



Evaluate Alternatives and Recommend

Signal Hill Water Treatment Plant Optimization

Advisory Control Board Meeting | Thursday January 16, 2025



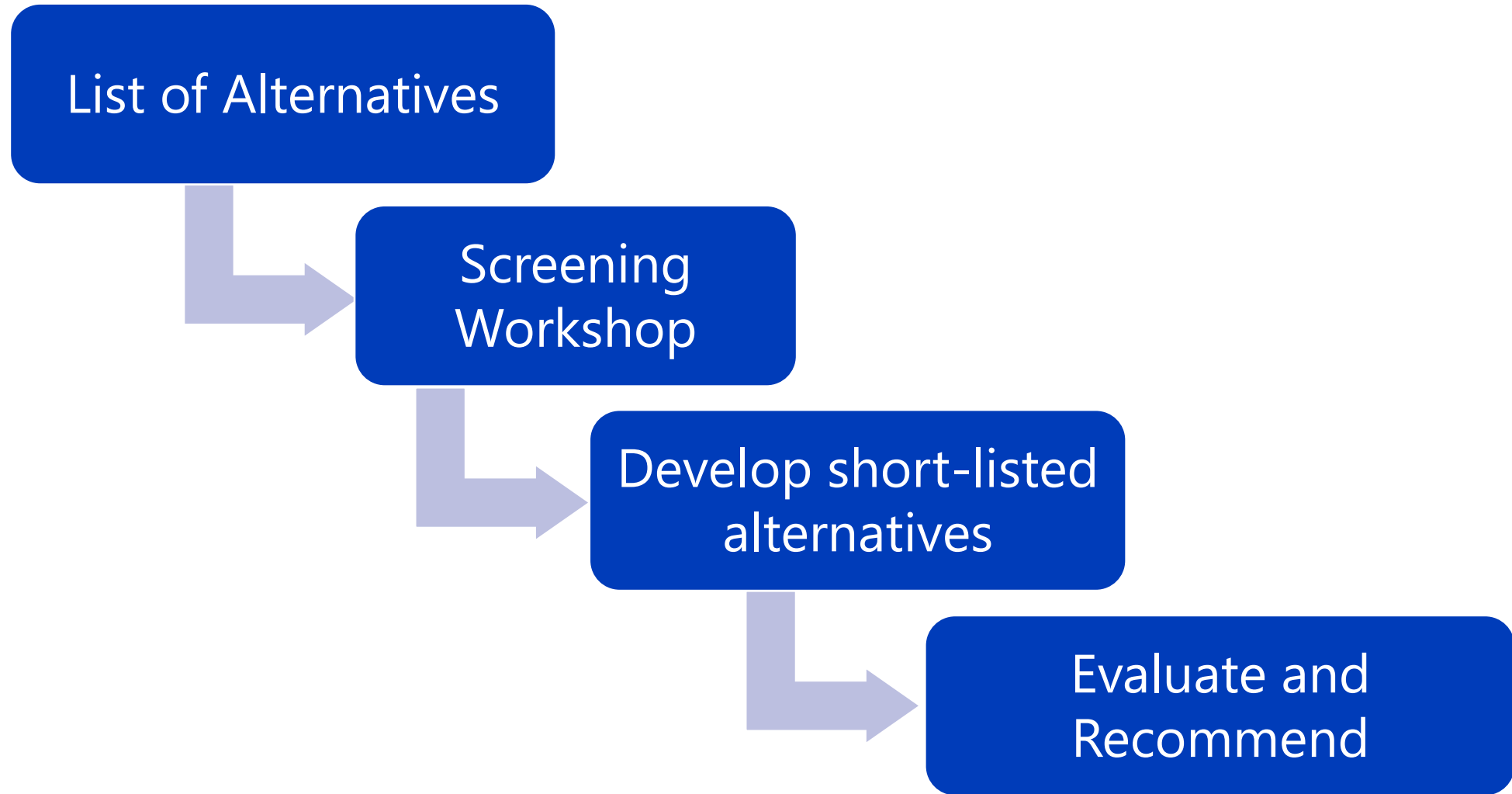
— Agenda

- Introduction
- Bench and Full-Scale Testing Takeaways
- Selected Alternatives
 - » Pretreatment
 - » Membranes
 - » Solids Handling
 - » Granular Activated Carbon (GAC)
 - » Chemical Building
- Overall Selected Alternative
- Next Steps

01

Introduction

Conceptual Design Workflow



— Today's Meeting

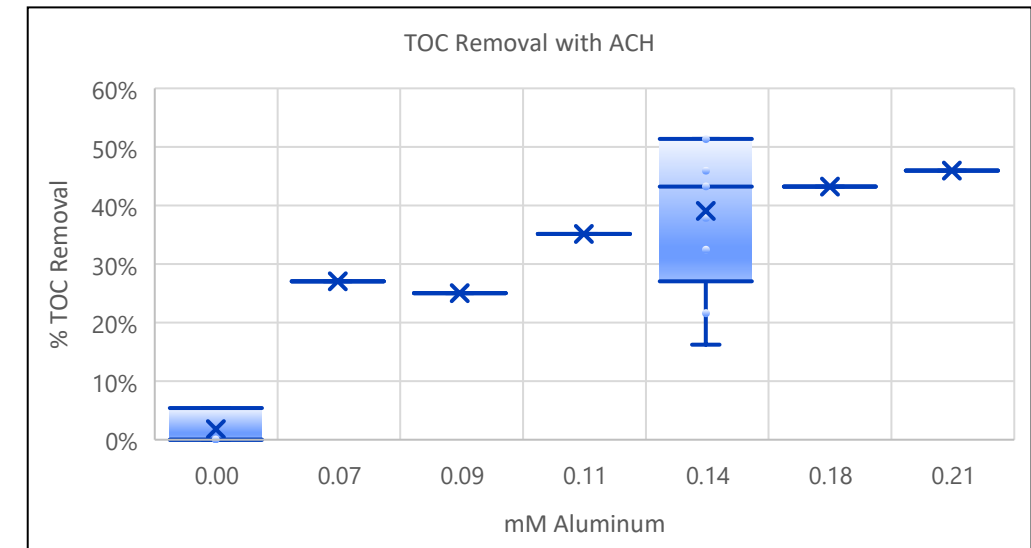
- Purpose
 - » Summarize short-listed alternatives
- Objective
 - » Recommended alternative to carry forward to design phase of the project

02

Bench and Full-Scale Testing Takeaways

Bench Testing Conclusions

- Bench Testing Conclusions:
 - » Can achieve more than 30% organic carbon (TOC) removal with existing ACH coagulant
 - Great news! This will reduce disinfection by-product formation DBP formation potential
 - » But we need to address flash mix
 - Temporary pumped flash mix installed by MRW staff this month



Preliminary Full-Scale Testing Takeaways

- Skid B in direct filtration mode since late September, with redirected XR stream. We are comparing Skid B performance with Skid C as the control.

