Pacific Grove WWTP & Decentralized Reuse

Presentation to WateReuse Association
Northern California Chapter Meeting
February 23, 2018

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Brezack & Associates Planning

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Presentation Focus

• Trends In Wastewater Recycling From Regional To Satellite Systems

• Pacific Grove Local Water Project Example
  • A local Satellite Water Recycling Project
Trends In Wastewater Recycling Include Regional To Satellite Systems

- Development of Regional WWTP Was Part of The Method to Achieve Fishable & Swimmable Objectives

- Federal Clean Water Act Acknowledged Water Reuse As A Part of The Innovative/Alternative (I/A) Technology Program

- Scalping/Satellite Recycling Facilities Were Not Initially Envisioned
Development of Alternative Water Supplies in California

- Water Conservation
- Stormwater Capture & Graywater Development
- Recycled Wastewater
  - Non-Potable, Irrigation Supplies
  - Seawater Barriers
  - Indirect & Direct Potable Reuse
Trend In Funding Innovation

- USEPA Developed Alternative/Innovative Technology Program (I/A)
  - 1977 CWA Wastewater Reuse & Small Community Systems As Alternative Technology
  - A/I Program Provided Increased Grant Incentives
What Is Centralized Water Reuse?

- Large Centralized WWTPs
  - Tend to Discharge to Surface Waters, Percolation/Evaporation
  - Or, Develop RW Distribution Networks

- RW Distribution Networks May Have Significant Effects:
  - Environmental Impact Analysis & Mitigation Measures
  - Need for Additional Easements & R-O-W
  - Additional Permitting (e.g. WOTUS)
  - Additional Capital and O&M Costs Impact Project Feasibility
  - Additional Power Requirements
What Is Decentralized Water Reuse?

- Satellite Water Recycling Facilities (SWRF)
- Developed to Meet Specific End Use(s) Demands
- Targets Community, Facility or Consumer Level
- Recycles Only A Portion of Available Wastewater Flows
- Feasibility Is Based On:
  - Existing & Projected Cost Comparison to Potable Water
  - Reliability & Sustainability of Available Water Supplies
  - Value of Having A “Drought-Proof” Supply
  - Value of Potable Offset By Local Recycled Water Supply
Components of Typical Satellite Water Recycling Facility

1. Diversion Facility (Intercepting Manhole, Diversion Pump and Force Main Pipeline)
2. SWRF With MBR
3. Disposal of Waste Activated Sludge to Offsite Treatment Facilities
4. Operational Storage Facility (Ponds or Tanks)
5. Local Recycled Water Distribution System
6. Offsite Hauling of Inorganics To Disposal
Proximity Is Very Important

Adequate Wastewater Flow @ Reasonable Water Quality

Waste Discharge to Treatment/Disposal

Demand
(Irrigation/Cooling/Manufacturing/Habitat...)

Brezack & Associates Planning
Golf As An Example

- Relatively Large Irrigation Demand
- Approximately 100 Acres
- Often Distant From Centralized Urban Wastewater Facilities
- Excellent Irrigation Managers
- Cost-Benefit Is Well Defined
California Golf

- California Has 912 Courses
  - Municipal, Private, Restricted, Resort & Combination

- As An Economic Driver
  - California’s golf industry produced $13.1 billion of economic activity & over 128,000 jobs in 2011

- Conversion to recycled water irrigation represents an untapped drought-proof supply of over 90,000 AFY of water to California
Advances In Technology & Project Delivery That Are Facilitating Local Recycled Water Response

- Advances in Development of Membrane Technologies
- Lower Capital and O&M Costs
- Acceptance by RB and DDW to meet WDRs & WRRs
- Funding Assistance at Local, State & Federal Levels
Design-Build Procurement

- Project Development Focus On Importance of Planning Level Actions
  - Identify & Orient Project To Meeting Owner Objectives
  - Procurement of Design & Construction Contractor Under A Single Contract
  - Use of Best Value Selection
  - Process Management As Owners Rep Maintains Focus on Owner Objectives
Challenges in Meeting California’s Water Supply Availability

1. California’s Failing Infrastructure
   Per ASCE’s Infrastructure Report Card for California:
   • Drinking Water Needs = $44.5 Billion
   • Wastewater Needs = $26.2 Billion
   • 678 Dams Are High – Hazard Potential

2. Projects of Statewide Significance
   • Oroville Dam Spillway Emergency Repairs
   • Proposed Twin (Single?) Tunnel Project $10.7 to $16.3 Billion
   • Salton Sea Restoration $9 Billion

