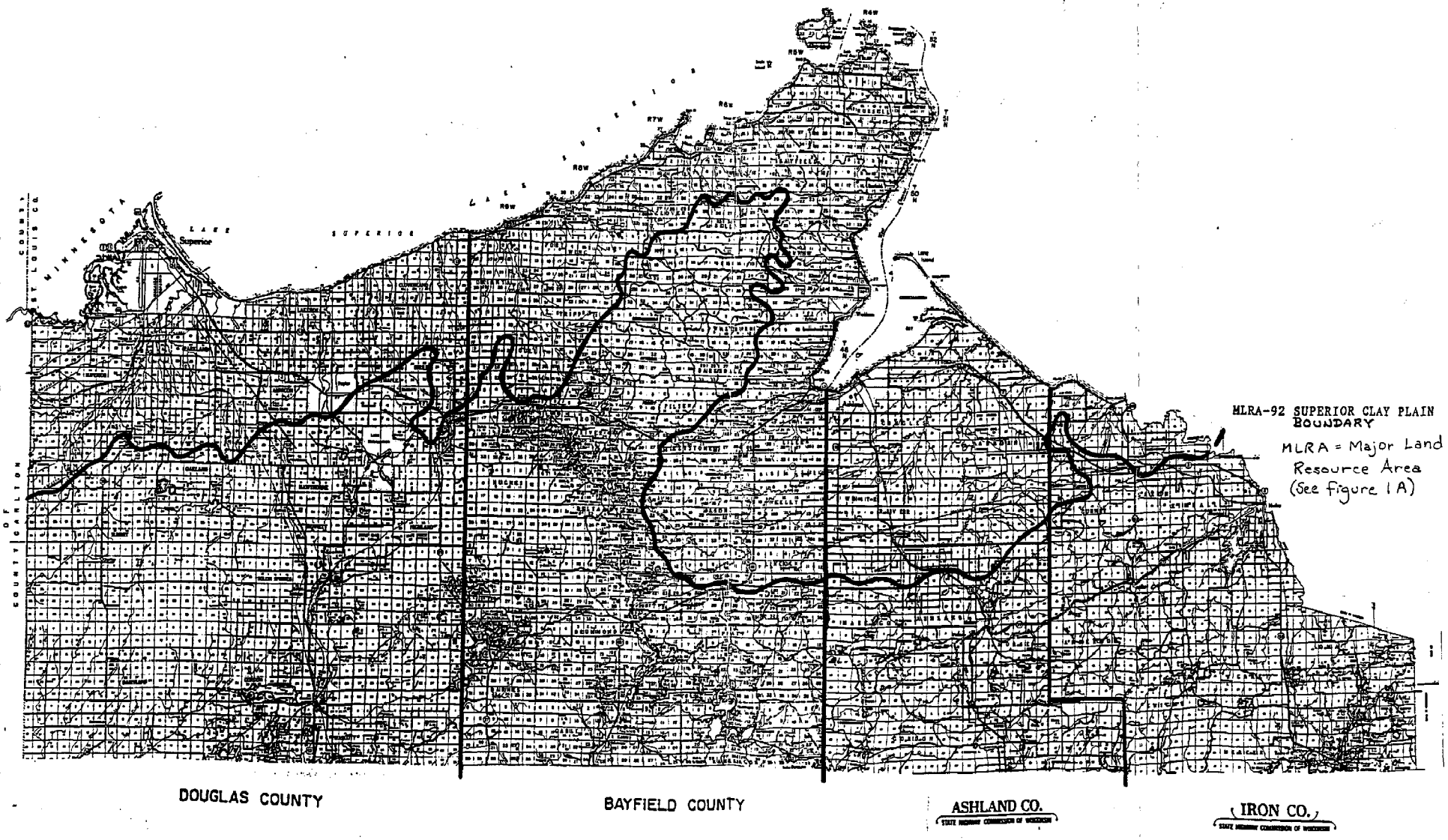
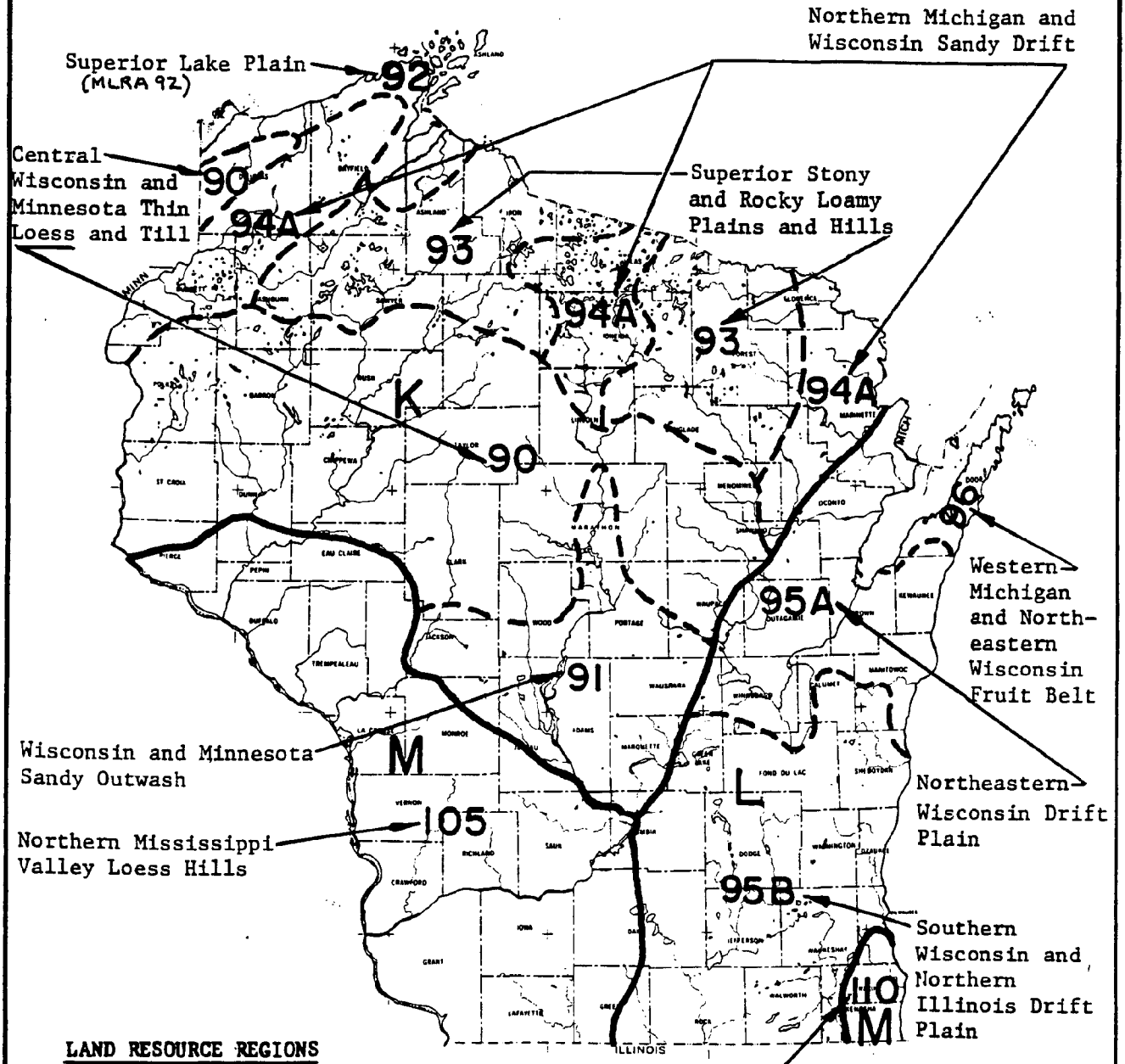


