

From Wine to Vine Water Reuse at Ridge Vineyards



Session 32 – Water Reuse: Growing Sustainable and Resilient Businesses and Communities with Water Reuse



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Presentation Outline

🍇 Site History and Geographic Location

🍇 Site and System Challenges

🍇 Keys to Success

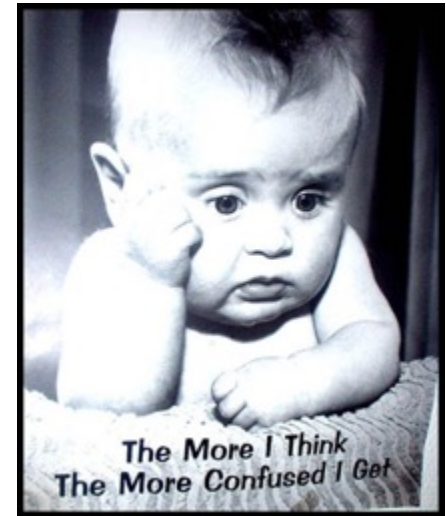
🍇 Solution

🍇 Results

🍇 Conclusions



From Wine to Vine



History (Monte Bello Vineyards)

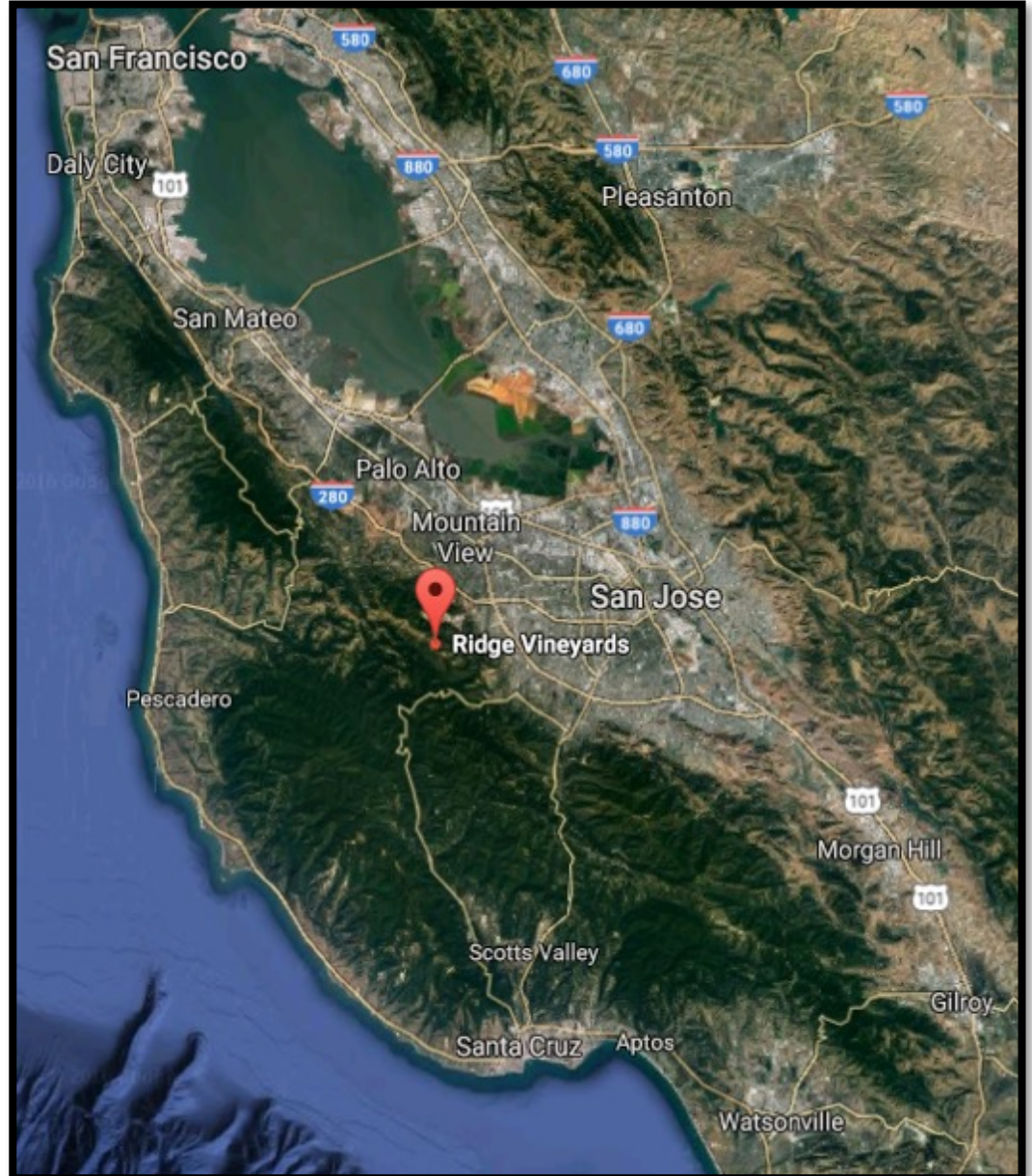
- 🍇 First vines planted in 1886, first wine produced in 1892
- 🍇 Prohibition 1920 abandoned – More vines planted in 1949
- 🍇 Land purchased by 4 Stanford Scientists in 1959
- 🍇 Ridge Vineyards formed in 1962
- 🍇 Producer of high quality wine varietals since 1959



