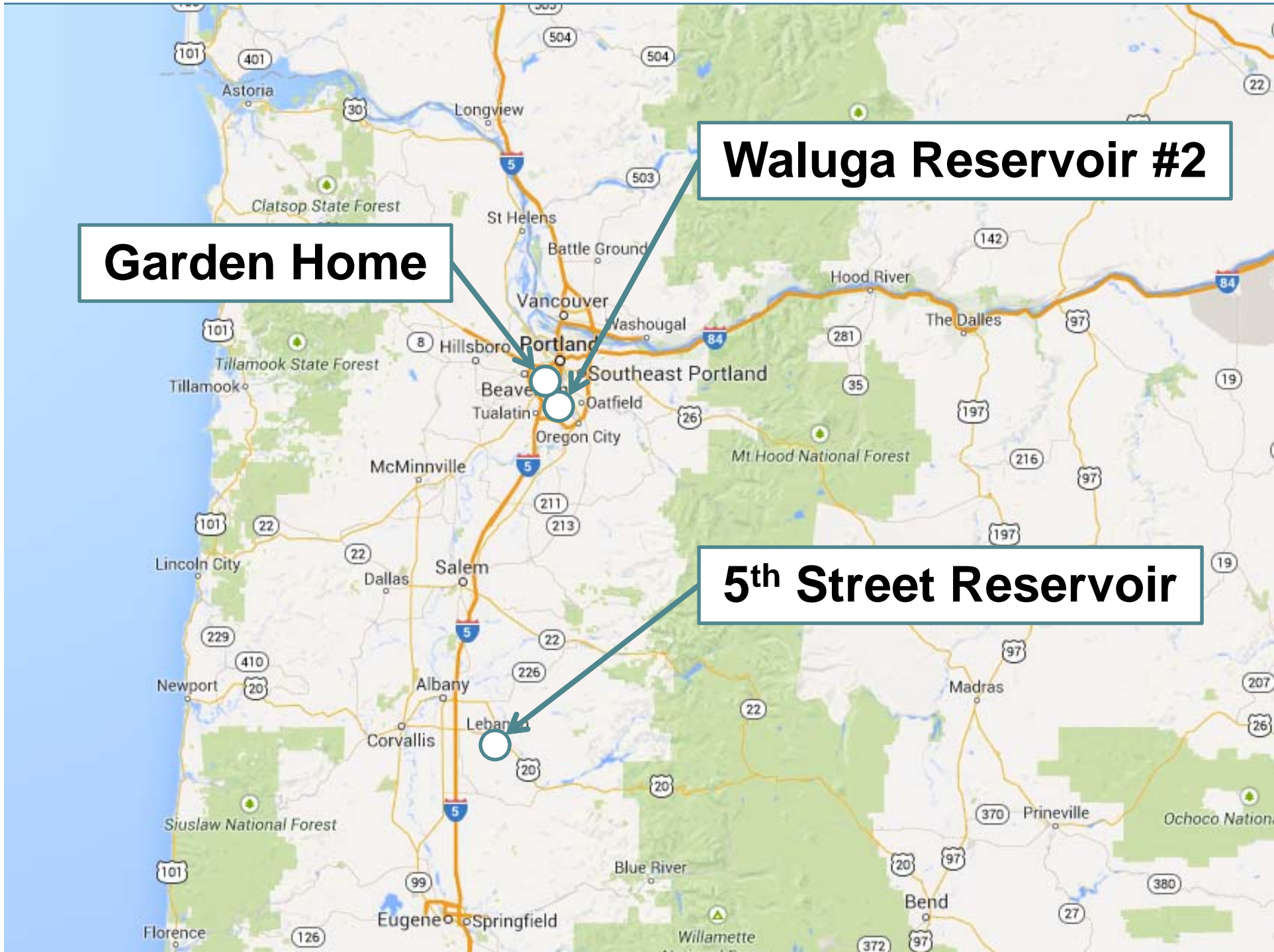




Concrete Reservoirs (Every Tank is Unique)