FIGURE 1A

10A

MAJOR LAND RESOURCE AREAS FOR WISCONSIN



LAND RESOURCE REGIONS

K---- Northern Lake States Forest and Forage Region

L---- Lake States Fruit, Truck, and Dairy Region

M--- Central Feed Grains and Livestock Region

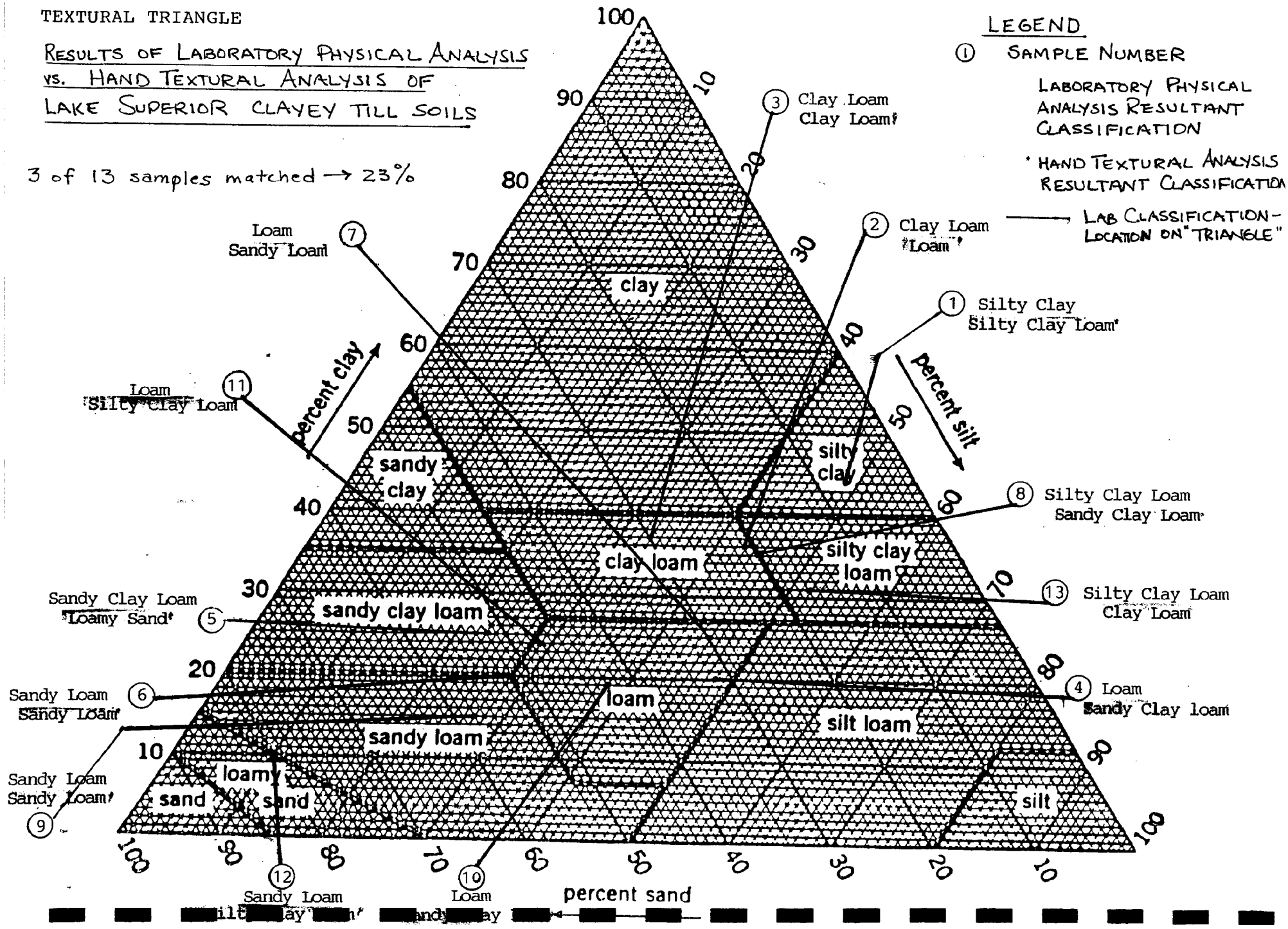
_ _ _ _ Land Resource Area Boundary

_____ Land Resource Region Boundary (or Area)

FIGURE 2:
TEXTURAL TRIANGLE

RESULTS OF LABORATORY PHYSICAL ANALYSIS vs. HAND TEXTURAL ANALYSIS OF LAKE SUPERIOR CLAYEY TILL SOILS

3 of 13 samples matched → 23%



Wisconsin Department of Industry,
Labor and Human Relations
Division of Safety and Buildings