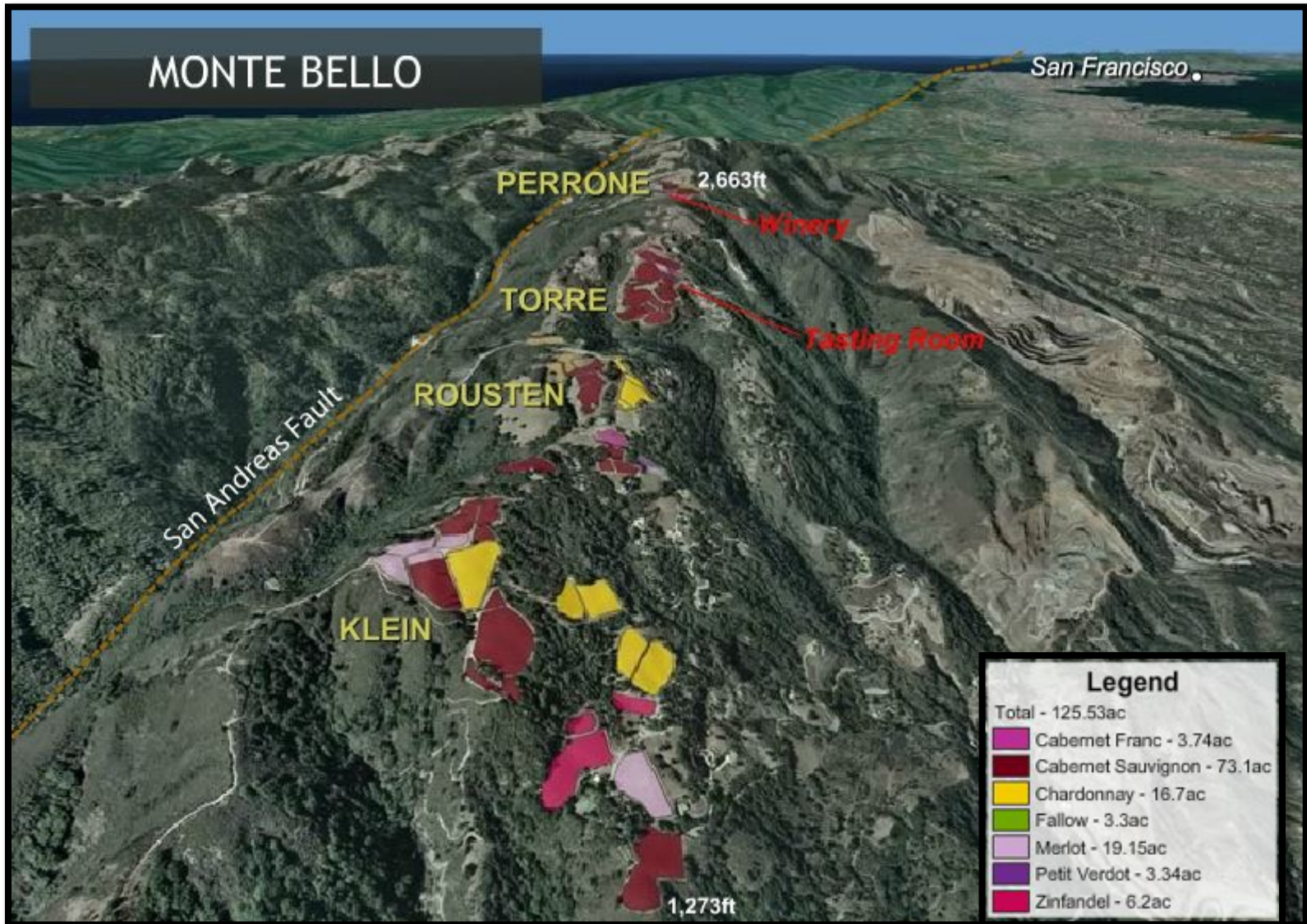
Project Location

- 🍷 Atop the Santa Cruz Mountains at elevation 2,700 feet above San Francisco Bay
- 🍷 Adjacent to San Andreas Fault

RIDGE
VINEYARDS



Geographic Location



Treatment System Location



AAAAHHHH...



Site/System Challenges

Long term struggles with wastewater treatment & disposal;

- 🍷 Frequent leach field failures
- 🍷 Historically difficult to manage wine production & wastewater disposal issues

System Upgrade;

- 🍷 Location – Site Isolated on Ridge
- 🍷 No existing building space available for treatment system
- 🍷 Significantly varying flows and loads



Keys to Success

IN NEED OF A TREATMENT SOLUTION THAT;

- 🍷 Provides a reliable long term solution.
- 🍷 Processes the varying daily flows and organic loading conditions.
- 🍷 Provides superior water quality for water reuse and vine irrigation.
- 🍷 Operates biologically and mechanically with minimal operator intervention.



System Design Criteria

Wine Production = 40,000 — 70,000+ cases/year

Wastewater Flow = 0 (no flow) — 7,200 GPD

COD Range = 0 (no flow) — 13,000 mg/L

BOD5 Range = 0 (no flow) — 8,000 mg/L



Solution – bioPULSE™ MBR

- 🍷 Energy efficient MBR process using Airlift assisted external tubular membranes
- 🍷 Containerized equipment skid conforms to site constraints
- 🍷 Use of existing tankage and process equipment



