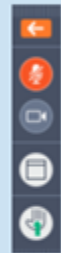


Logistics

Using the control panel

Opening the control panel

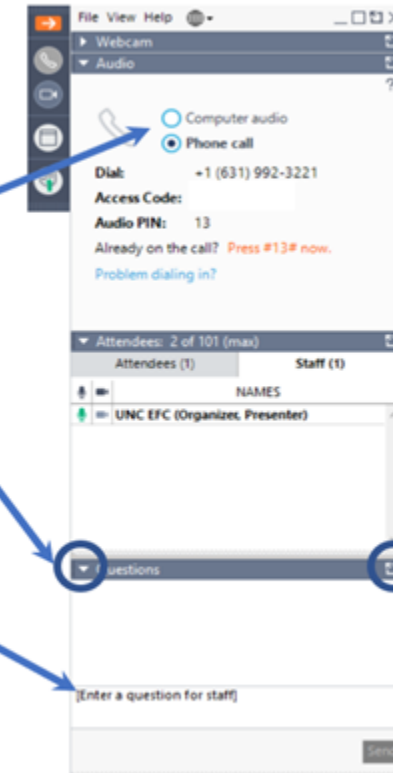
- 
- Show your control panel
 - All phones/microphones are muted for the duration of the webinar
 - Toggle between full screen/window screen view

Audio: please choose between computer audio or phone call

If you do not hear audio right now, please check your speaker volume or enter #[your Audio PIN]# if using phone

Click  to open in Control Panel

Submit **questions** in the Questions box at any time, and press [Send]



Click  to open in separate box and resize

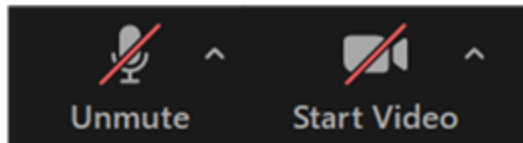
Zoom Logistics

Asking a Question

Audio/Webcam Settings

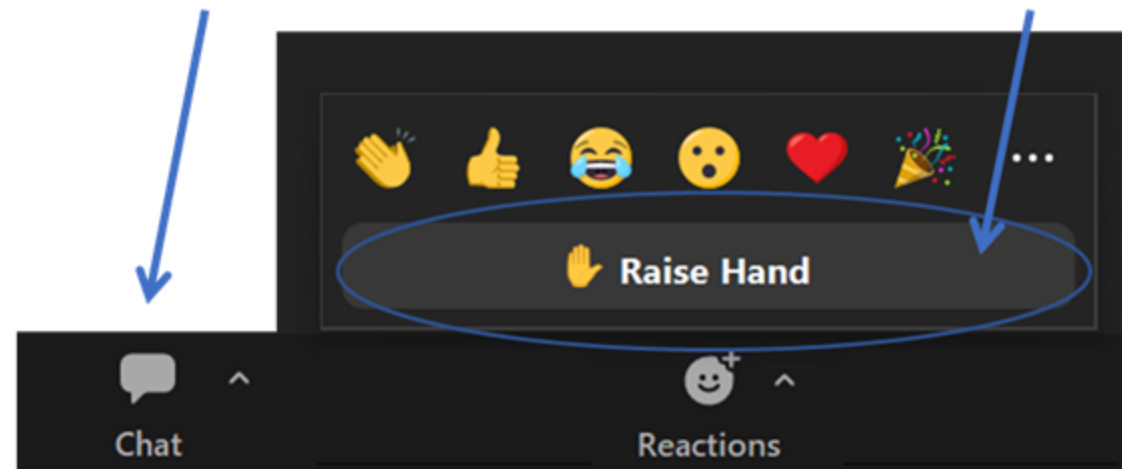
Mute, Unmute, select your audio source, or test audio settings.

Turn webcam on or off



Type questions into the chat box any time throughout the session

If you would like to **unmute** to ask a question, please **raise your hand** under the **Reactions** tab.



Certificate of Completion

This session has **NOT** been submitted for pre-approval of Continuing Education Credits, but eligible attendees will receive a certificate of attendance for their personal record.

