Bay Area Drought Relief Program (Bay DRP)

Attachment 3

PROJECT JUSTIFICATION

Association of Bay Area Governments

Proposition 84

Integrated Regional Water Management

2014 Drought Grant Application

List of Acronyms and Abbreviations

ABAG	Association of Bay Area Governments
ACWD	Alameda County Water District
AF	acre-feet
AFD	acre-feet per day
AFY	acre-feet per year
AMI	advanced metering infrastructure
AMR	automatic meter reading
BAIR	Bypass Alternatives Investigation Report
BAWSCA	Bay Area Water Supply and Conservation Authority
Bay DRP	Bay Area Drought Relief Program
BOD	biochemical oxygen demand
BOD_5	biochemical oxygen demand consumed over 5 days
CalWater	California Water Service Company
CBOD	carbonaceous biochemical oxygen demand
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
cfs	cubic feet per second

CIP	Capital Improvement Program
CLP	Cope Lake to Lake I Pipeline
COG	Council of Governments
COL-5	Chain of Lakes Well No.5
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CWD	County Water District
cy	cubic yards
DAF	dissolved air flotation
Delta	Sacramento-San Joaquin River Delta
DERWA	Dublin-San Ramon Services District (DSRSD) and East Bay Municipal Utility District (EBMUD) Recycled Water Authority
DSRSD	Dublin-San Ramon Services District
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
FEMA	Federal Emergency Management Agency
ft.	feet
FY	fiscal year
gpcd	gallons per capita per day
gpm	gallons per minute
GWh	gigawatt-hours
HDPE	high-density polyethylene
hp	horsepower
I-	Interstate
in.	inches
IRWM	Integrated Regional Water Management
kg/yr	kilograms per year
kWh	kilowatt-hours
LAVWMA	Livermore-Amador Valley Water Management Agency
LCA	Lower Cherry Aqueduct
LCWD	Los Carneros Water District
LF	linear feet
MCL	maximum contaminant level
MG	million gallons
MGD	million gallons per day
mg/L	milligrams per liter
MMWD	Marin Municipal Water District
MND	Mitigated Negative Declaration
MST	Milliken-Sarco-Tulocay
MWh	megawatt-hours
NBWRA	North Bay Water Reuse Authority
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSD	Napa Sanitation District
PAC	Powdered Activated Carbon
Plan	Stinson Beach Water Supply & Drought Preparedness Plan
Prop 84	Proposition 84
Proposal	the proposal being submitted in response to the 2014 IRWM
PSP	Proposal Solicitation Package
RCD	resource conservation district

RWQCB	Regional Water Quality Control Board
RWTP	Rinconada Water Treatment Plant
San Mateo County RCD	San Mateo County Resource Conservation District
SBA	South Bay Aqueduct
SCVWD	Santa Clara Valley Water District
SFEP	San Francisco Estuary Partnership
SFPUC	San Francisco Public Utilities Commission
SRVRWP	San Ramon Valley Recycled Water Program
StopWaste	Alameda County StopWaste.org
SWP	State Water Project
TDS	total dissolved solids
THMs	trihalomethanes
TN	total nitrogen
TOC	total organic carbon
TSS	total suspended solids
TTHM	total trihalomethane
UFW	unaccounted-for water
U.S. EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WPCP	Sunnyvale Water Pollution Control Plant
WSIMP	SCVWD's 2012 Water Supply and Infrastructure Master Plan
WWTP	wastewater treatment plant
Zone 7	Zone 7 Water Agency
µg/L	micrograms per liter

Introduction

The Bay Area Drought Relief Program (Bay DRP) and its eleven high-priority projects comprise a geographically diverse and well-integrated implementation program with multiple water supply, recycled water, and drought preparedness benefits to the Bay Area's diverse population. This attachment demonstrates that this Proposal contains significant, dedicated, and well-defined projects that meet multiple Program Preferences of the California Department of Water Resources (DWR) Proposition 84 (Prop 84) Integrated Regional Water Management (IRWM) Guidelines. This attachment describes how the Bay DRP meets the needs created by the drought, estimates the physical benefits associated with each project, justifies how the project is technically feasible, describes how the project can achieve the claimed level of benefits, and explains whether the benefits will be attained through the least cost alternative. A brief description of grant administration tasks is provided as Project 12.

The Bay DRP geographically spans the entire Bay Area region and addresses four primary benefits:

- Water Supply Enhancement
- Recycled Water
- Human Right to Water
- Drought Preparedness

To facilitate review, the projects are grouped by primary benefit type, as listed in **Table 3-1**, below. **Table 3-2** provides an abstract for each project. A **Regional Map** showing the locations of these projects in relation to the San Francisco Bay IRWM Regions is included as **Figure 3-1**. It is important to note that while the project groupings shown in **Table 3-1** are intended to facilitate review, many of the 11 high-priority projects provide multiple benefits (such as Water Supply Enhancement and Drought Preparedness). Details and justifications for each of the 11 high-priority projects are provided in this attachment following the summary tables.

Table 3-1. Bay DRP Project Identification Numbers and Organization

Primary Project Benefit	Project ID#	Project Proponent	Project Title
Water Supply Enhancement	1	San Francisco Public Utilities Commission (SFPUC)	Lower Cherry Aqueduct Emergency Rehabilitation Project
	2	Santa Clara Valley Water District (SCVWD)	Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment
	3	Zone 7 Water Agency (Zone 7)	Zone 7 Water Supply Drought Preparedness Project
Recycled Water	4	Napa Sanitation District	Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines
	5	SCVWD and City of Sunnyvale	Sunnyvale Continuous Recycled Water Production Facilities and Wolfe Road Pipeline
	6	DERWA[1]	DERWA Phase 3 Recycled Water Expansion Project
	7	City of Calistoga	Calistoga Recycled Water Storage Facility
Human Right to Water	8	San Mateo County Resource Conservation District (San Mateo County RCD)	Drought Relief for South Coast San Mateo County
	9	Stinson Beach County Water District (CWD)	Stinson Beach Water Supply & Drought Preparedness Plan

Primary Project Benefit	Project ID#	Project Proponent	Project Title
Drought Preparedness	10	StopWaste[2]	Bay Area Regional Drought Relief Conservation Program
	11	Marin Municipal Water District (MMWD)	WaterSMART Irrigation with AMI/AMR[3]
Administration	12	Association of Bay Area Governments (ABAG)/San Francisco Estuary Partnership (SFEP)	Grant Administration

[1.] *DERWA: Dublin-San Ramon Services District (DSRSD) and East Bay Municipal Utility District (EBMUD) Recycled Water Authority*

[2.] *This Project will be implemented by a group of 12 project proponents led by Alameda County StopWaste.org (StopWaste). Participating agencies and organizations include: Alameda County Water District, Bay Area Water Supply and Conservation Authority, City of Napa, Contra Costa Water District, EBMUD, MMWD, SFPUC, SCVWD, Solano County Water Agency, Sonoma County Water Agency, StopWaste, and Zone 7.*

[3.] *AMI/AMR: advanced metering infrastructure/automatic meter reading*

Table 3-2. Bay DRP – 2014 IRWM Drought Grant Application Project List

Project ID #	Project Name	Project Proponent	Project Abstract
1	Lower Cherry Aqueduct Emergency Rehabilitation Project	SFPUC	The project provides access to 150,000+ acre-feet (AF) of immediate, cost-effective, potable water for drought preparedness for 2.6 million Bay Area residents.
2	Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment	SCVWD	This project adds PAC treatment to SCVWD's Rinconada Water Treatment Plant to deliver 36,233 AF of water that meets drinking water standards.
3	Zone 7 Water Supply Drought Preparedness Project	Zone 7	The project constructs a new well and short pipeline to increase water supply in the Livermore-Amador Valley during severe drought conditions.
4	Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Distribution Pipelines	Napa Sanitation District (NSD)	The projects extend recycled water distribution infrastructure, which will offset groundwater and surface water use in the Napa Valley.
5	Sunnyvale Continuous Recycled Water Production Facilities and Wolfe Road Pipeline	SCVWD and City of Sunnyvale	The project consists of plant improvements and construction of a recycled water pipeline to offset 1,680 acre-feet per year (AFY) of potable water demand.
6	DERWA Phase 3 Recycled Water Expansion Project	DERWA	The project includes construction of 9 miles of recycled water pipelines (867 AFY), which will replace potable demand with recycled water.
7	Calistoga Recycled Water Storage Facility	City of Calistoga	The project enhances recycled water production and storage to provide increased water supply for urban and agricultural use.

Project ID #	Project Name	Project Proponent	Project Abstract
8	Drought Relief for South Coast San Mateo County	San Mateo County RCD	The project enhances water supply and management to improve drought preparedness and drinking water supply reliability.
9	Stinson Beach Water Supply & Drought Preparedness Plan	Stinson Beach CWD	The plan mitigates water supply shortages and increases water conservation efforts in response to current and future droughts.
10	Bay Area Regional Drought Relief Conservation Program	StopWaste	The project expands indoor and outdoor water use efficiency efforts to support the statewide 20% drought demand reduction goal.
11	WaterSMART Irrigation with AMI/AMR	MMWD	The project provides immediate drought preparedness by improving landscape irrigation efficiency and achieving long-term water use reductions.
12	Grant Administration	ABAG/SFEP	The grant administration task ensures that IRWM grant funds for the 11 projects are properly managed, projects completed, and schedules met within budget.

Notes:

AF = acre-feet

AFY = acre-feet per year

AMI = advanced metering infrastructure

AMR = automatic meter reading

DSRSD = Dublin-San Ramon Services District

EBMUD = East Bay Municipal Utility District

StopWaste = Alameda County StopWaste.org (StopWaste), Alameda County Water District, Bay Area Water Supply and Conservation Authority, City of Napa, Contra Costa Water District, East Bay Municipal Utility District, Marin Municipal Water District San Francisco Public Utilities Commission, Santa Clara Valley Water District, Solano County Water Agency, Sonoma County Water Agency, and Zone 7 Water Agency

Regional Map

Proposed Bay DRP Project Location

IRWM Subregions

- North - Marin, Sonoma, Napa, Solano
- East - Alameda, Contra Costa
- West - San Francisco, San Mateo
- South - Santa Clara

S.F. Bay Area IRWM Region Boundary

County Line

Figure 3-1

Bay Area Drought Relief Program (Bay DRP)
2014 IRWM Drought Grant Application
Proposed Project Locations

Project Summary Table

PSP Table 4 lists the projects by identification number and identifies which aspects of the Drought Project Element and IRWM Project Element are met by the 11 drought preparedness projects. The IRWM Drought Project Eligibility and IRWM Project Elements presented in the table are as follows:

IRWM Drought Project Eligibility:

D.1: Provide immediate regional drought preparedness

D.2: Increase local water supply reliability and the delivery of safe drinking water

D.3: Assist water suppliers and regions to implement conservation programs and measures that are not locally cost effective

D.4: Reduce water quality conflicts or ecosystem conflicts created by the drought

IRWM Project Elements:

IR.1: Water supply reliability, water conservation, and water use efficiency

IR.2: Stormwater capture, storage, cleanup, treatment, and management

IR.3: Removal of invasive non-native species; the creation and enhancement of wetlands; and the acquisition, protection, and restoration of open space and watershed lands

IR.4: Non-point source pollution reduction, management, and monitoring

IR.5: Groundwater recharge and management projects

IR.6: Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users

IR.7: Water banking, exchange, reclamation, and improvement of water quality

IR.8: Planning and implementation of multipurpose flood management programs

IR.9: Watershed protection and management

IR.10: Drinking water treatment and distribution

IR.11: Ecosystem and fisheries restoration and protection

PSP Table 4. 2014 IRWM Drought Solicitation Project Summary Table											
Project ID and Title	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
	Lower Cherry Aqueduct Emergency Rehabilitation Project	**Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment**	**Zone 7 Water Supply Drought Preparedness Project**	**Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines**	**Sunnyvale Continuous Recycled Water Production Facilities and Wolfe Road Pipeline**	**DERWA Phase 3 Recycled Water Expansion Project**	**Calistoga Recycled Water Storage Facility**	**Drought Relief for South Coast San Mateo County**	**Stinson Beach Water Supply & Drought Preparedness Plan**	**Bay Area Regional Drought Relief and Conservation Program**	**WaterSMART Irrigation with AMI/AMR**
IRWM Drought Project Element											
D.1	●	●	●	●	●	●	●	●	●	●	●
D.2	●	●	●	●	●	●	●	●	●	●	●
D.3											
D.4	●	●			●	●	●	●		●	●
IRWM Project Element											
IR.1	●		●	●	●	●	●	●	●	●	●
IR.2											
IR.3											
IR.4						●				●	
IR.5			●	●		●	●	●	●		
IR.6					●	●	●				
IR.7	●		●		●		●				
IR.8											
IR.9							●	●			
IR.10		●						●	●		
IR.11					●	●	●	●	●	●	●

The subsequent sections of Attachment 3 are organized by project benefit type and include the following information for each project:

1. Project description;
2. Project map;
3. Annual project physical benefits (primary, secondary, as well as tertiary and quaternary, if applicable) (PSP Table 5);
4. Technical analysis of physical benefits claimed; and
5. Cost effectiveness analysis (PSP Table 6).

References to support the project physical benefits described for each project are listed at the end of each project section. Copies of all references cited are provided in **Files 2 and 3 of Attachment 3**. Attachment 3, File 2 includes references for Projects 1 through 5 and File 3 includes references for Projects 6 through 11. References are truncated to provide just the document cover and relevant pages.

Project Justification – Water Supply Enhancement Projects

Project descriptions, estimated physical benefits of the projects, justification of each project's technical feasibility, and a cost-effectiveness analysis are presented in this section for the projects listed below. These projects span two sub-regions in the San Francisco Bay IRWM Region as well as Tuolumne County. The projects included in this section have benefits related to potable water supply enhancement, groundwater management, water quality treatment, and water supply reliability.

Project ID#	Project Proponent	Project Title
1	SFPUC	Lower Cherry Aqueduct Emergency Rehabilitation Project
2	SCVWD	Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment
3	Zone 7	Zone 7 Water Supply Drought Preparedness Project

Project 1 – Lower Cherry Aqueduct Emergency Rehabilitation Project

Project Description

Project Goals: The Lower Cherry Aqueduct (LCA) Emergency Rehabilitation Project (Project) will allow the San Francisco Public Utilities Commission (SFPUC) to access up to 150,000 AF of potable supply from Cherry Reservoir and Lake Eleanor in the Upper Tuolumne River watershed. The Project will provide immediate, cost-effective, regional drought relief for 2.6 million residents of the Bay Area during a severe drought, safeguarding the region against possible extension of the drought and future droughts. It will also enable flexibility of long-term water operations and adaptive management of water supplies under changing climate conditions.

Project Description: The Project is located in Tuolumne County on Cherry Creek, a tributary to the Tuolumne River. The LCA system connects water supply from Cherry Creek, Cherry Reservoir, and Lake Eleanor to the Hetch Hetchy Regional Water System, which transmits 85% of SFPUC's water supply to the Bay Area. The LCA system diverts water at the Lower Cherry Diversion Dam from Cherry Creek, and a 3-mile-long system of tunnels and open canals ultimately discharges into the Hetch Hetchy system. The LCA system was last used to convey stored water to the Bay Area during drought years in 1988. Due to aging infrastructure (built in 1917) and the damage caused by the Rim Fire, the LCA system is unable to reliably convey stored water to SFPUC's water delivery system. Project components include:

Pipe Installation & Replacement: About 5,600 ft. of open aqueduct will be converted to enclosed 84-in.-diameter pipeline, about 400 ft. of existing pipe will be replaced with new piping, and 1,000 ft. of the existing pipe will be rehabilitated to prevent erosion and corrosion; 500 cy of accumulated debris in the aqueduct will also be removed.

Tunnel Repair: Select sections of the LCA system's 9,500 ft. of tunnel will be repaired, including rock bolting, grouting, and reinforced concrete placement. Due to the Rim Fire, about 750 cy of rocks, muck, and sand from erosion will be removed from the tunnel.

Cherry Creek Diversion Dam Facility Repairs: Reconstruction of the gate house and control room; trail and bridge rehabilitation; geotechnical hazard repair (e.g., rock scaling, rock retaining walls, replacement of safety cables); replacement of head gates; concrete structural inspections and repair work; and replacement of the existing tunnel inlet structure, including a temporary coffer dam, demolishing the existing structure, and removing 20 cy of debris.

Forebay Trash Rack: SFPUC will clean an existing 20-ft.-diameter reinforced concrete structure, remove a non-functioning trash rack, seal the existing slide gate, and construct a new cover.

Geotechnical Hazard Mitigation: Engineering studies to evaluate conditions of slopes and potential rockfall hazards as a result of the 2013 Rim Fire are being conducted. Hazard mitigation work may include selective rock scaling, erosion control measures, and/or rockwall screens and fencing.

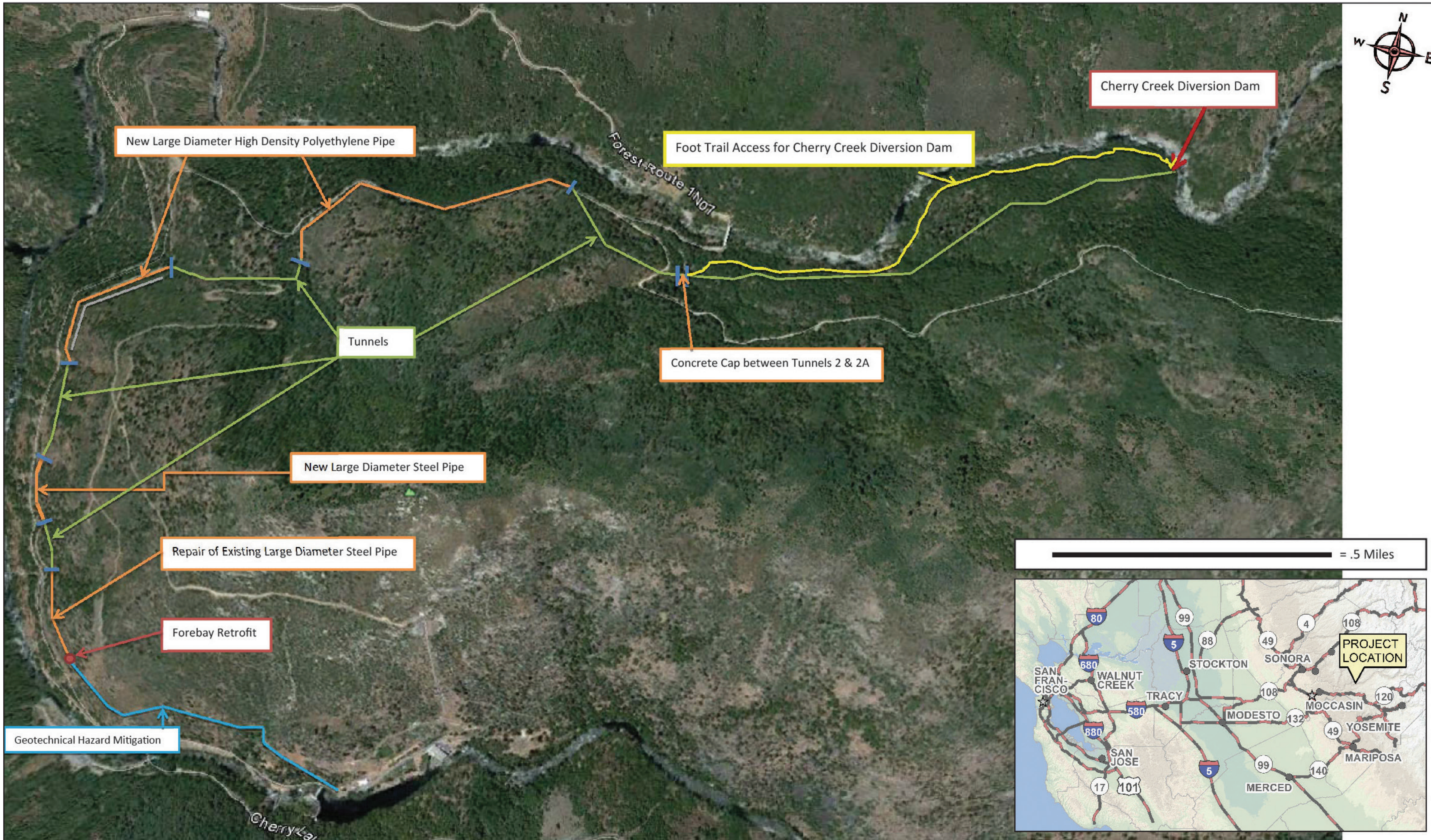
Implementation Status: The project is being implemented in two phases. Phase One will clear the aqueduct and do minimal repairs to enable the use of the asset by December 2014. Construction is estimated to commence in August 2014, and SFPUC is aiming to complete Phase One work by December 2014. Phase Two will consist of the more substantial work described above, including pipe installation and more permanent tunnel repairs. Phase Two construction will begin in April 2015 and be completed by August 2015. Project design for both phases is approximately 90% complete, environmental documentation is 35% complete and project permitting is 80% complete.

Funding Needs: The LCA system infrastructure was damaged in the 2013 Rim Fire and funding for the project was not included in SFPUC's FY 2013/14 budget. Although SFPUC has applied for FEMA funds, these sources cover only a small portion of the necessary rehabilitation, and it is unclear how much money will be made available. Considering the drought, the Project was initiated in 2014 by diverting funds from other capital infrastructure improvements, which will result in delays of these improvements into future fiscal years and increased customer rates over the long term.

Drought Eligibility: Immediate regional drought preparedness. Phase One is projected to be complete in December 2014. Once complete, the LCA will allow immediate access to 150,000 AF of supply stored in Cherry Reservoir and Lake Eleanor.

Increase local water supply reliability and safe drinking water. Upon project completion, 150,000 AF of safe drinking water will be available for consumption as soon as December 2014 to alleviate water supply demands in the Bay Area. This Project will provide connections to reliable sources of supply and ensure the SFPUC can continue making full deliveries to customers hardest hit by droughts, and to guard against the need for further rationing if dry conditions persist.

Project Map



Cherry Creek Diversion Dam
Foot Trail Access for Cherry Creek Diversion Dam
New Large Diameter High Density Polyethylene Pipe
Forest Route 1N07
Tunnels
Concrete Cap between Tunnels 2 & 2A
New Large Diameter Steel Pipe
Repair of Existing Large Diameter Steel Pipe
Forebay Retrofit
Geotechnical Hazard Mitigation
Cherry Lake
N
S
E
W
= .5 Miles
PROJECT LOCATION
SAN FRAN-CISCO
WALNUT CREEK
STOCKTON
SONORA
TRACY
MODESTO
MOCCASIN
YOSEMITE
MARIPOSA
SAN JOSE
MERCED

Project Physical Benefits

Primary and secondary project physical benefits are summarized in **PSP Tables 5a and 5b**, respectively, below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: Lower Cherry Aqueduct Emergency Rehabilitation Project **Primary Benefit Claimed:** Water Supply **Units of the Benefit Claimed:** Acre-feet (AF) **Additional Information About This Benefit:** Access to an additional 150,000 AF of water supply delivered through the Hetch Hetchy Regional Water System			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2015*	0	150,000 AF	150,000 AF of additional accessible potable water supply
2016*	0	150,000 AF	150,000 AF of additional accessible potable water supply
Last Year of Project Life (approximately 2040)	0	150,000 AF	150,000 AF of additional accessible potable water supply
Comments: **The Lower Cherry Aqueduct will not likely be used in normal hydrologic years. It will allow access to 150,000 AF of potable supply in dry years. If 2015 and 2016 are normal hydrologic years, it is unlikely SFPUC will need to utilize the asset.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: During dry years, it has historically been possible to divert water from Cherry Reservoir and Lake Eleanor through the LCA to supplement supplies to the Bay Area when Hetch Hetchy Reservoir storage is low. The primary purpose of the LCA system since the 1950s has been to convey water supply from Cherry Creek that can supplement the primary Hetch Hetchy Reservoir supply during a drought year. The last time SFPUC used the LCA system to supplement Hetch Hetchy supply was in 1988. Due to aging infrastructure, the damage caused by the 2013 Rim Fire, and current drought conditions, the LCA system is currently unable to reliably convey the supplemental water supply from Cherry Creek to SFPUC's primary water delivery system. Therefore, SFPUC is expediting the repair of the aqueduct and adding improvements to enable access to the water supply in Cherry and Eleanor Reservoirs. Given the drought, SFPUC is expediting construction of the Project to provide water supply in the event of continuing dry conditions (SFPUC, 2014).

Recent and historical conditions: SFPUC is currently requesting 10% voluntary conservation from all of its Retail and Wholesale customers. The Project is needed to repair the Lower Cherry Aqueduct because of damage caused in the 2013 Rim Fire (Black and Veatch, 2013).

Estimates of without-project conditions: If the drought continues into the winter of 2014/15 and beyond, SFPUC will need to maintain or increase rationing and potentially move to mandatory cutbacks. This could result in rationing of some individual Wholesale Customers up to 40%. With Project implementation, SFPUC will be able to defer the need for extreme rationing by an additional year.

Methods used to estimate physical benefits: Reservoir storage levels presented on SFPUC's website were used to estimate physical benefits (SFPUC, 2014).

New facilities, policies, and actions required to obtain the physical benefits: The proposed repairs and improvements to the LCA system are needed to realize the physical benefits of the Project. No additional policies are needed to ensure project implementation.

Potential adverse effects: The Project will result in adverse effects to the historically significant features of the LCA system, which has been determined to be a historic property eligible for listing on the National Register of Historic Places. The Project will also displace Townsend's big-eared bats, a USFWS-listed sensitive species and a CDFW-listed Candidate species, from three existing tunnel segments. SFPUC will implement impact avoidance, minimization, and mitigation measures to reduce significant impacts resulting from the Project.

