

# OVERVIEW OF O&M OF WASTEWATER TREATMENT TANKS

Presented at NOWRA 2025 Mega-Conference, October 19-22, 2025.



# DISCLAIMER

The materials being presented represent our own opinions, and do NOT reflect the opinions of NOWRA.

# LEARNING OBJECTIVES

Upon completion of this module, the participant should be able to:

- Describe various types of treatment tanks.
- Evaluate baffles & effluent screens within a tank.
- Measure sludge & scum and identify if the tank needs pumping.
- Identify unacceptable conditions in a tank.
- Accurately complete Operational Checklist 5-2 Septic, trash and processing tanks (STPT).

# OVERVIEW

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Types of treatment tanks used in  
OWTS

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Tank function and construction

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Baffle wall and effluent screen  
performance

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Measuring solids in tanks

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Assessing tank structural condition

# 1. TYPE

- Septic tank
- Trash tank
- Processing tank
- Grease interceptor
- Holding tank (different form)

All must be properly vented.

Main function is solids separation.

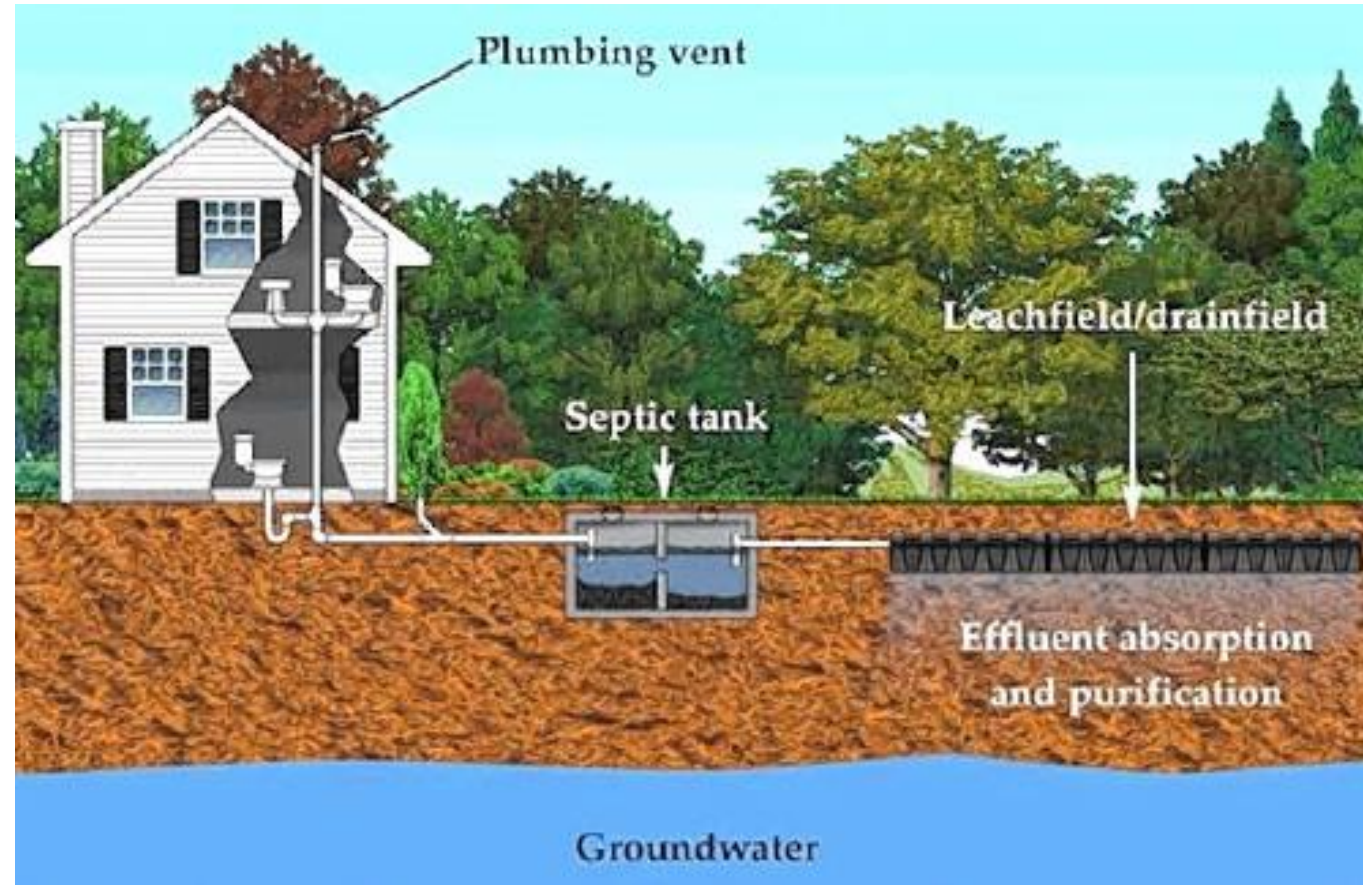
Processing tanks also used for denitrification.

Requires an additional form for the pump.

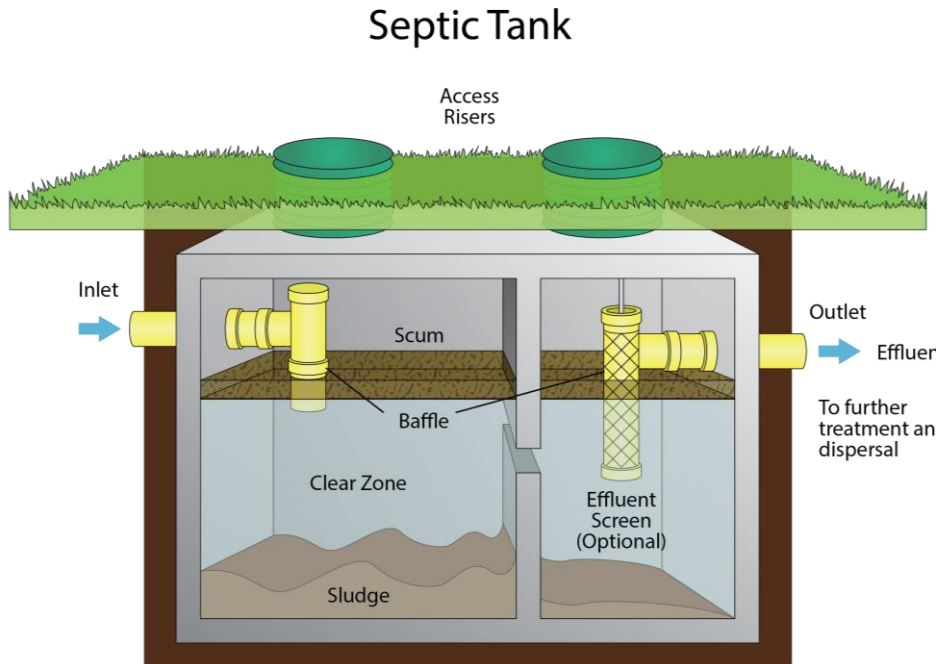


# TANK FEATURES

- Typically, the first component of a treatment train
- Provide primary treatment: solids separation
- Watertight containers
- Components
  - Baffles: Inlet/Outlet/Center
  - Riser(s) to grade
- Venting is critical