To receive a certificate:

- You must attend the entire session
- You must register and attend using your real name and unique email address - group viewing credit will not be acceptable
- You must participate in polls
- Certificates will be sent via email within 30 days

If you have questions or need assistance, please contact smallsystems@syr.edu.

About Us

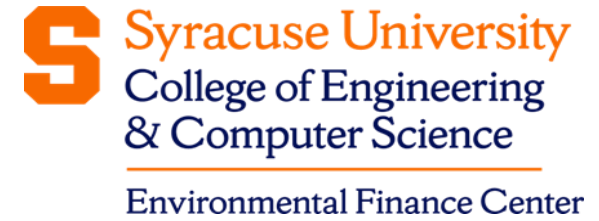
The **Environmental Finance Center Network (EFCN)** is a university- and non-profit-based organization creating innovative solutions to the difficult how-to-pay issues of environmental protection and water infrastructure.

The EFCN works collectively and as individual centers to address these issues across the entire U.S, including the 5 territories and the Navajo Nation. The EFCN aims to assist public and private sectors through training, direct professional assistance, production of durable resources, and innovative policy ideas.





ENVIRONMENTAL
FINANCE CENTER



Monitoring your Solids in a Sludge Lagoon.

August 12, 2026

Shannon Hazelton



Goals for the Webinar

- Learning objectives
- My water story
- How the project started
- Why the project is important
- How it can help your facility
- How to get started
- Questions

Learning Objectives

- You will be able to identify new technology to help in your sludge management plan.
- You will understand the impact of sludge on your treatment process.
- You will be able to plan for future needs of your lagoon.

My Water Story

- I didn't choose this profession, It chose me
- I would have gotten into it sooner if I knew what I know now.



Over 25 years experience

- McAnnich Corporation Laborer
- Correll Contractor Pipe Layer
- City of Des Moines WRA Pump Station Technician
- City of Ida Grove Wastewater Superintendent
- Iowa Great Lakes Sanitary District Wastewater Operator
- USW Utility Group City of Winterset Project Manager
- UIC Point Hope Alaska
- City of Iowa Falls Water/Sewer Superintendent
- Environmental Finance Center Wichita State University

Professional Achievements

- Licensed by the Iowa DNR
- Grade 4 Wastewater Treatment
- Grade 4 Wastewater Collections
- Grade 4 Drinking Water Treatment
- Grade 4 Drinking Water Distribution
- Reciprocity in Alaska
- Speaking to Iowa Jobs for America's Graduates (iJAG) Students all over Iowa
- Worked with Interns and conducted Job Shadows

Existing Technologies Not Widely Used Together

- Not new technologies
- Used in multiple applications
- Currently others doing the same thing
- Varying costs by region and size
- No cost in our region

How The Project Started

- Met with State of Iowa DNR staff
- Knew of the current technology already
- Divided research task amongst staff

Initial Research

Steps in the Sludge Survey

1. Gather necessary personnel and equipment.

Personnel—There should be two people in the boat and one on the bank.

Boat—A 12-foot jon boat with a trolling motor is recommended.

Flotation vests—Every person within the lagoon berm should wear a flotation vest.