3. Climate Change & Reduced Sierra Snowpack
Challenges in Meeting California’s Water Supply Availability

4. Analysis of Sufficient Supplies for Purveyors
   • Urban Water Mgt Planning Act

5. Analysis of 20-Year Adequacy for New Projects
   • SB610 & 221

6. Over Subscription of CO River
   • Quantification Settlement Agreement (QSA)

7. Impacts to Critical Habitat & TES

8. Contaminants of Emerging Concern
Trends

• Working Locally for Feasible Solutions
• Managing Demand
• Technology Improvements Local Capital and O&M Costs, Shrink Project Footprint
• Education / Outreach to Involve Stakeholders
• Willingness to Think Differently
Pacific Grove Example
City of Pacific Grove’s Objectives

- **Produce** 125 acre-feet per year of Recycled Water for Local Irrigation Use
- **Achieve** Final Completion by Spring 2017
- **Avoid** Implications of Cease and Desist Order
- **Comply** with Regulatory and SRF Loan Requirements
- **Design & Build** a Cost Competitive Facility with Capacity of 0.25 MGD
- **Focus** Design on Future Expansion Capacity
- **Focus** on Life-Cycle Cost and Long /Useful Life of Facilities
- **Allocate** Project Risk to a Single Design/Build Team
Design Response

- **Quality** Materials and Equipment, Designed for Corrosive Environment
- **Proven** Reliable MBR Technology with Extended Warranties
- **Competitive** Procurement Process
- **Designed** to Consistently Produce 0.25 MGD
- **Flexibility** for ease of Future Expansion
- **Designed** for Aesthetics and Appearance
- **Meets** the Project Schedule
Major Project Components

1. Diversion Structure
2. Diversion Pipeline
3. SRWTP
4. WAS Pipeline
5. RW Pipeline
6. Potable Pipeline
Water Recycling Facility Longevity
# What We Learned

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Lessons Learned</th>
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<tbody>
<tr>
<td>Competition for $ Availability</td>
<td>Allow Additional Time</td>
</tr>
<tr>
<td>Innovation Isn’t Easy</td>
<td>Transparency &amp; Openness Pays Off</td>
</tr>
<tr>
<td>Your Issues ≠ Their Issues</td>
<td>Stakeholder Support Is Important</td>
</tr>
<tr>
<td>City’s 1st Time Through This Process</td>
<td>Team’s Experience Is Important to Anticipate Issues &amp; Craft Robust Process</td>
</tr>
</tbody>
</table>
Permits Approvals Received

- CC-RWQCB / SWRCB DDW:
  - General Waste Discharge Requirements for Recycled Water Use
  - Recycled Water Production Permit
  - General Construction Storm Water NPDES Permit
- Cal-AM:
  - Compliance w/Backflow Prevention Requirements (Submitted; Final @ Start-Up)
- City Utility Plan Approval
- CCC: Coastal Development Permit Waiver
- MBUAPCD: Authority to Construct/Permit To Operate
Groundbreaking to Ribbon Cutting

December 9, 2016

December 6, 2017
## PGLWP Financial Overview

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td><strong>PROJECT COST</strong></td>
<td>$7.7 M</td>
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<tr>
<td><strong>STATE WRLP GRANT</strong></td>
<td>$2.42 M</td>
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<tr>
<td><strong>NET FINANCED</strong></td>
<td>$5.29 M</td>
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<tr>
<td><strong>30 YEAR @ 1%</strong></td>
<td>$205,000</td>
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<tr>
<td><strong>ANNUAL O&amp;M</strong></td>
<td>$238,000</td>
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<tr>
<td><strong>TOTAL ANNUAL</strong></td>
<td>$443,000</td>
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<tr>
<td><strong>UNIT COST</strong></td>
<td>$3,544 / AF</td>
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Structure Being Built
Discussion
<table>
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<tr>
<th>Milestone</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Design Notice to Proceed</td>
<td>11/18/15</td>
</tr>
<tr>
<td>100% Designs Approved</td>
<td>8/26/16</td>
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<tr>
<td>Final SWRCB Budget Approval</td>
<td>10/11/16</td>
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<tr>
<td>Construction Notice to Proceed</td>
<td>10/18/16</td>
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<tr>
<td>Recycled Water Production Permit</td>
<td>12/8/16</td>
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<tr>
<td>City Groundbreaking</td>
<td>12/9/16</td>
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<tr>
<td>Construction Completion</td>
<td>8/14/17</td>
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<tr>
<td>O&amp;M Startup</td>
<td>11/2/17</td>
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<tr>
<td>Full Implementation</td>
<td>11/10/17</td>
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</table>
Diablo CC Example
Proposed Treatment Train