PSP Table 5b. Secondary Annual Project Physical Benefits

Project Name: Lower Cherry Aqueduct Emergency Rehabilitation Project
Secondary Benefit Claimed: Water Supply – Groundwater Storage
Units of the Benefit Claimed: Acre-feet (AF)
Additional Information About This Benefit: 5,500 AF of unused groundwater in the Santa Clara basin

Year	Physical Benefits		
	Without Project	**With Project**	**Change Resulting from Project**
2014	SFPUC supplies 49,500 AF to Santa Clara Groundwater Basin (Santa Clara County).	SFPUC supplies 49,500 AF to Santa Clara Groundwater Basin (Santa Clara County).	No net result.
2015	Assuming continued drought conditions, SFPUC imposes additional rationing and supplies 44,000 AF to Santa Clara County, resulting in 199,880 AF of groundwater stored in the Santa Clara Basin (loss of 5,500 AF recharge).	With supply from the LCA, SFPUC supplies 49,500 AF to Santa Clara County, resulting in 205,380 AF of groundwater stored in the Santa Clara Basin.	5,500 additional AF in the Santa Clara Groundwater Basin. This represents the difference between "Severe" and "Critical" levels of SCVWD's Water Supply Contingency Plan due to common customers relying more on SFPUC supply.
2016	Assuming continued drought conditions, SFPUC imposes additional rationing and supplies 44,000 AF to Santa Clara County, resulting in 199,880 AF of groundwater stored in the Santa Clara Basin (loss of 5,500 AF recharge).	With supply from LCA, SFPUC supplies 49,500 AF to Santa Clara County, resulting in 205,380 AF of groundwater stored in the Santa Clara Basin.	5,500 additional AF in the Santa Clara Groundwater Basin. This represents the difference between "Severe" and "Critical" levels of SCVWD's Water Supply Contingency Plan due to common customers relying more on SFPUC supply.
2017	Further benefits will depend on whether dry conditions persist.	Further benefits will depend on whether dry conditions persist.	Further benefits will depend on whether dry conditions persist.
Ongoing	SFPUC supplies 49,500 AF to Santa Clara Groundwater Basin (Santa Clara County).	SFPUC supplies 49,500 AF to Santa Clara Groundwater Basin (Santa Clara County).	No net result.

Source: *SCVWD, 2014.*

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: Given the drought, SFPUC is expediting construction of the Project to provide water supply in the event of continuing dry conditions. The water provided to customers that also receive water from the SCVWD will relieve pressure on the Santa Clara Groundwater Basin, resulting in 5,500 AF of additional water stored in the basin (SCVWD, 2014: pp. 1 and 3, Table 1).

Recent and historical conditions: SFPUC is currently requesting 10% voluntary conservation from all of its Retail and Wholesale customers. The SCVWD, which manages the Santa Clara Groundwater Basin, is requesting 20% rationing from its customers (SCVWD, 2014).

Estimates of without-project conditions: Supply through the LCA will delay the time at which SFPUC will need to resort to 20% mandatory rationing. Failure to implement the Project will result in 5,500 fewer AF of water recharge to the Santa Clara Groundwater Basin, among other impacts (SCVWD, 2014: pp. 1 and 3, Table 1).

Methods used to estimate physical benefits: Reservoir storage data, demand projections, and SCVWD groundwater basin estimates were reviewed to determine groundwater recharge benefit estimates (SCVWD, 2014: pp. 1 and 3, Table 1).

New facilities, policies, and actions required to obtain the physical benefits: The proposed repairs and improvements to the LCA system are needed to realize the physical benefits of the Project. No additional policies are needed to ensure project implementation.

Potential adverse effects: None known.

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project name: Lower Cherry Aqueduct Emergency Rehabilitation Project	
Question 1	***Types of benefits provided as shown in Tables 5a and 5b:*** Water Supply**:** Project will directly and immediately increase water supply for the region by over 150,000 AF and will provide ongoing access to storage for potable water. Rehabilitation of the Lower Cherry Aqueduct (LCA) will provide reliable access to the entire Tuolumne River system water supply for the 2.6 million residents served by SFPUC before the end of calendar year 2014, providing immediate drought relief. Groundwater Recharge**:** The Project will reduce pressure on groundwater pumping in Santa Clara County to offset reduced SFPUC water deliveries due to drought. Energy Saved**:** As a third benefit, the Project will increase the quantity of water delivered by gravity to the San Francisco Bay Area, which will result in lower energy costs and less energy consumption for water delivery.
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** No. Other alternatives examined were cost-prohibitive or technically infeasible. It would be difficult to find another water supply source enabling access to 150,000 AF of potable water to the Bay Area in a dry year. For example, short- and long-term water transfers and expansion of water conservation projects would both be costly and technically infeasible to meet immediate drought relief needs. Equivalent amounts of water rationing would be economically damaging to the Bay Area region (SFPUC, 2014).
Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** See above answer to Question 2.

References Cited:

Black and Veatch, 2013. SFPUC HHWP Rim Fire Asset Recovery Plan, November 15.

San Francisco Public Utilities Commission (SFPUC), 2014. We Deliver website, Graphs 1 and 2. Available at: www.sfwater.org/wedeliver.

Santa Clara Valley Water District (SCVWD), 2014. March Water Supply Outlook.

Project 2 – Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment

Project Description

Project Goals: The Rinconada Water Treatment Plant (RWTP) Powdered Activated Carbon (PAC) Treatment Project (Project) will ensure reliable treatment and distribution of 40,000 AF of safe drinking water from a variety of sources, including sources directly affected by the drought. As alternate water supply sources are utilized as a result of the 2014 and future droughts, this Project will enable the RWTP to reliably treat water of poorer quality, such as from reservoirs that are not at full capacity (e.g., Anderson Reservoir).

Project Description: The Santa Clara Valley Water District (SCVWD)'s RWTP is located in Los Gatos and serves the following water retailers: Cities of Sunnyvale, Santa Clara, and Mountain View; San Jose Water Company; and California Water Service Company. The RWTP is over 40 years old and is SCVWD's only plant that treats the widest variety of sources in the County (Central Valley Project [CVP], South Bay Aqueduct [SBA], and local sources). Alternating between these sources is challenging, requiring the plant to adjust treatment processes quickly to adapt to source water quality. Currently, the RWTP has limited ability to adapt to such variations, which constrains the reliability of drinking water standard compliance.

Source water quality for imported supplies has deteriorated since the drought declaration in January 2014. The plant has experienced increases in total dissolved solids (TDS), bromides, total organic carbon (TOC), and organic compounds that affect taste and odor. Of particular concern are the increasing levels of TOC and bromide, which contribute to formation of carcinogenic trihalomethanes (THMs), and are expected to worsen as drought conditions continue. Due to the RWTP's age and drought conditions, compliance with current disinfection by-product regulations is threatened by the high TOC and bromide levels in local water supply sources. Thus, to ensure compliance with drinking water standards, the RWTP has employed the addition of PAC, which is typically used in summer months to remove taste and odor compounds but has been not needed for THM treatment.

Grant funding is requested to cover the costs of purchasing PAC and adding it to the RWTP treatment process continually throughout 2014. Approximately 40,000 pounds of PAC per month is needed, which costs about $24,000 per month, a costly treatment method. SCVWD plans to upgrade the RWTP to add ozone treatment and reduce the need for PAC treatment, but these upgrades will not be online until 2019. In the meantime, PAC is the only method to ensure reliable potable water delivery to west Santa Clara County during the 2014 drought and future drought years. Use of PAC will ensure all water treated at the RWTP will meet federal and State treatment standards.

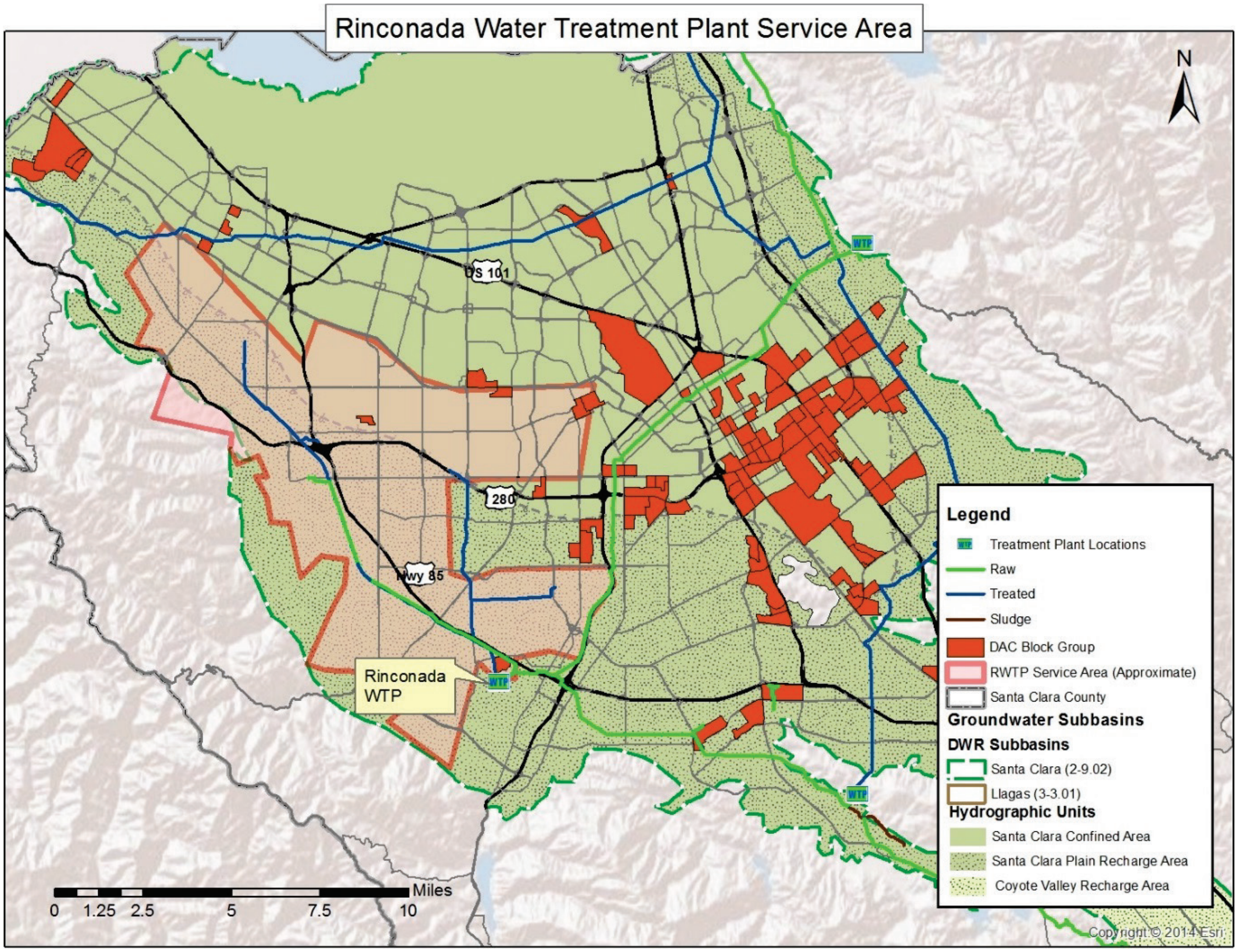
Implementation Status: SCVWD is currently purchasing PAC on a monthly basis since the drought declaration in January 2014. Purchase of PAC will continue through December 2014, and funding is requested to recover these unplanned PAC purchases. With PAC purchases through May 2014, the project is more than 40% complete.

Funding Needs: PAC treatment is the least cost alternative to meet drinking water standards at the RWTP. Purchase of PAC throughout 2014 is an unbudgeted drought response cost for SCVWD. Without funding support, purchase of PAC for the RWTP will reduce funding for other ongoing water supply operations and maintenance needs throughout Santa Clara County.

Drought Eligibility: *Increase local water supply reliability and the delivery of safe drinking water* – The ability for SCVWD water retailers to switch to other drinking water sources, especially in high demand periods, is limited; the RWTP is the only plant on the west side of SCVWD's treated water system. This Project will ensure compliance with drinking water standards for local supply sources and reliable delivery of safe drinking water to SCVWD's users.

Reduce water quality conflicts – Source water quality for imported supplies treated at the RWTP has deteriorated since the drought declaration in January 2014. Increased TDS, bromides, TOC, and taste and odor compounds threaten formation of THMs and exceedance of drinking water standards; treatment challenges are expected to worsen as drought conditions continue. PAC has proved to be effective in reducing these threats and is the most cost-effective alternative.

Project Map


Rinconada Water Treatment Plant Service Area
N
US 101
280
Hwy 85
Rinconada WTP
WTP
Legend
Treatment Plant Locations
Raw
Treated
Sludge
DAC Block Group
RWTP Service Area (Approximate)
Santa Clara County
Groundwater Subbasins
DWR Subbasins
Santa Clara (2-9.02)
Llagas (3-3.01)
Hydrographic Units
Santa Clara Confined Area
Santa Clara Plain Recharge Area
Coyote Valley Recharge Area
Miles
0 1.25 2.5 5 7.5 10
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Project Physical Benefits

Primary and secondary project physical benefits are summarized in **PSP Tables 5a and 5b**, below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment **Primary Benefit Claimed:** Amount of Water Quality Improvement **Units of the Benefit Claimed:** micrograms per liter (μg/L) **Additional Information About This Benefit:** This is the estimated reduction in total THM concentrations at Rinconada Water Treatment Plant in 2014 as a result of PAC treatment.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014 Last Year of Project Life (1 year only)	67	39	28
Comments: *See e-mail communication with T. Hemmeter, 2014a for total trihalomethane (TTHM) reduction. The average TTHM concentration without treatment was about 67 μg/L. The TTHM concentration with a 20-mg/L PAC dose on 4/28/14 was about 39 μg/L. This estimate of physical benefits assumes a 20-mg/L PAC dose. It also assumes water quality entering RWTP remains about the same or declines through the summer. SCVWD anticipates that any potential improvement in source water quality from using water stored in local reservoirs will be offset by declining water quality of imported water sources necessary to supplement locally stored supplies.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: SCVWD experts have determined that PAC is necessary in 2014 to meet drinking water standards for THMs in the SCVWD-delivered water and/or SCVWD retailers' distribution systems. The drinking water standard for TTHMs is 80 μg/L, with compliance determined based on a locational running annual average. Laboratory testing shows PAC removes up to 41% of THMs from the treated water (Hemmeter, 2014a and 2014b).

Recent and historical conditions: Concentrations of TTHMs greater than the drinking water standard of 80 μg/L were detected in the retailers' distribution systems in early 2014 as a result of deteriorating source water quality due to the drought and longer residence times in distribution systems resulting from low winter demands. PAC treatment has been effective at reducing concentrations of THMs leaving RWTP at levels that keep concentrations in the retailers' systems below 80 μg/L (SCVWD, 2014b).

Estimates of without-project conditions: TTHM concentrations without PAC treatment averaged about 67 μg/L in April 2014 (Hemmeter, 2014a).

Methods used to estimate physical benefits: A 20-mg/L PAC dose reduced TTHM concentrations by 41%, or about 28 μg/L (Hemmeter, 2014a).

New facilities, policies, and actions required to obtain the physical benefits: None have been identified.

Potential adverse effects: None have been identified.

PSP Table 5b. Secondary Annual Project Physical Benefits			
Project Name: Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment **Secondary Benefit Claimed:** Amount of Water Treated/Improved **Units of the Benefit Claimed:** Acre-feet (AF) **Additional Information About This Benefit:** This is the amount of water that will be treated with PAC at RWTP			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2014 Last Year of Project Life (1 year only)	13,808	39,953	26,145
Source: *SCVWD, 2014a. The "Without Project" value represents the total supply for July through September 2014, a period when PAC is typically used to treat for taste and odor and would be used in the summer regardless of THM removal needs. In other words, SCVWD would treat about 13,808 AF of water at RWTP with PAC during the summer months under the "without project" condition. The "with project" value represents total 2014 deliveries with PAC treatment. PAC treatment may also be needed in 2015 depending on water quality conditions, but only the benefits for 2014 are calculated.*			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: SCVWD has determined that PAC is necessary in 2014 to meet drinking water standards for THMs in the SCVWD-delivered water and/or SCVWD retailers' distribution systems. The drinking water standard for TTHMs is 80 µg/L, with compliance determined based on a locational running annual average. Laboratory testing shows PAC removes up to 41% of THMs from the treated water (Hemmeter, 2014a and 2014b).

Recent and historical conditions: Concentrations of TTHMs greater than the drinking water standard of 80 µg/L were detected in the retailers' distribution systems in early 2014 as a result of deteriorating source water quality due to the drought and longer residence times in distribution systems resulting from low winter demands. PAC treatment has been effective at reducing concentrations of THMs leaving RWTP to levels that keep concentrations in the retailers' systems below 80 µg/L (SCVWD, 2014a).

Estimates of without-project conditions: PAC would likely be used at RWTP during the summer months (July through September) to address taste and odor issues, regardless of the drought and THM issues. The without-project condition was estimated by summing the projected treated water deliveries for July through September (SCVWD, 2014a).

Methods used to estimate physical benefits: The amount of water treated/improved is equivalent to the estimated treated water deliveries for 2014. Treated water deliveries are based on actual deliveries and contract amounts (SCVWD, 2014a).

New facilities, policies, and actions required to obtain the physical benefits: None have been identified.

Potential adverse effects: None have been identified.

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project name: Rinconada Water Treatment Plant Powdered Activated Carbon (PAC) Treatment	
Question 1	***Types of benefits provided as shown in PSP Tables 5a and 5b:*** Production of Treated Water that Meets Drinking Water Standards: PAC addition at RWTP ensures that drinking water quality in the SCVWD and retailers' systems meets drinking water standards. THM concentrations in the water would be reduced by approximately 28 µg/L. Water Supply: This project ensures an additional 26,145 AF of water that is compliant with drinking water standards. Without the Project, the Rinconada Water Treatment Plant would only be able to provide 13,808 AF of safe drinking water to water retailers. Without the project, water retailers would be unable to meet drinking water demands with supplies that meet drinking water standards. Although retailers have some capacity to switch to other sources, such as groundwater, this capacity is limited in peak demand periods such as those experienced during summer months (June to September).
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** Yes.
	If yes, list the methods (including the proposed project) and estimated costs. SCVWD has completed a Planning Study Report documenting alternatives for achieving better THM reduction at RWTP, as well as other objectives (SCVWD, 2012). The Planning Study Report identifies a preferred alternative (raw water ozonation), which would be effective at addressing source water quality concerns including those that SCVWD is currently experiencing throughout this drought. The report indicates that ozone addition is effective at reducing TOC, a THM precursor (SCVWD, 2012: p. 26). The estimated capital cost of the ozone component is $7,489,000 (SCVWD, 2012: p. 32). Adding PAC at the beginning of the treatment plant process (the Project) is an alternative to improving drinking water treatment processes via ozonation. The estimated annual cost for PAC treatment in 2014 is $1,091,088. SCVWD has not been able to identify other alternatives for achieving the Project benefits associated with treatment processes due to the plant's old age. Costs associated with raw water ozonation improvements at the plant are higher than PAC treatment for 2014. In addition, construction of the improvements in 2014 is infeasible because this alternative would still need to undergo design and construction. As described in the Project Description above, SCVWD plans to upgrade the plant to include ozonation, but such improvements would not be online until 2019. Another alternative to reducing THM concentrations is blending the source water with higher quality local surface water sources. This alternative is used when possible as it is essentially a no-cost alternative. However, this alternative is infeasible because local surface water supplies are minimal due to the drought.
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods. As described above in response to Question 2, the least cost alternative includes blending with local surface water supplies. However, blending with surface water is not a feasible option due to drought conditions and limited local surface water supplies (SCVWD, 2012 and 2014c). In comparison to the raw water ozonation improvements to the plant, PAC addition is the least cost alternative to meet current water supply needs in the western area of Santa Clara County, allowing treatment and distribution of safe drinking water from a variety of sources.
Comments: *None.*	

References Cited:

Hemmeter, T., 2014a. E-mail communication with SCVWD staff re: RWTP PAC efficacy. June 11.

Hemmeter, T., 2014b. E-mail communication with SCVWD staff re: PAC necessity. June 11.

Santa Clara Valley Water District (SCVWD), 2012. Rinconada Water Treatment Plant Reliability Improvement Project Planning Study Report, prepared by CDM-Smith. May.

__________, 2014a. SCVWD FY 2014 Treated Water Deliveries, RWTP 2014 TW Deliveries tab.

__________, 2014b. Monthly Water Quality Reports. May.

__________, 2014c. Supplemental Board Agenda Memorandum: Update on 2014 Water Supply and Drought Response, March 25.

Project 3 – Zone 7 Water Supply Drought Preparedness Project

Project Description

Project Goals: The goal of Zone 7 Water Agency's Zone 7 Water Supply Drought Preparedness Project (Project) is to increase potable water supply and groundwater recharge for residents of the Livermore-Amador Valley through construction of a production well and pipeline. The new production well, Chain of Lakes Well No. 5 (COL-5), is projected to produce up to 2 million gallons per day (MGD) (6.1 acre-feet per day [AFD] or 2,240 AFY) and will improve management of the groundwater basin by pumping from a different area of the basin to minimize effects on existing, localized, low water levels. The Cope Lake to Lake I Pipeline (CLP) will transfer water between an impervious pond to a pervious pond to recharge up to 15 MGD (46 AFD).

Project Description: The Project includes two components: the COL-5 and CLP, located in the Livermore Valley between the cities of Pleasanton and Livermore, described below.

COL-5 Project: The COL-5 project will provide better access to stored supplies in the Main Groundwater Basin. The well is being constructed on vacant land north of Lake H and near Zone 7's existing Chain of Lakes Well Nos. 1 and 2. The well will be 700 feet deep with an 18-inch mild steel/stainless steel casing. A vertical turbine pump will be installed approximately 360 feet (ft.) below the ground surface, and powered by a 350-horsepower (-hp) motor. A masonry block well building with a paved access road and fencing will be constructed to protect the well and pump. The well is projected to produce up to 2 MGD. The well discharge outlet will be connected to an existing 14-inch (-in.) pipeline located about 50 ft. away, which was installed as part of a previous project. A chemical treatment facility co-located with Well No. 1 has sufficient capacity to treat water from the new well.

CLP Project: Groundwater stored in the Main Groundwater Basin is a critical source of water supply during droughts. Historically, gravel mining companies have pumped groundwater from their active mining pits and discharged this groundwater into the creeks that flow out of the Livermore-Amador Valley, resulting in a permanent loss of water. In December 2013, a project was completed to allow Vulcan Materials Company to capture water pumped from its quarries and transfer it into Cope Lake, which has a clay lining that prevents percolation and recharge of the groundwater basin. The CLP project, already under construction, will transfer water from Cope Lake to Lake I via a 620-ft.-long high-density polyethylene (HDPE) pipeline. With the CLP, water can be recharged and stored in the groundwater basin, thereby improving conjunctive use of imported water supplies. Up to 15 MGD of groundwater recharge will result from this project when Lake I water elevations are at their highest level. In the future, the pipeline will enable Cope Lake to function as a detention basin during flood events to reduce peak storm flows. A slide-gate structure will be installed to control flow through the pipeline, and the Cope Lake inlet includes a trash rack to prevent obstructions from passing into the pipe. The Lake I outlet includes a concrete and rip-rap outfall structure to protect the lake slope. Once constructed, the pipe will remain open to carry all inflow from the mining company discharges into Cope Lake and into Lake I.

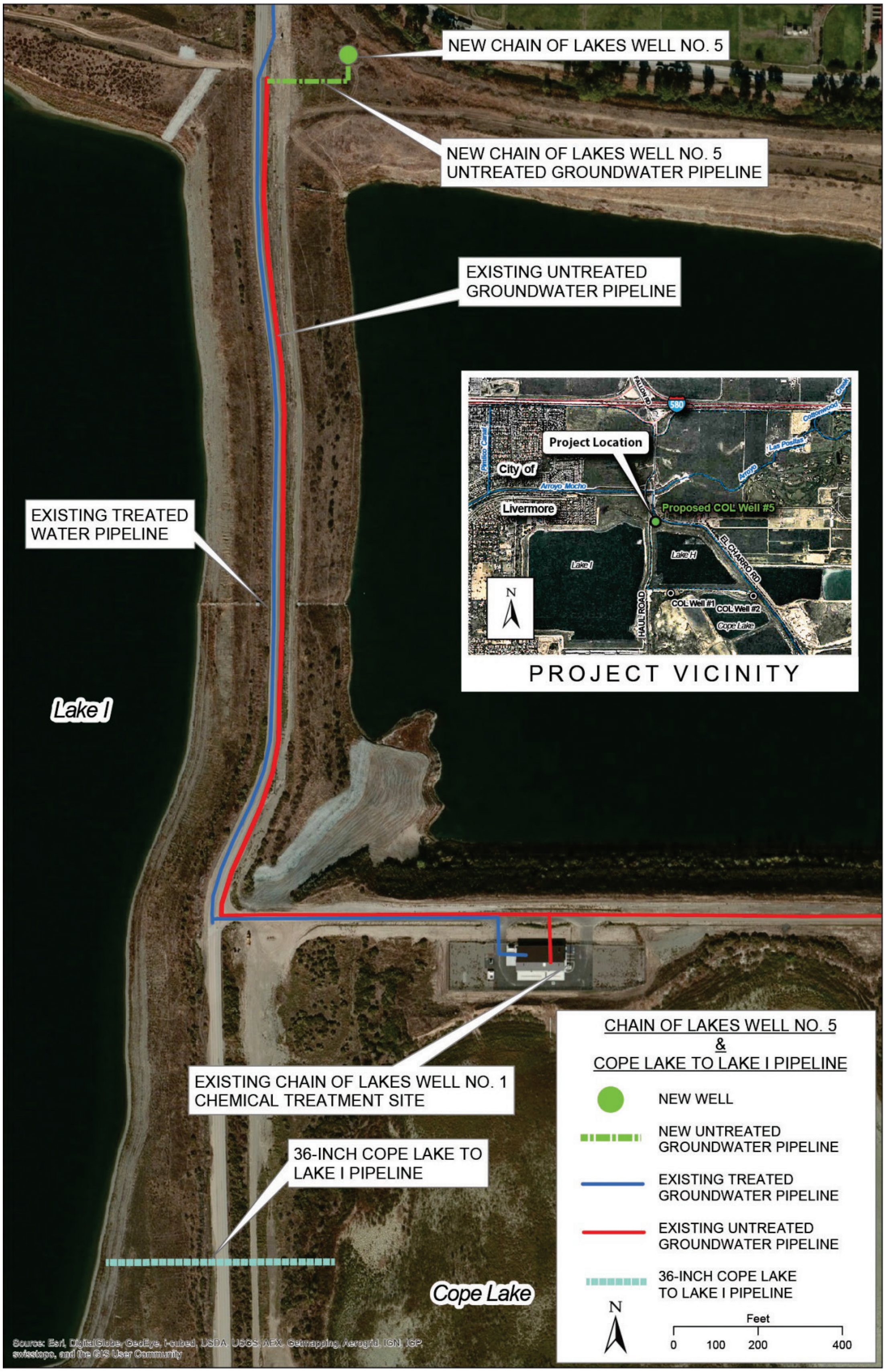
Implementation Status: Construction of the COL-5 project was initiated in February 2014 and will be complete in October 2014. The CLP project was installed in May 2014. Construction reporting and project monitoring remain to be completed.