SOIL AND SITE EVALUATION FIGURE 3

in accordance with s. ILHR 83.09, Wis.

Page ____ of ____

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and ...nt slope, scale or dimensions, north arrow, and location and distance to nearest road.

County

Parcel I.D. #

Reviewed by | Date

APPLICANT INFORMATION - *Please print all information.*

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

Property Owner

Property Owner's Mailing Address

City | State | Zip Code | Phone Number ( )

Property Location
☐ Govt. Lot ☐ 1/4 ☐ 1/4,S ☐ T ☐ ,N,R ☐ E (or) W

Lot # | Block# | Subd. Name or CSM#

☐ City ☐ Village ☐ Town | Nearest Road

☐ New Construction ☐ Replacement

Use: ☐ Residential / Number of bedrooms _____ Addition to existing building _____
☐ Public or commercial - Describe: _____

Code derived daily flow _____ gpd

Recommended design loading rate _____bed, gpd/ft^2_____trench, gpd/ft^2

Absorption area required _____bed, ft^2_____trench, ft^2

Maximum design loading rate _____bed, gpd/ft^2_____trench, gpd/ft^2

Recommended infiltration surface elevation(s) _____ft (as referred to site plan benchmark)

Additional design/site considerations _____

Parent material _____ Flood plain elevation, if applicable _____ft

S = Suitable for system U = Unsuitable for system	Conventional	Mound	In-Ground Pressure	AT-Grade	System in Fill	Holding Tank
	☐ S ☐ U	☐ S ☐ U	☐ S ☐ U	☐ S ☐ U	☐ S ☐ U	☐ S ☐ U

SOIL DESCRIPTION REPORT

...ig #

Ground elev. ____ft.

Depth to ...iting ...actor ____in.

Horizon	Depth in.	Dominant Color Munsell	Mottles Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	Roots	GPD/ft^2 Bed	GPD/ft^2 Trench

Remarks: _____

...oring #

...round ...ev. ____ft.

...th to ...

____in. Remarks: _____

ST Name (Please Print) | Signature | Telephone No.

Address | Date | CST Number

FIGURE 4

Soils Training Workshop For Certified Soil Testers -Morphologic

Friday July 21, 1995
8:30 am - 1:00 pm
U.W. Ashland Agricultural Research Station

SPONSORED BY
Wisconsin Coastal Management Program
ABDI - Land Conservation Department
Natural Resources Conservation Department
DILHR
UW Agricultural Research Station

Pre-Registration Required
BY 3:00 p.m. Tuesday JULY 18, 1995

**Lunch courtesy of the ABDI-LCD and the Wisconsin Coastal Management Program & catered by Ann Skalon*

ABDI-Land Conservation Department
P.O. Box 267
Ashland, WI 54806-0267

Pre-Registration Required by July 18, 1995

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ATTENDING _____

SEND TO: ABDI-LCD
2012 W. 3rd Street, P.O Box 267
Ashland, WI 54806-0267
OR TELEPHONE: (715)682-7187

This Workshop is designed to:

- *provide certified soil testers with an overview of soil evaluation techniques specific to red clayey till soils found on the Lake Superior till plain;*
- *provide certified soil testers with information concerning proposed modifications to the existing regulations governing private sewage facilities;*
- *offer CSTMs specialized training for the morphologic evaluation of the red clayey till soils found on the Lake Superior till plain specifically targeting permeability and structure, and*
- *provide CSTMs a view of a model cross section of a conventional system and mound system. The model will be on display during the workshop*

Program Agenda

Soils Training Workshop For CSTMs

Registration
8:00 am (Coffee & Rolls)

Welcome
8:15 am ***Sandy Schultz & Mike Mlynarek***

Presentations
8:40 am Proposed modifications to existing rules governing private sewage systems
- Carl Lippert

9:10 am Field Evaluations of Red Clayey Till Soils
- Kim Goerg

9:20 am Test Pit # 1
9:50 am Test Pit # 2
10:20 am Test Pit # 3

11:00 am Classroom Discussion of Test Pits and Properties of Red Clayey Till Soils
- Kim Goerg

11:50 am Open Discussion - All

Lunch
12:00 pm Lunch provided

PRESENTERS

Kim Goerg
Soil Survey Project Leader
USDA Natural Resources Conservation Service

Carl Lippert
Wastewater Treatment Specialist
Department of Industry, Labor and Human Relations

Mike Mlynarek
Assistant Superintendent
Ashland Agricultural Research Station

Sandy Schultz
County Conservationist
ABDI Land Conservation Department

For More Information Contact

Ashland Bayfield Douglas Iron
Land Conservation Department
682-7187

Table 1

Guide for predicting the class of saturated vertical hydraulic conductivity from soil properties