Garden Home

Waluga Reservoir #2

5th Street Reservoir

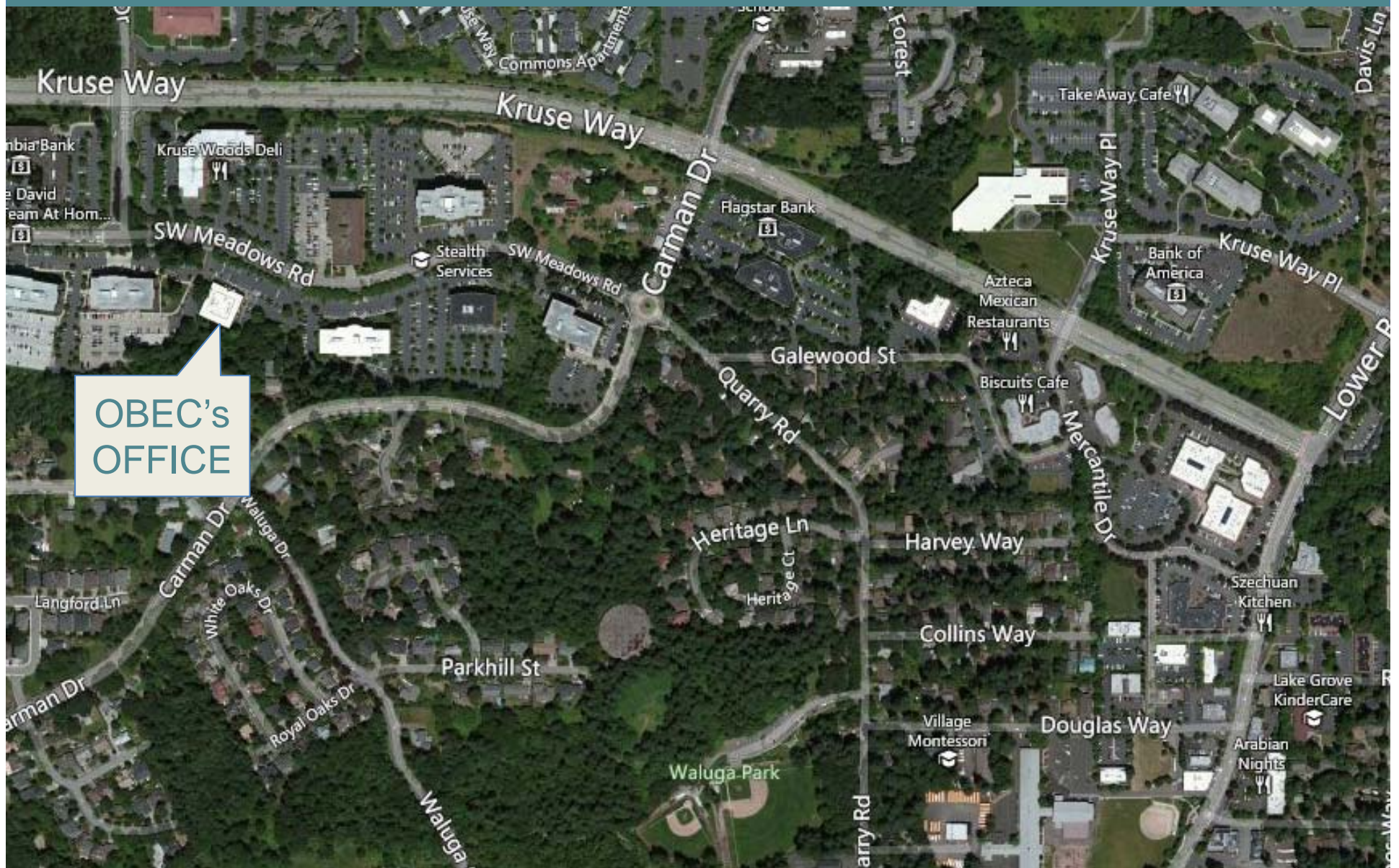
5th Street Lebanon



5th Street Lebanon



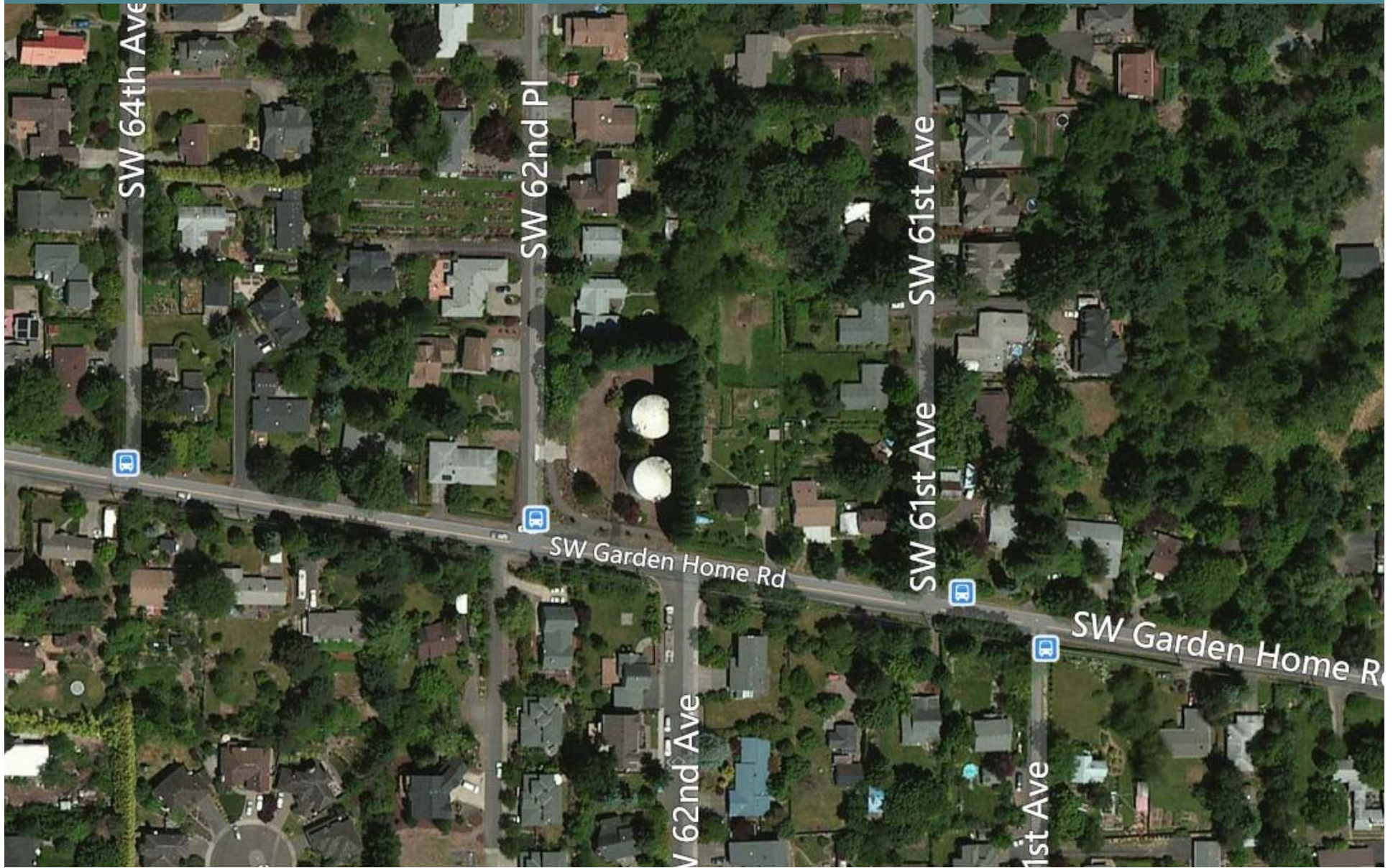
Waluga Reservoir #2



Waluga Reservoir #2



Garden Home



Garden Home



Reservoir Facts

5th Street

Type: Prestressed

Height: 45'

Diameter: 124'

Volume: 4MG

Roof Type: Flat Slab

Seismic: 0.67g

Bid Cost: \$1.9M

Waluga #2

Type: Prestressed

Height: 36'

Diameter: 131'

Volume: 3.5MG

Roof Type: Dome

Seismic: 0.98g

Bid Cost: \$2.0M

Garden Home

Type: Prestressed

Height: 37'-5"

Diameter: 89'-4"

Volume: 1.75MG

Roof Type: Flat Slab

Seismic: 0.97g

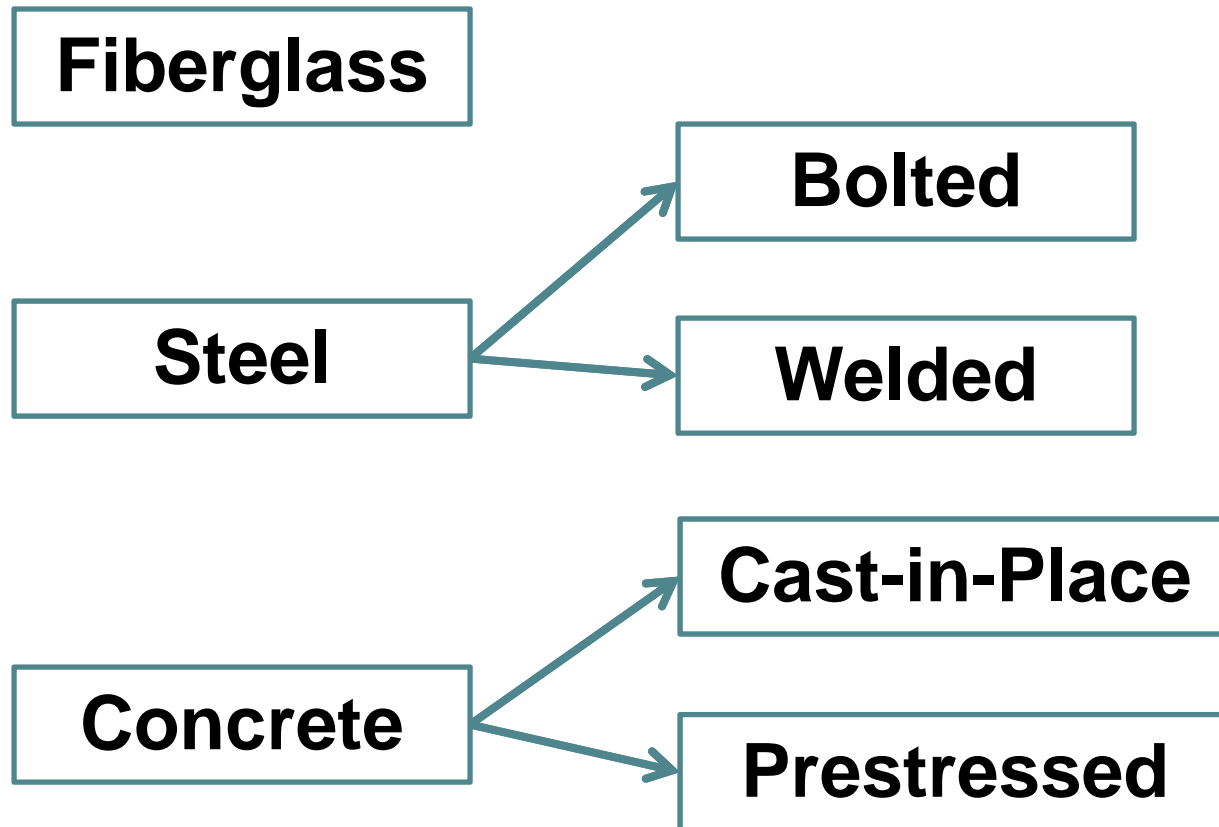
Bid Cost: ~\$1.8M



1

Why Prestressed Concrete?

