# Banning No. 4 Mine: A Tale of Title V Facility Retrofit Project Development

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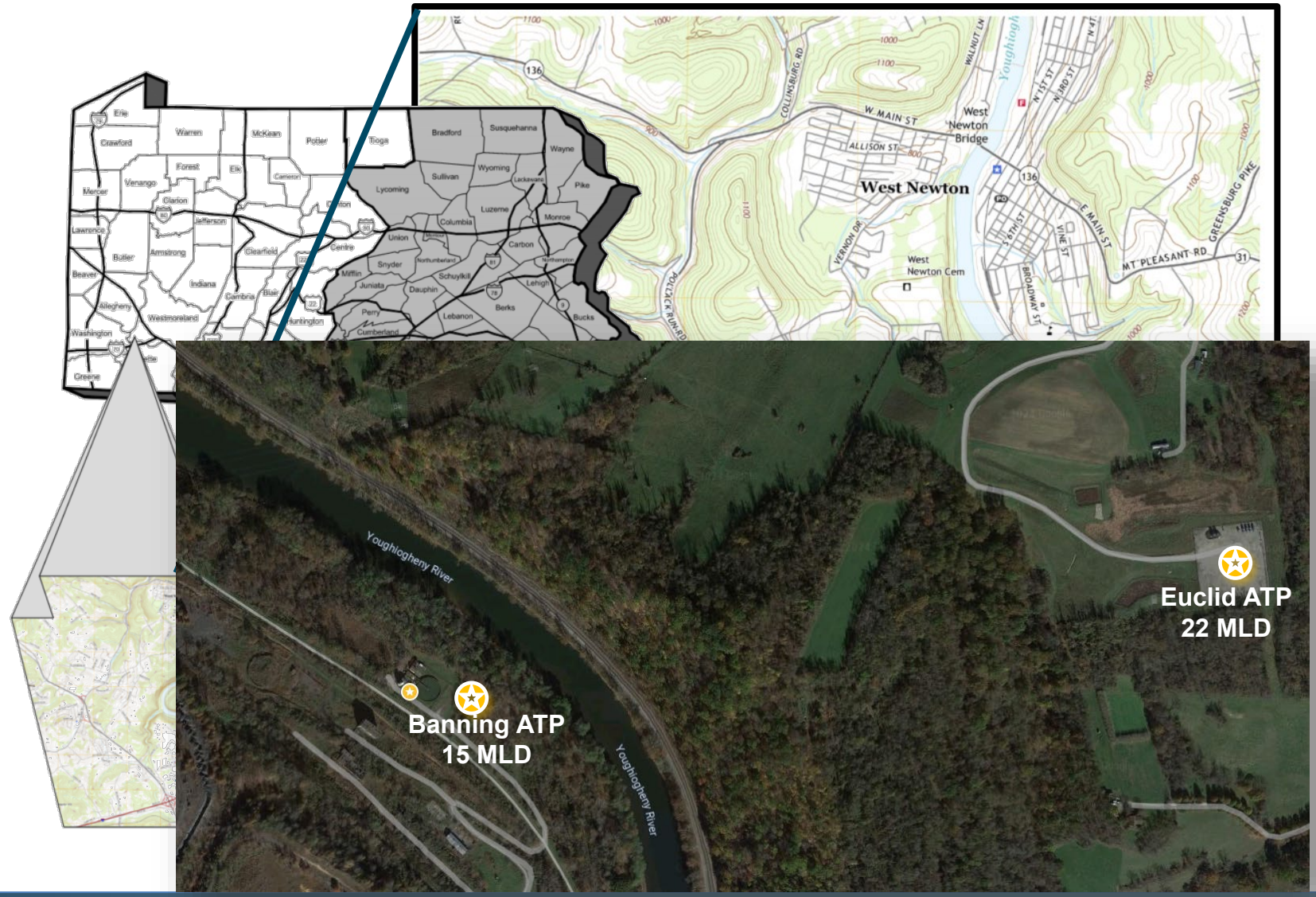
# Outline