Funding Needs: The COL-5 well was listed in the Capital Improvement Program (CIP) but was not scheduled to be constructed until fiscal year (FY) 2016-17. Because the CLP was not included in Zone 7's CIP, project funding was not budgeted in the current fiscal year. Both projects were prioritized as a result of the drought declaration. To initiate earlier than scheduled construction of these projects, other CIP projects had to be deferred or canceled. Drought grant funding is requested to recover costs of fast-tracking the COL-5 and CLP projects.

Drought Eligibility: *Immediate regional drought preparedness* – Currently, there are not enough supply wells to meet the demands in the Livermore-Amador Valley, nor does the local groundwater basin have a sustainable supply to keep up with area demands. The COL-5 and CLP projects are currently being constructed to address the current and future drought shortages.

Increase local water supply reliability and safe drinking water – The projects will provide up to 17 MGD (19,043 AFY) of water supply for drought and emergency situations, ensuring delivery of safe drinking water to residents of the Livermore-Amador Valley.

Project Map


NEW CHAIN OF LAKES WELL NO. 5
NEW CHAIN OF LAKES WELL NO. 5 UNTREATED GROUNDWATER PIPELINE
EXISTING UNTREATED GROUNDWATER PIPELINE
EXISTING TREATED WATER PIPELINE
Lake I
PROJECT VICINITY
Project Location
Proposed COL Well #5
City of Livermore
EXISTING CHAIN OF LAKES WELL NO. 1 CHEMICAL TREATMENT SITE
36-INCH COPE LAKE TO LAKE I PIPELINE
Cope Lake
CHAIN OF LAKES WELL NO. 5 & COPE LAKE TO LAKE I PIPELINE
NEW WELL
NEW UNTREATED GROUNDWATER PIPELINE
EXISTING TREATED GROUNDWATER PIPELINE
EXISTING UNTREATED GROUNDWATER PIPELINE
36-INCH COPE LAKE TO LAKE I PIPELINE
N
Feet
0 100 200 400

Project Physical Benefits

Primary and secondary project physical benefits are summarized in **PSP Tables 5a and 5b**, below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: Zone 7 Water Supply Drought Preparedness Project **Primary Benefit Claimed:** Water Supply Production **Units of the Benefit Claimed:** MGD Additional Information About This Benefit: Potable supply production			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2014	No new groundwater production	Up to 2 MGD of groundwater produced	Up to 2 MGD groundwater supply produced.
2015-2089 (75 years)	No new groundwater production	Up to 2 MGD of groundwater produced	Up to 2 MGD groundwater supply produced.
Comments: *None*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: To develop a more reliable water supply, Zone 7 needs to develop alternative ways to deliver potable water to its customers. There may be instances where a treatment plant is out of service or at a reduced rate, one or more wells are out of service, or there are issues on the South Bay Aqueduct (SBA) that reduce the total volume of water available to Zone 7 for distribution. Additional well capacity allows Zone 7 to be more flexible and better able to adapt to various situations, such as the current low deliveries on the SBA. Additional wells in the Chain of Lakes area were identified in the Well Master Plan (CH2MHill, 2003).

Recent and historical conditions: The Livermore-Amador Valley is experiencing water shortages, loss of habitat or ecosystem function, and water quality issues. These are being caused by:

- Urbanization that has degraded water quality in the Bay Area,
- The recent drought (declared by the Governor in January 2014),
- Drastically reduced deliveries through the State Water Project (SWP), and
- The unavailability of "banked" water from south/central California water banks.

Estimates of without-project conditions: As evaluated in the No Project Alternative in Zone 7's Well Master Plan EIR, Zone 7 would not implement construction of new facilities under the Well Master Plan, and would continue withdrawing groundwater to meet reliability and emergency demands using Zone 7's existing facilities. Zone 7's current drought well capacity of 25 MGD would remain unchanged. However, as growth occurs within its service area, peak demands and drought-year demands would continue to increase. Implementation of the No Project Alternative within this context would have several potential consequences with respect to provision of reliable water supplies within the Livermore Valley. These would include inability to meet Zone 7's Reliability Goals; a potential shift in the ratio of surface water and groundwater supplies provided by Zone 7, with subsequent reduction of salt management benefits; and the likely need to acquire additional dry-year supplies. These supplies, which would likely be surface water supplies, or surface water supplies in lieu of groundwater stored outside of the Zone 7 service area, would be subject to hydrologic conditions in a given dry year, and would not provide the in-service-area storage reliability provided by use of the groundwater basin for storage and conjunctive use. As treated water demands increase over time within the Zone 7 service area, Zone 7's existing well capacity of 25 MGD would not be adequate to recover the stored groundwater necessary to provide water supply to its Retail Agencies in a manner consistent with Goal 1 of Zone 7's Reliability Policy, "provision of 100% reliability during average, single drought year, and multiple drought years" (Zone 7, 2005).

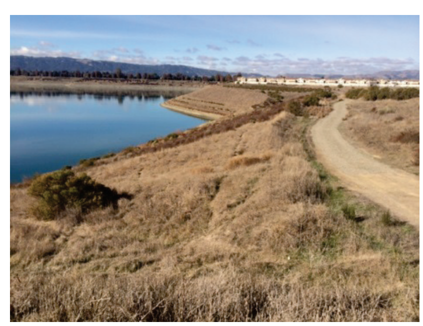
Methods used to estimate physical benefits: The estimate of up to 2 MGD of well capacity was based upon the completion logs of the COL-1 and COL-2 wells and their current production, along with the adjacent monitoring well log lithology. The final capacity of the well will ultimately determine the extent of the Project's physical benefit (DWR, 2014).

New facilities, policies, and actions required to obtain the physical benefits: The Project will require the construction of a new supply well, piping to connect well discharge to existing pipeline, well house, and associated equipment to run the well.

Potential adverse effects: Potential issues associated with Project construction pertain to land subsidence. The Project could also result in short-term water quality impacts to Lake I (e.g., potential high turbidity) which receives well to waste discharges, while the well is ramping up for production (Zone 7, 2012).

PSP Table 5b. Secondary Annual Project Physical Benefits			
Project Name: Zone 7 Water Supply Drought Preparedness Project **Primary Benefit Claimed:** Water Supply Savings – Groundwater Recharge **Units of the Benefit Claimed:** Million gallons per day (MGD) **Additional Information About This Benefit:** The secondary benefit of this Project is conjunctive use of the Main Groundwater Basin. The pipeline portion of the Project will result in discharge water from mining operations to be transferred from Cope Lake to Lake I. Unlike Cope Lake, which has an almost completely impermeable clay-lined bottom, Lake I will permit the percolation of the water to recharge the basin that is used as a water supply. Otherwise, the water, when reaching a certain level in Cope Lake, would have been discharged into the Arroyo Mocho and found its way to San Francisco Bay. It is anticipated that even with evaporation in the lakes, groundwater recharge will be as much as 15 MGD when Lake I reaches its highest level at 340 feet (the level where the recharge capacity is the highest).			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	No recharge water	15 MGD of recharge water	An additional 15 MGD of recharge water.
Last Year of Project Life (2089)	No recharge water	15 MGD of recharge water	An additional 15 MGD of recharge water.
Comments: *None.*			

Technical Analysis of Secondary Physical Benefits Claimed



Technical basis of the Project: The CLP project, which would result in conjunctive use, the secondary benefit of the overall Project, will move water from one former gravel pit (Cope Lake) to another, Lake I. At Lake I, the water will recharge the groundwater basin from which potable supplies are pumped. Lake I is pervious and receives discharged water through Cope Lake from mining operations. Prior to this project, these mining discharges would eventually flow to the Bay (Stetson Engineers, 2004).

Recent and historical conditions: Over the years, water used in sand and gravel mining operations has been discharged into Cope Lake (a former quarry), which has developed a clay lining that prevents groundwater recharge. When the mining company discharges into the creek rather than Cope Lake, these flows exit the Valley via the Arroyo Mocho to San Francisco Bay (Zone 7, 2010).

Estimates of without-project conditions: Without the pipeline, there will be no additional recharge of the Main Groundwater Basin through Lake I and the mining company discharges will be lost (Zone 7, 2012).

Methods used to estimate physical benefits: Stetson Engineers prepared the Management Plan for Lakes H and I and Cope Lake in June 2004. In this report, Stetson Engineers calculated the estimated recharge rates in Lake I using water budget analysis, current groundwater conditions, and calibrated aquifer hydraulic conductivity (Stetson Engineers, 2004).

New facilities, policies, and actions required to obtain the physical benefits: The facility needed to obtain the conjunctive use physical benefit of the Project is the pipeline between Cope Lake and Lake I. The pipeline is included in Zone 7's CIP, but construction was accelerated because of the drought and the need to further recharge the Main Ground Basin from where Zone 7 and other agencies pump a portion of the area's potable water supplies.

Potential adverse effects: The pipeline project would not result in any potential adverse effects (Zone 7, 2012).

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project name: Zone 7 Water Supply Drought Preparedness Project	
Question 1	***Types of benefits provided as shown in Tables 5a and 5b:*** This Project (the well and pipeline) may result in up to an additional 15 MGD of groundwater recharge and an additional 2 MGD of potable water production available to residents of the Livermore-Amador Valley . The recharged groundwater storage would offset the need to use surface water supplies from the State Water Project. While there could be some other incidental benefits (e.g., flood control), this is principally a drought preparedness water supply project intended to address the current, and assuredly future (because of climate change), drought conditions.
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** No alternative methods have been considered for the COL-5 Project; however, two alternative methods were evaluated for the CLP Project. See below.
	If no, why? COL-5 Project: Due to limited water resources in the Livermore-Amador Valley (the majority of potable supply is imported from the Delta), the most feasible and immediately accessible water supply source is groundwater. Installation of the COL-5 well was determined to be the only and least expensive alternative to provide immediate water supply for the region. Zone 7 is approaching its mandatory 25% water conservation goal but that does not obviate the need for the COL-5 well and pipeline.
	If yes, list the methods (including the proposed project) and estimated costs. CLP Project: Two alternative methods were explored. First, Zone 7 investigated the use of a siphon to transfer water from Cope Lake to Lake I, using an existing tunnel that connected the two lakes. This option was rejected due to the elevation difference between the existing tunnel and the maximum water surface of Cope Lake – a siphon would not be able to lift water the required elevation. Because the siphon would have been infeasible there is no cost estimate. Secondly, Zone 7 investigated the possibility of pumping the water from Cope Lake to Lake I. The pipeline cost would be a little less at about $1 million. The pump cost would have been about $500,000. The annual operations and maintenance, including power, would have been about 10% of the initial capital cost. Additionally, the pump alternative would only have delivered half the water per day to Lake I, thus reducing to 7.5 MGD the potential recharge amount. The option selected is, over the long run, by far the least expensive.

Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** The Project is the least cost alternative. For CLP, Zone 7 investigated transferring water by siphon, but the physical characteristics of the site made that option unworkable. Zone 7 also investigated a pump system to move water from one lake to the other; this option had a lower construction cost, but the energy costs associated with this project made it more expensive after a few years. The gravity system proposed for the CLP is more reliable and eliminates the need for electricity and on-going power costs from pumping. The COL-5 well was planned to be constructed at a future date and has been accelerated due to the drought. When the COL-1 well was constructed in 2009, the chemical facilities were sized and a connector pipeline was constructed to accommodate a future COL-5. Construction of this well is the least cost alternative because the infrastructure necessary to distribute supply pumped from the well is already in place. Placement of the well at another location would not be cost effective and may not achieve the desired groundwater management goals.
Comments: *None.*	

References Cited:

CH2MHill, 2003. Draft Report Well Master Plan, prepared for Zone 7 Water Agency, October. Page ES-5, ES.3.3, last paragraph; and page 1-6, 1.4, first paragraph

California Department of Water Resources (DWR), 2014. Well Completion Report No. e0206419.

Stetson Engineers, 2004. Management Plan for Lakes H & I and Cope Lake, June. Pages 4-13 and 4-14.

Zone 7 Water Agency (Zone 7), 2005. Zone 7 Water Agency Well Master Plan Final EIR Responses to Comments, SCH: 2002032163, July. Page 2-1.

__________, 2010. 2010 Urban Water Management Plan, December 15.

__________, 2012. Cope Lake Improvements & Maintenance Final Environmental Initial Study/Draft Mitigated Negative Declaration, January 26.

Project Justification – Recycled Water Projects

Project descriptions, estimated physical benefits of the projects, justification of each project's technical feasibility, and a cost-effectiveness analysis are presented in this section for the projects listed below. These projects span three sub-regions in the San Francisco Bay IRWM Region. The projects included in this section have benefits related to recycled water production and distribution, potable water supply demand offset, water quality improvements (pollutant reductions in the Bay), and reduced demand on Delta water supplies.

Project ID#	Project Proponent	Project Title
4	Napa Sanitation District	Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines
5	SCVWD and City of Sunnyvale	Sunnyvale Continuous Recycled Water Production Facilities and Wolfe Road Pipeline
6	DERWA	DERWA Phase 3 Recycled Water Expansion Project
7	City of Calistoga	Calistoga Recycled Water Storage Facility

Project 4 - Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines Project

Project Description

Project Goals: The goal of the Los Carneros Water District (LCWD) and Milliken-Sarco-Tulocay (MST) Recycled Water Pipelines Project (Project) is to extend the Napa Sanitation District (NSD)'s recycled water distribution system in Napa Valley by 15 miles west into the Los Carneros area and northeast into the MST area. The LCWD is an agricultural area directly west of Napa. The MST area is a rural residential and agricultural area directly east of Napa. Both are in unincorporated areas, with no connections to a municipal water supply system. As a separate project, the NSD is expanding the Soscol Water Recycling Facility to increase production of tertiary treated recycled water, which will be completed in fall 2014. The MST recycled water pipeline will supply 700 AFY for agricultural and landscape irrigation purposes, offsetting groundwater use. The LCWD recycled water pipeline will provide up to 1,250 AFY to supplement surface water demands and offset agricultural demands.

Project Description: The NSD provides wastewater treatment services for the City of Napa and a small unincorporated area around the city. NSD treats an average 7.8 MGD (8,700 AFY) of wastewater, of which 2,000 AFY is treated to a tertiary level. Of this, 1,400 AFY is provided to the community as "Title 22 Unrestricted" recycled water.

> *LCWD Project:* NSD will construct 9 miles of recycled water pipeline (6-in. to 20-in. diameter) for agricultural and landscape irrigation in the Los Carneros region of Napa Valley, which will connect to existing pipelines. Pipelines will mostly be constructed within public road right-of-way; NSD will acquire an easement for a short portion of the alignment in July 2014. Major pipeline segments will be constructed along Ranch, Stanly Cross, Cuttings Warf, Milton, Las Amigas, Duhig, Withers, and Neuenschwander roads, and Sough and Los Carneros avenues. The pipeline will serve approximately 106 parcels or 3,800 acres of irrigable land within the Los Carneros region with 1,250 AFY of recycled water. Recycled water users within the Carneros region will connect their own facilities to distribute the water to their private land and will apply water at agronomic rates to avoid runoff and/or saturation to protect surface water and groundwater quality.
>
> *MST Project:* NSD will construct 5 miles of recycled water pipeline (8-in. to 24-in. diameter) in the MST groundwater basin area to provide agricultural and landscape irrigation supply. The proposed pipeline network will be constructed within public road right-of-way. Major pipeline segments will be installed along Imola, 2nd, 3rd, 4th, and North avenues and Coombsville Road. To provide adequate flow and line pressure, a booster pump station will be constructed on an existing easement. The Project will serve approximately 34 parcels (360 acres) of irrigable land with approximately 700 AFY of recycled water supply. Recycled water users will connect their own facilities to distribute recycled water to their private land.

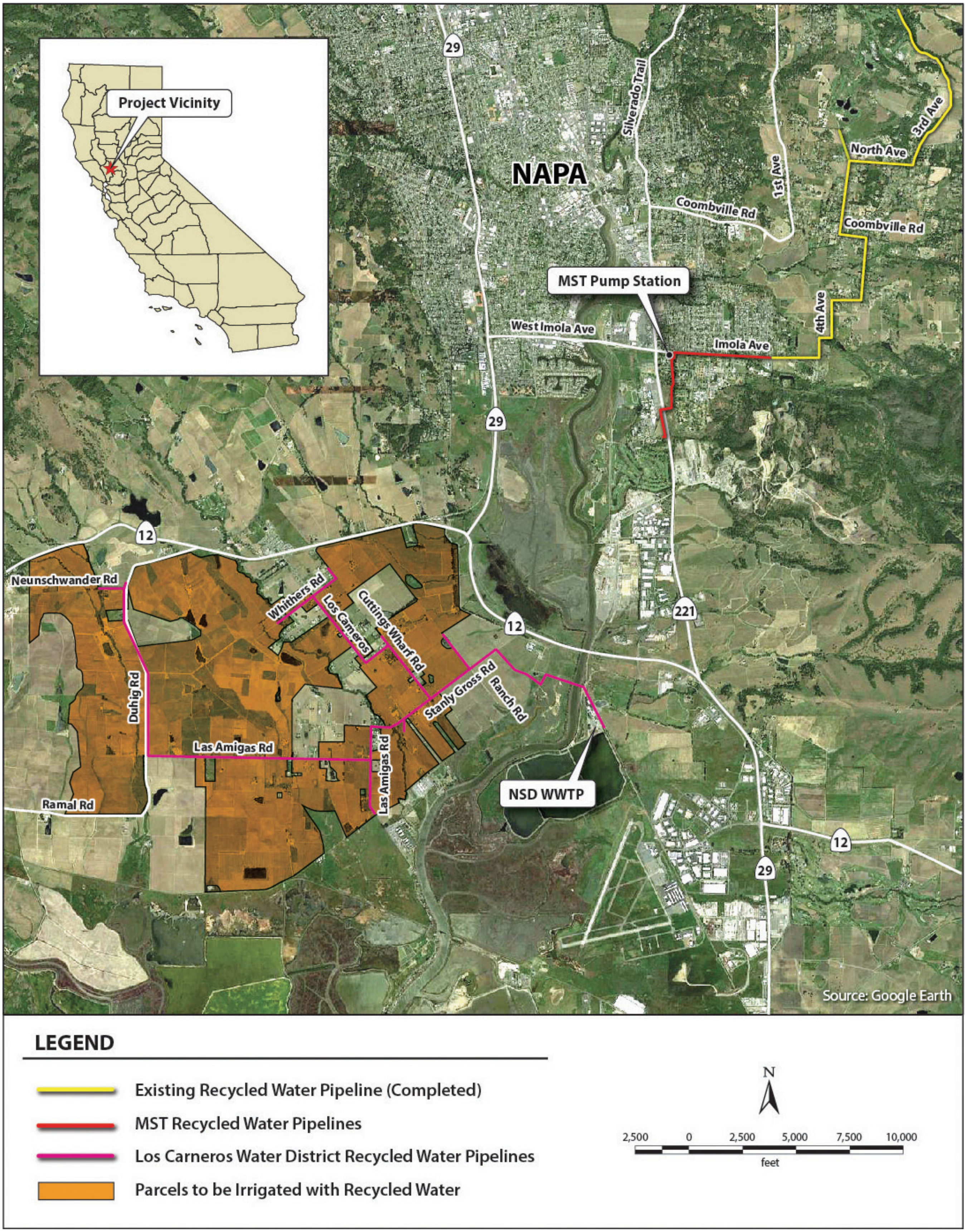
Implementation Status/Funding Needs: Construction of the MST project begins in summer 2014; the LCWD project is scheduled to begin early 2015. Both projects are relying on local assessment districts to pay for the majority of costs. (The MST assessment district and associated special tax has been approved, and the vote for the LCWD assessment is scheduled for July 2, 2014). Expedited funding will align with the construction schedule for these projects.

Drought Eligibility: *Immediate regional drought preparedness* – Napa County is currently in "Extreme Drought" conditions, as designated by the U.S. Drought Monitor. Surface water in the LCWD area is fully appropriated. Most private surface water storage reservoirs in this area are at half capacity or less. Several landowners are trucking water to their crops. As agricultural users turn to groundwater, residential users may bear the consequences. The only source of water in the MST area is the groundwater basin, estimated to be overdraft by 2,000 AFY. The LCWD and MST projects are anticipated to be complete fall 2015 and will immediately begin delivering recycled water; maximum deliveries will be realized in 2017.

Increase local water supply reliability and safe drinking water – Potable water supply in the Project area is under severe threat. The MST pipeline will supply 700 AFY of recycled water to offset potable groundwater demands, which provides additional safe drinking water for consumption.

Reduce water quality/ecosystem conflicts – Napa River is on the U.S. Environmental Protection Agency's (U.S. EPA's) 303(d) list of impaired water bodies due to excessive concentrations of nutrients and algae growth. The project will reduce treated wastewater effluent discharged to the Napa River and the Bay, reducing nutrient loading of Biological Oxygen Demand (BOD), nitrogen, and Total Suspended Solids (TSS).

Project Map


Project Vicinity
NAPA
MST Pump Station
NSD WWTP
West Imola Ave
Imola Ave
Coombville Rd
North Ave
3rd Ave
1st Ave
4th Ave
Silverado Trail
Neunschwander Rd
Whithers Rd
Los Carneros
Cuttings Wharf Rd
Stanly Gross Rd
Ranch Rd
Duhig Rd
Las Amigas Rd
Ramal Rd
Source: Google Earth
LEGEND
Existing Recycled Water Pipeline (Completed)
MST Recycled Water Pipelines
Los Carneros Water District Recycled Water Pipelines
Parcels to be Irrigated with Recycled Water
N
2,500 0 2,500 5,000 7,500 10,000
feet

Project Physical Benefits

Primary and secondary project physical benefits are summarized in **PSP Tables 5a and 5b**, below.

PSP Table 5a: Primary Annual Project Physical Benefits			
Project Name: Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines **Primary Benefit Claimed:** Water Supply – Recycled Water Use **Units of the Benefit Claimed:** Acre-feet per year (AFY) **Additional Information About this Benefit:** Total amount of recycled water distributed and used in the LCWD and MST areas. Water delivery is expected to expand annually through 2017 based on increased voluntary connections and conversions of private distribution systems.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2015	0	150 (100 for LCWD and 50 for MST)	150 AFY of recycled water use
2016	0	1,600 (1,250 for LCWD and 350 for MST)	1,600 AFY of recycled water use
2017	0	1,950 (1,250 for LCWD and 700 for MST)	1,950 AFY of recycled water use
2018-Last Year of Project Life (2065)	0	1,950 (1,250 for LCWD and 700 for MST)	1,950 AFY of recycled water use
Comments: *None.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project:

MST Project: NSD studied the MST recycled water pipeline project as part of the North Bay Water Recycling Program. The study included an environmental analysis of the recycled water pipeline project to deliver recycled water to the MST area. The study included several alternatives, including “No Project,” “No Action Alternative,” “Basic System,” “Partially Connected System,” and “Fully Connected System.” The “Basic System” was found to be the least cost alternative with the least negative environmental impacts that still met project goals of reducing groundwater overdraft in the MST area. The Project included and described in this grant application is the first phase of the “Basic System” alternative, which builds the main trunk system for recycled water delivery (North Bay Water Reuse Authority, 2009).

LCWD Project: The LCWD Project is described in environmental documents (SBM Environmental, 2013). Section 1.2 identifies surface water availability issues during the irrigation season and states that groundwater in some localities have marginal quality and highly unreliable quantity from year to year. Supply of recycled water to the Carneros region will partially or completely mitigate these issues. Section 2.1 states that the project will supply recycled water to approximately 106 parcels, 3,800 acres of irrigable land, and supply approximately 1,300 AFY.

Table 7.2 of Carollo Engineers’ memorandum (last two pages) lists that the LCWD pipeline could deliver 1,783 AFY to the Carneros region (Carollo Engineers, 2012).

NSD Recycled Water Policy establishes priories for use of recycled water produced at the Soscol Recycled Water Facility. This policy establishes an allocation of recycled water to the MST area (700 AFY during the summer months) and the LCWD (450 AFY in the summer months and 800 AFY in the winter months). The policy also establishes LCWD priority for future recycled water that may become available.

Recent and historical conditions:

<u>*MST Groundwater Conditions:*</u> Napa County commissioned a study in 2003 to evaluate the conditions of the MST groundwater aquifer. The study used data from 4,800 private wells in the MST area from 1975 to 2002 to evaluate the amount of annual groundwater pumping in 2000 (5,350 AF) and calculate the increased groundwater usage since 1975 (80% increase). The study determined that between 1975 and 2001, the groundwater levels declined 25 to 125 feet in the central and eastern parts of the aquifer, with the declines resulting from increases in groundwater pumpage and possibly changes in infiltration capacity caused by changes in land use (Farrar and Metzger, 2003). From the data in this study, and the information in the Napa County Baseline Data Report (2005), the County determined that the MST groundwater basis was being overdraft by approximately 2,000 acre-feet per year. This became the basis of the County's declaration of the MST as a "Groundwater Deficient Area" and the establishment of guidelines for groundwater permits. These guidelines, adopted in July 2005 and updated in 2012, establish the "no net increase" policy for water consumption that the County enforces in this area (NSD, 2012a).

<u>*LCWD Area Conditions:*</u> Section 1.2 of the LCWD Initial Study/Mitigated Negative Declaration/Environmental Assessment/Finding of No Significant Impact (SBM Environmental, 2013) identified the recent and historical conditions in the LCWD area regarding available water:

- The agricultural economy, which is dominated by high-value vineyard culture, requires a highly reliable water supply to maintain and to expand its crop base
- Surface water supplies are already diverted by multiple users, have low flows in the summer (which coincides with the irrigation season), and can have low flows in dry years
- Groundwater supplies are typically heavily used and in some localities have marginal quality and highly unreliable quantity from year to year
- Groundwater availability is irregular. In some areas, especially during the dry months, pumping of the scattered groundwater aquifer often causes some residential users' well production to markedly diminish and in some cases stop altogether. As a result, those homeowners must truck in water.
- Rising sea levels, combined with groundwater and surface water extraction, have increased the risk of saltwater intrusion from San Pablo Bay in many parts of the area.