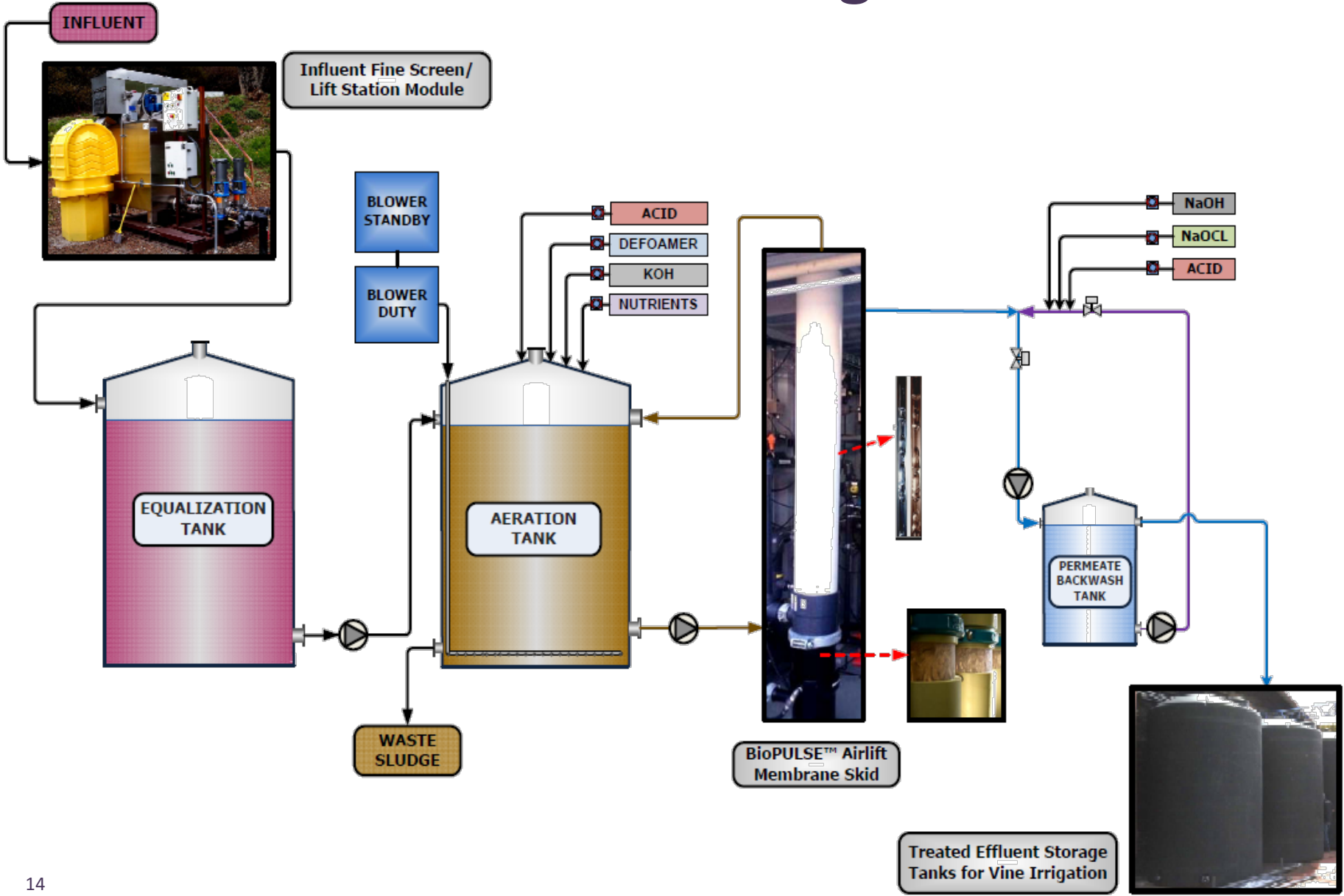
bioPULSE™ Membranes

Advantages:

- Airlift provides for low energy consumption and high flux rates
- Back-pulsed to enhance and sustain flux
- Inside-out filtration (0.03 um pore size)
- Effective drain and flush sequence for removal of fibrous material
- CA Title 22 certified