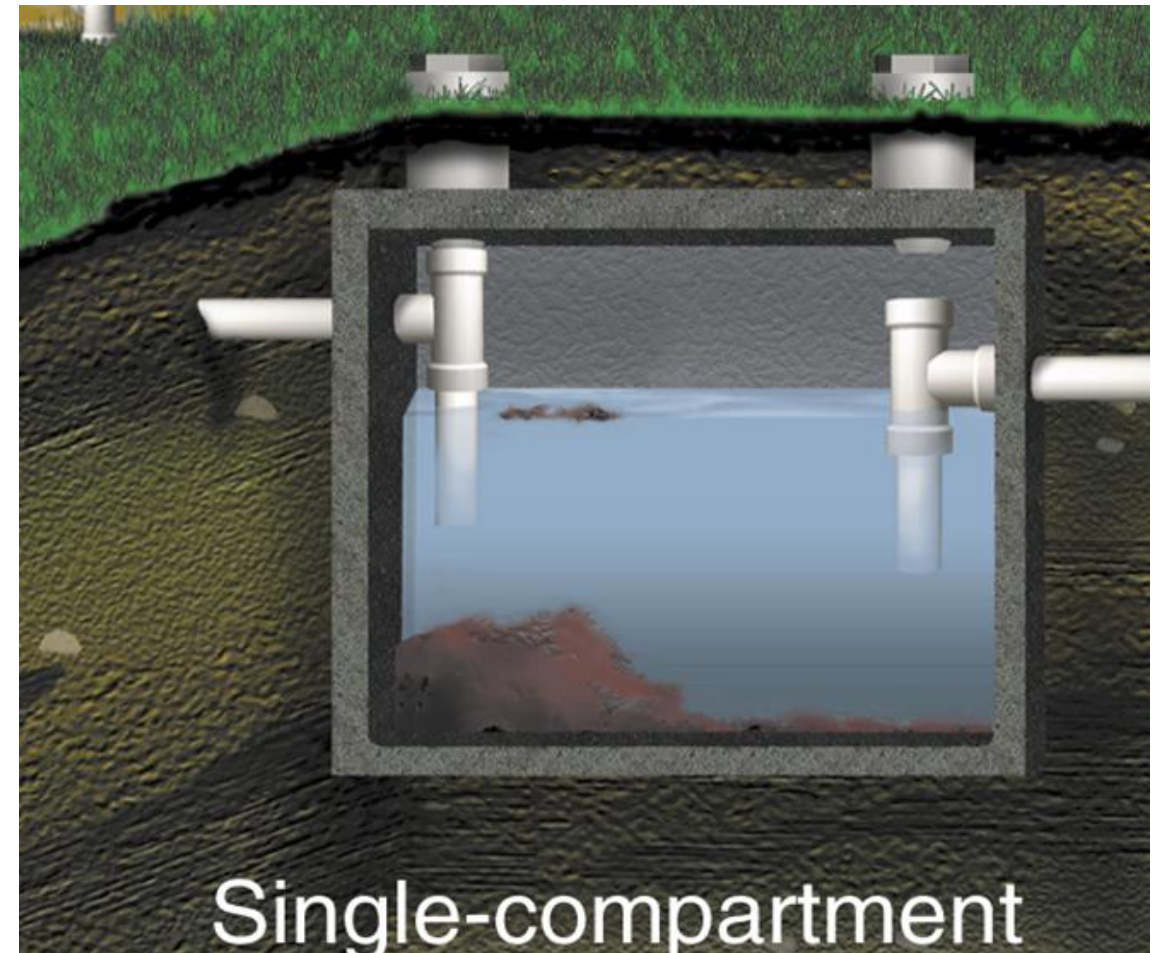
# WHAT IS A SEPTIC TANK?



- Septic tank function
  - Clarification by solids separation
  - Anaerobic digestion
  - Storage
- Gravity separation
  - Heavier sinks
  - Lighter floats
- Designed at 150-300% daily flow
  - Adequate detention time for treatment to occur
- Screen-assisted

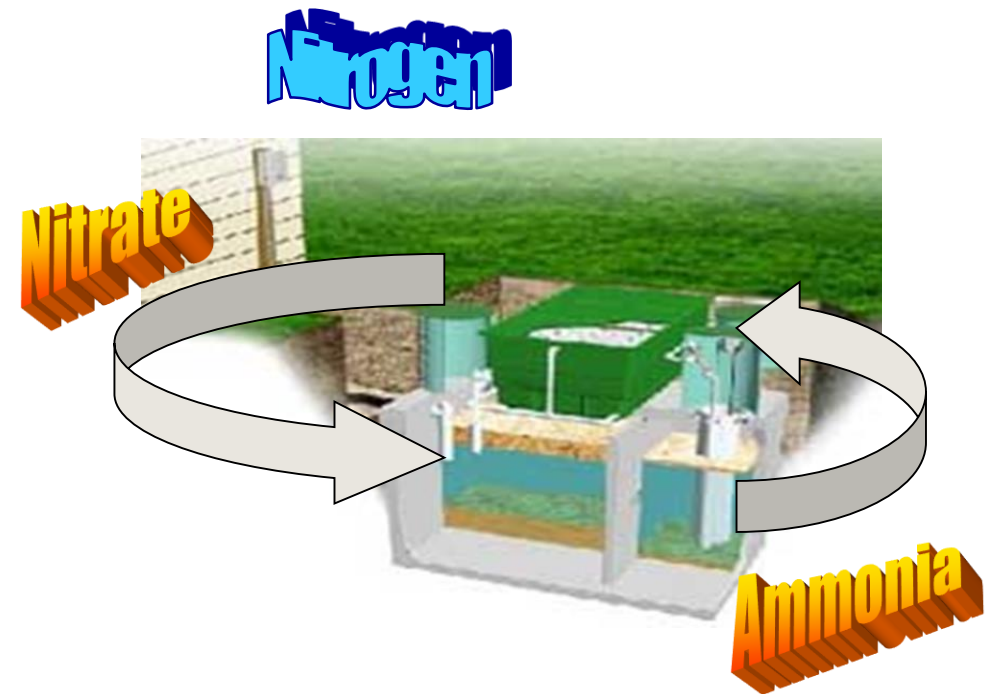
# WHAT IS A TRASH TANK?