Estimates of without-project conditions:

<u>*MST Area:*</u> The MST groundwater basin is being overdraft by approximately 2,000 acre-feet per year. This overdraft of will continue without the project, which will decrease the overdraft by 700 AFY (35%).

<u>*LCWD Area:*</u> Recycled water will not be delivered to the area without the project (SBM Environmental, 2013). The conditions described above under "Recent and Historical Conditions" will continue without abatement.

Methods used to estimate physical benefits: Estimates of recycled water usage are based on current usage of groundwater from agricultural and irrigation purposes on properties that will be served by recycled water pipeline projects.

New facilities, policies, and actions required to obtain the physical benefits: NSD is constructing additional filter capacity at the Soscol Recycled Water Facility, which will be completed in 2014. The MST and LCWD recycled water pipelines (as described in the Project Description) are necessary to distribute recycled water. Onsite irrigation systems and meters installed at all user connections are necessary for users to receive water and comply with regulations regarding recycled water use. These onsite improvements are being constructed by most landowners concurrent with the construction of the MST and LCWD recycled water pipelines.

Potential adverse effects: Temporary impacts during project construction will be reduced to less-than-significant levels (SBM Environmental, 2013).

PSP Table 5b: Secondary Annual Project Physical Benefits			
Project Name: Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines **Secondary Benefit Claimed:** Groundwater Demand Offset **Units of the Benefit Claimed :** Acre-feet per year (AFY) groundwater demand offset to the MST aquifer due to offset recycled water use **Additional Information About this Benefit:** Recycled water delivery in the MST area is expected to be 350 AFY by 2016, expanded to 700 AF as early as 2017, based on increased voluntary connections and conversions of private distribution systems.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2015	0	50 AFY in MST groundwater aquifer	50 AFY in MST groundwater aquifer
2016	0	350 AFY in MST groundwater aquifer	350 AFY in MST groundwater aquifer
2017	0	700 AFY in MST groundwater aquifer	700 AFY in MST groundwater aquifer
2018-Last Year of Project Life (2065)	0	700 AFY in MST groundwater aquifer	700 AFY in MST groundwater aquifer
Comments: *None.*			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: See discussion under the heading “Primary Physical Benefits Claimed,” above.

Recent and historical conditions: See discussion under the heading “Primary Physical Benefits Claimed,” above.

Estimates of without-project conditions: See discussion under the heading “Primary Physical Benefits Claimed,” above.

Methods used to estimate physical benefits: Estimates of recycled water usage are based on current usage of groundwater from agricultural and irrigation purposes on properties that will be served by recycled water pipeline projects.

New facilities, policies, and actions required to obtain the physical benefits: NSD is constructing additional filter capacity at the Soscol Recycled Water Facility, which will be completed in 2014. MST and LCWD recycled water pipelines (as described in this application) are necessary to distribute water. Onsite irrigation systems and meters installed at all user connections are necessary for users to obtain water and comply with regulations on the use of recycled water. These onsite improvements are being constructed by most landowners concurrent with the construction of the MST and LCWD recycled water pipelines. Increased use of recycled water as a result of Project implementation will reduce demands for groundwater in the MST groundwater basin area.

Potential adverse effects: Temporary impacts during project construction would be reduced to less-than-significant levels (SBM Environmental, 2013).

PSP Table 5c: Tertiary Annual Project Physical Benefits			
Project Name: Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines **Tertiary Benefit Claimed:** Ecosystem improvement – pollution reduction **Units of the Benefit Claimed :** Kilograms per year (kg/year) **Additional Information About this Benefit:** The Napa River is on the U.S. EPA's 303(d) list of impaired water bodies due to excessive concentrations of nutrients and algal growth. Kilograms per year of nitrogen, biological oxygen demand consumed over 5 days (BOD_5) and total suspended solids (TSS) per year removed is based on NSD's average monthly discharge concentrations of these constituents to the Napa River in calendar year 2013.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2015	0	Reduction from discharge into Napa River/Bay: Nitrogen: 255 BOD_5: 981 TSS: 1,402	Nitrogen: 255 $BOD_{5:}$ 981 TSS: 1,402
2016	0	Reduction from discharge into Napa River/Bay: Nitrogen: 2,716 $BOD_{5:}$ 10,460 TSS: 14,989	Nitrogen: 2,716 $BOD_{5:}$ 10,460 TSS: 14,989
2017	0	Reduction from discharge into Napa River/Bay: Nitrogen: 3,310 $BOD_{5:}$ 12,748 TSS: 18,268	Nitrogen: 3,310 $BOD_{5:}$ 12,748 TSS: 18,268
Last Year of Project Life (2065)	0	Reduction from discharge into Napa River/Bay: Nitrogen: 3,310 $BOD_{5:}$ 12,748 TSS: 18,268	Nitrogen: 3,310 $BOD_{5:}$ 12,748 TSS: 18,268
Comments: *Kilograms per year of nitrogen, BOD_5, and TSS removed are based on Napa Sanitation District average monthly discharge concentrations of these constituents to the Napa River in calendar year 2013.*			

Technical Analysis of Tertiary Physical Benefits Claimed

Technical basis of the project: See discussion under the heading "Primary Physical Benefits Claimed," above.

Recent and historical conditions: In 2013 and in accordance with NSD's National Pollutant Discharge Elimination System (NPDES) permit, the NSD discharged treated wastewater effluent to the Napa River during January, February, March, April, November, and December. The BOD_5 monthly average in the effluent during these months ranged from 3.73 milligrams per liter (mg/L) to 8.57 mg/L, with an annual average of 5.30 mg/L. The TSS monthly average ranged from 4.59 mg/L to 10.53 mg/L, with an annual average of 7.595 mg/L. The nitrogen monthly average ranged from non-detect to 4.547 mg/L, with an annual average of 1.376 mg/L.

Estimates of without-project conditions: 150 AF of effluent diverted from river discharge equates to the following pollution reduction:

BOD_5 = 981 kg/year
TSS = 1,402 kg/year
Nitrogen = 255 kg/year

1,600 AF of effluent diverted from river discharge equates to the following pollution reduction:

BOD_5 = 10,460 kg/year
TSS = 14,989 kg/year
Nitrogen = 2,716 kg/year

1,950 AF of effluent diverted from river discharge equates to the following pollution reduction:

BOD_5 = 12,748 kg/year
TSS = 18,268 kg/year
Nitrogen = 3,310 kg/year

Methods used to estimate physical benefits: Continuous testing and reporting of nitrogen, BOD_5, and TSS in wastewater were used to estimate pollution reduction benefits. Data from 2013 was used to calculate pollution diversion based on estimated delivery of recycled water (Napa Sanitation District, 2013b).

New facilities, policies, and actions required to obtain the physical benefits: See discussion above for primary and secondary benefits claimed.

Potential adverse effects: Temporary impacts during project construction would be reduced to less-than-significant levels (SBM Environmental, 2013).

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project name: Los Carneros Water District and Milliken-Sarco-Tulocay Recycled Water Pipelines Project	
Question 1	***Types of benefits provided as shown in Table 5:*** The LCWD and MST projects would provide water supply benefits by expanding distribution and recycled water use opportunities in NSD's recycled water service area. The projects are anticipated to be complete in late 2015 and will immediately begin delivering water. In 2015, usage could approach 150 AFY. In 2016, delivery is expected to approach 1,600 AFY, while 2017 and beyond usage is anticipated to be 1,950. The projects would also provide ecosystem improvement/environmental benefits, as they would collectively reduce discharge of wastewater effluent to the Bay by 1.74 MGD.
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** Yes. The LCWD Engineering Feasibility Study evaluated alternative alignments. The proposed project can provide recycled water to all interested recycled water users. The MST project was initially envisioned as a much more extensive and expensive project. The EIR/EIS was based upon this larger project. Unfortunately, sufficient funding could not be identified. The currently proposed project constitutes the "backbone" of the larger system and has been optimized to serve the largest users identified; thus the proposed project provides the lowest cost per AF.
Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** The LCWD Engineering Feasibility Study evaluated all possible supply alternatives. Recycled water was the only viable option, so yes, it is the least cost alternative. The MST project was initially envisioned as a much more extensive and expensive project. The EIR/EIS was based upon this larger project. Unfortunately, sufficient funding could not be identified.

	The currently proposed project constitutes the “backbone” of the larger system and has been optimized to serve the largest users identified; thus the proposed project provides the lowest cost per AF.
Comments: *None.*	

References Cited:

Carollo Engineers, 2012. Project Memorandum: Analysis of New Alternatives for the LCWD Recycled Water Distribution System.

Farrar and Metzger, 2003. Ground-Water Resources in the Lower Milliken–Sarco–Tulocay Creeks Area, Southeastern Napa County, California, 2000–2002. USGS Water-Resources Investigations Report 03-4229.

Napa County, 2005. Napa County Baseline Data Report, Chapter 16 – Groundwater Hydrology, November.

Napa Sanitation District (NSD), 2011. Resolution 11-004 – Summer Water Allocation.

___________, 2012a. General Information Regarding Groundwater Permits for Projects Within the MST Groundwater Deficient Area. July 2005 (Updated 2012).

___________, 2012b. NSD Minute Resolution MR 12-072 – Establish 800 AFY winter water allocation to LCWD, and 150 AFY of summer water.

___________, 2013a. NSD Minute Resolution MR 13-019 – Allocates an additional 300AFY of summer water to LCWD.

___________, 2013b. 2013 Annual Self-Monitoring Report for Napa Sanitation District (inclusive of data submitted directly to CIWQS).

North Bay Water Reuse Authority (NBWRA), 2009. North San Pablo Bay Restoration and Reuse Project (North Bay Water Recycling Program) EIR/EIS, November.

San Francisco Bay Regional Water Quality Control Board (RWQCB), NPDES Permit No. CA0037575.

SBM Environmental, 2013. Los Carneros Water District Recycled Water Pipeline Project, Initial Study/MND/EA, October.

Project 5 – Sunnyvale Continuous Recycled Water Production Facilities and Wolfe Road Pipeline Project

Project Description

Project Goals: The purpose of the Sunnyvale Continuous Recycled Water Production Facilities and Wolfe Road Pipeline Project (Project) is to increase recycled water production and distribution capacity in order to provide 1,680 acre-feet per year (AFY) of additional recycled water to alleviate immediate and future drought impacts. The potable water offset of 1,680 AFY will help maintain groundwater levels and contribute to the ongoing conjunctive management in the Santa Clara sub-basin. In addition, the Project will reduce nutrient loading to San Francisco Bay. Lastly, the Project will set the stage for a future potable reuse project to adapt to climate change and alleviate future drought impacts.

Project Description: Current recycled water demands in Santa Clara County are increasing as a result of the drought, construction of the new Apple 2 Campus in the City of Cupertino, and other development. To meet these demands, the SCVWD and City of Sunnyvale (Project co-sponsors) Project will increase recycled water production and use in Santa Clara County through two methods: (1) increasing the recycled water production capacity at the Sunnyvale Water Pollution Control Plant (WPCP) and (2) adding distribution system capacity (Wolfe Road Pipeline). The WPCP is owned by the City of Sunnyvale and is located at 1444 Borregas Avenue in Sunnyvale. Plant configuration limitations require recycled water production to be a batch operation that alternates between recycled water production and San Francisco Bay effluent discharge. Infrastructure age and control system limitations, together with compliance challenges, have necessitated complex flow management that has ruled out batch production. As a result, during the last two years, all of the recycled water demand of 1.0 million gallons per day (MGD) (1,120 AF) has been met with potable water supplies (City of Sunnyvale, 2013a and 2014a). This Project includes improvements to the WPCP's recycled water production process so that recycled water can be produced on a continuous basis and potable water will no longer need to be diverted into the recycled water distribution system to meet current and future recycled water demands. The plant improvements consist of air flotation tank influent and effluent piping and flow diversion valving, new flow metering for process control, filter influent channel modifications including a new separator wall and isolation gate, filtered water pump discharge pipe modifications and new discharge isolation valves, chlorine contact tank modifications including a new separator wall and isolation gate. These improvements will allow for the production of an additional 1,120 AFY of supply by 2016. The additional recycled water production will reduce effluent discharges to San Francisco Bay and, as a result, reduce nutrient loading to the bay.

SCVWD will also construct a booster pump station and 13,000 linear feet of 24-inch recycled water pipeline along Wolfe Road to serve new projected demands in the cities of Sunnyvale and Cupertino. The pipeline will extend along Wolfe Road from the City of Sunnyvale's San Lucar pump station at Kifer Road to the new Apple 2 Campus at Wolfe Road and East Homestead Road in Cupertino. This will extend the recycled water system into the City of Cupertino and California Water Service Company (CalWater)'s service area. The Wolfe Road Pipeline will deliver 560 AFY of supply starting in 2016. This Project sets the stage for a future potable reuse project involving groundwater recharge with 11,200 AFY of advanced treated recycled water produced at the WPCP. Water would be delivered through an extension of the Wolfe Road recycled water pipeline from the Apple 2 Campus to SCVWD recharge ponds, approximately 17 miles long.

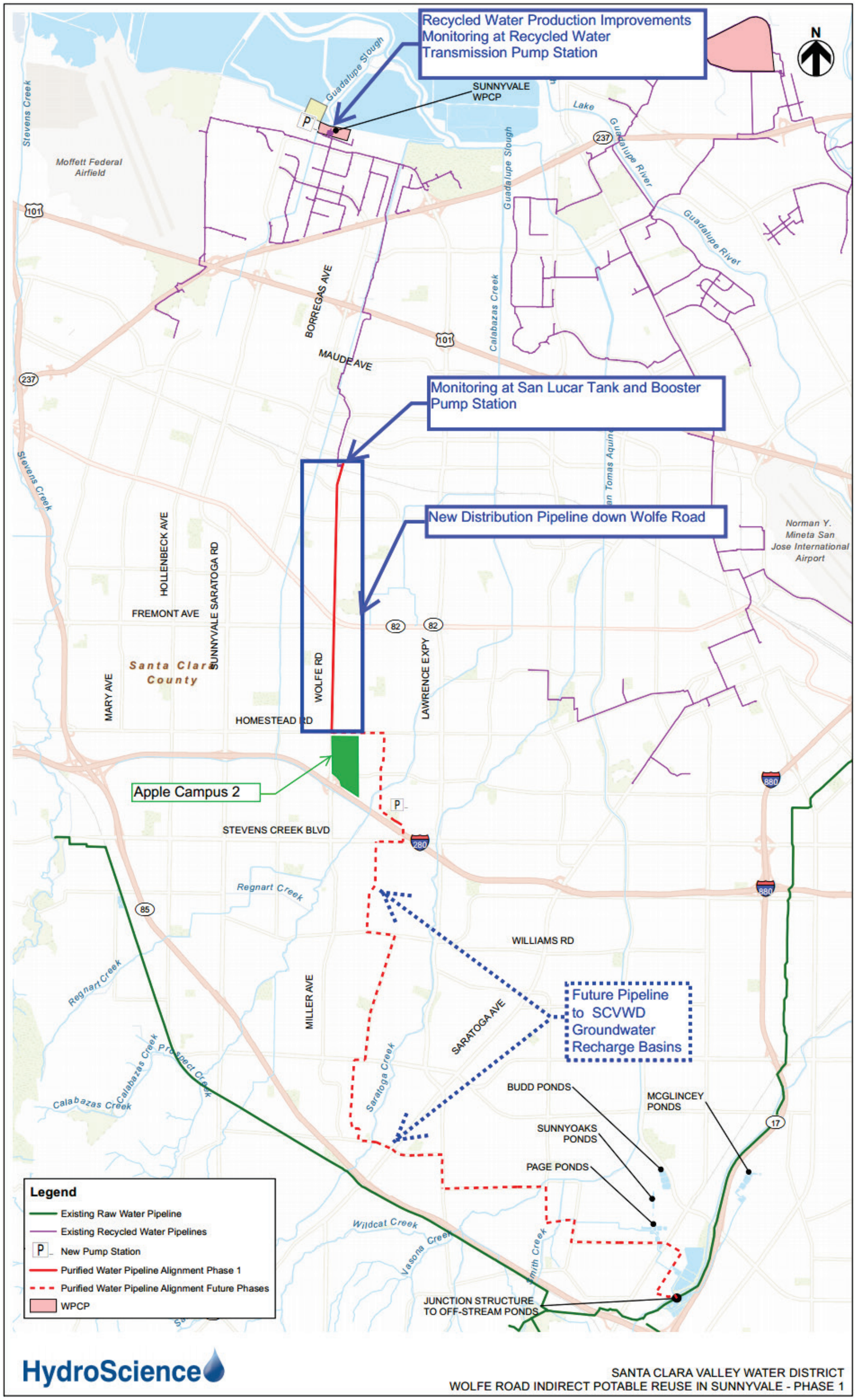
Implementation Status: Proposed WPCP facilities are currently at 10% complete (conceptual) design level. Project construction will begin in April 2015 (HDR, 2013). The Wolfe Road Pipeline Project is at 30% complete design and construction is scheduled to start in June 2015.

Funding Needs: Expedited funding is needed to accelerate recycled water production and distribution improvements to reliably meet existing demands and accelerate subsequent, planned recycled water distribution expansion to provide drought-proof recycled water supply and permanent potable water demand reduction.

Drought Eligibility: *Immediate regional drought preparedness* — The Project will produce 1,680 AFY of additional recycled water by 2016. This local source of drought-proof supply will help Santa Clara County respond to droughts and adapt to climate change.

Increase local water supply reliability and safe drinking water — Currently, about 55% of Santa Clara County's water supply is imported and about 5% is recycled water. This Project will increase recycled water use to 10% of the total water use in the County by 2025. This Project will increase local water supply reliability by increasing recycled water production and distribution capacity, while reducing demands for potable water and facilitating increased access to safe drinking water

Project Map



Recycled Water Production Improvements
Monitoring at Recycled Water Transmission Pump Station
SUNNYVALE WPCP
Monitoring at San Lucar Tank and Booster Pump Station
New Distribution Pipeline down Wolfe Road
Apple Campus 2
Future Pipeline to SCVWD Groundwater Recharge Basins
BUDD PONDS
MCGLINCEY PONDS
SUNNYOAKS PONDS
PAGE PONDS
JUNCTION STRUCTURE TO OFF-STREAM PONDS
Moffett Federal Airfield
Norman Y. Mineta San Jose International Airport
Santa Clara County
BORREGAS AVE
MAUDE AVE
HOLLENBECK AVE
SUNNYVALE SARATOGA RD
FREMONT AVE
MARY AVE
WOLFE RD
LAWRENCE EXPY
HOMESTEAD RD
STEVENS CREEK BLVD
WILLIAMS RD
MILLER AVE
SARATOGA AVE
Legend
Existing Raw Water Pipeline
Existing Recycled Water Pipelines
New Pump Station
Purified Water Pipeline Alignment Phase 1
Purified Water Pipeline Alignment Future Phases
WPCP
HydroScience
SANTA CLARA VALLEY WATER DISTRICT
WOLFE ROAD INDIRECT POTABLE REUSE IN SUNNYVALE - PHASE 1

Project Physical Benefits

Primary and secondary Project physical benefits are summarized in **PSP Tables 5a, 5b, and 5c,** below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: SCVWD-Sunnyvale Recycled Water Expansion Project **Primary Benefit Claimed:** Water Supply – Recycled Water Production **Units of the Benefit Claimed :** Acre-feet/year (AFY) **Additional Information About This Benefit:** Drought-proof permanent potable water demand reduction by replacement with recycled water			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2016-2066	0	1,680	1,680
Last Year of Project Life (50 years)	0	1,680	1,680
Source: HydroScience, 2013: p. ES-2 and Table 11-1.			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: The Project consists of the following:

- Recycled Water Production Improvements (HDR, 2013): structural, mechanical, and pipeline improvements to dissolved air flotation (DAF), dual media filters and chlorine contact tanks that will produce, at a minimum, 1,680 AFY: 1,120 AFY for existing demand (HydroScience, 2013: p. ES-2) plus 560 AFY (HydroScience, 2013: Table 11-1) for the Wolfe Road Pipeline.
- New Distribution Pipeline down Wolfe Road: 13,000 linear feet (LF) of 24-inch pipeline and booster pump station which will deliver 560 AFY (HydroScience, 2013: Table 11-1; number reported is 495 AFY but subsequent discussions with prospective users increased the value to 560 AFY).

The Project will achieve the following drought-proof permanent potable water demand reduction:

- From 2016 to 2066: 1,680 AFY recycled water produced and distributed

Recent and historical conditions: SCVWD is in Stage 3 (Severe) of its Water Shortage Contingency Plan (SCVWD, 2010: Table 6-1). The Board of Directors adopted Resolution 14-11 calling for 20% water use reduction in Santa Clara County through 12/31/14. SCVWD has also reduced treated water contract deliveries by 20% through 12/31/14 and is planning to discontinue raw surface water deliveries to its customers. If dry conditions continue into 2015, SCVWD falls to Stage 5 Emergency of its Water Shortage Contingency Plan, which could require water use reductions of up to 50%.

Plant configuration limitations require recycled water production to be a batch operation that alternates between recycled water production and San Francisco Bay effluent discharge. Infrastructure age and control system limitations together with compliance challenges have necessitated complex flow management that has ruled out batch production. As a result, during the last two years, all of the recycled water demand of 1.0 MGD (1,120 AF) has been met with potable water (City of Sunnyvale, 2013a: Attachment B, p. 23; and City of Sunnyvale, 2014a: Attachment B, p. 27).

Estimates of without-project conditions: Plant configuration limitations require recycled water production to be a batch operation that alternates between recycled water production and San Francisco Bay effluent discharge. Infrastructure age and control system limitations together with compliance challenges have necessitated complex flow management that has ruled out batch production. As a result, during the last two years, all of the recycled water demand of 1.0 MGD (1,120 AF) has been met with potable water (City of Sunnyvale, 2013a, Attachment B, p 23; and City of Sunnyvale, 2014b, Attachment B, p. 27).

Therefore, 0 AFY of drought-proof permanent potable water demand reduction is achieved without the Project, given the Plant's inability to produce recycled water on a continuous basis.

Methods used to estimate physical benefits: According to Brown and Caldwell's 2009 technical memorandum (p. ES-2), the typical total annual recycled water demand is approximately 1,120 AFY or 1 MGD. The Phase 1 Wolf Road pipeline will serve a demand new demand for 560 AFY (number reported is 495 AFY but subsequent discussions with prospective users increased the value to 560 AFY) (HydroScience, 2013).

New facilities, policies, and actions required to obtain the physical benefits: Recycled Water Production Improvements (HDR, 2013) and 13,000 LF of new distribution pipeline down Wolfe Road (HydroScience, 2013: p. ES-6 and Table ES1-2) are required to achieve the benefits.

Potential adverse effects: Production improvements are likely exempt from the California Environmental Quality Act (CEQA) under Guideline Section 15301(d) (rehabilitation of deteriorated structures, facilities, or mechanical equipment to meet current standards of public health and safety entailing negligible or no expansion of an existing use).

A Mitigated Negative Declaration (MND) was prepared for the Wolfe Road Pipeline Project, which concluded that mitigation measures would need to be implemented to reduce potential adverse effects on nesting birds and effects related to potential exposure to hazardous materials (e.g., contaminated soil or groundwater) that could be encountered during pipeline construction. The City of Sunnyvale adopted the MND for the new Distribution Pipeline (Wolfe Road Pipeline Project) on September 24, 2013 (City of Sunnyvale, 2013b).

Table 5b. Secondary Annual Project Physical Benefits

Project Name: SCVWD-Sunnyvale Recycled Water Expansion Project
Secondary Benefit Claimed: In-lieu Groundwater Recharge
Units of the Benefit Claimed: Acre-feet per year (AFY)
Additional Information About This Benefit: Amount of in-lieu groundwater recharge provided by the Project.

Year	Physical Benefits		
	Without Project	With Project	Change Resulting from Project
2016-2066	0	1,680	1,680
Last Year of Project Life	0	1,680	1,680

Source: HydroScience, 2013: p. ES-2 and Table 11-1.

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: See technical basis discussion under the heading "Technical Analysis of Primary Physical Benefits Claimed," above. The Project will increase recycled water use by 1,680 AFY from 2016 through 2066. This additional recycled water use is a drought-proof supply that provides in-lieu groundwater recharge (SCVWD, 2012a: p. 2-6). In-lieu recharge help keeps groundwater supplies from diminishing and the land from subsiding by reducing demands on the groundwater sub-basins.

Recent and historical conditions: Northern Santa Clara County has a history of groundwater overdraft and land subsidence Nearly half the water used in Santa Clara county is pumped from groundwater. Natural groundwater recharge needs to be augmented by managed and in-lieu recharge in order to avoid resumption of groundwater overdraft and land subsidence. The use of recycled water is in-lieu groundwater recharge (SCVWD, 2012a: pp. 2-2 and 2-6, Figure 2-4 on p. 2-7).

Because of the lack of local rainfall and cut backs in water imported from state and federal water projects, SCVWD has had to reduce management groundwater recharge operations in ponds and creeks to conserve drinking water supplies for use this summer (SCVWD, 2014a). Consequently, groundwater levels in the Project area (Santa Clara Plain portion of the Santa Clara subbasin) are 22 feet lower than last year and are 21 feet below the five-year average (SCVWD, 2014b). In addition, SCVWD is in Stage 3 (Severe) of its Water Shortage Contingency Plan (SCVWD, 2014c: p. 14) and is calling for a 20% reduction in water use in 2014.

Estimates of without-project conditions: Current Plant configuration limitations require recycled water production to be a batch operation that alternates between recycled water production and San Francisco Bay effluent discharge. Infrastructure age and control system limitations together with compliance challenges have necessitated complex flow management that has ruled out batch production. As a result, during the last two years, all of the existing recycled water demand of 1.0 MGD (1,120 AF) has been met with potable water (City of Sunnyvale, 2013a: Attachment B, p. 23; and City of Sunnyvale, 2014: Attachment B, p. 27). Without the Project, potable water will continue to be used to meet existing recycled water demands. In addition, without the Project, 560 AFY of new demand from the Apple 2 Campus development and other projects will be unmet (HydroScience, 2013: Table 11-1; number reported is 495 AFY but subsequent discussions with perspective users increased the value to 560 AFY).

Therefore, 0 AFY of in-lieu groundwater recharge would be achieved without the Project given plant treatment limitations and the lack of distribution infrastructure.

Methods used to estimate physical benefits: As described on page ES-2 of the City of Sunnyvale's Feasibility Study for Recycled Water Expansion Report (HydroScience, 2013: Table 11-1), the typical existing annual recycled water demand is approximately 1,120 AFY or 1 MGD. The total recycled water use of 1,680 AFY provides an equivalent amount of in-lieu groundwater recharge.