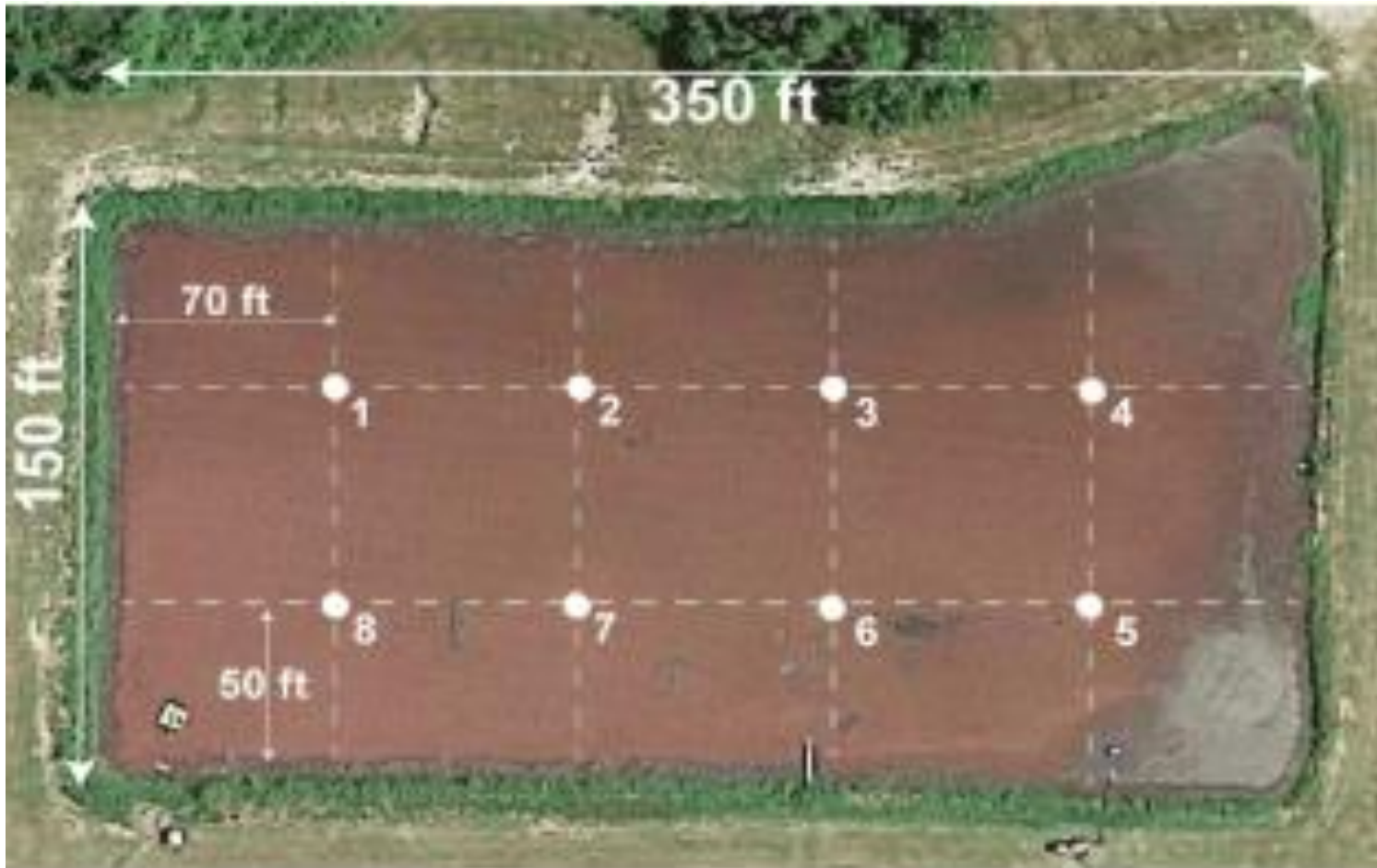
Anchors—Two to three anchors are recommended to steady the boat during measurements.

Sludge detection device—An infrared sensor or a disk-on-rope with interval markings can be used to determine the top of the sludge layer (see [Measuring Sludge Layer Thickness](#) section).