Reservoir Options



Bolted Steel



Welded Steel



Cast-in-Place Concrete



Prestressed Concrete



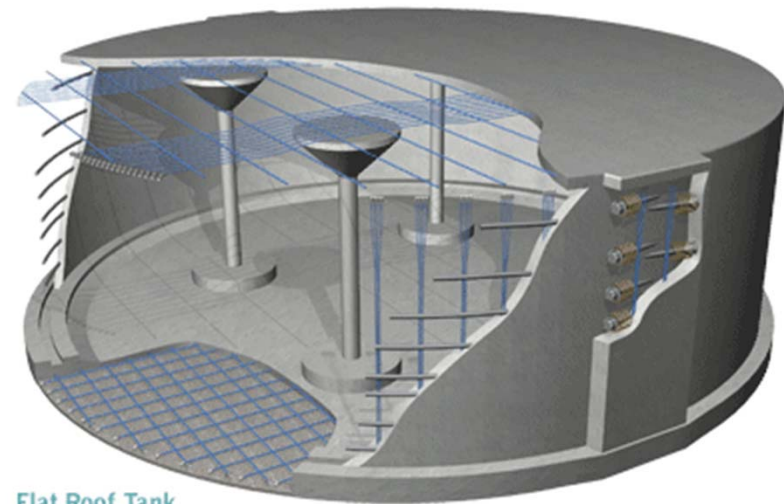
Types of Prestressed Tanks

Prestressed

Wire Wrapped

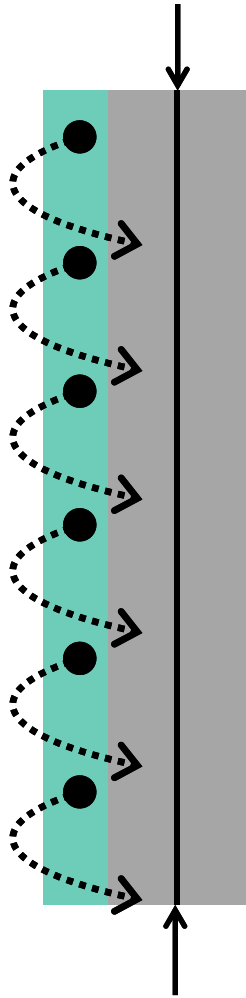


**Post
Tensioned**

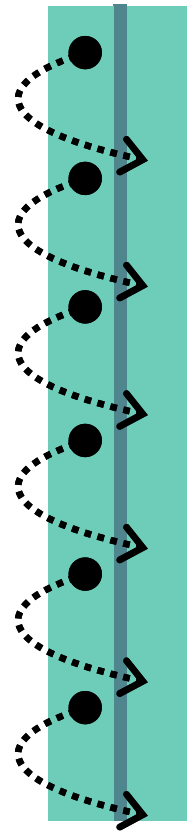


Flat Roof Tank

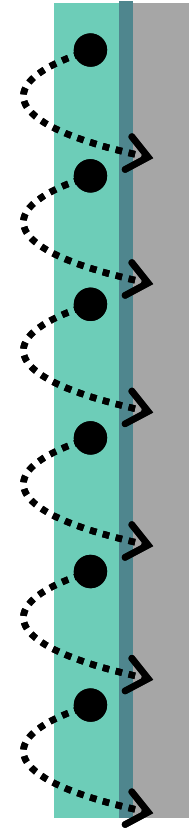
Types of Prestressed Tanks



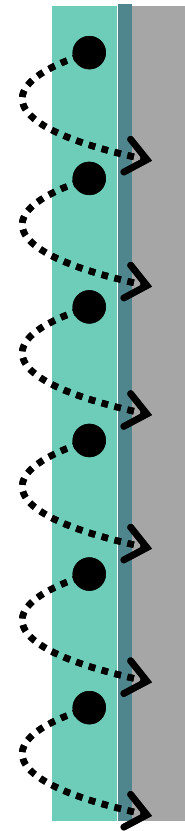
Type I



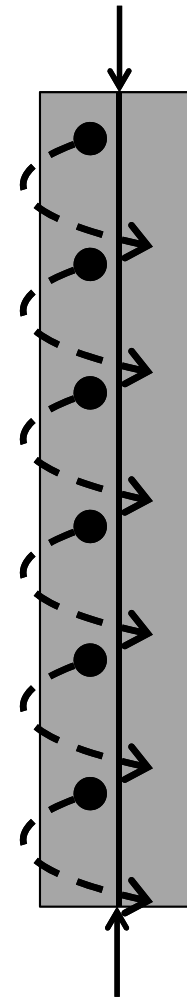
Type II



Type III



Type IV

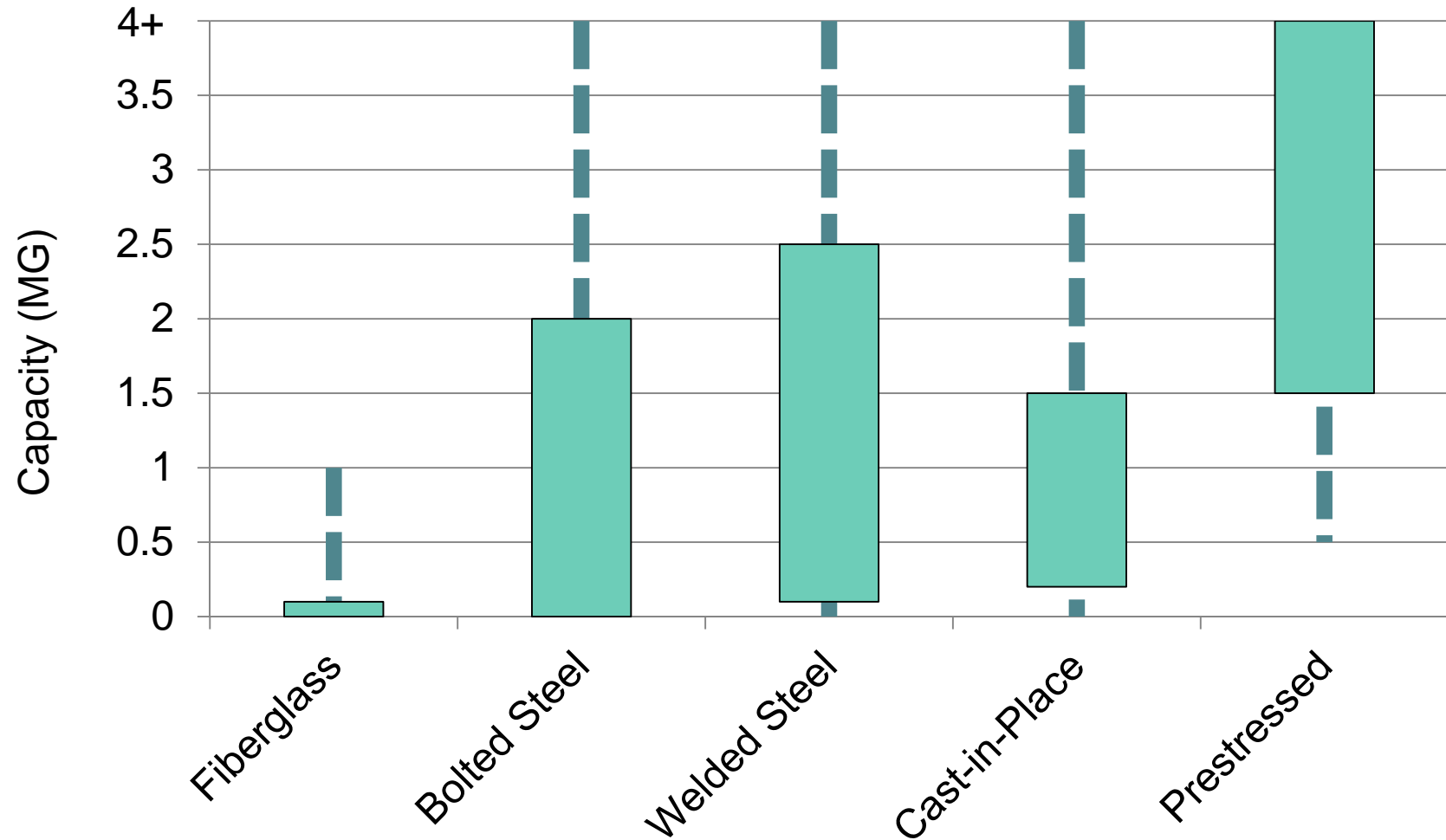


D115

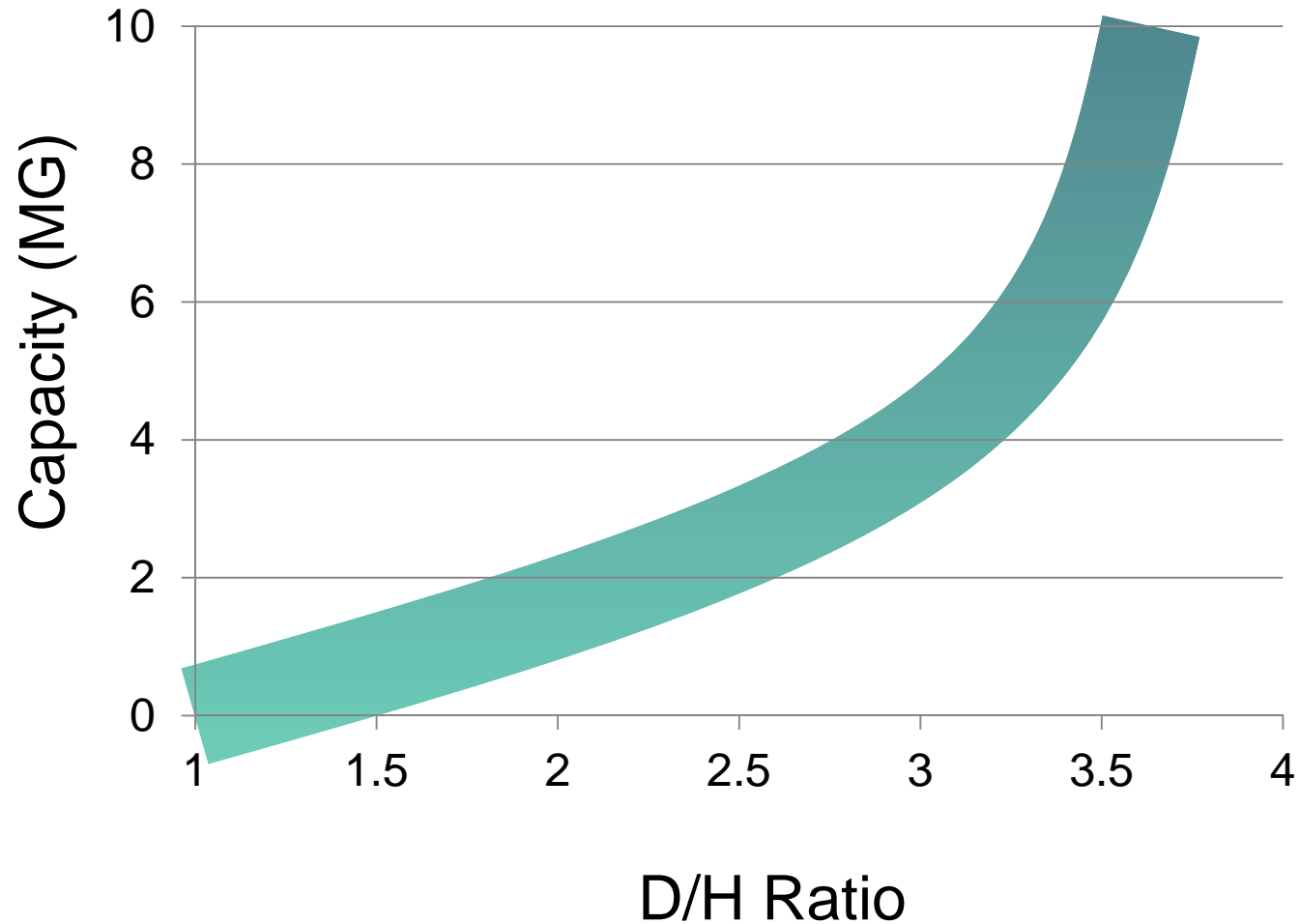
Advantages of Prestressed

- Low Initial Cost*
- No Coating Requirements
- Low Maintenance
- Long Life
- Good Water Tightness
- Good Seismic Performance

Reservoir Type by Size



Pre-stressed Cost Efficiency



5th Street

- 4 Million Gallons of Storage
- Alternatives Study
- Cost/Maintenance

WR2

- 3.5 Million Gallons
- WR1 - Concrete
- Cost / Maintenance

Garden Home

- Replacing 2 Steel Tanks
- Existing Site
- 1.75 Million Gallons
- Owner Preference



2

Structural Design Considerations

Design Considerations

Structural Considerations

- Design Criteria
- Floor/Foundation
- Roof Type
- Seismic Detailing
- Construction Staging



3

Non-Structural Design Considerations

Design Considerations

Non-Structural Considerations

- Tank Mixing
- Aesthetics
- Piping
- Instrumentation
- Bidding/Schedule
- Public Involvement

