BUILDING A WORLD OF DIFFERENCE

WATER RESOURCES FACILITIES PLAN – WORKSHOP #3

VALLECITOS WATER DISTRICT

VALLECITOS WATER DISTRICT
Water and Wastewater Specialists since 1955

BLACK & VEATCH
Building a world of difference.

AGENDA

- Setting the stage
- Water resource options update
- Local supply options
- Where can we use recycled water
- Findings and recommendations

SETTING THE STAGE

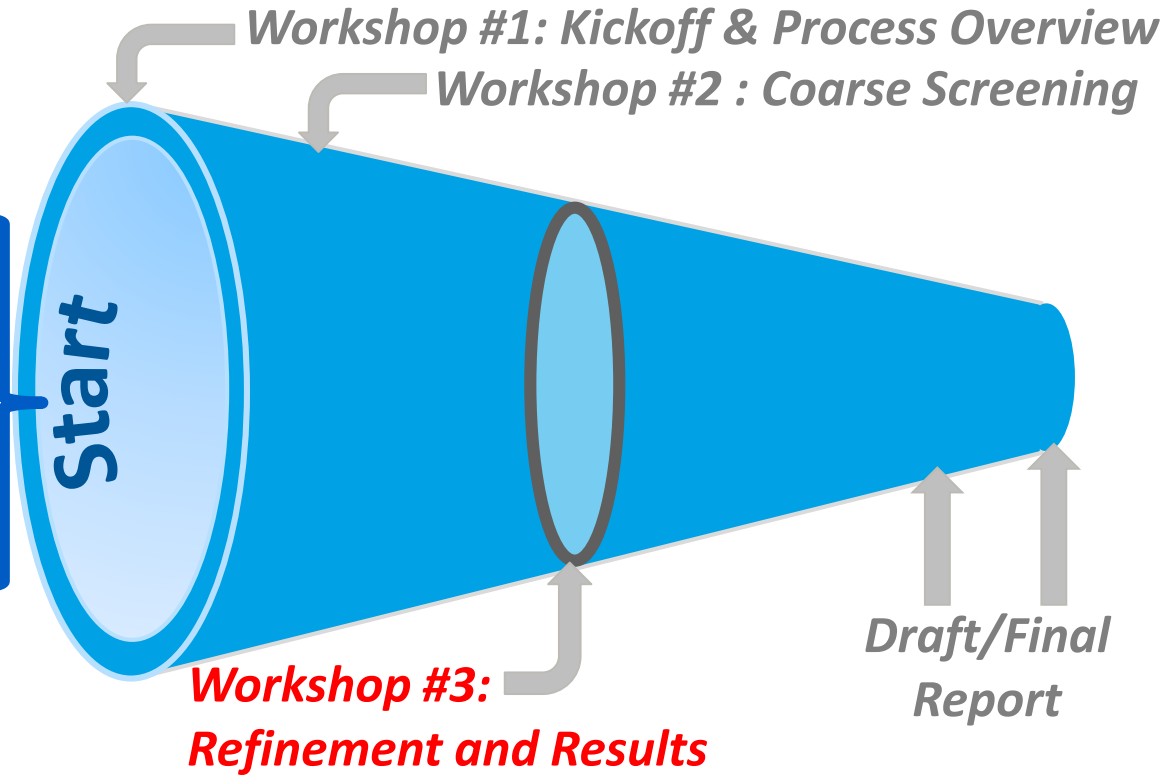
- Where are we
- Scope of this study

WHERE ARE WE?

- **Reuse effort put on hold to focus on drought response**
- **Meanwhile …**
  - Water resource options updated
  - Reuse conditions updated
- **Todays presentation**
  - Review water resource options
  - Review refined reuse opportunities
  - Recommendations on reuse opportunities

SCOPE OF THIS STUDY

- Document previous efforts
- SWRCB grant
- New opportunities



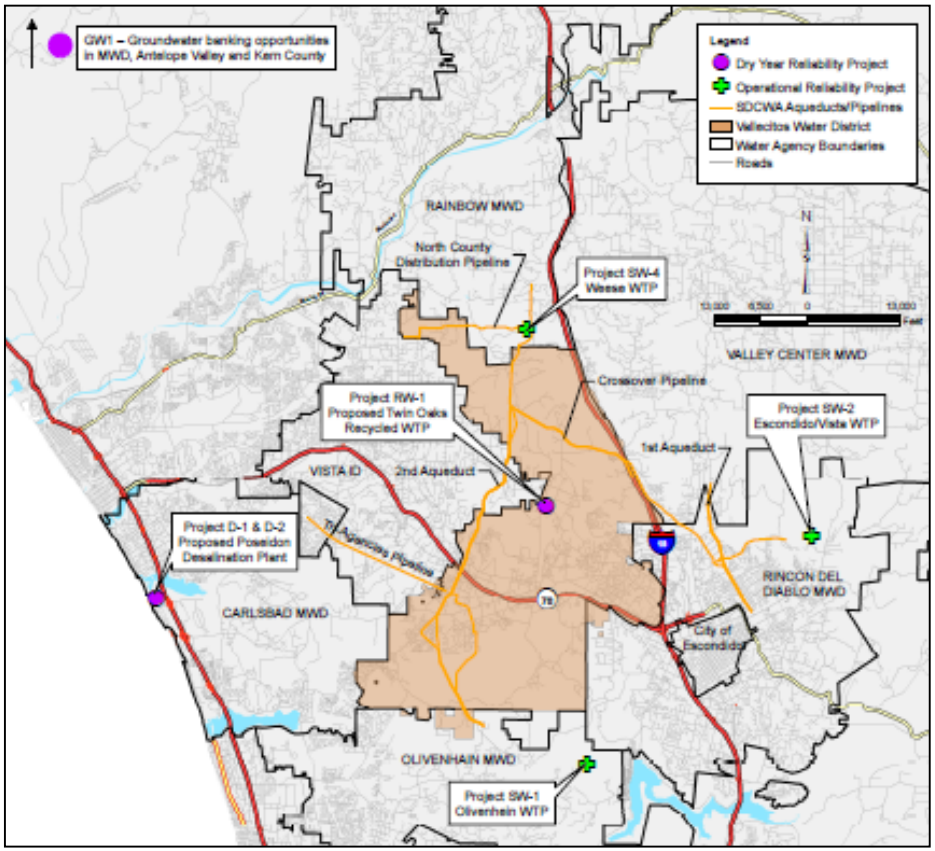
- Goal of Study
  - Not to necessarily define what to do…
  - But to identify next steps to investigate in more detail
- **Objectives for today:**
  - Review findings
  - Identify top 3 conceptual opportunities

WATER RESOURCE OPTIONS UPDATE

PREVIOUS VWD INTEGRATED WATER RESOURCES PLAN

Completed

- ✓ Increased irrigation efficiency
- ✓ Connection to Olivenhain WTP
- ✓ Desalination supply

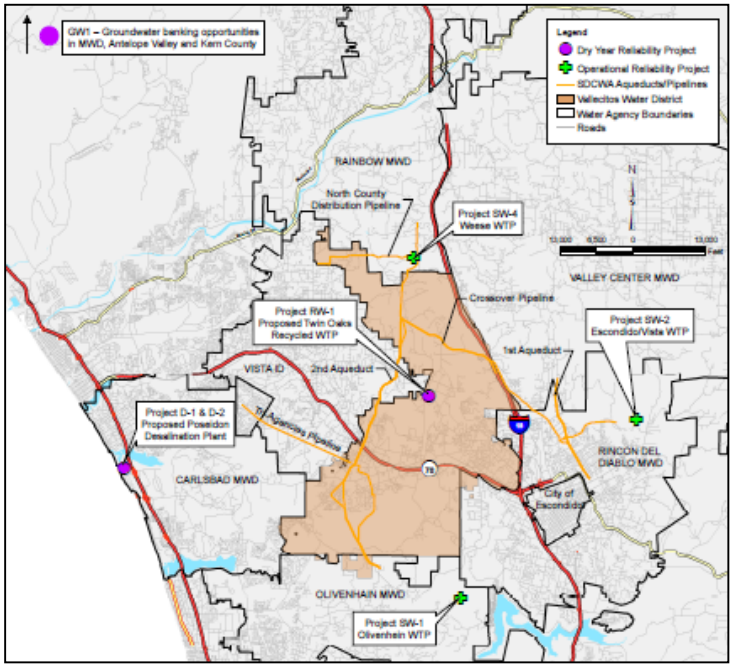


Projects improved supply and system reliabilities

PREVIOUS VWD INTEGRATED WATER RESOURCES PLAN

Other Options Considered

- Groundwater Banking
  - Requires partnership outside region
- Escondido/VID Transfer (Purchase)
  - Potential for potable reuse
- Oceanside Weese WTP
  - Not a new supply
- Recycled water from Escondido
  - Not available in summer
- Twin Oaks Valley Recycled Water
  - Deemed too costly in previous study

