

# Sand Me a Solution

*Dealing with sand in your intakes*

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***murraysmith***



# Agenda



- 01 Background
- 02 The Problem
- 03 The Science
- 04 Case Study
- 05 Conclusions/Recommendations
- 06 Questions

# Background





## Surface water sources:

- Over 300 water systems in Oregon rely on surface water
- Over 350 water systems in Washington
- Over 80 water systems in Idaho

# Background



# The Problem

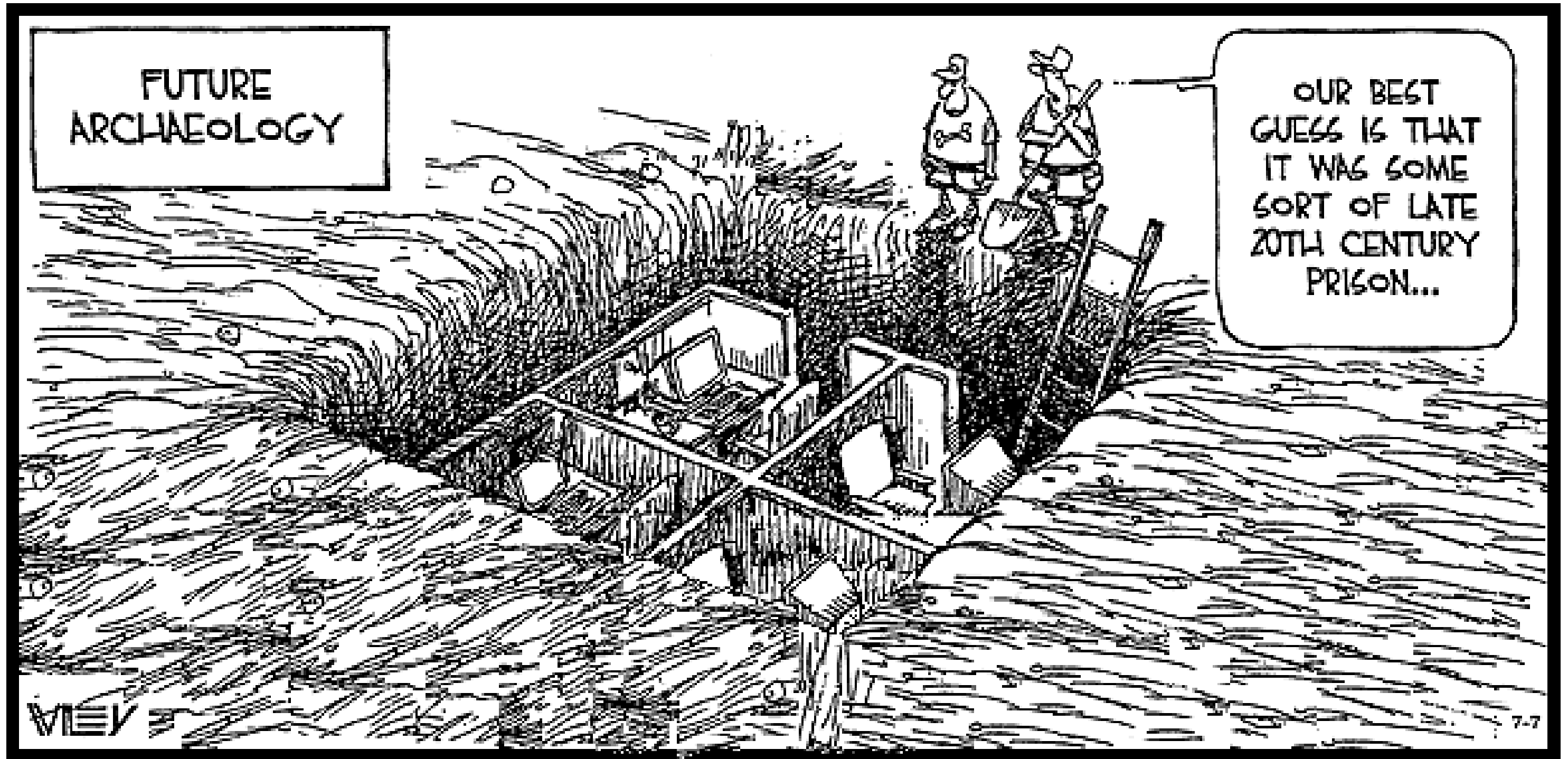




**“An ounce of prevention is worth a pound of cure.”**

*-Benjamin Franklin*

- Limited area for settling
- Pump wear
- Settling in transmission mains
- Screening/Sedimentation
- Backwashing
- Disposal of settled solids





# The Problem

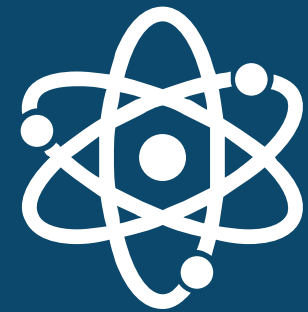


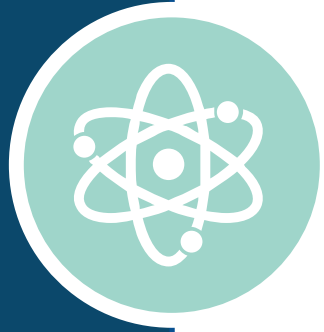
Source: <https://www.lagoonpumping.com/resources/removing-solids/effects-of-heavy-solids/>