- A smaller septic tank
  - 75 – 100% daily flow
- Designed to deal with big pieces (trash)
- Some Aerobic Treatment Units (ATU's) use a trash tank or trash compartment as part of their treatment unit



# WHAT IS A PROCESSING TANK?

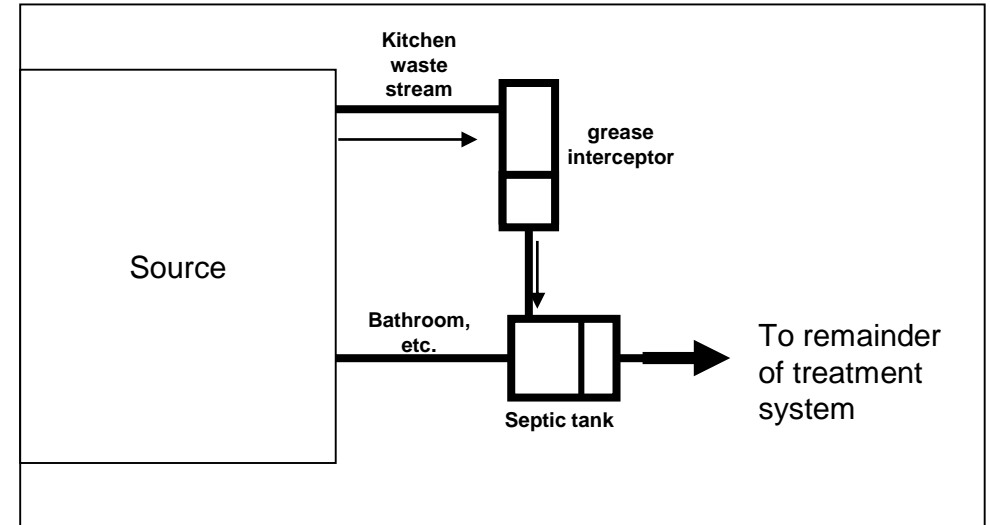
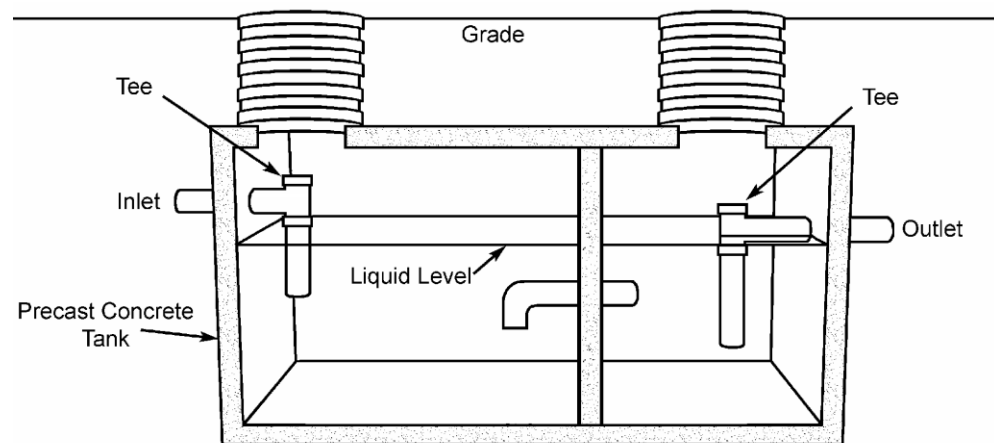
- Anaerobic component of a treatment train
- Anoxic conditions with presence of oxygen bound in  $\text{NO}_3^-$
- Aerobically treated effluent recirculates to the tank
- Used in nitrogen reduction systems
- $\text{NH}_4^+ \rightarrow \text{NO}_3^- \rightarrow \text{N}_2$



# GREASE INTERCEPTOR

## 3 types:

- Gravity
- Hydromechanical
- FOG Disposal



# GREASE INTERCEPTOR MAINTENANCE

- No matter how big or well built, maintenance is the KEY!
- Serviced when solids reach 25%
- Inspection and cleaning of tees and screens
- Record keeping
- Service every 30 days max.
- Pump it ALL!

# HOLDING TANKS

- A collection and storage system
  - *No outlet to dispersal on the site*
- Watertightness is imperative
- Pump when tank is full
- Remote telemetry may help with system management
- See Form 5-1 for guidance



# 2. CONDITIONS AT THE TANK



# 2. CONDITIONS AT THE TANK

a. Evaluate presence of odor within 10 feet of perimeter of system

- None
- Mild
- Strong
- Sour
- Chemical

b. Source



# 3. TANK DESCRIPTION

- a. Material
- Concrete
  - Fiberglass
  - Plastic



# 3A. CONCRETE



# 3A. PLASTIC

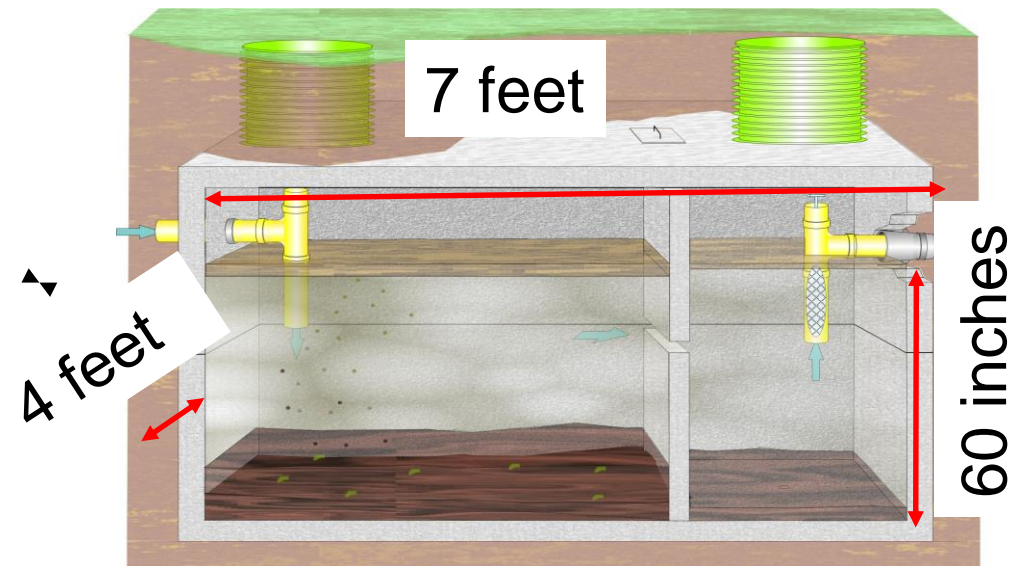


# 3A. METAL



# 3. TANK DESCRIPTION (CONT.)

- b. Capacity
  - Based upon tank INSIDE dimensions
  - Operating depth is measured to the outlet invert
    - 4' x 7' x 60"
    - $4' \times 7' \times [60'' \div 12] = 140 \text{ ft}^3$
    - $140 \text{ ft}^3 \times 7.5 \text{ gal/ft}^3 = 1050 \text{ gal}$
    - $1050 \text{ gal} / 60'' \text{ depth} = 17.5 \text{ gal/inch}$



