ACT PRESENTATION 6

SOIL PROFILE DOCUMENTATION SEPTEMBER 2013

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REQUIREMENTS FOR COMPLETING SOIL PROFILES

- Acceptable Documentation
- What it means to DOH, especially in cases lacking SHWT (Redox) Indicators

CHD Responsibilities

- The CHD ***must*** require the SHWT be properly validated.
- The evaluator ***must*** use the accepted method of justifying the SHWT, and all required sources must be cited.
- Relevant information may be included on site plan, such as slope of lot, topography, etc.

- All information required by rule ***must be presented by the site evaluator*** (since the CHD has not been to the actual lot in question), and ***only*** that information can be used by the CHD to evaluate the validity of the soils (actually any site evaluation) information.
- ***Only the information presented by the evaluator can be used by the CHD in their review, as it is the information the evaluator is representing was used to determine the SHWT.***

- If the site evaluator does not provide all the information necessary to properly validate the SHWT determination, the CHD cannot presume any other information.
- Once the CHD has the fully completed evaluation, they will use this information along with their knowledge of the area and all other reference sources to make a decision on the SHWT determination.

For the CHD to assume information that is not presented by the evaluator is analogous to the CHD assisting in the evaluation of the property, as opposed to judging the information for correctness and compliance with DOH regulation.

See slides on “Lack of SHWT (Redox) Features” later in this presentation for more information

Anyone performing soil profiles must follow the same procedures

- CHD’s have additional duties when the work is performed by non-departmental personnel

CHD Review Duties

- Must check all applications for correctness/completeness.
- Where incorrect or incomplete, correction is required.
- Must notify applicant/agent in writing regarding all deficiencies.
- Application is incomplete until all corrections made.

Non-CHD Evaluators

- Non-departmental evaluators must, at a minimum, comply with all 64E-6 standards (including use of minimum standards).
- ***However they can choose to mandate more than the minimum rule requirements (e.g. more drainfield, a specific drainfield type, larger tanks, etc.).***

Each soil profile:

- Must be performed correctly
- Must use USDA NRCS methodology
- Must be documented correctly
- Stands on its own (see next slide)
- Establishes ***facts*** (something determined by evidence) i.e. soil colors, textures, SHWT indicators, etc.

Stands on it's own????

- ***This means that each profile must be able to allow the system to be installed according to regulations when using the profile by itself.***
- Why? ***The system is being installed where the profiles are performed.***
- Most restrictive conditions ***must be used***.

Point of Refusal

- Point of refusal (or termination, etc.) indicates that the soil profile could not be advanced to the required 72" depth.
- Once 72" is reached, point of refusal is not normally used due to the minimum depth having been reached).
- Point of refusal must be clearly documented as to reason for the "refusal."

Examples of Refusal

- Hole collapses due to excessive water, ironstone, excessive roots, excessive debris, etc. "Didn't want to dig" is not a reason.
- *In all cases, the evaluator must not be able to proceed further.*
- *The reason must be given and clearly recorded on the profile information or remarks section.*

Soil is spatially variable

- Once a soil profile is terminated (normally above 72"), what lies below the depth of termination cannot be assumed!! (Spodic layer, limestone, clay?)
- The termination point of the profile will influence the bottom of the drainfield due to the effective soil depth requirements.
- This could raise the system more than the separation to SHWT requirement.

Example with two profiles for system:

- One soil profile has FS down to 72", the other shows FS down to 42", then refusal due to limestone (or bedrock, boulders, buried tree stump, whatever). ***The point is that the profile stops at 42".***
- The profile that goes down to 72" ***cannot*** be used to justify the effective soil depth in the other profile. This makes the 42" depth the more restrictive profile and therefore must be used to install the system.

Effects on System Requirements

- In this example, presume the more restrictive SHWT between the profiles was determined to be at 42"
- The effective soil depth would have to be based on 42", not 72".
- ***This would mean that the elevation of the bottom of the drainfield would be higher based on the effective soil depth requirement rather than the SHWT requirement (an 18" difference).***

Continuing with ramifications…

- Adds height to the system, will add a fill requirement, in this case goes from standard subsurface system to 18" filled system.
- Effects placement of system, system geometry, even ability of system to be permitted.
- If it were to change from fill to mound system the drainfield size could increase (depending on fill material), which would increase the unobstructed area, exacerbating the above issues.

CHECKING NON-DEPARTMENTAL EVALUATOR SOIL PROFILES OR FILL MATERIAL

- ***THIS IS REQUIRED***
- **CHD'S *MUST* perform confirmatory soil profiles to check non-CHD personnel work (includes checking any type of fill material).**
- ***When the results are different or unsatisfactory, CHD soil profiles must be documented for enforcement measures.***

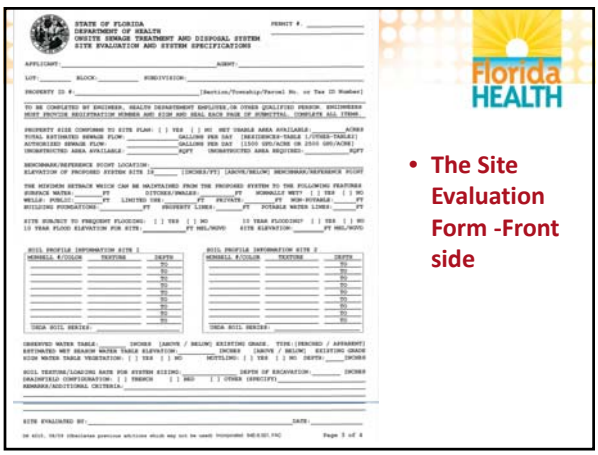
How many confirmatory profiles must be done?