# The Problem

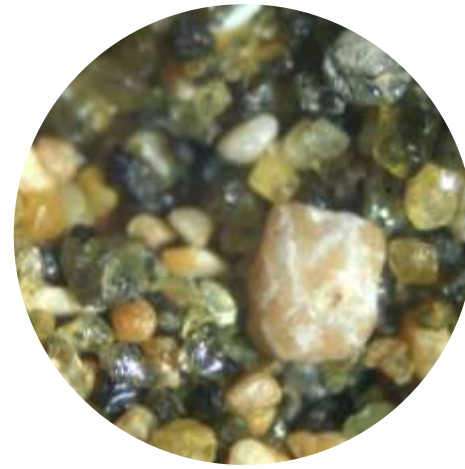


# The Science





# Mechanics of settling



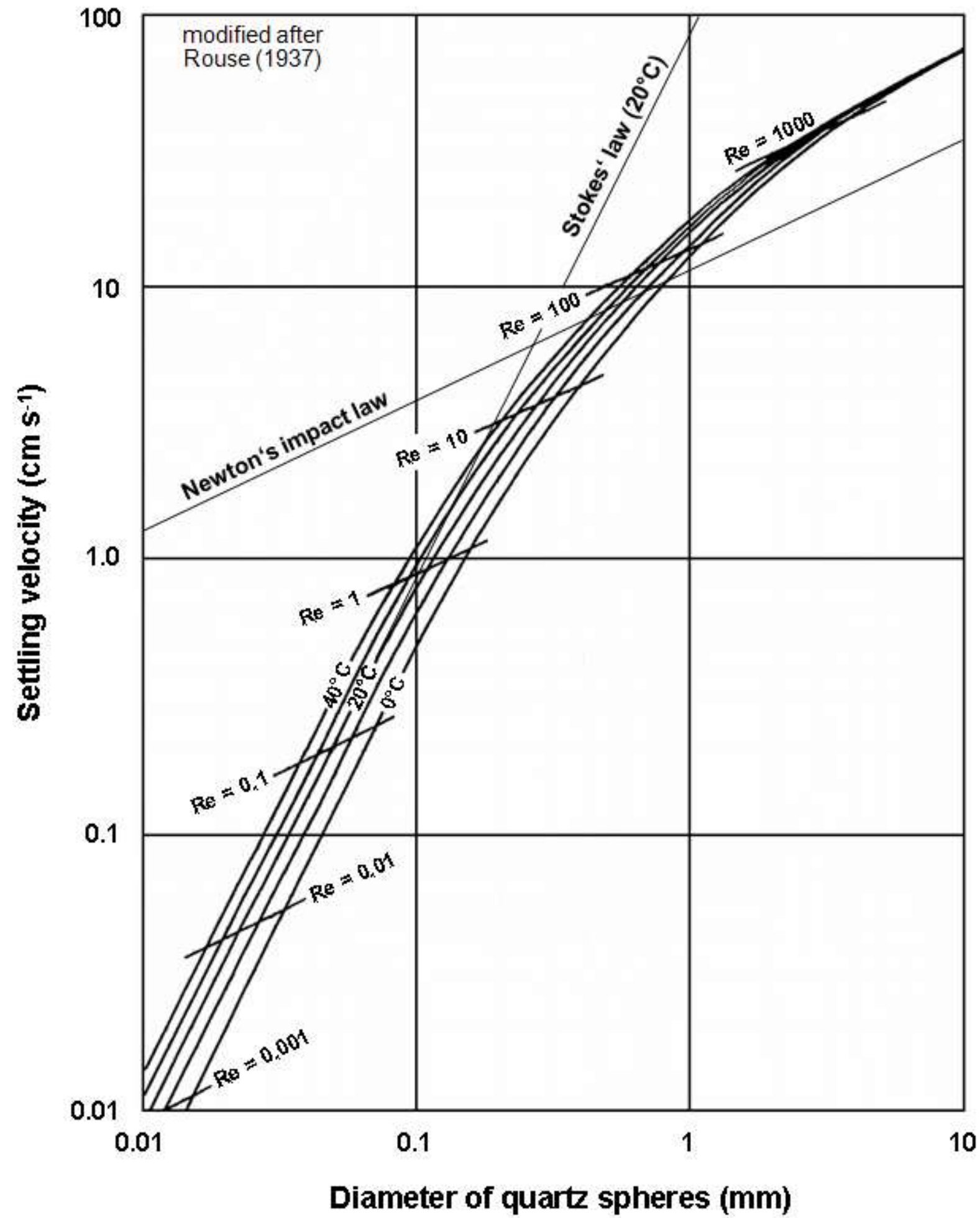
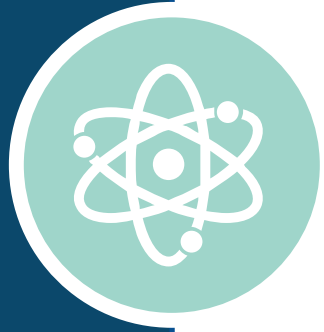
Particle size