# 3. TANK DESCRIPTION (CONT.)

- c. Number of compartments
- d. Capacity of each compartment



# 4. TANK ACCESS

a. Access Location:

- Inlet
- Outlet
- Center



# 4. TANK ACCESS (CONT.)

- b. Located at grade
- c. If 'No', how deep is tank buried



# 4. TANK ACCESS (CONT.)

d. Risers on tank

e. Evidence of infiltration



## 4. TANK ACCESS (CONT.)

- f. Lids securely fastened
- g. Secondary restraint safety feature secure



# SECONDARY RESTRAINT SAFETY FEATURE



# SECONDARY RESTRAINT SAFETY FEATURE



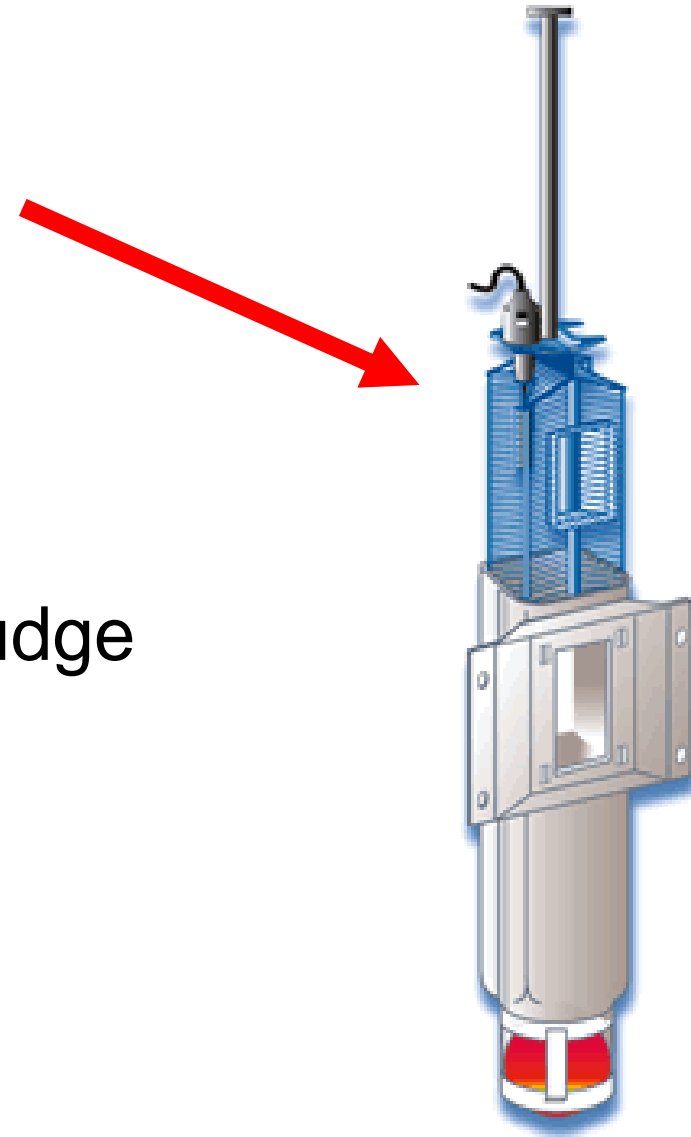
# TANK ACCESS (CONT.)



- h. Lid in operable condition

# 5. ALARM(S)

- a. Alarms present
- b. Audible alarm operational
- c. Visible alarm operational
- d. Remote telemetry operational
- e. Electronic monitoring of scum and sludge