- **Absolute minimum of one for SHWT and soil textures, should do more.**
- **However, if the findings of the confirmatory profile do not match the soil information used to issue the construction permit, perform more around the system to confirm departmental findings.**

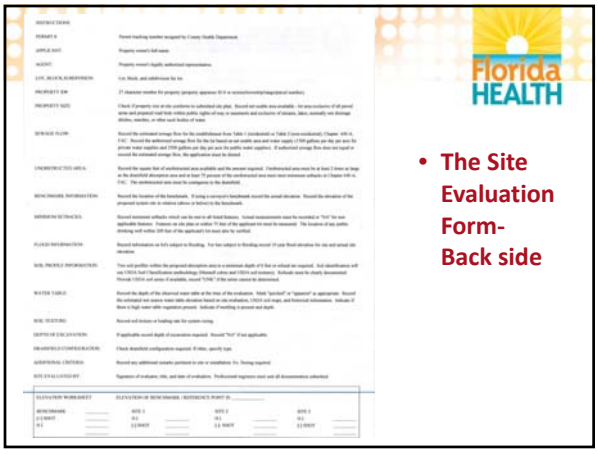
CHECKING FILL MATERIAL

- **Must check fill material in enough locations to justify approval of material. Minimum of 4 locations, including under drainfield. Also must check shoulders and slopes.**
- **If excavation was performed, must confirm this was performed to correct dimensions (length, width, depth).**
- **Remember that the O horizon and vegetation must be removed from entire fill area, must confirm.**

The Site Evaluation Form

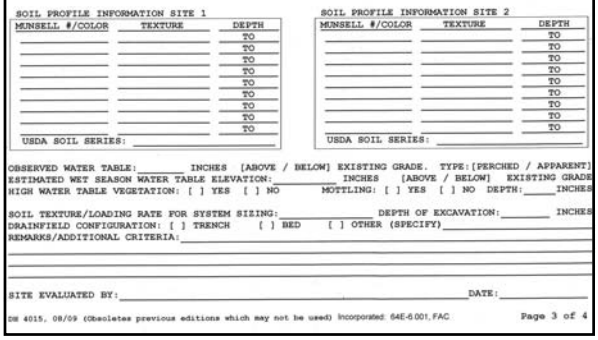


- The Site Evaluation Form -Front side



- The Site Evaluation Form- Back side

The part of the site evaluation form discussed in this presentation



SOIL PROFILE INFORMATION SITE 1

MUNSELL #/COLOR	TEXTURE	DEPTH
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USDA SOIL SERIES: _____

SOIL PROFILE INFORMATION SITE 2

MUNSELL #/COLOR	TEXTURE	DEPTH
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USDA SOIL SERIES: _____

OBSERVED WATER TABLE: _____ INCHES [ABOVE / BELOW] EXISTING GRADE. TYPE: [PERCHED / APPARENT]
ESTIMATED WET SEASON WATER TABLE ELEVATION: _____ INCHES [ABOVE / BELOW] EXISTING GRADE
HIGH WATER TABLE VEGETATION: [ ] YES [ ] NO MOTTLING: [ ] YES [ ] NO DEPTH: _____INCHES

SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: _____ DEPTH OF EXCAVATION: _____ INCHES
DRAINFIELD CONFIGURATION: [ ] TRENCH [ ] BED [ ] OTHER (SPECIFY) _____
REMARKS/ADDITIONAL CRITERIA: _____

SITE EVALUATED BY: _____ DATE: _____

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- In the column with the heading "Munsell #/Color," Munsell notation must be used. This includes the hue, value and chroma in the specified format, which is:
- HUE VALUE/CHROMA (e.g. 10YR 7/4).

SOIL PROFILE INFORMATION SITE 1

MUNSELL #/COLOR	TEXTURE	DEPTH
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USDA SOIL SERIES: _____

- For example, the color 10YR 7/4. ***It is not necessary to add the name of the color, however, if used, the correct color name must be written out.*** For example 10YR 7/4 has a corresponding color of "very pale brown," NOT "tan."
- ***Note that the color "tan" DOES NOT exist in the Munsell soil color scheme.***

DUE TO RULE RESTRICTION, USDA NRCS TEXTURES AND METHODOLOGIES ARE THE ONLY ONES THAT ARE ACCEPTABLE FOR DOH USE

- **The column with the heading "Texture," must be completed using the correct USDA NRCS texture for each horizon. The use of non-standard abbreviations cannot be accepted. The use of the term "fill" in this column should be used when necessary, along with the corresponding texture(s) of the fill material.**

- **Note that *ONLY* the USDA NRCS particle sizes are used. Textures given in any other particle size or texture classification system are not acceptable. Some examples: Mucky Peat would be abbreviated as MK Peat. Note that the term "organic" is not listed. Organic soils are listed as muck, mucky peat or peat.**

- Spodic (Bh) horizons should be noted as such. While a spodic layer contains organic matter that coats mineral soil particles, it is not an organic soil layer nor mucky mineral due to the small amount (<5%) of organic matter (carbon).

Spodic example

- 10YR 2/1 FS Spodic 16-23 inches
- This entry indicates a horizon of black fine sand that exists as a spodic layer from 16 to 23 inches.
- This is NOT an organic layer. Mucky mineral must have at least 5% organics and muck must have at least 12% organics, depending on texture.
- A spodic contains <5% organic matter (carbon), generally 1-3%.

A word about spodic layers

- By definition, spodic layers are a sandy material. They can be any texture sand. As long as it has the word "sand" and is a REAL texture, it can be used.
- Proper Examples: LFS, S, FS, VFS
- UNACCEPTABLE Examples: Muck, SiL, SiFS, organics

Particle Sizes Larger Than The Fine Earth Fraction (2mm)

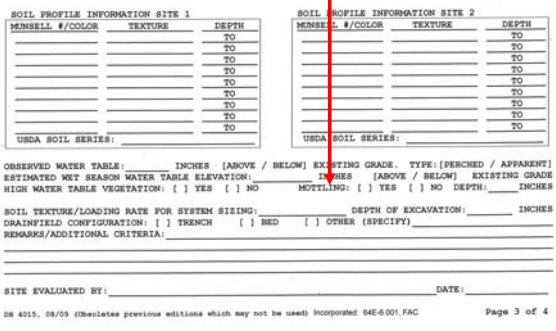
- Must modify soil texture name when >15% of particles in the horizon are >2mm
- Don't forget to use proper nomenclature such as Gravelly (GR), etc.