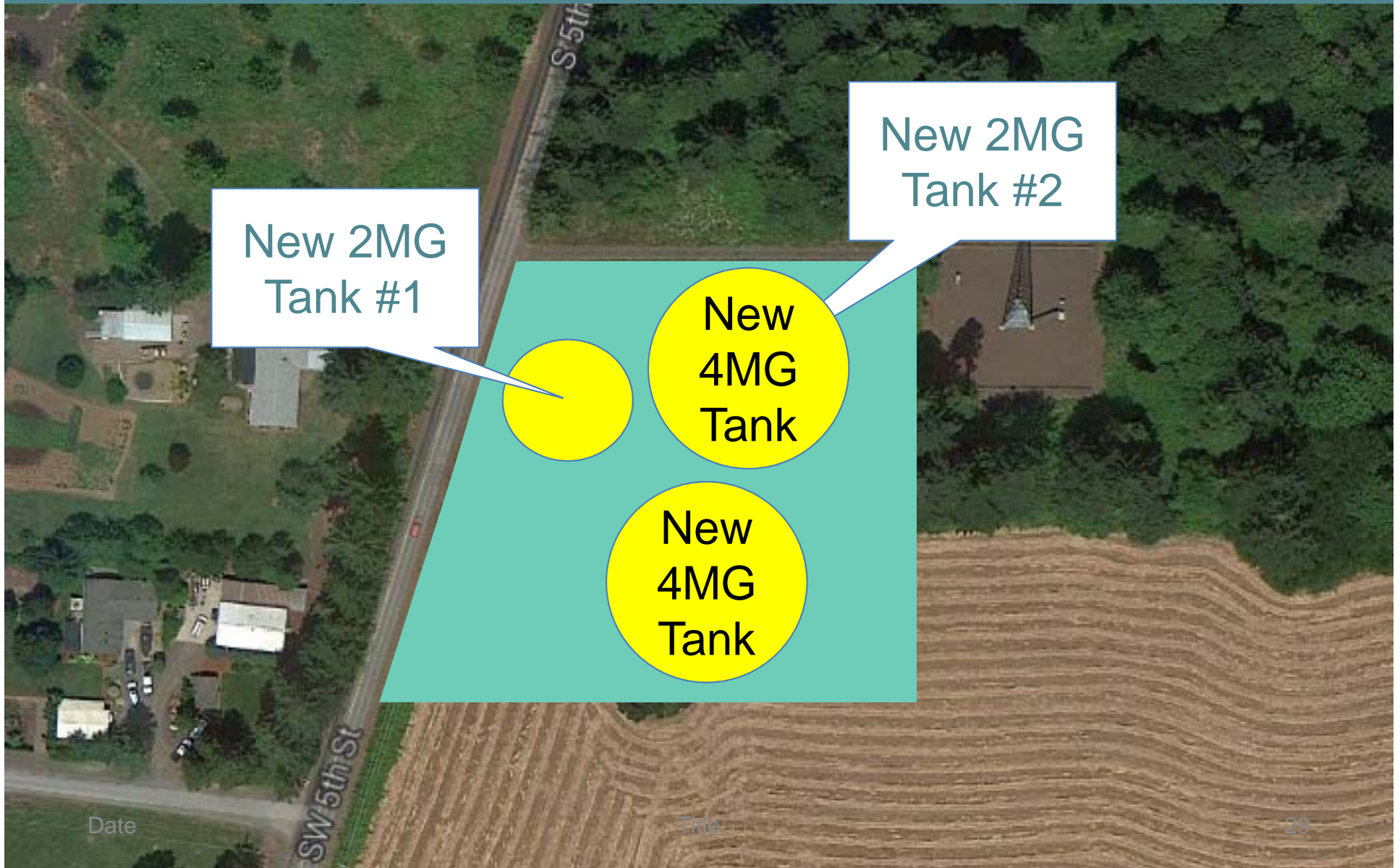


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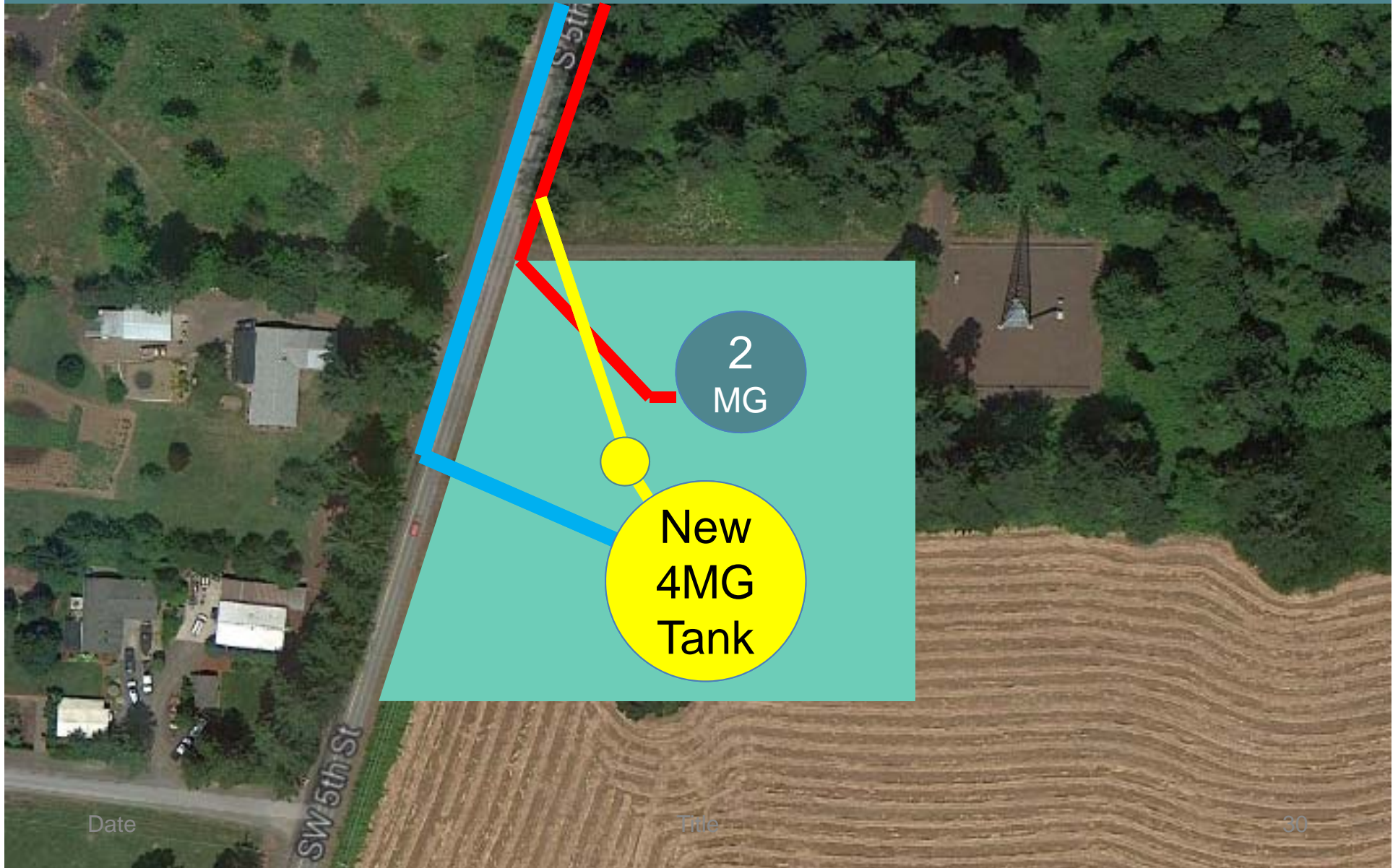
5th Street Lebanon

- Site Layout
- Piping
- Alternate Bidding

5th Street Lebanon (Site Layout)



5th Street Lebanon (Piping)