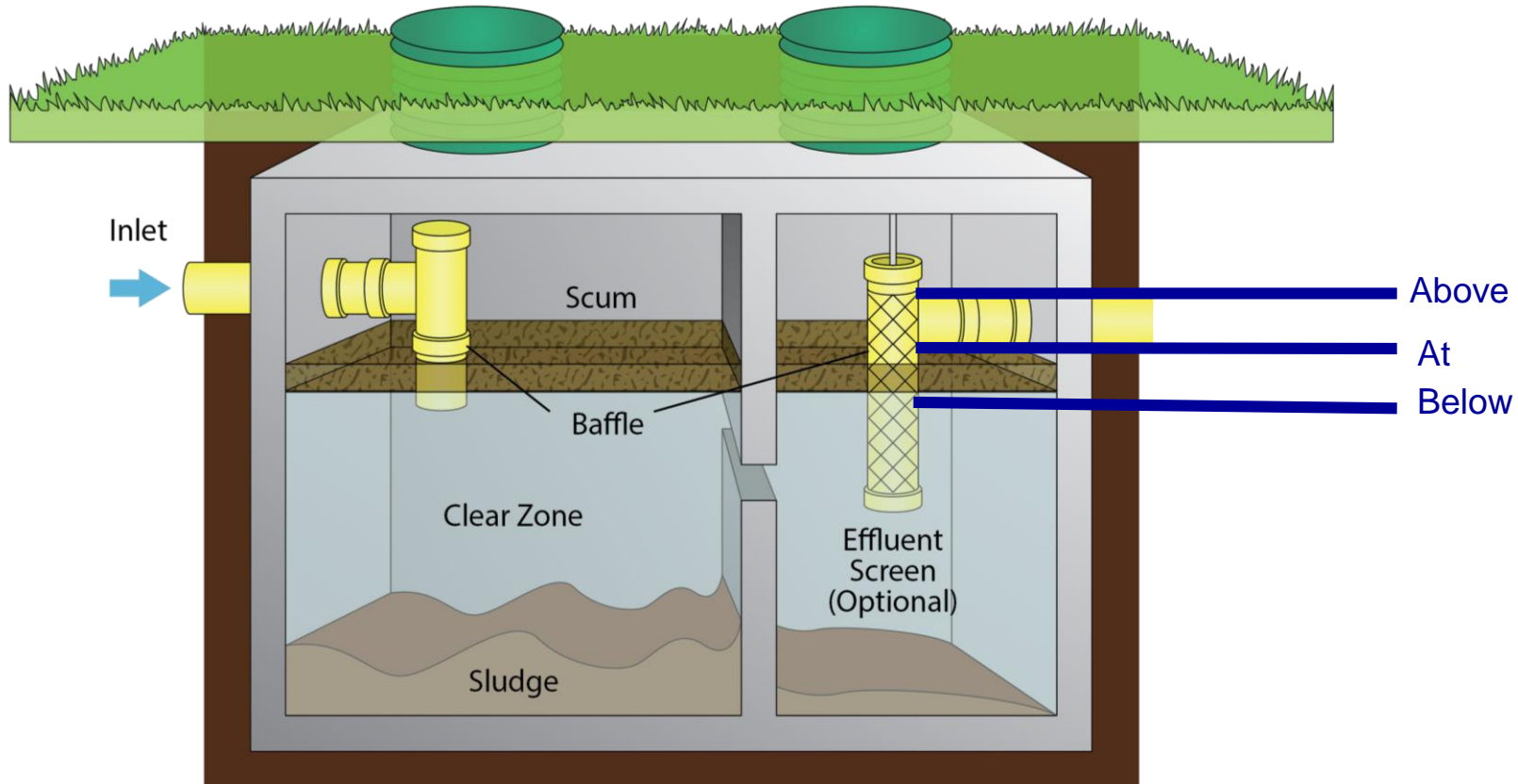


# 6. CURRENT OPERATING CONDITION

a. Liquid level in respect to outlet (inches):

- At
- Above
- Below

In: \_\_\_\_\_



## 6. CURRENT OPERATING CONDITION (CONT.)



b. Maximum liquid level of the tank

c. Height at which alarm is activated as measured from invert of inlet



d. Evidence liquid level has been higher

## 6. CURRENT OPERATING CONDITION (CONT.)



e. Evidence level dropped without pumping

f. Evidence of continuous inflow

# 6. CURRENT OPERATING CONDITION (CONT.)

- g. Date of last pumpout
- h. Presence of suspended particles in the clear zone



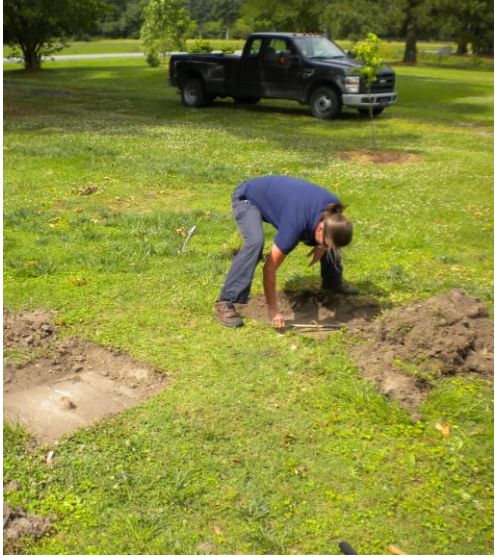
# 6. CURRENT OPERATING CONDITION (CONT.)

## i. Evaluation of layers in tank

- Compartment number
- Scum (in.)
- Clear Zone (in.)
- Sludge (in.)
- Odor
- Color
- Other











# SLUDGE JUDGE

- Thick scum plugs the sludge judge; less of a problem with the dip-stick
- Separate the scum and insert the tool



