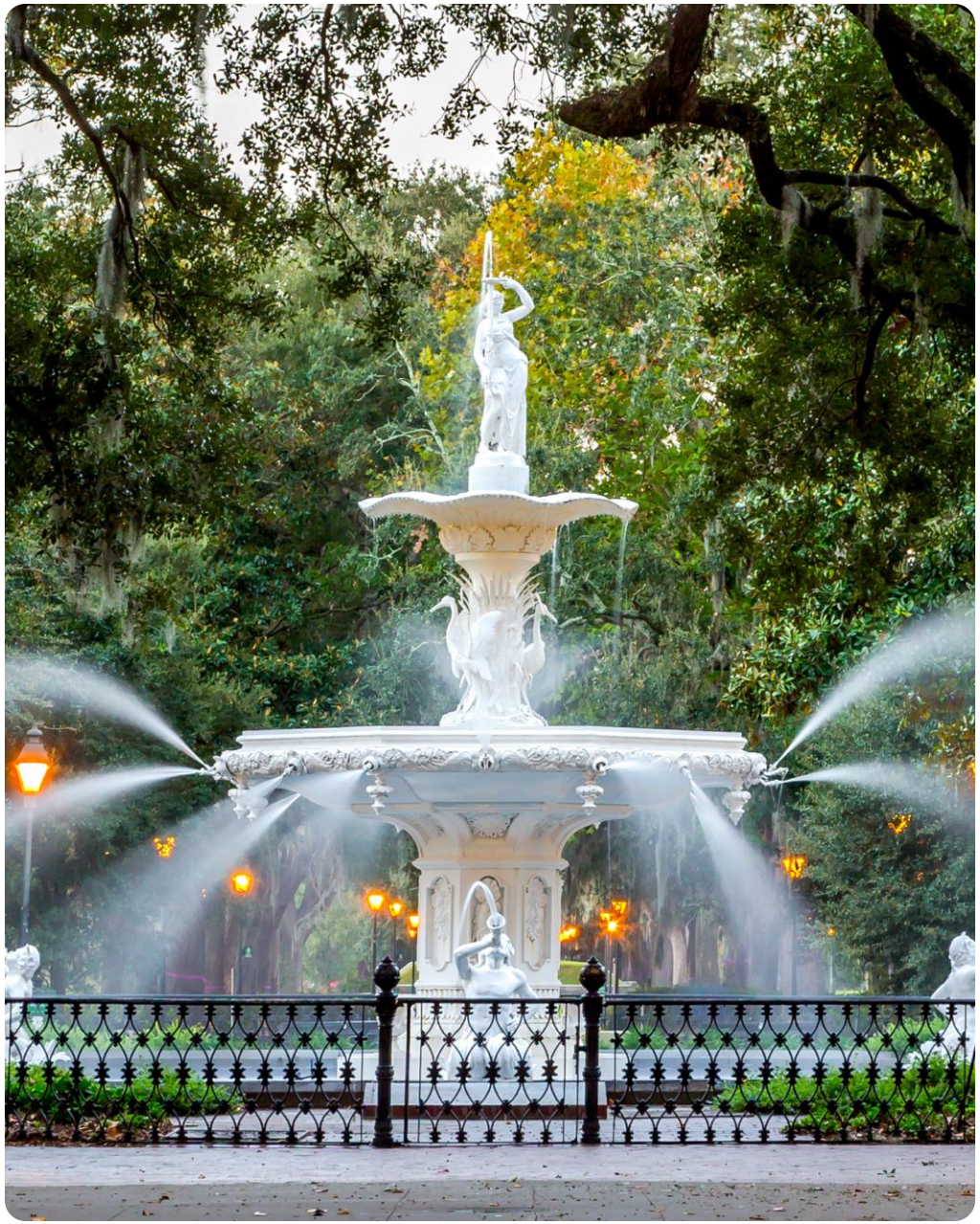
Turning a tough phosphorus permit into a treatment success