Class	Soil Properties
Very High	- Fragmental. - Sandy with coarse sand or sand texture, and loose consistence - More than 0.5 percent medium or coarser vertical pores with high continuity
High	- Other sandy, sandy-skeletal, or coarse-loamy soil material that is very friable, friable, soft or loose - When very moist or wet has moderate or strong granular structure, or, strong blocky structure of any size or prismatic finer than very coarse, and many surface features except stress surfaces or slickensides on vertical surfaces of structural units - 0.5 to 0.2 percent medium or coarser vertical pores with high continuity
Moderate	- Sandy in other consistence classes except extremely firm or cemented - 18 to 35 percent clay with moderate structure except platy or with strong very coarse prismatic, and with common surface features except stress surfaces or slickensides on vertical surfaces of structural units - 0.1 to 0.2 percent medium or coarser vertical pores with high continuity
Moderately Low	- Other sandy classes that are extremely firm or cemented - 18 to 35 percent clay with other structures and surface conditions except pressure or stress surfaces - greater than or equal to 35 percent clay and moderate structure except if platy or very coarse prismatic, and with common vertical surface features except stress surfaces or slickensides - Medium or coarser vertical pores with high continuity percent but less than 0.1 percent
Low	- Continuous moderate or weak cementation greater than or equal to 35 percent clay and meets one of the following: weak structure; weak structure with few or no vertical surface features; platy structure; common or many stress surfaces or slickensides
Very Low	- Continuously indurated or strongly cemented and less than common roots - greater than 35 percent clay and massive or exhibits horizontal depositional strata and less than common roots

FIGURE 17

MAXIMUM WASTEWATER INFILTRATION RATES FOR SOIL ABSORPTION SYSTEMS

If the answer to the condition is yes, the infiltrative, exposed natural soil surface for the system shall be sized using the identified soil loading factor in gallons per square foot per day [1, 2, 3].

Soil Condition	Beds	Trenches
A. Is the soil texture of the entire profile 3 feet below the infiltrative surface extremely gravelly sand, gravelly coarse sand or coarser?	0.4[4]	0.4[4]
B. Is the soil structure of the horizon moderate or strong platy?	NP[5,6]	0.2[7]
C. Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam, silt loam or finer, and the soil structure weak platy?	NP[5,6]	0.3[7]
D. Is the moist soil consistence of the horizon stronger than firm or any cemented class?	NP[5,6]	NP[5,6]
E. Is the soil texture of the horizon sandy clay, clay or silty clay of high clay content, and the soil structure massive or weak?	NP[5,6]	NP[5,6]
F. Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam, silt or silt loam and the soil structure massive?	NP[5,6]	0.2[7]
G. Is the soil texture of the horizon sandy clay, clay or silty clay of low clay content, and the soil structure moderate or strong?	0.2	0.3
H. Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam or silt loam and the soil structure weak?	0.2	0.3

I.	Is the soil texture of the horizon sandy clay loam, clay loam or silty clay loam, and the soil structure moderate or strong?	0.4	0.5
J.	Is the soil texture of the horizon loam or sandy loam and massive soil structure?	0.3	0.4
K.	Is the soil texture of the horizon loam or sandy loam and the soil structure weak?	0.4	0.5
L.	Is the soil texture of the horizon sandy loam, loam or silt loam, and the soil structure moderate or strong?	0.5	0.6
M.	Is the soil texture of the horizon very fine sand or loamy very fine sand? Or condition N below but with massive soil structure?	0.4	0.5
N.	Is the soil texture of the horizon fine sand or loamy fine sand?	0.5	0.6
O.	Is the soil texture of the horizon loamy sand, sand or coarse sand?	0.7	0.8

Footnotes for Figure 17

1. The infiltration rates may be adjusted due to crossing horizons at the proposed infiltrative surface. Where such conditions occur, a weighted average may be used to determine the infiltration rate.

2. The infiltration rates and soil conditions specified may be verified by the county or department, who may require modification of these rates, particularly where soil conditions exist that are not specifically referenced in this table.

3. A soil description report (SBD-8330) shall be completed for each soil profile. The reported texture, structure and consistence shall be used in calculating the loading rate of the infiltration soil surface.

4. Pressure distribution shall be provided in accordance with s. ILHR 83.14, except that doses shall be provided more than 4 times per day to increase retention time. Department written approval is required for sites where voids between gravels and cobbles are not filled with soil material of 2 millimeters or less in size. If at least a 6-foot separation below the proposed system to a limiting factor is evaluated and determined, or if a sand textured blanket at least one-foot thick is provided at the infiltration surface, then a soil loading rate of 0.8 may be used with or without pressure distribution. Split spoon or power auger equipment may be used for evaluations at depths of more than 3 feet below the proposed system, provided such usage is noted on the soil description report.

5. NP = Not permitted. Systems may be permitted in these soils only with prior department approval. Site specific department approval will not be required where standard approvals have been issued based on a design concept or regional soil conditions.

6. Soil horizons meeting conditions D or E are not permitted within 3 feet below the infiltrative surface of either seepage beds or trenches. Soil horizons meeting conditions B, C or F are not permitted within 3 feet below the infiltrative surface of seepage beds.

7. Pressure distribution is required.

APPENDIX A:

Written Evaluations
of the
CSTM Soils Training Workshop

SAFETY & BUILDINGS DIVISION

201 E. Washington Avenue
P.O. Box 7969
Madison, Wisconsin 53707

AUG 16 1995

State of Wisconsin
Department of Industry, Labor and Human Relations

DILHR-Safety & Buildings Division
209 W First St
Route 8 Box 8072
Hayward WI 54843

August 15, 1995

Wisconsin Coastal Management Program
Oscar Herrera, Chief
PO Box 7868
Madison WI 53707-7868

Dear Mr. Herrera:

I recently had the opportunity to both participate and attend a Soils Training Workshop for certified soil testers on July 21, 1995. The course was made available by the area Land Conservation Department in Ashland.

As a Wastewater Specialist for the Dept. of Industry, Labor and Human Relations, it is my job to oversee the certified soil testers in my district. Classes of this type will make my job easier and will allow for more professionalism from the testers. I only hope that all of the counties in my district would offer so helpful a course. As this course was so specific to the region (red clay soils), it gave the testers information that they can relate to instantly and use in their own work. I have not attended a more timely, interesting program.