Seated

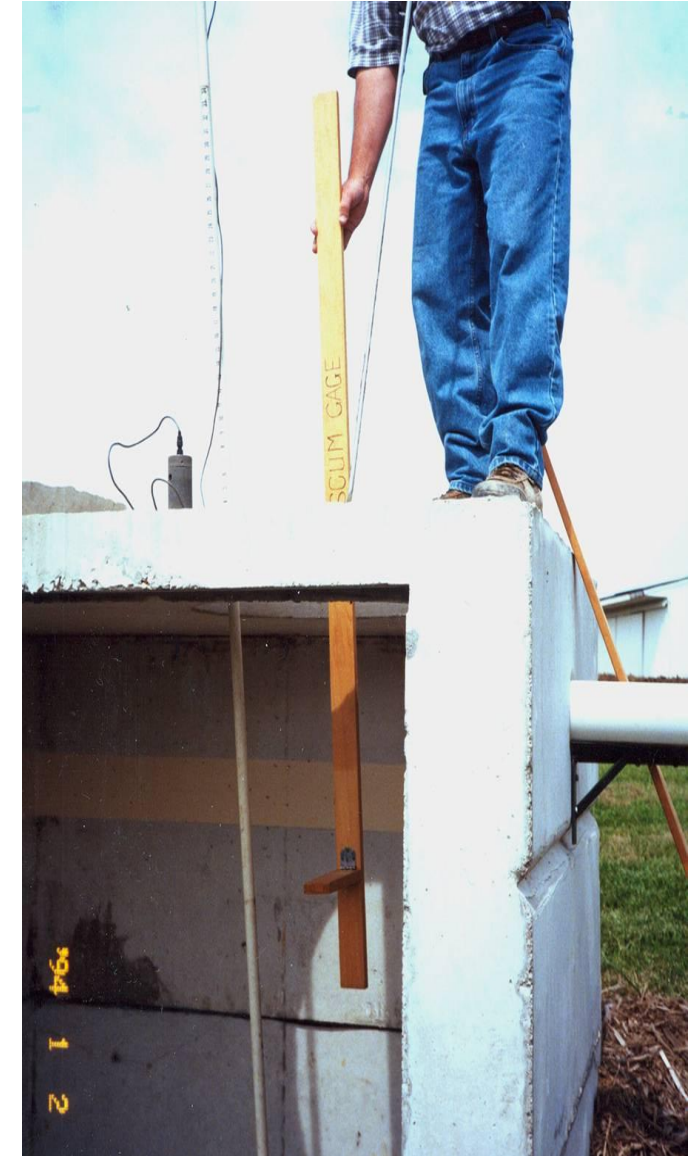


Unseated



# SOLIDS MEASUREMENTS

- Measure depth with a scum hook

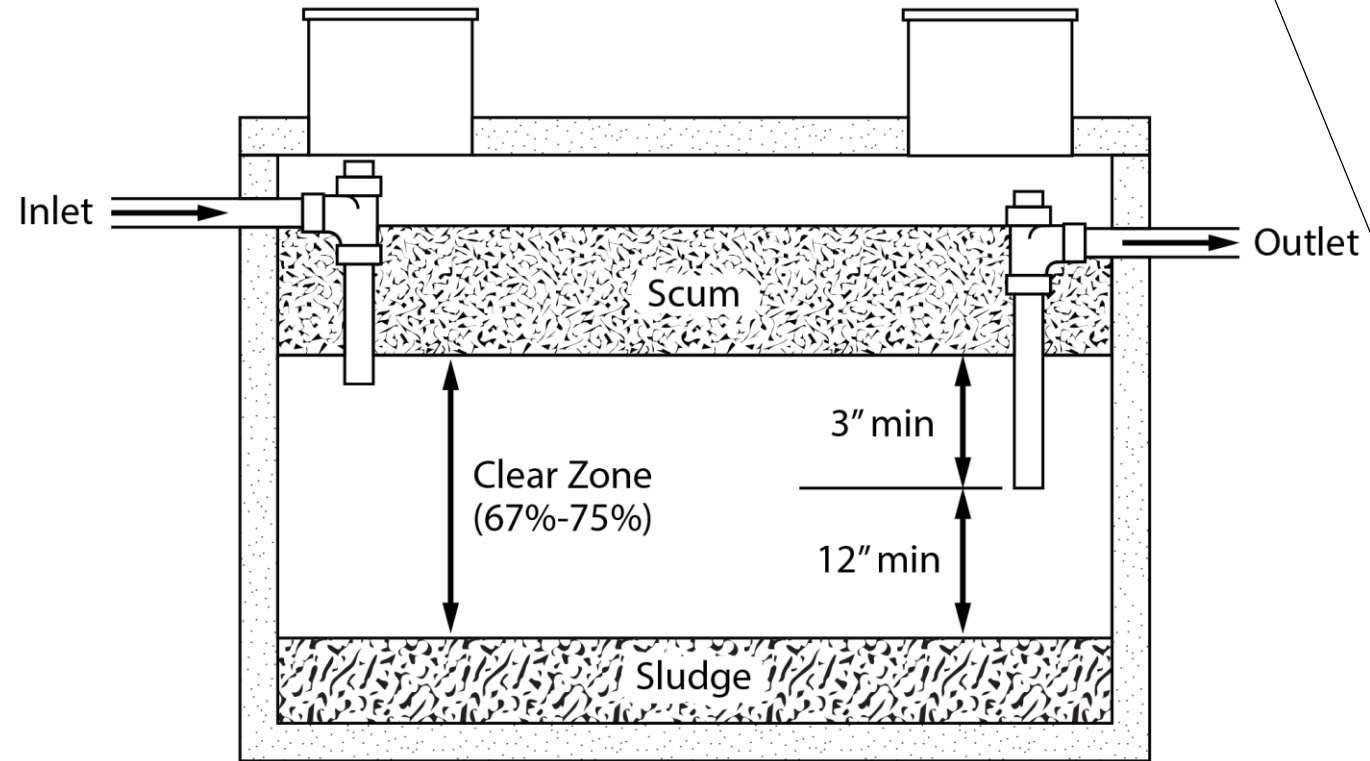


# TOTAL SOLIDS

- Add the sludge and scum measurements to calculate total solids in the tank
- Total Solids = Sludge depth + Scum depth

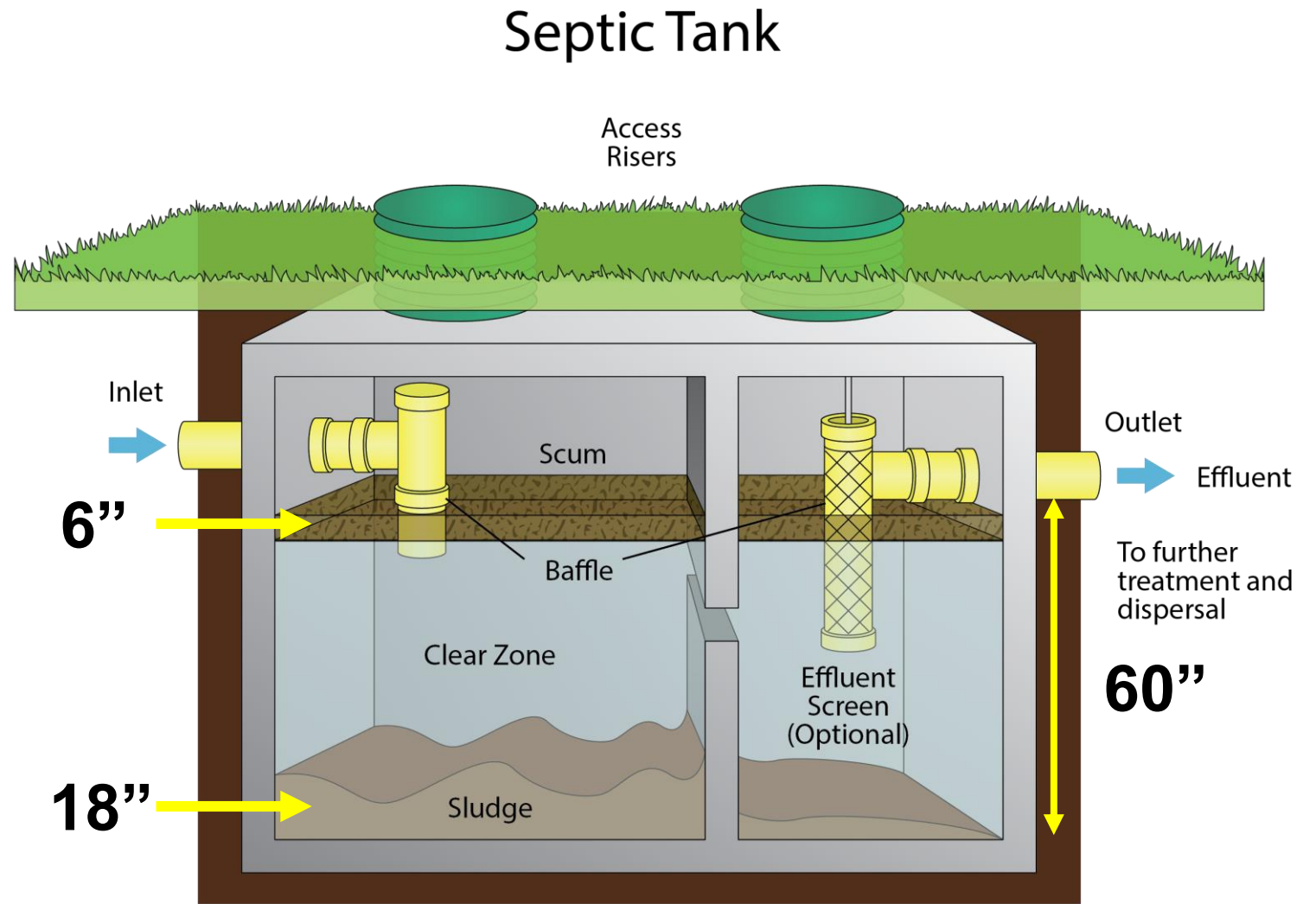
# 7. TANK PUMPING RECOMMENDED

1. Should be pumped when:
  - a. Total solids are 25-33% of tank capacity.
  - b. If 'A' is less than 3"
  - c. If 'B' is less than 12"
2. If recommended, did it happen?



