

What's in Your Pond?



What You See is What You Get!

5 Minute Break

Review It!

Reviewing Plans to Ensure Ponds are Built Properly

What's in Your Pond

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Review is not easy

- Pressure to ensure design is adequate and safe
- Pressure to review faster
- Pressure to allow for short-cuts or special exemptions
- Personal and professional pressure to “do the right thing”



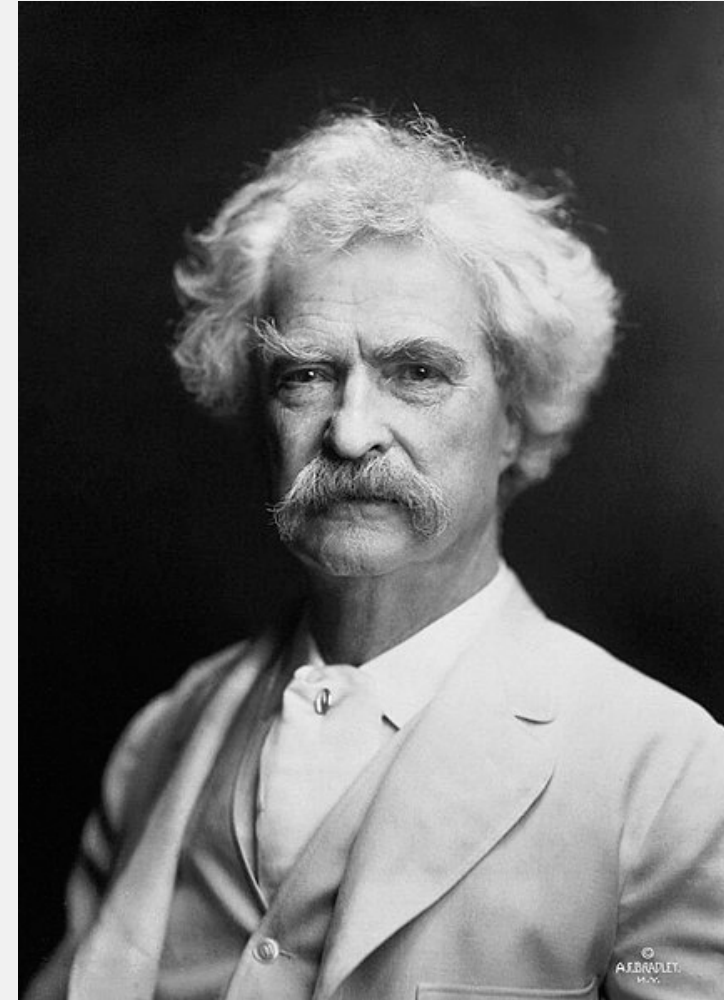
And sometime the tool chest leaves a bit to be desired....



Beyond major regulation overhauls, what can we do?

“Continuous
improvement is
better than
delayed
perfection”

Samuel Clemens (Mark Twain)



A portrait of the American writer Mark Twain taken by A. F. Bradley in New York, 1907

Source: [Wikipedia](#) Public Domain



What's in your pond?

COMBAT TUNNEL VISION

Is your design review
suffering from tunnel vision?



Sophisticated lab testing, finite element slope stability models, seepage analysis

Oversized impervious core and cutoff

Strict material and compaction requirements

Chimney and blanket drains

4H:1V slopes

Spillway??