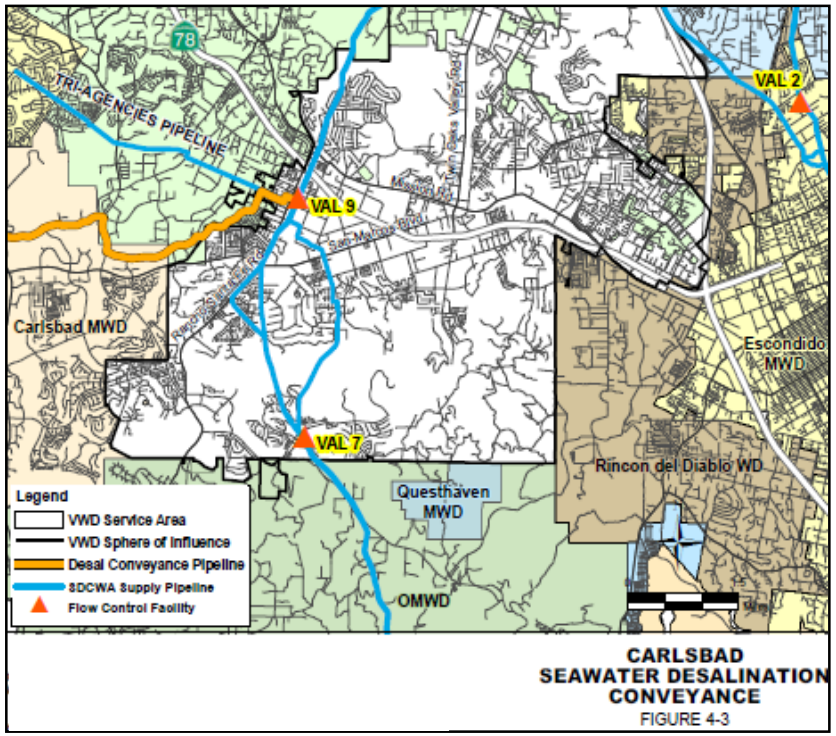


These options have same/more challenges as previous study

PREVIOUS VWD INTEGRATED WATER RESOURCES PLAN

- **Additional Seawater Desalination**
  - Option available in 2025
  - Increase from 3,500 (2,170 gpm)
  - Assume OMWD Supply: 1,708 gpm
  - VWD in 2025:
    - Min. demand in South/Central Areas: 5,748 gpm

    →Could take up to 1,870 gpm in additional desal. supply
    - Potential to take more:
      - Pump (new) to North area
      - Reduce OMWD take in winter



WATER RESOURCE OPTIONS

- **Water supply options covered**
  - ✓ Groundwater banking
  - ✓ Other agency partnerships
  - ✓ Desalination
  - Recycled Water

WHAT ARE THE LOCAL WATER SUPPLY OPTIONS?

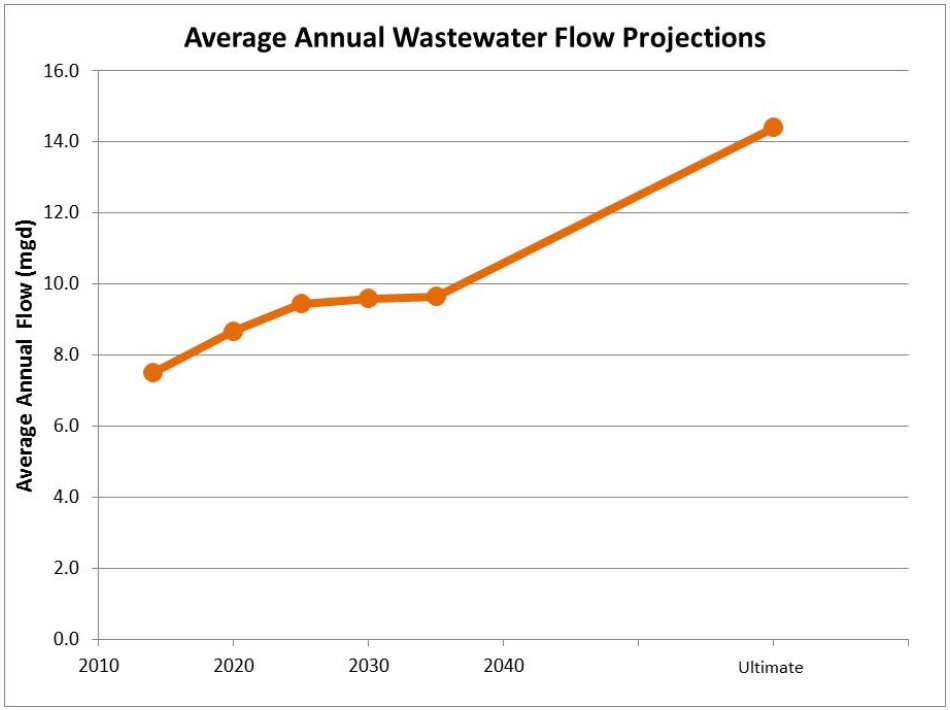
- Wastewater
- Stormwater
- Dry Weather Runoff

WASTEWATER/ RECYCLED WATER SOURCES

VALLECITOS RECYCLED WATER SOURCES

Overview

- Meadowlark WRF (5 MGD -> 6.5 MGD)
- Wholesaling 5 MGD to Carlsbad/OMWD



Benefits

- Control supplies
- Potential to reduce downstream treatment
- Long-term: more flows

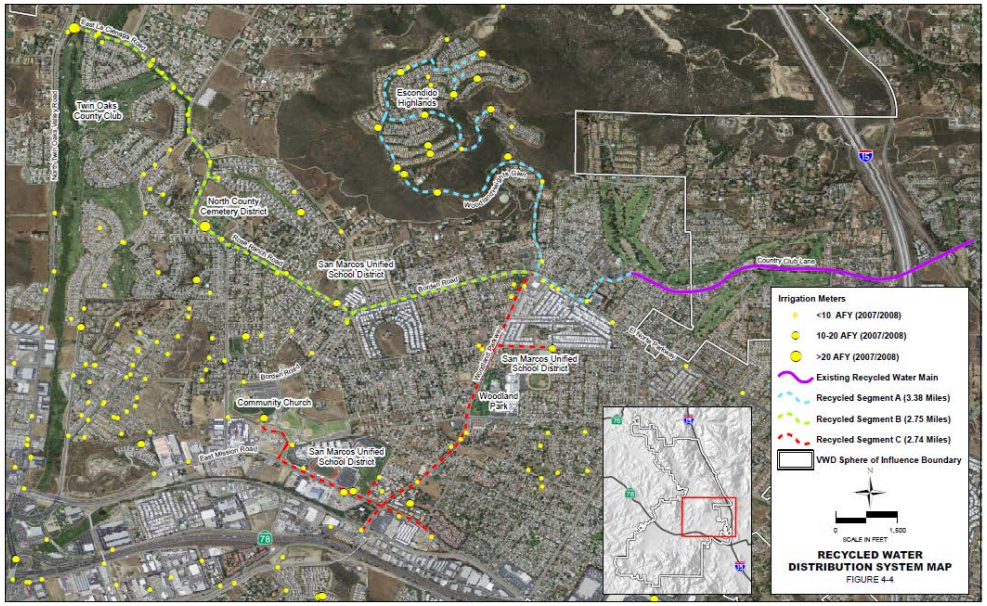
Challenges

- Limited WW availability
- Capacity limited at MWRF
- Treatment/ocean disposal still needed via Encina WPCF

ESCONDIDO RECYCLED WATER SOURCES

Overview

- 2008 Master Plan: 477 AFY
- North San Diego Water Reuse Coalition Project: 922 AFY



Benefits

- Regional partnership provides
  - Economy of scale
  - Facility optimization (esp. storage)

