



# Standards Oversight Council (SOC)

Developing effective technical standards that protect Wisconsin's natural resources

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## 01 Verification of Land Features in Silurian Bedrock/Karst Areas Standard Team

### MEETING NOTES

Thursday, September 26, 2019 ▲ 9:30am – 3:00pm ▲

UW Division of Extension - 625 E. County Road Y, Meeting Room D, Oshkosh, WI

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#### 9:30 Welcome, Introduction, Notes Approval (Kate, Team)

Goal: Welcome, review objective for meeting today, and review and approve 7/18/19 draft meeting notes.

- 7/18 Notes were emailed around to the team. No edits raised by the team. Kate will wait a week before finalizing and posting publicly on our team website; get in touch with her soon if you note any changes.
- Great conversations so far in this team and we should be able to make some good progress today.
  - o Use of Lidar – will it be included in standard and if so, how?
  - o Base sample density for intrusive methods
  - o % reduction when combined with geophysics
- If there's a topic that's been parked or something that you'd like to still get addressed, please talk to me and Rachel over the break or record on a Post It note so we can flag it for a later discussion. Kate will collect the Post Its at the end of this meeting.

#### Use of Lidar for Assessing Bedrock (Bruce Riesterer, Manitowoc Co. Soil & Water Conservation)

Goal: Presentation on the use of Lidar for assessing depth to bedrock and closed depressions in Manitowoc County. Team discussion to follow.

Bruce provides detailed Power Point presentation on Manitowoc County's use of Lidar, including incorporating topography in 2' contours and rock elevations. Some key points of the presentation and discussion:

- Many aspects of the Manitowoc County Lidar and GIS work are available on their county website. There are GIS layers to turn on and off.
- They incorporate NRCS engineering tools like flow accumulation and hydrology like stream flow.
- Man. Co. uses ArcGIS to map the sinkholes and contribution areas in 3D. Lidar identified 40 new sinkholes in their county that weren't previously in their inventory. They expect this will be part of SnapMaps (data is with UW now).
- They were surprised to find that sinkholes weren't always in areas mapped with less than 20 to rock (by WGNHS or SnapMaps). In addition, closed depressions are mapped as a

single point, and not the outer limits (which would be used to determine the 100-foot setback under NR151) so field observations would be necessary here.

- Lidar used to identify features like rock outcrops, concentrated flow channels, culverts, and slope.
- Tree cover didn't impact contours. They found that thick grasses like canary grass may result in error in ground surface elevation.
- There are some counties that don't have Lidar yet. Brown and Kewaunee, for instance, don't have this level of Lidar available. Calumet County have the Lidar data but it's not processed yet; it could be another year.
- Manitowoc County put in a lot of time and money into data evaluation, including some trial and error. Other counties could use their lessons.
- Lidar would not be appropriate as the sole tool to identify depth to bedrock, though it IS a helpful screening tool to use with field observations. Field verification would be needed to differentiate details that could be kettle moraine, manure pit, wetland, or closed depression.
- The interpretation of the presence and extent of a closed depression in the Lidar should be by someone with credentials.

### **Closed Depressions (Rachel/Team)**

Goal: Discuss whether criteria and considerations are appropriate specific closed depressions.

- Team discusses whether extra criteria or recommendations should be included regarding closed depressions.
- There is a detailed definition of "closed depression" in NR 151. There are also restrictions under "direct conduit to groundwater" that would cover things like gravel pits.
- Team discusses whether sampling density would need to be changed.
- Since there is a professional involved with the verification design and interpretation, that same professional should also be trusted to identify closed depressions.
- The differentiation between sinkhole and closed depression should be maintained.
- Team discusses whether a minimum size of closed depression should be specified. The seasonal high water mark would dictate the size and that is clearly defined.

### **Comparison of In-Field Results (Travis, Nate, Dave)**

Goal: Review results of depth to bedrock verification test with multiple techniques concurrently in one field.

In July several team members organized to test depth to bedrock together on one field in Kewaunee County. Travis, Nate and Dave presented their results for hand probing, Veris+hand probing, and other geophysics (EM-31, 38 and elect. resistivity), respectively. Some key points from these presentations and subsequent discussion:

- Nate used Veris shallow and deep scanning, with a few confirmatory hand probes. They drove strips across the field, also comparing to NRCS soil map and what the field looks like. Veris took half a day in the field plus several hours in the office.

