WEST COUNTY WASTEWATER

Nutrient Strategy

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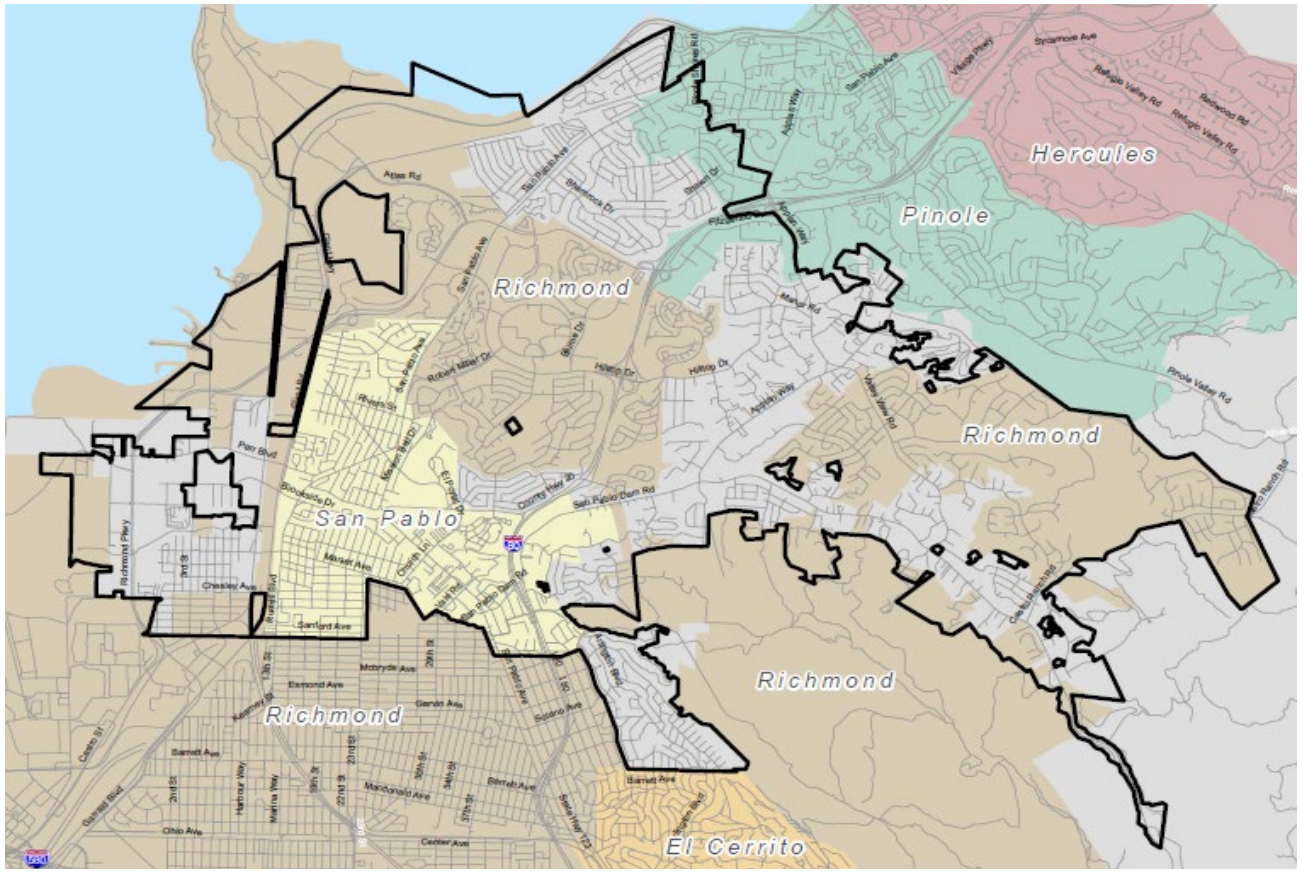
carollo

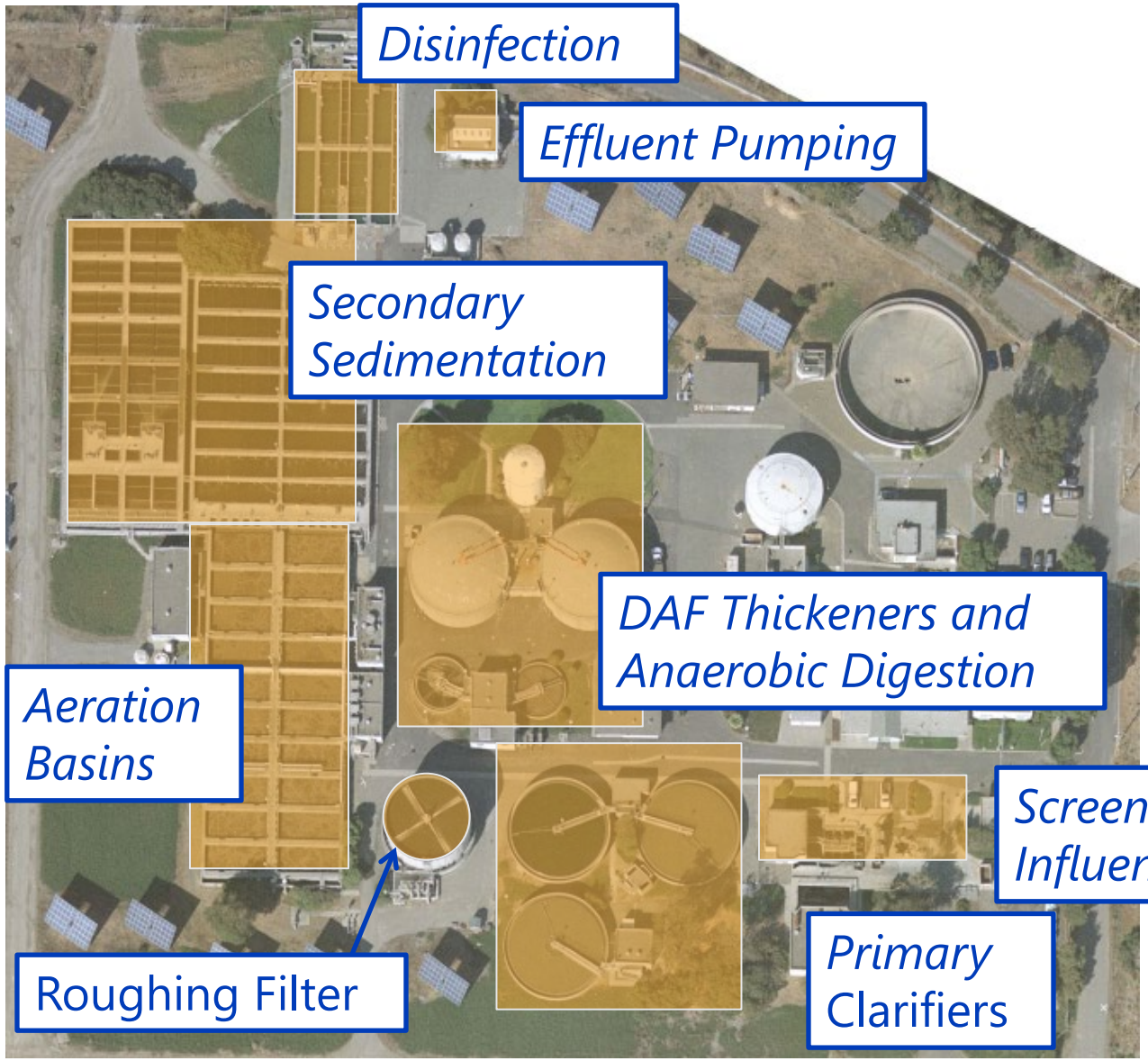
WCW provides wastewater collection, treatment, and disposal for about 100,000 people in Western Contra Costa County

The service area includes the Cities of Richmond, San Pablo, Pinole, and portions of unincorporated Contra Costa County