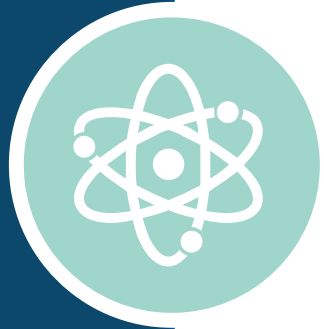


Velocity



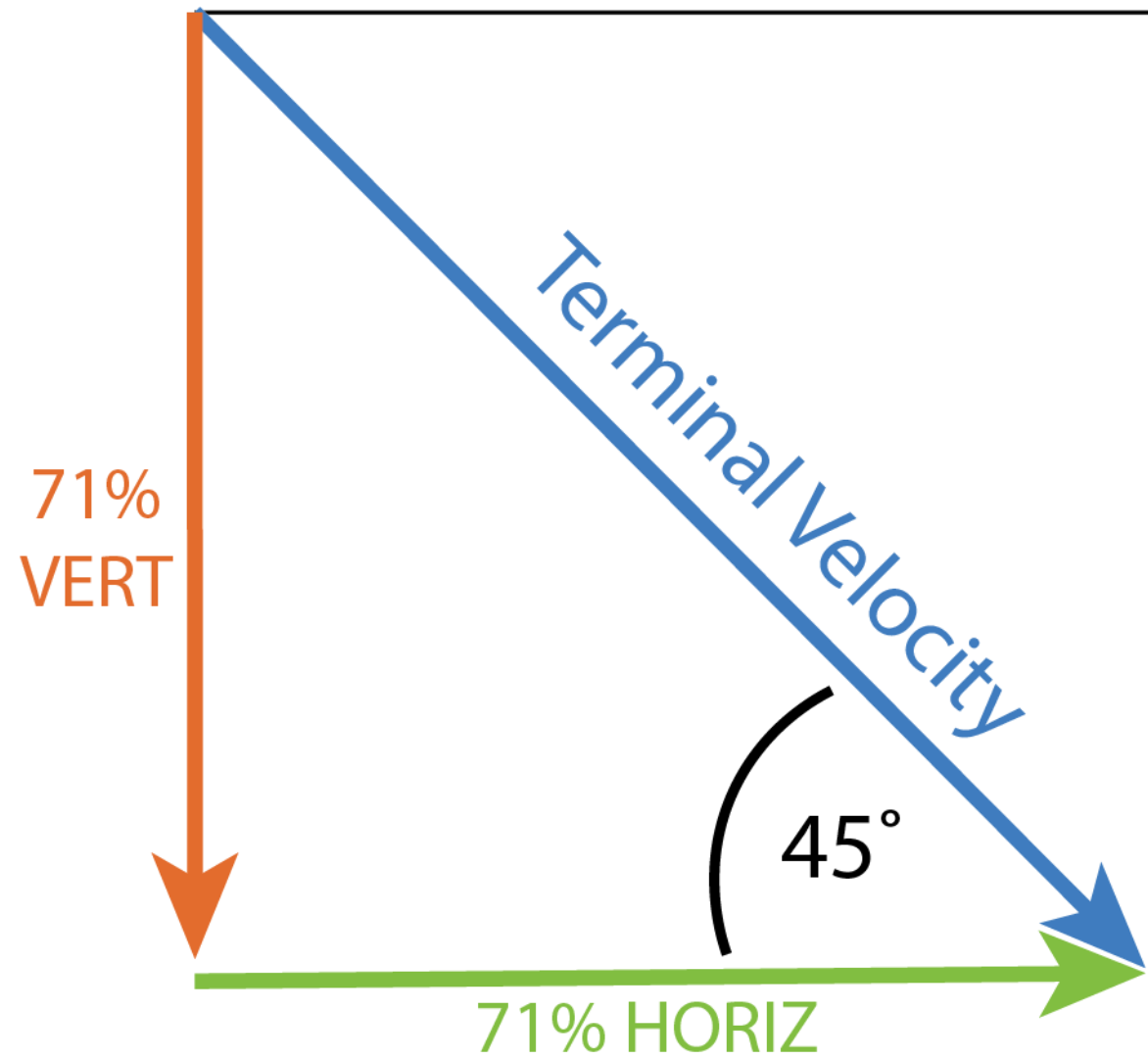
Turbulence



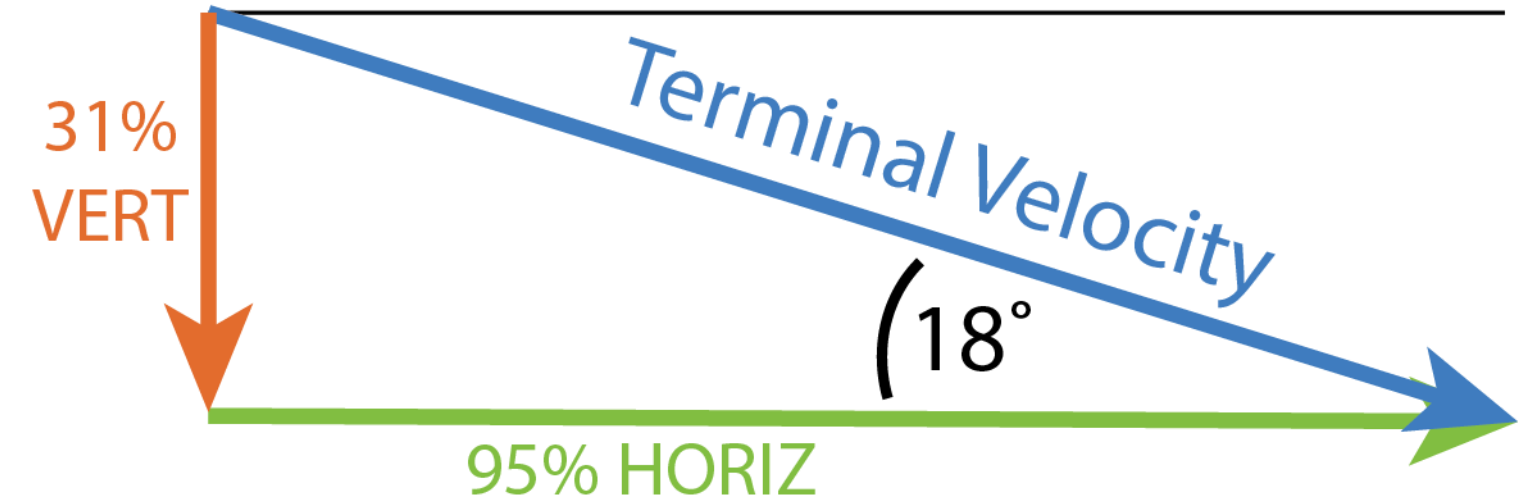


# Terminal Velocity Components

GLIDE RATIO 1:1  
(ZERO WIND)