- Travis did hand probing on a quarter acre grid, but also created maps as if he had done probing on a 1-acre grid. There is greater “no spread” area (rock <2’) with the ¼ acre sample density. Hand probing took a full day with field work, download data for mapping, plus drive time.
- Comparing Veris vs hand probing only, there were some contradictions, though neither method was skewed only shallower or only deeper compared with the other method. Hand probing on ¼ acre grid more closely resembled Veris.
- In the “no spread” maps for Veris vs hand probing, the two drew the boundary line for no spread differently. In the standard, team discussed that this interpolation step would be up to the professional interpreting the data.
- Dave’s geophysical investigation results were largely not usable. There were instrument logging troubles and there was poor correlation between EM 31 and 38 vs hand probing depths. The EM is accurate +/- 20%. Better data could possibly be collected if he approached the site with instrumentation reading multiple frequencies, or investigated zones similar to Nate’s approach. **Dave** will return to the site (or another nearby site, to be determined with assistance from Travis) with **Jason** and **Francisco** for more thorough evaluation of a variety of geophysics. Depending on timing of their work, they may be able to report back at our next meeting on 10/24; however, the field work may not be performed by then.

**Review Options for Density Adjustments (Matt K)**

Goal: Review results of Matt K’s assignment

- Matt looked at a data set of existing depth to bedrock probes and created subsets of different sampling densities to see how results changed with fewer or more sampling points.
- Using different sample density resulted in very different size and shape of restricted areas (“no spread” areas with <2 depth to bedrock).
- With greater density, the overall data would be more accurate. We could also delineate boundaries to get a greater accuracy, though that would add a lot of borings.

**Sample Density for Intrusive Methods (Rachel/Team)**

Goal: Discussions on sample density for intrusive methods and percent reduction when combined with geophysics.

For reference in discussion, team receives handout of the draft working copy table comparing Summary of Intrusive Methods. Key points of team discussion:

- Team prefers to change sampling density with depth—less dense as depth increases since risk decreases.
- Team agrees to **1 sample per ¼ acre (approx. 100-foot spacing)** intrusive sampling when less than 5’ (i.e., disputing the 2’ and 3’ boundary). This is consistent with manure storage borings. This is. this spacing

- When disputing 5' boundary, team agrees to **1 sample per 1 acre (approx. 200-foot spacing)** for intrusive sampling.
- When disputing 20' boundary (i.e. determining whether NR151 restrictions apply or not), team discusses options. Team agrees to less dense sampling than the 5' boundary, but doesn't yet reach a decision. This depth would likely also involve geophysics and we don't yet have information to support a team decision on % reduction in intrusive samples when geophysics used in combination. Team will revisit this sample density with further understanding of geophysical method use.

**Decisions on Sample Density and Percent Reduction (Team)**

Goal: Make team decisions on sample density for intrusive methods and percent reduction when combined with geophysics.

- This topic not discussed since geophysical results discussed earlier today were not good data. After additional geophysical techniques tested in-field, we will return to this discussion.

**Next Meeting Topics and Plan of Action (Kate, Team)**

Goal: Identify the topics, concerns, and goals for next meeting. Review Action Items and agenda items for next meeting.

Next meeting scheduled for October 24—4 weeks.

Then none in Nov., last scheduled meeting on Dec. 17, 2019. We may also need a January meeting?

**Possible Assignments**

- **We'd like to include some** Examples in the standard to show how one would approach a project to verify (or dispute) a map. This may be possible homework; **Rachel** and **Kate** will discuss after the meeting some baseline for this and get in touch with the team for volunteers.
- **Dave, Jason** and **Francisco** will return to the Kewaunee County field (or another nearby site, to be determined with assistance from Travis) for a more thorough evaluation of a variety of geophysical methods. Depending on timing of their work, they may be able to report back at our next meeting on 10/24; however, the field work may not be performed by then. **Kate** will check in with them to track progress.
- NEXT STEPS:
  - o Rachel has been compiling details of the team's concerns and observations, assembled with some of the writing assignments some of you have had. She'll be circulating this around for review, POSSIBLY AFTER THE NEXT MEETING?, for team critique. There will probably be some early agency input as well.
  - o When it's time for you to critique the text, we'd like you to provide a constructive review and provide alternate language, not just broad comments. Keep in mind this is a team product.

- After the internal team comments are addressed and we have substantial agreement, we'll then send it out for review by a short list of experts—the Initial Review.
- HOMEWORK FOR ALL: Think of some experts that you'd like on the list for consideration as potential Initial Reviewers. We'd like to have broad representation, typically a little different from who is on the team. The team will then decide on the final list. This step is still several months out but we need time to reach out to make sure they are interested and available, so we have the reviewers ready when the text is in good shape.
- Right now, we're thinking this Initial Review would be early next year (possibly as soon as Feb?), depending on how the writing and editing process goes.

3:00 End