New facilities polices, and actions required to obtain the physical benefits: Recycled Water Production Improvements (HDR, 2013) and 13,000 LF of new Distribution Pipeline down Wolfe Road (HydroScience, 2013: p. ES-6, Table ES1-2) are required to achieve the benefits.

Potential adverse effects: See discussion above under the heading "Technical Analysis of Primary Benefits Claimed," above.

PSP Table 5c. Tertiary Annual Project Physical Benefits

Project Name: SCVWD-Sunnyvale Recycled Water Expansion Project
Tertiary Benefit Claimed: Water Quality Improvement – Pollutant Reduction to San Francisco Bay
Units of the Benefit Claimed: kilograms per year (kg/year)
Additional Information About this Benefit: Reduced total nitrogen (TN), carbonaceous biochemical oxygen demand (measure of organics loading) (CBOD), and total suspended solids (TSS) Pollutants Loadings to the San Francisco Bay

Year	Physical Benefits		
	Without Project	With Project	Change Resulting from Project
2016-2066	TN, BOD, and TSS: 0	Pollutant reductions to Bay: TN: 48,000 BOD: 10,900 TSS: 20,400	TN: 48,000 BOD: 10,900 TSS: 20,400
Last Year of Project Life	TN, BOD, and TSS: 0	Pollutant reductions to Bay: TN: 48,000 BOD: 10,900 TSS: 20,400	TN: 48,000 BOD: 10,900 TSS: 20,400

Source: City of Sunnyvale, 2014b and 2014c.

Technical Analysis of Tertiary Physical Benefits Claimed

Technical basis of the Project: Recycled water production in lieu of effluent discharge will reduce pollutant loadings to the San Francisco Bay. The following pollutants loadings will be reduced: TN; CBOD (a measure of the oxygen demand exerted by the oxidizable organic carbon in the sample); and TSS.

The Project will achieve the following reduction in pollutants loads to the Bay from 2016-2066:

- TN reduction: 48,000 kg/yr
- CBOD reduction: 10,900 kg/yr
- TSS reduction: 20,400 kg/yr

Values were calculated based on recycled water produced (1,680 AFY) multiplied by pollutant concentrations (TN: City of Sunnyvale 2014c; CBOD, and TSS: City of Sunnyvale, 2014b).

Recent and historical conditions: In 2014, San Francisco Bay dischargers including Sunnyvale received a Nutrients Watershed Permit (San Francisco Bay RWQCB, 2014) which requires evaluation of methods to reduce nutrient discharges to the San Francisco Bay. One of the primary nutrients of concern is Nitrogen. The proposed project supports the Regional Board's goal of reducing nutrient discharge to the Bay.

Estimates of without-project conditions: 0 kg/yr of TN, CBOD, and TSS diverted from Bay discharge.

Methods used to estimate physical benefits: Values were calculated based on recycled water produced (1,680 AFY) multiplied by pollutant concentrations (TN: City of Sunnyvale 2014c; CBOD and TSS: City of Sunnyvale 2014b).

The 1,680 AFY is determined as follows:

- 1,120 AFY for existing users (City of Sunnyvale 2014b: p. ES-2)
- 560 AFY for the Wolfe Road Pipeline service area (HydoScience 2013: Table 11-1)

New facilities polices, and actions required to obtain the physical benefits: Recycled Water Production Improvements (HDR 2013) and 13,000 LF of new Distribution Pipeline down Wolfe Road (HydroScience 2013: p. ES-6, Table ES1-2) are required to achieve the benefits.

Potential adverse effects: See discussion above under the heading "Technical Analysis of Primary Benefits Claimed."

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the project are provided at the least possible costs.

<table>
<tr><th colspan="2">PSP Table 6. Cost-Effectiveness Analysis</th></tr>
<tr><td colspan="2">Project name: SCVWD-Sunnyvale Recycled Water Expansion Project</td></tr>
<tr><td>Question 1</td><td>Types of benefits provided as shown in Tables 5a, 5b, and 5c:
The Project’s primary benefit is that it will produce 1,680 AFY of drought-proof permanent potable water demand reduction. The project consists of the following:
• Recycled Water Production Improvements:
− Structural, mechanical, and pipeline improvements to DAF, dual media filters and chlorine contact tanks that will provide a continuous and reliable recycled water source
− At a minimum, production of 1,680 AFY (1,120 AFY for existing demand plus 560 AFY for Wolfe Road service area) (Hydroscience, 2013: p. ES-2 and Table 11-1)
• New Distribution Pipeline down Wolfe Road:
− 13,000 LF of 24-inch pipeline and booster pump station
− Delivery of 560 AFY to its service area
As a result of the Project, potable water demand would be reduced 1,680 AFY from 2016 to 2066.
Cost per AF for the Project was calculated based on the following:
• 5.7% discount factor (per direction of the Association of Bay Area Governments [ABAG])
• 50-year lifetime for the Recycled Water Production Improvements
• 50-year lifetime for the New Distribution Pipeline down Wolfe Road
• Recycled water produced/supplied: 1,680 AFY
Total project annualized cost per acre foot is $752/AF. In addition to drought-proof permanent potable water demand reduction, the Project will reduce pollutant loadings to the San Francisco Bay through recycling water in lieu of discharging to the Bay. Pollutant loading reduction from 2016 to 2066 are as follows:
• TN reduction: 48,000 kg/year (City of Sunnyvale, 2014c)
• CBOD reduction: 10,900 kg/year (City of Sunnyvale, 2014b)
• TSS reduction: 20,400 kg/year (City of Sunnyvale, 2014b)</td></tr>
<tr><td rowspan="2">Question 2</td><td>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?
Yes.</td></tr>
<tr><td>If yes, list the methods (including the proposed project) and estimated costs.
SCVWD’s 2012 Water Supply and Infrastructure Master Plan (WSIMP) evaluated the costs, benefits, and risks of various options for providing a reliable supply of water for Santa Clara County now and in the future, including additional conservation, additional water recycling, indirect potable reuse, additional groundwater recharge, additional imported water agreement, regional desalination, additional conveyance, and additional storage (SCVWD, 2012b: Attachment 2, pp. 11-18, and SCVWD, 2011). The options were combined into three different strategies – Local Supply Development (indirect potable reuse; $600 to $700 million), System Flexibility (reservoir expansion and conveyance; $400 to $600 million) and Minimize Costs (dry year imported water options; $100 million) – and evaluated for how well they met planning objectives (SCVWD, 2012b: Attachment 2, pp. 19-25, and SCVWD, 2011). All of the options included achieving baseline non-potable recycled water use of 30,000 AFY by 2035.</td></tr>
</table>

Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** Three alternatives were screened for improvements to the production facilities: 1. Modifications to Existing Facilities: Structural and mechanical modifications to the existing tertiary treatment facilities at an estimated cost of $3,280,000 (HDR, 2013)[a] 2. New Cloth Disk Filters dedicated for recycled water production at an estimated cost of $3,590,000 (Brown & Caldwell, 2009)[b] 3. New Granular Media Filters dedicated for recycled water production at an estimated cost of $5,900,000 (Brown & Caldwell, 2009)[b] Modification to existing facilities, the Project, is the least cost alternative. To expand recycled water use, two pipeline alternatives were screened in the City of Sunnyvale's 2013 Feasibility Study for Recycled Water Expansion (Hydroscience, 2013). They include: • Wolfe Road Main (similar to proposed Project): Prior to selecting the preferred pipeline alignment, the City considered construction of 13,000LF of 12" to 24" pipeline. This alternative would cost $7.2 million. • Wolfe Road Pipeline (proposed Project): The Project as proposed includes 13,000 LF of 24" pipeline and provides regional interconnection. The Project also includes pump station upgrades, which will deliver 560 AFY, future potential for IPR demand. The Project's estimated cost is $17.5M. • Main Loop: This alternative includes 24,800 LF of 16"-24" pipeline and would meet a potential demand 345 AFY. However, no regional interconnectivity would be provided. Costs associated with this alternative are $15.9M. The Wolfe Road Pipeline as described in the Project Description, includes the least length of additional pipeline with a higher potential rate of recycled water demand per year. The water supply strategy adopted by the SCVWD Board of Directors builds on the Local Supply Development/Indirect Potable Reuse strategy discussed in Question 2 above. The strategy is to secure existing supplies and infrastructure, optimize the use of existing supplies and infrastructure, and develop additional recycled water and conservation to meet future increases in demands (SCVWD, 2012b: pp. iii and 17, and SCVWD, 2011). Securing existing supplies includes increasing non-potable reuse from about 15,000 AFY in 2010 to 30,000 AFY in 2035 (SCVWD, 2012b: p. 17, and SCVWD, 2011). Developing additional recycled water includes developing 20,000 AFY of indirect potable reuse (SCVWD, 2012b: p. 19, and SCVWD, 2011). Indirect potable reuse is not the least cost alternative, but it best addresses risks such as climate change and imported water reductions. In addition, the strategy best achieves non-cost planning objectives (SCVWD, 2012b: Attachment 2, p. 25, and SCVWD, 2011) and received almost unanimous support from stakeholders (SCVWD, 2012b: p. 35, and SCVWD, 2011). In the SCVWD 2012 Potable Reuse Study and follow-on Technical Memorandums, the Los Gatos Groundwater Recharge System Indirect Potable Reuse (IPR) Project presents the most cost-effective among all alternatives analyzed (See note b, below). In addition to the non-potable re-use benefit of the project, the Wolfe Road Water Pipeline alignment is the first step toward a 10 MGD Indirect Potable Reuse project in the SCVWD's Los Gatos recharge system. Improvements to the production facilities at the Sunnyvale treatment plant combined with the construction of the Wolfe Road pipeline aligns the City of Sunnyvale's 2013 Feasibility Study for Recycled Water Expansion with the SCVWD 2012 Potable Reuse Study. The Local Supply Development/Indirect Potable Reuse strategy has the following accomplishments that are different from the alternative strategies (SCVWD, 2012b: p. 22, and SCVWD, 2011): • Provides a local supply of drought-proof water (the other strategies are dependent on hydrologic condition), • Maintains local reservoir supplies that are used to meet flow and temperature requirements for fish (by using advanced treated recycled water for recharge instead of local reservoir supplies), and • Improving groundwater quality (because the advanced treated recycled water quality is of higher quality than the local and imported supplies currently used for groundwater recharge).

	The Wolfe Road pipeline alignment supports both the local and regional planning efforts to increase use of recycled water and provide future potential opportunities for indirect potable reuse within the Santa Clara County.

Source: *Brown & Caldwell, 2009; City of Sunnyvale, 2014c; HDR, 2013; HydroScience, 2013; SCVWD, 2012b, and SCVWD, 2011.*

Notes:

a. *The 2013 HDR memorandum reports construction cost including 30% contingency. Sunnyvale added a 40% markup to account for engineering and construction support to report a project cost.*
b. *Alternatives 2 and 3 construction cost data shown in the 2009 Brown & Caldwell memorandum were converted to project costs as follows: construction cost data were adjusted using ENR data from October 2009 to July 2013. These alternatives costs were also adjusted to include contingency (30%), yard piping ($100,000), and other project costs (40%) multiplier.*

References Cited:

Brown & Caldwell, 2009. Technical Memorandum - Recycled Water Treatment Alternatives, City of Sunnyvale WPCP Strategic Infrastructure Plan, October 10.

City of Sunnyvale, 2013a. 2012 Recycled Water Annual Report, March 15.

__________, 2013b. Mitigated Negative Declaration – Wolfe Road Recycled Water Project. September 24, 2013.

__________, 2014a. 2013 Recycled Water Annual Report, March 14.

__________, 2014b. 2013 Annual NPDES Report, City of Sunnyvale Water Pollution Control Plant, February 1.

__________, 2014c. Nutrient 13267 Study Data, July 2012 – March 2014.

HDR, 2013. Technical Memorandum - Simultaneous Production of Recycled Water, City of Sunnyvale Water Pollution Control Plant, Sodium Hypochlorite Disinfection Project, July 19.

HydroScience, 2013. City of Sunnyvale Feasibility Study for Recycled Water Expansion Report, June.

San Francisco Bay Regional Water Quality Control Board (RWQCB), 2014. Order No. R2-2014-0014, Nutrients from Municipal Wastewater Discharges to San Francisco Bay, NPDES Permit No. CA003887.

Santa Clara Valley Water District (SCVWD), 2010. Urban Water Management Plan.

__________, 2011. Board Agenda Memorandum, Water Supply and Infrastructure Master Plan Update, meeting date December 13, 2011.

__________, 2012a. 2012 Groundwater Management Plan.

__________, 2012b. SCVWD 2012 Water Supply and Infrastructure Master Plan, October.

__________, 2014a. Neighborhood Update – May 2014, Reservoir and local stream conditions.

__________, 2014b. May 2014 Water Tracker.

__________, 2014c. Supplemental Board Agenda Memorandum, Update on 2014 Water Supply and Drought Response, meeting date March 25, 2014.

SCVWD and City of Sunnyvale. 2014a. Primary Benefit Calculations: Cost per Acre Foot.

__________, 2014b. Tertiary Benefit Calculations: Effluent CBOD and TSS.

__________, 2014c. Tertiary Benefit Calculations: Total Nitrogen.

Project 6 – DERWA Phase 3 Recycled Water Expansion Project

Project Description

Project Goals: The DSRSD-EBMUD Recycled Water Authority's (DERWA's) Phase 3 Recycled Water Expansion Project (Project) will construct permanent distribution system infrastructure, providing immediate drought relief by permanently meeting some current potable water demand with recycled water for non-potable uses. The Project will offset the use of limited potable water supplies and preserve it for drinking water for residents in Alameda and Contra Costa counties. This Project contributes to DERWA's long-term recycling goal, which will reduce the need for severe rationing during prolonged droughts. With Project implementation, anticipated recycled water deliveries are 390 acre-feet per year (AFY) from DERWA to DSRSD and 477 AFY from DERWA to EBMUD.

Project Description: The Project consists of three pipeline components, described below. Together, these components will add nearly 9 miles of recycled water distribution pipelines that will deliver up to 867 AFY.

> Central Dublin Pipeline: This pipeline will add 1.5 miles of 4-inch (in.) to 10-in.-diameter recycled water pipe to deliver an annual average of 230 AFY of recycled water to six existing federal and county facilities in Dublin for landscape irrigation purposes. This pipeline will primarily run along 8th Street and Broder Boulevard and will connect to DSRSD's existing recycled water system at three locations: Dougherty Road/8th Street, Broder Boulevard/Arnold Road, and Madigan Road/Gleason Road.

> West Dublin Pipeline: This pipeline consists of 3.6 miles of 4-in. to 8-in.-diameter recycled water pipe. It will serve an annual average of 160 AFY to 34 existing water customers located west of Interstate (I-) 680 along Amador Valley Boulevard in western Dublin. The recycled water will be used for landscape irrigation of City-owned streetscapes and parks, business parks, a fire station, and two schools. The pipeline will connect to DSRSD's existing recycled water pipeline and pass under I-680 along Amador Valley Boulevard, extending under the highway overpass to San Ramon Road.

> San Ramon Valley Phase 2: This pipeline consists of 3.6 miles of recycled water distribution pipe ranging in diameter from 6 in. to 16 in. It will provide an average of 477 AFY to 39 customer sites, including the Bishop Ranch Business Park, the City of San Ramon, the Town of Danville, and a golf course. Recycled water will be used for landscape irrigation and a decorative pond feature. The alignment will run along Camino Ramon, Crow Canyon Road, Alcosta Boulevard, Sunset Drive, Bishop Drive, Executive Parkway, Norris Canyon Road, and other small side streets. The pipeline will connect to EBMUD's existing recycled water system at two locations: Bollinger Canyon Road/Sunset Drive and Alcosta Boulevard near Iron Horse Middle School.

Implementation Status: The Central Dublin Pipeline will be constructed between January and April 2015. The West Dublin Pipeline will be constructed between May 2015 and January 2016. The San Ramon Valley Phase 2 Pipeline will be constructed between July 2015 and June 2016.

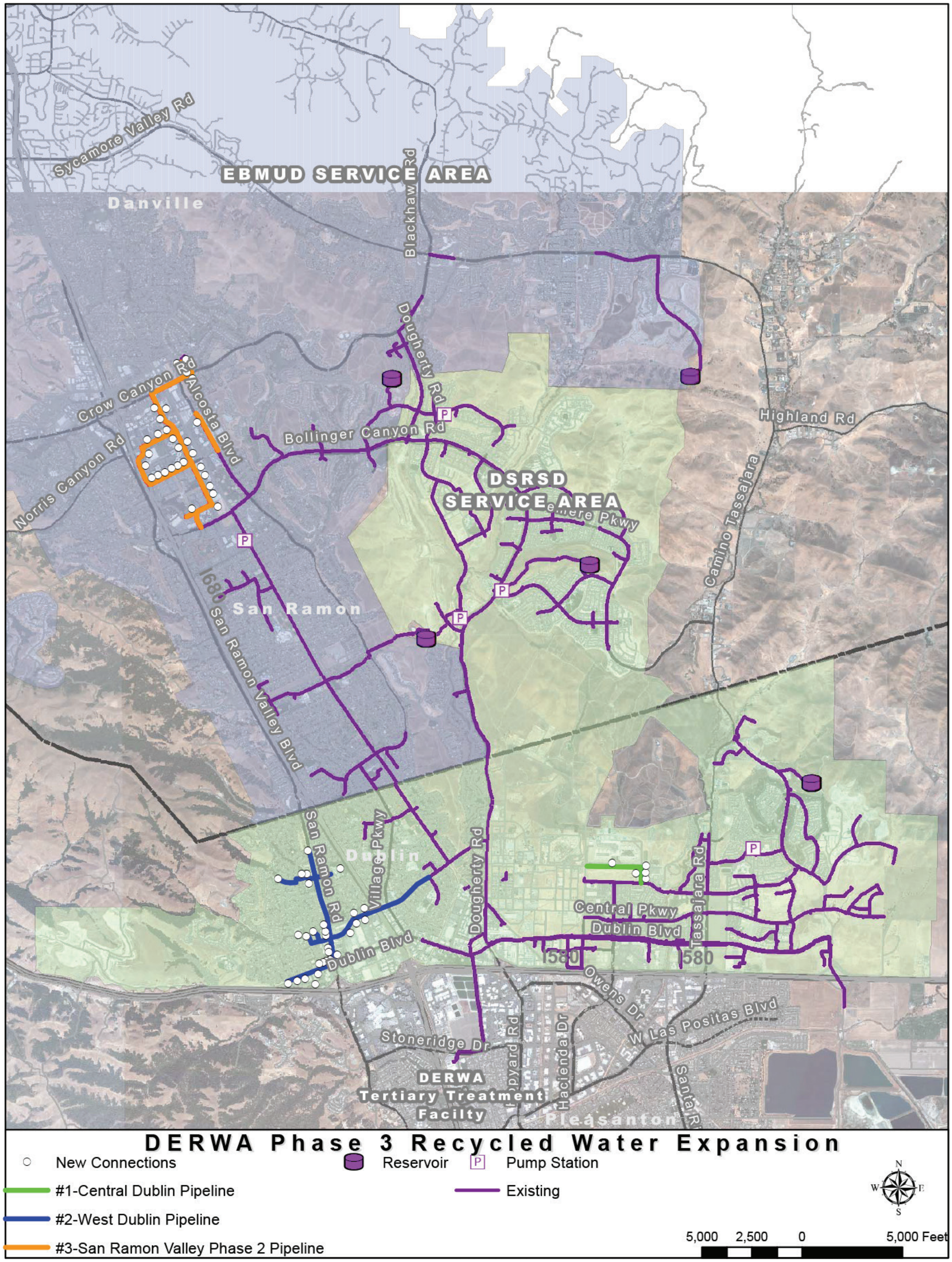
Funding Needs: DERWA projects are funded by DSRSD and EBMUD. Expedited funds are needed to facilitate Project construction beginning this year and to achieve potable water demand savings within the next 10 months. Without expedited funding, construction of the West Dublin and San Ramon Phase 2 pipelines may not begin for another 2-3 years. Construction of the Central Dublin Pipeline will begin this year to ensure potable demand savings by early next year. State funding will free up some of the financial resources of each agency so that those resources can be applied to implementation of other conservation and recycled water projects.

Drought Eligibility: *Immediate regional drought preparedness* – The Project will provide 230 AFY to DSRSD's water service area by 2015 and 867 AFY (390 AFY to DSRSD water service area, 477 AFY to EBMUD water service area) by 2016.

Increase local water supply reliability and safe drinking water – This Project provides a new reliable water supply that will offset existing potable water demands in Alameda and Contra Costa counties. The recycled water supply provided by this Project will conserve high-quality drinking water supplies and increase overall potable water supplies for water customers within the DSRSD and EBMUD service areas.

Reduce water quality/ecosystem conflicts – The Project will result in reduced discharge of point-source pollutants (e.g., nutrients and suspended solids) from treated wastewater effluent, which will contribute to overall improvement of the San Francisco Bay ecosystem.

Project Map



EBMUD SERVICE AREA
Danville
Sycamore Valley Rd
Blackhawk Rd
Dougherty Rd
Crow Canyon Rd
Alcosta Blvd
Bollinger Canyon Rd
Norris Canyon Rd
DSRSD SERVICE AREA
Highland Rd
Camino Tassajara
I680
San Ramon
San Ramon Valley Blvd
San Ramon Rd
Village Pkwy
Dublin
Dougherty Rd
Central Pkwy
Dublin Blvd
Tassajara Rd
I580
Owens Dr
W Las Positas Blvd
Stoneridge Dr
Hacienda Dr
DERWA Tertiary Treatment Facilty
Pleasanton
DERWA Phase 3 Recycled Water Expansion
New Connections
Reservoir
Pump Station
#1-Central Dublin Pipeline
Existing
#2-West Dublin Pipeline
#3-San Ramon Valley Phase 2 Pipeline
5,000
2,500
0
5,000 Feet

Project Physical Benefits

Primary, secondary, tertiary, and quaternary Project physical benefits are summarized in PSP **Tables 5a through 5d,** below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: DERWA Phase 3 Recycled Water Expansion Project **Primary Benefit Claimed:** Water Supply – Recycled Water **Units of the Benefit Claimed:** Acre-feet (AF) **Additional Information About this Benefit:** This new recycled water supply will result in a permanent potable water demand reduction and reduce demands on the Delta.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	0	0	0
2015	0	230	230 AF of recycled water
2016 - 2064	0	867	867 AF of recycled water
Last Year of Project Life (2065)	0	867	867 AF of recycled water
Comments: *None.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: The DERWA 1996 Facilities Plan for the San Ramon Valley Recycled Water Program (SRVRWP) (DERWA, 1996a) identifies the Project area and facilities for implementation of the multi-phased SRVRWP. The Facilities Plan identifies potential customers within the San Ramon Valley (including the cities of San Ramon, Pleasanton, and Dublin, the Town of Danville, and portions of Alameda and Contra Costa counties), treatment facilities, and distribution facilities consisting of transmission pipelines, distribution pipelines, storage reservoirs, and pump stations. The Facilities Plan incorporates the recycled water planning work completed separately by DSRSD and EBMUD for their respective service areas.

DSRSD’s 1995 master planning work was incorporated into the 1996 DERWA Facilities Plan. The DSRSD SRVRWP Master Plan (DERWA, 1996a) included the proposed Central and West Dublin Project components that were refined in subsequent master planning updates and most recently in the *Dublin Recycled Water Expansion Recycled Water Treatment and Distribution System Analysis* (Carollo Engineers, 2013). The Distribution System Analysis identifies three alternative alignments for the West Dublin Pipeline. Since completion of the analysis, District staff has selected to move forward with Alternative #2 as described above under “Project Description”; this is the lowest cost alternative.

Customers of the proposed Central and West Dublin pipelines were identified in DSRSD's "Dublin Recycled Water Expansion Market Survey” (WBA, 2013). Since completion of these two studies, DSRSD staff has eliminated one of the Central Dublin customers (Camp Parks) from the Market Survey list because the customer’s planned land uses may change, and staff has updated the anticipated recycled water use at the Alameda County Sheriff's office.

EBMUD’s Project customers and preliminary pipe alignment were identified in the EBMUD New Customer Base Hydraulic Modeling Memo (CDM, 2003). EBMUD has recently updated the estimated recycled water use for the San Ramon Valley Phase 2 Project (Project component #3) based on potable water use metered over a three-year period from 2010 to 2012.

Recent and historical conditions: DSRSD's water supply deliveries from Zone 7 are not sufficient to meet demand during this drought period (DSRSD and Zone 7, 1994). DSRSD declared a Community Drought Emergency and Stage 3 Water Supply; customers have been mandated to reduce water use by 25% (5% indoors, 50-60% outdoors) below 2013 use. DSRSD has passed Ordinance No. 301 to restrict water use applications and to impose penalties and enforcement.

EBMUD's current available water supply is less than what is required to meet demands during this drought period. EBMUD has requested a 10% voluntary water use reduction of its customers and is using supplemental supplies from the Sacramento River diverted through the Freeport Project to meet demand. Additionally, EBMUD (and all water rights holders within the Sacramento–San Joaquin River watershed) was recently issued a curtailment order to stop diverting water from the Sacramento and San Joaquin river watershed. This has resulted in a loss of 4,000 AF of water supply within the EBMUD service area in addition to the existing below-normal supply. (DSRSD, 2014a-d; EBMUD, 2014a; SWRCB, 2014)

Estimates of without-project conditions: Without the Project, DERWA will not be able to offset 867 AFY of potable water use. The No Project Alternative is described in the SRVRWP EIR (DERWA, 1996b).

Methods used to estimate physical benefits: The DERWA Facilities Plan (DERWA, 1996a) includes an initial market survey of potential recycled water customers to be served by the DERWA system. Customers are initially identified based on high water use for non-potable demands and proximity to potential pipeline alignments. The initial market assessments are refined at the time of Project implementation. DSRSD and EBMUD have each conducted their own updated recycled water market surveys and estimated the amount of recycled water to be used by Project customers (WBA, 2013 and EBMUD, 2014b). Recycled water demand estimates are based on water use over the last three years and current landscaping at a site.

New facilities, policies, and actions required to obtain the physical benefits: Both DSRSD and EBMUD have recycled water use ordinances (DSRSD, 2004 and EBMUD, 2013) to facilitate customer connection to the recycled water system. Upon completion of the Project pipelines, retrofit of customer sites will begin. Recycled water deliveries will commence upon completion of site retrofits. Recycled water use will be metered.