GLIDE RATIO 3:1  
(ZERO WIND)



# Case Study





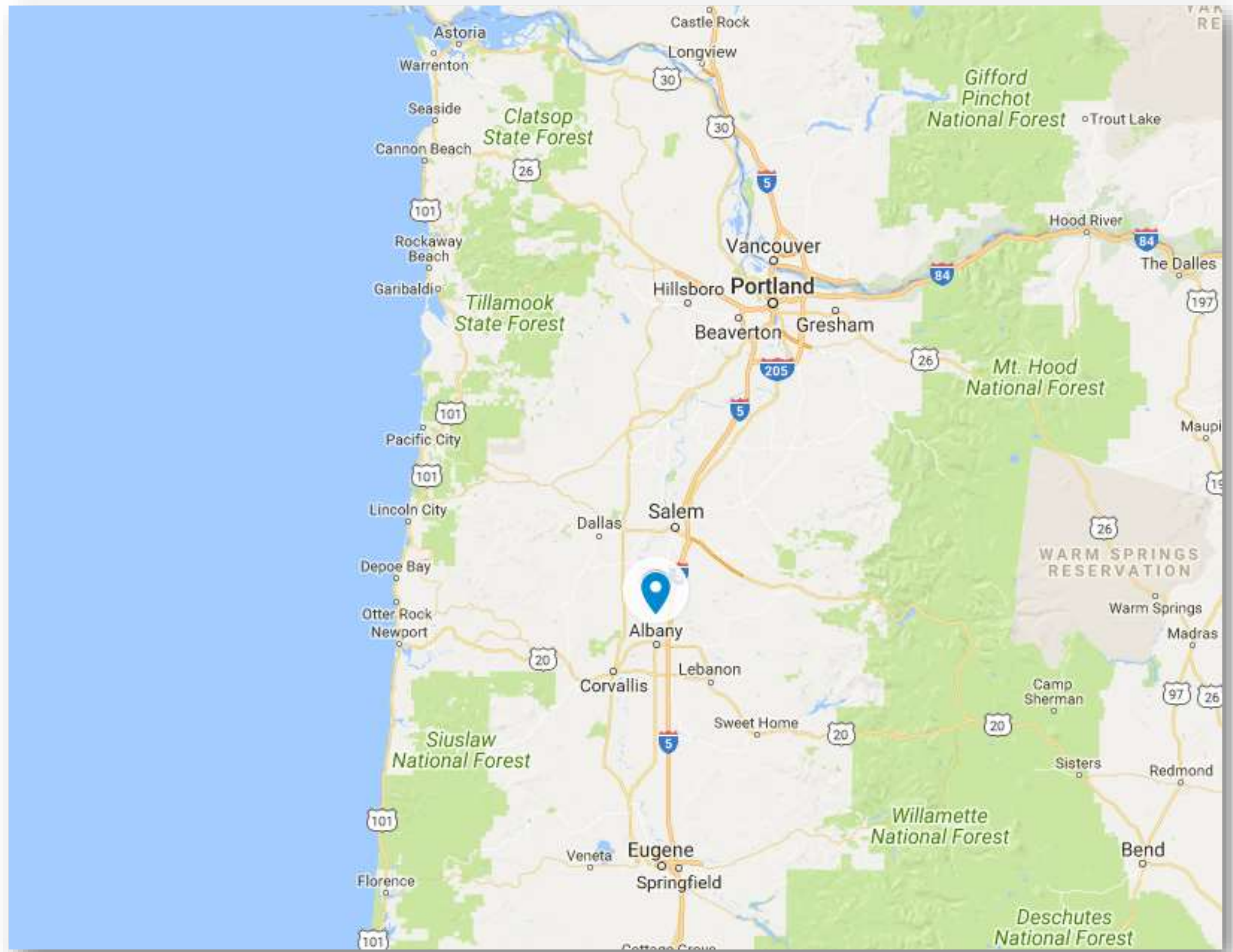
## City of Albany, OR

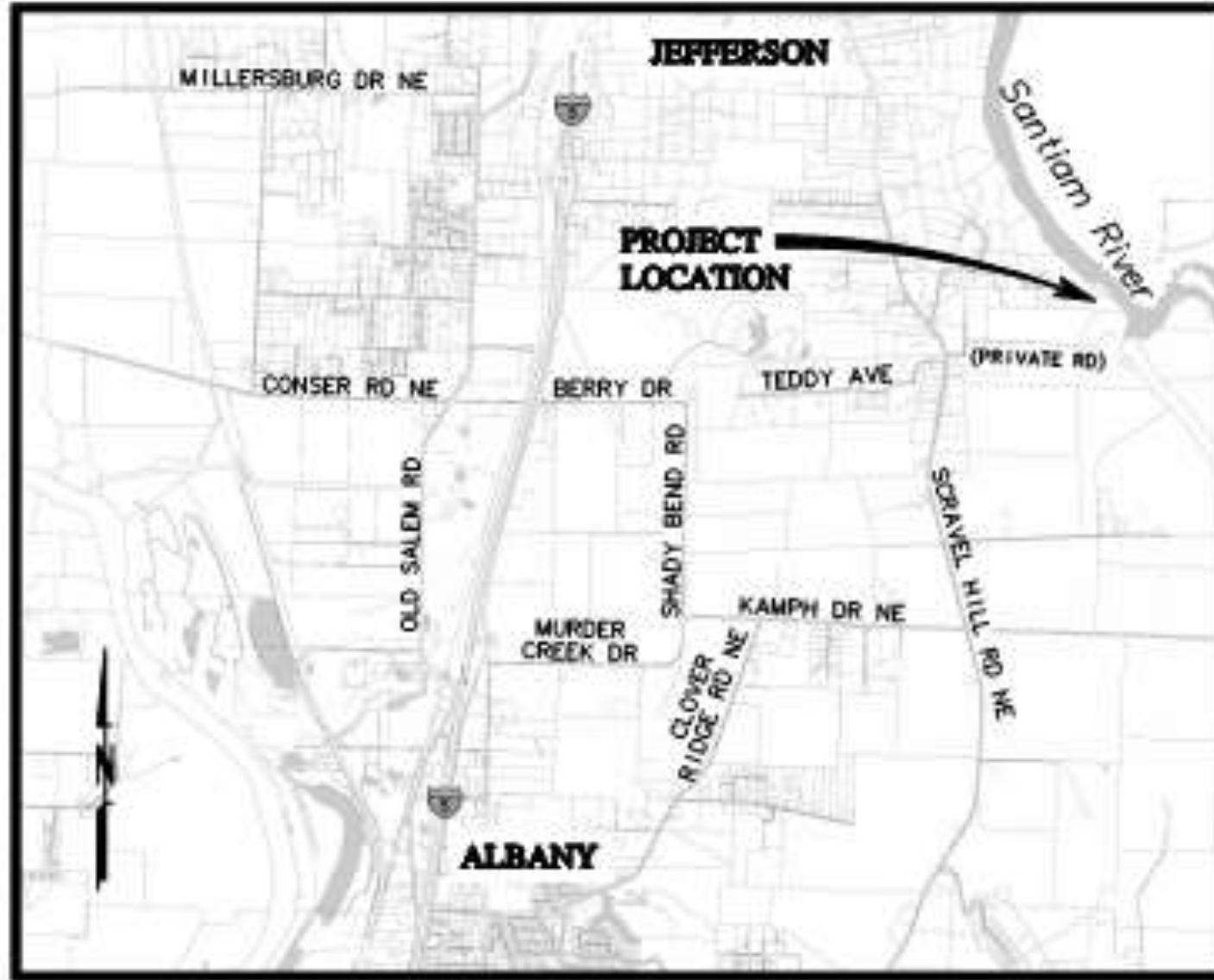
- Albany-Millersburg WTP Intake
- Membrane plant completed in 2005
- Intake at the confluence of the North and South Santiam Rivers