Specific Flux (gfd/psi) Comparison	Sum of Differences at Each Percentile	Takeaway
Skid B _{Test period} - Skid B _{Prior to Test}	+11.5 gfd/psi	Test skid is performing better during test than before the test
Skid C _{Test period} - Skid C _{Prior to Test}	-2.1 gfd/psi	Control skid is performing slightly worse than before the test

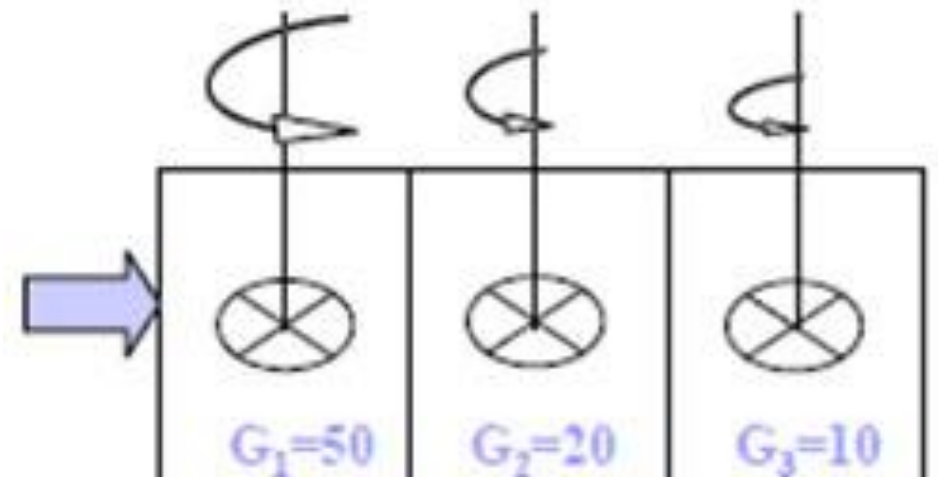
Rerouting XR reduces solids loading and improves membrane performance.

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Pretreatment Alternatives

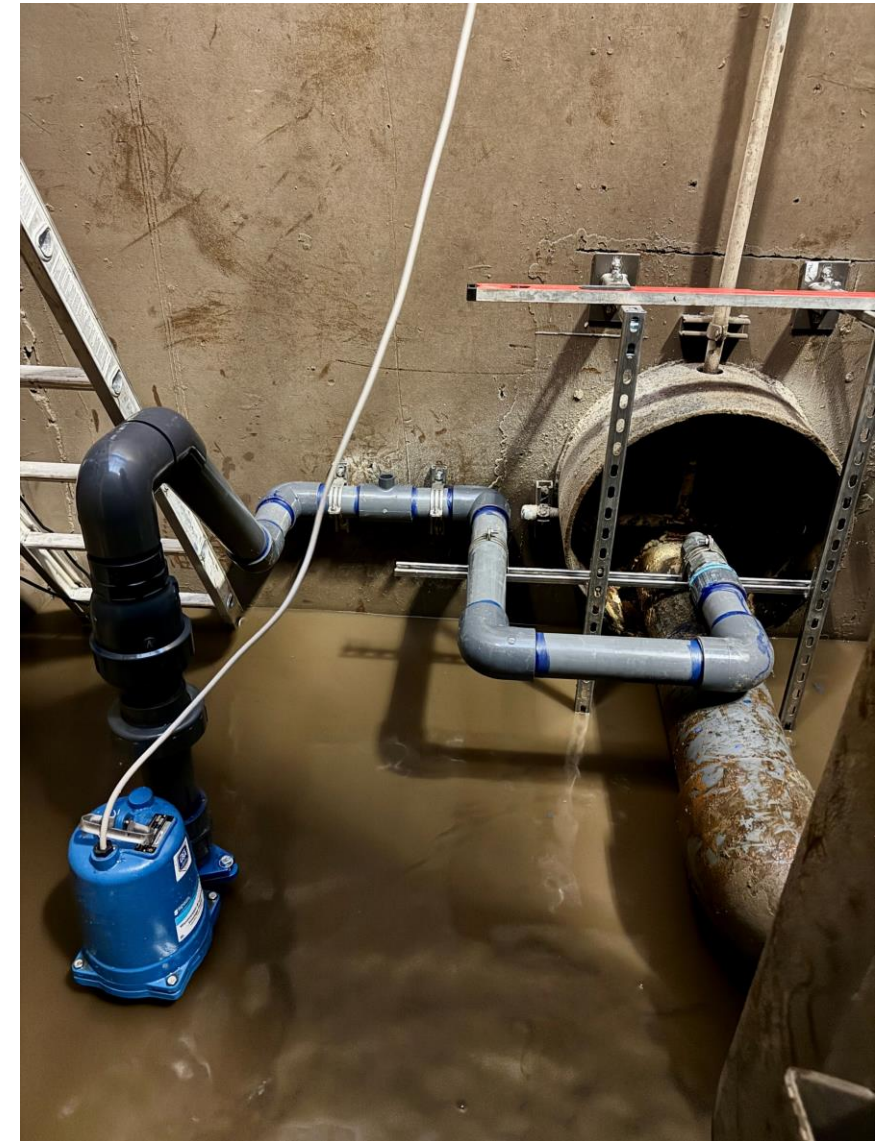
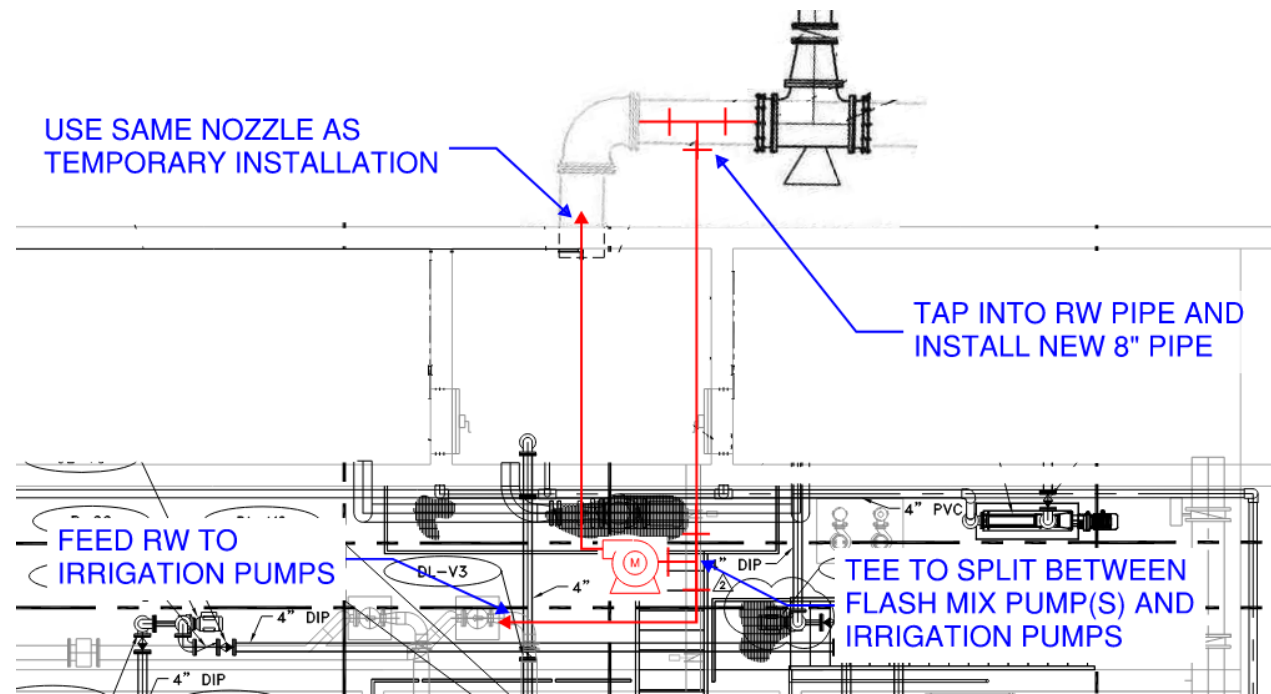
Review of Current Conditions & Challenges

- Flash Mix
 - » Mixing energy is important
 - » Floats on pond.
- Flocculation
 - » Air flocculation not typical for water treatment.
- Existing Sedimentation
 - » Floc shear