- Introduction
- Mine Pool Hydrology
- ATP Design
- Project Milestones

# Introduction

- Two aged ATPs
  - Banning
    - $H_2O_2$ + Polymer →Clarifier
  - Euclid
- Maintain mine pool elevation to prevent flooding
- Meet WQ objectives:
  - Total Fe < 1.5 mg/L
  - TSS < 35 mg/L



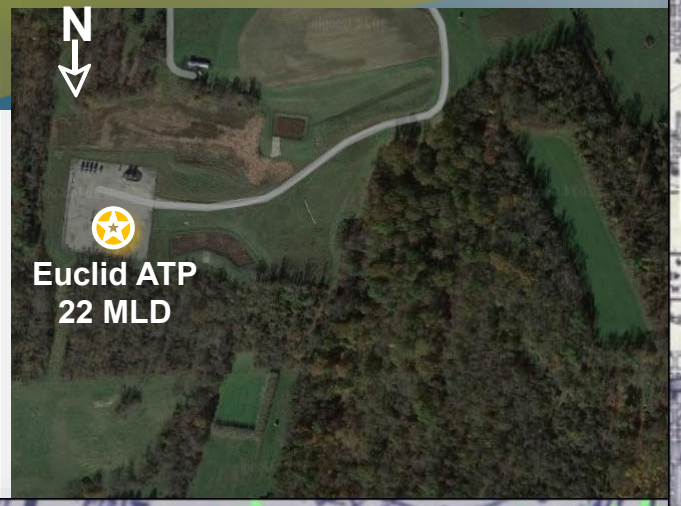
# Mine Drainage Water Quality

| Parameter | Unit | Banning | Euclid | Estimated Mix | Design Parameters |
|---|---|---|---|---|---|
| Quantity | MLD | 15.26 | 21.80 | | 35.38 |
| pH | SU | 7.3 | 7.1 | ~7.17 | |
| Specific Cond. | uS/cm | 2,700 | 2,730 | | |
| TDS | mg/l | 1,850 | 1,956 | 1,912 | |
| TSS | mg/l | 20* | 28 | 25 | 35 |
| Field Alkalinity | mg/l | 512 | 410 | 452 | |
| Lab Alkalinity | mg/l | 538 | 388 | 450 | |
| Hot Acidity | mg/l | -509 | -361 | -422 | |
| Total Aluminum | mg/l | 0.30* | 0.30* | 0.30 | |
| Dissolved Aluminum | mg/l | 0.30* | 0.30* | 0.30 | |
| Total Iron | mg/l | 10.24 | 30.00 | 21.86 | 1.5 |
| Dissolved Iron | mg/l | 8.62 | 23.20 | 17.19 | |
| Total Manganese | mg/l | 0.29 | 0.64 | 0.49 | |
| Dissolved Manganese | mg/l | 0.27 | 0.62 | 0.47 | |
| Sulfate | mg/l | 811 | 1,025 | 937 | |

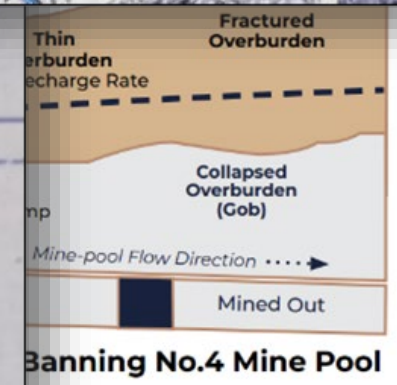
* Detection limits

# Mine Pool

- Determination of combined plant capacity 35.38 MLD (6,500 gpm)
  - Flow metering @ ATPs
  - Analysis of mine pool elev. 225.5 m (MSL)
- Vertical Turbine Pump (VTP)
  - borehole locations
- Sludge flow assessment