5th Street Lebanon

Alternative Bidding:
D115 vs D110 Type 1

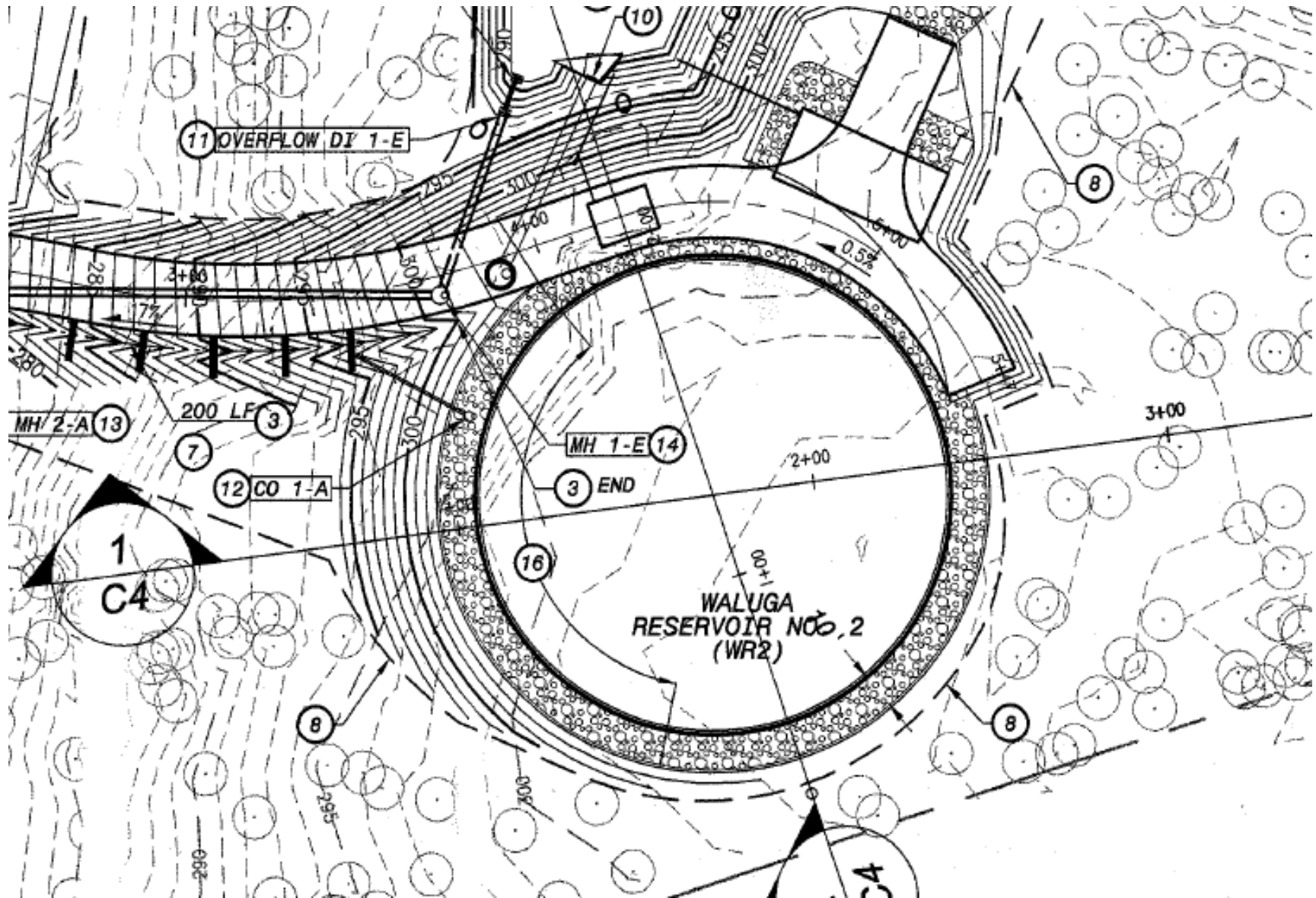


5

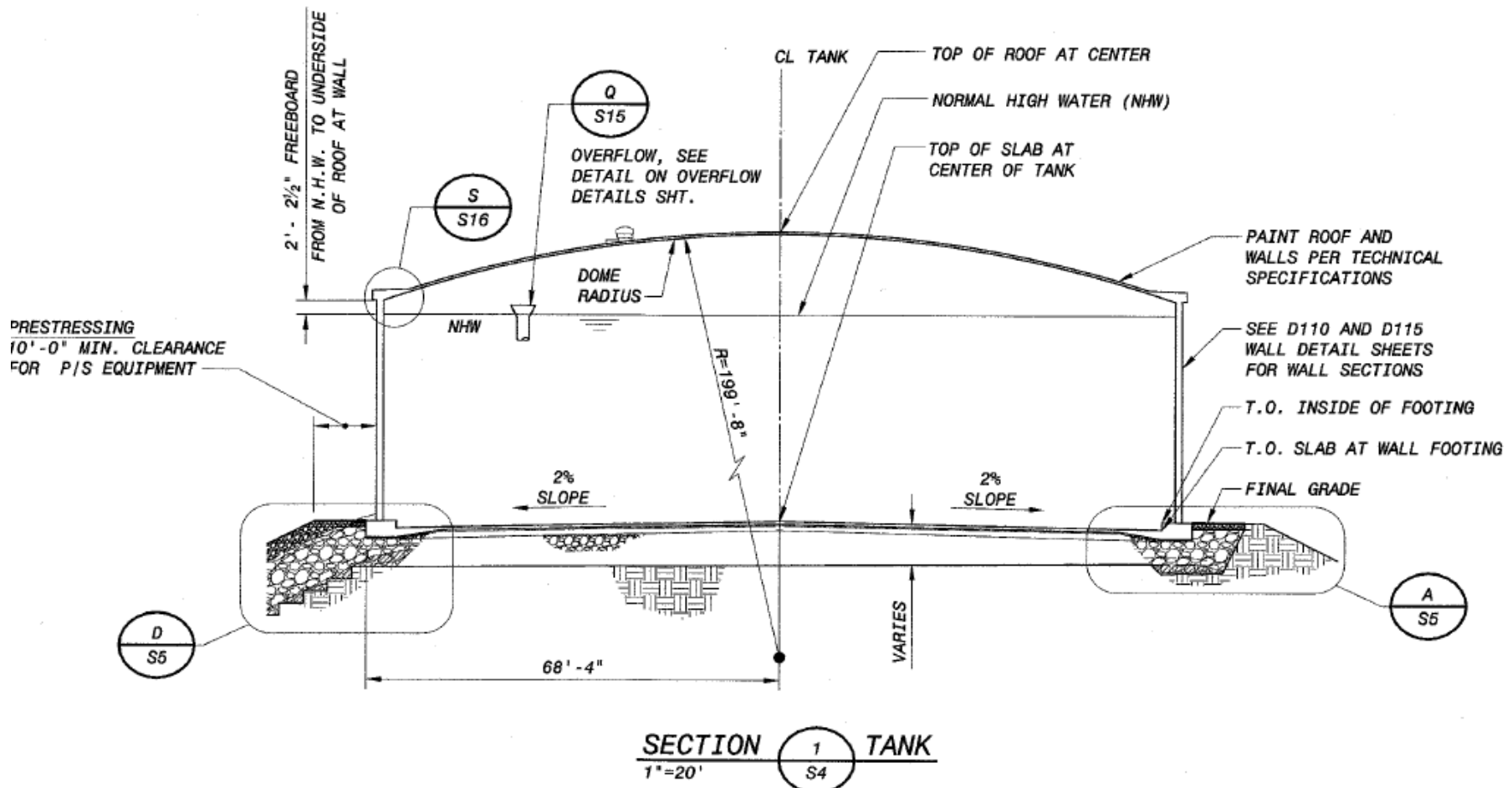
Waluga Reservoir 2

- Foundation
- Roof Type
- Site Constraints
- *Public Involvement**

