EAST BAY MUNICIPAL UTILITY DISTRICT

East Bayshore Recycled Water Project
Water Quality Improvements Pilot Study

BACWA Recycled Water Committee
May 17, 2022

Agenda

- East Bayshore Recycled Water Program
- Water Quality Challenges
- Water Quality Improvements Pilot Study
- Q&A

EBMUD Recycled Water Overview

- Recycled water use: 1970
- North Richmond: refinery
- San Leandro: golf courses
- San Ramon: residential and golf courses
- East Bayshore: landscape & industrial

East Bayshore Recycled Water Treatment

East Bayshore Service Area

- Online since 2008
- Goal = 2.3 mgd by 2040
- Current demand = 0.3 mgd
- 42 landscape customers
- Transmission (>12”) = 3.4 miles
- Distribution (4” – 12”) = 5 miles
- Average TDS = 900 mg/L
- Average Ammonia = 40 mg-N/L
- Drought TDS = 1100 mg/L
- Drought Ammonia = 60 mg-N/L

Challenges

- Infrastructures
- Water quality

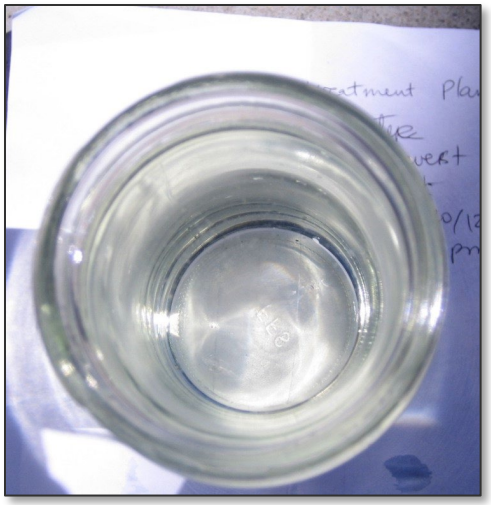
Challenges: Infrastructures

- Low demand users
- Development changes
- Cost/benefit ratio too low

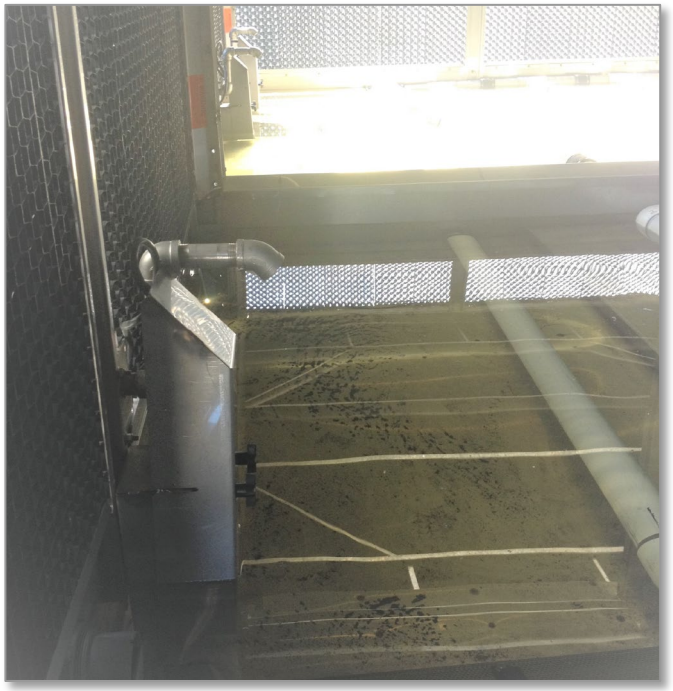
Challenges: Water quality

- Perception
- Water quality
  - High TDS and ammonia prohibit cooling tower & industrial uses
  - High TDS during droughts potentially damage landscaping