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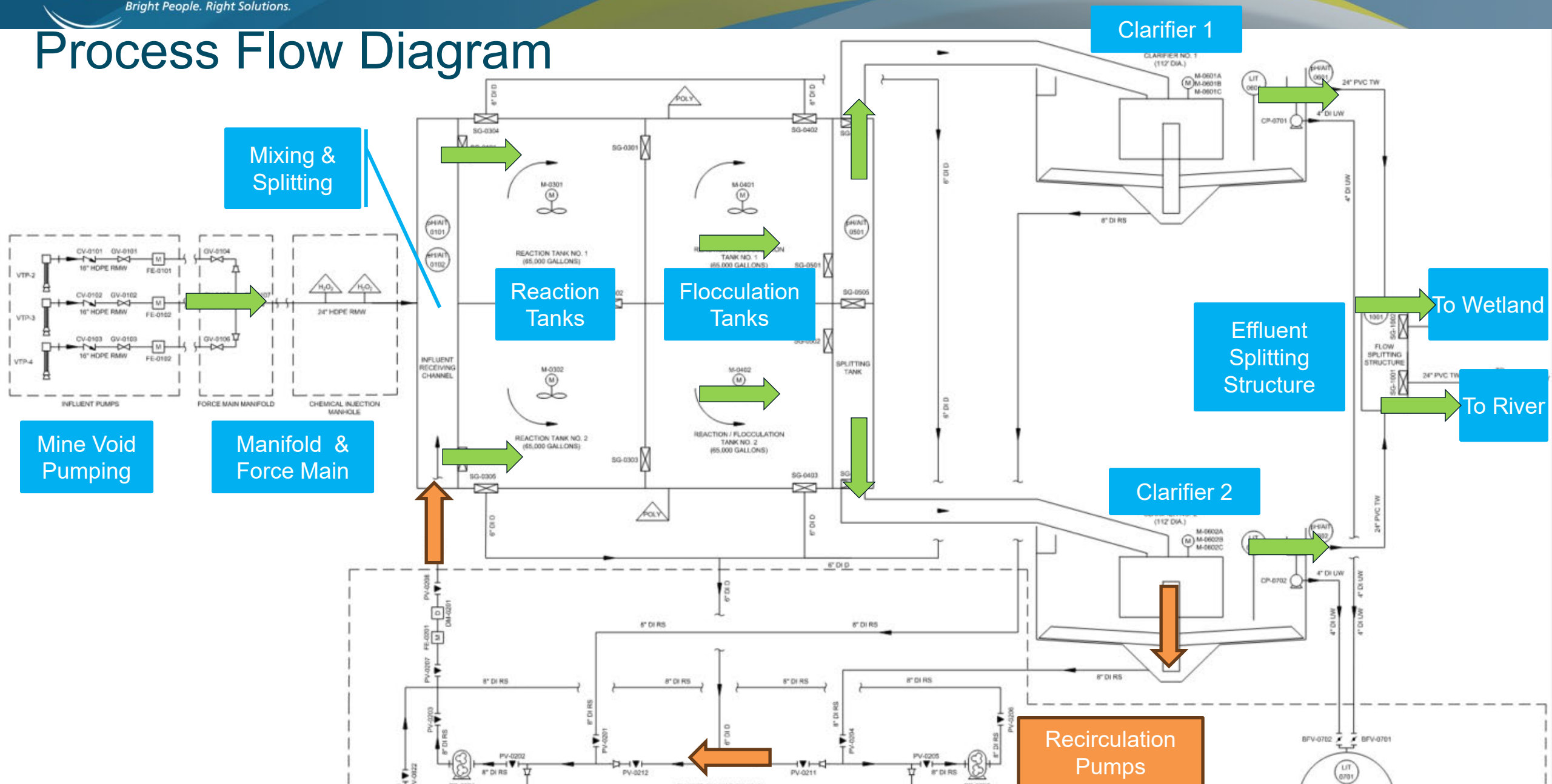
