



Standards Oversight Council (SOC)

Developing effective technical standards that protect Wisconsin's natural resources

121 S. Pinckney Street #420, Madison, Wisconsin 53703
(608) 441-2677 || socwisconsin.org

WDNR XXXX Urban Soil Health Standard Team

MEETING AGENDA

Thursday 18 Dec 2025 ▲ 9:00am – 2:30pm ▲

UW-Milwaukee School for Freshwater Science – for virtual option see zoom info below.

9:00 Brief welcome & overview (Pete, Christina & Carl; 15 min)

Attendance: Mark Polega, Stu Schwartz, Pete Wood, Christina Rauh, Phil Gaebler, Neal O'Riley, Rafael Gonzalez Pagan, Doug Soldat, Carl Wepking, Andy Kaminski, Jamie Patton

9:15 Criteria - Site Evaluation (75 min)

Notes:

- Two tracks for how the USH standard may be applied
 - (1) Revitalization of existing green spaces to help entities such as municipalities to help meet TMDL criteria /MS4 permitting.
 - (2) Application of standard principles to a soon-to-be-developed construction in order to maintain the hydrologic function of spaces that will be set aside as green spaces following the conclusion of construction.

(potentially, these two tracks could be split into separate standards if the team deemed it appropriate and this approach is acceptable with WDNR)

Site evaluation for Option 1:

- What is a good PSI to establish that, yes, a site has compacted soil? (Cornell soil health manual - 200-300 psi at field capacity is the range where we start to see impairment of root growth)
- Bulk density could be another metric used to assess a site
- NRCS approach – in-field soil health assessment (IFSHA) – is a good starting point, but will need to be tweaked for urban settings
- Depth of measurement is a potential issue for urban soils
- [Pages 15-16 of in-field soil health assessment](#) (pages 19-20 of the digital pdf, listed as page numbers 15-16 on the pdf itself) – which of these apply well to urban soils?
 - Penetrometer, ponding & infiltration, water-stable aggregates, and plant roots
 - Sample size is another consideration (how many measurements?)
 - Starting point could be a visual screening –
 - Health of plants is a visual inspection tool – not just roots, but whole plants
- Walking through an example using an urban space in Madison

- Web soil survey may have limitations as an investigation tool in urban settings – likely to mis-represent soil types based on construction practices – further investigation is likely needed
- Is age a good metric?
 - Counterpoint – old turfgrass areas are often less compacted than younger turfgrass areas
- Action item: come up with a list of 5-6 items, need 2 or 3 to come to the conclusion that there is a problem. Send this as it's own item, separate from the tech standard draft
- Ground truthing of approach would be helpful – site evaluation testing with Reflo or other similar organizations.
- Action item: soil textures - what soil texture data would be helpful?
 - Soil core?
 - Ribbon test?
 - Suggestion for soil core – soil profile information would be valuable
 - Can this be done in the field? By who?
 - Aside: At the low end and high end improvements don't actually move the needle much (decompacted clay soils are still poorly infiltrating clay soils, improved sandy soils infiltrate more water, but they already handled a lot of stormwater)
 - Sand can be compacted, but compacted sand can still handle quite a lot of stormwater
- Cost differences are important considerations between option 1 (existing) and option 2 (new construction) –
 - option 2 likely has a larger budget because new construction will have to account for hydrological soil rating by increasing the size of a retention pond for example.
 - Therefore efforts to lower the cost for option 1 would be valuable
- Evaluation consideration – what is the post-development intended land use? Certain types of land use could be designated as not permitted. (could go either within 'condition where practice applies' section or in site evaluation.
 - Overflow parking?
 - Playground area?
- Slope restrictions?

10:30 Break (15 min)

10:45 Criteria - Shallow Depth Restoration Criteria (75 min)

Notes:

(Continuation of early morning discussion topic post break)

Site evaluation for Option 2 – “New Development” or “Construction Site”

- What pre-work would need to be done?
- Is this pre-construction or post-construction evaluation?
- Evaluate where in the construction site infiltration sites will exist – green areas. And pursue one of two options:
 1. Protect areas during construction that will be green spaces,
 2. or use decompaction and amendment following construction completion
- DNR 1002 standard compatibility? There may be some crossover – we should be sure there is no conflict between this standard and other tech standards (with 1002 as an example)
- Potentially split into two standards

- Action item – Neal will review 1002 and send a subset of items from that standard that applies to this standard.
- Does this apply to situations where 10 feet of soil has been removed? Added? Are we only concerned with the top 2 feet?
 - Development of an 'urban soil health plan sheet' could be helpful
 - Curve number - NRCS hydrological soil classifications
 - Regardless of how the site construction takes place, so long as we focus on the top 20 or so inches, we can be satisfied we're addressing water movement issues? This is consistent with existing approaches (NRCS curve number practice).
 - Infiltration is half of the picture – storage is the other half. An impervious lower-layer is a problem – this would need to be documented.