Challenges: Water quality



Challenges: Water quality

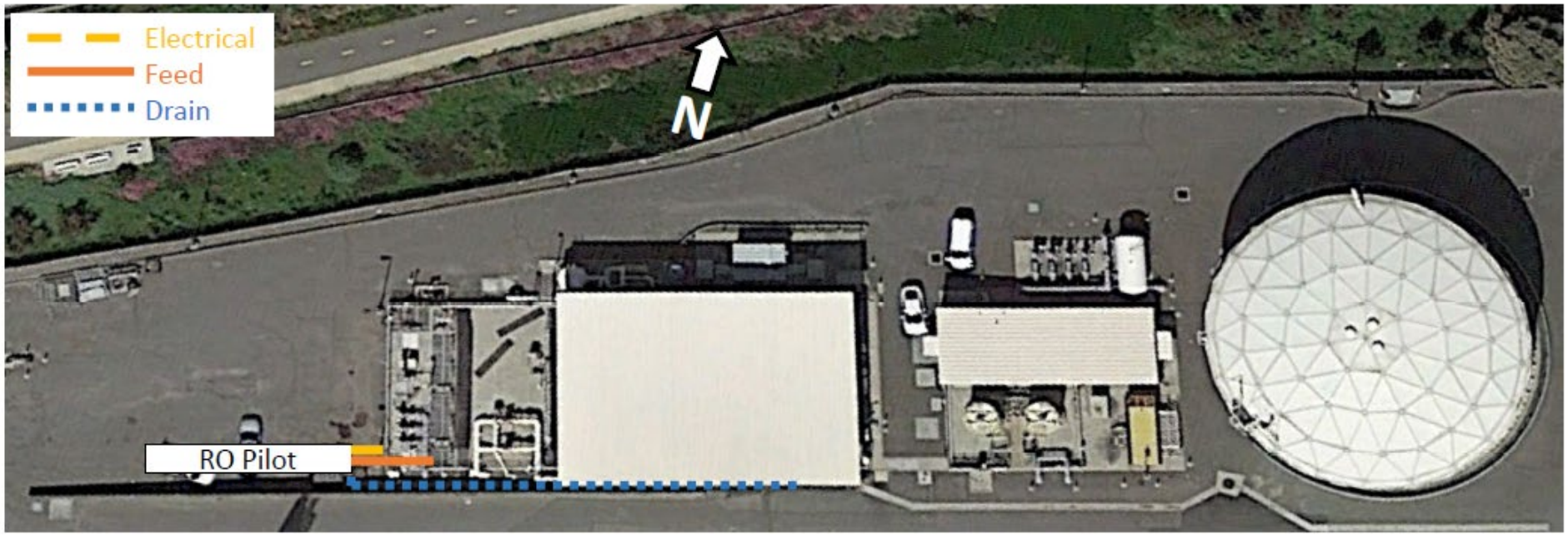


Challenges: Water quality

Solutions

- **Challenge**: Existing water quality
- **Solution**: Conduct water quality improvements pilot study to produce high quality recycled water that is suitable for cooling tower uses and during droughts
- 3-year Water Quality Improvements Pilot Study
- **Pilot Study components:**
  - Partial RO to reduce TDS during droughts
  - Full RO/Breakpoint chlorination to supply cooling towers
  - Alternative cooling tower point-of-use treatment
  - Alternative raw wastewater sources with reduced TDS