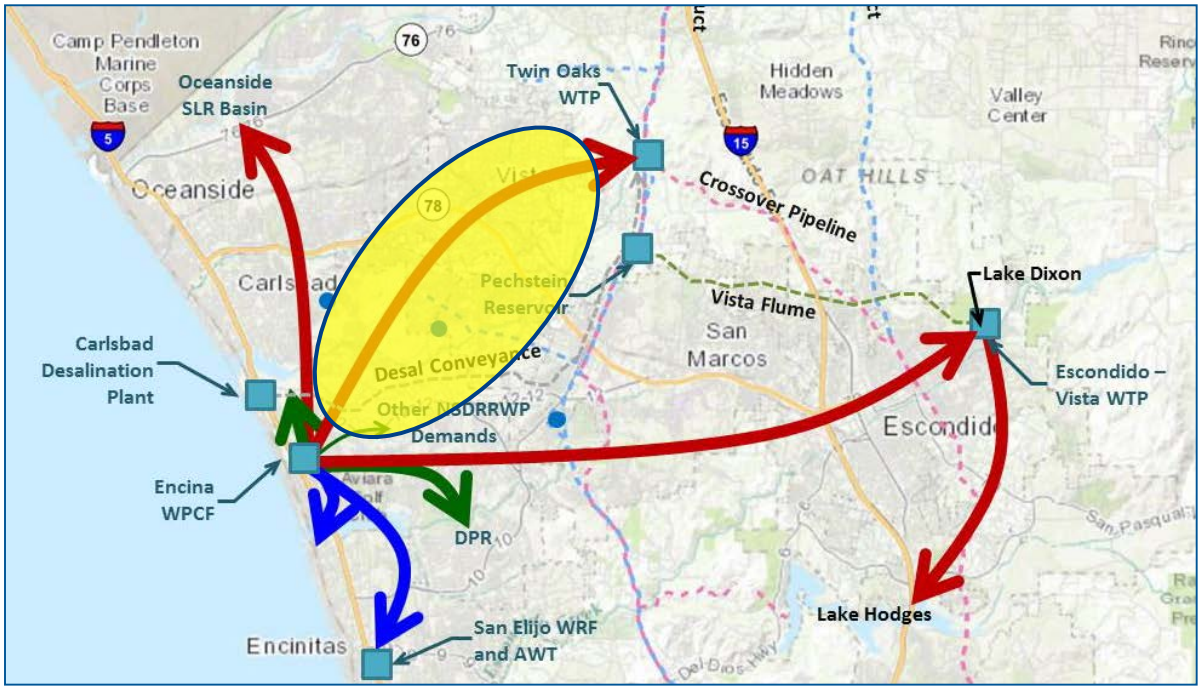
Challenges

- Escondido has moved forward with New Programmatic Plan
- Uncertain what is available in peak summer season

ENCINA WPCF RECYCLED WATER SOURCE

Overview

- Currently studying regional reuse
- Capacity equals VWD wastewater



Benefits

- Regional collaboration
- Timing may be right for DPR

Challenges

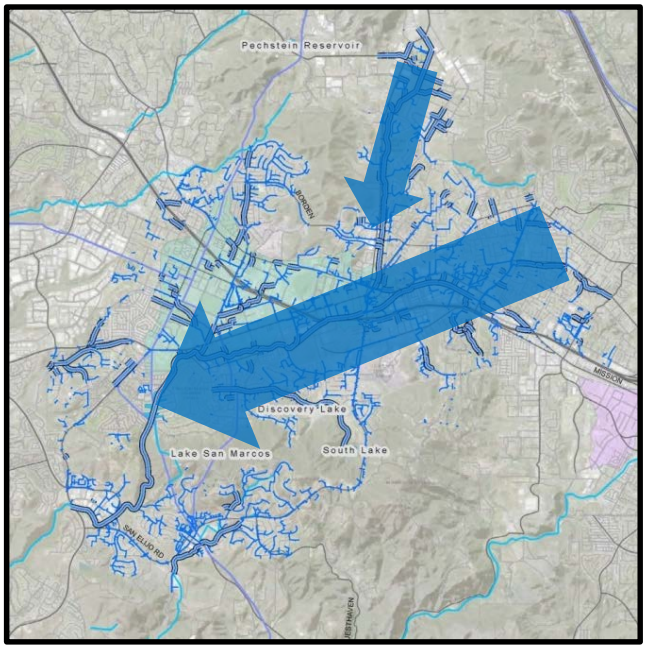
- Long distances for transmission piping
- Lift and energy for pumping

STORMWATER

AND

DRY WEATHER RUNOFF

STORMWATER CAPTURE



Overview

- Requires infrastructure to capture stormflows
- Utilize storage facilities

Benefits

- Dilution for indirect potable reuse
- Supplemental source for non-potable reuse
- May offer water quality benefits (TDS)

Challenges

- Requires significant storage volumes and diversions
- Water rights would need to be assessed
- Little yield in dry years

STORMWATER CAPTURE : SOUTH LAKE

Overview

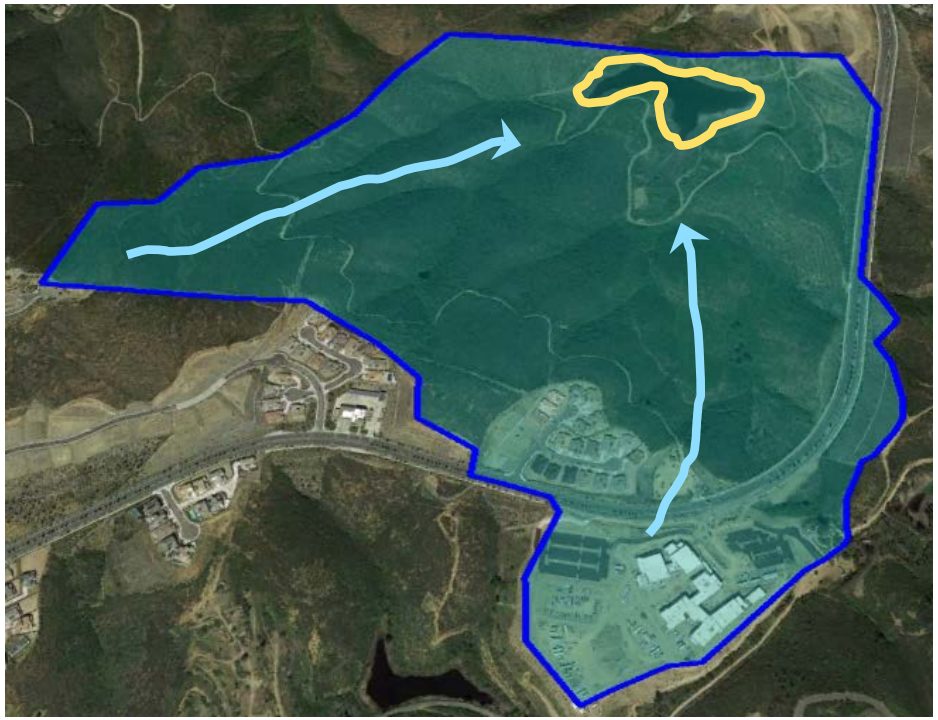
- 75 MG (230 AF) capacity
- 200 acre watershed with 15 in/year average rainfall less 60% losses yields 100 AFY *

Benefits

- Recreational opportunities
- NPR opportunities

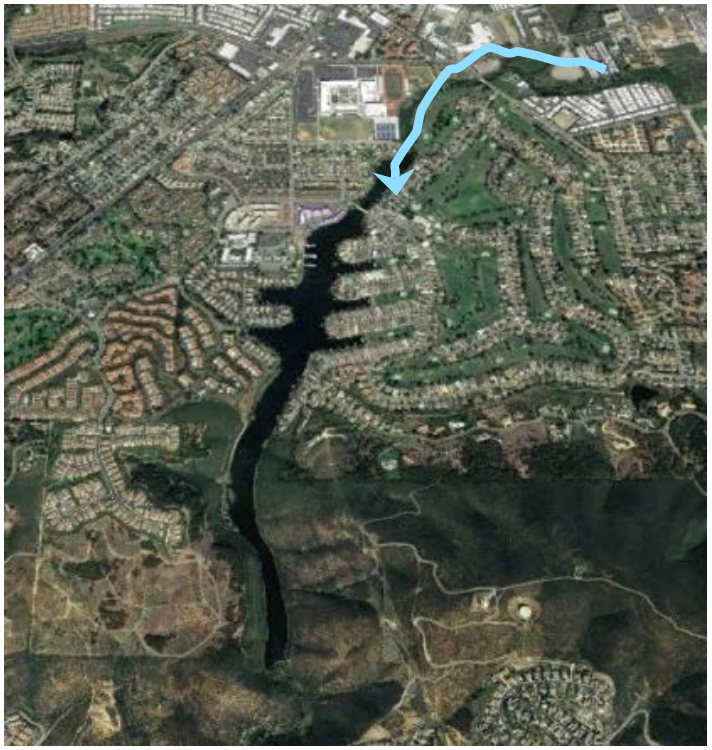
Challenges

- Diverts water away from Lake San Marcos
- Future park may restrict potential use