Potential adverse effects: There are no potential adverse effects that have been identified for this Project. Mitigation measures will be in place during construction. This Project is included in the SRVRWP EIR; a Notice of Determination was filed in December 1996 (DERWA, 1996c).

PSP Table 5b. Secondary Annual Project Physical Benefits			
Project Name: DERWA Phase 3 Recycled Water Expansion Project **Secondary Benefit Claimed:** Potable Supply Offset/Reduced Demands on the Delta **Units of the Benefit Claimed:** Acre-feet (AF) **Additional Information About this Benefit:** The Project will permanently reduce potable water demand on the Delta.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	0	0	0
2015	0	230	230 AF of reduced demand on the Delta
2016 - 2064	0	867	867 AF of reduced demand on the Delta
Last Year of Project Life (2065)	0	867	867 AF of reduced demand on the Delta
Comments: *Both DSRSD and EBMUD water supplies impact the Delta. DSRSD's water supply comes from the State Water Project, which is closely interconnected with the Delta. EBMUD's water comes from the Mokelumne River, a tributary to the Delta. Recycled water supply provided by this Project will offset potable water demands on the limited Delta water supply.*			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: See discussion above under the heading “Technical Analysis of Primary Physical Benefits Claimed.”

Recent and historical conditions: DSRSD’s Urban Water Management Plan (UWMP) (DSRSD, 2012) discusses its typical and historical water supply and demand. DSRSD's water supply is not sufficient to meet demand. DSRSD declared a Community Drought Emergency and Stage 3 Water Supply; customers have been mandated to reduce water use by 25% (5% indoors, 50-60% outdoors) below 2013 use. DSRSD has passed ordinances to restrict water use applications and to impose penalties and enforcement. (DSRSD, 2014a-d; EBMUD, 2014a; SWRCB, 2014)

EBMUD’s UWMP (EBMUD, 2010) discusses its typical and historical water supply and demand. EBMUD’s current available water supply is less than what is required to meet demands. EBMUD has requested a 10% voluntary water use reduction of its customers and is using supplemental supplies from the Sacramento River diverted through the Freeport Project to meet demand. Additionally, EBMUD (and all water rights holders within the Sacramento–San Joaquin River watershed) was recently issued a curtailment order to stop diverting water from the Sacramento–San Joaquin River watershed. This has resulted in a loss of 4,000 AF of water supply within the EBMUD service area in addition to the existing below-normal supply. EBMUD’s UWMP discusses its typical and historical water supply and demand (EBMUD, 2010).

Estimates of without-project conditions: See estimates of without-project conditions above under the heading “Technical Analysis of Primary Project Benefit.”

Methods used to estimate physical benefits: See methods discussion above under the heading “Technical Analysis of Primary Project Benefit.”

New facilities, policies, and actions required to obtain the physical benefits: See new facilities discussion above under the heading “Technical Analysis of Primary Project Benefit.”

Potential adverse effects: See discussion above under the heading “Technical Analysis of Primary Project Benefit.”

PSP Table 5c. Tertiary Annual Project Physical Benefits			
Project Name: DERWA Phase 3 Recycled Water Expansion Project **Tertiary Benefit Claimed:** Ecosystem improvement – pollution reduction **Units of the Benefit Claimed:** Kilograms per year (kg/yr) **Additional Information About this Benefit:** The Project will reduce pollutant discharge to San Francisco Bay.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	0	0	0
2015	0	Pollution reduction: Nitrogen: 10,200 C-BOD: 1,100 TSS: 1,900	Pollution reduction: Nitrogen: 10,200 C-BOD: 1,100 TSS: 1,900
2016 - 2064	0	Pollution reduction: Nitrogen: 38,500 C-BOD: 4,100 TSS: 7,100	Pollution reduction: Nitrogen: 38,500 C-BOD: 4,100 TSS: 7,100
Last Year of Project Life (2065)	0	Pollution reduction: Nitrogen: 38,500 C-BOD: 4,100 TSS: 7,100	Pollution reduction: Nitrogen: 38,500 C-BOD: 4,100 TSS: 7,100
Comments: *Pollution reduction estimated is based on the average monthly concentrations of pollutant constituents from DSRSD's 2013 wastewater effluent data (DSRSD, 2013).*			

Technical Analysis of Tertiary Physical Benefits Claimed

Technical basis of the Project: Recycled water is produced from treated wastewater effluent that would otherwise be discharged to the San Francisco Bay. Any reduction in discharge to the Bay results in reduced pollutant loadings to the Bay. The following pollutant loading reductions have been identified for this Project: total nitrogen (TN), carbonaceous biochemical oxygen demand (CBOD); and total suspended solids (TSS).

Pollutant load reductions identified in PSP Table 5c, above, were calculated based on average pollutant concentrations multiplied by recycled water production of 230 AF in 2015 and 867 AFY from 2016 through 2065. Average pollutant concentrations are the monthly average concentrations measured at the DSRSD Wastewater Treatment Plant (WWTP) in 2013.

Recent and historical conditions: In 2014, San Francisco Bay dischargers, including DSRSD, received a Nutrients Watershed Permit (San Francisco Bay Regional Water Quality Control Board [RWQCB], 2014), which requires evaluation of methods to reduce nutrient discharges to the San Francisco Bay. One of the primary nutrients of concern is nitrogen. The Project supports the RWQCB's goal of reducing nutrient discharge to the Bay.

Estimates of without-project conditions: 0 kg/yr of TN, CBOD, and TSS diverted from Bay discharge.

Methods used to estimate physical benefits: Pollutant load reductions identified in PSP Table 5c were calculated based on average pollutant concentrations multiplied by recycled water production of 230 AF in 2015 and 867 AFY from 2016 through 2065. Average pollutant concentrations are the monthly average concentrations measured at the DSRSD WWTP in 2013.

New facilities, policies, and actions required to obtain the physical benefits: The Project pipelines must be constructed to achieve the benefits and customers must be connected. Recycled water use policies are in place to facilitate customer connection and use of recycled water.

Potential adverse effects: There are no potential adverse effects that have been identified for this Project. Mitigation measures will be in place during construction. This Project is included in the SRVRWP EIR; a Notice of Determination was filed in December 1996 (DERWA, 1996c).

PSP Table 5d. Quaternary Annual Project Physical Benefits			
Project Name: DERWA Phase 3 Recycled Water Expansion Project **Quaternary Benefit Claimed:** Reduced Energy Consumption **Units of the Benefit Claimed:** Kilowatt-hours (kWh) **Additional Information About this Benefit:** The Project will reduce DSRSD's energy consumption.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	0	0	0
2015	0	279,220	279,220 kWh reduced energy consumption
2016 - 2064	0	444,360	444,360 kWh reduced energy consumption
Last Year of Project Life (2065)	0	444,360	444,360 kWh reduced energy consumption
Comments: *Recycled water will be produced at the DSRSD WWTP using treated wastewater that would otherwise be discharged to San Francisco Bay. Approximately 690 kWh per AF of water is consumed to pump treated wastewater for discharge out of the Tri-Valley (DSRSD, 2014e). Additionally, DSRSD's potable water supply from Zone 7 consumes on average 1,165 kWh per AF of energy for pumping water into the Tri-Valley Region (DERWA, 2014) and 110 kWh of energy used to treat DSRSD's potable water (DERWA, 2014). The total energy used to provide potable water to the DSRSD service area (pumping and treatment) is 1,965 kWh. The energy required to produce recycled water is 751 kWh (DERWA, 2013). This Project will result in overall reduced energy consumption of 1,214 kWh in the DSRSD service area. Since this Project will reduce EBMUD's potable water demand, EBMUD's water treatment energy use will decrease and the EBMUD service area will also realize reduced energy use with implementation of this Project.*			

Technical Analysis of Quaternary Physical Benefits Claimed

Technical basis of the Project and recent and historical conditions: Recycled water will be produced at the DSRSD WWTP using treated wastewater that would otherwise be discharged to San Francisco Bay. Recycled water is produced on average of 751 kWh per AF (DERWA, 2014). If not recycled, 690 kWh per AF of water is consumed to pump treated wastewater for discharge out of the Tri-Valley. Additionally, DSRSD's potable water supply from Zone 7 consumes on average 1,165 kWh per AF of energy for pumping water into the Tri-Valley Region and an additional 110 kWh per AF of energy is used to treat potable water. This Project will result in avoided energy consumption of 1,214 kWh per AF.

Estimates of without-project conditions: Continued net energy consumption would be 444,360 kWh for pumping water into the Tri-Valley, treatment of DSRSD potable water, and pumping treated wastewater out of the Tri-Valley.

Methods used to estimate physical benefits: The energy consumption for pumping water into the Tri-Valley is based on Zone 7's annual operating cost to pump water from its two pumping plants. Reduction of energy consumption for pumping water into the Tri-Valley and potable water treatment cost applies only to DSRSD's supply; EBMUD's water supply comes from the Mokelumne River and is delivered by gravity flow. The value used to calculate the energy consumption of DSRSD's imported water supply is 1,165 kWh per AF (DERWA 2014). This rate was multiplied by the AF of recycled water to be provided by DSRSD.

DSRSD contracts with the Livermore-Amador Valley Water Management Agency (LAVWMA) for discharge to the LAVWMA pipeline that pumps water out of the Tri-Valley and to the San Francisco Bay. The energy consumption rate for pumping water out of the Tri-Valley is based on LAVWMA's fiscal year (FY) 2013-14 data collected from LAVWMA expenditure reports. The average energy consumption rate used to calculate energy required to pump water out of the

Tri-Valley is 690 kWh per AF. This rate was multiplied by the total recycled water supply (from both DSRSD and EBMUD) to be provided by this Project.

DSRSD purchases treated potable water from Zone 7. Zone 7's average energy consumption rate used to calculate energy required to treat DSRSD's potable water is 110 kWh. This rate was multiplied by DSRSD's anticipated recycled water supply to be provided by this Project.

DSRSD's energy use to produce recycled water is on average 751 kWh. This rate is a 12-month average ending May 2014. This rate was multiplied by the total recycled water volume to be supplied by this Project.

Net energy savings to be realized in the DSRSD service area is the total energy used for pumping potable water into the Tri-Valley, pumping treated wastewater out of the Tri-Valley, plus the energy required to treat DSRSD's potable water, less the energy use required to produce recycled water.

New facilities, policies, and actions required to obtain the physical benefits: The Project pipelines must be constructed to achieve the benefits and customers must be connected. Recycled water use policies are in place to facilitate customer connection and use of recycled water.

Potential adverse effects: There are no potential adverse effects that have been identified for this Project. Mitigation measures will be in place during construction. This Project is included in the SRVRWP EIR; a Notice of Determination was filed in December 1996 (DERWA, 1996c).

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project name: DERWA Phase 3 Recycled Water Expansion Project	
Question 1	***Types of benefits provided as shown in Tables 5a through 5d:*** This Project provides a reliable drought-resistant, non-potable water supply and reduces demand on Delta water supplies. The Project includes installation of 9 miles of recycled water pipelines with a useful life of at least 50 years. This Project provides many long-term benefits to the region: • Saves limited potable supply for drinking and other domestic uses, permanently reducing potable demands by 867 AFY • Protects San Francisco Bay by reducing pollutant mass loading to the Bay • Provides a sustainable resource • Avoids energy pumping costs; Recycled water is produced using DSRSD's treated wastewater that would otherwise be pumped through a regional pipeline for discharge to the Bay • Leaves more water in-stream, enhancing fish and wildlife resources in the Delta and more available water supply for users downstream of the Delta • Provides a reliable, drought-proof non-potable water supply for landscaping • Supports sustainable development in the region • Supports a healthy environment that contributes to a high quality of life

Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** Yes. DSRSD alternatives for the Central and West Dublin pipeline alignments were evaluated in the Recycled Water Treatment and Distribution System Analysis (Carollo Engineers, 2013). There were no other alternatives considered for the Central Dublin pipeline. It is the only feasible alignment that can be constructed within existing rights-of-way to serve the prospective customers. Three alternative alignments were presented for the West Dublin pipeline. All three alternatives would serve the same customer base, but would follow a slightly different route that would either avoid construction in high traffic areas, jack and bore construction, or construction along a roadway that would have higher construction cost due to thick concrete along the route. The costs for each alternative were: Alternative A, $7,020,000; Alternative B, $6,420,000; and Alternative C, $7,120,000. DSRSD is moving forward with construction of Alternative B, the least cost alignment alternative. EBMUD considered alternative alignments for its proposed pipeline in the technical memo “Modeling Results for DERWA Task 7A - New EBMUD Customer Base Hydraulic Modeling” (CDM, 2003). The final alignment was determined based on hydraulics, customer concerns, and maintenance concerns. Because much of the alignment is located within a large business park, traffic concerns were considered, as well as ease of access for maintenance.
Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** This Project is the only viable water supply alternative for both DSRSD and EBMUD that will provide additional, reliable, long-term water supply. The Project is the only water supply alternative available to DSRSD. The District’s water supply agreement with Zone 7 prohibits the purchase of water supply outside of Zone 7. DSRSD’s only other supply alternative to this Project is to do nothing. The “do nothing” alternative would result in DSRSD not having sufficient supply to meet demands in future droughts, and increases the risk of the District being in a Stage 3 or Stage 4 water shortage emergency during future droughts. EBMUD has evaluated other water supply alternatives that could be more cost-effective, including the Freeport diversion at the Sacramento River or through increased conservation. However, these alternatives are in fact being implemented to their maximum feasible extent. Recycled water supplied through the Project is a permanent, reliable, year-round, locally controlled supply in response to this drought and future droughts. This project prepares EBMUD and DSRSD to respond to climate change and extreme conditions. It is the preferred alternative because it is the only alternative that provides a reliable, drought-proof, long-term water supply and a permanent reduction on demands from the Delta. Because DSRSD does not have any other water supply alternatives and because EBMUD’s supplemental drought year CVP supply is unreliable (described above) the Project is the preferred alternative and will provide a permanent, reliable, year-round, locally controlled water supply.
Comments: *None.*	

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Project 7 – Calistoga Recycled Water Storage Facility

Project Description

Project Goals: The Calistoga Recycled Water Storage Facility Project (Project) will enhance recycled water production and storage to provide increased water supply for urban and agricultural use. The City of Calistoga has a critical need for funding to advance water recycling within its community and region. Recycled water provides a sustainable local water supply source that reduces reliance on imported and local water supplies (Delta, surface water, and groundwater) and improves water quality in the Napa River and ultimately the San Francisco Bay. The goal of the Project is to provide an additional 25 acre-feet per year (AFY) of recycled water to Calistoga by extending the City's ability to generate recycled water year-round and provide new customers with recycled water to offset their potable water and groundwater use.

Project Description: The City's existing reclaimed water system produces an average of 180 AFY of recycled water and distributes recycled water to a large portion of the City's service area. However, recycled water storage capacity is lacking and constrains year-round recycled water production and distribution capabilities. The Project would construct a new 20-million gallon (MG) effluent storage pond (approximately 725 feet x 385 feet x 14 feet) on two City-owned parcels totaling about 10 acres, adjacent to the City's existing 10-MG effluent storage pond and distribution infrastructure. The pond will not be lined or covered. Other Project components include construction of a 200-foot-long pipeline, a pre-fabricated rail car bridge that will provide convenient access to the pond, and a maintenance road around the perimeter of the pond. Construction of the Project will require approximately 100,000 cy of excavation and embankment work. Excavated soil will be re-used on-site.

Implementation Status: The City has retained URS Corporation for Project design and environmental compliance. Biological, cultural resources, and hydrologic studies were completed in May 2014. A CEQA Notice of Exemption was filed in June 2014 (City of Calistoga, 2014c). Project permits and/or exemptions to permits are being pursued with resource agencies; agency authorizations are anticipated to be secured by fall 2014. The 90% complete Project design will be completed by mid-June 2014 and final construction documents are anticipated to be complete by August 2014. The Project will go out to competitive bid and is anticipated to be awarded by late fall 2014. Construction will begin in early spring 2015 and be completed approximately 4 months later. Delivery of additional recycled water supply may begin by July 2015.

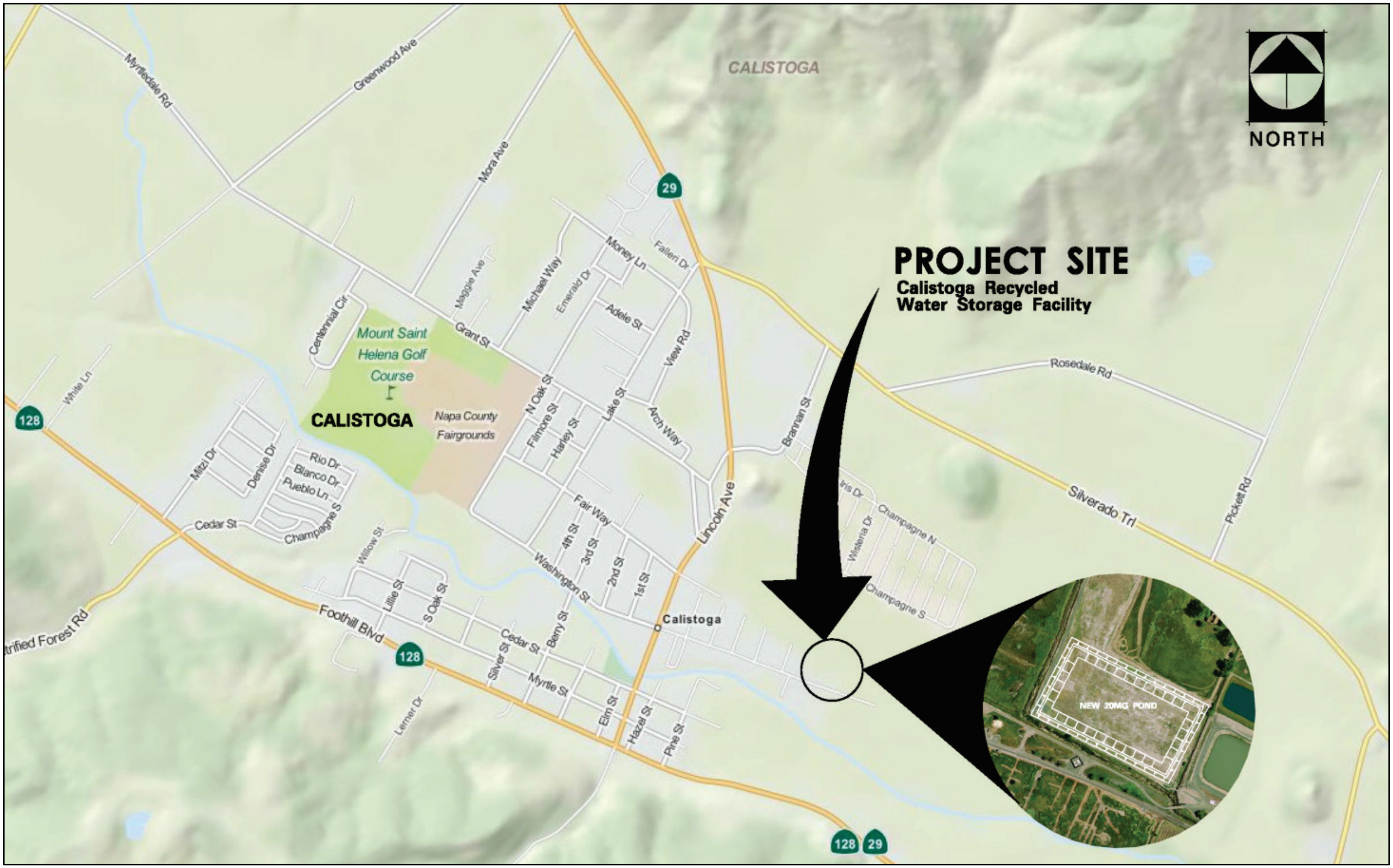
Funding Needs: This Project is critical in the City's efforts to improve water reliability, offset potable water and groundwater use, and improve the water quality of the Napa River. The Project will be ready to start construction within 6 months of grant award (construction to begin in February 2015). Considering these facts, the City is eligible and in need of expedited funding to build the Project. The City has funds in place to provide a 25% match for the Project cost ($1 million). Without expedited funding support, the City will have to secure funding elsewhere, with its rate payers likely being asked to pay for this Project.

Drought Eligibility: *Immediate regional drought preparedness* – Napa County is currently in "Extreme Drought" conditions, as designated by the U.S. Drought Monitor. The Project will provide an additional 25 AFY of recycled water to Calistoga beginning in 2015. A direct result of the additional recycled water production is an estimated 15 AFY of direct potable water demand reduction (8 AFY direct reduction of Delta/State Water Project supply) and an additional 10 AFY reduction in private groundwater use. The Project will immediately assist some new residential customers in complying with the required 20%, Stage II Emergency Water mandate by providing recycled water for landscape irrigation.

Increase local water supply reliability and safe drinking water – Recycled water can be utilized as a continuous, sustainable source to offset potable water and groundwater use for irrigation purposes. Increasing the use of recycled water reduces potable water and groundwater demand, which provides additional safe drinking water for consumption. Reduced discharge of treated water effluent to the Napa River improves overall water quality in the watershed, thereby protecting downstream drinking water supplies.

Reduce water quality/ecosystem conflicts – The Project would reduce treated water effluent discharge to the Napa River/San Francisco Bay by 61 AFY. This will reduce nutrient loading to the Napa River/San Francisco Bay, including Biological Oxygen Demand, Total Suspended Solids, and Total Nitrogen. The new storage facility will allow the City to store water rather than discharge it to the Napa River during low flow/drought conditions when dilution ratios cannot be met, thereby protecting riparian habitat that may be sensitive to effluent constituents at higher concentrations.

Project Map


PROJECT SITE
Calistoga Recycled
Water Storage Facility
NORTH
CALISTOGA
Mount Saint
Helena Golf
Course
Napa County
Fairgrounds
Calistoga
NEW 20MG POND
Silverado Trl
Rosedale Rd
Pickett Rd
Lincoln Ave
Foothill Blvd
Grant St
Washington St
Myrtle St
Cedar St
Greenwood Ave
Mora Ave
Myrtledale Rd
Brannan St
Champagne N
Champagne S
Wisteria Dr
Iris Dr
Money Ln
Falleri Dr
Adele St
View Rd
Arch Way
Lake St
Fair Way
N Oak St
Fillmore St
Harley St
Michael Way
Emerald Dr
Maggie Ave
Centennial Cir
White Ln
Mitzi Dr
Denise Dr
Rio Dr
Blanco Dr
Pueblo Ln
Champagne S
Willow St
Lillie St
S Oak St
Silver St
Berry St
4th St
3rd St
2nd St
1st St
Elm St
Hazel St
Pine St
Lerner Dr
trified Forest Rd
128
29

Physical Benefits

Primary and secondary Project physical benefits are summarized in **PSP Tables 5a, 5b, and 5c,** below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: Calistoga Recycled Water Storage Facility **Primary Benefit Claimed:** Increased Recycled Water Production / Use **Units of the Benefit Claimed:** Acre-feet/year (AFY) **Additional Information About this Benefit:** City of Calistoga will be able to provide recycled water 365 days per year from 240 days per year.			
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2015	200	225	25 AFY of additional recycled water produced
2016	205	230	25 AFY of additional recycled water produced
2017	210	235	25 AFY of additional recycled water produced
Etc.	225	250	25 AFY of additional recycled water produced
Last Year of Project Life (75 years)	225	250	25 AFY of additional recycled water produced
Comments: *City of Calistoga, 2014a.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project:

Calistoga is in a Stage II Water Emergency – Mandatory 20% Conservation Requirements (City of Calistoga, 2014b).

With the Project, the City will now be able to operate the recycled water system 365 days per year rather than averaging only about 240 days per year. There is also a small amount assumed due to increased demand of recycled water due to the drought continuing (about 2 AFY). These are new customers that have asked the City for new uses (dog park and Grant Street resident).

In June 2013, the City conducted a Bypass Alternatives Investigation Report (BAIR). This investigation was conducted by Larry Walker Associates, which produced a report consisting of eight alternatives (Larry Walker Associates, 2013). It was determined that Alternative #8 (Increase Permanent Storage) was the highest priority, and therefore the preferred alternative for immediate implementation. The City owns two parcels consisting of 10 acres close to existing recycled water infrastructure.

Recent and historical conditions:

Calistoga is in a Stage II Water Emergency due to the existing drought conditions (City of Calistoga, 2014b).

The new pond (proposed location shown in photo, above left) will allow the City to run the recycled water system year-round. Currently, the City does not have enough storage to operate the system year-round and must shut off the recycling system for 4-5 months each year.

Estimates without project conditions: If the Project is not completed, the following are the consequences:

- With the City's mandatory 20% conservation goal, a reduced demand for approximately 2 AFY will remain in effect.
- Year-Round Recycled Water Use – The City will not be able to provide year-round recycled water supply. The recycled water system will be shut off 4-5 months of the year because the City lacks adequate recycled water storage capacity. Approximately 13 AFY of recycled water will be lost and customers will use additional domestic water, half of which comes from the SWP/Delta.

Methods used to estimate physical benefits: The following is a summary of how the estimates of physical benefits of 25 AFY of additional needed recycled water were determined:

1. The City has two recent inquiries from customers that want to utilize recycled water for irrigation purposes. Based on area of turf, volumes of new recycled use have been calculated by the City's Senior Civil Engineer. This amount was determined to be 2 AFY.
2. Year Round Recycled Water Use – An average annual recycled water volume was used to estimate average monthly use. The average annual use is around 180 AFY, which (divided by 12 months) equals an average of 15 AF/month. Assuming that recycled water supply will be higher during the four higher precipitation months in a year (i.e., in late fall, winter, and early spring), the average monthly use (15 AF) was reduced by 78% to about 3.25 AF per month. A total of 13 AFY of increase in recycled water use is anticipated (i.e., 4 months multiplied by 3.25 AF = 13 AFY).

New facilities, policies, and actions required to obtain the physical benefits:

- Design of 20-MG recycled water storage pond is almost complete – City Council has authorized award of design to URS to complete this phase of work.
- Project will be placed out for bids.
- Bidder must be approved by City Council and a contract formally awarded through Council action.
- Construct the recycled water storage pond and related appurtenances.
- Begin filling the recycled water storage pond and distributing recycled water to customers.

Potential adverse effects: None anticipated (A categorical exemption under CEQA has been submitted to the State Clearinghouse).