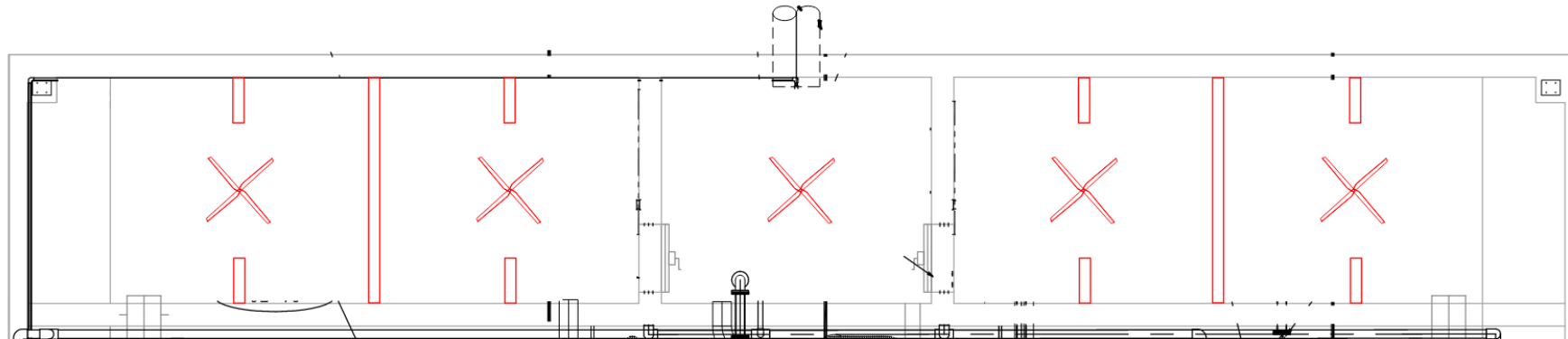
Flash Mix

- Pumped flash mix

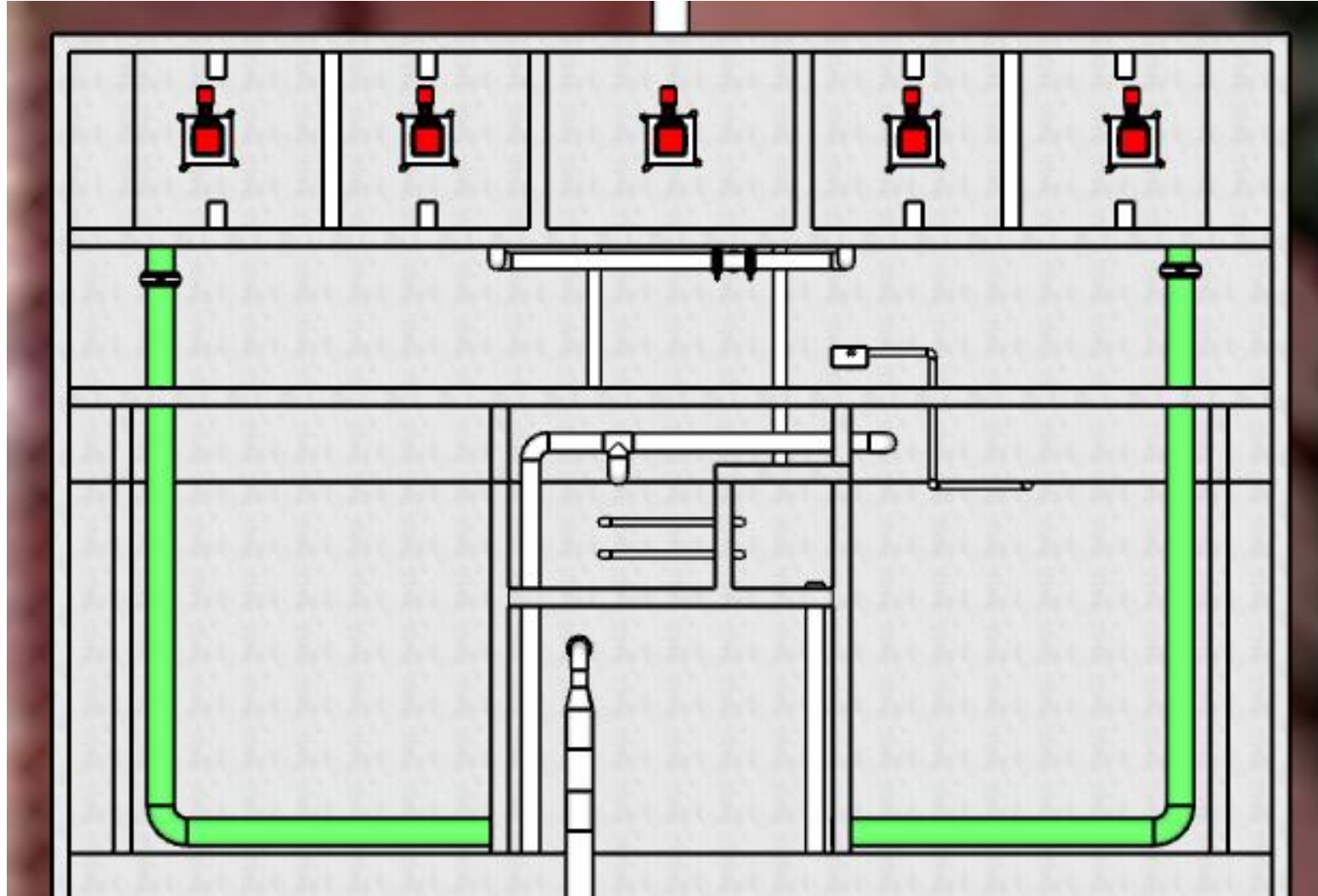


Flocculation

- Install vertical hydrofoil flocculators
 - » 1 flocculator in existing flash mix basin
 - » 2 flocculators per floc basin