* 2002 Todd Engineers Study

STORMWATER CAPTURE: LAKE SAN MARCOS



Overview

- ~160 to 230 MG (~400 to 700 AF) capacity

Benefits

- Manage water quality
- Potential NPR opportunities

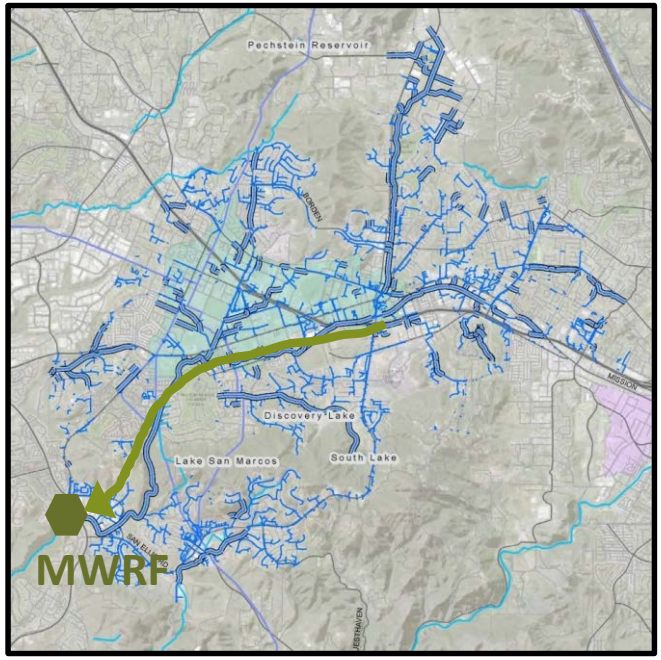
Challenges

- Requires jurisdictional arrangements
- Private ownership
- Need to address existing water quality challenges (currently in litigation)
- Requires regulatory approvals and institutional/operational changes

DRY WEATHER RUNOFF

OVERVIEW

- Divert to sewer to supplement recycled water supplies
- Divert to direct irrigation (parks, golf courses, etc.)



Condition	Flow Generation (gpd/acre)	Potential Yield for VWD from 9,000 Acres of urban watershed* (MGD)
Pre-Conservation	320	2.9
With Conservation	190	1.7
Soft Bottom	0-190	0 to 1.7 (Varies by reach of creek)

* Watershed area derived from Upper San Marcos Creek Nutrient Management Plan, 2010. Assumes ~50% of entire watershed is urbanized.

DRY WEATHER RUNOFF

BENEFITS

- Cost effective when diversion located near sewer or users
- Water quality enhancement in streams
- Partner with City

Low Flow Diversions

CHALLENGES

- Water rights
- Regulatory
- Conservation likely to reduce flows over time
- Treatment plant modifications

WHERE CAN WE USE RECYCLED WATER?

- **Non-potable reuse**
- **Potable reuse**

NON-POTABLE REUSE

NON-POTABLE REUSE: NEW WRF

Overview

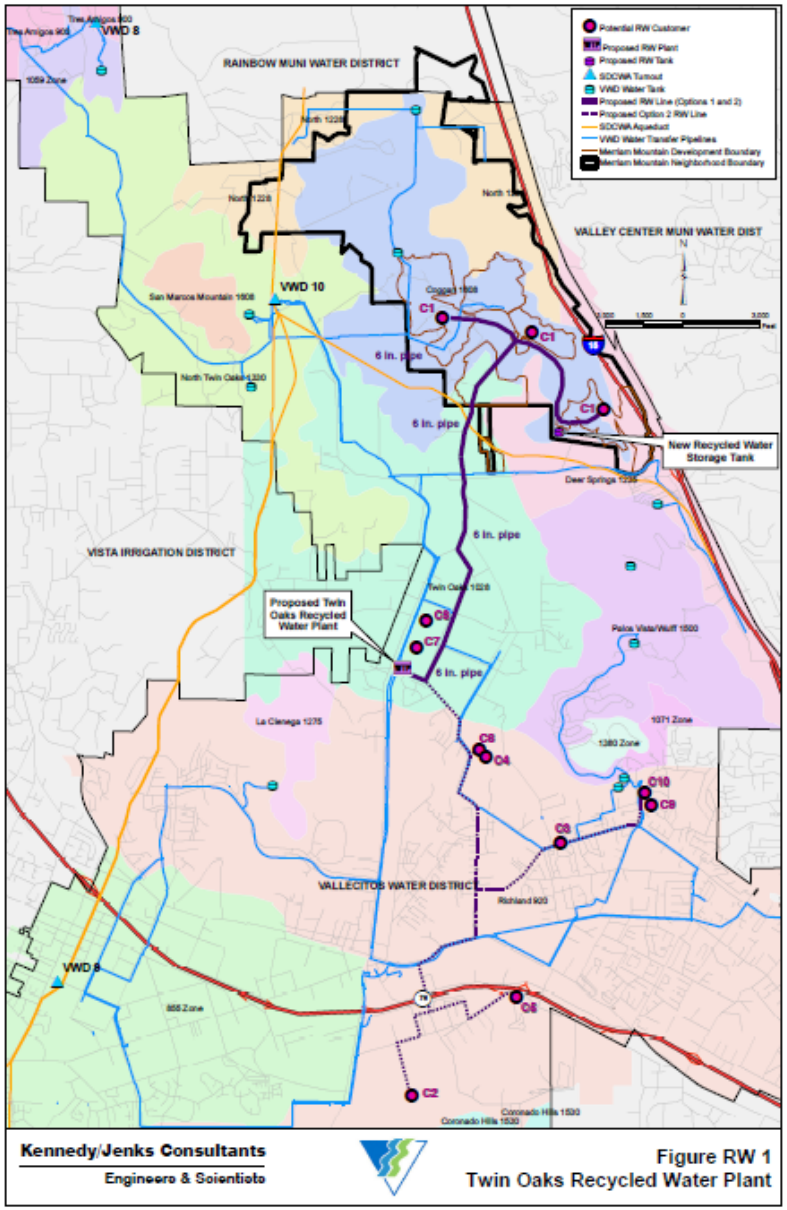
- Twin Oaks Valley Recycled Water Plant (2007 IRP Study)
- Annual Demand: 727 AFY

Benefits

- Development funded
- Expandable with growth

Challenges

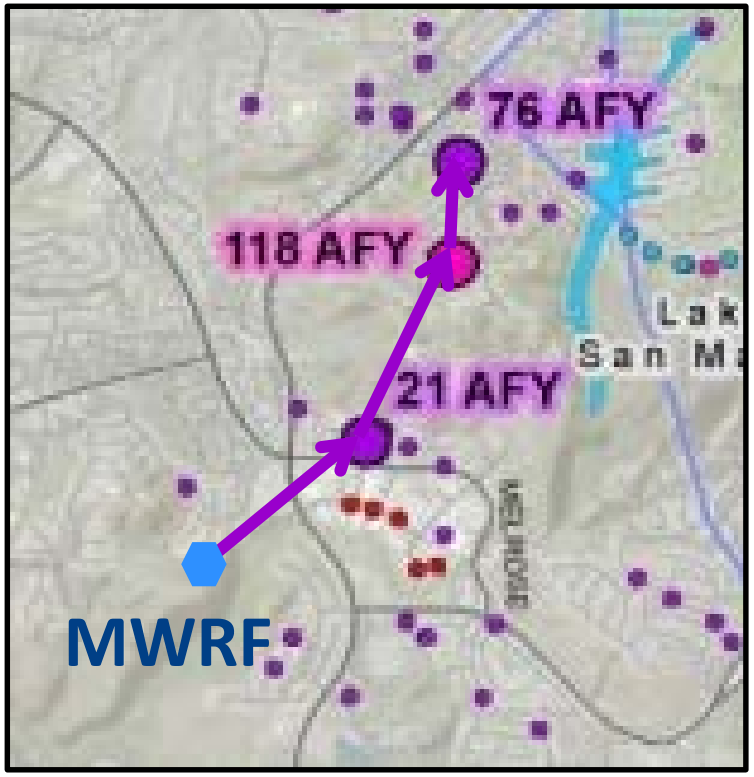
- Deemed costly
- No existing infrastructure
- Lacks economy of scale