Usalco

APRIL 7TH, 2026



Agenda

- Background on Larchmont Estates WPCP
- Regulatory challenge: New phosphorus limit
- Evaluation and treatment approach process
- Chemical strategy and implementation
- Performance results and takeaway

TURNING A TOUGH PHOSPHORUS PERMIT INTO A TREATMENT SUCCESS

Introductions

Zac Fagan – Director of Sales Southeast

Chris Lacey – Technical Marketing Manager

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Larchmont WPCP

Details

- Utility: Consolidated Utilities
- Location: Savannah, GA
- Service population: ~7,000 residents, heavy commercial
- Max flow: 1.5 MGD
- Process: Aeration basins, activated sludge, 2 clarifiers, and sand filters

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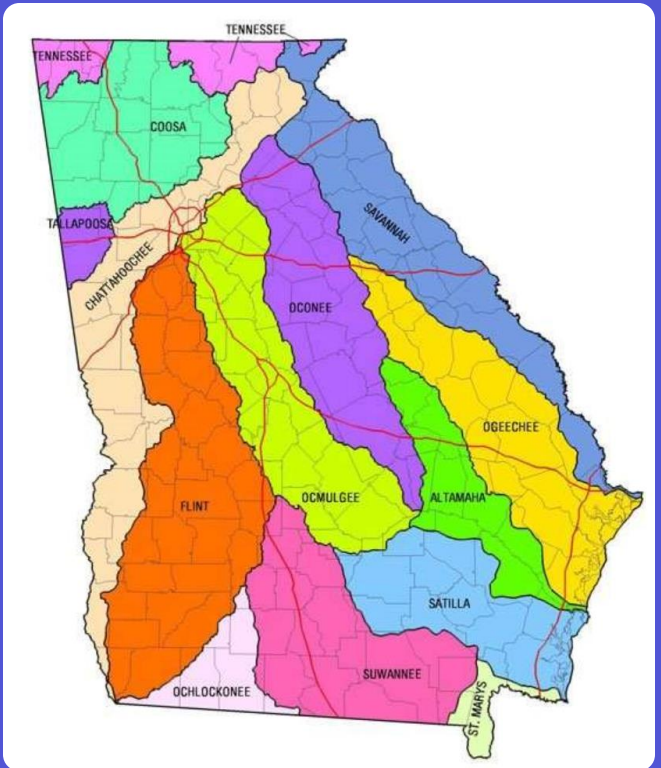
New Phosphorus Limit – Unknown Phosphorus Levels

- 2018 permit renewal
- First-ever phosphorus limit
- Effluent limit: 0.5 mg/L total phosphorus
- Issued by Georgia EPD
- No phosphorus removal infrastructure
- Required 1 year of monitoring before enforcement
- Influent/effluent P initially unknown



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Evaluating options

- Capital upgrades (chemical systems, tertiary treatment) in the millions of $
- Biological phosphorus removal vs Chemical phosphorus removal
- Timeline pressure from permit – speed was critical
- Need for hands-on guidance
- Desire to avoid major capital spend