I wish to thank you for the assistance in funding this program. I'm sure any further programs which Sandy Schultz and Kim Goerg are involved in will be met with great enthusiasm from our area soil testers. Thanks again.

Sincerely,

Carl J. Lippert
Wastewater Specialist
DILHR-Safety & Buildings Division

CJL:jkd
cc: Gary Gylund
Sandy Schultz ✓

APR 21 1994

CORRESPONDENCE / MEMORANDUM **STATE OF WISCONSIN**

DATE: April 18, 1994

TO: Gary Gylund, Department of Administration
Wisconsin Coastal Management Program

COPIES TO: Carl Lippert
Sandy Schultz

FROM: Bennette Burks, Chief, Private Sewage Section
608/266-0056-*voice*, 608-267-0592-*fax*

SUBJECT: Grant Proposal to Study the Lake Superior Clay Plain

The Private Sewage Section supports your agency's funding of the proposal submitted by the Ashland Land Conservation Department. This proposal, which is to study the applicability of the Private Sewage System Code (Chapter ILHR 83, Wis. Adm. Code) to the clay soils in Ashland and surrounding counties. These soils have been quite troublesome, and I welcome the efforts of the Land Conservation Department and your agency to develop alternative solutions.

If you have any questions about this or other grant proposals involving the siting of private sewage systems, please feel free to call me.

JUL 25 1995

Hi Sandy,

Thanks for the work I believe the people that were there learned a bit more on dealing with the clay plain soils problems.

Thanks again

Lad Anzek

SPEED MESSAGE

JUL 25 1995

TO SANDY SCHULTZ
COUNTY CONSERVATIONIST

FROM DAVID LEE
LAND RECORDS DEPT
POBox 878 - WASHBURN

SUBJECT SOILS WORKSHOP

DATE JULY 24, 1995

SANDY -

JUST A NOTE TO THANK YOU, KIM, MIKE, AND OTHERS INVOLVED WITH LAST FRIDAY'S SOILS TRAINING WORKSHOP.

GOOD EFFORT ! I THOUGHT ALL ASPECTS OF THE WORKSHOP WENT WELL - GOOD TOPIC, GOOD PRESENTORS, GOOD LOCATION, GOOD LUNCH, GOOD ORGANIZATION.

I HOPE THIS TRAINING WILL PROVE VALUABLE TO THOSE CST'S WORKING ON THE SUPERIOR CLAY PLAIN.

SIGNED David K Lee

ORIGINAL

WilsonJones - Carbonless - MADE IN USA
44-900 Duplicate

ASHLAND COUNTY ZONING ADMINISTRATION
Ashland County Court House, Room 109
201 W. Main Street
Ashland, WI 54806-1652
Phone 682-7014

July 28, 1995

Sandy Schultz
A.B.D.I.-Land Conservation Dept.
P.O. Box 267
Ashland, WI. 54806

Dear Sandy,

Thank you for putting on the soils training workshop.

This was a very informative workshop.

The speakers all did an excellent job of dismounting relevant information.

The class was well received by soil testers and plumbers as well as the code administrators who were present.

Thanks again!