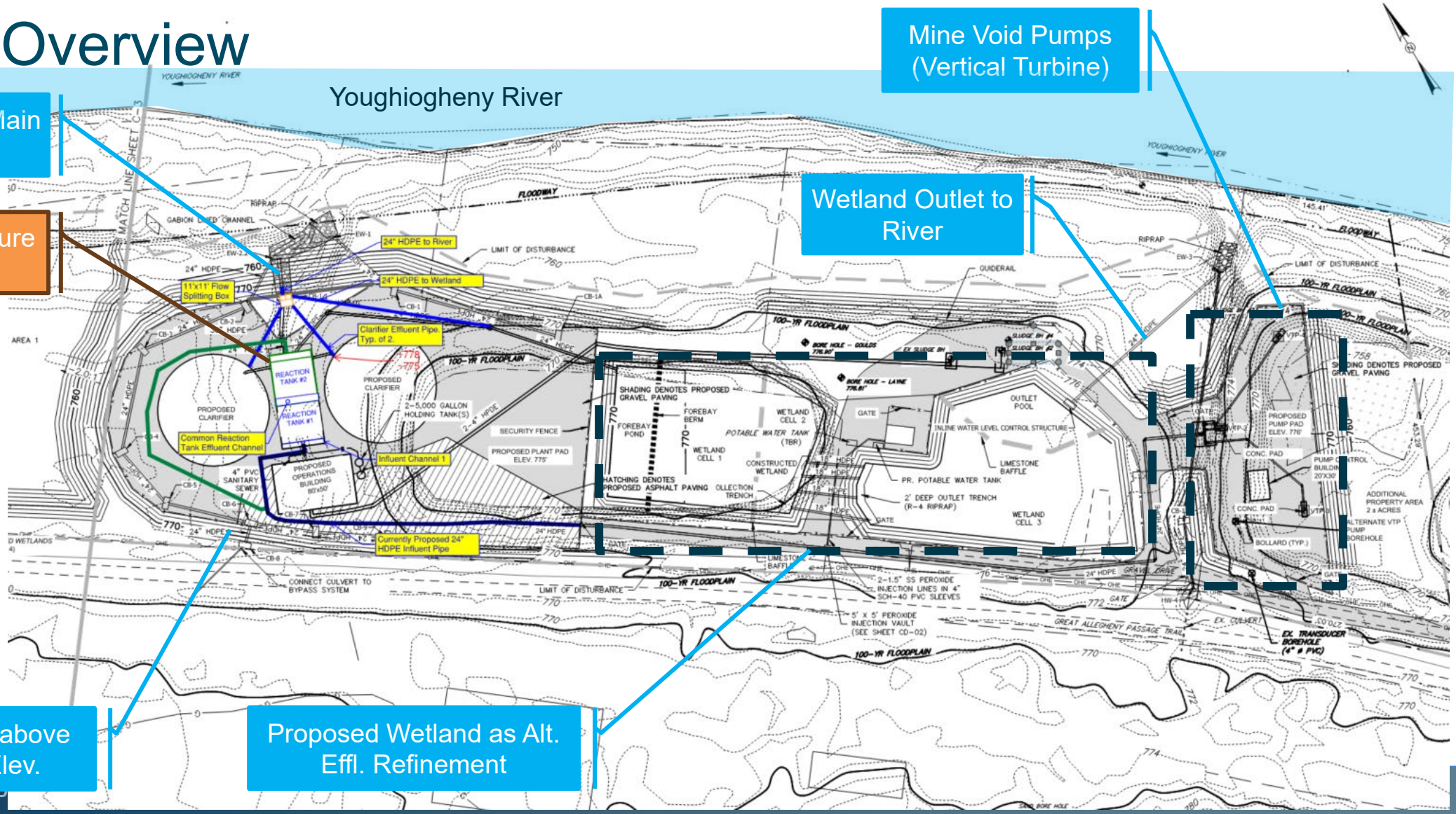
# Process Flow Diagram