Direct Filtration Alternative

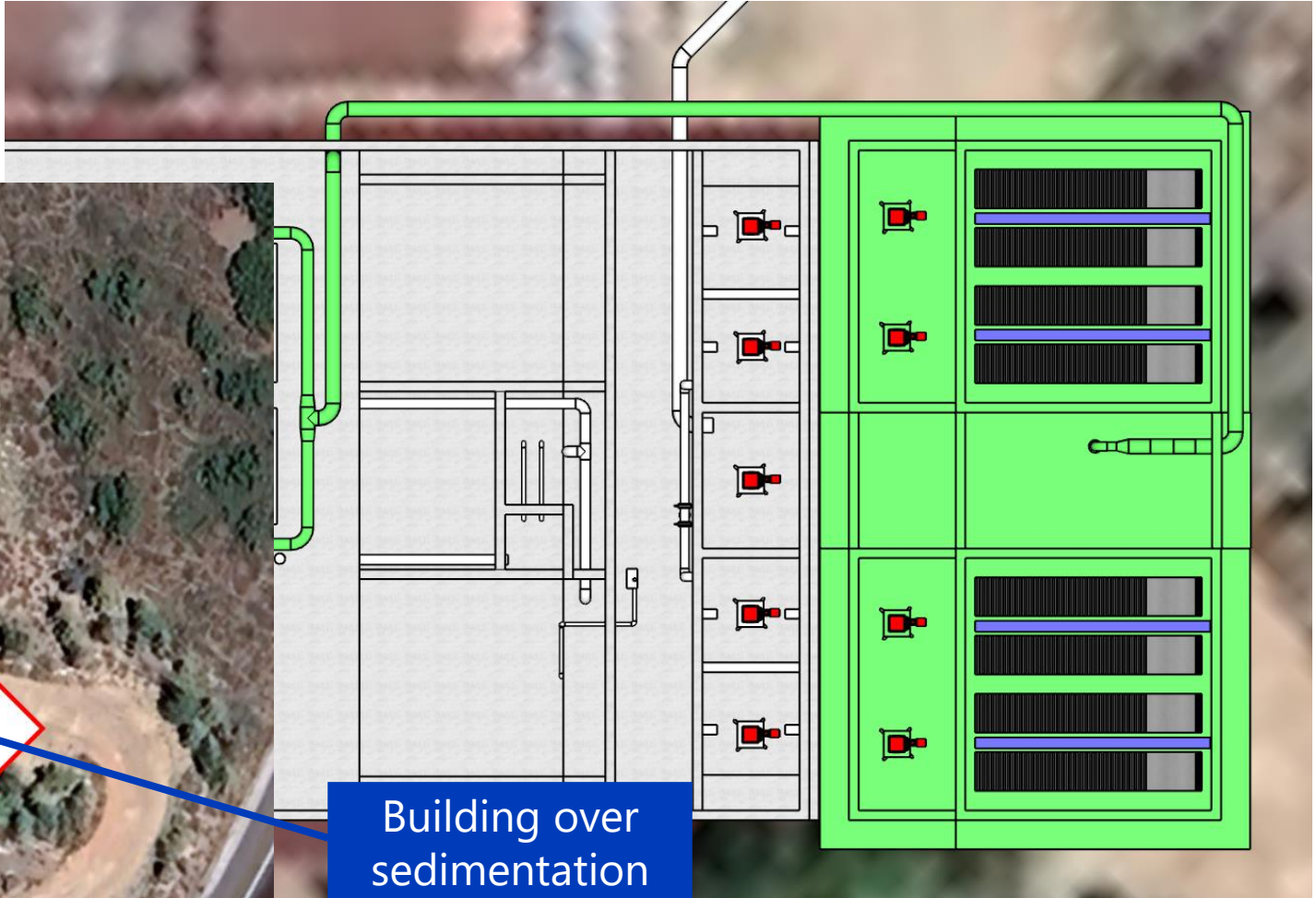


New Sedimentation Basin Alternative

Need raw water pump station

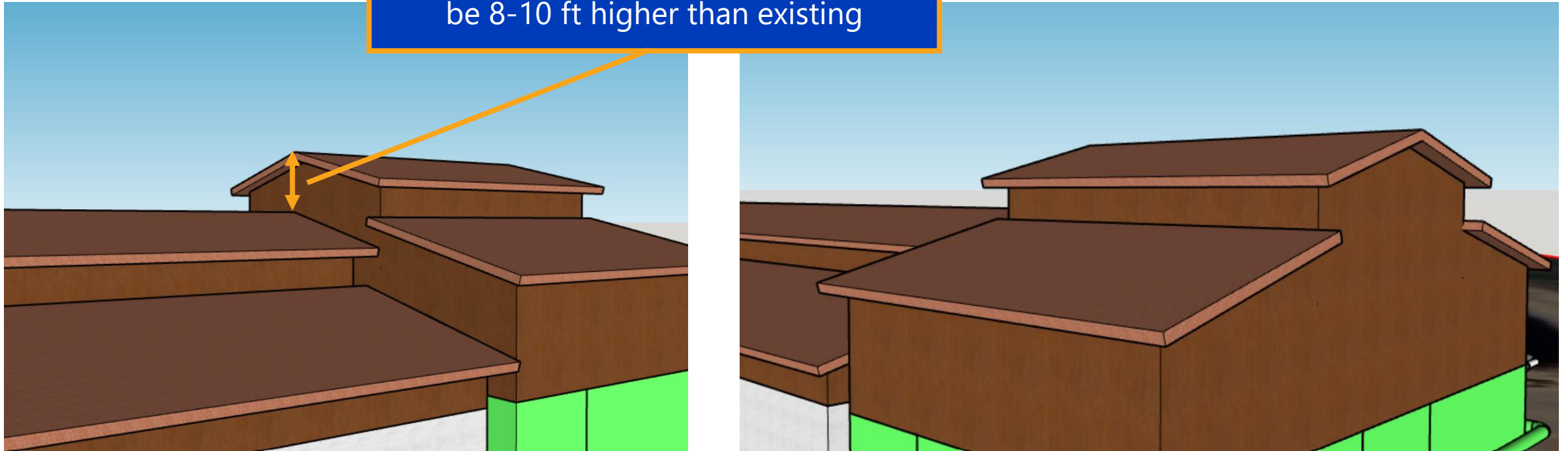


Building over sedimentation



New Sedimentation Basin Alternative

Roof Line of New Sed Building would be 8-10 ft higher than existing

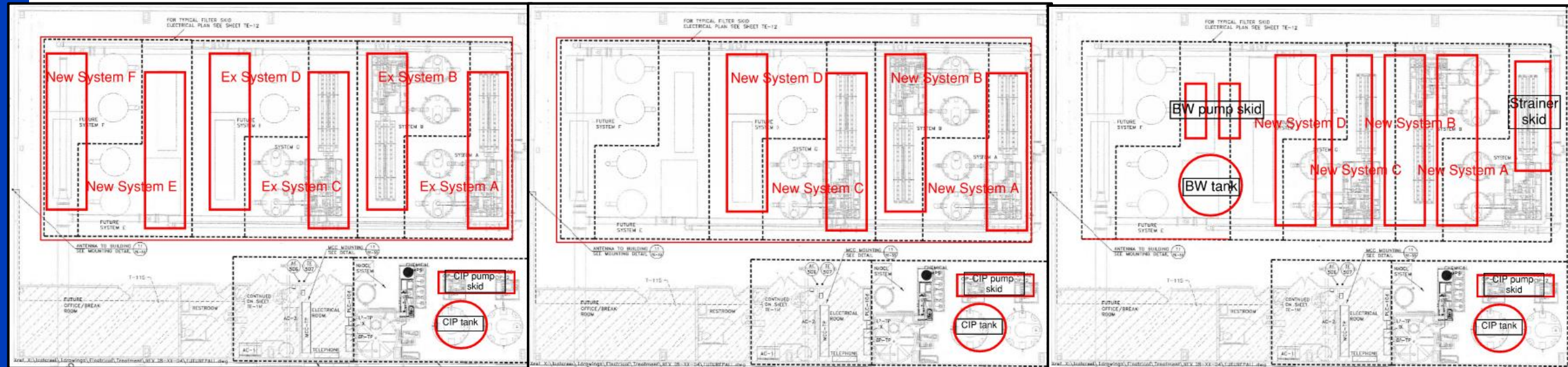


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Membrane Alternatives

Membrane Alternatives

- Alternative 1: 2 new 1.8 mgd skids and 4 existing AP6s
- Alternative 2: 4 new 1.8 mgd skids
- Alternative 3: 4 Quinns style skids, 1.8 mgd each