NON-POTABLE REUSE: MEADOWLARK WRF-LOCAL USERS

Overview

- Serve largest local irrigation users (3)
- Annual demand: 215 AFY



Benefits

- Short-term opportunity
- Expandable in future

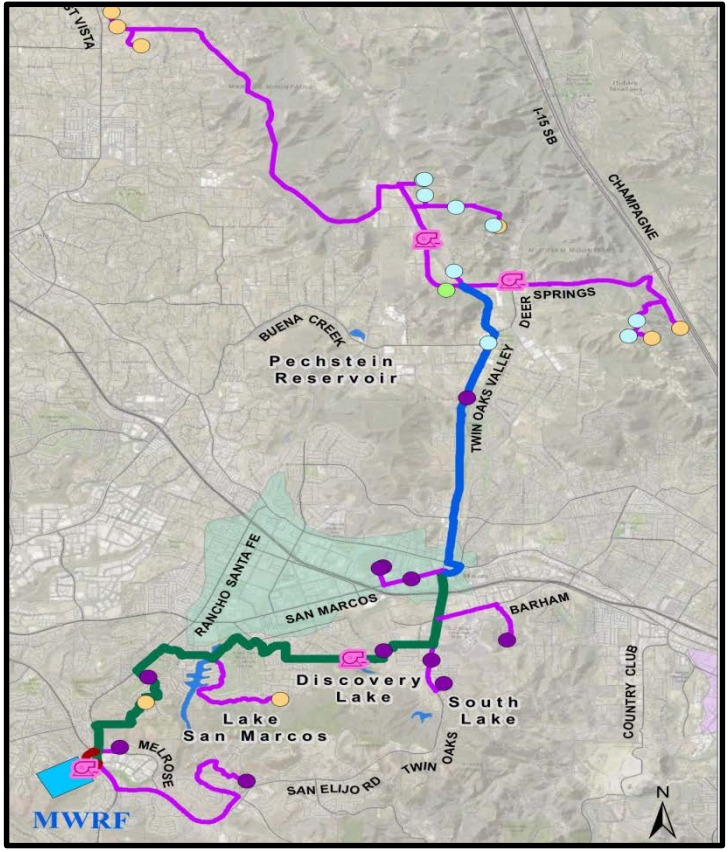
Challenges

- Wastewater supplies limited currently
- User/city agreement

NON-POTABLE REUSE: MEADOWLARK WRF-ALL USERS

Overview

- Serve all users
- Annual demand: 1,000 AFY for larger users (20+ AFY)



Benefits

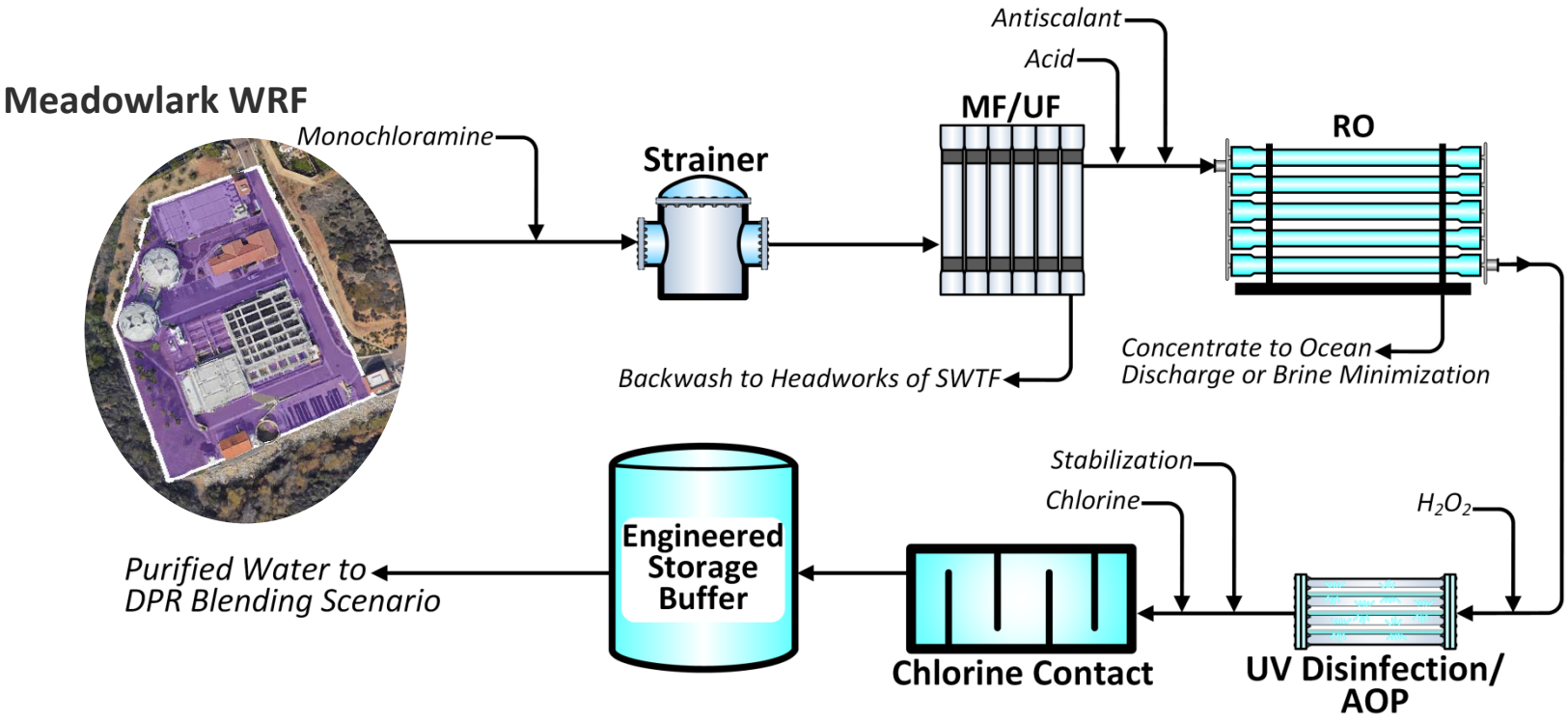
- Expandable as supply is available
- Development could provide funding/infrastructure

Challenges

- Wastewater supplies limited currently
- User/city agreement
- Expensive due to distance