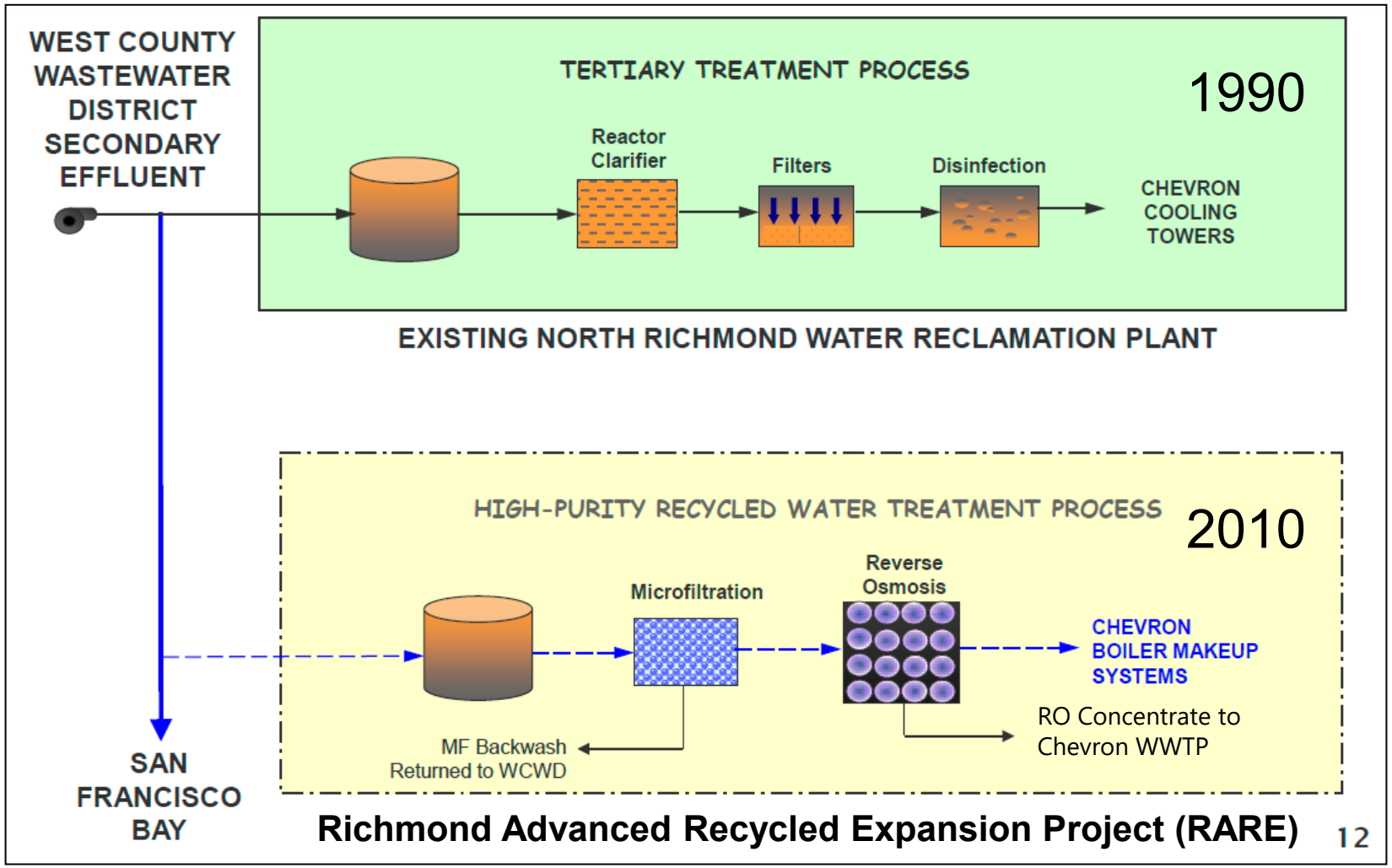
- 253 miles of gravity sewer
- 17 lift stations and nearly 4 miles of force mains
- 12.5 mgd Water Quality Resource Recovery Plant (WQRRP)
- Partner with EBMUD to provide effluent for reuse to Chevron

Water Quality Resource Recovery Plant (WQRRP) circa 2012



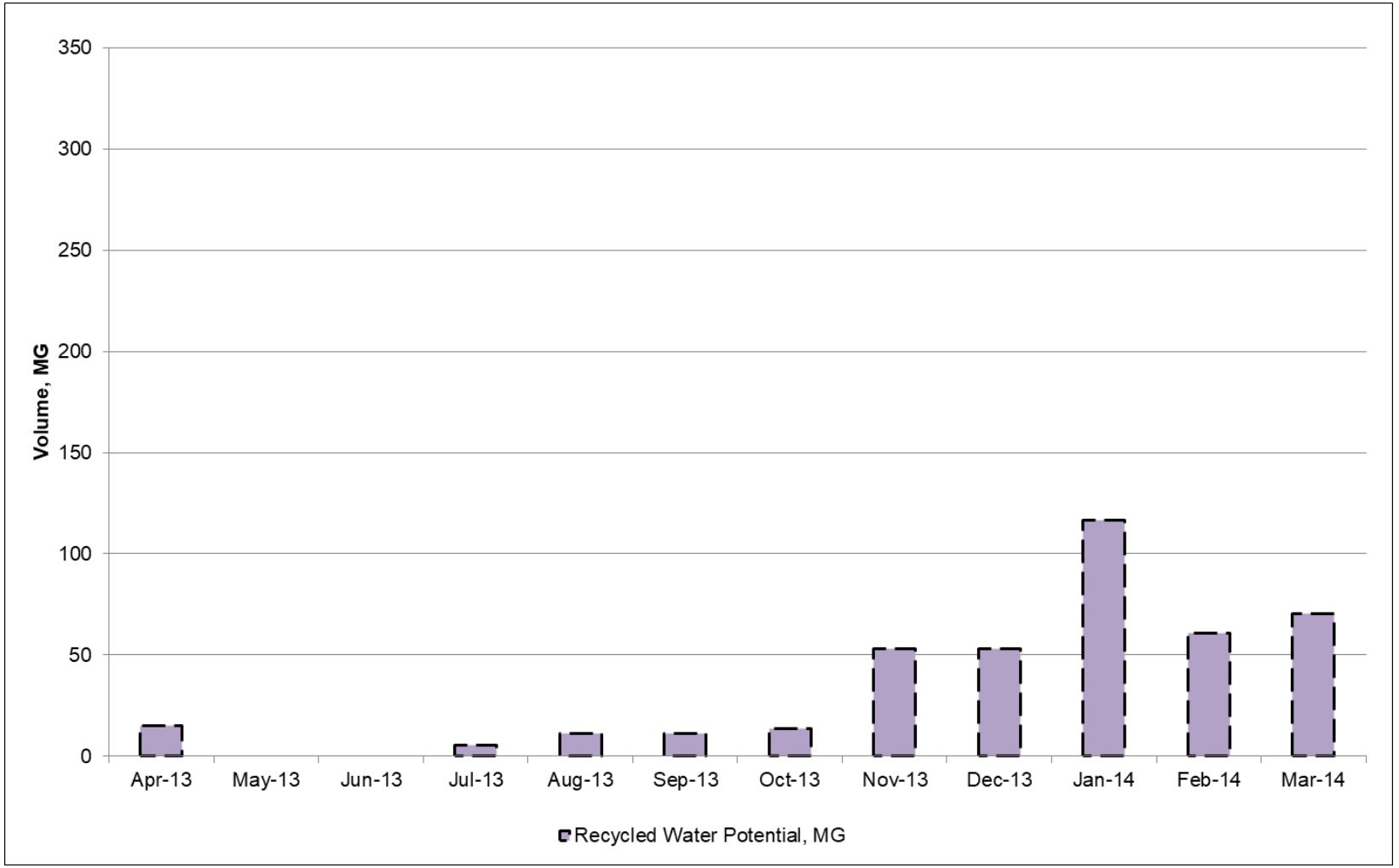
- Started comprehensive master planning process
- >$300M CIP, largely for asset rehabilitation and replacement
- Aware of upcoming nutrient regulations, but little clarity
- Roughing filter activated sludge process with periodic ammonia breakthroughs (10-20% of time)