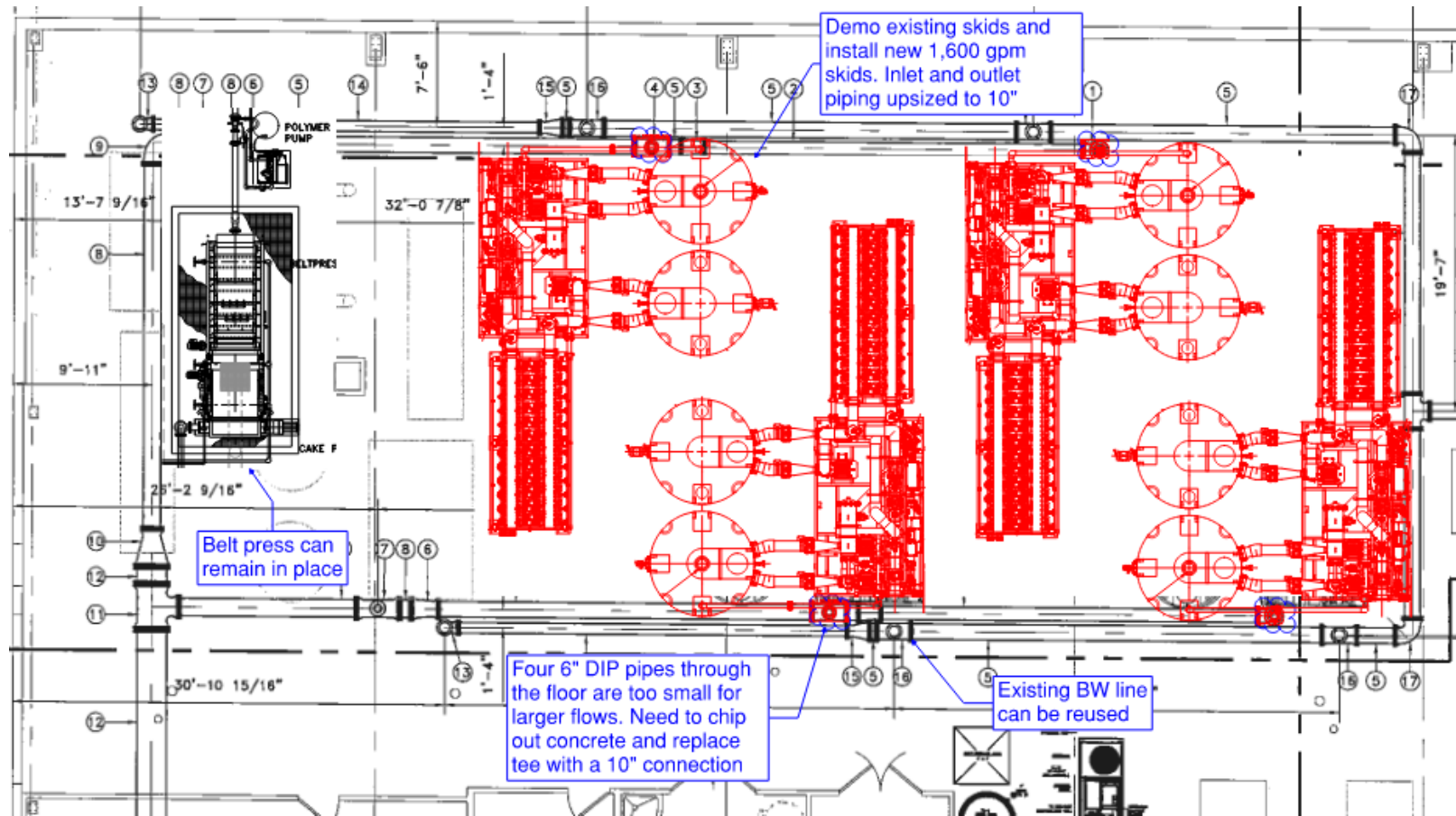
Alt 1

Alt 2

Alt 3

Selected Membrane Alternative

- Alternative 2
 - » Demo existing, install 4 new 1.8 mgd skids

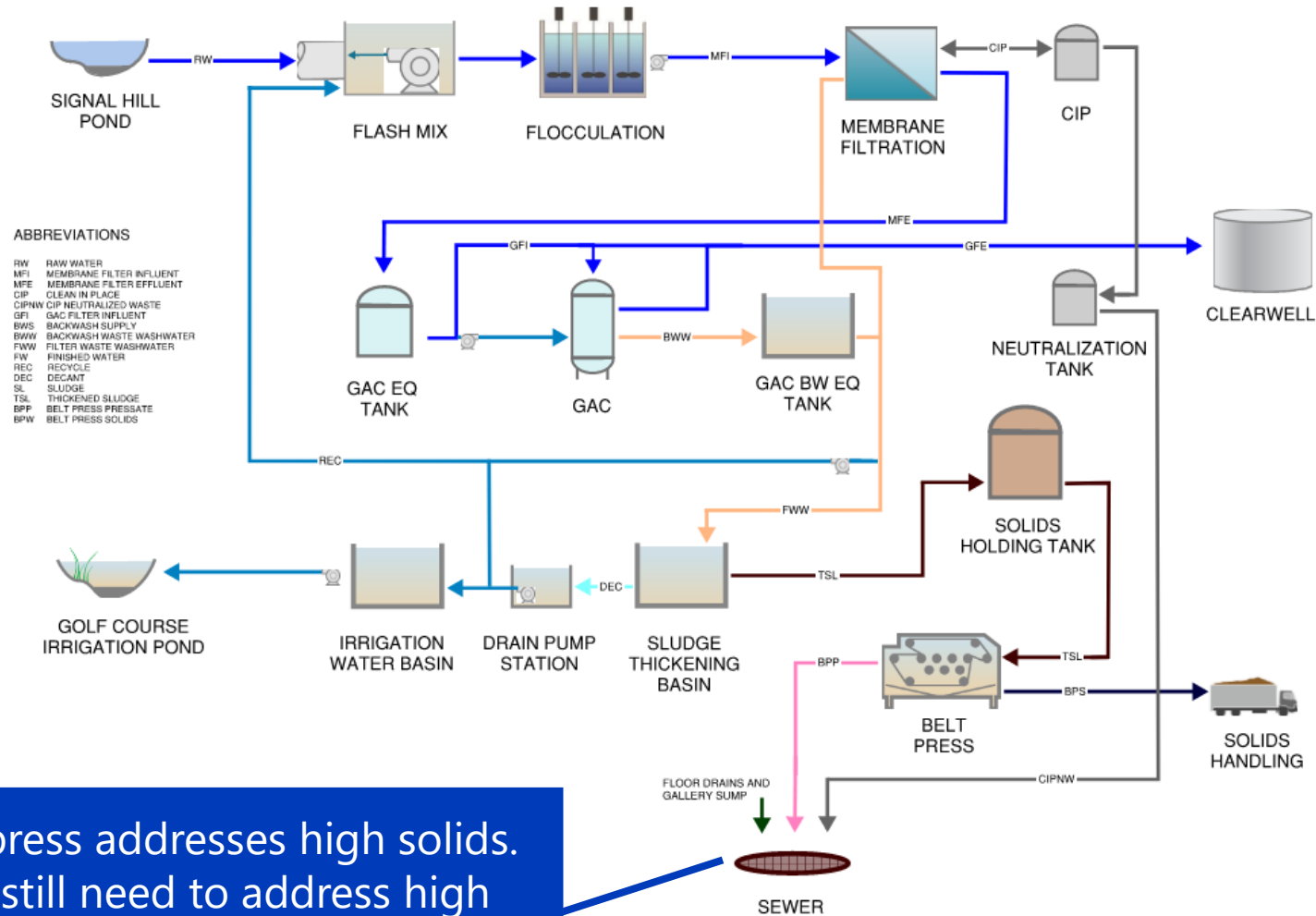


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Solids Handling Alternatives