Sincerely,

L.A. HILDEBRANDT

Lawrence A. Hildebrandt
Ashland County Zoning Administrator

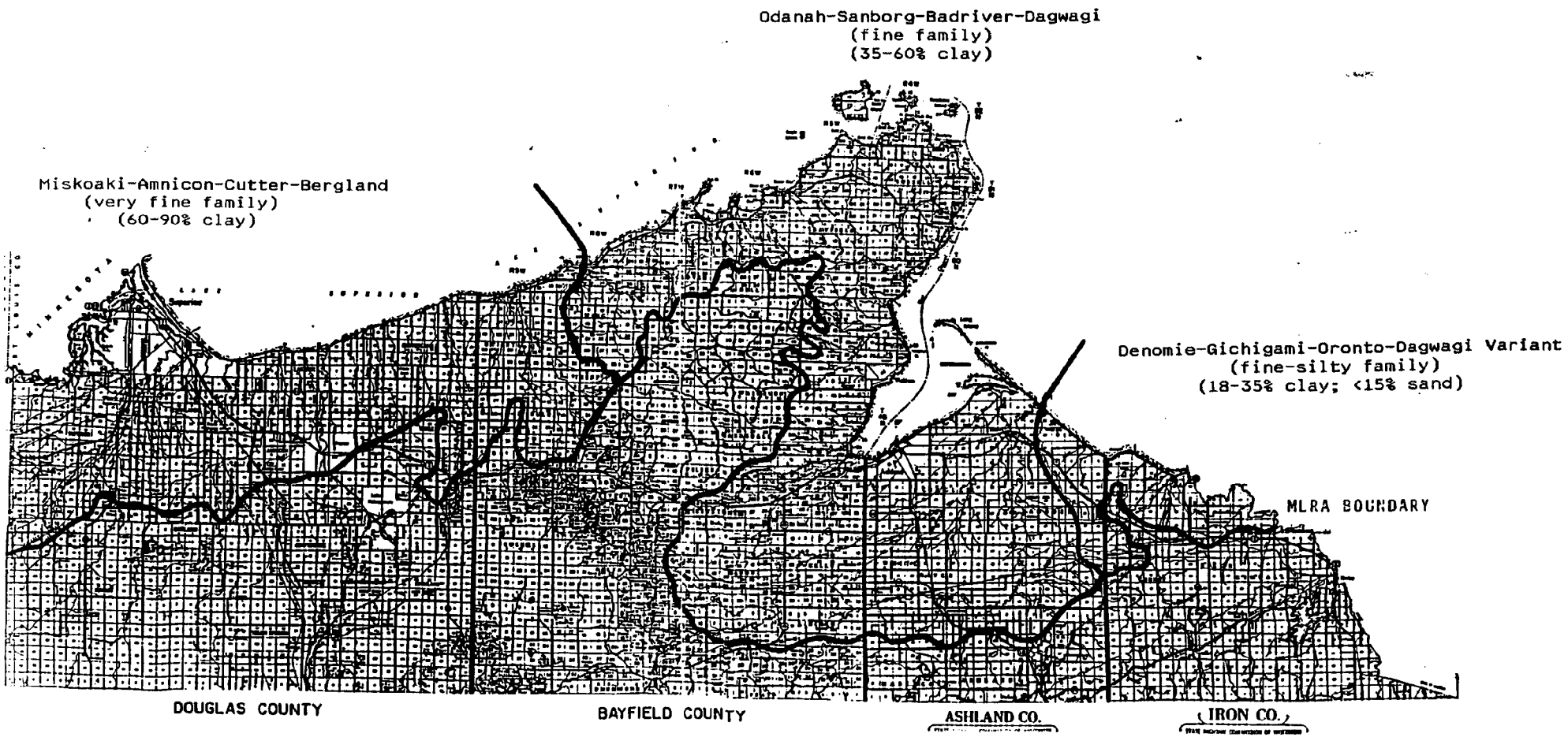
LAH/lmg

cc: File

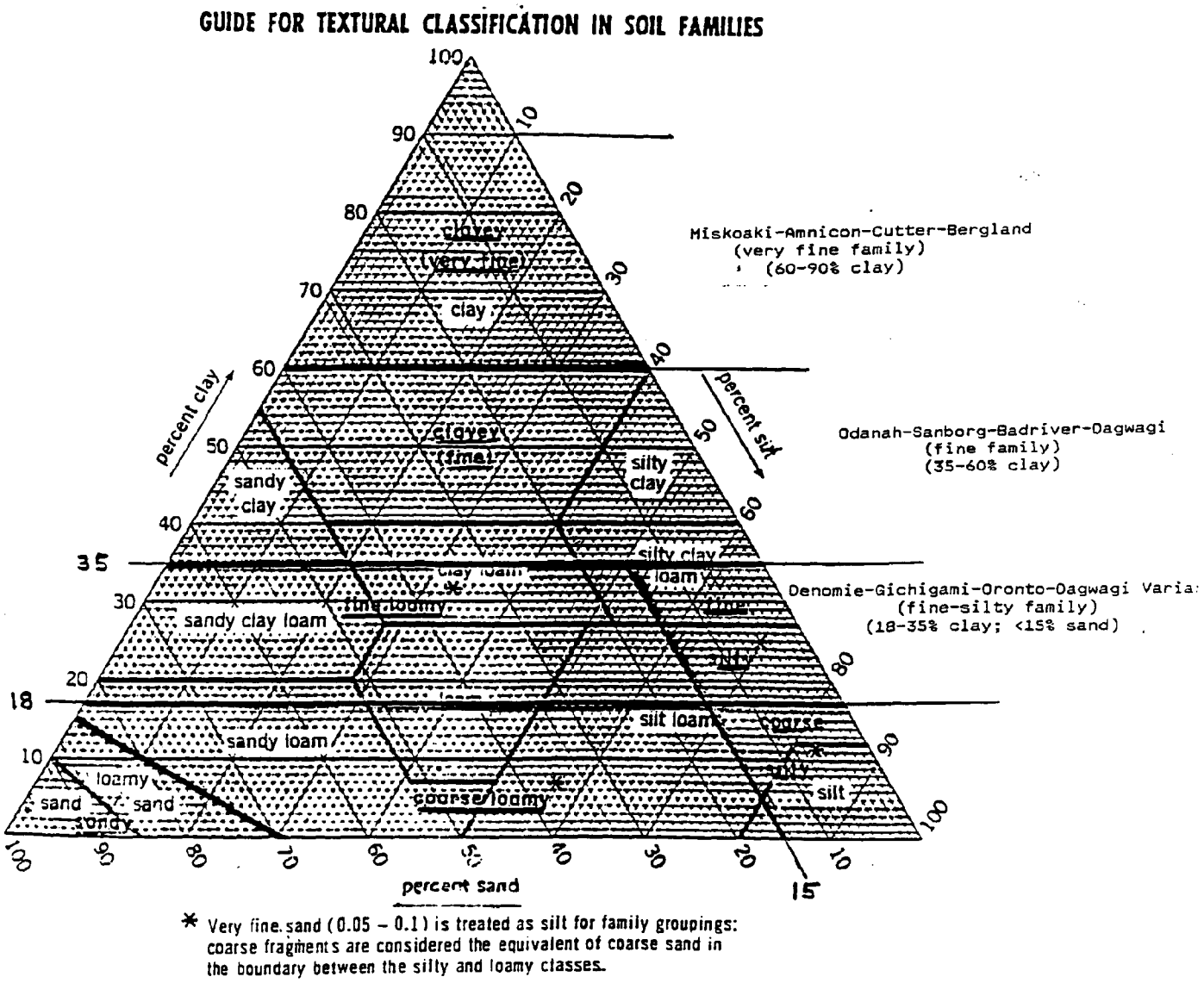
APPENDIX B:

Lake Superior Clayey Till Soil Information
as presented by
USDA-NRCS/Soil Survey Project at the
CSTM Soils Training Workshop in Ashland

MLRA-92 SUPERIOR CLAY PLAIN



MLRA-92 SUPERIOR CLAY PLAIN



* Very fine sand (0.05 – 0.1) is treated as silt for family groupings: coarse fragments are considered the equivalent of coarse sand in the boundary between the silty and loamy classes.