WCW provides disinfected secondary effluent to 2 EBMUD tertiary plants for use at Chevron's refinery

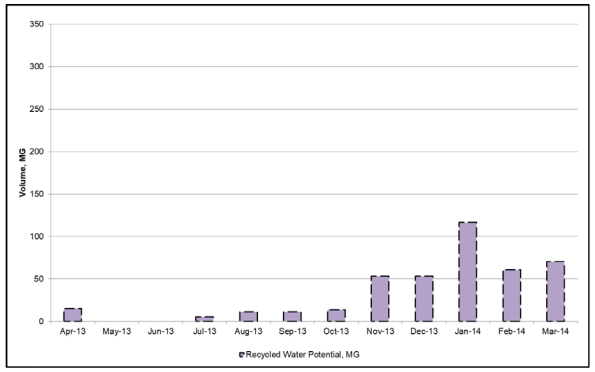


- Requires less than 1 mg/L ammonia for optimal operation
- Ammonia breakthrough at WCW typically means effluent not available for reuse

Ammonia breakthroughs in 2013/2014 sent 411 MG (1.12 MGD) of potential recycled water to SF Bay



WCW drivers to move forward with nutrient upgrades



1+ mgd of water for reuse

CALIFORNIA Water Boards

EDMUND G. BROWN JR. GOVERNOR

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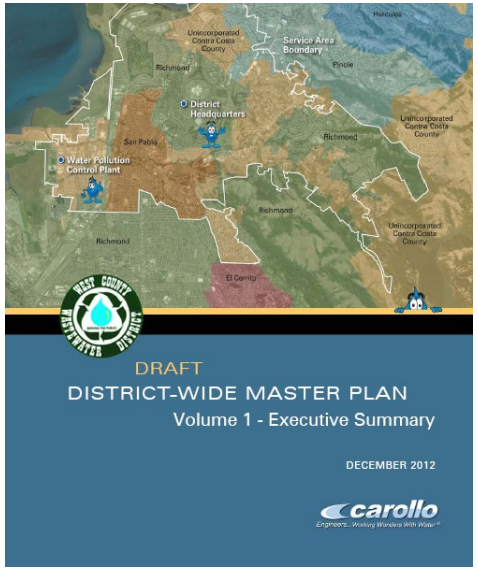
San Francisco Bay Regional Water Quality Control Board

ORDER No. R2-2014-0014
NPDES No. CA0038873

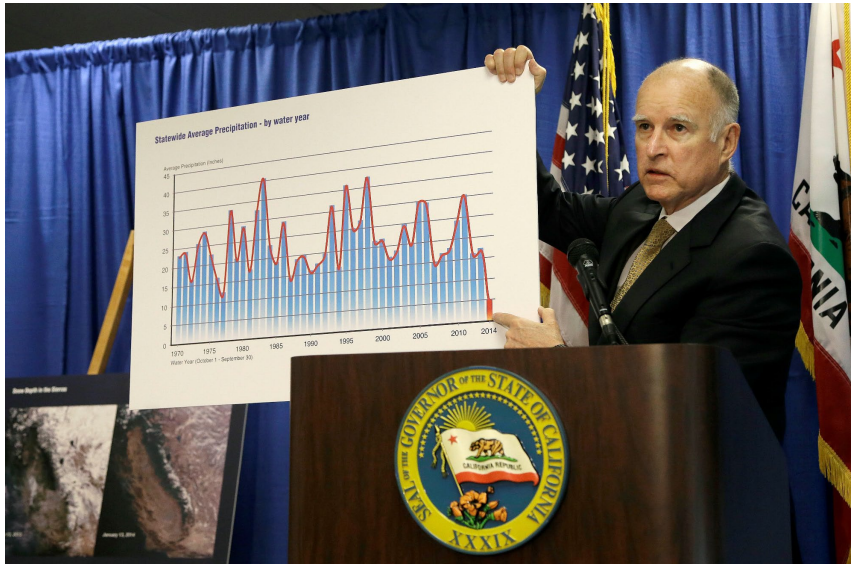
WASTE DISCHARGE REQUIREMENTS FOR NUTRIENTS FROM MUNICIPAL WASTEWATER DISCHARGES TO SAN FRANCISCO BAY