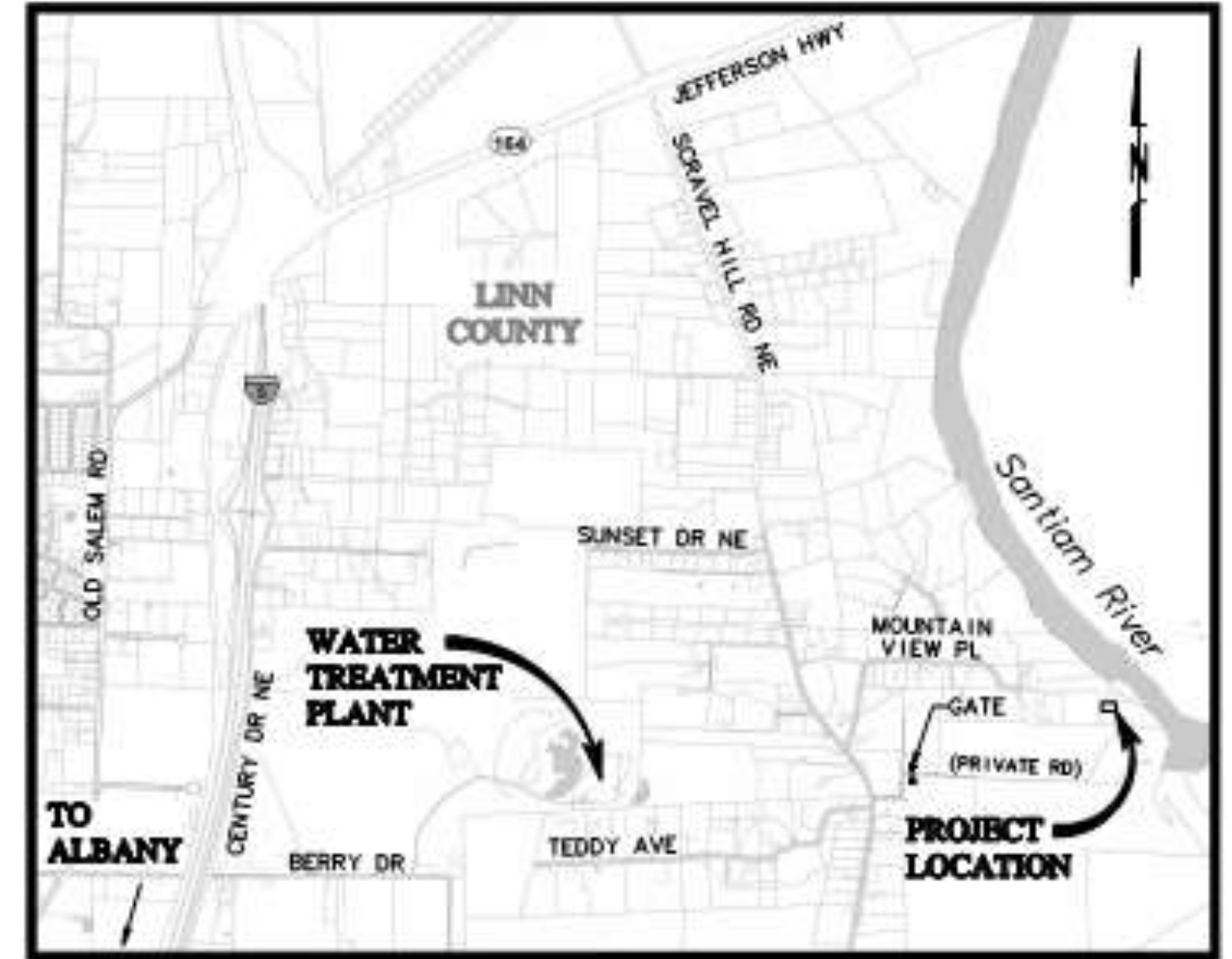


# Case Study





**VICINITY MAP**  
SCALE: 1"=4,500'



**LOCATION MAP**  
SCALE: 1"=1,500'



## Raw Water Delivery

- Raw water intake
- Settling chambers
- Raw water pumps
- Raw water transmission main
- Screening at the WTP
- Increased backwashing