WHY USALCO

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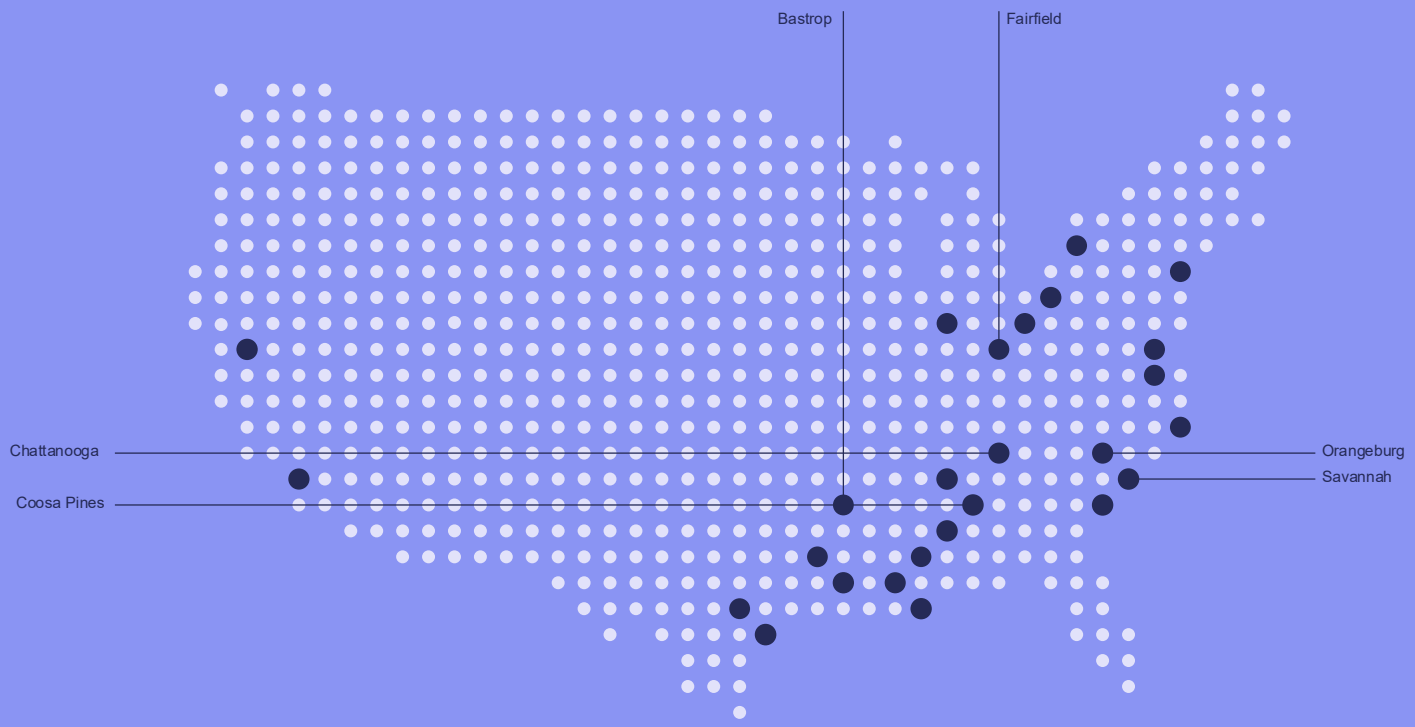

Sites serving Georgia for Wastewater treatment.

- Bastrop, LA
- Coosa Pines, AL
- Fairfield, OH
- Chattanooga, TN
- Orangeburg, SC
- Savannah, GA

Our large network of distributors and water treatment specialists spans the United States.

Many specialize in targeting phosphorus.

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Bench-Scale Testing & Evaluation

- On-site bench testing conducted
- Evaluated coagulant performance
- Focus on phosphorus removal efficiency & floc formation
- DelPAC identified as the best initial fit

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Starting point math

Feed 50 ppm aluminum sulfate (as-is not active) per 1 ppm of total P you want to remove

Example:

- Sample is 6 ppm Total Phosphorus
- Goal is 1 ppm Total Phosphorus
- We need to remove 5 ppm of Total Phosphorus
- 5 * 50 = 250 ppm of Aluminum Sulfate
- DelPAC 1842 = 17% Al2O3 of PACl

Formula:

$$\frac{(ppm\ of\ Alum\ \times\ \%\ Al_2O_3\ of\ Alum)}{\%\ Al2O3\ of\ PACl} = Dosage\ of\ PACl$$

$$\frac{(250ppm\ \times 0.08)}{0.17} = 118\ ppm$$ of PACl to do the same job as 250ppm of Alum

Dosage curve from there - 125, 100, 75, 50

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Full-Scale DelPAC & Sodium Aluminate trial results