Proposed Process Flow Diagram

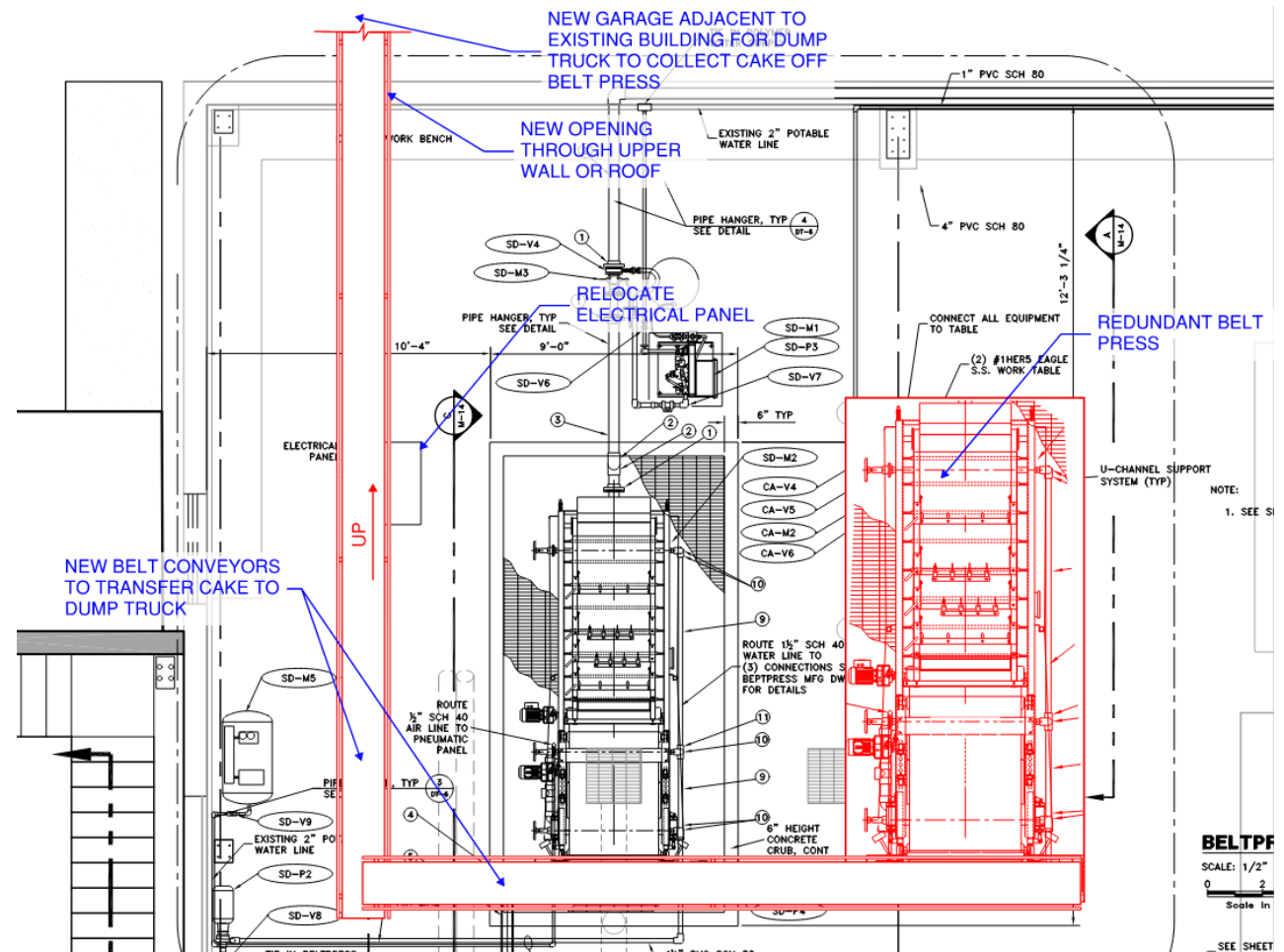
- All alternatives take advantage of footprint of existing sed and thickening basin.
 - » Need to replace solids holding basin.
- Other objectives
 - » Provide equalization
 - » Improve BFP cake transport



Belt press addresses high solids. But still need to address high flows and possibly low biological oxygen demand (BOD)

Keep the existing BFP in-place

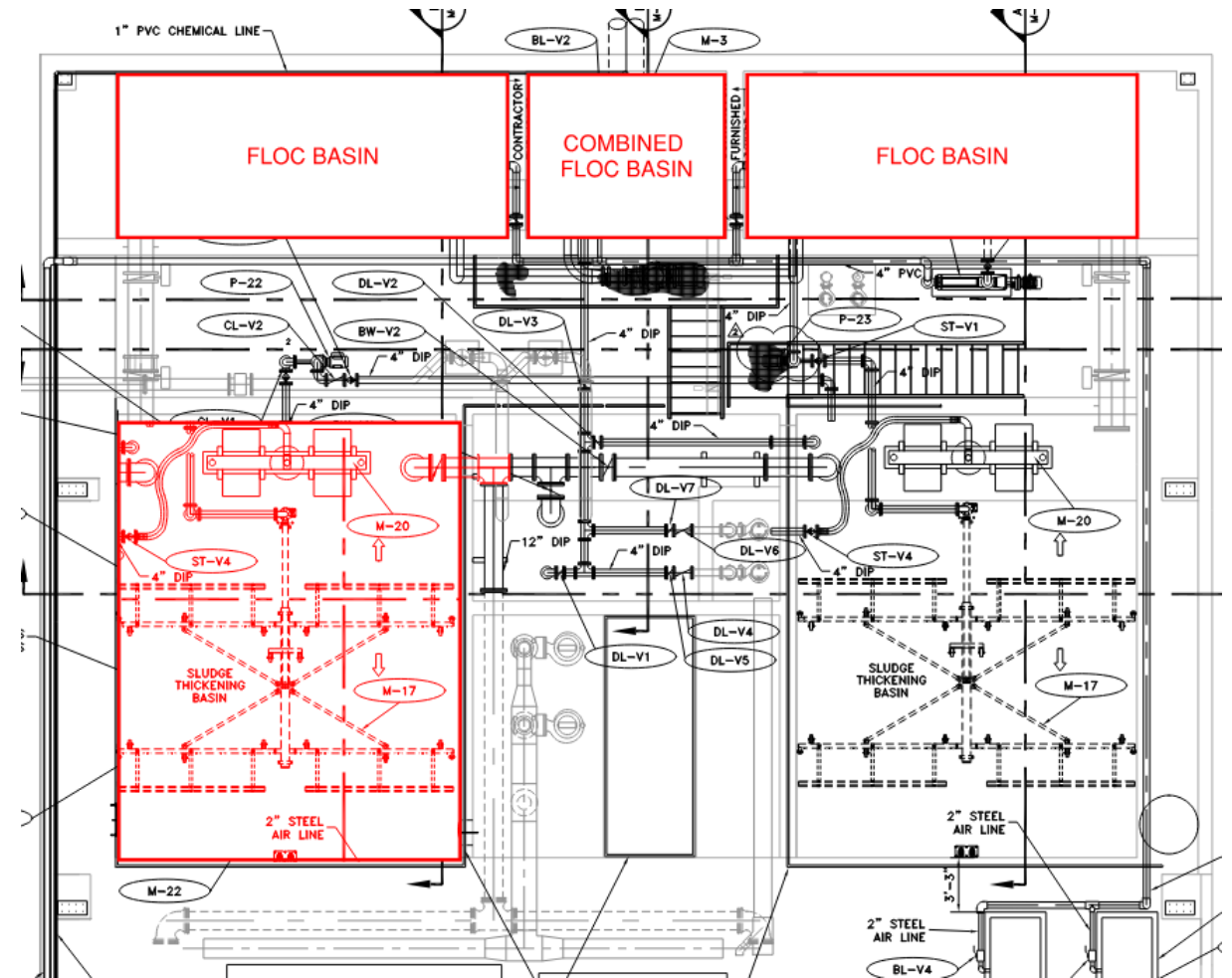
- Existing belt filter press (BFP) has capacity for expanded plant flows and higher solids.
- Add second belt filter press for redundancy.
- Solids Holding Tank in outside location footprint.
- Install new belt conveyors to transport cake solids to dump truck.
- Construct new garage with truck bay adjacent to existing building.