# Case Study

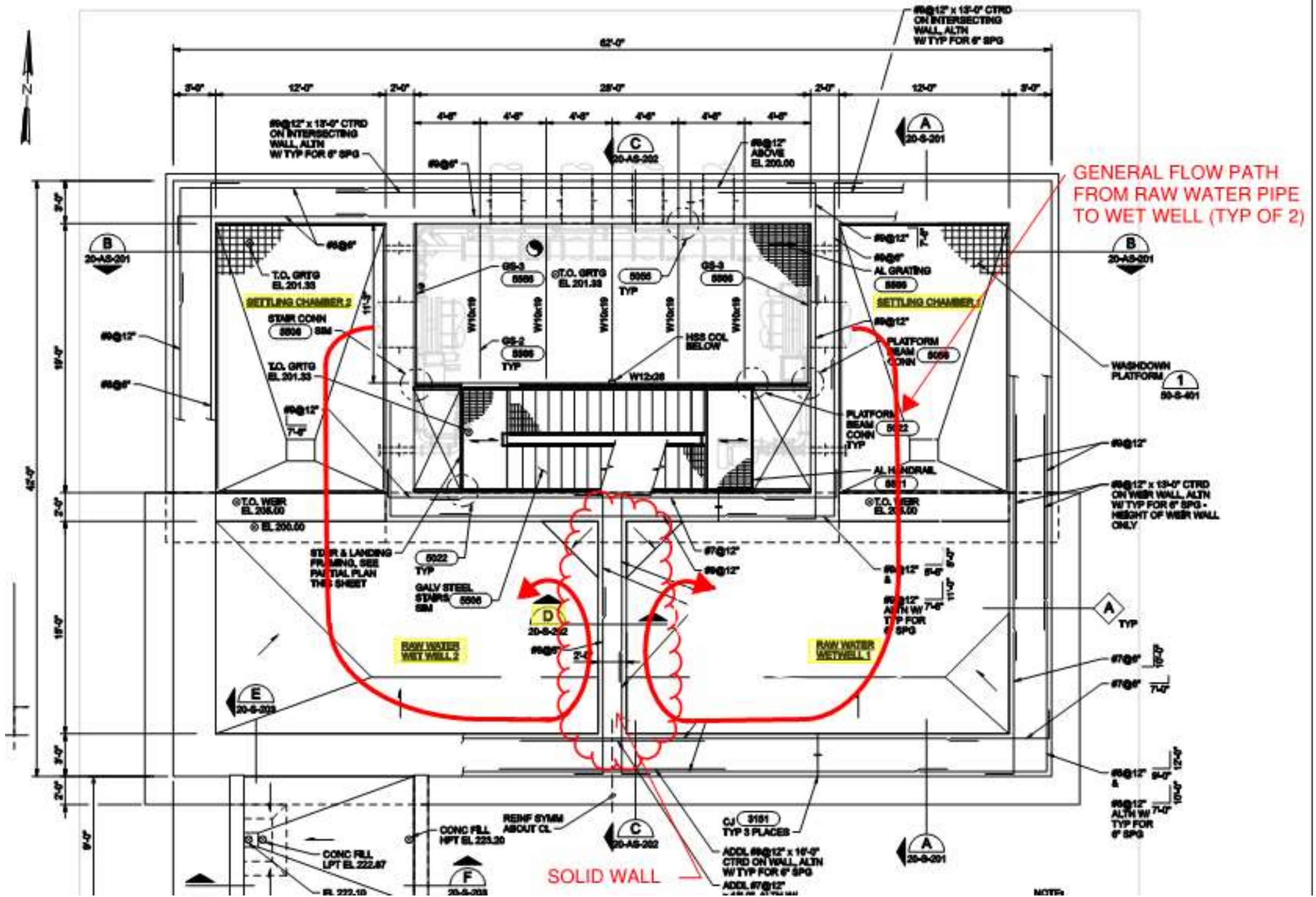


# Case Study





# Case Study

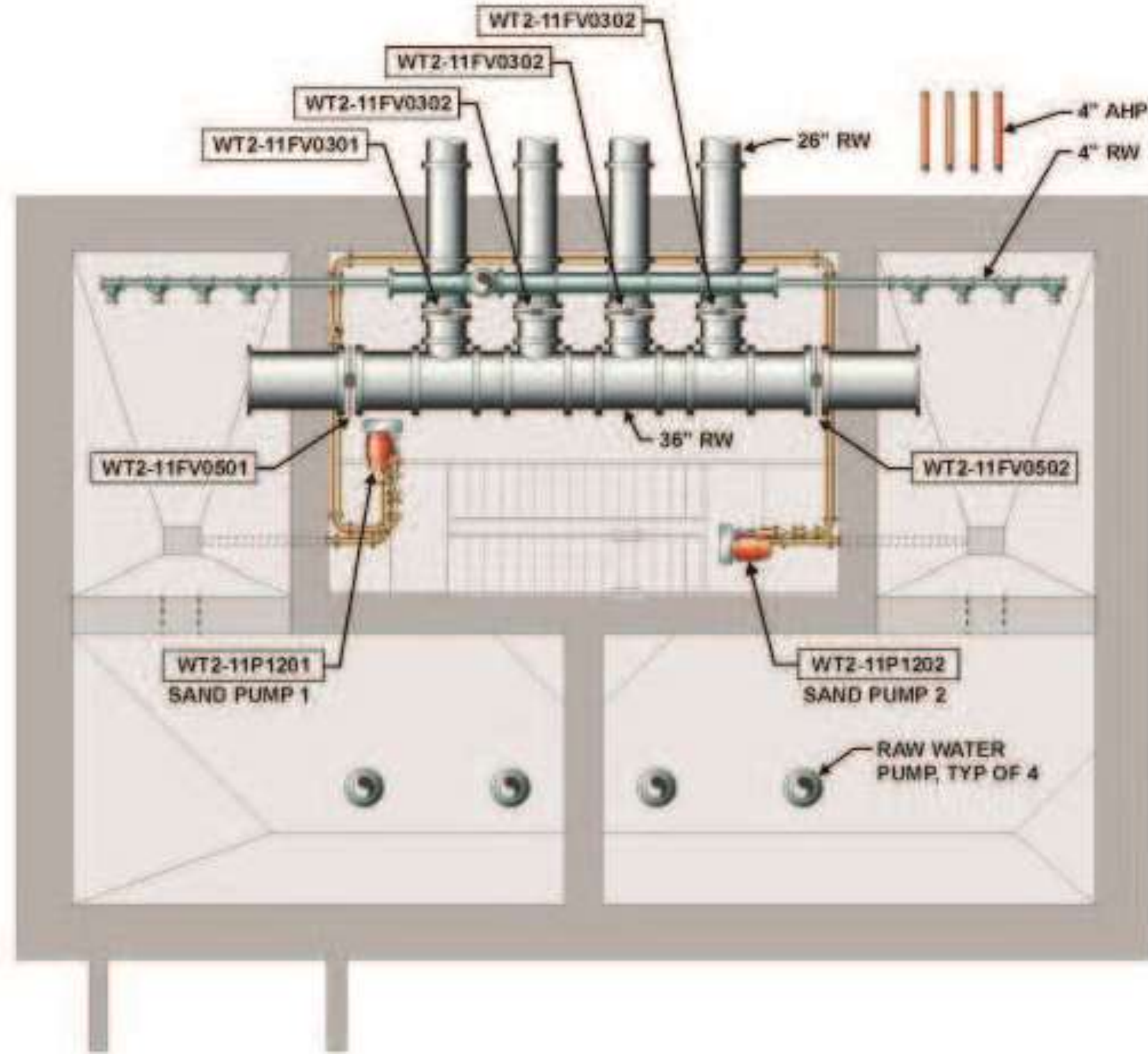