Test site



Equipment

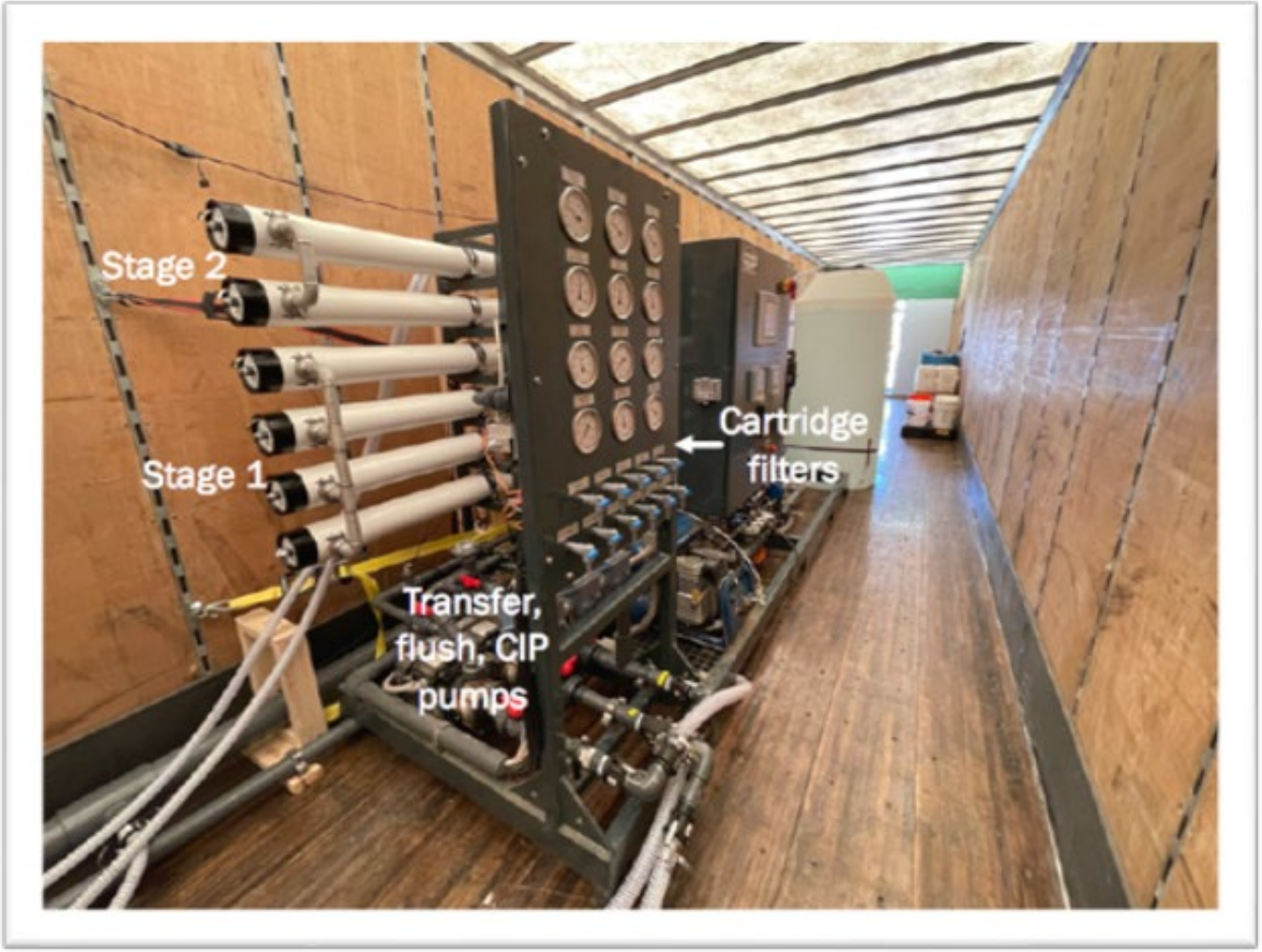
Equipment


Permeate
flush tank
Chemical
day tanks
Chemical
metering
pumps

RO Unit

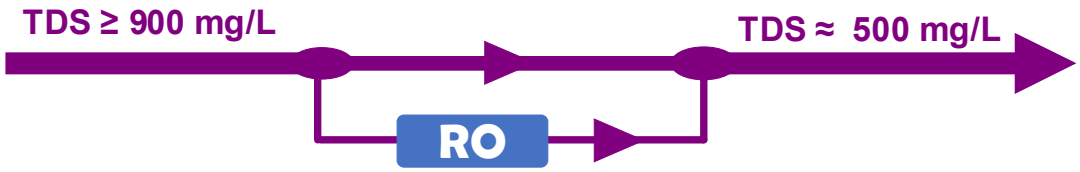

Concentrate
Permeate
CIP tank
Feed tank
High pressure pump
Feed

Equipment



Task I – Partial RO

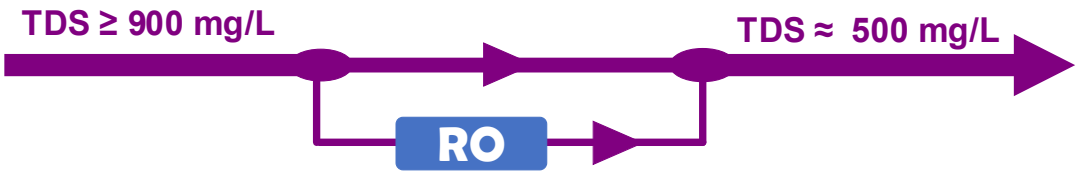
Objective: blending to maintain TDS ≈ 500 mg/L



Status:

- Started testing April 2021
- Completed Phase 1 testing March 2022
- Complete January 2024

Water quality parameters



Parameter (units)	Planning Study (2011-2016)		Pilot RO Feed (2021)	
	Average	90th Percentile	Average	90th Percentile
Chloride (mg/L)	322	480	315	390
Total Dissolved Solids (mg/L)	856	1,200	900	1,100

Operations

Balancing act

Parameter	Capital	O&M
↑Recovery	↓	↑
↑Flux	↓	↑
↑Acid	↑	↑↓
↑Reductant	↑	↑↓
↑CIPs	↓	↑↓