Let's take advantage of existing footprint

Selected Alternative

- Keep existing Sludge Thickening Basin
- Repurpose existing sedimentation basin as 2nd Sludge Thickening Basin
 - » Up to ~100,000-gal backwash equalization capacity
 - » Provides redundancy

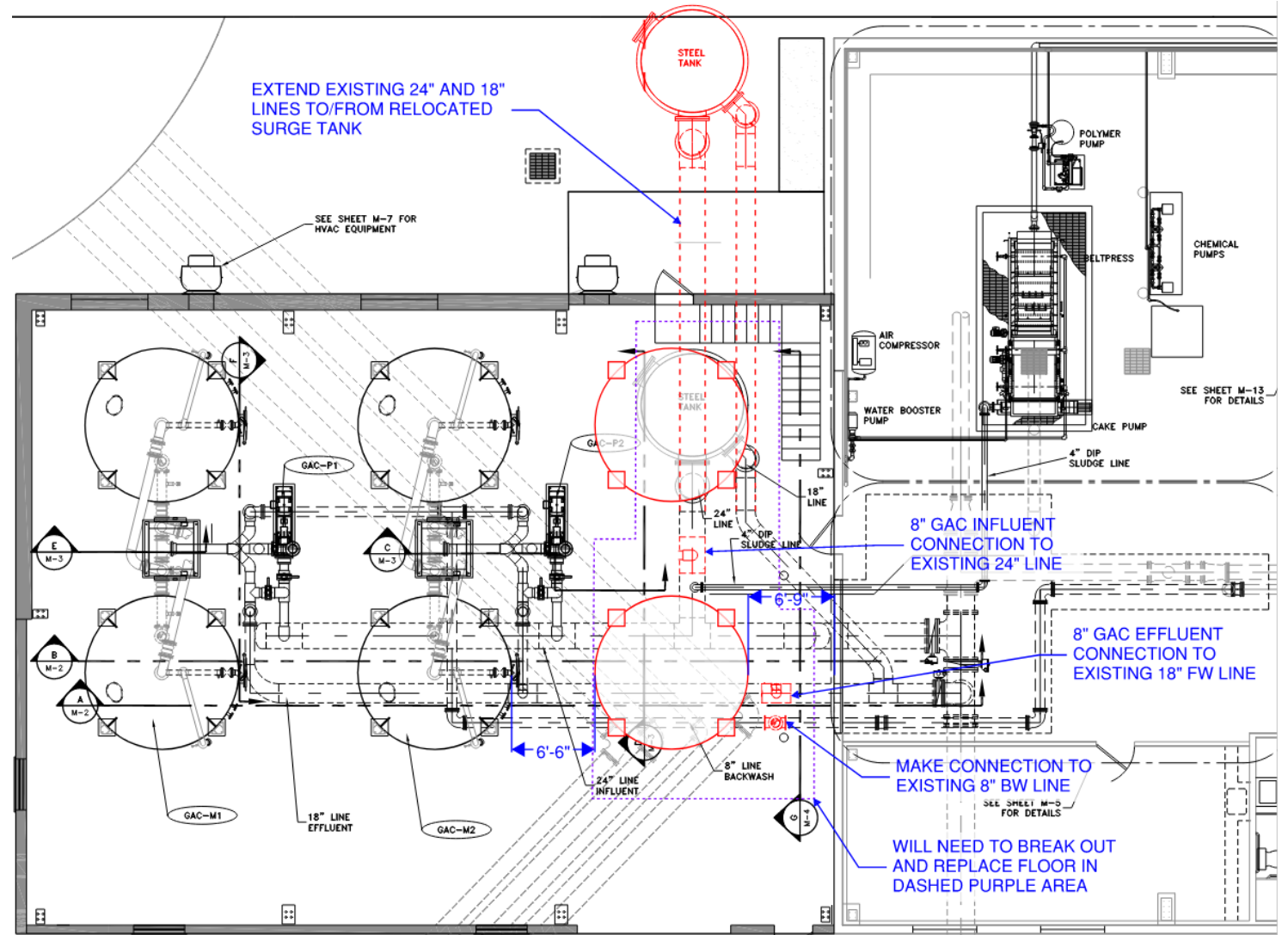


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Granular Activated Carbon (GAC) Alternatives

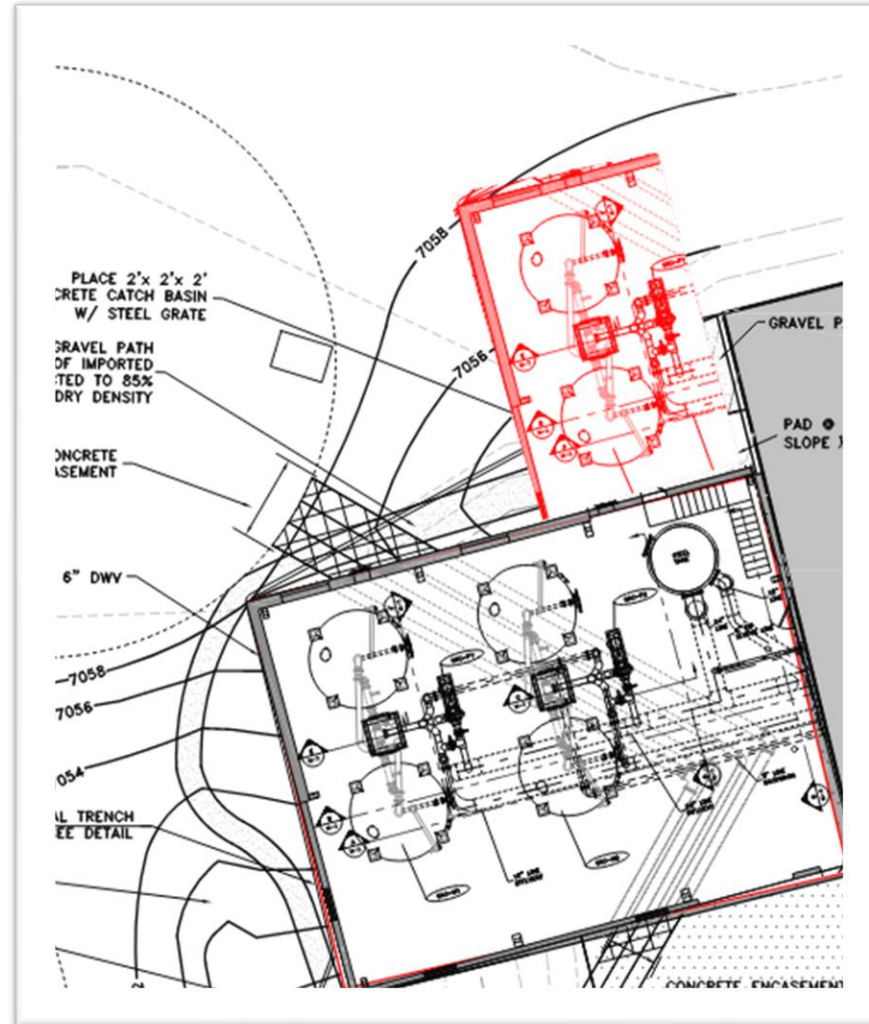
Previous GAC Alternative

- This can be done but is challenging, costly, and space would be tight



Revised GAC Alternative – add 2 contactors in new footprint

- These are easier and not in the way of new chemical building
- We will confirm GAC needs during early detailed design