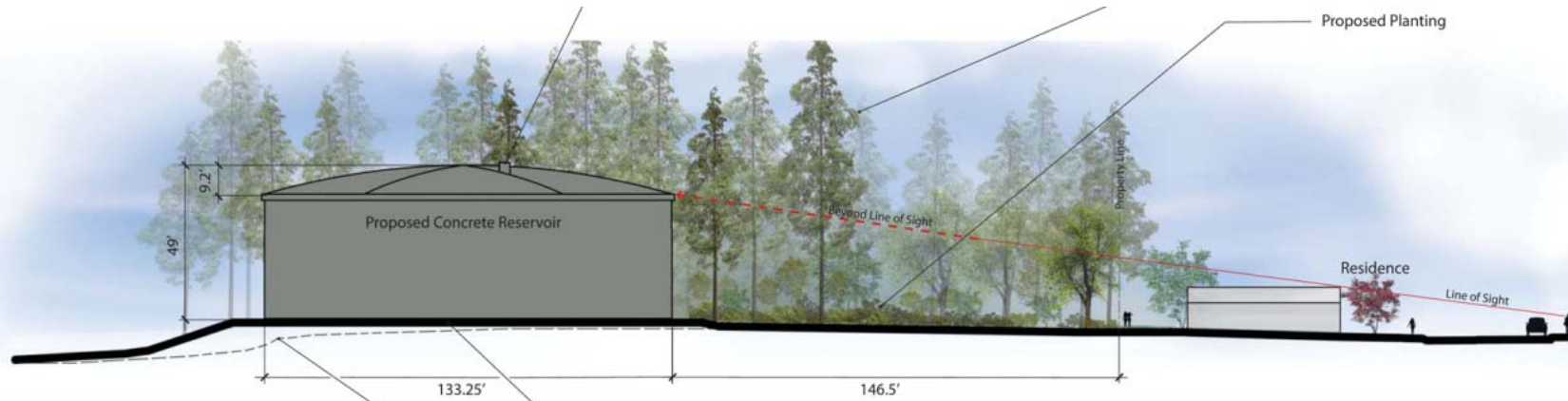
WR2 (Foundation)



WR2 (Dome Roof)



WR2 (Site Constraints)



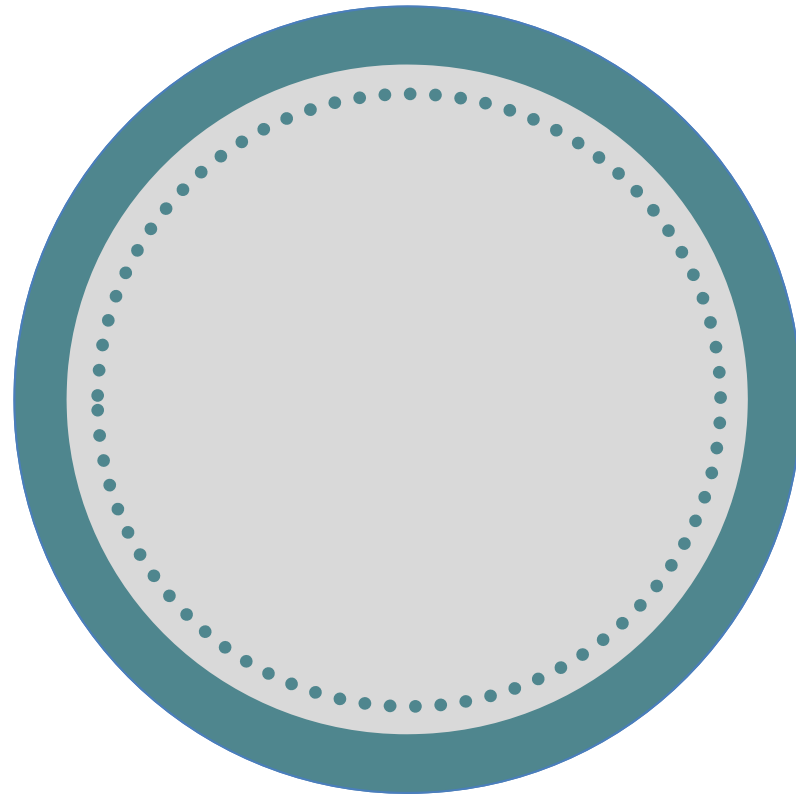
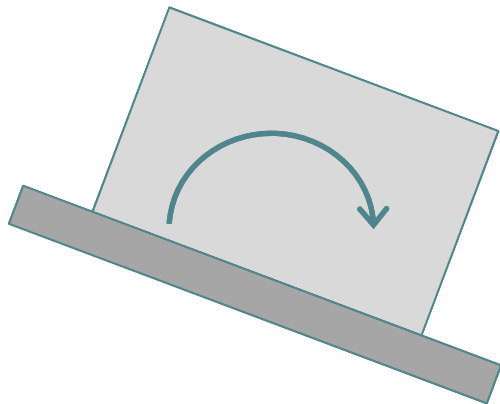
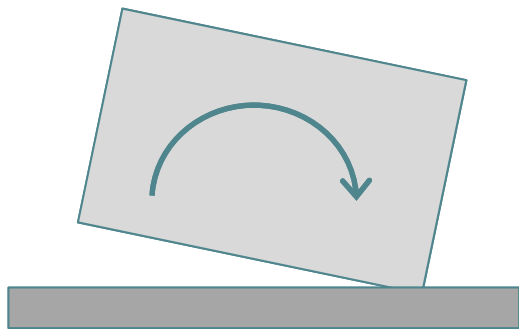
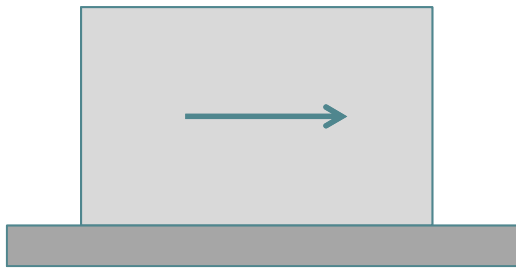