Preliminary results

Preliminary results

Task II – Full RO & breakpoint chlorination Centralized treatment

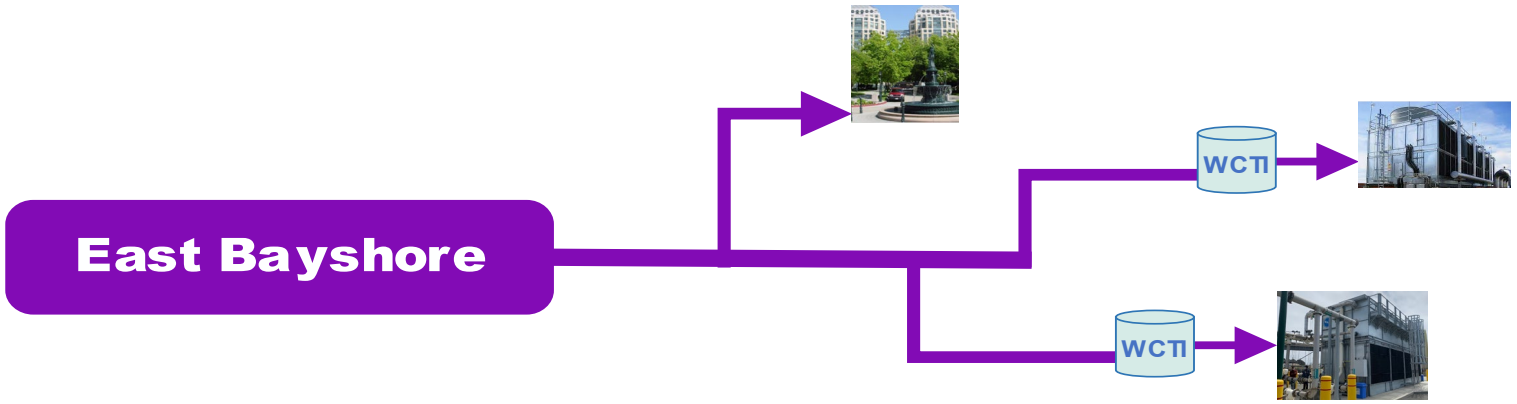
Objective: removing ammonia for cooling tower uses

Status:

- Selected breakpoint chlorination November 2020
- Start testing July 2022
- Complete January 2024

Task III – Point-of-use Treatment

Objective: treatment at customer sites

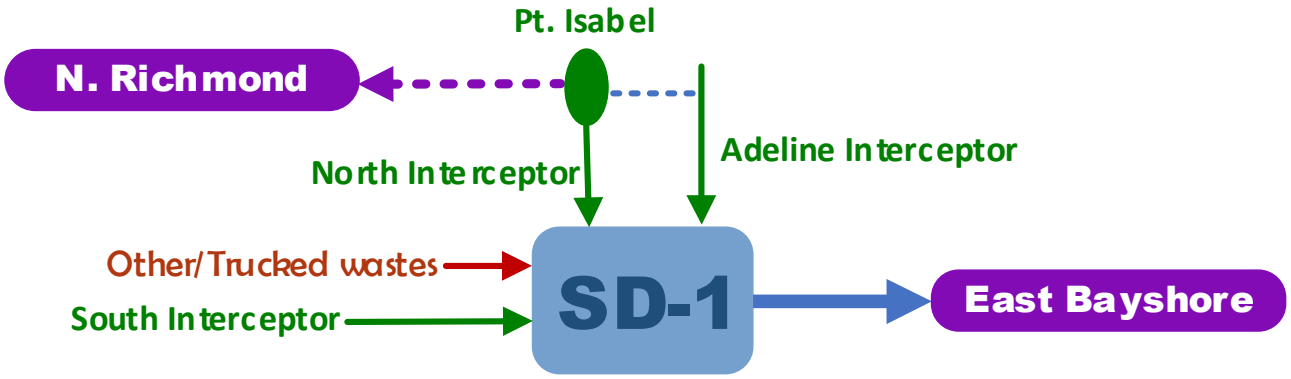


Status:

- Selected test site March 2021
- Start testing August 2022
- Complete January 2024

Task IV – Alternative supply assessment

Objective: assessing alternative supply sources



Status:

- Started sampling April 2021
- Completed sampling March 2022
- Evaluating options

Questions/Comments