Effective phosphorus reduction

01

Met effluent target

02

Observed pH and alkalinity impacts

03

Implemented a dual chemical strategy

04

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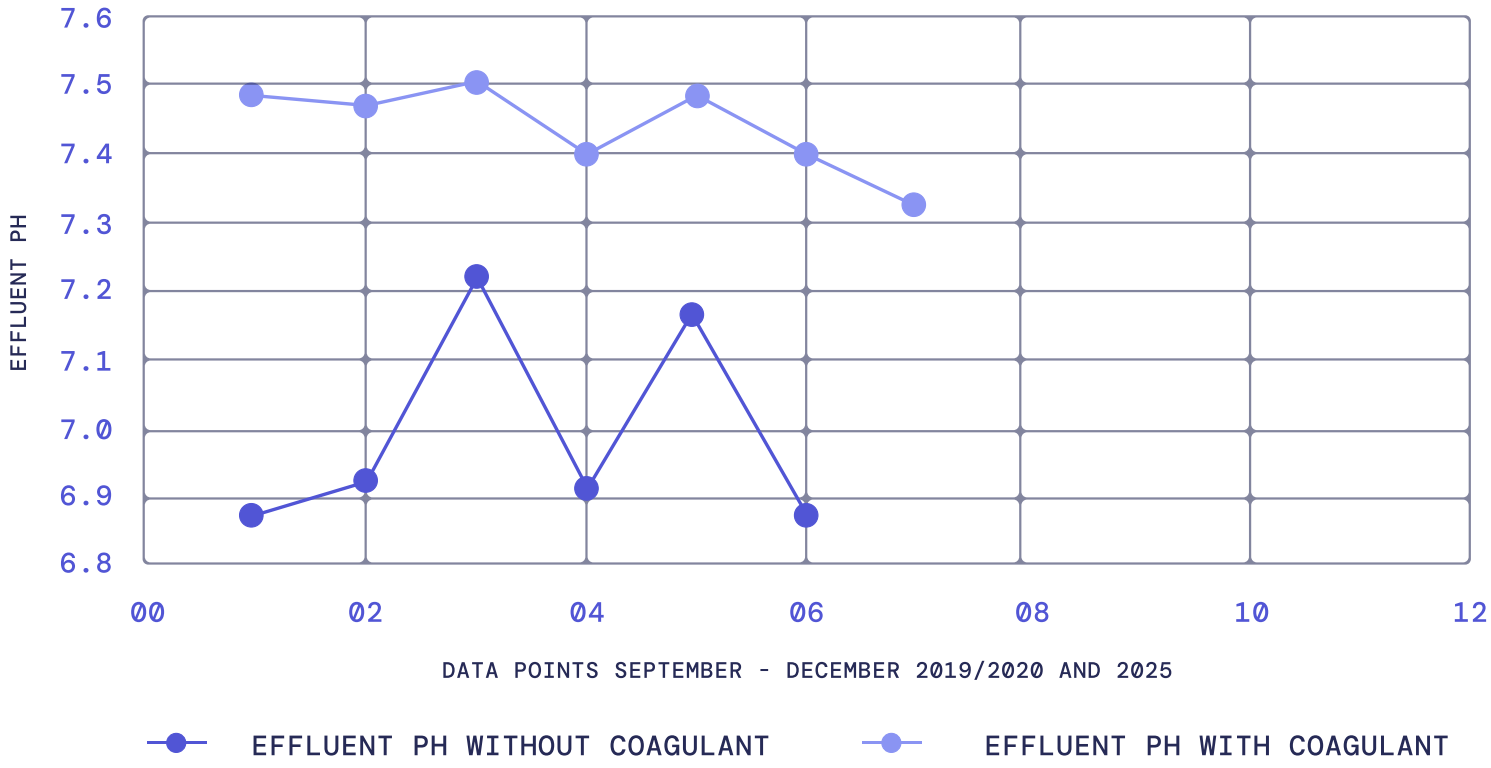

Addressing pH and Alkalinity Challenges

- High DelPAC dose lowered pH
- Risk to biological process stability
- Introduction of sodium aluminate