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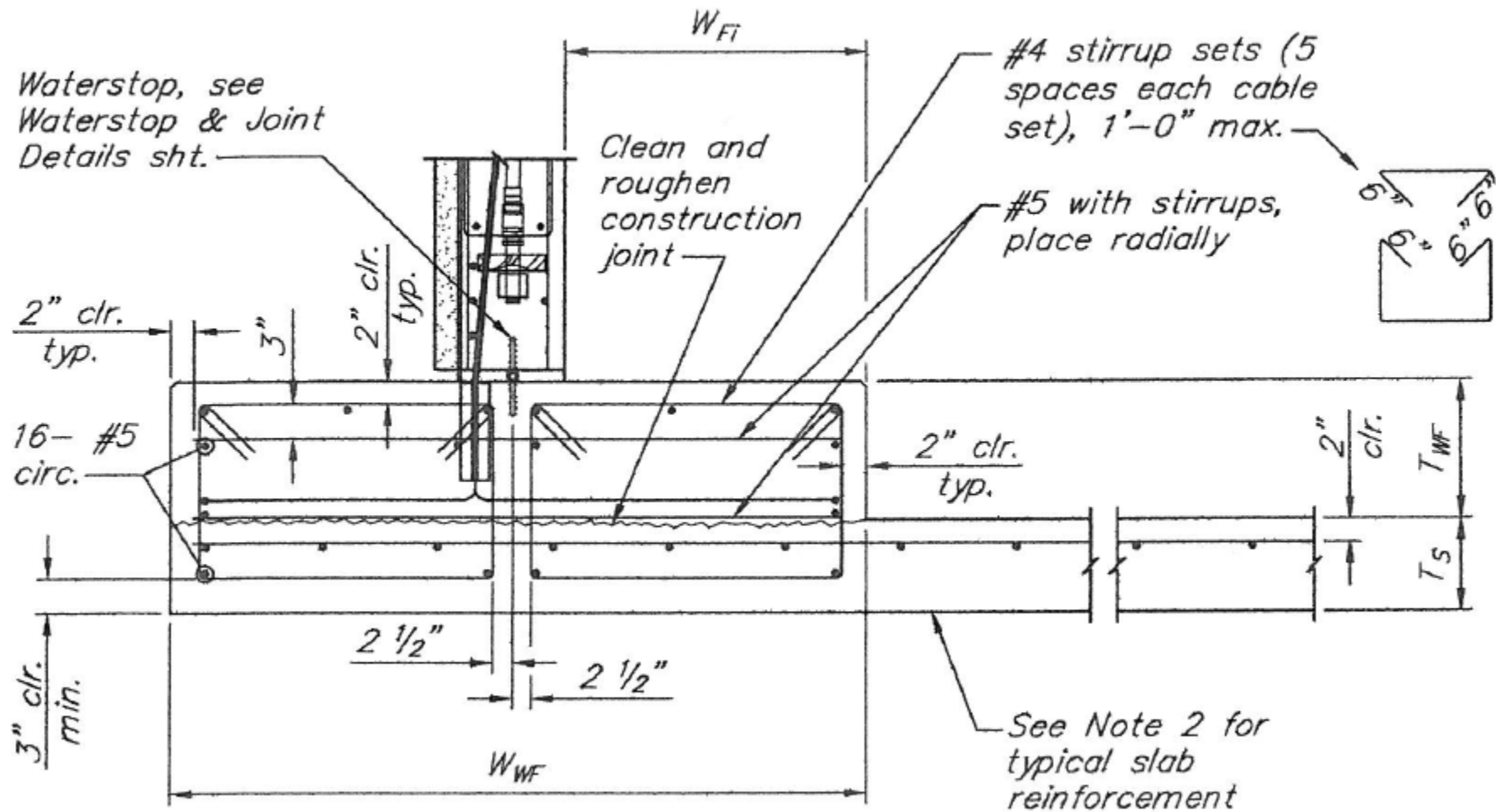
Garden Home

- Seismic Detailing
- Aesthetics
- Tank Mixing

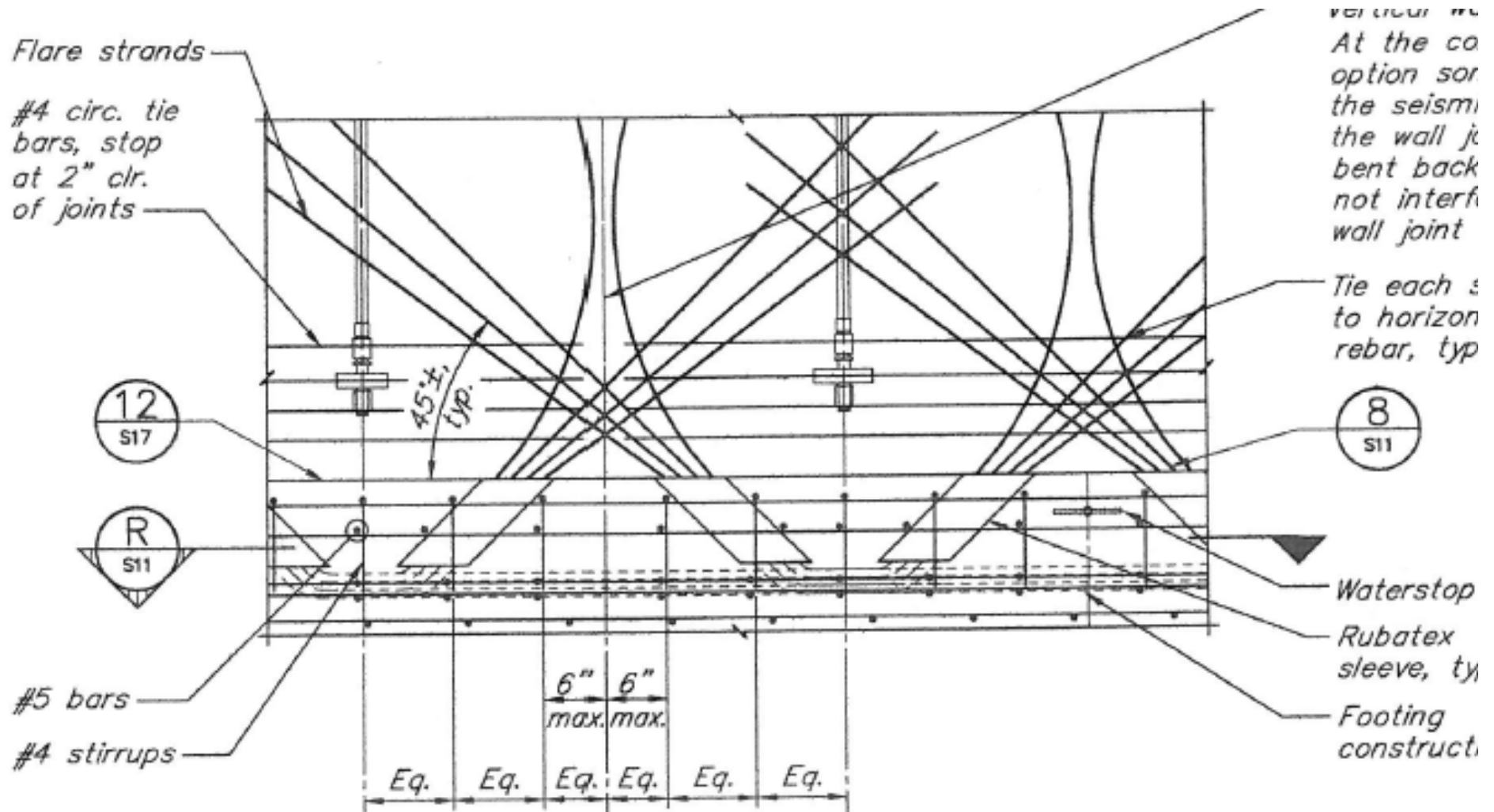
Garden Home (Seismic)