REDOXIMORPHIC (REDOX) FEATURES

Redox Feature Identification

- **The site evaluation form asks for indications of "mottles." What is required here are *SHWT indicators (including hydric soil indicators)*.**
- **Includes all redox features.**

Mottling=SHWT feature



SOIL PROFILE INFORMATION SITE 1

MUNSELL #/COLOR	TEXTURE	DEPTH
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USDA SOIL SERIES:

SOIL PROFILE INFORMATION SITE 2

MUNSELL #/COLOR	TEXTURE	DEPTH
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SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: _____ DEPTH OF EXCAVATION: _____ INCHES
DRAINFIELD CONFIGURATION: [ ] TRENCH [ ] BED [ ] OTHER (SPECIFY) _____
REMARKS/ADDITIONAL CRITERIA: _____

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- **Note that not all mottles are associated with the seasonal high water table (SHWT). Do not put the depth of non-redox features in the "mottling" depth location.**
- **Redoximorphic features must be described in quantity, contrast and color.**
- **Where present, must be described in all profiles.**

- **The department accepts the following abbreviations for quantity and visual contrast of redox features, which can be abbreviated as RF.**
- **Quantity of feature:**
  Common - CMN; Many - write out
- **Visual Contrast of feature:**
  Faint, write out (stripped matrix only);
  Distinct - DST; Prominent - PRM.

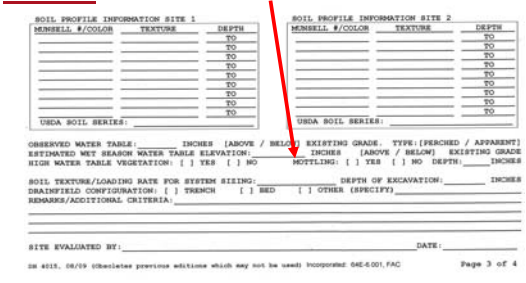
The presence of the redoximorphic features (if existing) must be indicated in the soil profile, or must be listed in the remarks section of the profile. Use the following examples.

- 10YR 3/2 FS 0-5"
- 10YR 5/3 FS 5-14"
- 10YR 7/4 FS 14-20"
- 7.5YR 6/8 CMN/PRM RF 16-20"
- 10YR 8/1 FS 20-72“

- Alternately, the row with the redoximorphic information could be omitted in the soil profile information ***if the information was placed in the remarks section.***

“Mottling” Yes or No

- On the site evaluation page, three lines below the soil profile information, it asks if mottling is present and the depth in inches. ***Mottling is synonymous with SHWT indicator.***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SOIL PROFILE INFORMATION SITE 2

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- Any indicator that is used to determine the SHWT is what goes in the blank.
- Additional redox features, while documented as colors and depths in the profile, are not entered into the "mottle" area.
- Can enter additional information in Remarks area.

In the above example, the mottling would be marked as "yes" and the depth in inches would be 16, which is where the common prominent redox feature started. This must correspond with the information in the profile and remarks section.

- In the column heading "Depth", the beginning and ending depth of the soil horizon (layer) is recorded. This is a soil profile description, <u>not a soil log</u>. ***<u>Soil logs are NOT acceptable.</u>*** Depths are given for the boundaries of soil horizons, not in evenly spaced increments (such as 0-6", 6-12", etc.). While soil profiles may on occasion match, one should expect differences in the colors and depths of each horizon in individual profiles.

- Note that the redoximorphic feature line in the previous example shows the feature existed from 16-20".
- This could also be listed as 16-16" if that is the only depth where the feature occurs, however, this would be very unusual in the case of most redox features. (Certain indicators have no thickness requirement.)
- Must document what is actually present.
- The Environmental Health Database requires horizons to have a beginning and ending point, but it can be the same point (depth)
- So…….

- If an evaluator only lists one depth (e.g. 16") where the redox feature is located, this is not necessarily an error, however this is not routine due to the methodology and requirements employed by the USDA NRCS.
- The redox feature would have to make up the correct percentage of the matrix (or be the matrix in certain circumstances) and be only one inch thick.
- This should not be a routine finding.

- Use the depth given as the beginning and ending depth for the area containing the redox feature.
  If the redox feature is listed in the remarks section, the CHD will normally enter the data into the EHD as a remark.
- ***CORRECTLY DOCUMENT ALL FEATURES IN THEIR ENTIRETY.***

The soil profile must contain all information to document and validate the corresponding conclusions drawn from the profiles, including the estimated seasonal high water table determination, soil textures and effective soil depth. Lack of or inconsistency between any required information is scientific basis to question the evaluation.

- For example, in a profile that indicates no SHWT indicators (including any redoximorphic features) either listed in the soil profile or remarks section, the mottling question has "no" and the evaluator indicates an estimated seasonal high water table at 10 inches.
- This is unacceptable by department standards as there is no scientific basis for the estimation of the seasonal high water table.

Another Improper Phrase

- Using a phrase such as "Seasonal high water table determined to be ___ inches above spodic layer" when no data is present to validate that claim is unacceptable.
- Must validate all SHWT determinations.
- The spodic layer is not related to the seasonal high water table.

CAN A SOIL THAT IS NOT MAPPED IN THE COUNTY ACTUALLY OCCUR IN THE COUNTY?

YES

Soils Mapped by Counties

- Soils are mapped for each county in Florida
- A minimum quantity of soil must be found in the county for it to be mapped in the county.
- Just because a soil is not actually mapped in the county DOES NOT mean that the soil cannot be found there (assuming same temperature region).
- Therefore you may find a soil (or be given a soil name) that you do not recognize as mapped in the county.
- Look name up using the Official Soils Series Description to find out more about the soil.

What to do when there is a lack of SHWT (REDOX) FEATURES

- SHWT (redox) features need certain conditions in which to form.
- In certain cases, these conditions will not be present and redox features will not be found.
- This can happen in naturally occurring soils where there is very little organic matter or iron content, such as in beach areas, or in the situation where fill material has been moved on top of an otherwise natural soil.