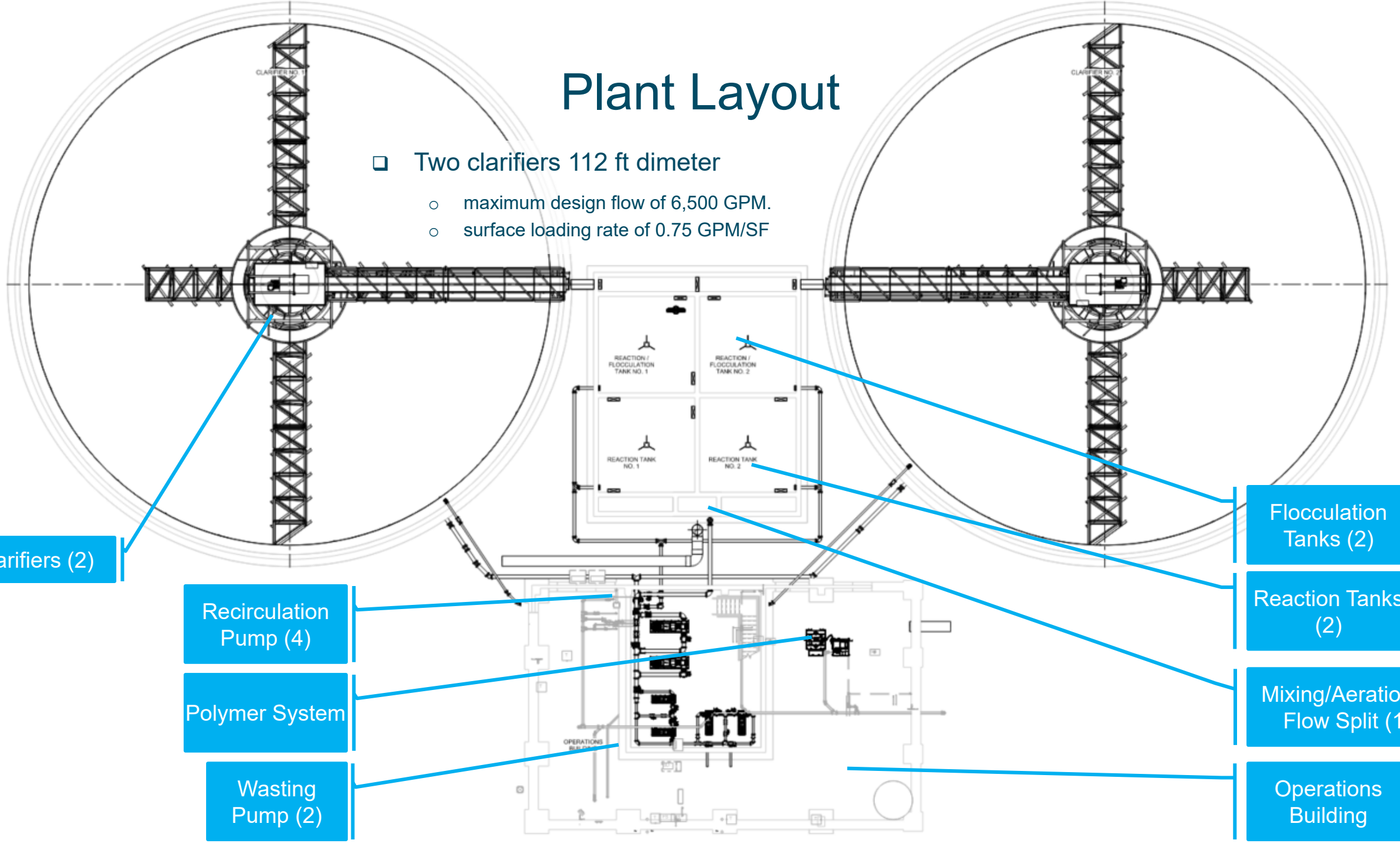


# Site Overview



# Plant Layout

- Two clarifiers 112 ft dimeter
  - maximum design flow of 6,500 GPM.
  - surface loading rate of 0.75 GPM/SF




Clarifiers (2)

Recirculation Pump (4)

Polymer System

Wasting Pump (2)