Anticipation of future regulations

Reduce chemical and power use



Need to rehabilitate aging assets

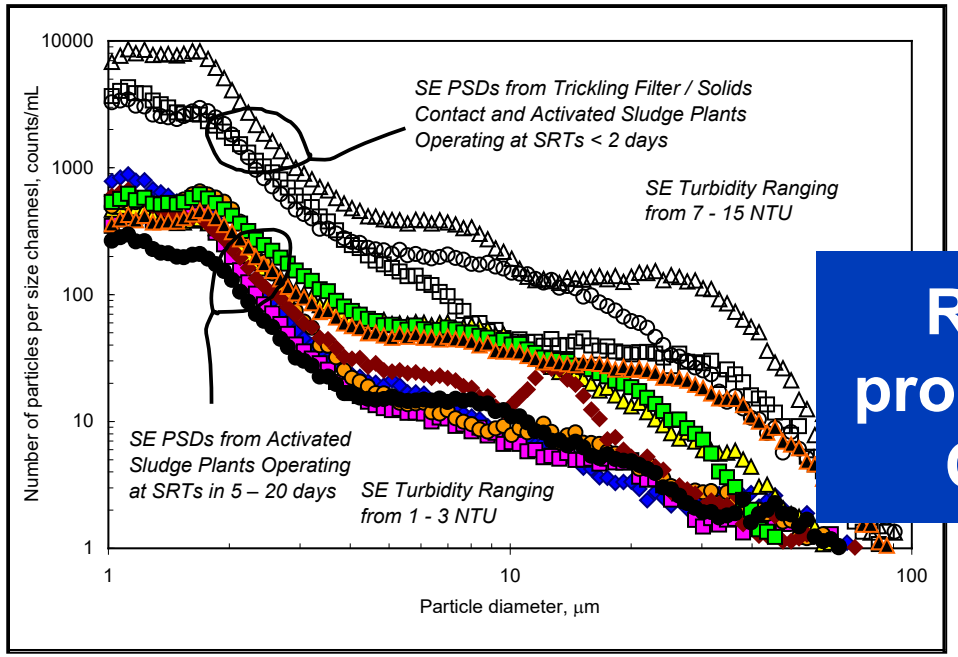


1% SRF Loans for RW Projects

Reduced Chemical and Power Use

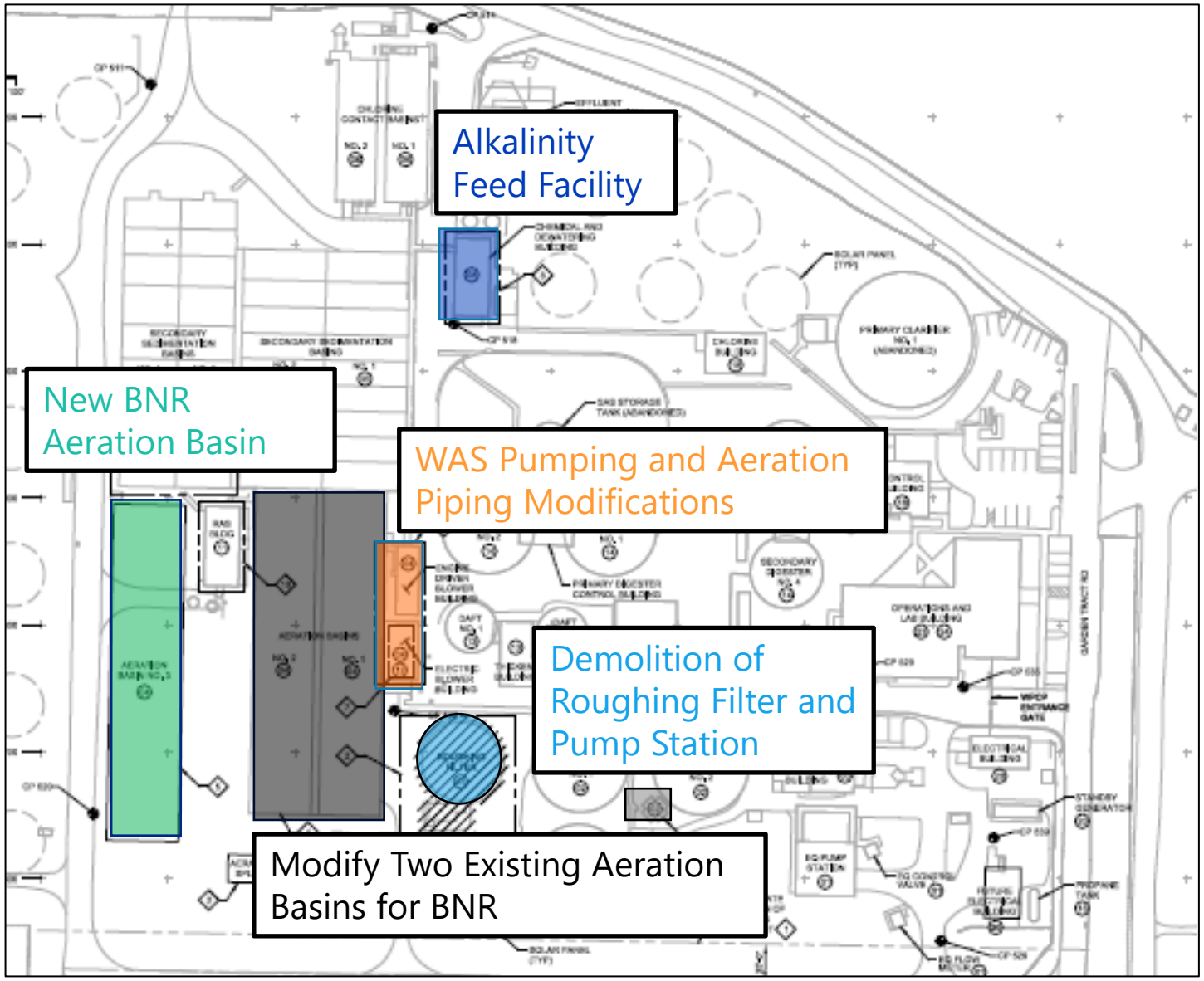
Approximately 3 parts oxygen are recovered per part of nitrogen reduced → ***$100K/yr power***

Approximately 3 parts alkalinity are recovered per part of nitrogen reduced → ***$400K/yr caustic***



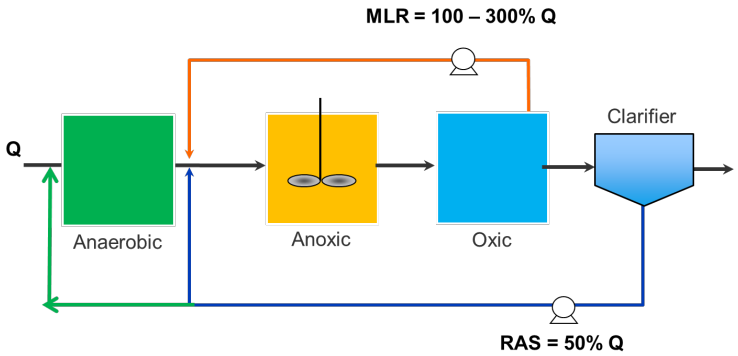
Roughing filter / activated sludge systems produce solids that are hard to filter, anticipate O&M benefit for EBMUD tertiary facilities

BNR Upgrade (Recycled Water Reliability Upgrade Project)

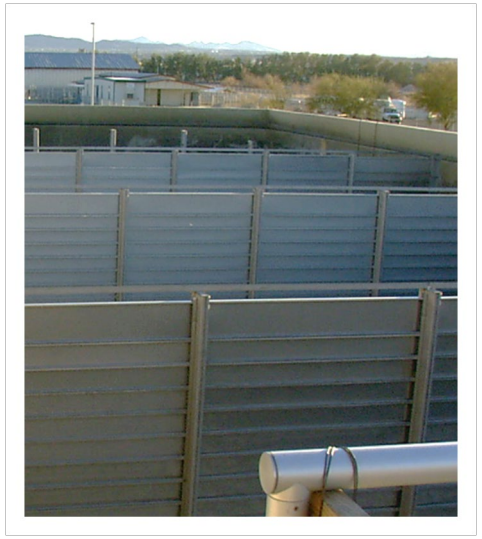


- 9.5 mgd BNR Capacity
- $25M in 2014 $$
- Planning/Design: 2012 to 2015
- Construction: January 2016 to December 2017
- Operational in January 2018

Key Features in Upgrade

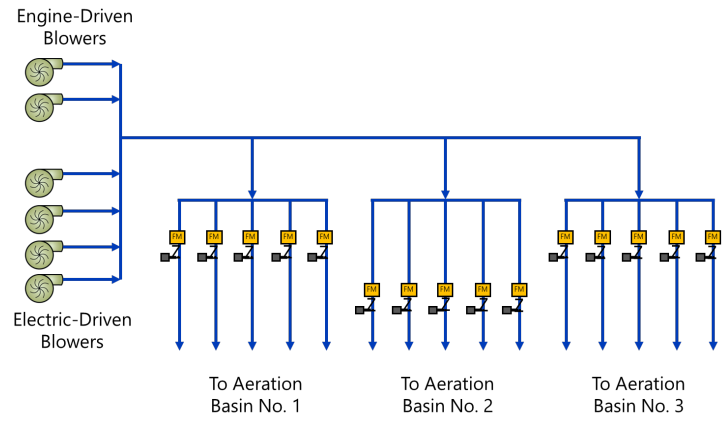


MLE, A2O, and Step Feed configuration with swing zones for future flexibility



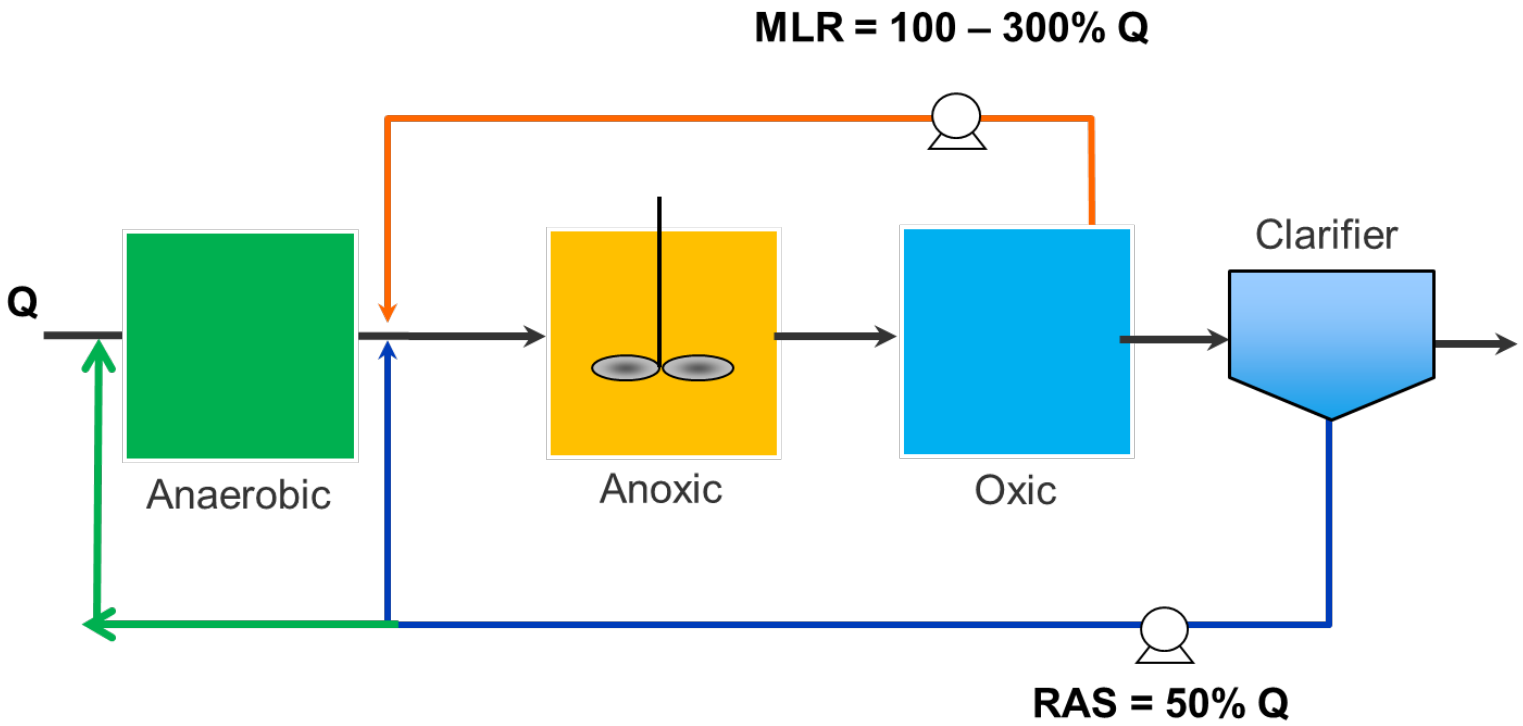
Louvered baffles to minimize seismic loads to existing structures