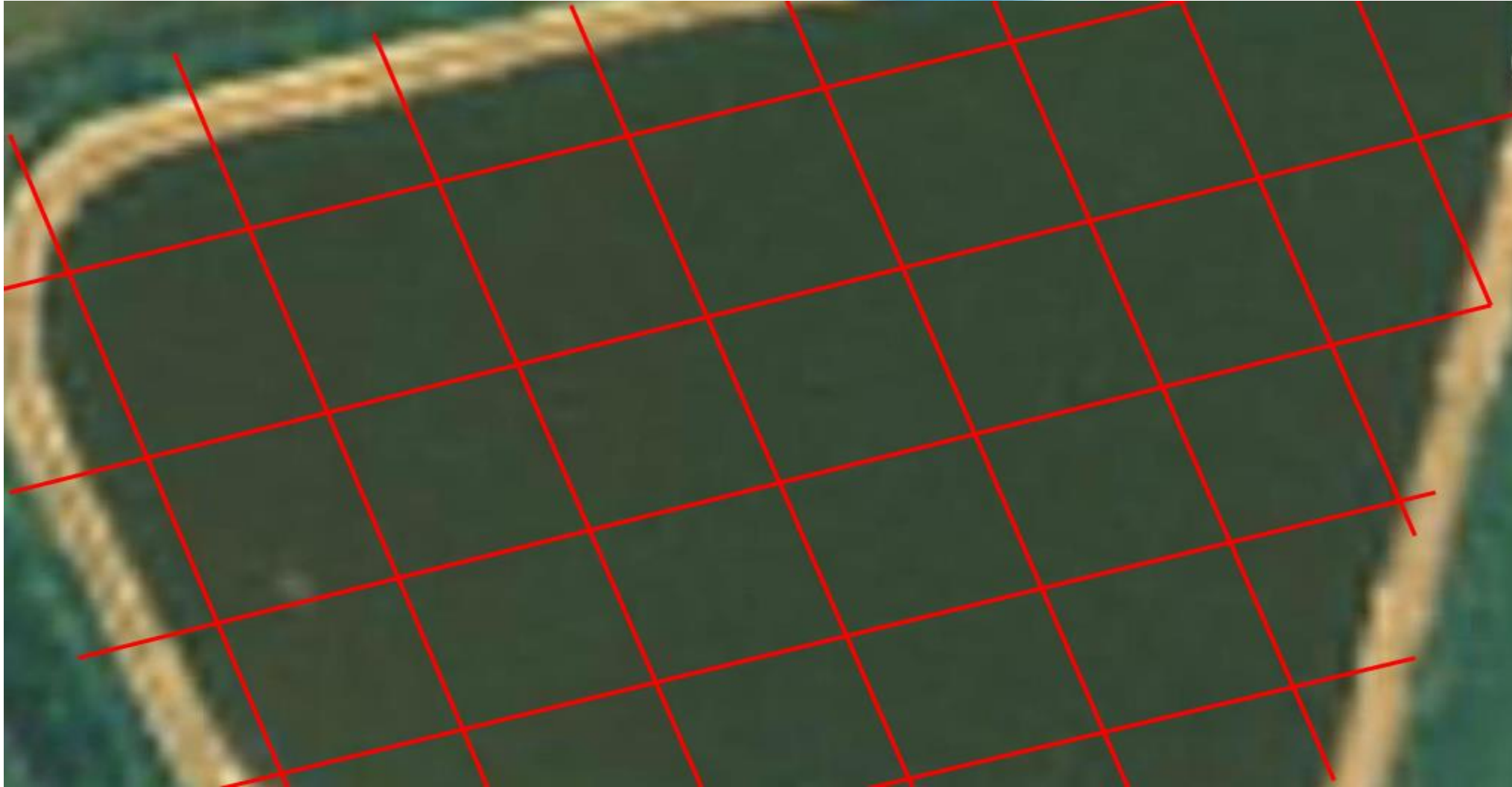
Solid, long rod or pole with measurement markings at intervals—Use these devices to determine the depth to the lagoon bottom.

2. Determine the number of points at which to take measurements. **Measure sludge at a minimum of six points per acre on a uniform grid, using 24 points maximum; if the lagoon is smaller than 1.33 acres, measure a minimum of eight points.**

Initial Research



Is This Grid Still Efficient?



Ideal in the Summer Months?



Would you let your kids do this?





That's How We Have Always Done It!