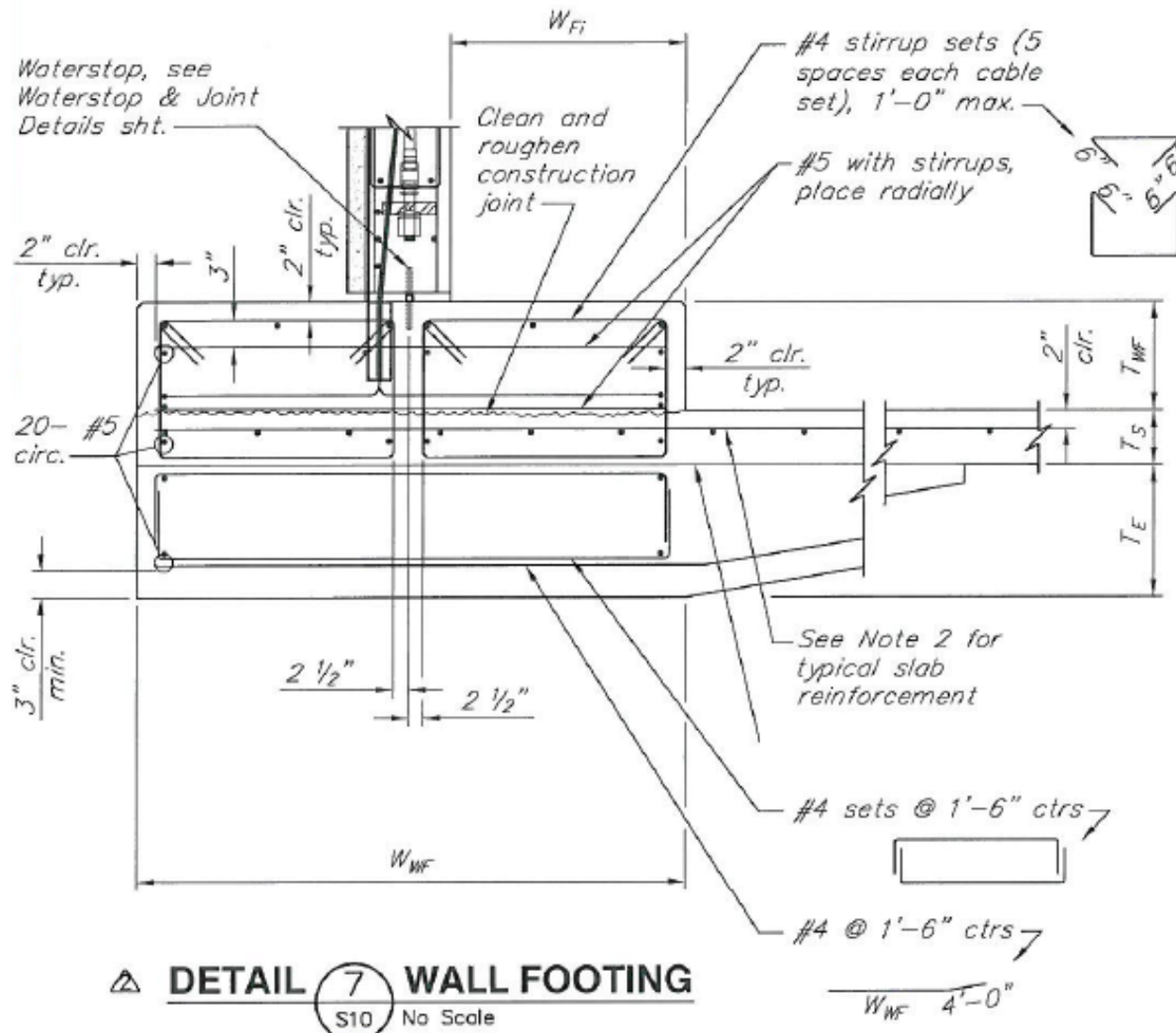
Garden Home (Seismic)



Garden Home (Seismic)



Garden Home (Seismic)



Cable Specs

Diameter = 0.6"
 Spacing = 4-ft
 Strand/bundle = 10

Garden Home (Seismic)



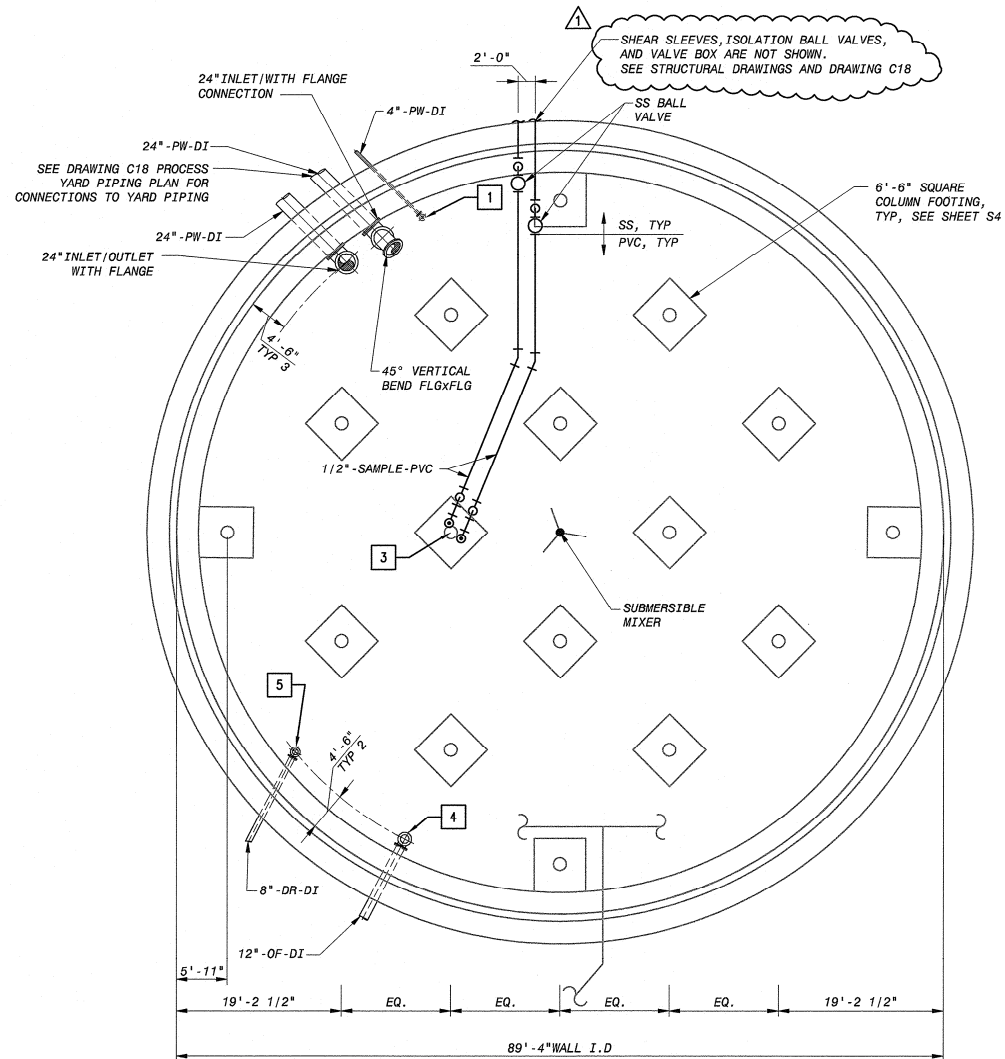
Garden Home (Aesthetics)



Garden Home

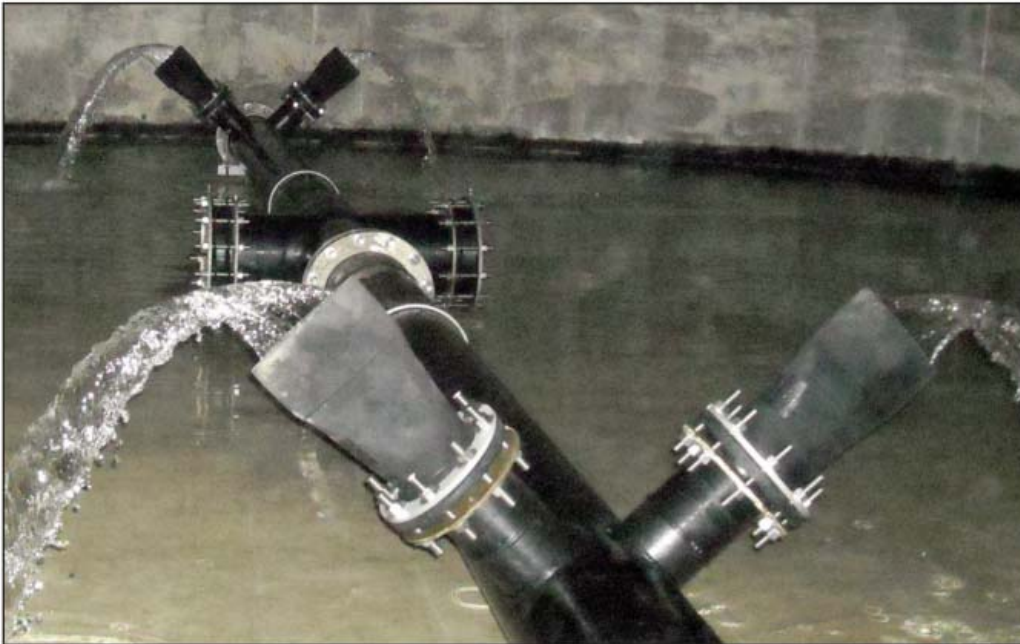


Garden Home (Tank Mixing)



Garden Home (Tank Mixing)

Passive vs. Active Mixing



Conclusions

- Strong Partnerships
- Collaboration leads to Innovation
- Every tank is unique