Mixed liquor and surface wasting for settleability and SRT control



Aeration Control Upgrades including MOV and ABAC

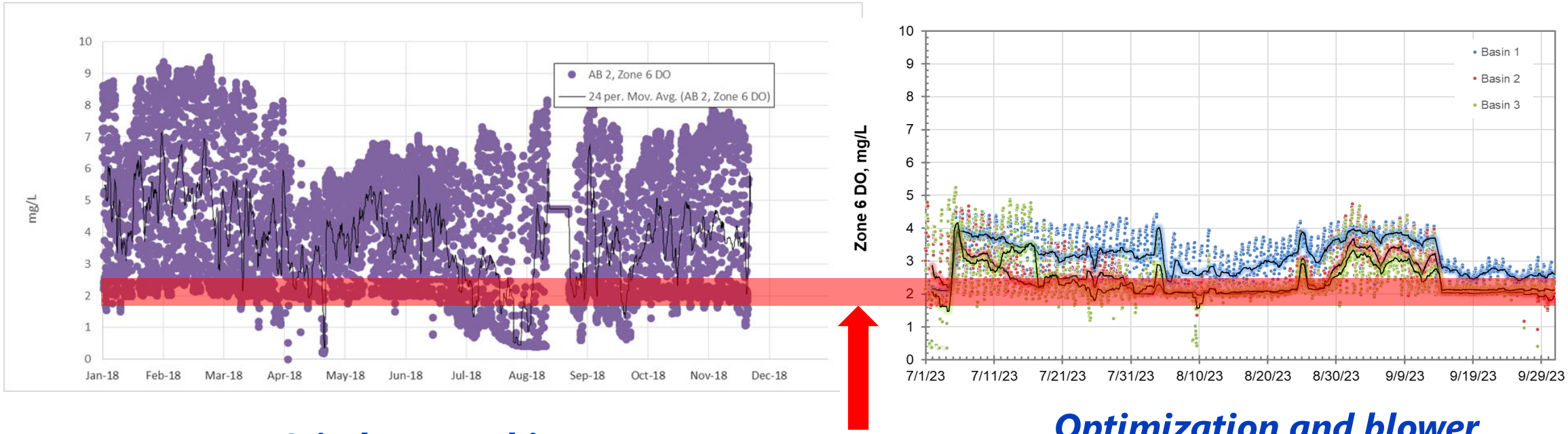
Lessons Learned – Process Configuration



Only used MLE

A2O and Step Feed not used yet

Lessons Learned – Aeration Control

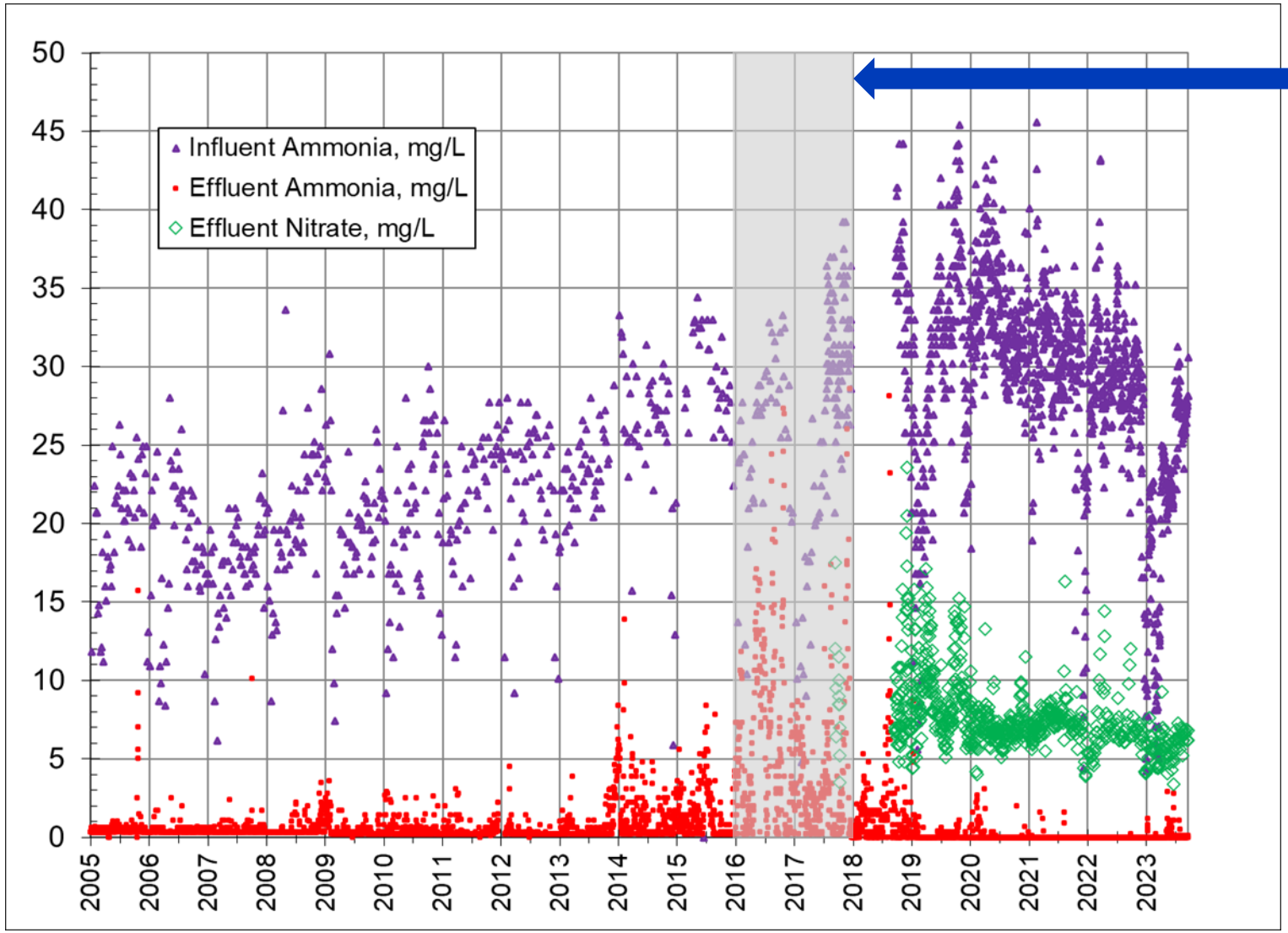


DO in last aerobic zone after initial startup

Design Target

Optimization and blower modifications were needed to achieve target DO

Ammonia and Nitrate Data



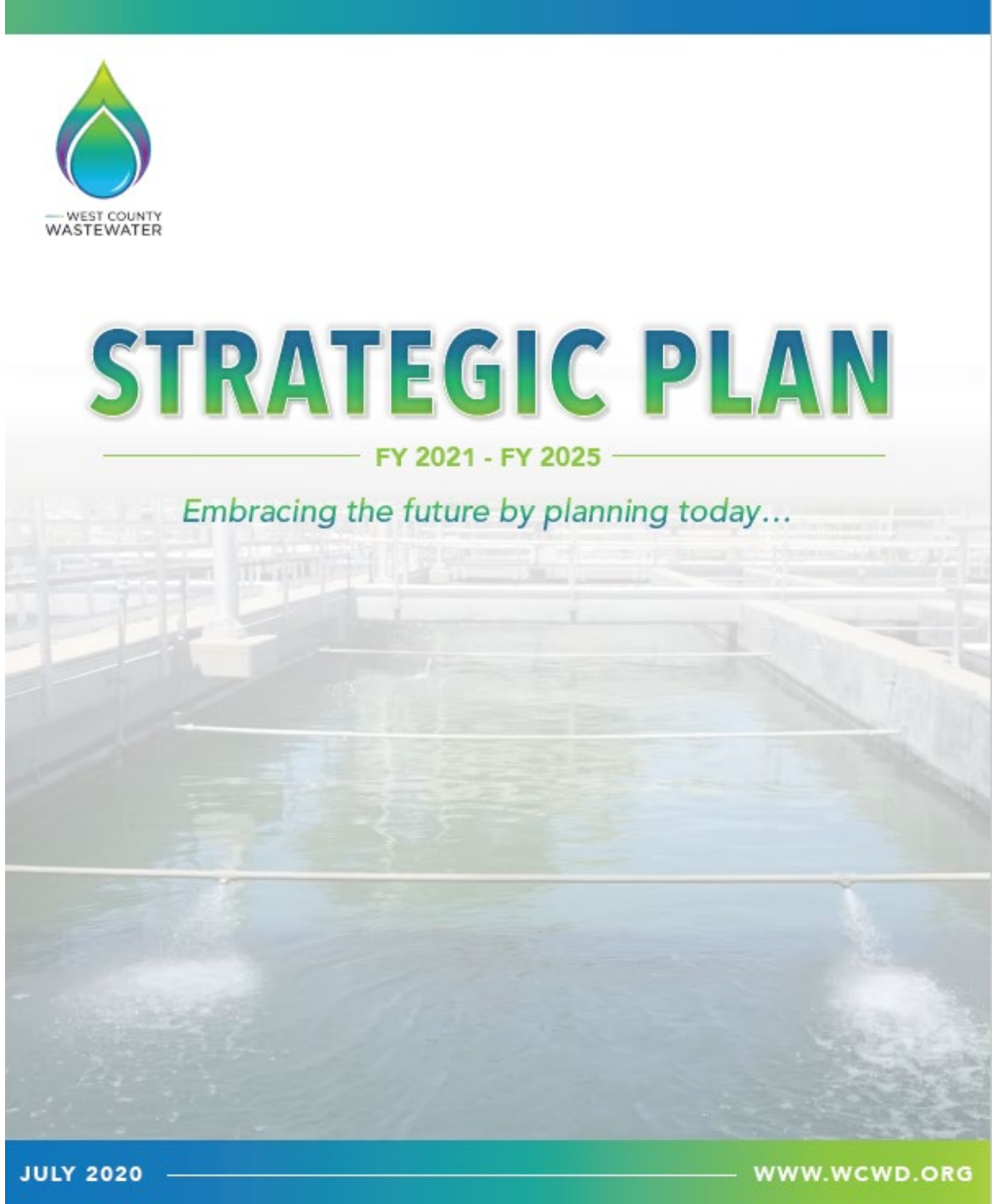
BNR Upgrade Construction Period

- Great performance since startup
- Less frequent ammonia breakthrough