- This should never be said or used!
- Regulations change

Initial Research



Initial Research



Subtotal	\$66,695.00
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Total US\$	\$66,695.00
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Demo Day in Southern Iowa

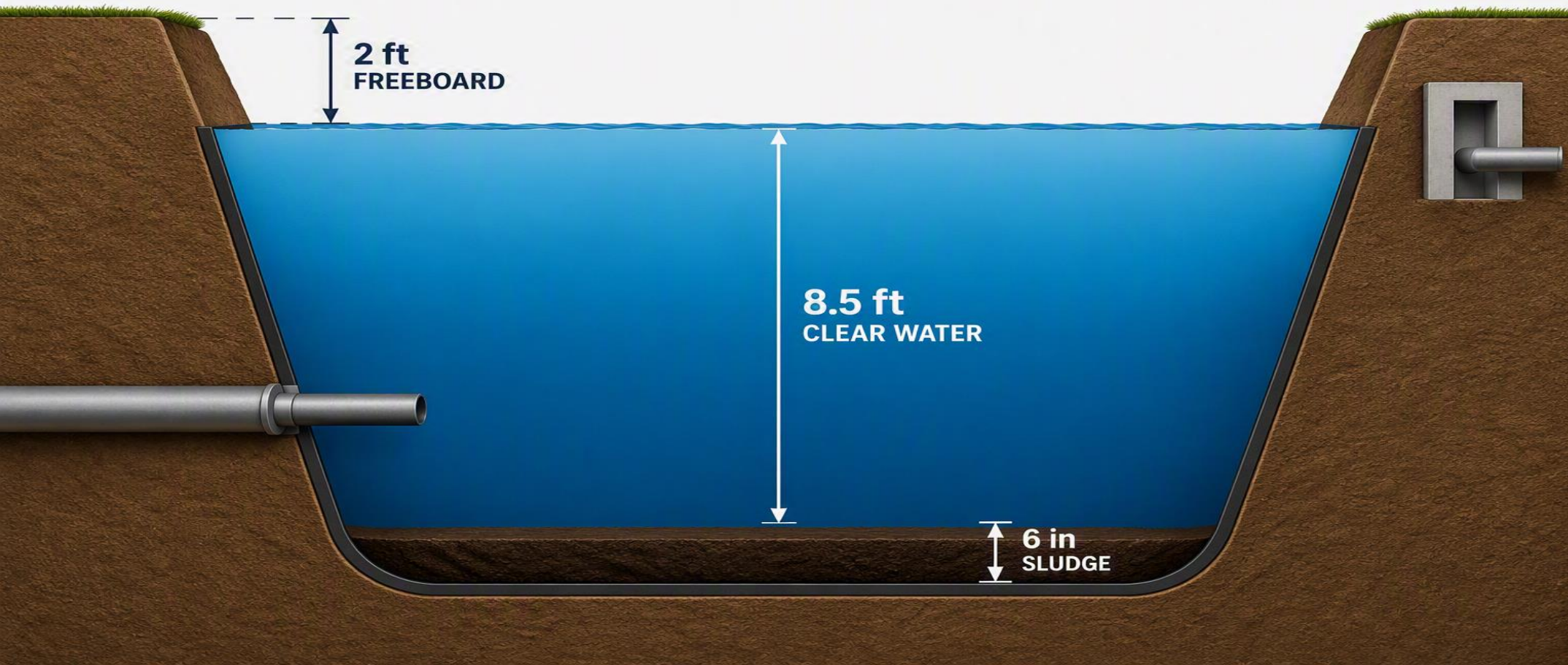


Why The Project is Important

- Measure sludge depth throughout the lagoon. Sludge levels should be maintained at $< 30\%$ of the total lagoon depth.
- Capacity and Efficiency
- Aquatic vegetation control
- BOD removal
- TSS challenges
- Microbial population control