# IS IT FULL?

- Measure solids in the tank
  - 60" deep
  - 6" of Scum
  - 18" of Sludge



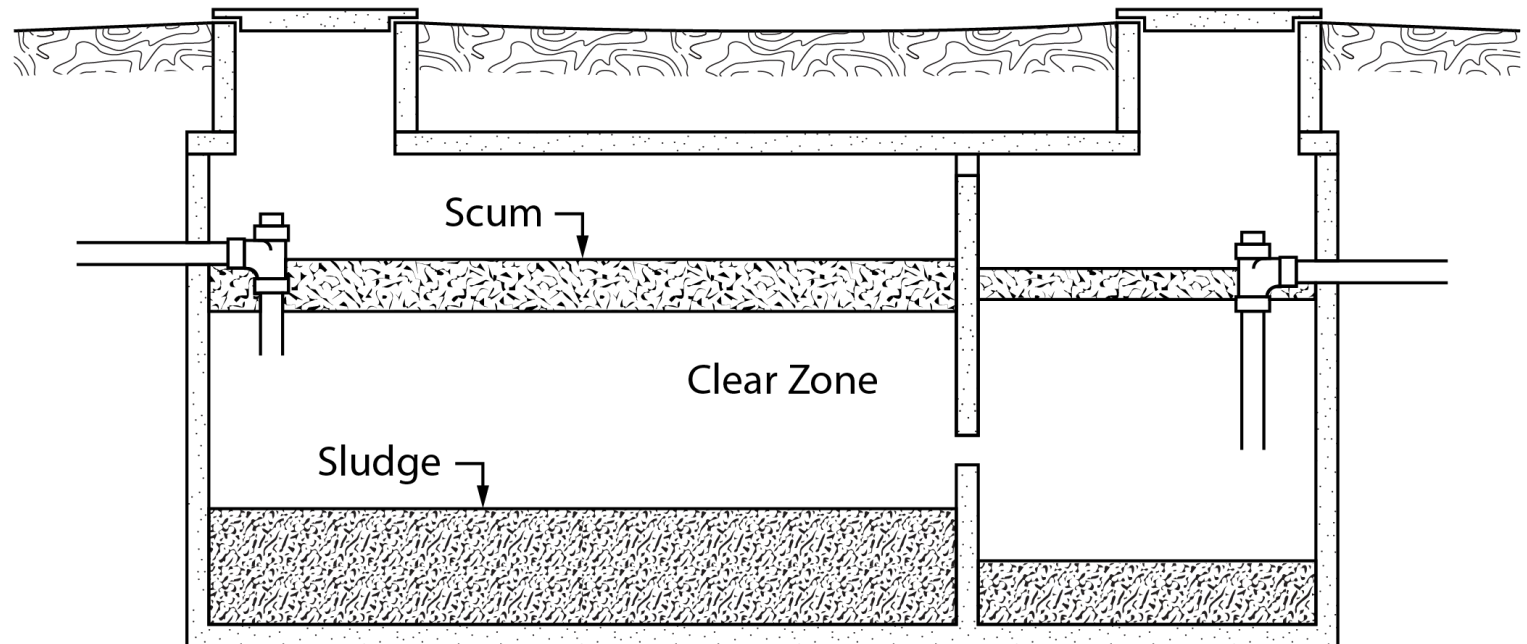
$$[18'' + 6''] \div 60'' \times 100 = 40 \%$$

# TRACKING TRENDS

- Year 1: 10% full of solids
- Year 2: 22% full of solids
- Year 3: What do you think?
- Pumping at year 2 may make sense
  
- System risk impacts decision to pump tank.

# 8. BAFFLES AND SCREENS STRUCTURALLY SOUND

- a. Inlet baffle in place
- b. Outlet baffle in place
- c. Compartment baffle in place



# CONCRETE E Baffle





Fiberglass baffle

# PLASTIC BAFFLE

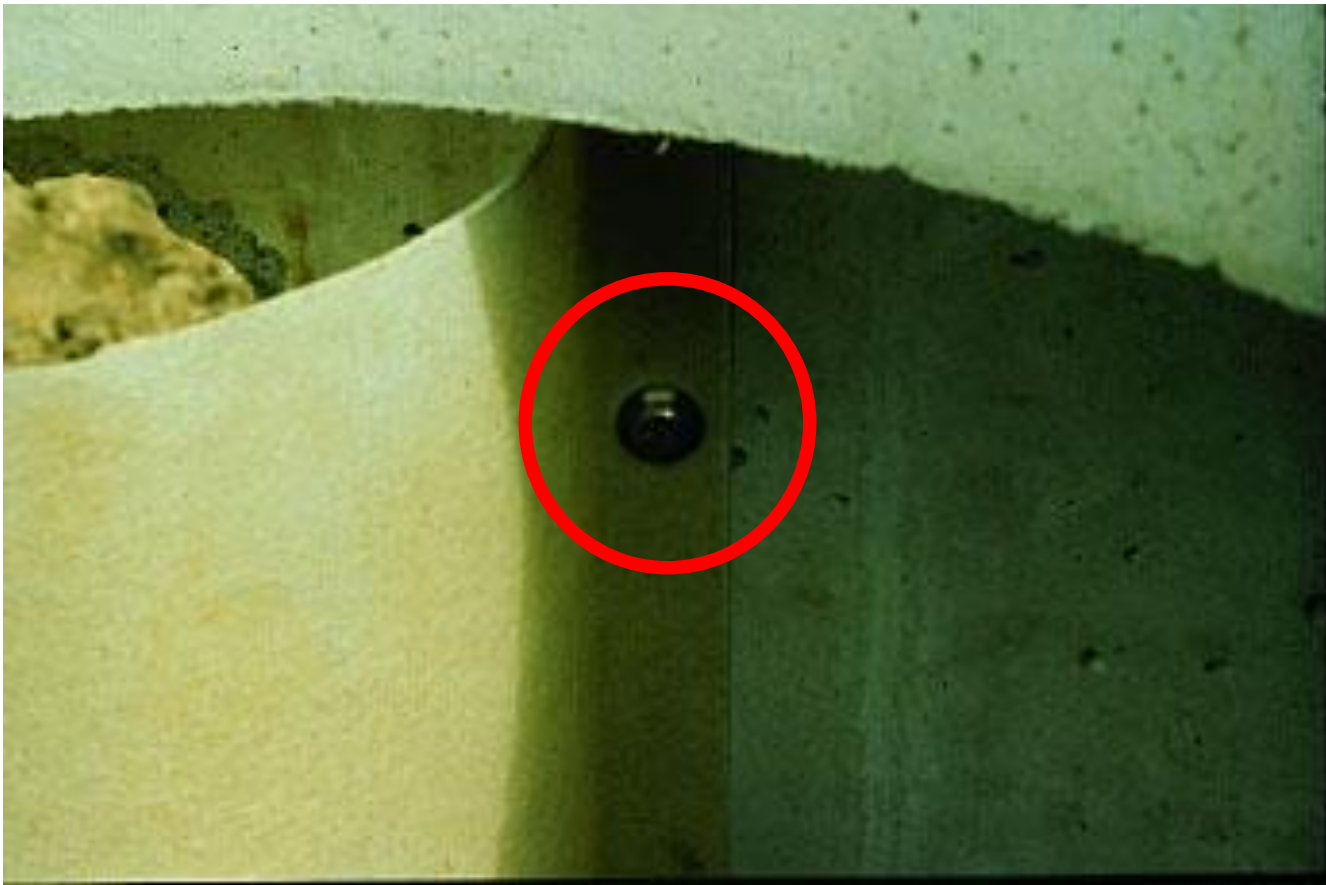


# BAFFLES - TEES



Sanitary on inlet





# BAFFLE CONNECTIONS



## 8. BAFFLES AND SCREENS STRUCTURALLY SOUND (CONT.)

d. Effluent screen:

- Manufacturer

\_\_\_\_\_

- Model\_\_\_\_\_

\_\_\_\_\_



# 0. DAPPLES AND SCREENS OF STRUCTURAL SOUND (CONT.)

- e. Screen accessible from ground surface



## 8. BAFFLES AND SCREENS STRUCTURALLY SOUND (C



- f. If screened, percent plugged
- g. Screen cleaned?

# SERVICING EFFLUENT SCREENS



- Wash accumulated material back into the septic tank
- If cleaned other than at the time of pumping
  - Remove and take elsewhere to clean, or
  - Clean over inlet end of the tank
  - Be sure no solids flow out of the tank while screen is removed

# SERVICING EFFLUENT SCREENS



- Screen is washed off directly into the septic tank
- This is being done at the inlet end of the tank to protect against cleanings going directly out the outlet
- Some units have protection against outflow or an extra screen that that operates during cleaning.

# SERVICING EFFLUENT SCREENS

- Often, a tool is needed to remove the screen for cleaning and then to replace it into the housing
- Note that riser opening allows easy access to filter



## 9. TANK STRUCTURAL CONDITION

a. Watertight (no visible leaks)



# 9. TANK STRUCTURAL CONDITION (CONT.)



b. Rebar exposed



# 9. TANK STRUCTURAL CONDITION (CONT.)

- c. Corrosion present
- d. Spalling present



# 9. TANK STRUCTURAL CONDITION (CONT.)



- e. Cracks present
- f. Root intrusion
- g. Deflection noted



# 10. CONTRACTOR RESPONSIBLE FOR PUMPING

- a. Gallons removed
  - Date
- b. Tank refilled?



# 11. LAB SAMPLES COLLECTED FOR MONITORING

- Regulatory agencies, designer or manufacturer may require sampling.
- The type of analysis and the sampling protocol is set by the requesting parties.

# SUMMARY

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# QUESTIONS?

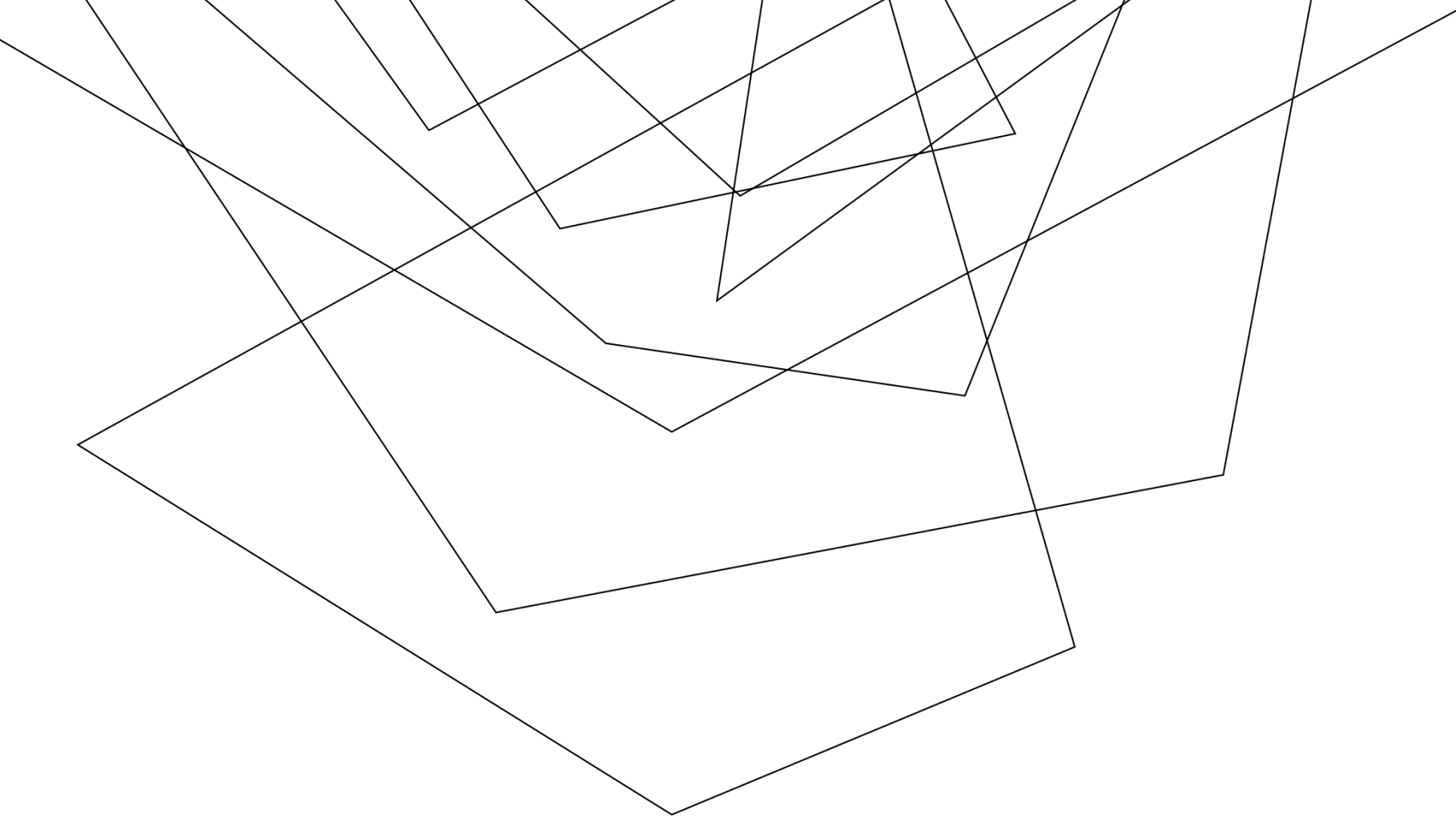
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