- Average nitrate 7.8 mg/L since startup, 5.8 mg/L in 2023
- No alkalinity or carbon addition

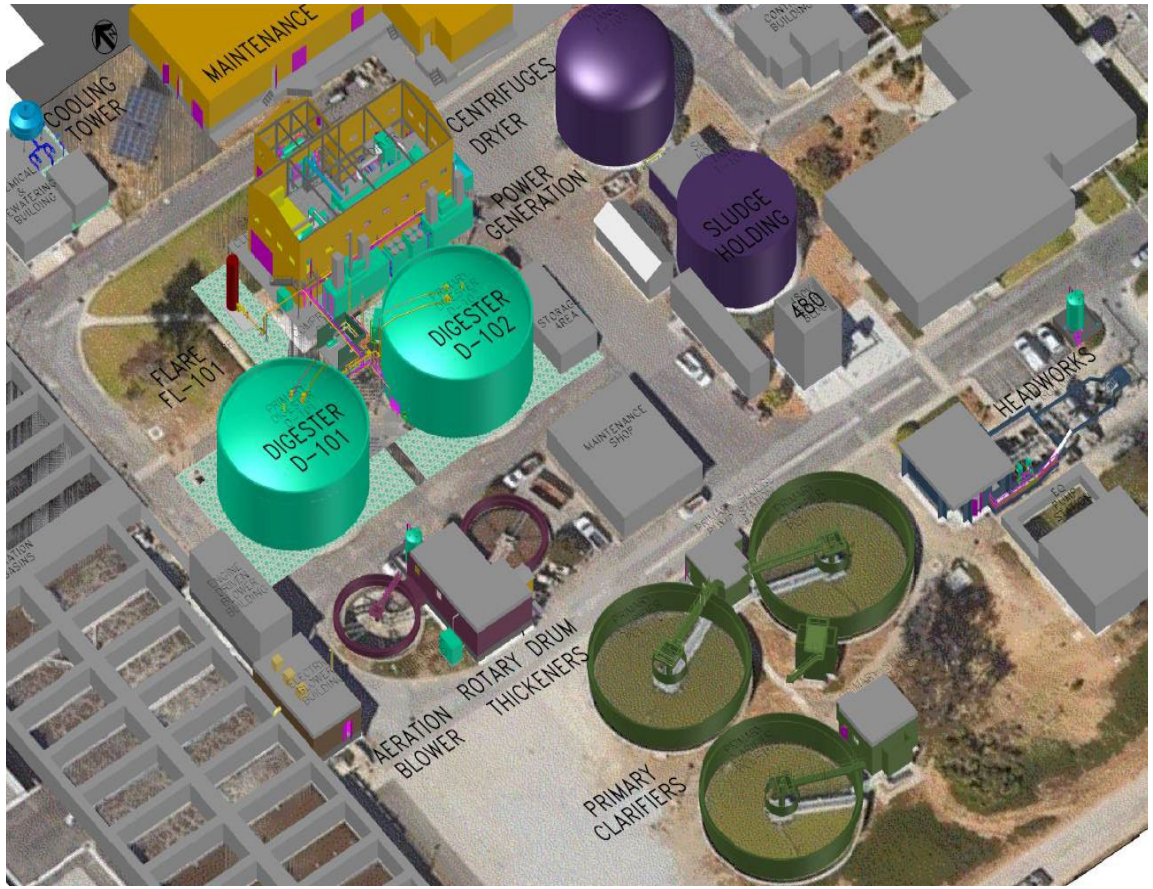
What's next for West County Wastewater?

Mission: *Protect public health through safe, responsible wastewater collection and treatment, recovering the water for reuse and promoting environmental stewardship*

Strategic Goal No. 2 (of 6): *Be an environmental steward in our community through a commitment to* ***reducing carbon emissions***, ***maximizing resource recovery***, *minimizing our environmental footprint, and making significant strides toward becoming a* ***carbon-neutral enterprise***.