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Dual-Chemical Strategy: DelPAC + Sodium Aluminate

- DelPAC for phosphorus removal
- Sodium aluminate for pH balance
- Optimized chemical efficiency
- Improved process stability

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Full-Scale Implementation

- Successful pilot trial
- Full-scale implementation before permit's effective date
- Chemical feed systems selected
- Storage tanks and pumps are sized appropriately

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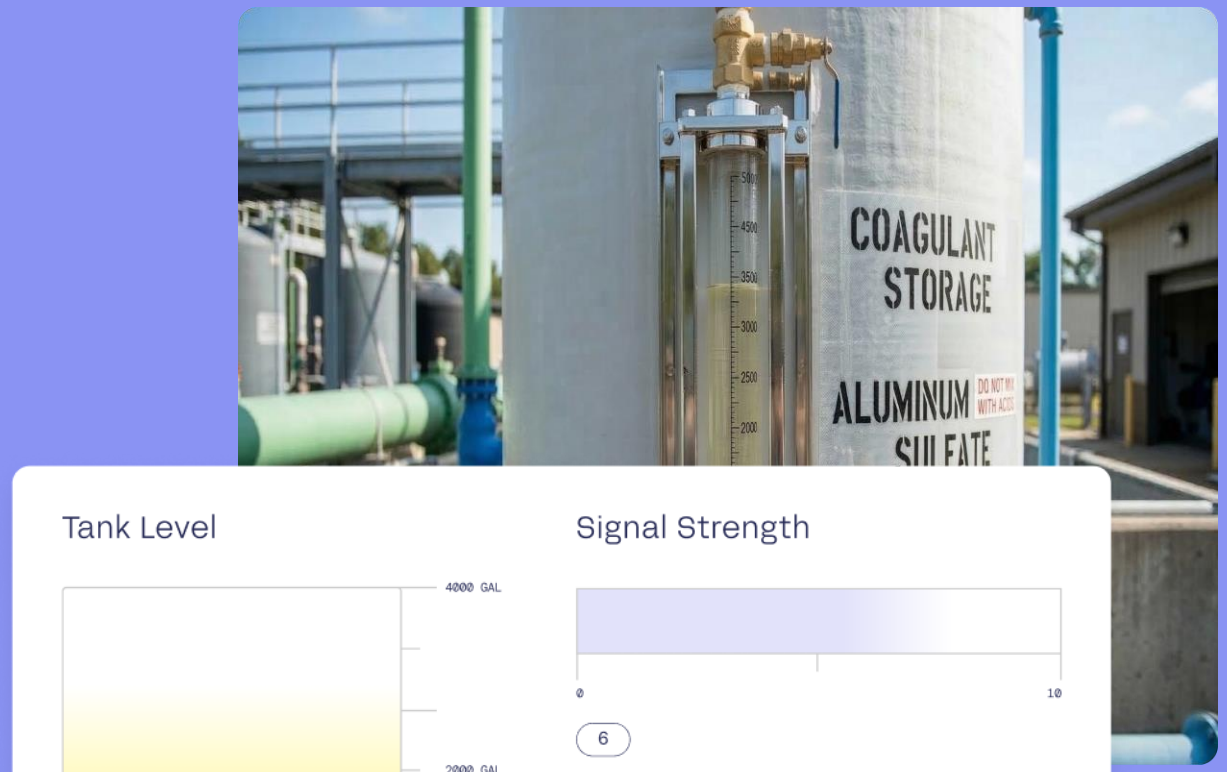

Operational support and telemetry

- Tank telemetry installation
- Improved inventory management
- Reduced risk of chemical outages
- Ongoing technical support

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Chemical usage rates

- Sodium aluminate: 29 gal/day
- DelPAC: 21 gal/day
- Optimized blend
- No major process disruption