- The fill material can be anywhere from a few inches to several feet thick, and have been in place for a few days to decades (anthropogenic soils), and can vary greatly in texture. These soils can be very problematic.
- The SHWT can still be higher in the profile, even within the fill material.

Contemporary/Relict Features

- Contemporary features are soil morphological features that reflect *current* hydrologic conditions of saturation and anaerobiosis. *These are used to determine SHWT.*
- Relict features are soil morphological features that reflect *past* hydrologic conditions of saturation and anaerobiosis. These would normally occur in natural conditions and are NOT used to determine SHWT.

RELICT FEATURES

- In our case, relict features would also include any SHWT indicators that have been transported in fill material and cannot be used to determine SHWT.

Absence of SHWT indicators

- In the case where absolutely no redox features are found in the soil, for example in some beach-area soils, the experience of the site evaluator will come into play. For example, at a beach location, if a soil profile showed a 10YR 8/1 sand from 0-72 inches, no observed redoximorphic features, but an observed water table existed at 54 inches, and it had not rained in several weeks, there would be cause to consider the actual water table in light of the lack of redoximorphic features.

Absence of SHWT indicators

- The amount of consideration would be based on the individual evaluator's experience and judgment. By way of this example, it could mean that a county health department (CHD) employee that has ample experience in the area in question has knowledge that water tables exist for several days or weeks at a time (as in the above example) at 48", even though no redox features are present.

Absence of SHWT indicators

- Another evaluator (private or not) may not have the same experience and would not necessarily reach the same conclusion. In this example, the CHD employee (or non-department employee) would use their experience and judgment to determine the estimated seasonal high water table from all different sources required by rule, and this information would have to be documented during the site evaluation, in the soil profiles and in the remarks section. As in all site evaluations, the SHWT determination must be validated using all available information.

Absence(?) of SHWT indicators

- From a historical perspective, it has been our experience that it is not uncommon for certain indicators to be missed, or misused, especially when the methodology in use is other than that employed by the USDA NRCS, which is required by regulation. This has resulted in improper seasonal high water table estimations.

VALIDATION OF SHWT

- There will be cases where no indicators will be found, even when the SHWT is within the soil profile. When this occurs, all sources required by rule would be used as well as the professional judgment of the evaluator to state why the SHWT was determined to be at a specific level.

VALIDATION OF SHWT

- There is not a specific statement that has been used to cover all scenarios, but we are also trying to guard against the evaluator that is not using ***contemporary indicators*** (when present) and just stating a depth and "the call was based on my professional experience."

Consider the following information

- 10YR 3/1; 5/4; 6/3 FS Fill 0-21"
- 10YR 4/1 FS 21-27"
- 10YR 4/1; 5/2 FS 27-35"
- 10YR 2/1 Spodic Material 35-50"
- REFUSAL REFUSAL 50"
- REMARKS: Observed water table at 34", refusal due to hole caving in. No rain in 5 weeks. SHWT 21".

Example of WRONG reasoning for previous slide:

- No clear indicators of seasonal high water could be observed. Due to filled nature of lot, 21" represents "natural grade." Set SHWT at natural grade; this is conservative call for SHWT.

Now, a *Proper Statement*

- Determination of the SHWT was based on a combination of the following: While no specific redox features were observed, the several inches of generally grayer (low chroma) soils that exist in the upper part of the natural soils is normally indicative of SHWT being closer to the ground surface when viewed in relation to the spodic horizon, and considering the observed water table of 34" during this time of year, also no rainfall has occurred in the last 5 weeks.

Proper Statement continued

- Landscape position was indicative of [make statement – was area fairly flat, no water outlets?] . The soils that are mapped in this area indicates that seasonal high water tables would normally be within a few inches of the natural soil surface. Using all available information, my professional judgment is that the SHWT is most likely to be at the top of what was determined to be the natural soil.

THE PRECEDING WAS AN EXAMPLE ONLY AND IS NOT THE ONLY FORMAT THAT COULD BE APPROVED.

Note: From looking only at the colors from 27-35", stripped matrix could have been present, just not identified.

DON'T FORGET: DOH PERSONNEL MUST REQUIRE FULL DOCUMENTATION AND VALIDATION OF SHWT DETERMINATIONS.

USDA NRCS Determinations

What happens when a USDA NRCS Soil Scientist reviews the site

DOH USES MOST RESTRICTIVE SHWT DETERMINATION

- Get a report if at all possible.
- Where the USDA NRCS Soil Scientist gives a range for the SHWT (they normally call it "Seasonal High Saturation"), the more restrictive measurement must be used.
- Example: "SHS at 7-10 inches below soil surface" would mean that a 7 inch SHWT would be used by DOH.
- CANNOT AVERAGE THE DEPTHS!!!!

DEPTH TO INDICATORS

- Where SHWT indicators exist in a profile, depth to indicators must be shown for all profiles (should it be routine to only find them in one profile?)
- Can be identified in the soil profile
- Can be listed in the remarks section (e.g. stripped matrix)
- Use proper methodology
- Document correctly and completely
- Verify soil color contrast is correct for indicator use. If not, must be corrected.

The Correct Soil Profile (Field Copy)

EXAMPLE 1. HIGH CHROMA REDOXIMORPHIC FEATURE IN SAND

• 10YR 3/1	S	0-3”
• 10YR 4/4	S	3-9”
• 10YR 6/6	S	9-31”
• 7.5YR 6/8	CMN/DST RF	27-30”
• 10YR 7/2	S	31-54”
• 10YR 8/1	S	54-72”

THE ABOVE EXAMPLE SHOWS THE ENTRY FOR THE REDOX FEATURE WITHIN THE SOIL PROFILE. IT IS PLACED AS THE ENTRY FOLLOWING THE HORIZON IN WHICH IT IS LOCATED. SO, THE 10YR 6/6 SANDY SOIL MATRIX HAS COMMON (≥ 2%, BUT <20%) 7.5YR 6/8 REDOX FEATURES, WHICH MEETS THE CRITERIA IN SANDY SOIL.