PSP Table 5b. Secondary Annual Project Physical Benefits			
Project Name: Calistoga Recycled Water Storage Facility **Secondary Benefit Claimed:** Permanent Potable / Groundwater Demand Reduction **Units of the Benefit Claimed:** Acre-feet per year (AFY) **Additional Information About this Benefit:** Groundwater recharge			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2014	Delta/SWP Reduction = 0 Kimball Surface Water Reduction = 0 Reduction of Private Groundwater Use = 0	Delta/SWP Reduction = 8 Kimball Surface Water Reduction = 7 Reduction of Private Groundwater Use = 10	Delta/SWP Reduction = 8 Kimball Surface Water Reduction = 7 Reduction of Private Groundwater Use = 10
Comments: *None.*			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: See discussion above under the heading "Technical Analysis of Primary Physical Benefits Claimed."

Recent and historical conditions:

- Calistoga is in a Stage II Water Emergency due to the existing drought conditions (City of Calistoga, 2014b).
- Delta/SWP Water Reduction: 50% of City water supply comes from the SWP, which pulls water from the Delta at Barkers Slough. Of the 15 AFY of offset to potable water use, 8 AFY of this is assumed to be SWP/Delta water that will not be needed.
- Kimball Surface Water Reduction: The other 50% of City water supply comes from the Kimball surface water. Of this potable water source, 7 AFY will not be needed.
- Reduction of Private Groundwater Use: Calistoga has a local resort that is tripling in size and wants to become a new recycled water customer. The resort currently irrigates with well water and, if it is unable to replace the well water with recycled water, will continue to use this source. The applicant's landscape architect submitted irrigation demands for the new landscaping and the annual use was calculated based on irrigating throughout the year. A total demand of 10 AFY is anticipated to meet the resort's irrigation needs. Note that the reduction of 10 AFY of groundwater use is not contingent upon implementation of subsequent projects; the groundwater reduction benefits would be realized through an existing recycled water use request.

Estimates without project conditions: If the Project is not completed, the following results would take place:

- Delta/SWP Water Reduction: 8 AFY of SWP supply will continue to be needed from the Delta
- Kimball Surface Water Reduction: 7 AFY of surface water supply will continue to be needed from this City water source.
- Reduction of Private Groundwater Use: 10 AFY will be pulled from local groundwater sources.

Methods used to estimate physical benefits: The following is a summary of how the estimates of physical benefits were made:

- Potable Water Reduction: 15 AFY of potable water offset is based on the following:
  - Water offset = New customers due to drought + 365-day operation of recycled water system (15 AFY = 2 AFY + 13 AFY).
  - Because the City's water use is about 50% from Kimball and 50% from the Delta/SWP, Calistoga uses 7.5 AFY from SWP supply and 7.5 AFY from the Kimball supply.
- Reduction of Private Groundwater Use: New resort project wants to use recycled water for irrigation that will offset existing groundwater supply of about 10 AFY.

New facilities, policies and actions required to obtain the physical benefits:

- Design of 20-MG recycled water storage pond is almost complete – City Council has authorized award of design to URS to complete this phase of work.
- Project will be advertised for competitive bids.
- Bidder must be approved by City Council and a contract formally awarded through Council action.
- Construct the recycled water storage pond and related appurtenances.
- Begin filling the recycled water storage pond and distributing recycled water to customers.

Potential adverse effects: See discussion for "Primary Project Benefits Claimed," above.

PSP Table 5c. Tertiary Annual Project Physical Benefits			
Project Name: Calistoga Recycled Water Storage Facility **Tertiary Benefit Claimed:** Water Quality Improvement - Pollution Reduction to San Francisco Bay **Units of the Benefit Claimed:** Kilograms per year (kg/yr), acre-feet per year (AFY) **Additional Information About this Benefit:** The benefits provided are presented in nutrient reductions and total treated effluent discharge volumes in Napa River/San Francisco Bay.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2015	Nutrient reduction: BOD = 0 TSS = 0= Nitrogen = 0 340 AFY of Napa River/Bay discharge	Nutrient reduction: BOD = 379 TSS = 341 Nitrogen = 1,514 279 AFY of Napa River/Bay discharge	Nutrient reduction: BOD = 379 TSS = 341 Total Nitrogen = 1,514 Reduction of 61 AFY of Napa River/Bay discharge
2016-Last Year of Project Life (75 years)	Same as for year 2015.	Same as for year 2015.	Same as for year 2015.
Source: *Raynor, Derek, 2014*			

Technical Analysis of Tertiary Physical Benefits Claimed

Technical basis of the Project: The Project will eliminate discharge of 61 AFY of treated effluent to the Napa River/Bay. Calistoga is estimating that Napa River/Bay discharge will be reduced by 20 MG (the size of the new storage pond), equivalent to 61 AFY. Tertiary project benefits include reductions in volume and nutrients to the Napa River/San Francisco Bay as follows:

BOD = 379 kg/yr

TSS = 341 kg/yr

Total Nitrogen = 1,514 kg/yr

Volume Reduction to Napa River/Bay = 61 AFY

As recycled water replaces the need for diverting and importing surface water, more water remains in streams for fish and wildlife in local areas of the region, as well as the Delta.

Recent and historical conditions:

- Calistoga is in a Stage II Water Emergency due to the existing drought conditions (City of Calistoga, 2014b).
- Nutrient/Volume reduction: With the onset of the current drought (beginning in the fall of 2011), localized conditions resulted in lower-than-normal water flows in the Napa River. This has resulted in the City's storage facilities operating above capacity, requiring the City to request bypass directly to the Napa River/San Francisco Bay from the Regional Water Quality Control Board (RWQCB).
  - As a result of the drought and low flows in the Napa River, the City has requested permission from RWQCB to over-irrigate the irrigation fields with tertiary-treated, disinfected, and de-chlorinated wastewater. Subsequently, this treated wastewater bypasses the permitted discharge point and is discharged to the river at much lower dilution ratios.
  - RWQCB required the City to investigate all feasible bypass alternatives, including increased storage capacity, and submit a report.
  - Uncontrolled discharge to the Napa River could result in loss of or harm to habitat in the river.

Estimates without project conditions: If the Project is not completed, the following results would take place:

- Volume reduction: The volume reduction would be zero (0). 61 AFY of treated effluent would be discharged to the Napa River/San Francisco Bay.
- Nutrient Reductions:
  - a. BOD = Zero (0) instead of 379 kg/yr
  - b. TSS = Zero (0) instead of 341 kg/yr
  - c. Total Nitrogen = Zero (0) instead of 1,514 kg/yr

Methods used to estimate physical benefits: The following is a summary of how the estimates of physical benefits were made:

- Nutrient/Volume reduction: The new pond will provide approximately 20 MG (or 61 AFY) of storage. Calistoga expects that new recycled water users will use the 25 AFY of recycled water. Between the new recycled water users and the ability to store more recycled water, the City expects to reduce the volume of discharge to the Napa River/Bay by at least 61 AFY (25 AFY plus additional storage capacity of about 36 AFY). As the storage pond will be topped off continuously through the summer and fall months, the volume reduction will most likely be greater than 61 AFY. The nutrient loading is based on this conservative volume and the concentration of average wastewater discharged by the WWTP.

New facilities, policies and actions required to obtain the physical benefits:

- Design of 20-MG recycled water storage pond is almost complete – City Council has authorized award of design to URS to complete this phase of work.
- Project will be advertised for competitive bids.
- Bidder must be approved by City Council and a contract formally awarded through Council action.
- Construct the recycled water storage pond and related appurtenances.
- Begin filling the recycled water storage pond and distributing recycled water to customers.

Potential adverse effects: See discussion for "Primary Project Benefits Claimed," above.

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project Name: Calistoga Recycled Water Storage Facility	
Question 1	***Types of benefits provided as shown in PSP Tables 5a, 5b, and 5c:*** The Project would provide water supply and water quality benefits. As California is currently facing severe drought, recycled water production is an added benefit to offset the use of potable water and groundwater supplies. In addition, recycled water benefits the environment by reducing nitrogen/ nutrient loading to the Napa River and San Francisco Bay through reduced discharges. The Project has the potential to reduce bypass discharges during low flow conditions, thereby protecting water quality and riparian ecosystems that may be impacted by effluent constituents in higher concentrations due to lack of dilution. The Project will eliminate 61 AFY of treated effluent discharged to the Napa River/ San Francisco Bay. Recycled water replaces the need for diverting and importing surface water, more water remains in streams for fish and wildlife in local areas in the region, as well as the Delta. This water also reduces the amount of private groundwater well use that will be replaced with recycled water. The Calistoga Recycled Water Storage Facility will yield 25 AFY of water. The following water supply benefit yields are anticipated: • Water Supply - Replaces Potable Water Demand = 15 AFY (8 AFY of Delta/SWP Supply)

<table>
<tr><td></td><td>

- Water Supply - Replaces Private Groundwater Use = 10 AFY
- Water Quality - Reduction in Discharge to Napa River/Bay = 61 AFY
- Water Quality - Reduction in Nutrients: BOD = 379 kg/yr, TSS = 341 kg/yr, Total Nitrogen = 1,514 kg/yr

Benefits will accrue in and around the City of Calistoga and downstream along the Napa River, which is a tributary to San Pablo Bay/San Francisco Bay.</td></tr>
<tr><td rowspan="2">Question 2</td><td>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?</td></tr>
<tr><td>If yes, list the methods (including the proposed project) and estimated costs.

A preliminary draft technical memorandum (Larry Walker Associates, 2008) evaluated the costs for various recycled water storage and distribution alternatives for the City. The two most promising alternatives for increasing recycled water availability and reducing discharge to the Napa River/San Francisco Bay are additional recycled water storage and additional treatment process to remove boron from wastewater for use on local vineyards. Boron treatment is estimated to cost $3-4 million dollars to treat Calistoga's average dry-weather flow (0.84 MGD). The 20-MG storage facility is estimated to cost about $1.1 million and will reduce discharge by about 0.06 MGD. Even though the boron treatment yields a greater potential to reduce discharge, the City still needs to generate and store recycled water to meet demands from local vineyards and, more importantly, to build the additional storage pond so this boron-treated water can be stored prior to bulk delivery. The storage pond is the first step enabling the City to substantially increase its recycled water yield and must be constructed prior to implementation of boron treatment.

Other alternative methods were initially considered to achieve similar types and amounts of physical benefits. The BAIR (Larry Walker Associates, 2013) initially looked at eight alternatives to reduce Napa River/San Francisco Bay discharge and increase recycled water use. The BAIR states clearly that impediments for agricultural use must be further evaluated prior to being able to deliver recycled water to the local vineyard community (Larry Walker Associates, 2013: p. 6). Alternatives 1 and 7 provide increases in seasonal discharge start/stop dates or discharge higher flows when river volumes are higher, resulting in a net reduction in recycled water availability and proportional increases in nutrient loading to the Napa River. Alternative 2 (Private Storage) has been pursued with three different property owners, who have rejected the City's offers. Alternatives 3 through 6 are underway, and the City has identified funding to move these projects forward. Alternative 8 (Increase Permanent Storage) is the only real project that can be implemented immediately that will provide increased water supply, improve ecosystem habitat, and provide significant reduction in river discharge (and associated reduction in nutrient loadings).

The Calistoga Recycled Water Storage Facility, estimated to cost $1.1 million, will be built on City-owned property, significantly reducing the cost of the Project. Using property currently owned by the City avoids additional land purchase cost, estimated to be $3 million (or more if the City were to pursue acquisition of private property for the pond). Other City-owned properties are farther away from existing recycled water infrastructure; if used, such infrastructure would need to be extended, thereby increasing the cost. Other properties cannot have a pond built on them because they are in the 100-year floodplain and a recycled water storage facility would not be permitted by regulatory agencies.</td></tr>
<tr><td>Question 3</td><td>If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.

As described in response to Question 2 above, the proposed project is the least cost alternative because this parcel is also the closest to the existing recycled water infrastructure.

The Calistoga Recycled Water Storage Facility is the least cost alternative when compared to:
(a) WWTP plant upgrades for boron removal; (b) construction of a similar pond on other City-owned property combined with construction of the necessary piping infrastructure; or (c) construction of the storage pond on private property acquired as part of the Project. For these reasons, it is the preferred alternative; in addition, it provides the necessary "backbone" infrastructure before boron removal can be implemented efficiently and effectively.</td></tr>
<tr><td colspan="2">Sources: Kirn, M., 2013; Larry Walker Associates, 2008, 2013.</td></tr>
</table>

References cited:

City of Calistoga, 2014a. Calculations and Estimates of Primary and Secondary Benefits completed by Senior Civil Engineer.

__________, 2014b. Stage II Water Emergency declaration – Resolution 2014-052.

__________, 2014c. Notice of Exemption for Calistoga Recycled Water Storage Pond Expansion Project. June 14.

__________, Municipal Code Section 3.32.

Kirn, M., 2013. Letter from City of Calistoga to San Francisco Bay Regional Water Quality Control Board, dated December 10, 2013.

Larry Walker Associates, 2008. Recycled Water Strategic Plan Technical Memorandum No. 3: Recycled Water Disposal/Storage Scenarios to Meet Buildout Conditions, pp. 8-12. May 2008.

__________, 2013. Bypass Alternatives Investigation Report. Prepared for City of Calistoga.

Rayner, Derek, 2014. E-mail communication.

Project Justification – Human Right to Water Projects

Project descriptions, estimated physical benefits of the projects, justification of each project's technical feasibility, and a cost-effectiveness analysis are presented in this section for the projects listed below. These projects span two sub-regions in the San Francisco Bay IRWM Region. The projects included in this section have benefits related to increased reliability of water supplies and delivery of safe drinking water, and water supply savings.

Project ID#	Project Proponent	Project Title
8	San Mateo County RCD	Drought Relief for South Coast San Mateo County
9	Stinson Beach County Water District	Stinson Beach Water Supply & Drought Preparedness Plan

Project 8 – Drought Relief for South Coast San Mateo County

Project Description

Project Goals & Description: The San Mateo County Resource Conservation District (RCD) and its partners (American Rivers, Trout Unlimited, and the Natural Resources Conservation Service [NRCS]) work to reduce water supply conflicts in rural communities of the Central California coast. The goals of the Drought Relief for South Coast San Mateo County Project (Project) are to improve water supply and drought resiliency for domestic and agricultural water users in the two largest coastal watersheds in the county (Pescadero-Butano and San Gregorio watersheds). A suite of site-specific water use, infrastructure, and water management improvements will result in 20.1 AFY (6.55 MGY) of additional water storage capacity and 157 AFY (51 MGY) of reduced water demand. The RCD's water management coordination efforts will be implemented in the Pescadero-Butano and San Gregorio watersheds to address domestic and agricultural water use efficiency, water supply storage, and regional water management during drought and dry years.

Water Use Efficiency Element A.1–Domestic: Repair four significant water main pipe leaks/breakages and inspect primary community drinking water supply lines to identify and address other inefficiencies, resulting in water savings of 14 AFY.

Water Use Efficiency Element A.2–Agricultural: Conduct assessments of water use and management at 13 sites and implement on-farm infrastructure upgrades and water management modifications based on assessment results. These actions are anticipated to result in water savings of approximately 143 AFY.

Water Supply Storage Element B.1–Domestic: Improve and expand domestic water supply infrastructure at San Mateo County's Memorial Park Reservoir and Cuesta La Honda Guild's Granny Flat Reservoir. The Memorial Park Reservoir provides potable water to a regional park and campground that serves approximately 9,000 visitors annually and the Redwood Glen community, which supports 10 residents and 10,000-12,000 visitors annually. The existing 250,000-gallon reservoir will be replaced with a 2-MG concrete reservoir (final reservoir sizing may be adjusted). Potable water supply for the community of La Honda will be improved by dredging (to remove accumulated sediment) and lining the ±12.5-AF Granny Flat Reservoir. This upgrade will increase storage capacity by 2.5 AF, reduce seepage losses by 3 AFY, and address past water quality issues associated with high total organic carbon (TOC) levels. Both projects will enable water to be stored in the wet season and reduce water diversions when stream flow is low.

Water Supply Storage Element B.2–Agricultural: Construct storage facilities and identify storage improvements across four agricultural sites, allowing agricultural water diverters to dramatically reduce or eliminate stream pumping rates during low flow periods, and ensure that domestic and environmental water use needs are met during times of water scarcity. This element will create 11.5 AF of drought preparedness storage for some of the largest water diverters in the area.

Regional Drought Water Management Element C: Develop and implement a regional strategy to coordinate timing and rate of water diversions which, when paired with water use efficiency and storage improvements (Elements A and B), will dramatically reduce water conflicts/competition between domestic, agricultural, and environmental demands and improve resiliency of local water supplies during drought and dry years.

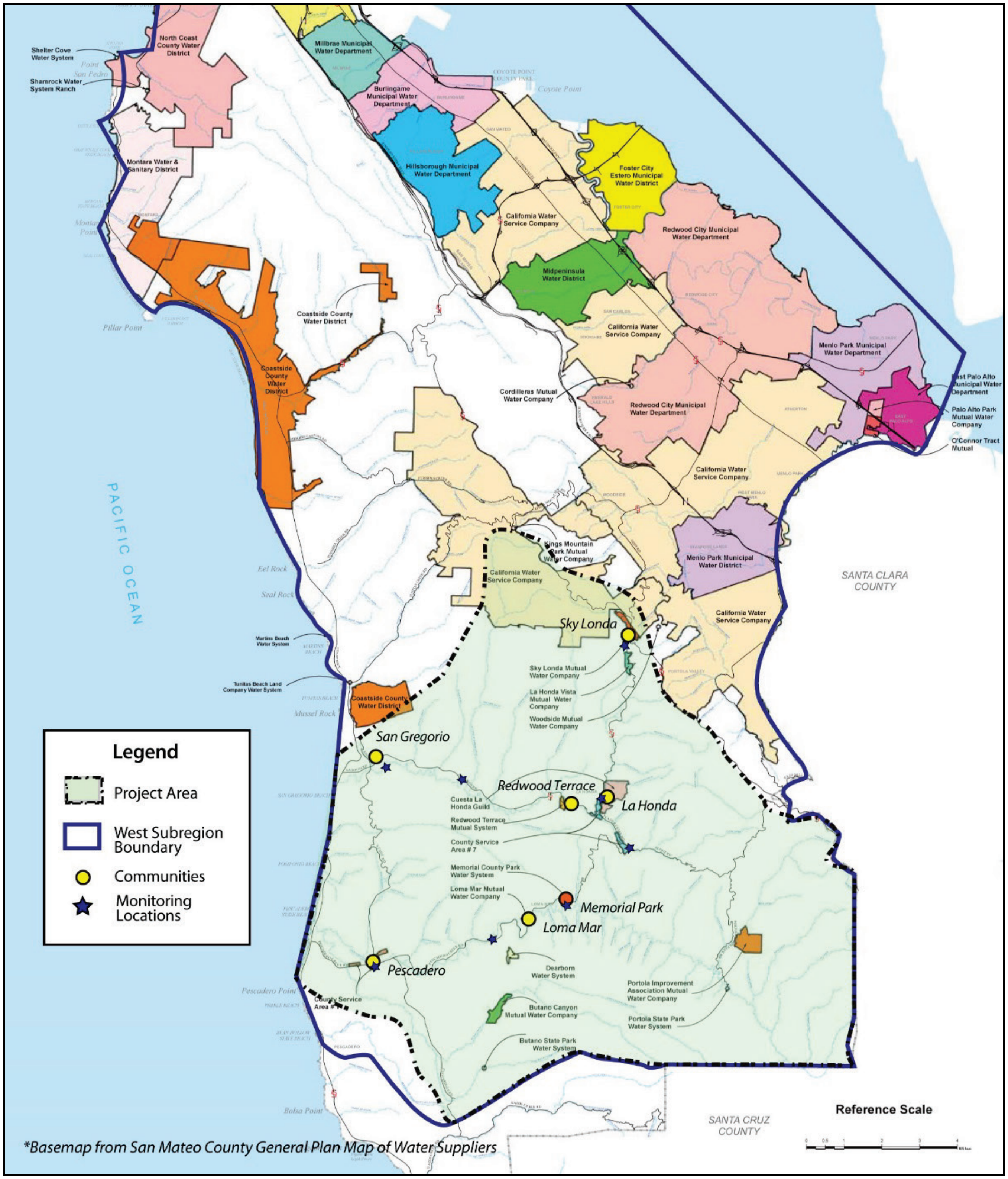
Implementation Status: Element A.1: One pipe replacement has been completed; two others will be completed by end of 2014. Element B.1: Environmental compliance and permit applications are underway for domestic water supply storage projects to be completed by summer 2015; construction is scheduled for fall 2015. Elements A.2 and B.2: Sites are at various stages of assessment and evaluation, design, and construction. Element C will be initiated in fall 2014.

Funding Needs: This Project is critical to the region's ability to improve local water supply reliability and deliver safe drinking water. Community water suppliers do not have the user fee base needed to finance these Projects, and the agricultural community consists of family farms that cannot afford to develop these Projects without emergency drought relief funding. To date planning, design and implementation efforts have been largely funded by grants or San Mateo County.

Drought Eligibility: *Immediate regional drought preparedness* – The Project will result in 20.1 AFY (6.55 MGY) of additional water supply storage and 157 AFY (51 MGY) of water use efficiency improvements; benefits will begin to be realized by fall 2014. Additional water storage at three sites (Element B.1) will increase the water storage totals to about 43 AFY (14 MGY). Repair of known leaks and pipe breaks (Element A.1) will save approximately 6 AFY (2 MGY) of water in 2014; irrigation efficiency projects (Element A.2) will save about 105 AFY by fall 2014.

Increase local water supply reliability and safe drinking water – Repair of leaks and pipe breaks on community water supply systems and water storage upgrades will improve the reliability and safety of local water supplies by ensuring water users in coastal San Mateo County are working together as efficiently as possible.

Project Map


North Coast County Water District
Shelter Cove Water System
Shamrock Water System Ranch
Millbrae Municipal Water Department
Burlingame Municipal Water Department
Hillsborough Municipal Water Department
Foster City Estero Municipal Water District
California Water Service Company
Redwood City Municipal Water Department
Midpeninsula Water District
Montara Water & Sanitary District
Coastside County Water District
Pillar Point
Cordilleras Mutual Water Company
Menlo Park Municipal Water Department
East Palo Alto Municipal Water Department
Palo Alto Park Mutual Water Company
O'Connor Tract Mutual
PACIFIC OCEAN
Kings Mountain Park Mutual Water Company
Menlo Park Municipal Water District
SANTA CLARA COUNTY
Eel Rock
Seal Rock
Sky Londa
Martins Beach Water System
Sky Londa Mutual Water Company
La Honda Vista Mutual Water Company
Woodside Mutual Water Company
Tunitas Beach Land Company Water System
Mussel Rock
San Gregorio
Redwood Terrace
La Honda
Cuesta La Honda Guild
Redwood Terrace Mutual System
County Service Area # 7
Memorial County Park Water System
Loma Mar Mutual Water Company
Memorial Park
Loma Mar
Pescadero
Dearborn Water System
Portola Improvement Association Mutual Water Company
Portola State Park Water System
Pescadero Point
County Service Area #
Butano Canyon Mutual Water Company
Butano State Park Water System
Bolsa Point
SANTA CRUZ COUNTY
Reference Scale
Legend
Project Area
West Subregion Boundary
Communities
Monitoring Locations
*Basemap from San Mateo County General Plan Map of Water Suppliers

Project Physical Benefits

Primary and secondary Project physical benefits are summarized in **PSP Tables 5a and 5b**, below.

PSP Table 5a. Primary Annual Project Physical Benefits

Project Name: Drought Relief for South Coast San Mateo County

Primary Benefit Claimed: Increased Water Supply Reliability

Units of the Benefit Claimed: Acre-feet per year (AFY)

Additional Information About this Benefit: The Project will result in an increase of 21.5 AFY (14 MGY) in additional water storage capacity and 157 AFY (51 MGY) of reduced water need due to efficiency improvements. Increased water supply is roughly equivalent to 3% of domestic water allocations in the area, and water savings are roughly equivalent to 17% of domestic water allocations in the area.

Year	Physical Benefits		
	Without Project	**With Project**	**Change Resulting from Project**
2014	Water savings: 0 Water storage capacity: 46	Water savings: 112 Water storage capacity: 47.1	Water savings: 112 Additional water storage capacity: 1.1
2015	Water savings: 0 Water storage capacity: 46	Water savings: 157 Water storage capacity: 66.1	Water savings: 157 Additional water storage capacity: 20.1
2016	Water savings: 0 Water storage capacity: 46	Water savings: 157 Water storage capacity: 66.1	Water savings:157 Additional water storage capacity: 20.1
2017 – 2047 (30-year period)	Water savings: 0 Water storage capacity: 46	Water savings: 157 Water storage capacity: 66.1	Water savings: 157 Additional water storage capacity: 20.1

Comments: *Existing water storage capacity includes existing storage for the two domestic water supply Project sites at La Honda and Memorial Park (Element B.1). Between 2017 and 2047, up to 4,705 AF would be saved.*

Technical Analysis of Primary Physical Benefits Claimed

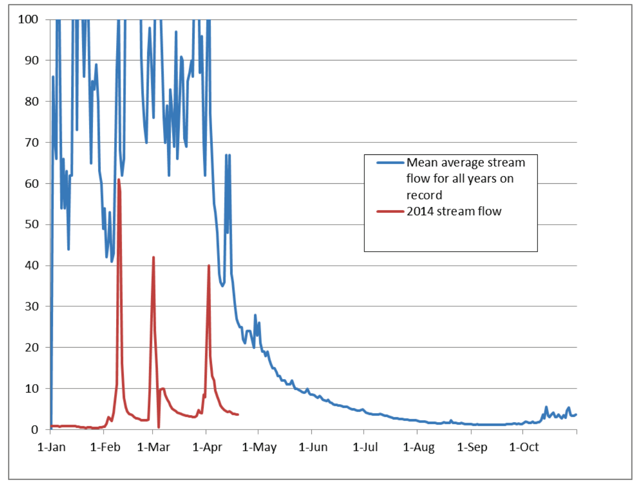
Technical basis of the Project: Water supply reliability will increase as a result of the Project's additional water storage, which will provide supplies during late summer months and prolonged drought periods when surface water is unable to meet water demands. Water supply reliability will also be improved by reducing summer water demands and water use conflicts through water efficiency projects and coordinating water diversion and management activities (Alford, 2010: pp. 67-69).