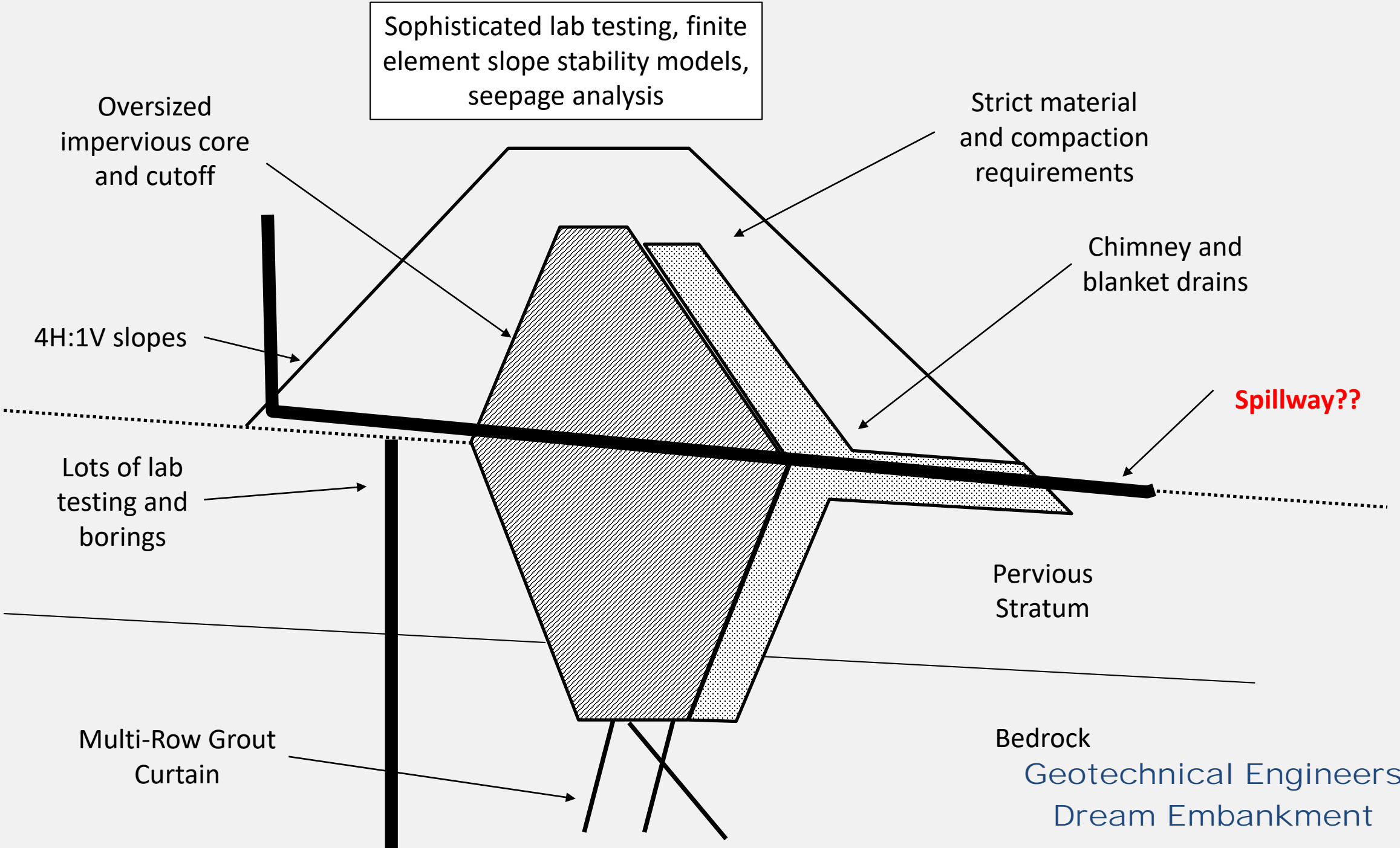
Lots of lab testing and borings

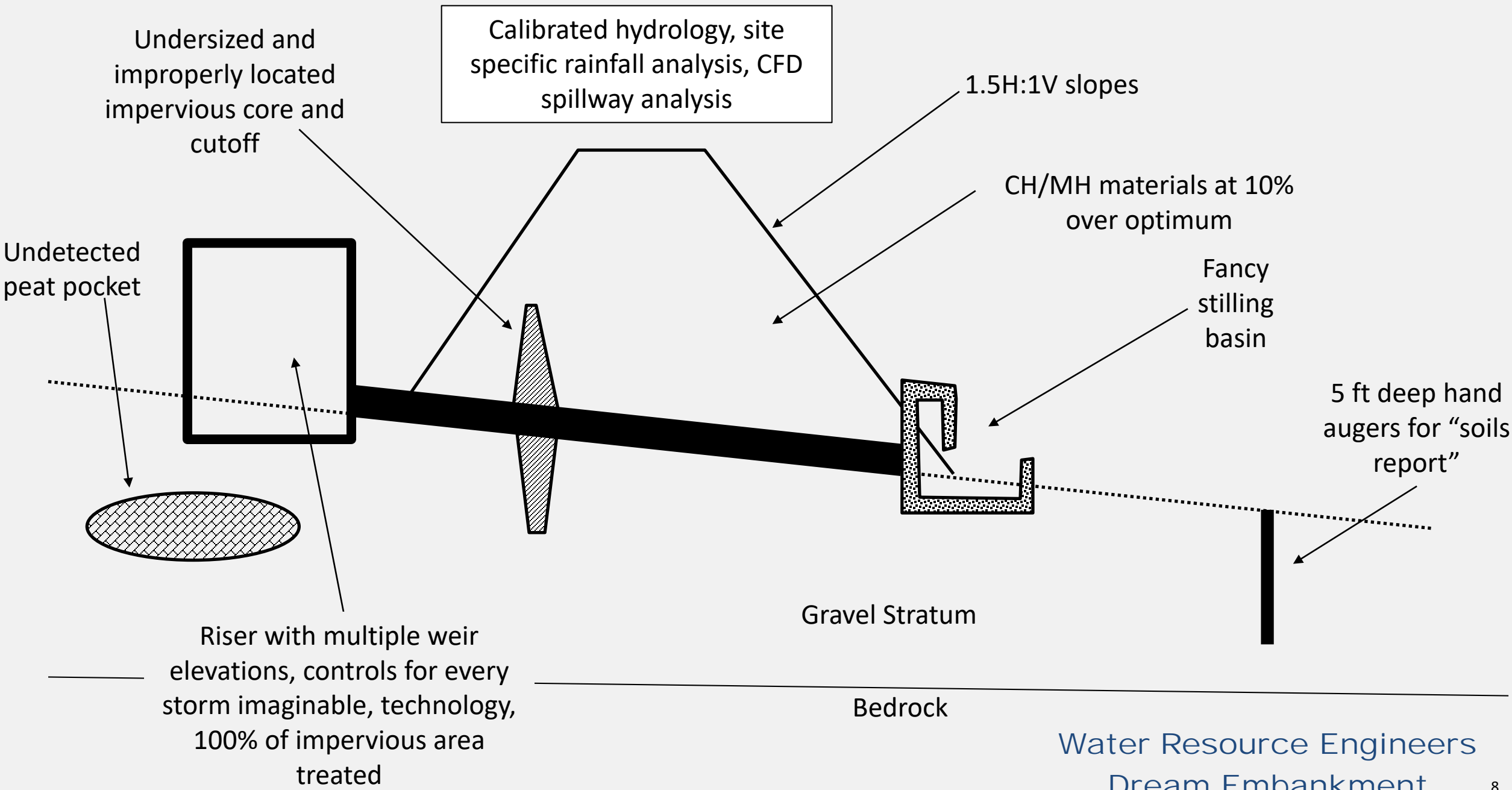
Pervious Stratum

Multi-Row Grout Curtain

Bedrock

Geotechnical Engineers
Dream Embankment





Calibrated hydrology, site specific rainfall analysis, CFD spillway analysis

Undersized and improperly located impervious core and cutoff

1.5H:1V slopes

CH/MH materials at 10% over optimum

Fancy stilling basin

5 ft deep hand augers for "soils report"

Undetected peat pocket

Gravel Stratum

Bedrock

Riser with multiple weir elevations, controls for every storm imaginable, technology, 100% of impervious area treated

Water Resource Engineers
Dream Embankment

Combat Tunnel Vision

- Remember to think strategically:
 - What to look for and where to find it?
 - Use job aids / check lists
 - Multi-disciplinary review teams
- Don't forget to look at things holistically – your review may be for small pond compliance, but flag SWM and other issues that you may see to improve review





What's in your pond?