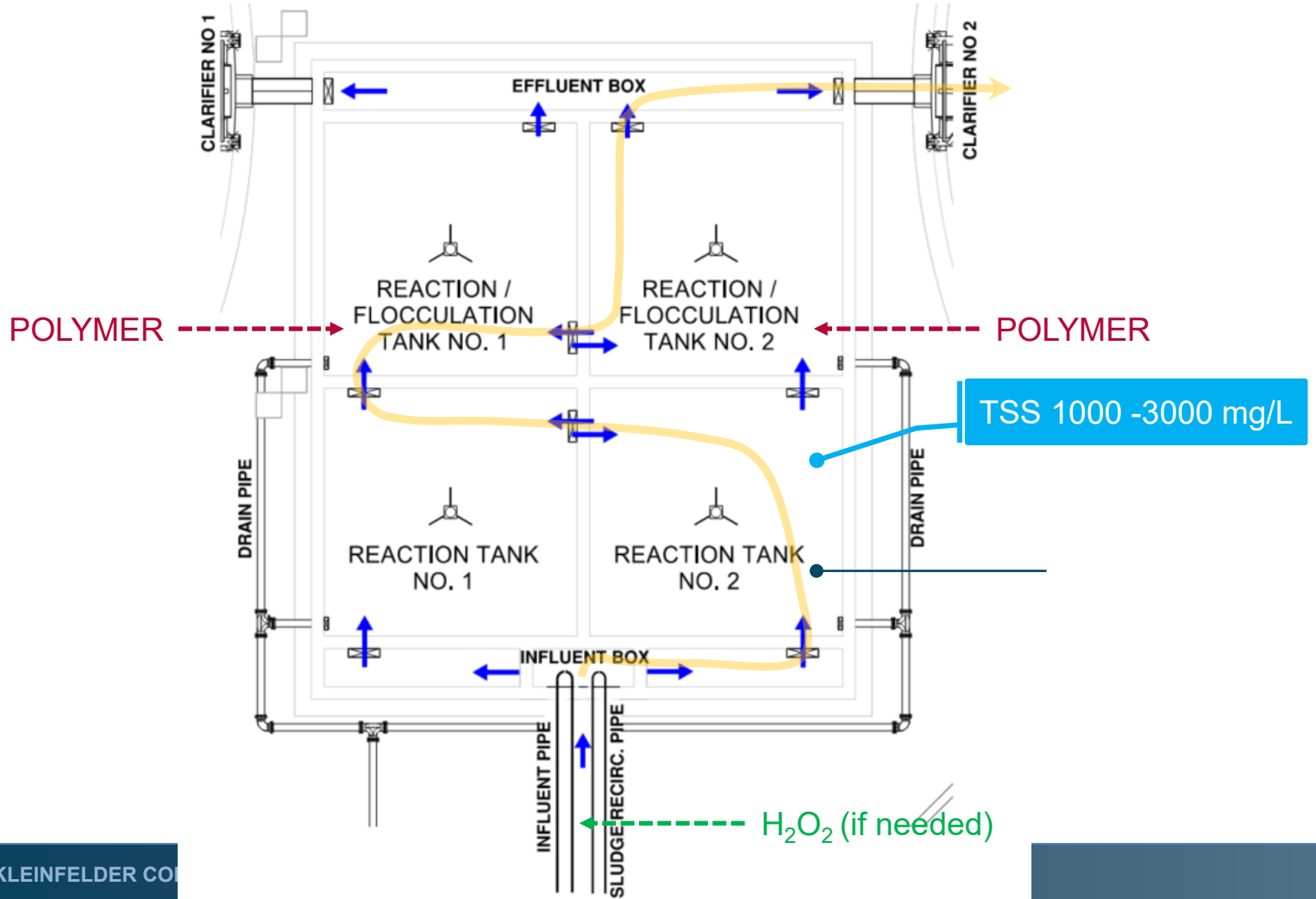
Flocculation Tanks (2)

Reaction Tanks (2)

Mixing/Aeration & Flow Split (1)