Why the Project is Important

NEW WASTEWATER LAGOON



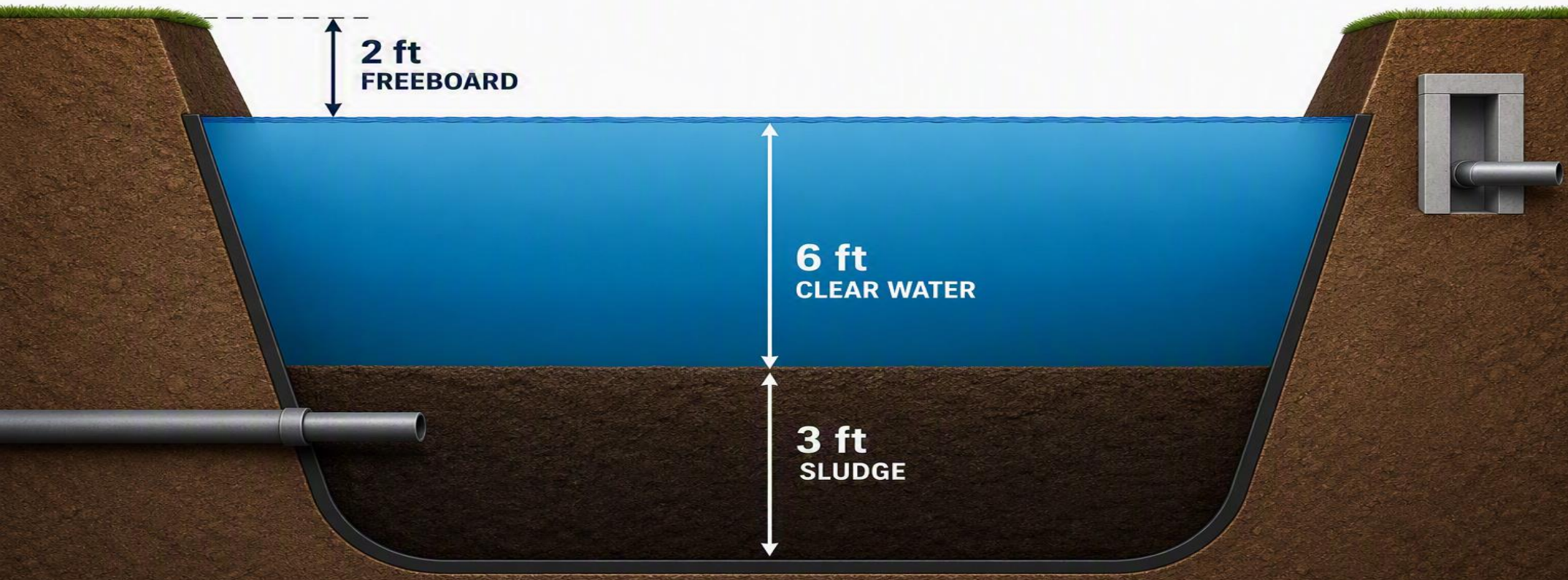
How Does Sludge Accumulate

- Sludge is composed of :
- Primarily organic matter...poop
- Dead algae
- Living and dead bacteria
- Dead protozoa
- Dead duckweed, cattails and other plants
- Grit, clay, sand, dirt, trash, plastics, fabrics
- Many others