Clean and Green Project allows WCW to achieve Strategic Goal of reducing carbon emissions and increasing resource recovery



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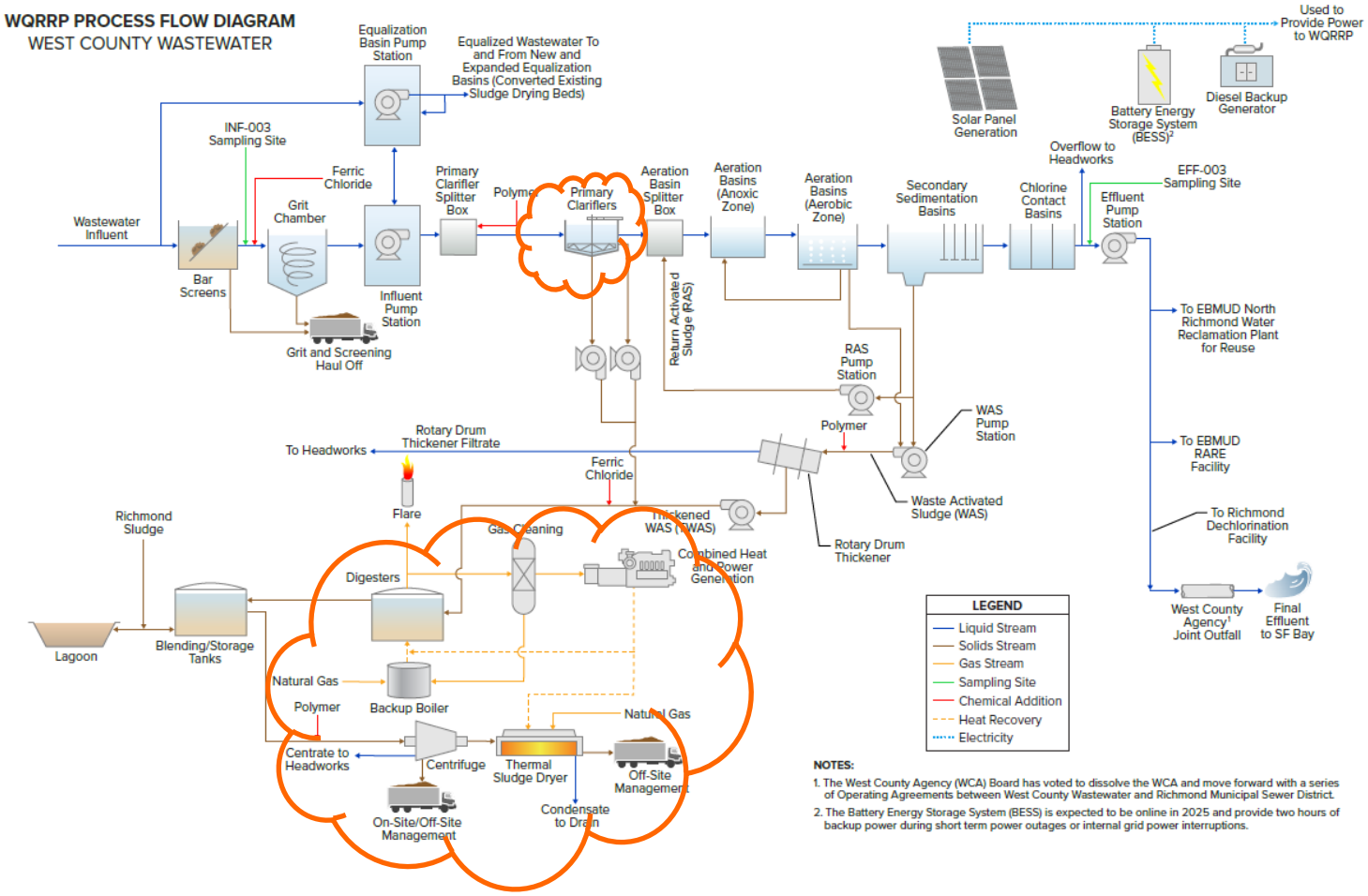


29 Acres of sludge lagoons will be repurposed

Benefits of Repurposing Sludge Drying Lagoons

- Elimination of large scale GHG emissions (primarily methane and CO2)
- Avoids costs of necessary large-scale levee and plumbing improvements
- Eliminates diesel emissions, odors and dust from equipment used in sludge turning, drying and handling
- Opens land for alternative uses, including possible wetlands restoration and others

Anticipate replacing sludge drying lagoons with dewatering will increase ammonia loads to the liquid stream

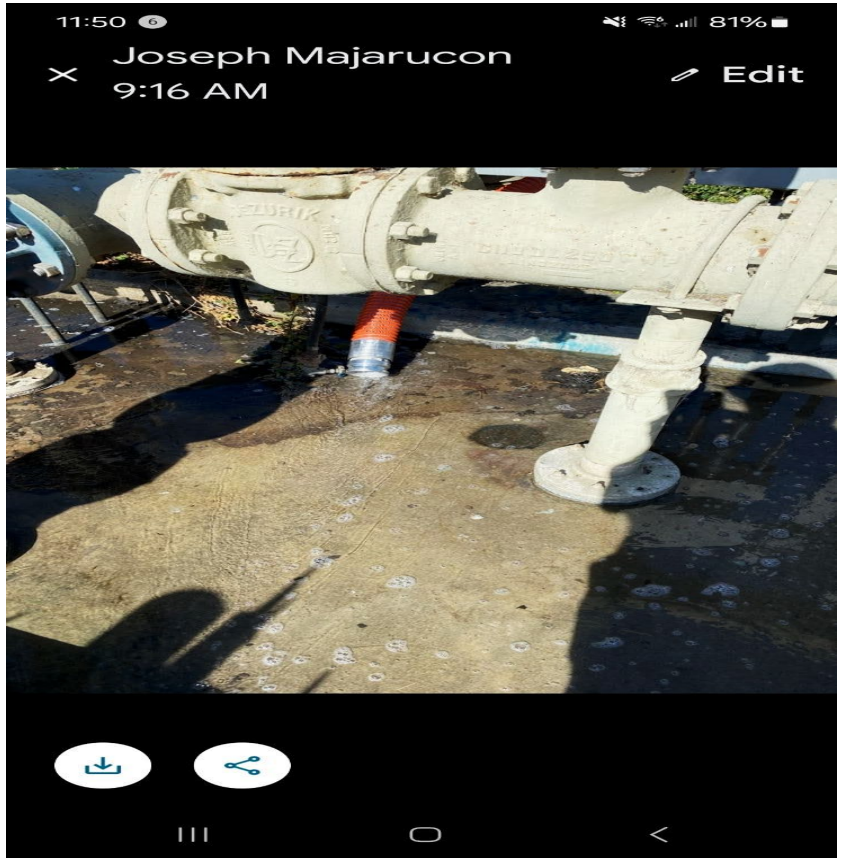
Item	Calibrated Process Model	Plant Data
Influent Ammonia, lb/d	1,500	1,500
Sludge Lagoon Supernatant Ammonia, lb/d	225	75
Supernatant/Influent	15%	5%

Data/sampling representative?