SOIL COLOR CONTRAST IS CALCULATED FROM THE CHANGE IN HUE, VALUE AND CHROMA

- CHANGE IN HUE IS 1 UNIT (10YR TO 7.5YR)
- CHANGE IN VALUE IS 0 UNITS (10YR 6/6 TO 7.5YR 6/8)
- CHANGE IN CHROMA IS 2 UNITS (10YR 6/6 TO 7.5YR 6/8)
- This color change is DISTINCT by definition.

EXAMPLE 2A. STRIPPED MATRIX

- 2.5Y 2.5/1 FS 0-2”
- 2.5Y 4/1 FS 2-5”
- 2.5Y 5/1 FS 5-12”
- 2.5Y 7/2 FS 5-12”
- 2.5Y 8/1 FS 12-25”
- N 8/ FS 25-72”
- REMARKS: SPLOTCHY COLORS WITH DIFFUSE BOUNDARIES FROM 5-12” EXIST AS FAINT SOIL COLOR CONTRAST AND THE LIGHTER AREAS (2.5Y 7/2) ARE AT LEAST 10% OF THE VOLUME, WHICH MEETS THE DEFINITION OF A STRIPPED MATRIX BEGINNING AT 5”.

THE ABOVE EXAMPLE SHOWS THE ENTRY FOR THE REDOX FEATURE IN THE SOIL PROFILE OCCURRING ON TWO LINES. THE REDOX FEATURE IS STRIPPED MATRIX. COMPARE WITH FOLLOWING EXAMPLE.

EXAMPLE 2B. STRIPPED MATRIX

- 2.5Y 2.5/1 FS 0-2”
- 2.5Y 4/1 FS 2-5”
- 2.5Y 5/1; 7/2 FS 5-12”
- 2.5Y 8/1 FS 12-25”
- N 8/ FS 25-72”
- REMARKS: SPLOTCHY COLORS WITH DIFFUSE BOUNDARIES FROM 5-12” EXIST AS FAINT SOIL COLOR CONTRAST AND THE LIGHTER AREAS (2.5Y 7/2) ARE AT LEAST 10% OF THE VOLUME, WHICH MEETS THE DEFINITION OF A STRIPPED MATRIX BEGINNING AT 5”.

- ***THE ONLY DIFFERENCE IS HOW THE SOIL COLORS WERE WRITTEN FOR THE 5-12” HORIZON. THIS EXAMPLE HAS ONE HUE SHOWN WITH 2 DIFFERENT COLORS ON THE SAME LINE, MEANING BOTH COLORS HAVE A HUE OF 2.5Y. THE REMARKS ARE THE SAME.***

EXAMPLE 3. LOW CHROMA REDOX DEPLETIONS

- 7.5YR 3/1 FS 0-4”
- 7.5YR 4/2 LFS 4-9”
- 5YR 5/6 FSL 9-43”
- 5YR 5/8 FSL 43-72”
- 5YR 6/3 MANY/PRM RF 65-72”
- REMARKS: SHWT AT 65” DUE TO LOW CHROMA DEPLETIONS AS NOTED.

THIS EXAMPLE SHOWS THE ENTRY FOR LOW CHROMA REDOX DEPLETIONS IN THE SOIL PROFILE. THE 5YR 5/8 FINE SANDY LOAM SOIL MATRIX HAS MANY (>20%) 5YR 6/3 REDOX DEPLETIONS, WHICH IS ACCEPTABLE IN THIS SOIL AT A DEPTH OF BELOW ONE METER (39.37”)

EXAMPLE 4. LOW CHROMA REDOX AS A MATRIX

- 7.5YR 2.5/1 FS 0-3”
- 7.5YR 4/1 FS 3-7”
- 7.5YR 6/6 FSL 7-34’
- 7.5YR 7/1 FSL 34-72”
- REMARKS: THE HORIZON BEGINNING AT 34” IS THE REDOX FEATURE IN THAT THE COLORS MEET VALUE *≥5 AND CHROMA ≤2 ABOVE ONE METER.*

EXAMPLE 5. MUCK SOIL SURFACE (SAMPLE IN LRR U)

- N 2.5/ MUCK 0-0.25”
- 5Y 4/1 FS 0.25-6”
- 5Y 7/1;8/1 FS 6-15”
- 10BG 6/1 FS 15-22”
- Refusal Refusal 22-22”
- REFUSAL DUE TO HOLE CAVING IN AND FILLING WITH WATER.
  REMARKS: MUCK IS THE SHWT, AS IT QUALIFIES AS HYDRIC SOIL INDICATOR A8 (MUCK PRESENCE). SITE IS LEVEL, NOT IN A DEPRESSION. ALSO OF NOTE IS STRIPPED MATRIX INDICATOR IS MET BEGINNING AT 6”, AND GLEYED MATRIX IS MET AT 15”.

EXAMPLE 6: HYDROGEN SULFIDE SMELL

- N 2.5/ FS 0-1”
- 5Y 4/1 FS 1-6”
- 5Y 7/1 FS 6-15”
- 10BG 6/1 SCL 15-22”
- REFUSAL DUE TO HOLE CAVING IN AND FILLING WITH WATER

- REMARKS: HYDROGEN SULFIDE SMELL OBSERVED AT 2”, WHICH IS HYDRIC SOIL INDICATOR A4, HYDROGEN SULFIDE. ALSO OF NOTE IS GLEYED MATRIX IS MET AT 15”. SHWT 2”.

Anything wrong with the following profile?