Process Flow Diagram



Fine Screen Assembly



bioPULSE™ MBR



bioPULSE™ MBR



bioPULSE™ MBR



bioPULSE™ MBR



bioPULSE™ MBR



Challenges

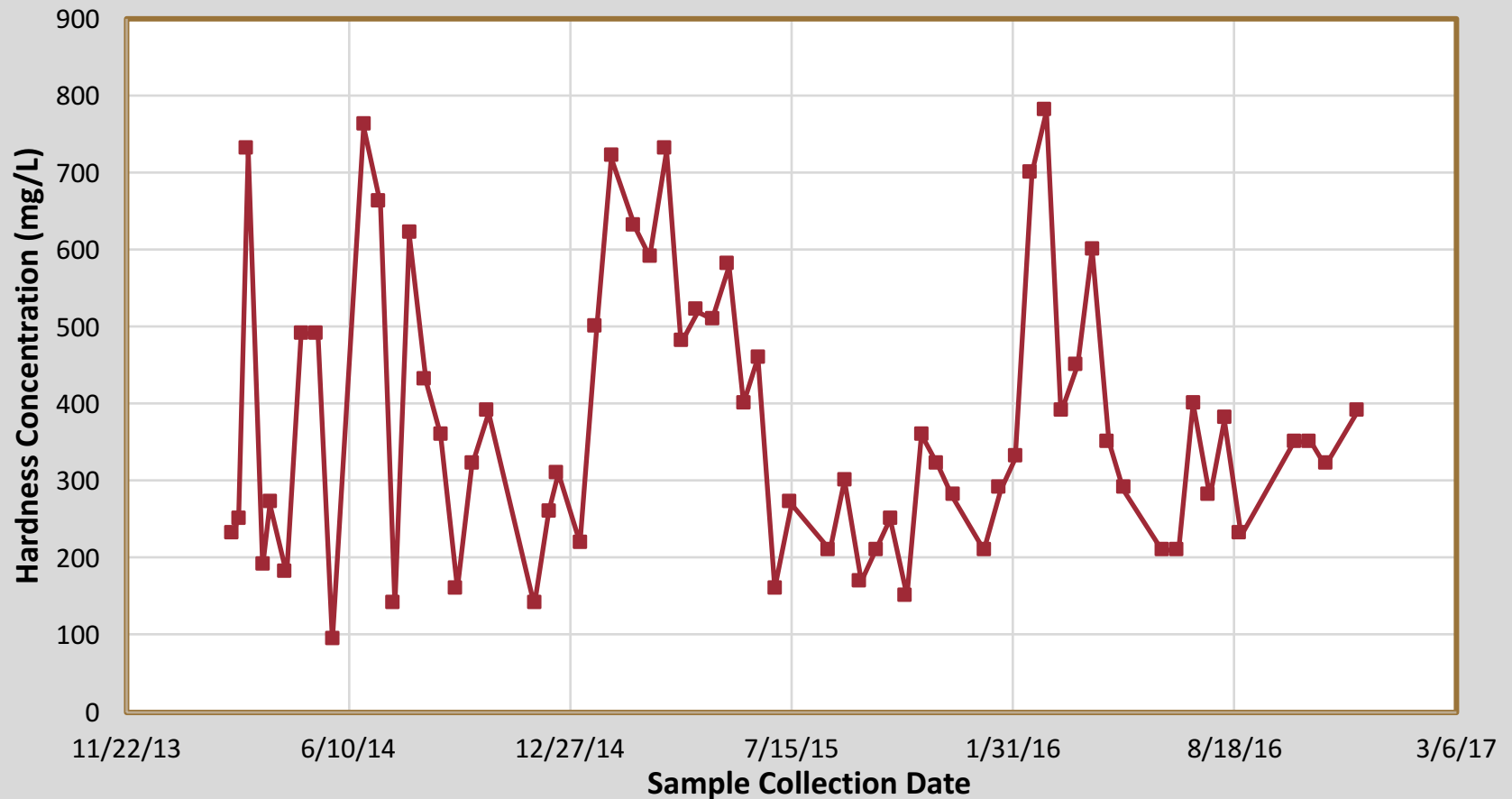
Issues Discovered During Plant Startup & Operation;

- 🍇 Well water hardness
 - 🍇 Water softener issues (mechanical issues and backwash directed to system)
 - 🍇 Membrane CEB is critical to maintain flux and TMP
 - 🍇 Softened water for CIP
 - 🍇 EDTA and Citric now used for scale removal
- 🍇 Lees – solids from fermentation vessels, directed to system during first crush