Notes – Shallow-depth restoration:

- What approaches should be allowed for shallow depth restoration criteria?
 - 16 inch depth is often achieved by a big implement dragging a j-hook and lifting a lot of soil – is this the best approach? Is the implementation causing further issues?
 - 3990 project in Janesville/Beloit – infiltration basins – deep aeration ripping
 - Differentiation between aeration and ripping
 - Deep-tine aeration is used in golf courses, but rarely elsewhere
 - Skepticism that aeration is impacting infiltration
 - Aeration is more for vegetation health
 - Aeration should be considered as an incremental improvement – good housekeeping practice more-so than a top choice
 - Aeration could be moved to maintenance OR considerations
 - Solid core vs hollow core differentiation
- Top dressing
 - Potentially not a stand-alone practice – top dressing could be better considered within thinking about vegetative restoration criteria
 - Action item: Doug S. will share published work that shows compost application can improve infiltration (other treatments did not) – team can see shared folder for these publications
 - 3-years of compost application – ¼ inch twice a year, spread over existing plantings
 - Improves water holding capacity, but doesn't improve underlying soil properties
 - How much does this improve water infiltration? Quantifying the infiltration would be important to consider.
 - Action item: Stu Schwartz will share studies looking at 10cm of top soil above compacted soil –
 - it would be good to compare these studies with the studies Doug mentioned above (varying methods / approaches used)
- What else do we have for shallow depth restoration?
 - Incorporation of compost would be good - what practice would be best for this?
 - Full-depth vs shallow depth question – ripping depth question.
 - Question remains as to how much hydrologic benefit is gained by shallow ripping

12:00 Lunch (45 min)

12:45 Continuation of Criteria discussion (75 min)

Notes:

- Added Full-depth restoration criteria to the agenda for discussion

Full-depth restoration criteria

- Motivated by MS thesis by Jeremy Balousik (sp)
- Soil decomposition & amendment (ripping and amending)
- Suburban Subsoiling – goal is infiltration & drainage
- Techniques:
 - Soil profile rebuilding (Susan Day - Virg.Tech)
 - Complete cultivation – Forest Research (United Kingdom)
 - Repurposed with a rubber-tracked mini-excavator for a small-scale approach. Double-digging, avoiding utilities
 - Loose tipping – Forest Research (United Kingdom)
 - A way to spread topsoil without treading with heavy equipment
- Stormwater practice with co-benefits
- West Allis project – removal of a ‘decommissioned’ street
 - Decompact the soil
 - Amend with compost
 - Variation of double-digging procedure was used
- These practices can achieve functions that approximate native soil conditions
 - Effective curve numbers were calculated for before and after to show what credit could be attributed to a site that underwent this process
- Ohio has a standard - Jay Dorsey (sp) - Ohio hired NRCS to reclassify hydrologic soil groups – Ohio now has urbanized and non-urbanized soil classifications
 - Ohio document could be a starting point for tech standard language – Neal will review and provide some recommendations
- Is 20 inches an adequate depth for full-depth restoration?
 - Is this achievable by a contractor?
 - The line needs to be drawn somewhere
 - There may be exceptions, but leaving too much wiggle room can be problematic in terms of achieving goals
 - Agricultural subsoiling could be used as a reference
- A timing section would be a good addition to the standard (avoiding certain work during unfavourable weather/conditions)
- Lessons learned question – something to revisit after rumination
- Operations and maintenance will be revisited at a later date

2:00 Next steps & action items (15 min)

Notes:

- To do: (see highlighted sections above)
 1. Come up with a list of 5-6 criteria for determining whether soil health would benefit from revitalization – using the IFSHA model, need 2 or 3 to come to the conclusion that there is a problem. This should be sent to the team separately decentralized from the tech standard
 2. Soil textures - what soil texture data would be helpful?
 3. Neal will review 1002 and send a subset of items from that standard that applies to this standard.

4. Doug will share published work that shows compost application can improve infiltration (other treatments did not) – team can see shared folder for these publications
5. Stu will share studies looking at 10cm of top soil above compacted soil –
6. Ohio document could be a starting point for tech standard language – Neal will review and provide some recommendations

Zoom connection info:

Link: <https://us02web.zoom.us/j/86983662049?pwd=GMu90ZpaKvb1CeXw7H357jjpsrGjpu.1>

Meeting ID: 869 8366 2049

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