DelPAC

TIME SPAN	31.0 days
ACTUAL DATE RANGE	3.1.2026 – 3.31.2026
TOTAL ACTIVE USAGE	811.9 gallons
TOTAL INACTIVE USAGE	0.0 gallons
AVERAGE DAILY USAGE	26.2 gallons
MAXIMUM DAILY USAGE	35.0 gallons
* DAYS TO ALARM	79.5
* DAYS TO CRITICAL	97.8
* DAYS TO LIMIT (EMPTY)	120.7

Sodium Aluminate

TIME SPAN	31.0 days
ACTUAL DATE RANGE	3.1.2026 – 3.31.2026
TOTAL ACTIVE USAGE	881.6 gallons
TOTAL INACTIVE USAGE	0.0 gallons
AVERAGE DAILY USAGE	28.4 gallons
MAXIMUM DAILY USAGE	41.5 gallons
* DAYS TO ALARM	19.7
* DAYS TO CRITICAL	40.8
* DAYS TO LIMIT (EMPTY)	61.9

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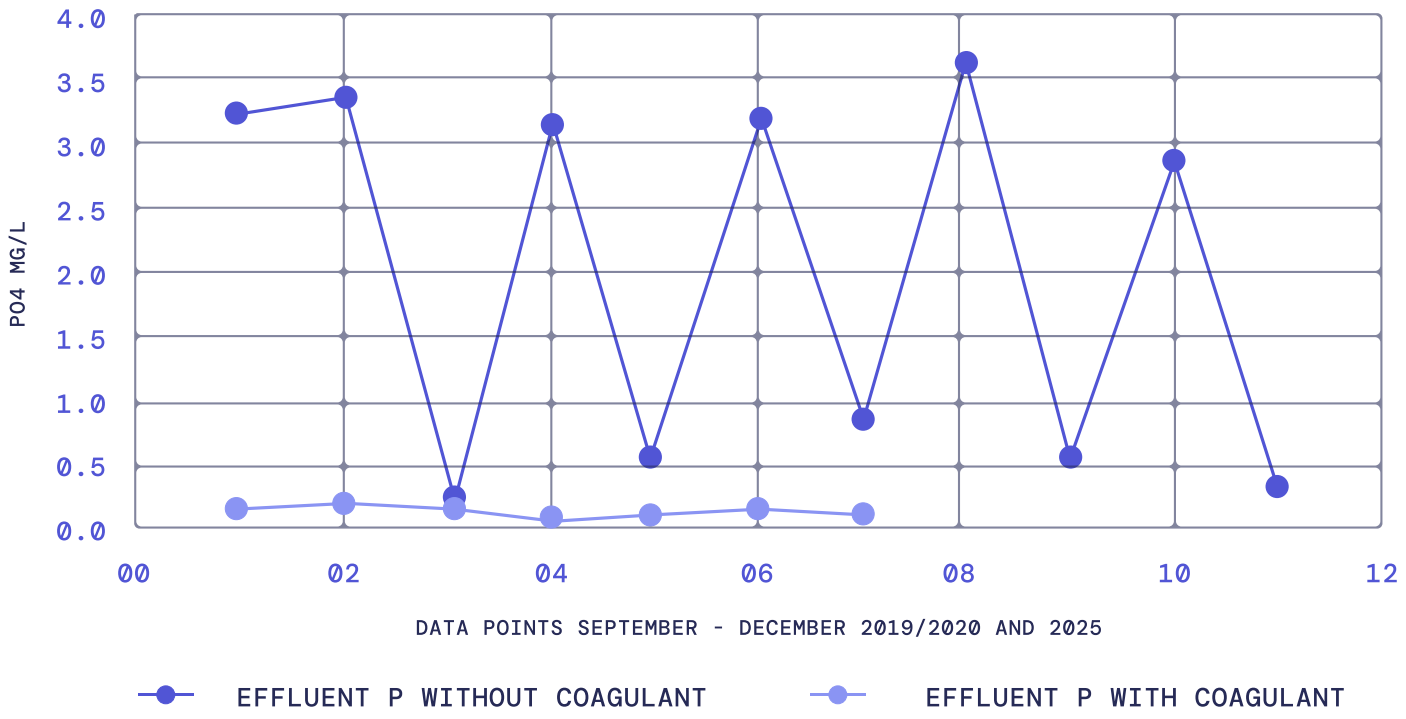