Results – Hardness Concentrations

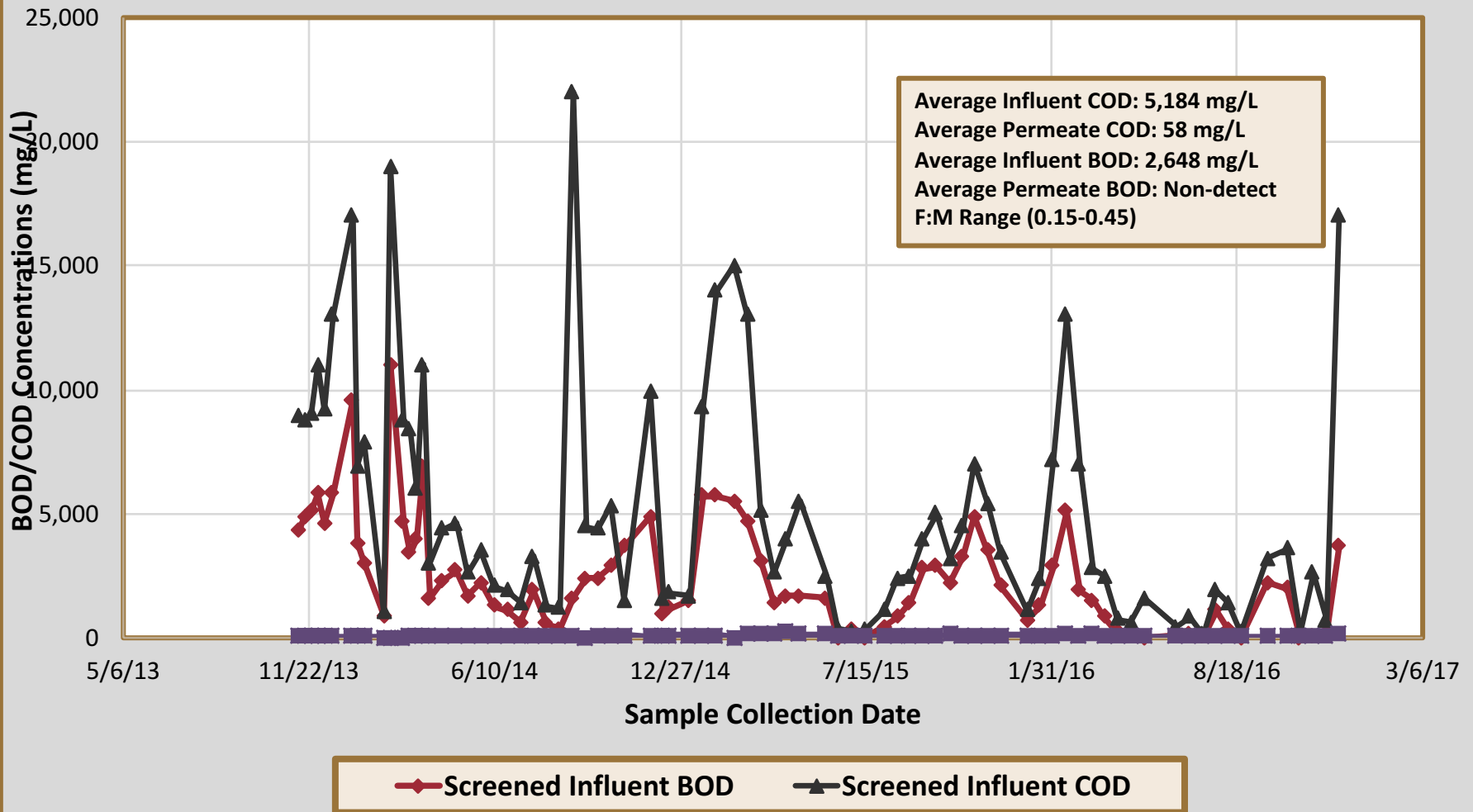
Aeration Tank Hardness Concentrations



—■ Hardness - Aeration Tank

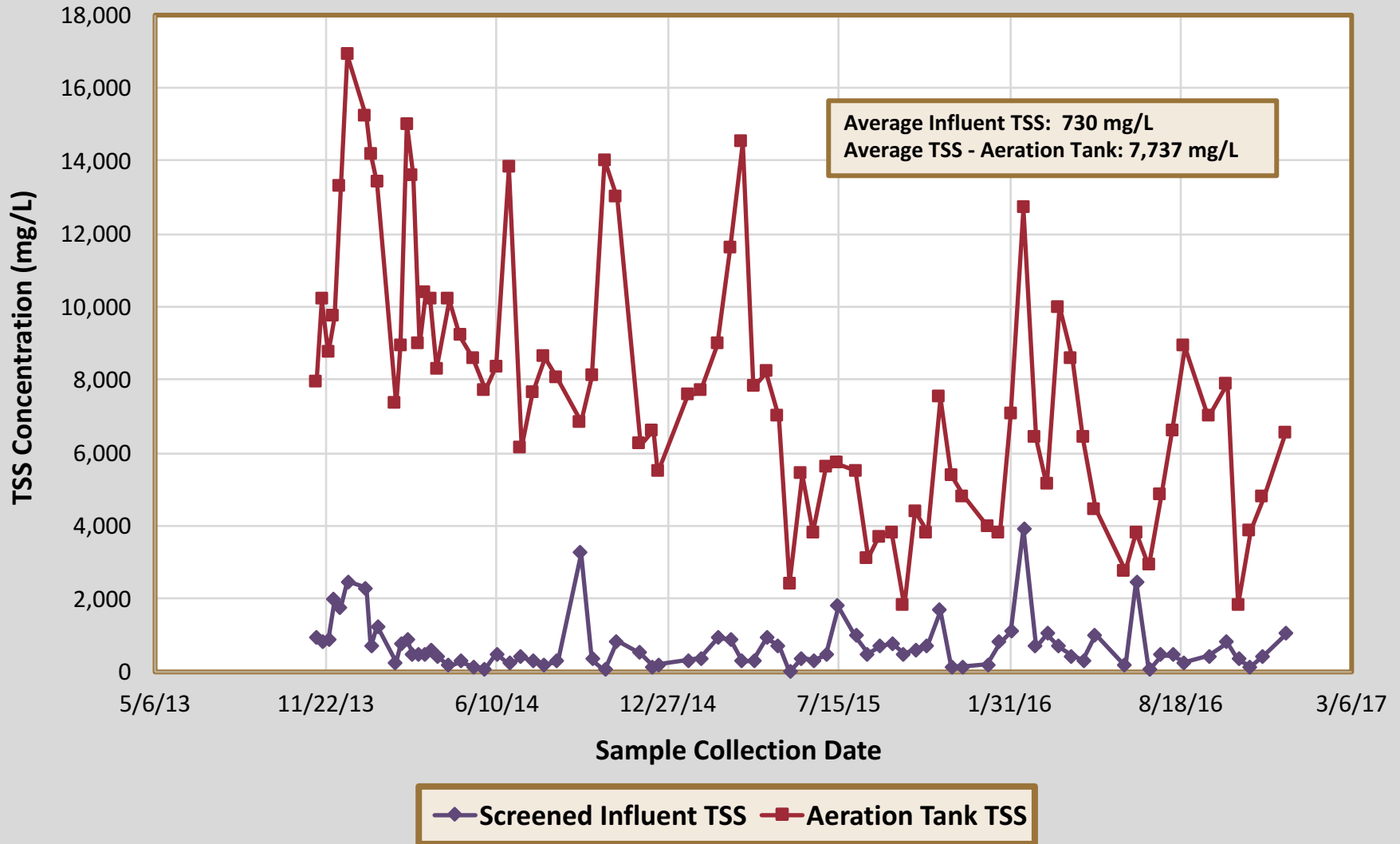
Results – BOD & COD Concentrations

Screened Influent and Permeate BOD/COD Concentrations



Results – TSS Concentrations

Screened Influent and Aeration Tank TSS Concentrations



Testimonial from Ridge Vineyards

“This year’s crush (2014) was one of the wildest in my twenty-one vintages at the winery. We started early and just finished with 612 tons harvested. Everyone here was pleased with the quality of the vines and the exceptional crop we received. They are relieved to have gotten any fruit off the thirsty vines, given the severe drought the vines endured...the reclaimed water really helped those vines along and they look really healthy” – Eric Baugher



Conclusions

- 🍇 bioPULSE MBR System provides a long term reliable and sustainable water treatment and reuse for the Ridge Vineyards.
- 🍇 System consistently removes >99% BOD5 and COD through extended periods of no flow and peak loading conditions.
- 🍇 Reuse of system permeate has been critical for vine irrigation during the recent drought conditions, and has resulted in healthy vines and excellent grape quality.
- 🍇 Efficient and well running treatment system has simplified overall winery operations for management.

Questions?