Satellite Recycled Water Treatment Plant

- Bar Screen
- Disk Screen
- Membrane Bioreactor
- Ultraviolet (UV) Disinfection
- Effluent to Storage or Irrigation Reuse

- Influent Pump
- Permeate Pump
- Biosolids Return
- Biosolids to Sewer
- Untreated wastewater and waste solids from satellite treatment to MRWPCA

- Waste Screenings
- Haul Offsite

Untreated Wastewater
PRESERVING THE VALUE
OF OUR GOLF COURSE AND ITS SCENIC VIEWS
Ongoing Coordination with Central San & EBMUD:

- Club Signed Memorandums of Understanding for Project Collaboration & Development.
- Project Agreement w/Central San
- Investigated Potential Grant Funding.
Groundwater Investigations

- Initial Project Objective = 60 gpm
  - Designed to Meet 1/3 of Irrigation Demands
  - Matched w/Potable + Reclaimed Water

- Historical Data Search

- Utility Investigations

- Onsite Testing:
  - St Timothy’s = 7.5 gpm
  - Local Well = 9 gpm (not sustained)
## 215 AFY SWRF (0.4 MGD)

<table>
<thead>
<tr>
<th>Application</th>
<th>Number</th>
<th>Design Capacity</th>
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<tbody>
<tr>
<td>Influent Pumps</td>
<td>Duty and installed backup</td>
<td>0.53mgd&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Screens</td>
<td>Duty and installed backup</td>
<td>0.53mgd&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Biological Reactors</td>
<td>Two trains, no backup</td>
<td>0.20 mgd each train</td>
</tr>
<tr>
<td>Biological System Support Equipment (Blowers, Pumps etc.)</td>
<td>Duty (2)</td>
<td>0.20 mgd each train</td>
</tr>
<tr>
<td>MBR Tanks</td>
<td>Two trains, no backup</td>
<td>0.20 mgd each train with peaking factor of 1.2</td>
</tr>
<tr>
<td>MBR Support Systems (blowers, pumps, etc.)</td>
<td>Duty (2) and installed backup</td>
<td>0.20 mgd each train with peaking factor of 1.2</td>
</tr>
<tr>
<td>UV Disinfection</td>
<td>Duty and installed backup</td>
<td>0.48 mgd</td>
</tr>
<tr>
<td>Chemical Feed Systems for MBR: (e.g.; Liquid Hypochlorite, MBR cleaning chemicals)</td>
<td>Duty and boxed spare</td>
<td>0.48 mgd</td>
</tr>
</tbody>
</table>

<sup>a</sup> Provides feed at the maximum MBR filtration rate (0.4 mgd x 1.2 peaking factor) plus 10%, which is maximum, WAS rate.

1.2 PF is for Max day. Max hour could be greater.
Bull Stockwell Allen
Photo Simulation
“Pilot” Nature of Diablo Project

- Other Similar Projects Had Previously Been Proposed
- Not Precedent Setting for the Purveyors
- Timing Was Ripe for Diablo:
  - Middle of 4-Year Drought
  - Similar Old & New Projects in Monterey County
  - Lack of Debt & Financial Capacity to “Go It Alone”
  - Willingness to Invest for the Club’s Next 100 Years
Benefits of Recycled Water Extend Beyond the Club

• Saves Potable Water for Potable Uses
• Expands Regional Water Supply Portfolio
• Produces A “Drought-Proof” Supply for the Club
• Stabilizes the Club’s Costs of Water
• Produces Positive Public Relations
• Consistent with Environmental & Conservation Ethics
Diablo’s Irrigation Demand

• Average Annual Day
  • 260,000 GPD Year-round 2009
  • 180,000 GPD Year-round 2015

• Historical Peak Day
  • 800,000 GPD

• Annual Average Demand
  • 198 AFY
  • ~90 Million Gallons / Year 2009
  • ~65 Million Gallons / Year 2015

• 1 Billion Gallons Over the Life of 30-Year Loan
DCC Recycled Water Focus

1. Required Investigations:
   • Monetary Feasibility
   • Acceptable to Membership
   • Acceptable to Local Utilities & Regulatory Agencies

2. Initial Planning Level Cost Estimates:
   • Based on Above Investigations
   • Foundational to Everything Else
Diablo County Club’s Initial Project Development

• Investigate Potential Water & Energy Conservation Savings

• Alternatives for Onsite Energy Production

• Review of Water & Energy Billing Records

• Interior & Exterior Audits of Water & Energy Use

• Club’s Conclusion:
  • To Strongly Pursue Water Savings
  • Including Focus on Recycled Water