Phosphorus compliance results

- Permit limit: 0.5 mg/L TP
- Average effluent: 0.35 mg/L
- Consistent monthly performance
- Stable operations

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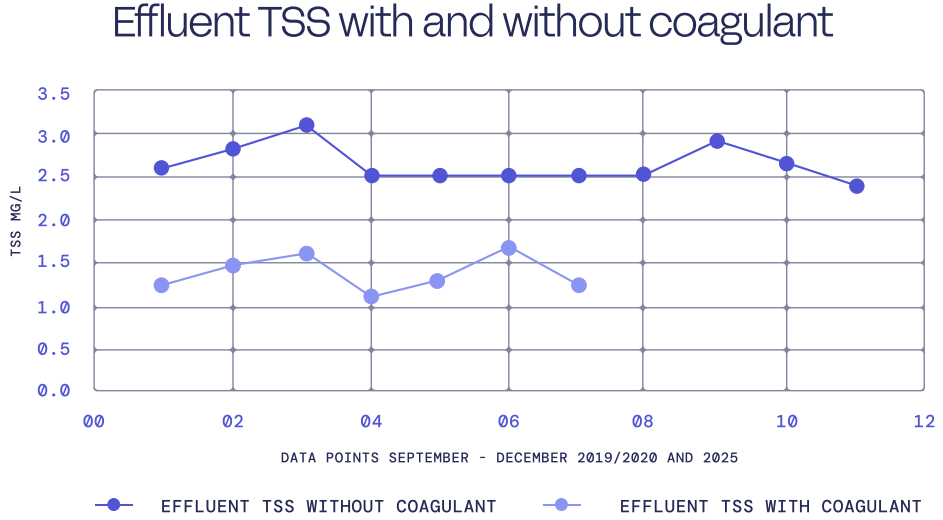

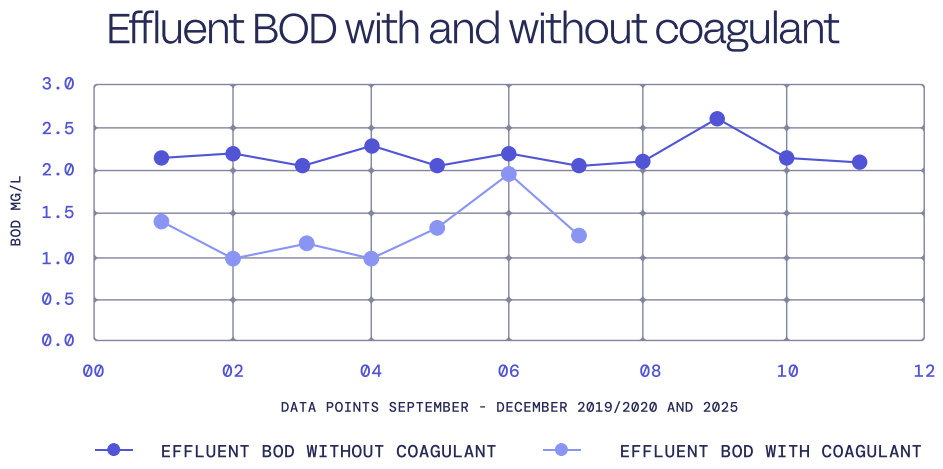

Additional treatment benefits

- 97% reduction in TSS
- 60% reduction in BOD
- Improved overall effluent quality