SUPERIOR RED CLAY TILL REGION LAB DATA

CLAY CONTENT RANGE BY HORIZON BY SOIL SERIES

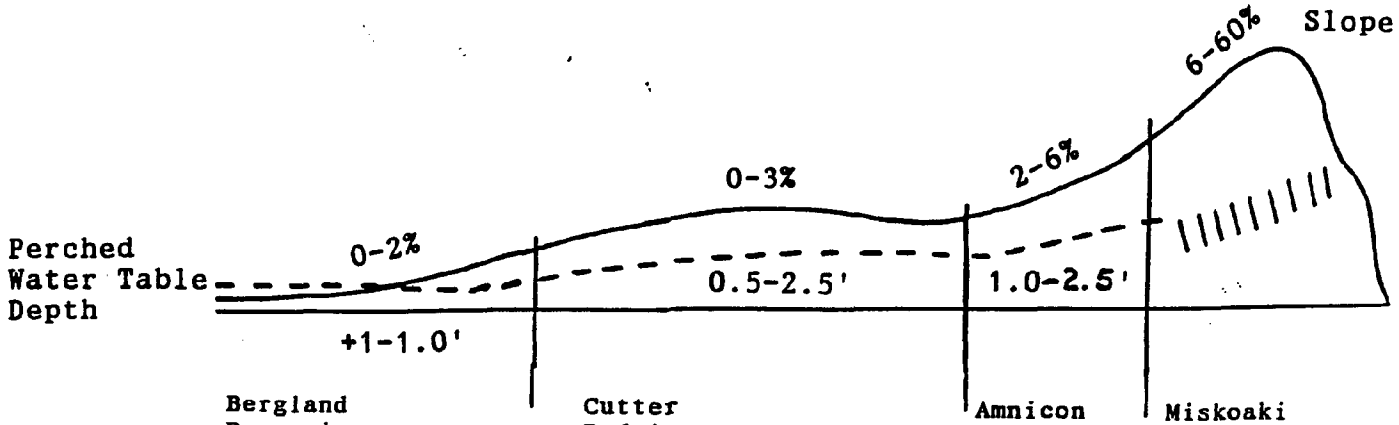
	SOIL SERIES NAME					
HORIZON	MISKOAKI AMNICON	CUTTER	ODANAH SANBORG	BADRIVER	DENOMIE GICHIGAMI	ORONTO
A	18-53% 12	23-60% 8	14-37% 8	23-50% 4	8-16% 4	16-40% 4
E	17-49% 4	-----	14-23% 5	15-36% 2	8-12% 3	16% 1
E/B	14-40% 6	22-52% 10	15-34% 10	25-35% 4	8-33% 5	13-23% 4
B/E	42-77% 13	41-59% 5	28-53% 9	33-50% 5	23-33 5	24-33% 4
Bt1	63-90% 11	61-81% 7	30-60% 11	41-59% 4	27-34% 5	22-34% 4
Bt2	70% 1	78% 1	37-55% 9	53-59% 2	29-32% 2	22-53% 4
Bt3	-----	-----	42% 1	-----	33% 1	19-37% 2
Btk1	64-88% 11	59-71% 8	31-57% 12	43-51% 5	28-29% 4	26-53% 4
Btk2	65-89% 11	55-85% 8	36-59% 7	48-49% 3	-----	26-52% 2
Btk3	70-78% 5	58-78% 3	48-56% 3	-----	-----	-----
BC	64-81% 7	54-74% 2	46-49% 2	50% 1	-----	63% 1
C	68-91% 5	65-78% 3	35-46% 5	33-50% 4	27-38% 5	23-33% 3

FOOTNOTE: The highlighted number next to the clay percentage range indicates the number of samples analyzed by the National Soil Survey Laboratory in Lincoln, Nebraska.

Superior Clayey Till Plain Soil Catena

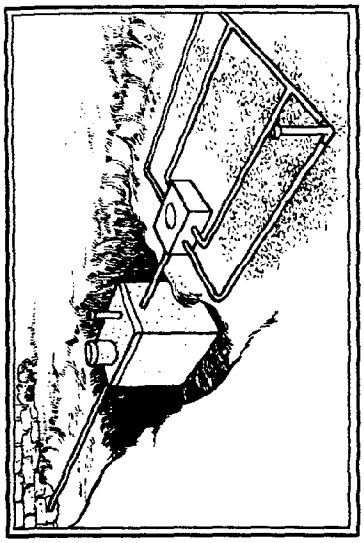
Ashland, Bayfield, Douglas and Iron Counties

Revised-3/95
KCG



	Bergland Dagwagi Dagwagi Var.	Cutter Badriver Oronto	Amnicon Sanborg Gichigami	Miskoaki Odanah Denomie
DRAINAGE	Poorly (Hydric Soils)	Somewhat poorly	Moderately Well -well	
POSITION	Nearly level to depressional	Nearly level to gently sloping convex ridges	Sloping to very steep sideslopes	
DURATION OF SATURATION	Long periods to the surface - Ponded at times	Moderate periods within the profile- No ponding	Short periods within the profile	None
SURFACE LAYER	Some profiles may develop as much as 8" of organic material above the mineral surface	Very thin (<2") or no organic matter above mineral surface	Some profiles lack a dark colored mineral surface layer on steeper slopes	
SURFACE COLORS (Munsell)				
HUE----------	5YR. 7.5YR. 10YR. or Neutral	5YR. 7.5YR. 10YR	5YR. 7.5YR. 10YR	
VALUE---------	2 to 4	2 or 3	3 or 4	
CHROMA--------	0 to 2	1 or 2	2	
	(Black to Dark Gray)----------->(Dark brown)			
REDUCTION OF RED PARENT MATERIAL (2.5YR) DUE TO DURATION OF SATURATION	Gleyed layer directly below surface layer HUE-10YR to 5Y VALUE- 4 to 6 CHROMA- 1 or 2	Hue changes in the upper part of the profile from dark reddish brown (2.5YR) to reddish brown (5YR) or dark brown (7.5YR).	No color change	
MOTTLES	Common to many reddish brown. few gray- high in the profile	Common to many reddish brown in the upper part of the profile.	Few reddish- brown in the upper part of the profile.	--None