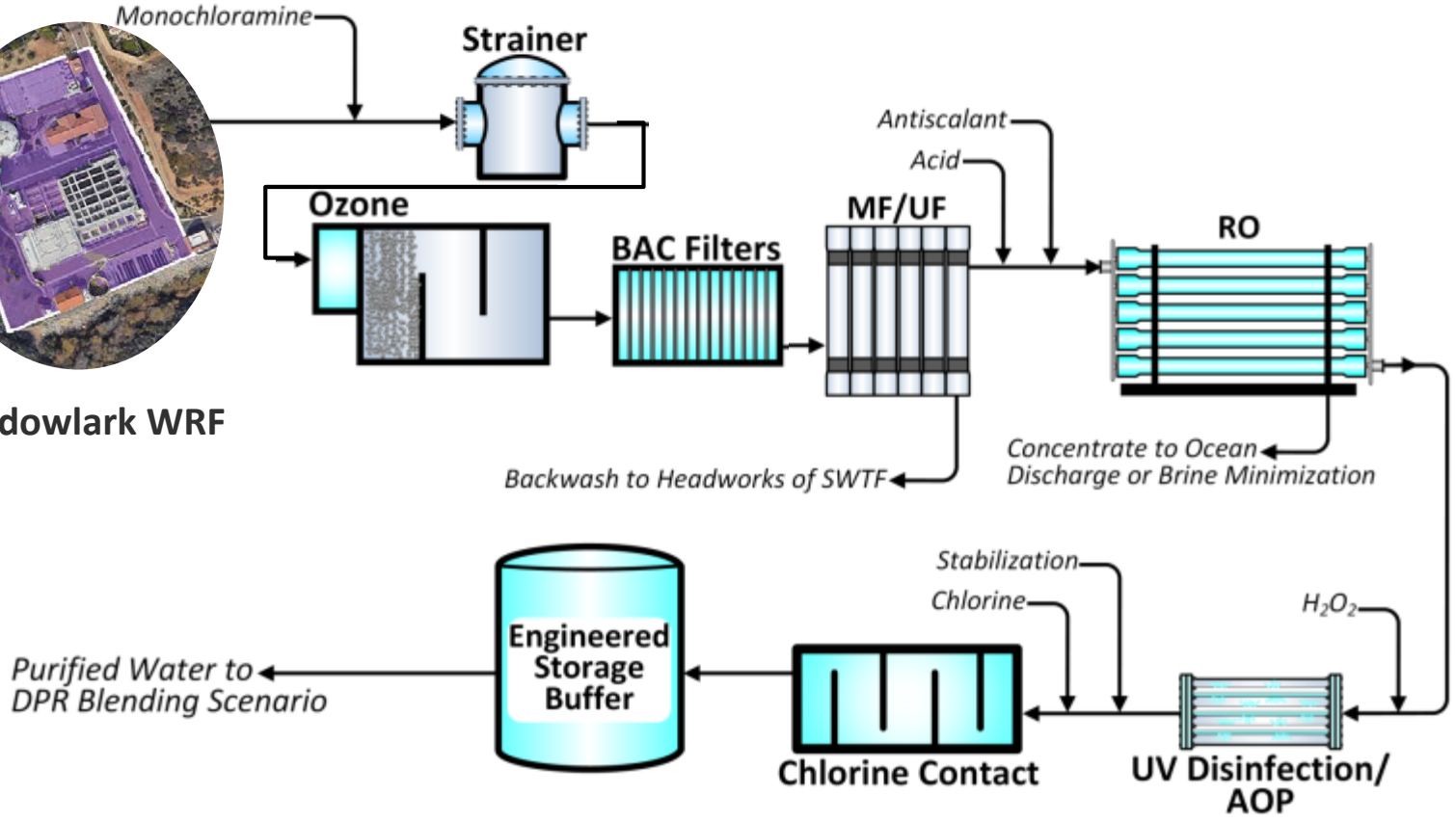
POTABLE REUSE TREATMENT

INDIRECT POTABLE REUSE PROCESS: TYPICAL



INDIRECT POTABLE REUSE PROCESS: SURFACE WATER AUGMENTATION (SMALL RESERVOIR)

Meadowlark WRF



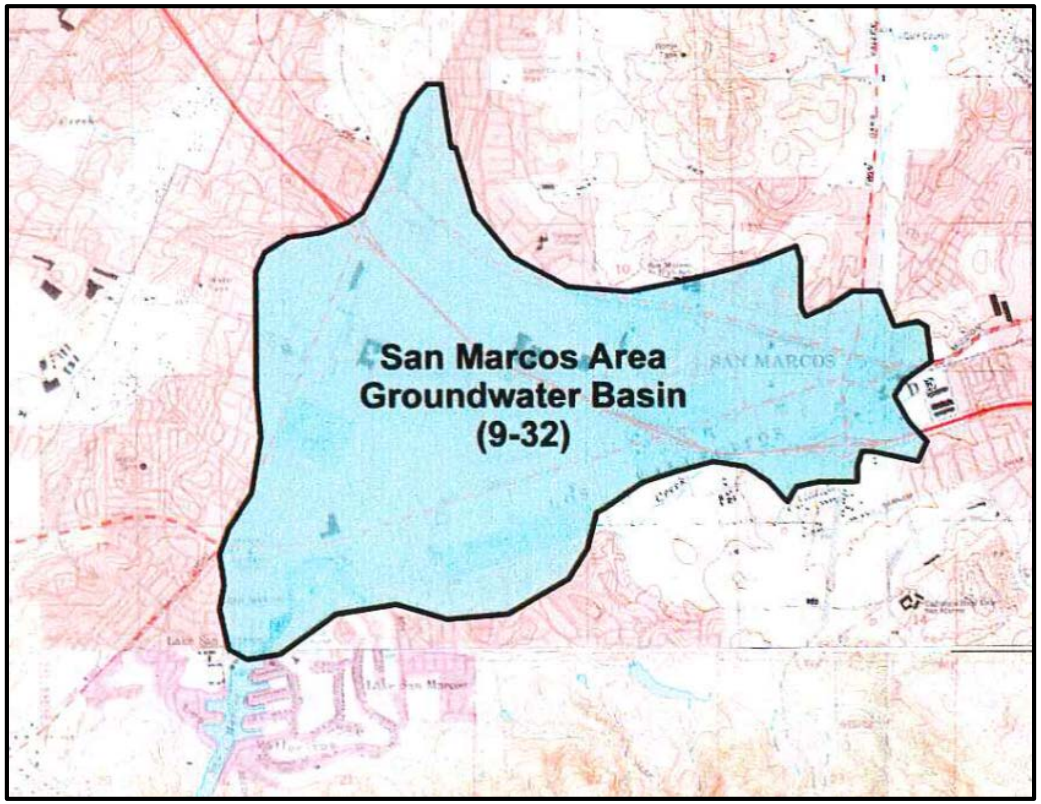
POTABLE REUSE:

GROUNDWATER RECHARGE

GROUNDWATER RECHARGE: GROUNDWATER BASIN (SMAGB)

OVERVIEW

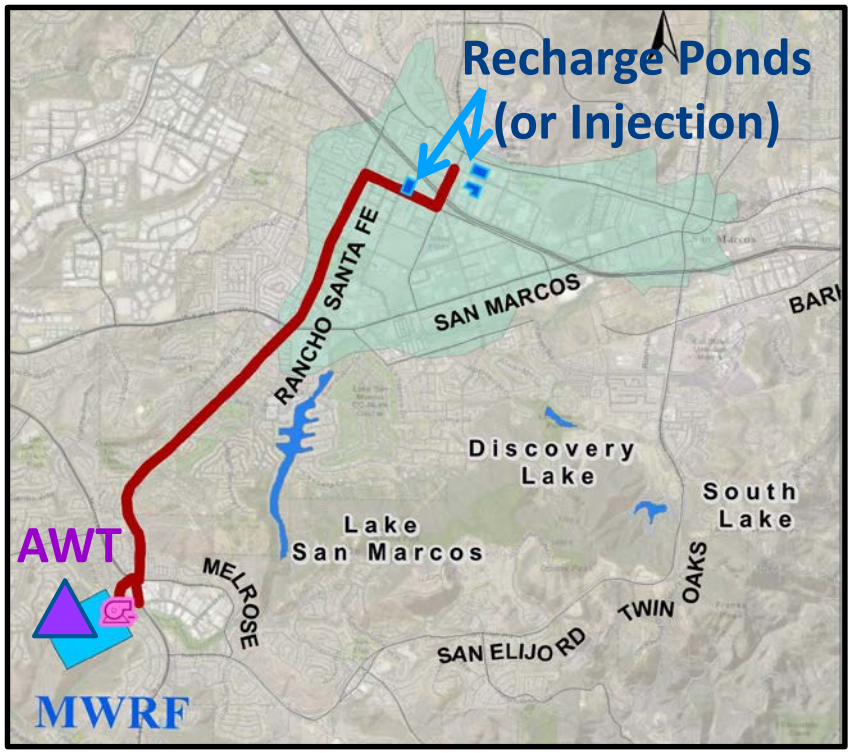
- **Current beneficial use is NPR irrigation at specific sites**
- **NPR Option:**
  - Increase recharge to improve reliability of existing irrigation wells
- **Potable Reuse Option:**
  - Requires recharge and extraction facilities