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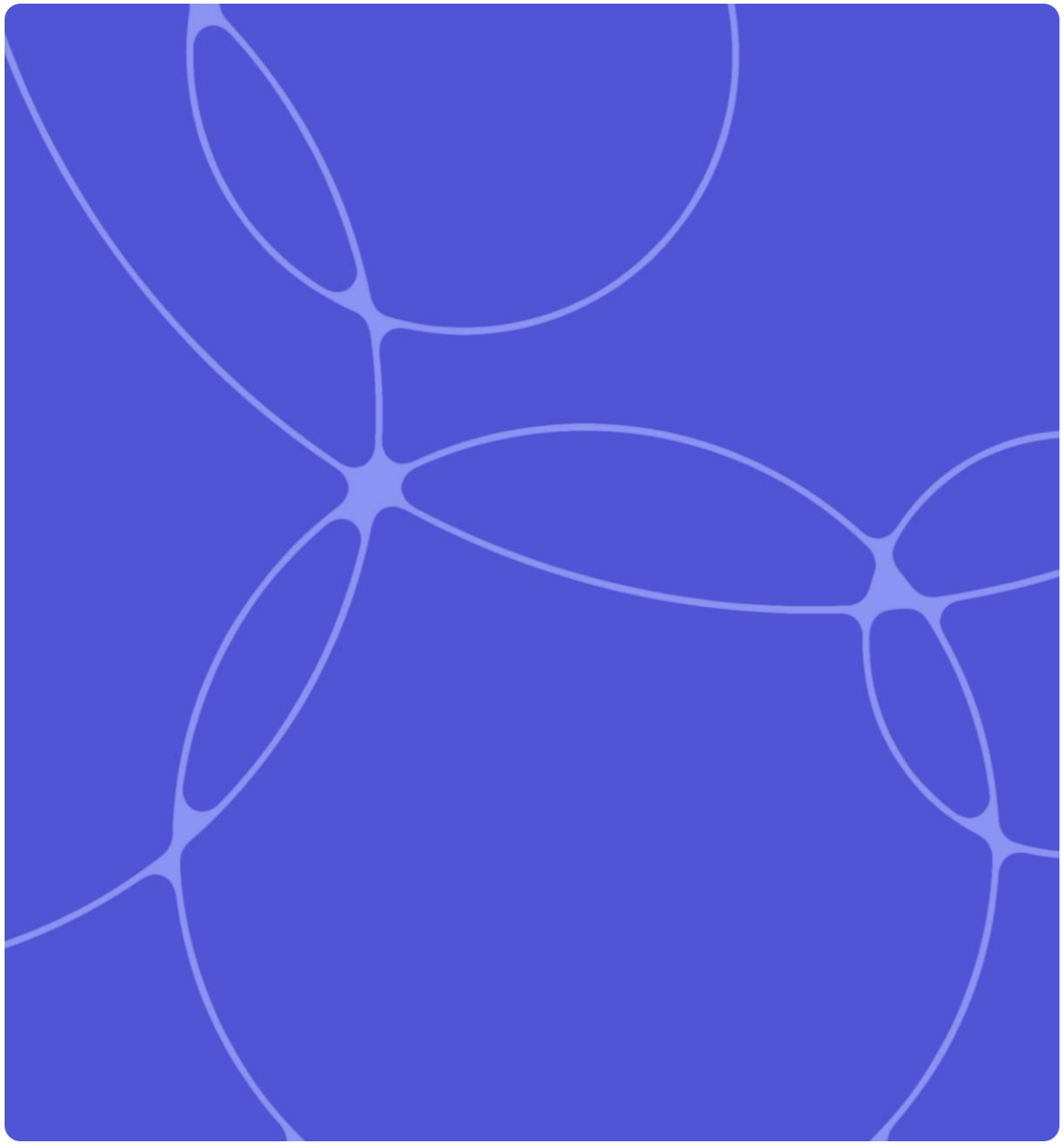
Key lessons learned

- Baseline monitoring is critical
- Bench testing prevents surprises and optimal product selection from the start
- Dual-chemical strategies can outperform single products
- Support matters as much as chemistry



Questions?

ZAC FAGAN – DIRECTOR OF SALES SOUTHEAST

Innovation flows here.