

What Can Go Wrong With BMP Design?

Leif Hauge, PE, P. Hydrologist
Sr. Civil Engineer
Waukesha County Land Resources Division

Infiltration Basins

- Soil not permeable enough – doesn't drain
- Soil too permeable – drains too fast, groundwater protection, plant sustenance
- Water table too high – basin floods seasonally, drowns plants



Poor soil drainage



Drowned plantings – same view of site



No organic content in subsoil for plants



Water table
higher than
expected



Water table higher than expected — Pete Wood

Bioretention Basins

- Engineered soil mix doesn't drain well – too many fines
- Engineered soil mix drains too well – doesn't support plants
- Water table higher than expected – drain runs constantly



Too much clay in topsoil — Jeremy Baloušek

Clay + salt = Impermeable

- Roger Bannerman





Fines in engineered soil
plugged filter fabric



Engineered soil with no organics will not support plants



Underdrain is below water table – Pete Wood

Wet Detention Basins

- Liner leakage due to
 - Permanent pool in unsaturated granular soil
 - Ensuing erosion or burrowing through clay
- Liner upheaval due to higher water table than expected

Design perm. Pool and safety shelf



Eroded liner at infall

Design perm. Pool and safety shelf

Eroded liner at infall



Muskrats



Pete Wood



Liner bubbling up due to high water table 07/10/2016

Questions?