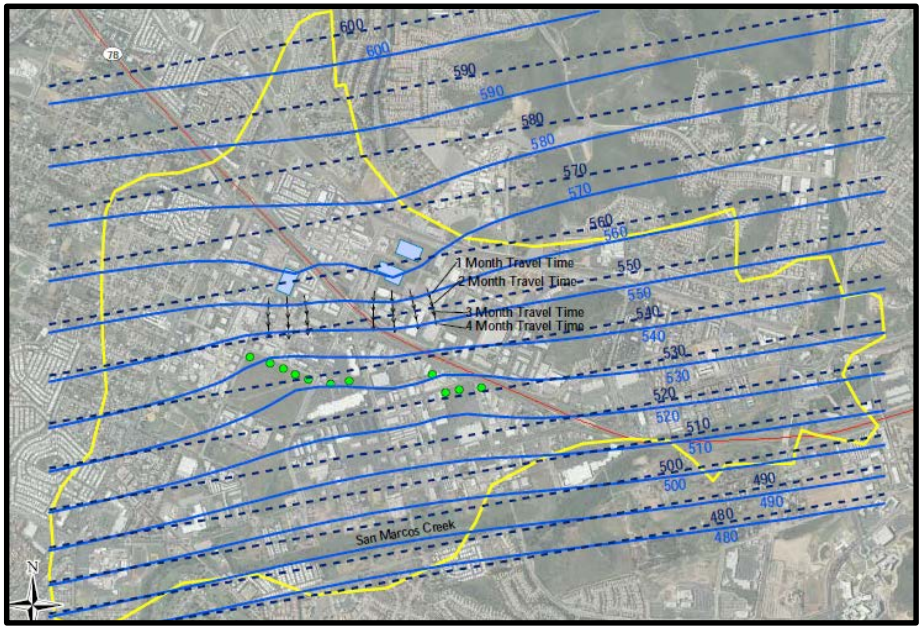


INDIRECT POTABLE REUSE OPTION: GROUNDWATER RECHARGE

Overview

- New Advance Wastewater Treatment Plant at MWRF
- 3 MGD (3,360 AFY)
- Brine-concentrate to Encina WPCF





*EWA Advanced Treatment and Water Reuse Analysis Study (2012)

GROUNDWATER RECHARGE: SMAGB

BENEFITS

- Diversified water supply (potable or NPR supplies)
- May improve water quality in long-term

CHALLENGES

- Water rights could be a challenge
- Uncertainty in basin yield (may be much lower than 3 MGD)
- Decomposed and fractured bedrock => loss of water
- Siting for recharge and extraction facilities
- Potable reuse would require source of blend water
- High cost just to evaluate
- Requires land purchase for recharge

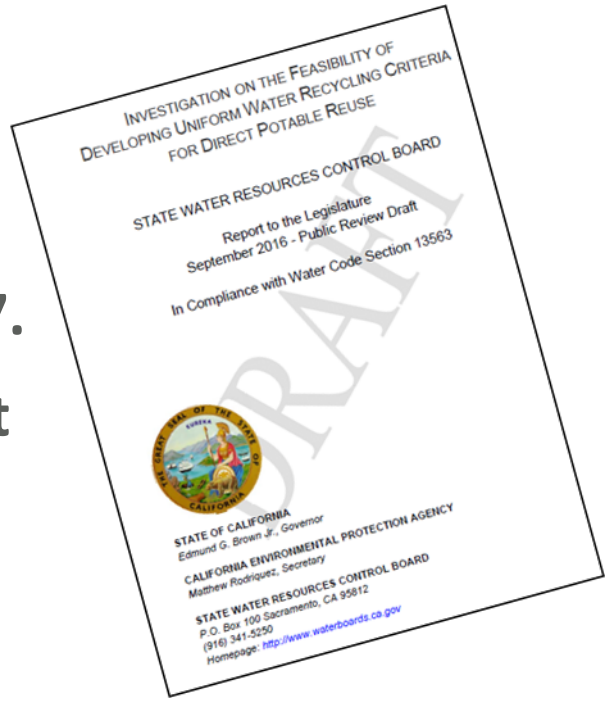
POTABLE REUSE:

SURFACE WATER AUGMENTATION

SURFACE WATER AUGMENTATION

Overview

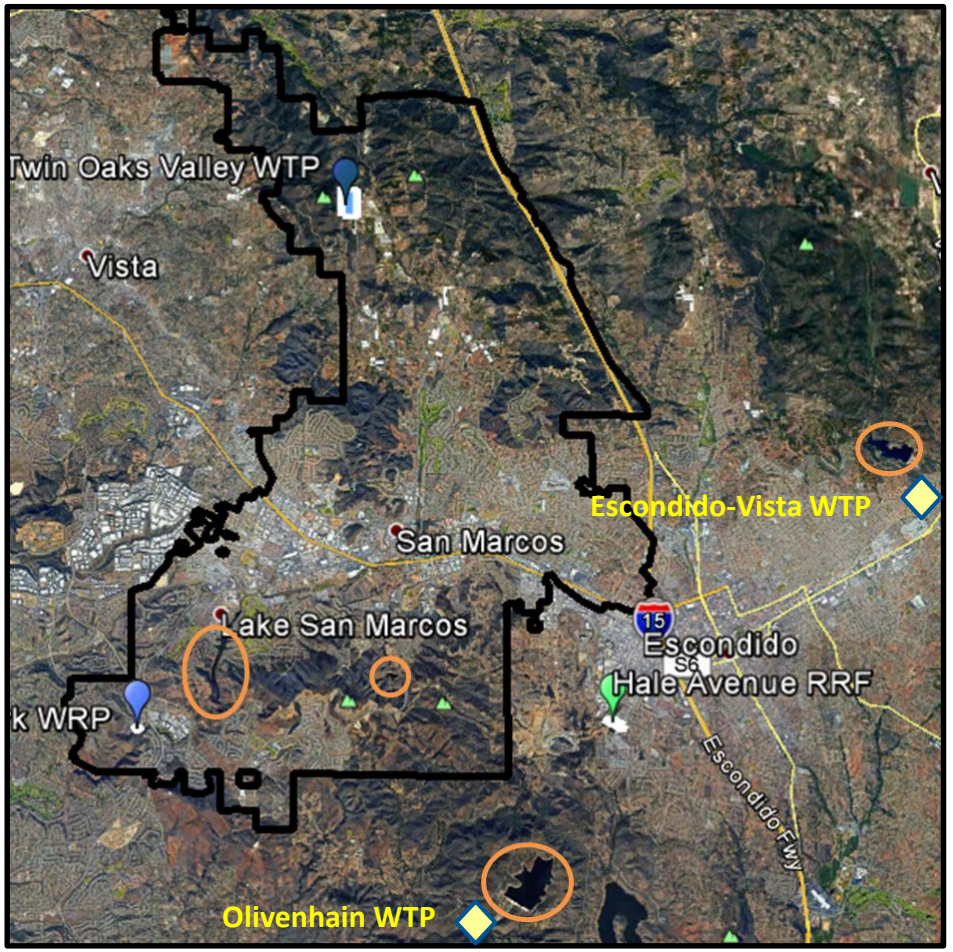
- Proposed SWA regulations will be available for public comment in Q1 2017.
- Need reasonably large reservoir to meet regulations
- Smaller reservoirs likely to require additional treatment (Ozone-BAC)



Benefits

- Year-round utilization of recycled water
- Diversified potable water supply

SURFACE WATER AUGMENTATION OPTIONS



Challenges

- **South Lake**
  - Very small
  - No existing WTP
- **Lake San Marcos**
  - Small
  - No existing WTP
  - No ownership
- **Escondido**
  - Program in progress
  - Distance to North Escondido
- **Olivenhain**
  - Other agency's facility/public
  - Long distance and elevation gain to VWD

SURFACE WATER AUGMENTATION: SOUTH LAKE

Overview

- New AWT and WTP
- 165 AFY (0.15 MGD)

Benefits

- Potable water supply
- VWD facilities
- Enhance South Lake

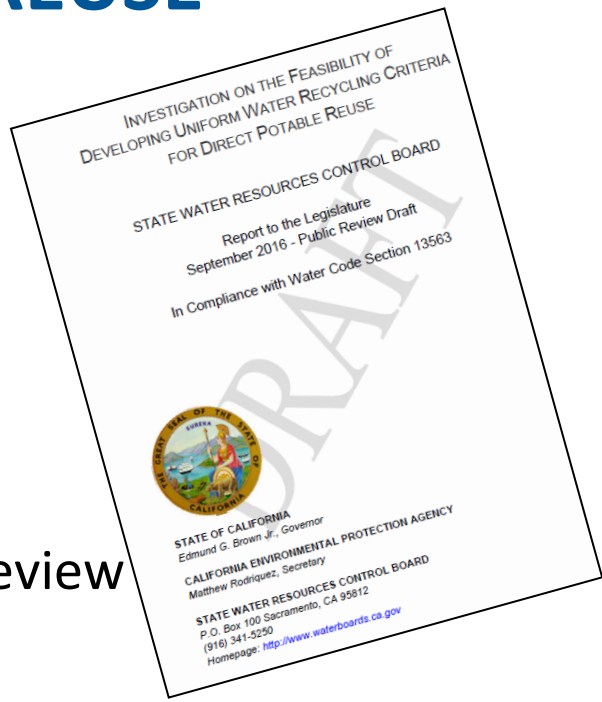
Challenges

- Regulatory
- Public acceptance/dual use
- Blending water source needed
- Major facility needs
- Economy of scale

