Recycled Water Master Plan Update:
To Drink or Not to Drink?
Potable vs. Non-Potable Reuse

Northern California WateReuse Chapter Meeting
March 1, 2019
About EBMUD

- Mokelumne River watershed provides 90% of water supply
- Rely on supplemental supplies in 3 out of 10 years
- Avg water production 175 MGD

Gravity Flow Aqueducts
- Provide wastewater treatment for 685,000 people
- Average wastewater flow of 60 MGD

EBMUD Service Area, >1.4 million people

Access to supplemental supplies

Mokelumne Watershed
EBMUD’s Recycled Water History

- 1970s – recycled water for irrigation & in-plant processes at main WWTP
- 1980s – multiple landscape irrigation
- 1990s - first Water Recycling Master Plan, 1993 goal of 14 MGD by 2020
- 1996 & 2010 – partnership with refinery
- 2006 & 2008 – additional irrigation projects
- 2012 - recycling goal of 20 MGD by 2040
- 2018 - Recycled Water Master Plan Update to consider both non-potable & potable reuse
Current Recycled Water Program

- 5 non-potable projects
- Production capacity of 9.2 MGD
- Goal of 20 MGD by 2040
- ~$250 million invested
- >80% of capacity serves a single industrial customer

![Pie Chart]

- North Richmond (Refinery Cooling Towers) 4.0 MGD
- San Leandro (irrigation) 0.2 MGD
- East Bayshore (irrigation) 1.3 MGD
- San Ramon Valley (irrigation) 3.5 MGD
- RARE (Refinery Boiler Feed) 4.0 MGD
Challenges of Non-potable Reuse

• Supply limitation, low wastewater flows
• Limited demands in urban setting
• Challenging water quality: Ammonia, TDS, aging water in distribution system
• Extensive distribution systems and site retrofits
• Single user project, risk of stranded assets
EBMUD Recognizes Advances in Potable Reuse

• Key potable reuse projects:
  - Groundwater augmentation - Orange County (2008)
  - Groundwater augmentation - Pure Water Monterey (expected 2019)
  - Reservoir augmentation - Pure Water San Diego (expected 2023)
  - Bay Area - Santa Clara Valley Water District in planning stages for groundwater augmentation

Questions for EBMUD Master Plan:

• How could Potable Reuse fit into the District’s Recycled Water Program?
• Should Potable Reuse be added to the District’s Recycled Water program at this time?
Master Plan Evaluation

1. Identify Non-Potable Reuse Alternatives
2. Identify Potable Reuse Alternatives
3. Cost Evaluation
4. Non-Cost Evaluation
5. Economic Evaluation

Recommended Projects
1. Identify Non-Potable Reuse Alternatives
Master Plan Evaluation

2. Identify Potable Reuse Alternatives

Sources
East Bay WWTPs

Advanced Treatment

Targets
Link to EBMUD Potable Water System

3. Cost Evaluation

Capital Cost

Unit Cost
4. Non-Cost Evaluation

- **Non-Cost Factors**
  - Operations
    - Would the project significantly impact existing water or wastewater operations, or require operation of new facilities?
  - Environmental Justice
    - Would the project impact or benefit many District customers, or just a few?
  - Construction
    - Does the project have difficult engineering or construction obstacles, like trenchless crossings or treatment sites with insufficient space?
  - Regulatory
    - Would the project require a large number of permits, easements, or other environmental documentation to be constructed and operated?
  - Complexity and Risk
    - Non-Cost Evaluation Criteria
  - Environmental and Social Objectives
  - Environmental Impacts from Construction
    - Would the project impact environmentally sensitive areas, like streams and wetlands?
  - Energy Use
    - How much energy would the project require to treat and pump water?
  - Institutional
    - How much coordination with other public agencies and/or customers would the project require?
  - Wastewater Discharge
    - Would the project reduce the discharge of nutrients to San Francisco Bay?
Potential Sources for Potable Reuse

Potable Projects

- **Municipal WWTPs:**
  - > 1 MGD dry weather flow
  - Inside or near District’s water service area

  - More than 80 MGD available in region

- **Satellite locations also considered**
  - Pt. Isabel
  - LAVWMA Pipeline
Potential Potable Reuse for EBMUD

Groundwater Augmentation:
East Bay Plain Groundwater Basin

Reservoir Augmentation:
Briones, San Pablo, & Upper San Leandro Reservoirs

Raw Water Augmentation:
Orinda WTP, Sobrante WTP, Upper San Leandro WTP, and Mokelumne Aqueduct to Walnut Creek WTP

Treated Water Augmentation:
Treated Water Distribution System
Highest Scoring Potable Reuse Alternatives
Cost of Potable vs Non-Potable

Costs do NOT include necessary wastewater treatment plant upgrades.
Relative Cost of Recycled Water

<table>
<thead>
<tr>
<th></th>
<th>Cost ($) /unit of water</th>
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<tbody>
<tr>
<td>Normal Supply</td>
<td>15</td>
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<tr>
<td>(7 out of 10 years)</td>
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<tr>
<td>Supplemental Supply</td>
<td></td>
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<td>Recycled Water</td>
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Pros & Cons of Potable Reuse

PROS
• No need for dual distribution system
• Reduced risk of stranded assets
• Single project can yield >20 MGD
• Economies of scale

CONS
• Large size, significant up front capital costs
• Significant $/AF, especially as compared to cost of supplemental drought year supplies
• Customer acceptance not yet certain
Master Plan Evaluation Summary

- No projects are economically advantageous at this time
- No driver to increase current 20 MGD goal
  - Water supply needs can be met by less costly alternative sources, especially given limited dry year needs
- District’s Recycled Water Program driven by social and environmental more than economic factors

Conclusions of the Master Plan Update

- Maintain 20 MGD goal for 2040
- Implement Recommended Non-Potable Reuse projects
- Continue to track regulations and other projects
- Monitor & identify changing water supply conditions
- Re-Evaluate Potable Reuse in approximately 5 years
Recommended Non-Potable Projects

- 1 new project
- 3 expansions
- Support on-site reuse
- 10+ MGD new capacity
- > $300 million in capital costs over 20 years
Estimated Project Phasing

2024 – Re-evaluate Potable Reuse

Planned Recycled Water Capacity (Annual Average, MGD)
Potential Triggers for Potable Reuse

**Supply**
- Rain/Snow/Climate Change
- Upcountry Development
- Regulatory Requirements
- Supplemental Supplies
- Recycling

**Demand**
- Population Growth
- Conservation

Potable reuse may be a future tool to provide long-term water supply reliability.
• July 2018 - Board workshop

• October 2018 - January 2019: Outreach and meetings with stakeholders (agencies, cities, customers, environmental groups)

• January 2019 - Release of draft report and public workshop

• February 2019 - Completed master plan update

• https://ebmud.com/recycledwater
Comments/Questions?