SOIL PROFILE INFORMATION SITE 1

MUNSELL #/COLOR	TEXTURE	DEPTH
10YR 5/2	FS (GRAVEL FILL	0 TO 8”
10YR 5/1	FS	8 TO 15”
10YR 7/3	FS	15 TO 24”
10YR 5/4	FS	24 TO 30”
10YR 6/2	*RF 10YR 5/6 FS	30 TO 35”
10YR 4/4	FS	35 TO 41”
10YR 5/8	SC	41 TO 53”
10YR 8/3	SAND & SHELL	53 TO 72”
		TO

USDA SOIL SERIES: Eau Gallie/Malabar FS (Classified as a similar to)

SOIL PROFILE INFORMATION SITE 2

MUNSELL #/COLOR	TEXTURE	DEPTH
10YR 5/2	FS (GRAVEL FILL)	0 TO 10”
10YR 5/1	FS	10 TO 17”
10YR 7/3	FS	17 TO 25”
10YR 5/4	FS	25 TO 29”
10YR 6/2	*RF 10YR 5/6 FS	29 TO 36”
10YR 4/4	FS	36 TO 42”
10YR 5/8	SC	42 TO 54”
10YR 8/3	SAND & SHELL	54 TO 72”
		TO

USDA SOIL SERIES: Eau Gallie/Malabar FS (Classified as a similar to)

OBSERVED WATER TABLE: NOT FOUND INCHES [ABOVE / BELOW] EXISTING GRADE. TYPE: [PERCHED / APPARENT]
ESTIMATED WET SEASON WATER TABLE ELEVATION: 32 INCHES [ABOVE] (BELOW) EXISTING GRADE
HIGH WATER TABLE VEGETATION: [ ] YES [X] NO MOTTLING: [X] YES [ ] NO DEPTH: 32 & 53 INCHES

SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: _____ DEPTH OF EXCAVATION: 53 INCHES
DRAINFIELD CONFIGURATION: [ ] TRENCH [ ] BED [ ] OTHER (SPECIFY) _____
REMARKS/ADDITIONAL CRITERIA: *RF-Redoximorphic features observed as 10YR 5/6 inclusions, Common & Distinct @ 32-35 inches

SITE EVALUATED BY: _____ DATE: _____

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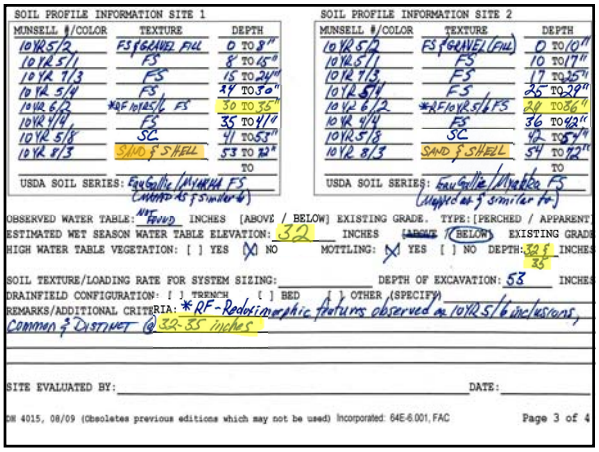
Problems

- The RFs were prominent, not distinct.
- What is actual depth to redox features? Inconsistent data presented.
- FS and gravel fill – what is actual texture?
- Sand and Shell? What is texture of soil? Is it sand/gravelly sand, or possibly gravel?
- Was a spodic present? Has to be for Myakka or EauGallie.
- EauGallie has Btg horizon, Myakka doesn't.



SOIL PROFILE INFORMATION SITE 1

MUNSELL #/COLOR	TEXTURE	DEPTH
10YR 5/2	FS (GRAVEL FILL)	0 TO 8"
10YR 5/1	FS	8 TO 15"
10YR 7/3	FS	15 TO 24"
10YR 5/4	FS	24 TO 30"
10YR 6/2	*RF 10YR 5/6 FS	30 TO 35"
10YR 4/1	FS	35 TO 41"
10YR 5/8	SC	41 TO 53"
10YR 8/3	SAND & SHELL	53 TO 72"
		TO

USDA SOIL SERIES: EauGallie/Myakka FS (Logged as a similar ft.)

SOIL PROFILE INFORMATION SITE 2

MUNSELL #/COLOR	TEXTURE	DEPTH
10YR 5/2	FS (GRAVEL FILL)	0 TO 10"
10YR 5/1	FS	10 TO 17"
10YR 7/3	FS	17 TO 25"
10YR 5/4	FS	25 TO 29"
10YR 6/2	*RF 10YR 5/6 FS	29 TO 36"
10YR 4/1	FS	36 TO 42"
10YR 5/8	SC	42 TO 54"
10YR 8/3	SAND & SHELL	54 TO 72"
		TO

USDA SOIL SERIES: EauGallie/Myakka FS (Logged as a similar ft.)

OBSERVED WATER TABLE: NOT FOUND INCHES [ABOVE / BELOW] EXISTING GRADE. TYPE: [PERCHED / APPARENT]
ESTIMATED WET SEASON WATER TABLE ELEVATION: 32 INCHES [ABOVE] (BELOW) EXISTING GRADE
HIGH WATER TABLE VEGETATION: [ ] YES [X] NO MOTTLING: [X] YES [ ] NO DEPTH: 32 (35) INCHES

SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: _____ DEPTH OF EXCAVATION: 53 INCHES
DRAINFIELD CONFIGURATION: [ ] TRENCH [ ] BED [ ] OTHER (SPECIFY) _____
REMARKS/ADDITIONAL CRITERIA: *RF-Redoximorphic features observed on 10YR 5/6 inclusions, Common & Distinct @ 32-35 inches

SITE EVALUATED BY: _____ DATE: _____

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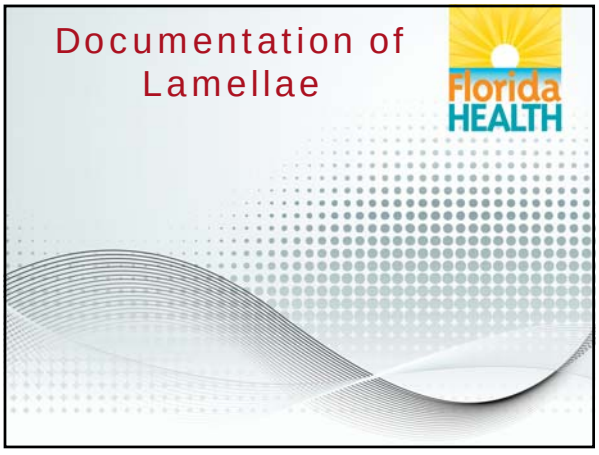