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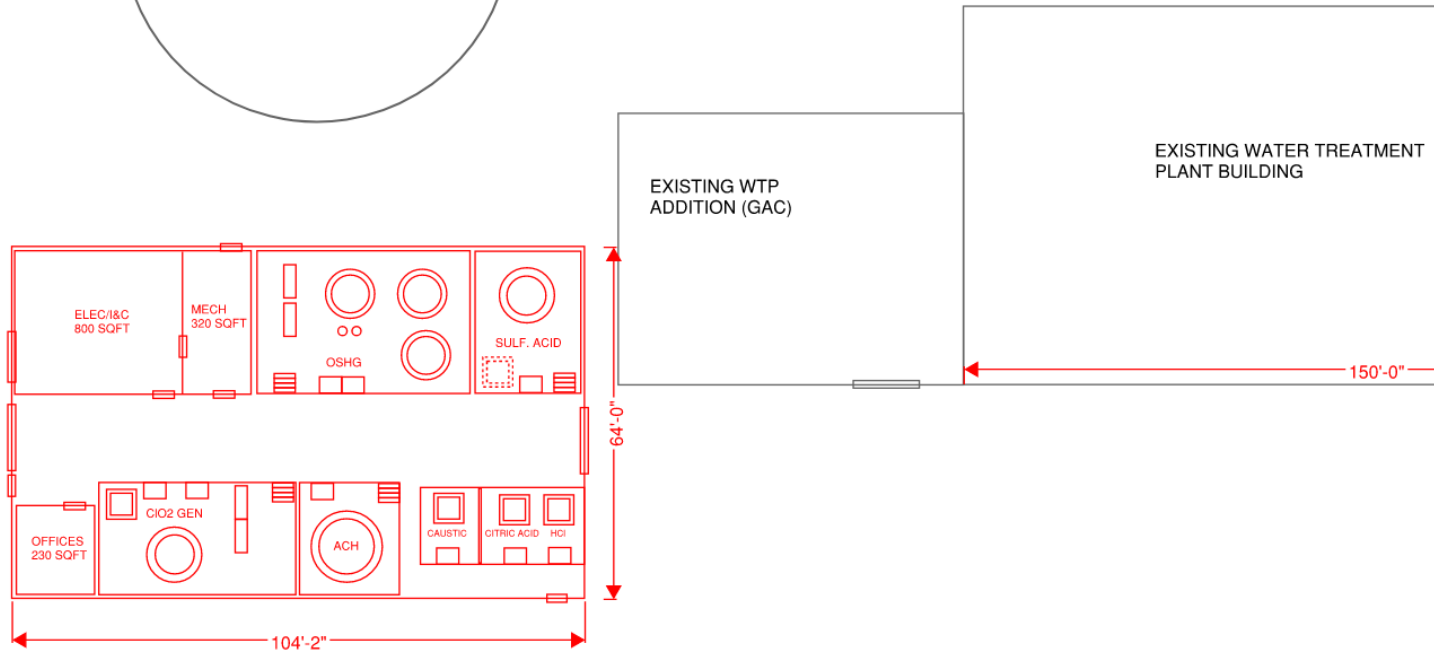
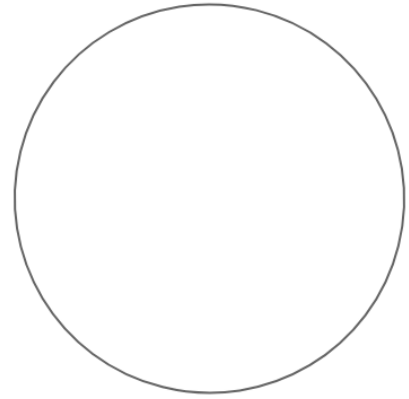
Chemical Alternatives

Chemical Building Alternatives

- Alternative 1 – Long and Skinny
- Alternative 2 – Square and Uniform



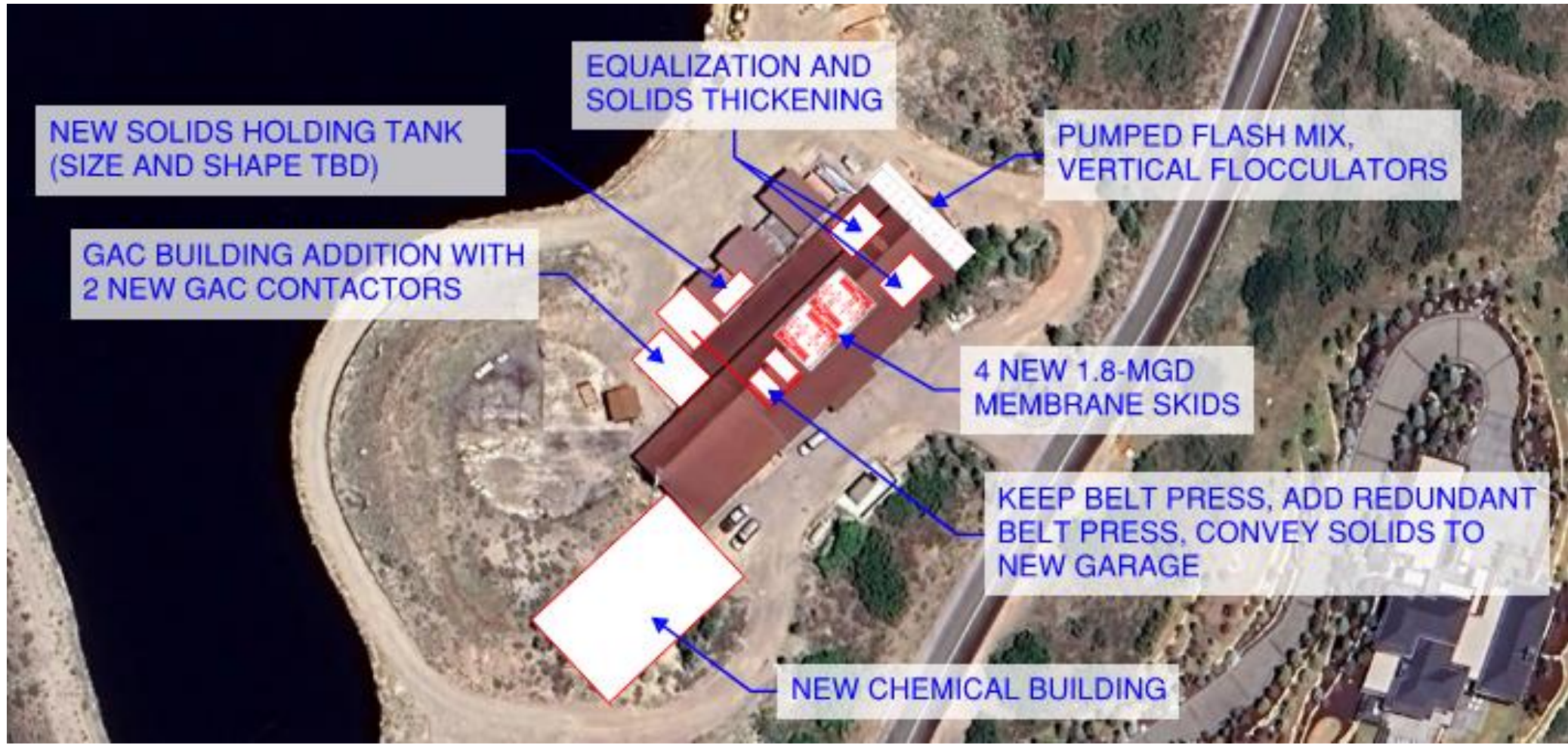
Selected Chemical Building Alternative



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Preferred Alternative

Preferred alternative



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Next Steps

Next Steps

- Detailed design kickoff February 2025
 - » 30% design Spring 2025