Why the Project is Important

OLD WASTEWATER LAGOON

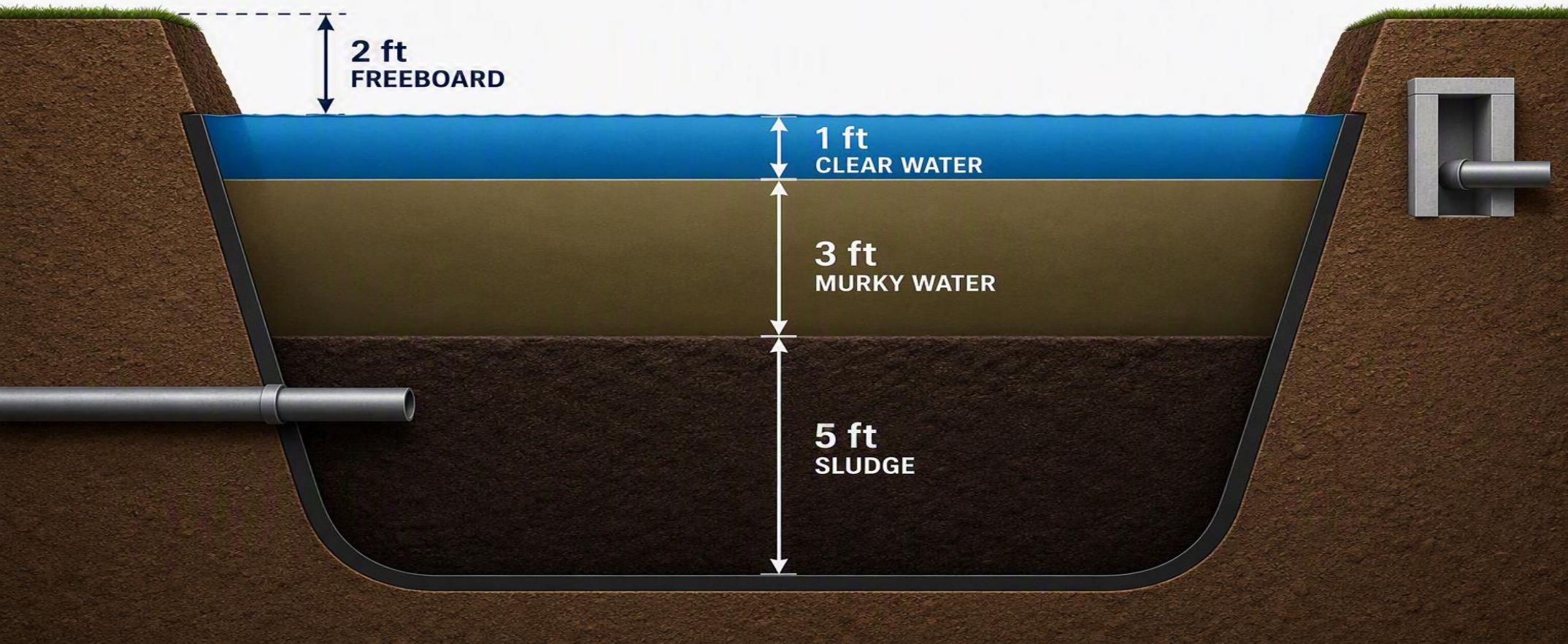


Sludge Problems

- Sludge displaces valuable treatment capacity
- It creates channeling of sewage flows creating short circuiting
- It feeds nutrients back into the water column feeding new algae cell growth
- Creates/Causes odors

Why the Project is Important

VERY OLD WASTEWATER LAGOON



What Can a Survey Help With

- Determine a sludge accumulation rate
- Estimate sludge volume and mass for a dredging contractor
- For permit or compliance requirements

Hydraulic Retention Time

- Nitrogen removal
- Pathogen destruction and inactivation
- Algae growth
- BOD removal
- TSS removal
- Contaminants removed with sludge and not brought back into suspension
- May have increased sludge from adding chemicals for treatment or removal of certain contaminants

Capacity in a Hypothetical Lagoon

1 acre of lagoon = 43,560 Sq Ft

1 acre foot = 326,000 gallons

Sq Ft x depth = Volume in Cu Ft

Volume x 7.48 = Gallons

Lagoon = 1acre, 8' deep, 1' max blanket, 7' water, 180 days, .012MGD

2.3 million gallons water, 43,560 Cu Ft sludge, 192 days detention

1.5' sludge = 2.1 million gallons water, 65,340 Cu Ft sludge, 175 days

2' sludge = 1.9 million gallons water, 87,120 Cu Ft sludge, 158 days

3' sludge = 1.6 million gallons water, 130,680 Cu Ft sludge, 133 days

Sludge Accumulation

- Climate
- Strength of waste
- Organics vs inorganics
- Age of sludge

How It Can Help Your Community

- Budgeting and planning
- Understanding
- Safety
- Time

Long Time Coming!!!!!!



Work or Play



What Can't We Survey



Liners can be OK





Safety Concerns?



How To Get Started

- Where are you located?
- EPA Region 7
- Illinois
- Find your as built drawings
- Check with your local TA providers
- Get quotes

Takeaways

- Start planning for sludge removal now
- There's safer newer technologies
- Understand your capacity



**Shannon
Hazelton**

Program Manager



Thank you

- **Shannon Hazelton**
- Shannon.Hazelton@wichita.edu