Operations Building

# Reaction Tank Operational Options

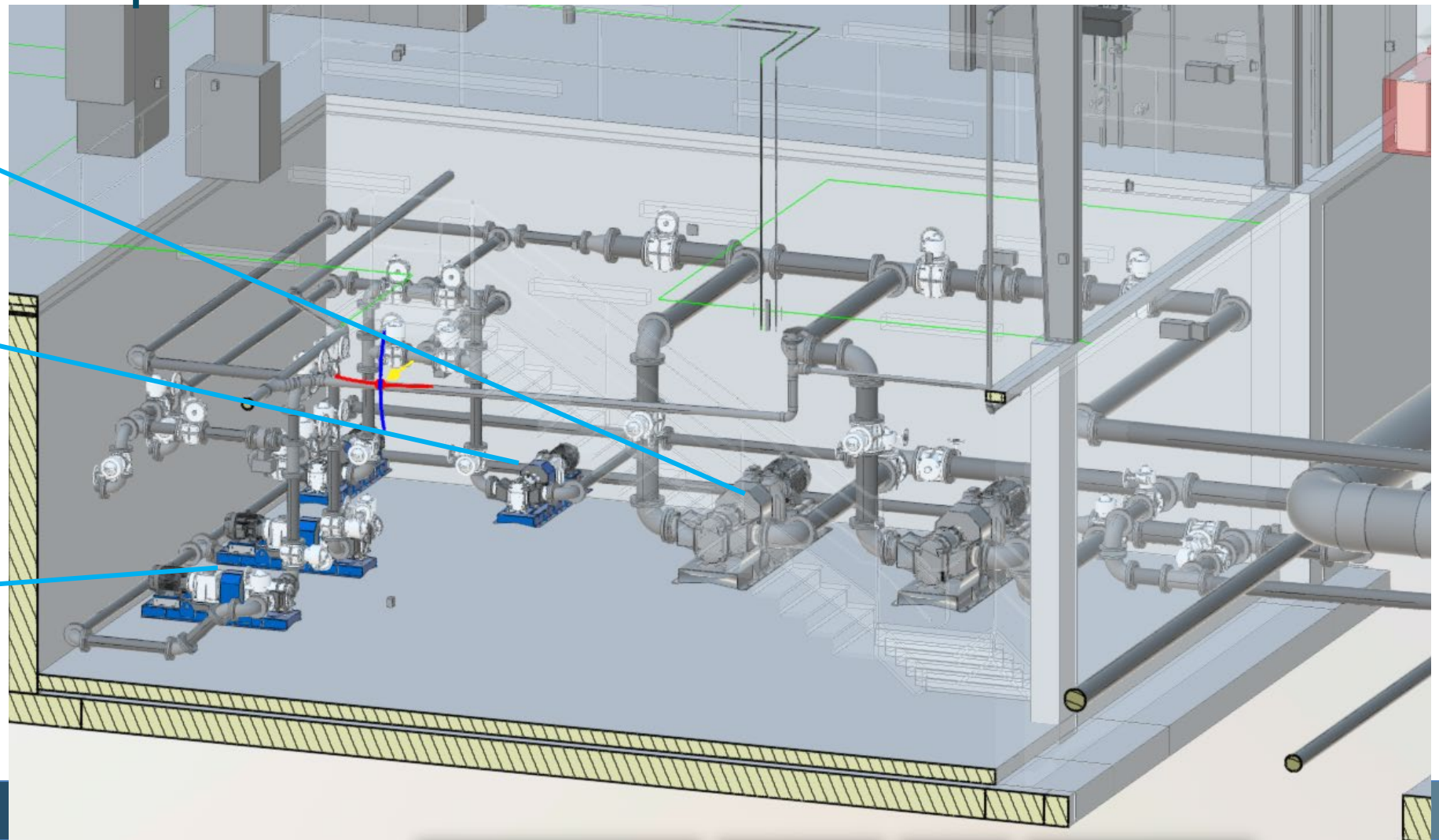



# Recirculation Pump Room

High Flow Recirculation Pumps (2)

Low Flow Recirculation Pumps (2)

Wasting Pumps (2)



# Project Milestones

- 30% Design finished on Jan 2024
- 75% Design Scheduled for September 2024
- 100% Design Scheduled for January 2025
- Bid Ready Documents scheduled for March 2025

# Acknowledgement

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