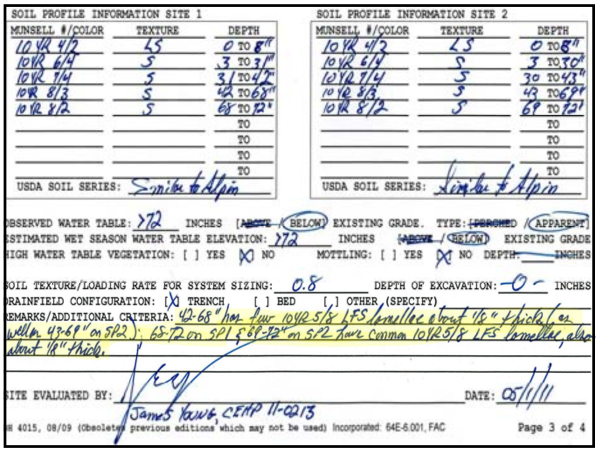
SOIL PROFILE INFORMATION SITE 1
MUNSELL #/COLOR | TEXTURE | DEPTH
10YR 4/2 | LS | 0 TO 8"
10YR 6/4 | S | 3 TO 31"
10YR 7/4 | S | 31 TO 42"
10YR 8/3 | S | 42 TO 68"
10YR 8/2 | S | 68 TO 72"
USDA SOIL SERIES: Similar to Alpin
SOIL PROFILE INFORMATION SITE 2
MUNSELL #/COLOR | TEXTURE | DEPTH
10YR 4/2 | LS | 0 TO 8"
10YR 6/4 | S | 3 TO 30"
10YR 7/4 | S | 30 TO 43"
10YR 8/3 | S | 43 TO 69"
10YR 8/2 | S | 69 TO 72"
USDA SOIL SERIES: Similar to Alpin
OBSERVED WATER TABLE: >72 INCHES [ABOVE / BELOW] EXISTING GRADE. TYPE: [PERCHED / APPARENT]
ESTIMATED WET SEASON WATER TABLE ELEVATION: >72 INCHES [ABOVE / BELOW] EXISTING GRADE
HIGH WATER TABLE VEGETATION: [ ] YES [X] NO MOTTLING: [ ] YES [X] NO DEPTH: INCHES
SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: 0.8 DEPTH OF EXCAVATION: -0- INCHES
DRAINFIELD CONFIGURATION: [X] TRENCH [ ] BED [ ] OTHER (SPECIFY)
REMARKS/ADDITIONAL CRITERIA: 42-68" has few 10YR 5/8 LFS lamellae about 1/8" thick (as well as 43-69" on SP2); 68-72 on SP1 & 69-72" on SP2 have common 10YR 5/8 LFS lamellae, also about 1/8" thick.
SITE EVALUATED BY: James Young, CEHP 11-0213 DATE: 05/1/11
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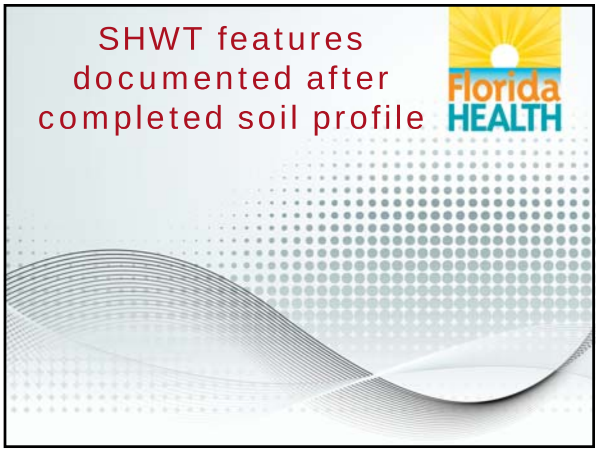
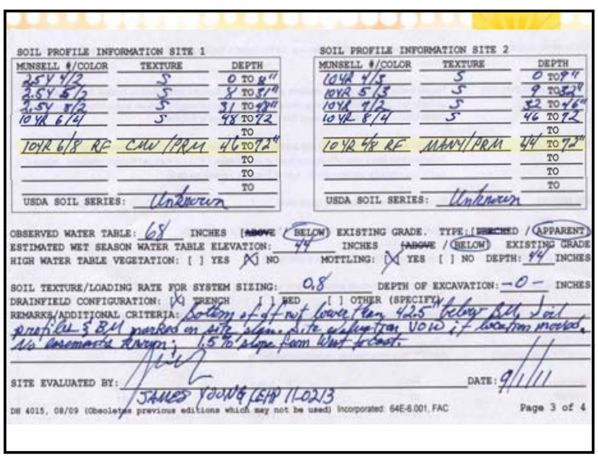

SHWT features documented after completed soil profile
Florida HEALTH


SOIL PROFILE INFORMATION SITE 1
MUNSELL #/COLOR | TEXTURE | DEPTH
2.5Y 4/2 | S | 0 TO 8"
2.5Y 5/2 | S | 8 TO 31"
2.5Y 8/2 | S | 31 TO 48"
10YR 6/4 | S | 48 TO 72
10YR 6/8 RF | CMN/PRM | 46 TO 72"
USDA SOIL SERIES: Unknown
SOIL PROFILE INFORMATION SITE 2
MUNSELL #/COLOR | TEXTURE | DEPTH
10YR 4/5 | S | 0 TO 9"
10YR 5/3 | S | 9 TO 32"
10YR 7/2 | S | 32 TO 46"
10YR 8/4 | S | 46 TO 72
10YR 4/8 RF | MANY/PRM | 44 TO 72"
USDA SOIL SERIES: Unknown
OBSERVED WATER TABLE: 68 INCHES [ABOVE / BELOW] EXISTING GRADE. TYPE: [PERCHED / APPARENT]
ESTIMATED WET SEASON WATER TABLE ELEVATION: 44 INCHES [ABOVE / BELOW] EXISTING GRADE
HIGH WATER TABLE VEGETATION: [ ] YES [X] NO MOTTLING: [X] YES [ ] NO DEPTH: 44 INCHES
SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: 0.8 DEPTH OF EXCAVATION: -0- INCHES
DRAINFIELD CONFIGURATION: [X] TRENCH [ ] BED [ ] OTHER (SPECIFY)
REMARKS/ADDITIONAL CRITERIA:
SITE EVALUATED BY: JAMES YOUNG CEHP 11-0213 DATE: 9/1/11
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Example of SHWT *above* the ground surface