DIRECT POTABLE REUSE

STATUS ON DIRECT POTABLE REUSE

- **Could be viable if State develops regulations (10+ years)**
- **Current regulations situation:**
  - Expert Panel Draft Key Research Recommendations (Issued: June 30, 2016)
  - Draft DPR Feasibility Report for Public Review (Issued: Sep 1, 2016) - 45 day comment period
  - Final Feasibility Report (SB 918)
    - Due to Legislature (Dec 31, 2016)
    - SWRCB to evaluate the feasibility to develop criteria for DPR



DIRECT POTABLE REUSE OPTION: NEW AWT

Overview

- New Advance Wastewater Treatment Plant at MWRF
- 1.2 to 5.2 MGD Available (1,300 AFY to 5,800 AFY)
- Brine-concentrate to Encina WPCF

Benefits

- No new distribution system
- Utilize recycled water year-round

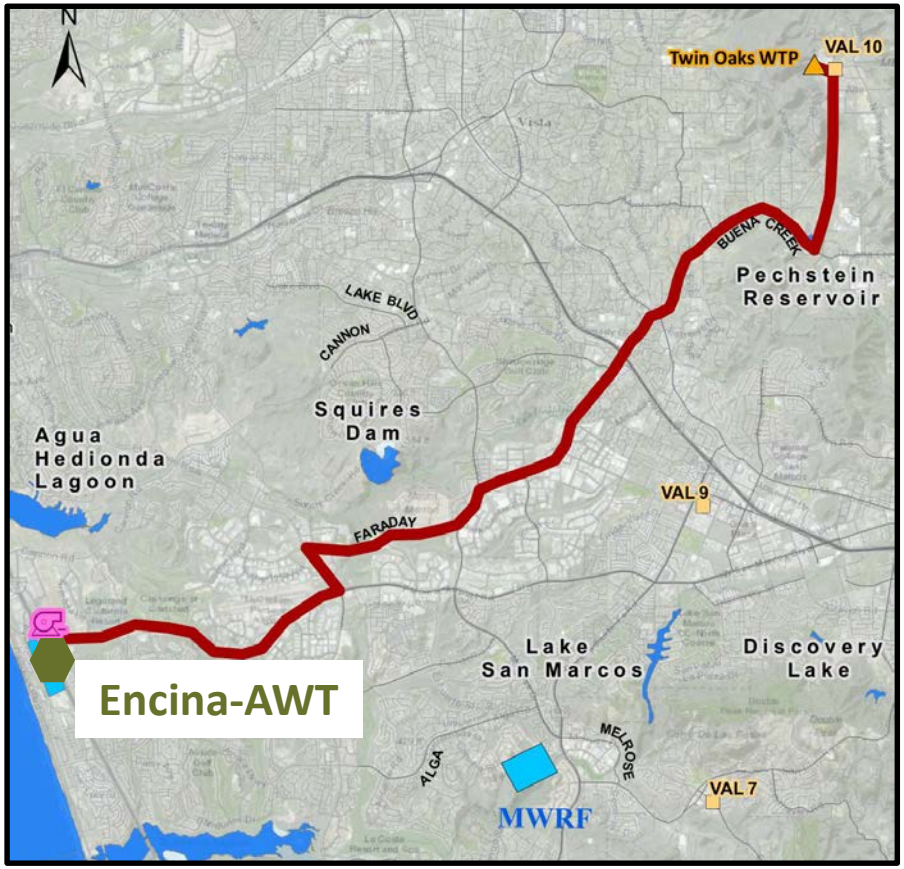
Challenges

- Regulatory
- Public acceptance
- DPR lacks environmental buffer (long-term option only)

DIRECT POTABLE REUSE OPTION: REGIONAL DPR AT ENCINA

Overview

- Regional program
- Region: 32 MGD
  VWD: 9.4 MGD (10,500 AFY)
- DPR to Twin Oaks WTP



Benefits

- Better economy of scale ($/af??)
- No new treatment plant

Challenges

- Regulatory (10+ year)
- Public acceptance
- Longer transmission line

FINDINGS AND RECOMMENDATIONS

AVOIDED COSTS

Typical Costs	Vallecitos Water District
Avoided/deferred water supply CIPs	None
Reduced imported water supply purchase costs	$1,255/AFY
Avoided/deferred wastewater disposal CIPs	None (Still need outfall as failsafe)
Reduced wastewater disposal operations costs	Minor (costs offset by brine-concentrate when using RO)

RECYCLED WATER ALTERNATIVES SUMMARY

Alternatives	Total Water Produced (AFY)	Capital Cost[1] ($)	Gross Water Cost[2] ($/AF)	Adjusted Unit Cost[3] ($/AF)
Non-Potable Reuse				
NPR-Local	215	$ 19,000,000	$ 6,500	$5,900
NPR-Max	994	$ 154,000,000	$ 10,100	$9,200
Indirect Potable Reuse				
IPR-GW	3,360	$ 356,000,000	$ 8,400	$7,700
IPR-SWA	165	$ 33,000,000	$ 14,500	$13,400
Direct Potable Reuse				
DPR-AWT-1	1,344	$ 107,000,000	$ 5,700	$5,200
DPR-AWT-2	5,825	$ 343,000,000	$ 4,500	$4,100
DPR-Encina	10,529	$ 215,000,000	$ 1,900	$1,700

Notes

Current Imported (SDCWA) Costs: $1255 per AF

1) Capital costs include construction, implementation (soft) costs (45%), and contingencies (30%)

2) Gross Water Cost includes O&M cost and assumed financing of 30 yr and 3% interest ammoniz

3) Adjusted unit costs include potential grant funding (10%) and potential LRP funding ($100/AF).

RECYCLED WATER ALTERNATIVES SUMMARY

Alternatives	Key Challenges	Relative Challenges (H/M/L)	Potential Timeframe
Non-Potable Reuse			
NPR-Local	Cost-effectiveness	Low	Short
NPR-Max	Cost-effectiveness, Avail. of supply	Med	5 to 10 years
Indirect Potable Reuse			
IPR-GW	Size/cost, Uncertainty	High	N/a
IPR-SWA	Size/cost, Regulations	High	10+ years
Direct Potable Reuse			
DPR-AWT-1	Size/cost, no current regulations	High	10+ years
DPR-AWT-2	Size/cost, no current regulations	High	10+ years
DPR-Encina	No current regulations	High	10+ years

FINDINGS

- **Evaluated many possibilities**
- **Major asset for VWD: wastewater available in future**
- **Major challenges:**
  - VWD lacks typical “resources” that drive solutions
  - Limited wastewater supplies currently
  - Lakes and groundwater: small with a lot of hurdles
- **All these options are doable but require a lot of steps and cost to get there**
- **Aim is to set up a pathway based what could confront or provide opportunities to VWD in the future**
  - Desalination
  - Local contracts
  - Regulatory environment
  - Cost of water

RECOMMENDED TOP OPTIONS

- **Short-term strategy: Non-potable reuse**
  - Implement small-local reuse based on available flow
  - Get VWD into reuse retail business
  - Maintains future flexibility for:
    - Expanding NPR as supply/funding available
    - Keeping IPR/DPR in play for long-term
    - Runoff/stormwater capture could enhance supplies
  - Part of North San Diego Regional goals

RECOMMENDED TOP OPTIONS

- **Long-term strategy: Potable Reuse Opportunities**
  - VWD lacks key resources for single agency project:
    - Groundwater is a major challenge
    - Surface water options not viable currently
  - Continue to engage in regional plans/options:
    - North San Diego Regional study
    - Encina Potable Reuse
  - Monitor State regulations for DPR