ENSURE ADEQUATE TRAINING

Training ensures better reviews

- Important to know that MD378 is written to simplify design practices gleaned from design of larger dams
 - There is a big world out there - important to know big concepts to ensure they are carried down to smaller dams appropriately
 - Remember that there are many ways to design something correctly
- Reviewers need to remain current with state of practice
- Employers need to ensure their staff is adequately trained
- **So, where to get training?**



Training ensures better reviews

- MDE provides training and outreach
 - Fall/winter dam owners workshop
 - HEC-RAS training
 - Emergency Preparedness (TTX facilitation)
 - MD Dam Safety 101
 - Guidance documents
 - Reference Library (on request)



MDE File Photo.

CHAT BOX: What are your top 3 training needs?



Training ensures better reviews

- **Training is an investment!**
- ASCE (asce.org)
 - Offers HEC-RAS seminars
- ASDSO (damsafety.org)
 - Offers webinars, Journal of Dam Safety, 2-3 day seminars, annual and regional conferences
- USSD (usdams.org)
 - Offers limited seminars, annual conference
- FEMA NDSPTS





What's in your pond?

APPROVE FOR THE FUTURE

Approve for the Future

- Good review considers future operation and maintenance
- Can it be built?
- Can it be maintained?
 - Who is the owner, think about their capabilities
 - Easements for access and woody vegetation zones?
 - Are slopes too steep to be mowed easily?
- Is there planned upstream or downstream development – has ultimate development/land use planned?
- Are there unique conditions that will cause premature wear or failure of components (e.g., CMP in acidic soils, heavy sediment loads, heavy debris loads, extreme freeze/thaw, brackish water)
- Avoid “design by review” – ensure designers are capable



Approve for the Future

Build it Better.

Less
Maintenance
Needs.

Less Review
Work!



Put these in your library

- NRCS Technical Release 210-60 “Earth Dams and Reservoirs” Mar. 2019
- NRCS National Engineering Handbook, Part 633, Ch. 26 “Gradation Design of Sand and Gravel Filters” Aug. 2017
- NRCS National Engineering Handbook, Part 633, Ch. 45 “Filter Diaphragms” Jan. 2007
- USBR “Design of Small Dams” 1987
- Federal Guidelines for Dam Safety: Selecting and Accommodating Inflow Design Floods for Dams (FEMA Publication No. P-94) Aug. 2013
- Pocket Safety Guide for Dams and Impoundments (FEMA P-911) Oct. 2016
- FEMA Filters for Embankment Dams - Best Practices for Design and Construction Oct. 2011
- FEMA Technical Manual: Plastic Pipe Used in Embankment Dams (FEMA P-675) Nov. 2007
- FEMA Technical Manual for Dam Owners: Impacts of Plants on Earthen Dams (FEMA 534) Sept. 2005
- FEMA Technical Manual for Dam Owners: Impacts of Animals on Earthen Dams (FEMA 473) Sept. 2005
- FEMA Technical Manual: Conduits through Embankment Dams (FEMA 484) Sept. 2005
- USSD: Materials for Embankment Dams Jan. 2011
- USSD: The Aging of Embankment Dams May 2010
- USSD: Strength of Materials for Embankment Dams Feb. 2007



Help!

– Small Pond Workgroup

- Work together to identify needs and solve problems
- Link on MDE Dam Safety Webpage to sign -up



Thank You

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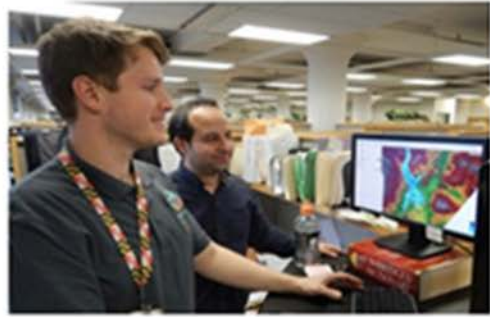
410-537-3552

mde.maryland.gov/programs/Water/DamSafety

“If you’re not moving forward and you’re not evolving, you’re devolving, and I don’t want to go backwards. I want to be better at what I do tomorrow than I am today”

Audra McDonald

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