Soils Training Workshop For Certified Soil Testers -Morphologic



Friday July 21, 1995
8:30 am - 1:00 pm
U.W. Ashland Agricultural Research Station

SPONSORED BY
Wisconsin Coastal Management Program
ABDI - Land Conservation Department
Natural Resources Conservation Department
DILHR
UW Agricultural Research Station

Pre-Registration Required
3:00 p.m. Tuesday JULY 18, 1995

courtesy of the ABDI-LCD and the Wisconsin Management Program & catered by Ann Skulan

ABDI-Land Conservation Department
P.O. Box 267
Ashland, WI 54806-0267

Pre-Registration Required by July 18, 1995

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ATTENDING _____

SEND TO: ABDI-LCD
2012 W. 3rd Street, P.O Box 267
Ashland, WI 54806-0267
OR TELEPHONE: (715)682-7187

This Workshop is designed to:

- *provide certified soil testers with an overview of soil evaluation techniques specific to red clayey till soils found on the Lake Superior till plain;*
- *provide certified soil testers with information concerning proposed modifications to the existing regulations governing private sewage facilities;*
- *offer CSTMs specialized training for the morphologic evaluation of the red clayey till soils found on the Lake Superior till plain specifically targeting permeability and structure, and*
- *provide CSTMs a view of a model cross section of a conventional system and mound system. The model will be on display during the workshop*

Program Agenda

Soils Training Workshop For CSTMs

Registration
8:00 am (Coffee & Rolls)

Welcome
8:15 am ***Sandy Schultz & Mike Mlynarek***

Presentations
8:40 am Proposed modifications to existing rules governing private sewage systems
- Carl Lippert

9:10 am Field Evaluations of Red Clayey Till Soils
- Kim Goerg

9:20 am Test Pit # 1
9:50 am Test Pit # 2
10:20 am Test Pit # 3

11:00 am Classroom Discussion of Test Pits and Properties of Red Clayey Till Soils
- Kim Goerg

11:50 am Open Discussion - All

Lunch
12:00 pm Lunch provided

PRESENTERS

Kim Goerg
Soil Survey Project Leader
USDA Natural Resources Conservation Service

Carl Lippert
Wastewater Treatment Specialist
Department of Industry, Labor and Human Relations

Mike Mlynarek
Assistant Superintendent
Ashland Agricultural Research Station

Sandy Schultz
County Conservationist
ABDI Land Conservation Department

For More Information Contact

Ashland Bayfield Douglas Iron Land Conservation Department
682-7187

CLAYEY AND SILTY GLACIAL TILL SOILS

Soil Properties	W Drained	MW Drained	SP Drained	P & VP Drained
Clay sola/ calc. red clay till; >60% clay in Bt (map only in [d] and western [b])	Miskoaki sicl 274B,C,D Vertic Eutroboralf vf, m	Amnicon sicl Vertic Eutroboralf	Cutter c 275A Vertic Eutroboralf	Bergland c 263 Vertic Epiaquept vf, m, na, f
Clay sola (40-60")/ stratified loamy & sandy deposits; >60% clay in Bt		Anton sil 578C [d] Vertic Eutroboralf vf, m	Borea sicl Vertic Eutroboralf	Lerch mk Vertic Epiaquept vf, m, na, f
Clayey sola/ calc. red clayey till; 35-60% clay in Bt (map only in western [a] and eastern [b])	Odanah sil 280B,C,D,F Glossic Eutroboralf f, m	Sanborg sil Oxyaquic Eutroboralf	Badriver cl 348A Oxyaquic Eutroboralf	Dagwagi muck 265 Aeric Epiaquept f, m, na, f
Clay sola (40-60")/ stratified loamy & sandy deposits; 35-60% clay in Bt		Anton Variant sil 481C,D Oxyaquic Eutroboralf f, m	Borea Var. sil Oxyaquic Eutroboralf	
Clayey sola (15-36")/ loamy till Bt in clayey deposits	Froberg sicl 283C[bd],D[bd] Typic Eutroboralf c/l, m	583B [bd] (Oxyaquic) Eutroboralf		
Loamy outwash (10-24")/ calc. red clayey till; Bt in till	Superior sl 256D Alfic Haplorthod cl/c, m, f	656B; C [abd] (Oxyaquic) Haplorthod	Sedgwick sl 253B; [abd] C [d] Alfic Epiaquod	Munuscong sl 238 [abd] Mollic Endoaquept cl/c, m, na, f
Loamy outwash (24-40")/ calc. red clayey till; Bt in till		Dryburg sl 214B,C [abd] (Oxyaquic) Haplorthod cl/c, m, f		
Sandy outwash (20-40")/ calc. red clayey till; Bt in till	Manistee lfs 213D Alfic Haplorthod s/c, m, f	Kellogg lfs 513B,C Oxyaquic Haplorthod	Allendale 226A lfs Alfic Epiaquod	Pinconning lfs 121 [abd] Mollic Epiaquent s/c, m, na, f
Sandy outwash (40-60")/ calc. red clayey till		Vilas Var. ls 223B,C [abd]; D [abd] (Oxyaquic) Haplorthod s, m, f	Au Gres ls clay subst. 225A [abd] Alfic Epiaquod	
Silty sola/ calc. red silty till; 18-35% c, <15% s in Bt (map only in [i] and eastern [a]	Denomie sil 204B,C,D,F Typic Glossoboralf fsi, m	Gichigami sil Oxyaquic Glossoboralf	Oronto sil 452A Oxyaquic Glossoboralf	Dagwagi Var. mk Aeric Epiaquept fsi, m, na, f

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