## Pinch Point

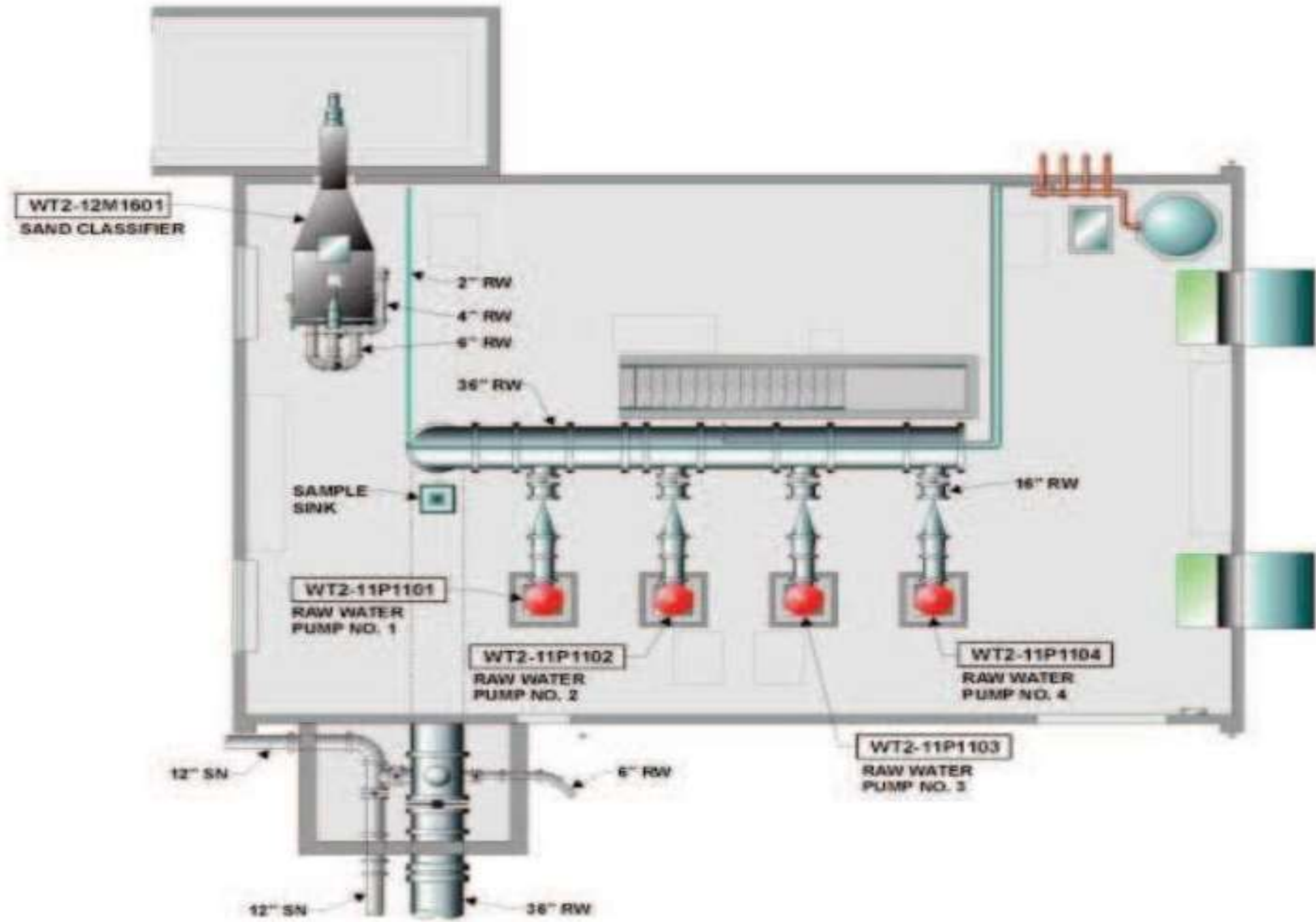
- Two sand pumps
- One sand classifier
- Effect on pump operation