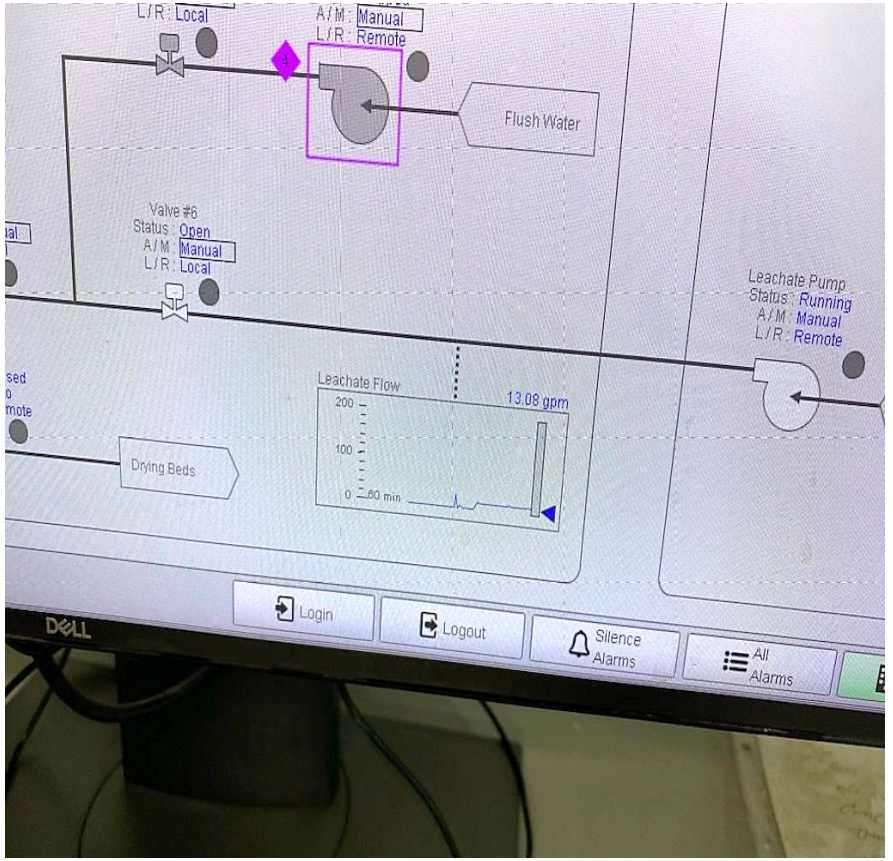
Do lagoons remove nitrogen through struvite precipitation?

Dewatering in shifts (vs continuous return of recycle streams) results in short term spikes in nutrient loads

Regional partnership with Republic Services/West County Landfill may further increase nutrient loads

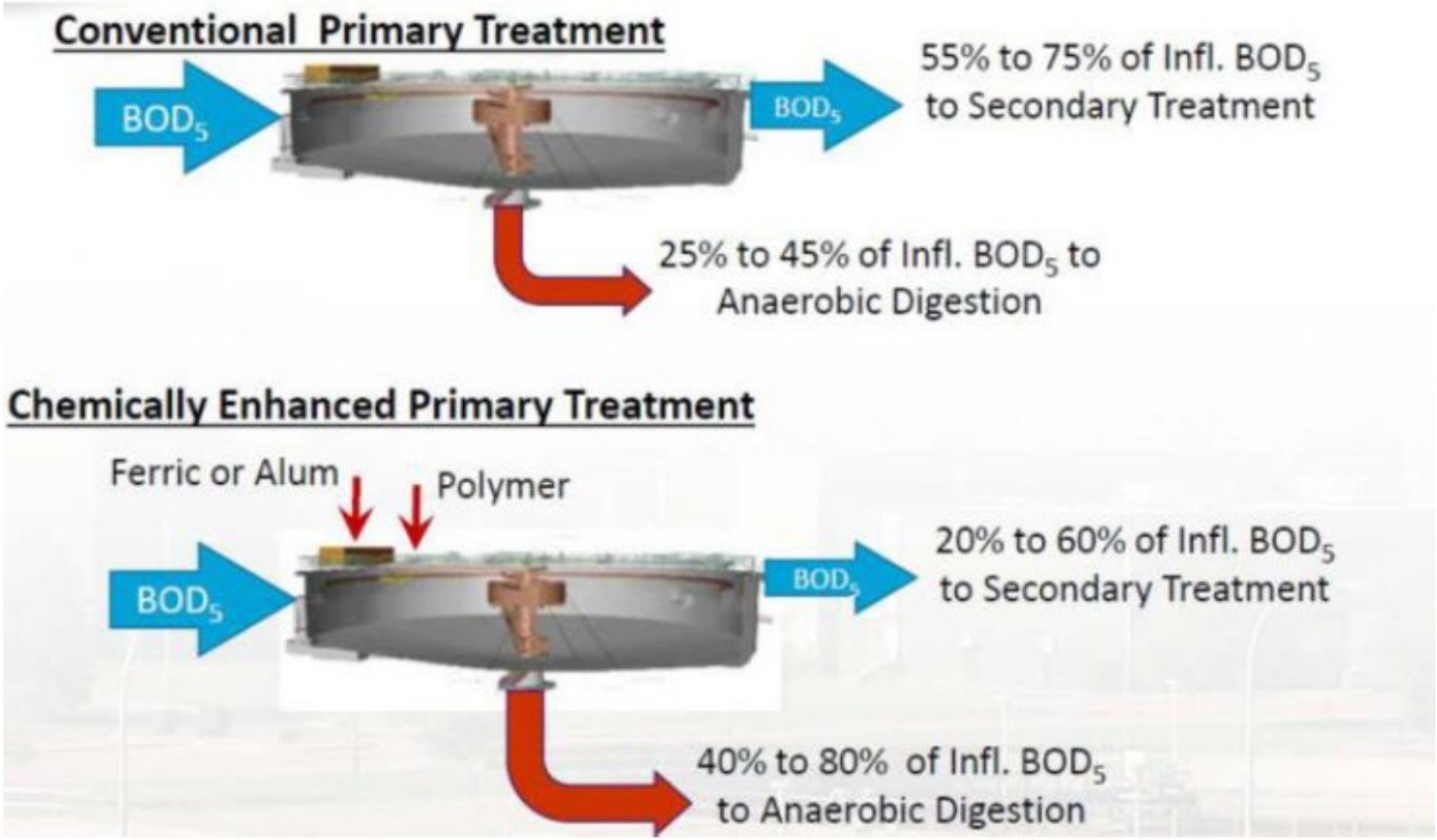


Original WCW Pilot Leachate Feed (6/11/24)

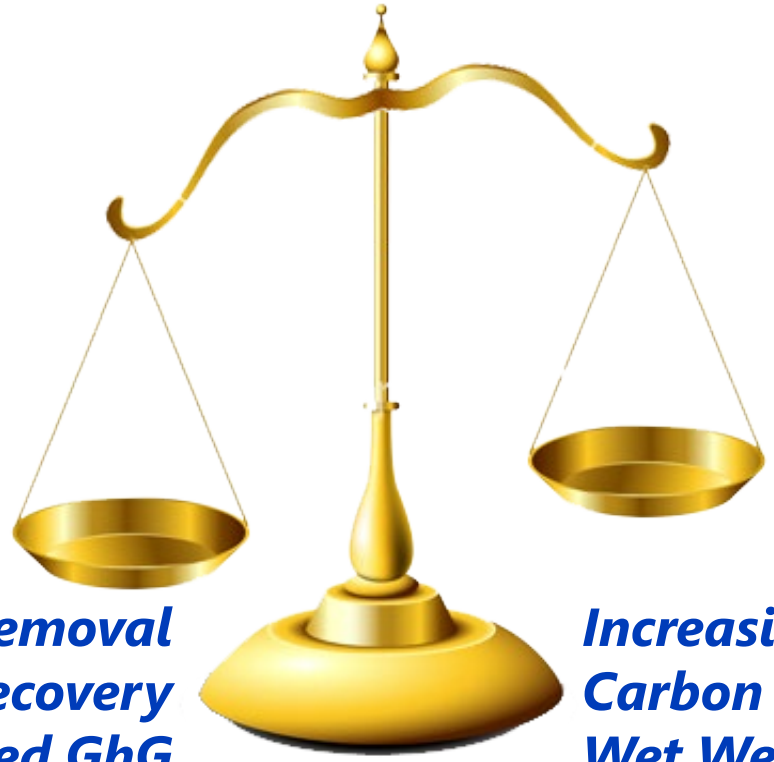


Flow rate in SCADA

Anticipate Clean and Green project will reduce available carbon for denitrification



WCW's future challenges include balancing nitrogen removal with resource recovery and all other needs



N Removal
Energy Recovery
Reduced GhG

Increasing N loads
Carbon Management
Wet Weather and I&I
Asset Rehab & Replacement
Future permit limits

WEST COUNTY WASTEWATER

Currently updating Master Plan to, among other things determine if additional optimization and upgrades are necessary to meet "final" TIN limit in Watershed Permit

Collection System, Water Quality and Resource Recovery Plant, and WCW Facilities Master Plan

2024

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Thank You!

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Questions?