SOIL PROFILE INFORMATION SITE 1

MUNSELL #/COLOR	TEXTURE	DEPTH
N 2.5/	MUCK	0 TO 27"
5YR 2/1 w/ 10YR 3/1 STREAKS	MK FSL	27 TO 35"
10YR 4/1 w/ 10YR 3/1 STREAKS	LFS	35 TO 41"
10YR 6/1; 4/1; 3/1	FS	41 TO 47"
10YR 4/1; 3/1; 8/1	FS	47 TO 72"
		TO
		TO

USDA SOIL SERIES: DIREGO-LIKE

SOIL PROFILE INFORMATION SITE 2

MUNSELL #/COLOR	TEXTURE	DEPTH
N 2.5/	MUCK	0 TO 28"
5YR 2/1 w/ 10YR 3/1 streaks	MK FSL	28 TO 36"
10YR 4/1 w/ 10YR 3/1 streaks	FS	36 TO 42"
10YR 6/1; 4/1; 3/1	FS	42 TO 44"
10YR 4/1; 3/1; 8/1	FS	44 TO 72"
		TO
		TO

USDA SOIL SERIES: DIREGO-LIKE

OBSERVED WATER TABLE: 68 INCHES [~~ABOVE~~ / BELOW] EXISTING GRADE. TYPE: [~~PERCHED~~ / APPARENT]
ESTIMATED WET SEASON WATER TABLE ELEVATION: 8 INCHES [ABOVE / ~~BELOW~~] EXISTING GRADE
HIGH WATER TABLE VEGETATION: [X] YES [ ] NO MOTTLING: [ ] YES [ ] NO DEPTH: ____ INCHES
TITI; BAY; CYPRESS; WAX MYRTLE
SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: ____ DEPTH OF EXCAVATION: 36 INCHES
DRAINFIELD CONFIGURATION: [ ] TRENCH [ ] BED [ ] OTHER (SPECIFY)
REMARKS/ADDITIONAL CRITERIA: SHWT based on water stains & lichen lines in immediate area over muck. DEP jurisdictional? Check if surface water. HYDRIC SOIL – A9 1cm muck. Muck is indicator, area is depressional, accounts for "+" SHWT.

SITE EVALUATED BY: ____ DATE: ____

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DID PRECEDING SLIDE MEET A DIFFERENT HSI?

What about A1, Histosol? There was more than 16" of organic soil material.

WHAT ABOUT SOIL TEXTURE DETERMINED BY A LAB ANALYSIS?

SHOULD YOU CALL THE LAB?

CAUTIONS ON LAB ANALYSIS

- **MAKE SURE THAT THE RESULTS ARE UNDERSTOOD!**
- **WHAT METHODS WERE USED?**
- **SIEVE ANALYSIS USING CORRECT USDA SIEVE STACK INCLUDED?**
- **HYDROMETER/PIPETTE METHOD?**
- ***THE RESULTS MUST ACCOUNT FOR SAND GRADATION AS WELL AS SILT/CLAY CONTENT***

Example

- **CHD sends a sample to an agricultural lab and asks for a texture determination**
- **Sample comes back as percent Sand/Silt/Clay so that the result could be read on the Textural Triangle.** ***Result was given as Sandy Loam.***
- ***The size of the sand fraction has not been determined, so it is unknown if sample is COSL, SL, FSL, VFSL.***
- ***The actual sand fragments would determine proper sizing of system. This could also be done in the field.***
- ***Accepting this lab report at face value would be a mistake!***

Results if CHD accepted the soil as sandy loam?

- NO EFFECT ON REDOX FEATURES, SHWT WOULD BE UNAFFECTED.
- IF THE SOIL TYPE WAS ACTUALLY FINE SANDY LOAM THE DRAINFIELD WOULD BE UNDERSIZED BY OVER 23 PERCENT IN A TRENCH SYSTEM AND OVER 71% IN A BED SYSTEM!!

When supplying soils samples to (or receiving results from) a lab always ensure a complete texture determination is made. This must include a proper USDA NRCS sieve analysis to determine the sand fraction size, or alternately, the sand texture can be determined in the field.

Lab Analysis continued

- If particles >2mm are present in sufficient quantities to require a "gravelly" or other modifier, ensure that the lab analysis provides this data.
- CHD personnel should make every effort to get a sample for their use and determine if the sample has particles larger than soil sizes, as well as the correct sand size.

Lab Analysis continued

- If at any time the CHD is not sure if the lab analysis is consistent with what is on the site, you should call the lab, or take your own sample and send it to the lab.

General Information of Note

When a percentage of something is required it should be noted in Remark Section:

- For example, when determining masked sand grains, state if hand lens was used (10-15X only) and the percentage, or if hand lens was not used and percentage
- Make observational comments

REMEMBER

- If there are no observable SHWT features, ***then other factual information must be used to validate the SHWT*** where determined to be at or above 72 inches (or the termination of the profile).

SHWT must be validated from all information required by rule, and from the data collected on site.

- If you document any SHWT feature (including redox features), you have "mottles"

SHWT CONCLUSIONS

- Conclusions must be validated by proper use of USDA NRCS methodology and wettest season water table indicators. Where no indicators can be detected or where there are conflicting factors, the evaluator must use all documented soil profiles, USDA NRCS soil maps and interpretation records, historical information, landscape position and onsite vegetation. (cont. next slide)

- They must also take into account the observed water table as well as the time of year and recent rainfall events and use their best professional judgment accounting for all observed factors to determine the wettest season water table. The wettest season water table shall always be validated.

For example, the following statements DO NOT validate SHWT determinations:

- "Redox feature found at __ inches" when NO RF ARE DOCUMENTED IN THE EVALUATION.
- SHWT based on rule 64E-6.004(2)(a)

END OF PRESENTATION