# Case Study





# Case Study





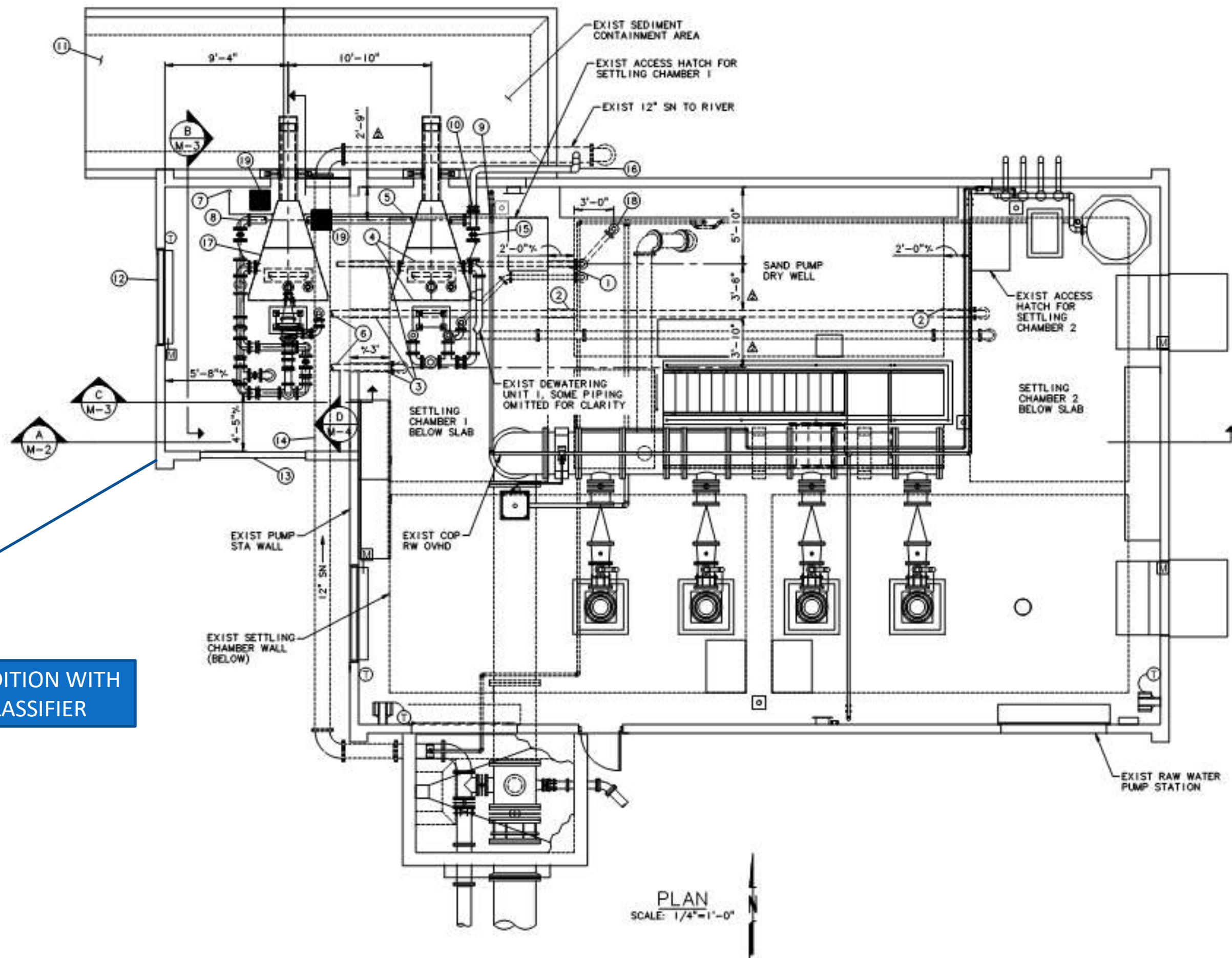
# Case Study



# Case Study



BUILDING ADDITION WITH  
SECOND CLASSIFIER



# Case Study



# Conclusions/Recommendations





## Efficiency recommendations

- Remove sand close to the source
- Provide redundancy
- Consider pumping operation



Q&A

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**Thank you!**