Recent and historical conditions: In an effort to address the lack of water availability during drought conditions, the San Gregorio Creek Watermaster has instituted water rationing in the area through no-pump days, and community water suppliers have coordinated conservation efforts the past three water years. Community water supply infrastructure was primarily constructed between 1930 and 1960; some of the main water distribution lines and other infrastructure are approximately 50-80 years old and at risk of breaks or failures.

Water rights allocated in the region exceed actual surface water supply during late summer months in dry water years (Alford, 2010: p. 56).

Estimates of without-project conditions: Without the development of additional water storage and substantial reductions in agricultural water demand, the ability to meet immediate and long-term human and environmental needs in the region during drought and dry summer conditions is at significant risk (Alford, 2010: p. 56)

Methods used to estimate physical benefits: Estimated physical benefits were developed based on volume of additional storage that could feasibly be developed as well as calculations of water saved by efficiency improvements. Water savings calculations were based on water audits conducted by NRCS and reduction of water loss associated with known pipe breaks and leaks.



Mean daily average stream flow recorded at the USGS San Gregorio Creek Stream Gage (11162570) for all available records between 1969 and 2013 compared to mean daily average recorded so far in the year 2014.

New facilities, policies, and actions required to obtain the physical benefits: New actions and facilities associated with this Project that will be required to obtain the primary physical benefits of the Project include water management coordination, increased water supply efficiency, and increased water storage capacity.

Potential adverse effects: Construction of water storage facilities could result in temporary construction-related impacts, including noise, traffic, and air quality, but such effects are expected to be mitigated to less-than-significant levels. All Projects will improve water supply and reliability in the long term. Infrastructure elements consist of modifications to existing structures or development of storage facilities on lands that are already developed.

PSP Table 5b. Secondary Annual Project Physical Benefits			
Project Name: Drought Relief for South Coast San Mateo County **Primary Benefit Claimed:** Protection of core habitat for steelhead and coho salmon due to reduced water diversion amounts and reduced pumping rates during summer months and low flow periods (late August to early October). **Units of the Benefit Claimed:** Number of summer rearing habitat areas protected from dewatering and/or significant fluctuations in channel flows. **Additional Information About this Benefit:** The Project will result in an increase in local streamflow by approximately 0.5 cfs per agricultural water diversion site and 0.1 cfs per domestic water diversion site. The agricultural water diversion sites are located along the main channels of San Gregorio and Pescadero creeks, where stream flows average 1-2.5 cfs during average years in September; domestic water supply sites are located on tributary streams where flows of less than 0.5 cfs are common during summer months. Each Project, once implemented, will result in a 20-50% reduction in local summer streamflow impacts due to reduced summer water diversion pumping. This will improve summer rearing habitat for steelhead and coho salmon located adjacent and downstream of the Project sites, as well as helping to ensure adequate stream connectivity for migrating juveniles along 6 miles of blue-line streams.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2014	0	2	2
2015	0	6	6
2016	0	7	7
Comments: *Water savings and storage noted in PSP Table 5a, above, also apply to the benefits described in this table.* *San Gregorio Creek and Pescadero Creek watersheds are noted as core recovery areas for central coast coho in the Central Coast Coho Recovery Plan (NOAA, 2012: p. 261). Low streamflows are noted in the San Gregorio Creek Watershed Management Plan as a primary limiting factor for steelhead and coho salmon (NHI, 2010: pp. 100, 114) and for steelhead in both the San Gregorio and Pescadero watersheds in the Southern Steelhead Resources Evaluation (Becker et al., 2010: pp. 17-25).*			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: Low streamflows, in part due to water diversions, are noted in the San Gregorio Creek Watershed Management Plan as a primary limiting factor for steelhead and coho salmon (NHI, 2010: pp. 100, 114) and for steelhead in both the San Gregorio and Pescadero watersheds in the Southern Steelhead Resources Evaluation (Becker et al., 2010: pp. 17-25). The U.S. Geological Survey (USGS) stream gages maintained in each watershed show that streamflows drop dramatically during summer months, to the point that larger water diversions can dramatically drop the streamflow in a short period of time. An assessment that evaluated the impacts of changing from a 250-gallon-per-minute (-gpm) pumping rate (common for most agricultural water users in the area) down to a 90-gpm pumping rate showed that these modifications can dramatically reduce streamflow fluctuations and impacts to salmonid habitat (American Rivers, 2013).

Recent and historical conditions: The San Gregorio and Pescadero Creek watersheds historically supported a population of approximately 2,000-2,500 steelhead and have been listed by the California Department of Fish and Wildlife (CDFW) as high-priority streams (Becker et al., 2010: pp. 17-25). These streams are also listed by the National Marine Fisheries Service (NMFS) as core recovery areas for Central California Coast Coho (NOAAA, 2012: p. 261).

Estimates of without-project conditions: Water diversions will continue to have dramatic impacts on the hydrograph and may dewater critical instream summer rearing habitat, particularly during drought periods. Salmonid population viability is at risk if these conditions continue. CDFW has conducted enforcement sweeps and has imposed regulatory instream flow requirements in these watersheds to protect fish and wildlife resources. If these CDFW actions occur, they will have a benefit to salmonids but will have a significant adverse impact on water users that rely on surface waters for drinking and/or agricultural water supplies.

Methods used to estimate physical benefits: Physical benefits correspond with the number of sites identified for Project implementation that are located within primary stream habitat areas and currently have diversion pumping rates equal to or greater than 50% of the local streamflow during low flow periods (flows equal to or less than average flows recorded for the month of September) (Alford, 2010: p. 56; ESA, 2004: p. 8-2; USGS, 2014a and 2014b).

New facilities, policies, and actions required to obtain the physical benefits: This Project will develop off-stream storage and/or improve operation of existing water storage infrastructure. These efforts are necessary to allow for reduced instantaneous pumping rates and to eliminate direct stream diversions during low flow periods. These facilities and actions will ensure protection of core habitat for steelhead and coho salmon.

Potential adverse effects: Reducing the water diversion amounts and pumping rates during summer months and low flow periods is not expected to result in any adverse effects (American Rivers, 2010: pp. 1-4). See discussion under the heading "Technical Analysis for Primary Physical Benefits Claimed" above for temporary effects associated with construction of water storage facilities.

Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6. Cost-Effectiveness Analysis	
Project name: Drought Relief for South Coast San Mateo County	
Question 1	***Types of benefits provided as shown in PSP Tables 5a and 5b:*** By increasing the water storage capacity at Memorial Park from 250,000 gallons to 2 MG (which constitutes about one-third to one-half of the park's annual use), the park will be able to fill its storage in the wet season when stream flow is high and eliminate its diversions from the creek during the summer when stream flow is lowest. San Mateo County estimates a loss of $350,000 this year from having to close Memorial Park campgrounds for the 2014 summer season due to lack of water supply. By lining the Granny Flats Reservoir in the Cuesta La Honda Guild water supply system, the TOC and disinfection byproducts associated with the Cuesta La Honda Guild drinking water supply system will be reduced and will allow the use of approximately 5 AF of stored water during late summer months

	that has historically become unusable due to high TOC. This could potentially extend water availability for the community by approximately 3 weeks. Altering the timing of water diversions at seven large water diversion sites in the Project area will protect critical salmonid rearing habitat along 6 miles of streams in the San Gregorio and Pescadero creek watersheds, which are listed by NMFS as core recovery streams for coho (NOAA, 2012: p. 261). The Project will protect stream regions downstream of these diversion sites from being dewatered and will improve stream flows in the immediate areas by approximately 0.5 cfs (equivalent to approximately 20-50% of the average stream flow in September during an average water year) at these locations. Addressing the protection and recovery of listed species habitat in a voluntary and collaborative manner will result in a significant reduction in regulatory enforcement costs incurred by the state and federal agencies.
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** Yes. The only other alternative to the Project includes development of an intertie with municipal water supplies on the other side of the Coast Range. This alternative is infeasible due to the long distance between water suppliers and the steep and landslide-prone terrain. In addition to high construction costs, ongoing electrical costs associated with pumping and would be costly to maintain. Trucking water in from outside the area is not a sustainable solution as it is cost prohibitive and resource intensive. Based on a report from a community member that is already trucking water, the cost to truck water into the area is approximately $1,300 per month for a single household. Furthermore, bottled water also must be purchased for drinking and cooking since it is not possible for residents to verify that the trucked-in water is potable.
Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** The Project as proposed is the least cost alternative. Interties with urban water agency infrastructure are cost prohibitive due to distance, so increasing available local drinking water supply by purchasing it from other areas is infeasible and not considered a realistic alternative. The Project will reduce long-term water treatment costs associated with one of the largest domestic water supply reservoirs in the region. It addresses infrastructure needs, resulting in both immediate and long-term benefits that outweigh the alternative option of incurring significant cumulative costs associated with needs to import water from other regions during drought periods, periods when aging water supply lines break, and/or when reservoir water quality renders stored water unusable.
Comments: *None.*	

References Cited:

Alford, 2010. Dynamic Water Resources Needs in California's Central Coast Watersheds.

American Rivers, 2013. San Gregorio Creek Stream Impact Evaluation for a Diversion Pumping Rate of 90gpm. Technical analysis submitted to the California Department of Fish and Wildlife, August 8, 2013.

Becker, G.S., K.M. Smetak, and D.A. Asbury. 2010. Southern Steelhead Resources Evaluation: Identifying Promising Locations for Steelhead Restoration in Watersheds South of the Golden Gate. Cartography by D.A. Asbury. Center for Ecosystem Management and Restoration. Oakland, CA.

ESA, 2004. Pescadero-Butano Watershed Assessment: pp. 2-2 and 8-2.

National Oceanic Atmospheric (NOAA), 2012. Central Coast Coho Recovery Plan. Available at: www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/north_central_california_coast/central_california_coast_coho/ccc_coho_salmon_esu_recovery_plan_vol_i_sept_2012.pdf

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U.S. Geological Survey (USGS), 2014a. USGS San Gregorio Gage data. Available at: waterdata.usgs.gov/ca/nwis/uv/?site_no=11162570&PARAmeter_cd=000614015,00060

USGS, 2014b. USGS Pescadero Creek Gage. Available at: waterdata.usgs.gov/usa/nwis/uv?site_no=11162500.

Project 9 – Stinson Beach Water Supply & Drought Preparedness Plan

Project Description

Project Goals: The Stinson Beach County Water District's (District's) critical water needs relate to the isolated location of the District's service area with no existing or feasible possibilities for inter-tie connections or water transfers with other water agencies, and limited local water supplies. The Stinson Beach Water Supply & Drought Preparedness Plan (Plan) includes four projects (Projects) that would reduce water system losses; improve the District's ability to identify, locate, and repair leaks in pipelines; improve drinking water supply and reliability; and benefit fish and wildlife.

Project Description: The District provides drinking water to the isolated Town of Stinson Beach (<1,500 residents) in coastal Marin County. The District's water resources are limited and highly vulnerable to climatic conditions and seasonal water demands from large numbers of summer visitors to Stinson Beach and adjacent areas. On average, the District produces 55 million gallons per year (MGY). Implementation of the Plan is estimated to generate about 15 MGY of reliable water supply for drought and emergency periods: 5 MGY by 2015 and an additional 10 MGY by 2016.

> *Project A. 2014 Calles Pipeline Replacement Project:* This Project involves replacing four priority water pipelines (1,300 feet total) in the Calles area of Stinson Beach (serving approximately 40 residents) and would recover 1 MGY of water. The existing pipelines in the Calles area are old and undersized, were installed at very shallow depths, and develop leaks regularly.
>
> *Project B. Patios Pipelines Replacement Project:* This Project involves replacing five pipelines (1,000 feet total) in the Patios area of Stinson Bach (serving approximately 40 residents) and would recover 1 MGY of water. Similar to those in the Calles area, these pipelines are old, undersized, shallow, and leak-prone.
>
> *Project C. Supplemental Groundwater Supplies:* This Project includes construction of a new 20-gallons-per-minute (GPM) groundwater well that can produce up to 10 MGY. The new well would be used in drought years and includes connecting up to three privately-owned wells to the District's water distribution system to supplement water supply during periods of drought or emergencies. Potential additional supply from private wells is currently under investigation.
>
> *Project D. Water Meter Replacements and In-Line Meters:* The District will replace approximately 700 old water meters and install up to five new in-line water meters in strategic locations throughout its system. New water meters will have remote reading capabilities. This Project will allow the District to perform mass-balance water calculations on isolated sections of its water system to determine when and where losses are occurring and promptly stop the leaks, resulting in water savings. Combined with completion of Projects A and B, approximately 5 MGY is expected to be recovered.

Implementation Status: All Projects are underway: (1) Project A construction should be completed by October 2014, (2) Project B construction should be completed by July 2015, (3) Project C should be completed by July 2016, and (4) Project D should be completed by July 2016.

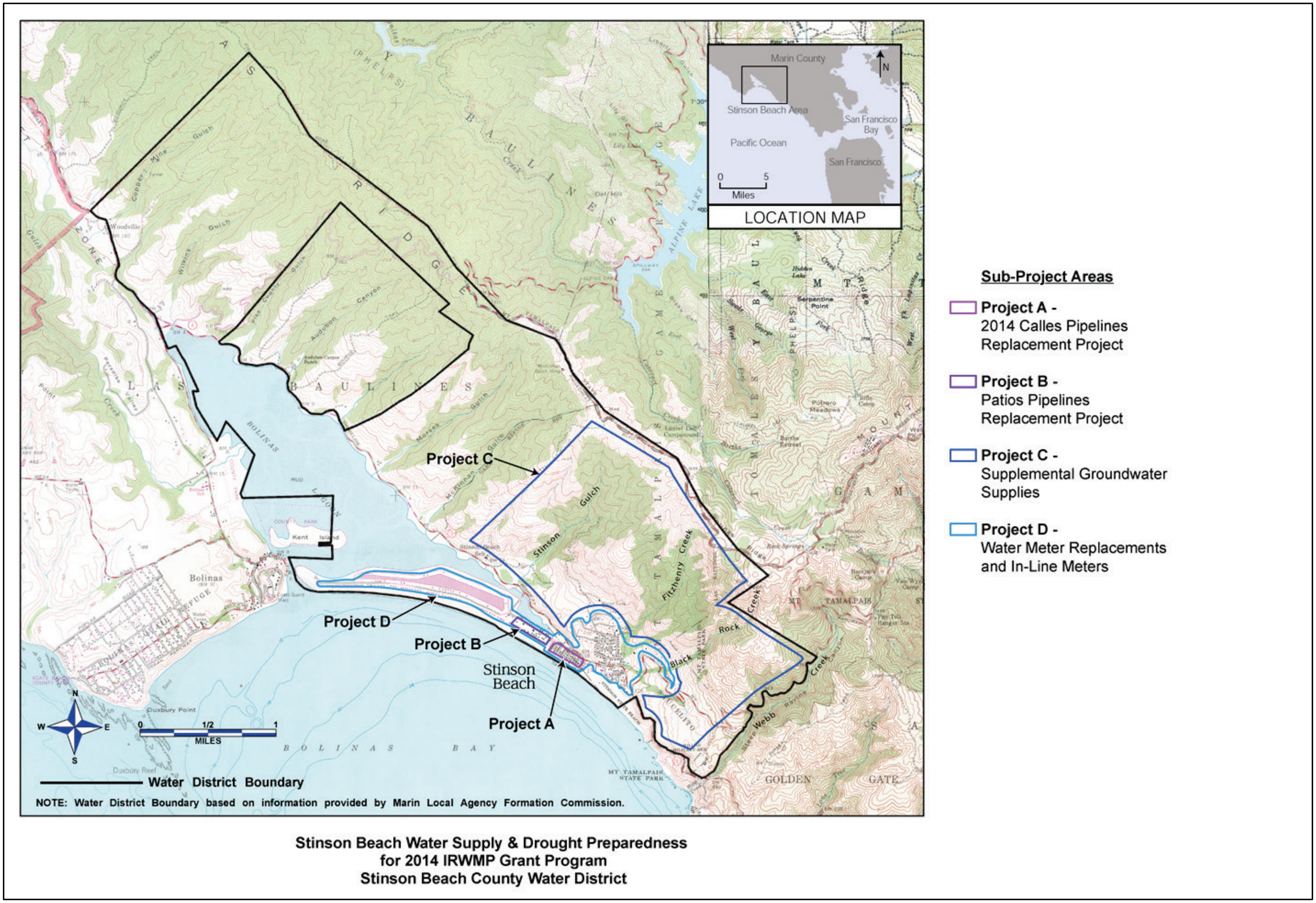
Funding Needs: The District's total annual budget is less than $2 million, and about $500,000 of the total annual budget is allocated for wastewater oversight and administration of issues related to all residential on-site wastewater systems in Stinson Beach. Grant funding is needed to help implement the District's Plan to expedite mitigation measures for the current drought situation and provide additional protections (and water savings) in future drought conditions.

Drought Eligibility: *Immediate regional drought preparedness* – The pipeline replacement Projects and water metering replacements will alleviate approximately 5 MGY of lost supply due to leaks, and the groundwater well Project will provide 10 MGY of drought and emergency supplemental groundwater supply. Project benefits will be realized as early as December 2014.

Increase local water supply reliability and safe drinking water – The groundwater Project will increase local water supply reliability and safe drinking water during drought and emergency periods, supplementing the District's supply by an additional 10 MGY (about 18% of the total amount of water produced by the District).

Reduce water quality/ecosystem conflicts – The Plan will provide direct environmental benefits due to more efficient use and distribution of water supply and reduced need to extract surface water supplies during drought and emergency periods. The Projects will allow up to 15 MGY of increased in-stream creek flows for fish and wildlife (SBCWD, 2010).

Project Map



Stinson Beach Water Supply & Drought Preparedness
for 2014 IRWMP Grant Program
Stinson Beach County Water District

Project Physical Benefits

Primary and secondary Project physical benefits are summarized in **PSP Tables 5a and 5b**, below.

PSP Table 5a. Primary Annual Project Physical Benefits

Project Name: Stinson Beach Water Supply & Drought Preparedness Plan

Primary Benefit Claimed: Additional Water Supply

Units of the Benefit Claimed: Million gallons per year (MGY)

Additional Information About this Benefit: Water supply reliability would increase with supplemental groundwater supplies and surface water use would be offset by use of groundwater wells when surface water availability is limited. Supplemental groundwater supplies (Project C) are estimated to be 10 MGY or approximately 18% of the District's total average annual water production.

Year	Physical Benefits		
	Without Project	With Project	Change Resulting from Project
2016	0	10 MGY with Project C completed.	10 MGY increase in water supply
2017 - 2065 (Estimate 50-Year Project Life)	0	10 MGY every year thereafter throughout the life of the project.	10 MGY increase in water supply

Comments: *The supply enhancement realized from Project C is 10 MGY. This is based on the following assumptions:*

- *The goal of Project C is to construct a 20-GPM well.*
- *A 20-GPM well run continuously for 1 year is 10.5 MGY. Because the well will not be operated 100% of the time, the estimate was reduced to 10 MGY.*

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: Although it is well below the State's Urban Water Management Plan (UWMP) criteria for the number of customers served and the amount of water delivered, the Stinson Beach County Water District prepared a 2005 UWMP that included an assessment of the District's existing water supply reliability and water demands. Based on the results of the water supply reliability assessment, the UWMP recommended that the District "conduct a groundwater investigation to determine the extent of the District's available groundwater resources" and the UWMP noted that "To prepare for the multiple consecutive dry-year scenario, more secure sources of supply (groundwater) and storage options should be considered."

Recent and historical conditions: Historically, the District relied on more surface water (2/3 of total water production) than groundwater (1/3 of total water production). In recent years, the trend has changed and the District currently utilizes surface water and groundwater in approximately the same annual proportions (DWR, 2012a).

Estimates of without-project conditions: The supplemental groundwater supply Project is estimated to produce an additional 10 MGY, which will not be available without the Project.

Methods used to estimate physical benefits: The physical benefits are increased water availability and increased water supply reliability. The estimated benefits (target capacity of new well) are based on the capacities of the District's existing wells, limited information regarding the capacity of existing privately-owned wells in the Stinson Beach area, and a cursory understanding of groundwater potential in the geologic formations surrounding the Stinson Beach area.

New facilities, policies, and actions required to obtain the physical benefits: Test drilling to help determine the extent of the local groundwater supply, construction of a new groundwater well, and agreements and easements with private well owners for emergency use and tie-ins to existing private wells will be required to implement the Plan and Projects.

Potential adverse effects: Potential adverse impacts of a new groundwater well will need to be evaluated. However, environmental impacts would likely be temporary, construction related, and less than significant. Effects of increased pumping during drought and emergency conditions on the affected groundwater basins are currently being investigated. Well sites will not be selected if significant adverse effects on groundwater basins will result.

PSP Table 5b. Secondary Annual Project Physical Benefits

Project Name: Stinson Beach Water Supply & Drought Preparedness Plan

Primary Benefit Claimed: Water Supply Savings (Drought Preparedness)

Units of the Benefit Claimed: Million gallons per year (MGY)

Additional Information About this Benefit: Water savings will be realized from the repair of leaking pipelines, and other (potential future) leaks in the distribution system will be identified for prompt repair with the installation of new water meters that have improved technology for remote reading and an aggressive leak detection program utilizing the new meters. A total of 5 MGY will be gained from Projects A, B, and D combined, or approximately 9% of the District's total average annual water production.

Year	Physical Benefits		
	Without Project	**With Project**	**Change Resulting from Project**
2014	0 MGY savings	1 MGY – with completed Project A	1 MGY potable water savings
2015	0 MGY savings	2 MGY – with completed Project A and Project B	2 MGY potable water savings
2016	0 MGY savings	5 MGY total – with completed Projects A, B, and D online	5 MGY potable water savings
2017 – 2065 (Estimate 50-Year Project Life)	0 MGY savings	5 MGY total every year thereafter throughout the life of the project.	5 MGY potable water savings

Comments: *The total savings for Projects A, B, and D is 5 MGY is based on the following assumptions:*

- *Total 2012 Water Produced = 55.8 MGY*
- *Total 2012 Water Delivered = 45.8 MGY*
- *Total 2012 Water Loss = 55.8-45.8 MG = 10.0 MGY (18% water loss)*

The District's goal is to recover 9% of unaccounted-for water (UFW), or one-half of the existing losses (5 MGY).

Conservation savings resulting from pipeline replacements and meter replacements and improved leak detection capability resulting from the new meter installations are estimated. However, the estimates are realistic and the water savings are realistically attainable considering existing water system losses, the District's ongoing experiences repairing existing pipelines, and the potential for increased losses over time without the Projects.

Project A (Calles) is assumed to recover 1 MGY after construction; Project B (Patios) is anticipated to recover 1 MGY after construction, and Project D (meters) is anticipated to recover 3 MGY after all meters are installed and leak detection and repair actions are in place.

The potential reduction in water system losses resulting from implementation of Projects A, B, and D (5 MGY) is equivalent to total water recovery corresponding to a single leak with an average (continuous) leak rate of about 9.5 gpm. Based on the beach areas that are targeted for prioritized pipeline replacement and leak identification, water recovery resulting from small leaks of 1-2 gpm per 1,000 feet of pipe are potential and anticipated.

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: In spite of ongoing efforts to locate and reduce water losses in its water system, the Stinson Beach County Water District is losing about 10 MGY of water, which corresponds to approximately 18% of UAF water losses. A large portion of the District's water pipelines are installed in well-drained beach sand, which makes water leaks difficult to find; the Calles and Patios pipelines are just such pipelines that were installed in the beach sand many years ago and are some of the oldest pipelines in the water system. The District has narrowed its focus to these areas of its water system as having a high potential for undetected water leaks.

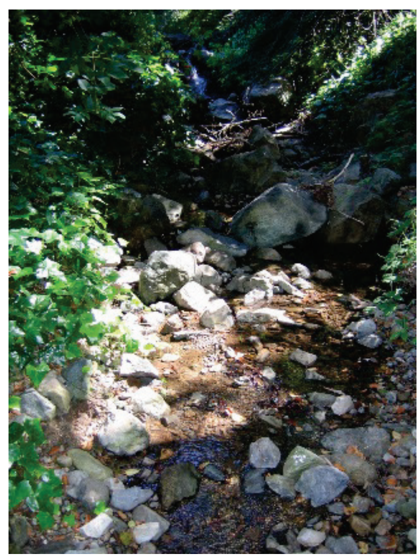
Recent and historical conditions: The District's average annual water system losses have been approximately 10 MGY for several years. Typical water losses in California municipal systems range from 5% to 30% and average 10%. The District's goal is to cut its UAF water in half (from 18% to 9%), and the pipeline replacement Projects and metering Project for which it seeks grant funding will provide the basis for significantly reducing water losses (DWR, 2012b).

Estimates of without-project conditions: Without the proposed projects, UAF water losses will likely continue, and are likely to increase over time because water leaks increase as water pipelines age.

Methods used to estimate physical benefits: Methods used include calculation of UAF water and reasonable, professional judgment that UAF water can be reduced in the District's water system to the California statewide average of 10% or lower.

New facilities, policies, and actions required to obtain the physical benefits: Other than the water pipeline replacements and new meter installations, no new facilities, policies, or actions will be required to obtain the estimated benefits.

Potential adverse effects: Temporary impacts from pipeline installation, primarily related to traffic and other construction-related effects, would occur during the construction period. Pipelines would be installed beneath existing roads and would not significantly impact special-status species or cultural resources. Water meter replacements would not create significant environmental impacts.



Cost-Effectiveness Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6 – Cost-Effectiveness Analysis	
Project name: Stinson Beach Water Supply & Drought Preparedness Plan	
Question 1	***Types of benefits provided as shown in Tables 5a and 5b:*** <u>*Projects A and B (2014 Calles Pipeline Replacement Project & Patios Pipelines Replacement Project)*</u>: These pipeline Projects will directly address drought preparedness in the form of water savings that will be realized from eliminating ongoing leaks and potentially finding and eliminating leaks that have not yet been discovered. <u>*Project C (Supplemental Groundwater Supplies)*</u>: As previously described, the primary benefit of the Project is increased water supply availability and reliability during dry and drought periods. Use of supplemental groundwater supplies will alleviate potable water demand on surface water supply, thereby providing incidental benefits to fish and wildlife. The new groundwater well and private well connections will supplement the limited surface water and groundwater supplies in the District's service area, thereby increasing water availability and reliability. <u>*Project D (Water Meter Replacements and In-Line Meters)*</u>: The Project will directly address drought preparedness in the form of water savings that will be realized from replacement of customer water meter. The new meters will have improved technology and remote reading capability such that the District may be able to identify and repair leaks promptly. The new customer meters, in conjunction with new in-line water meters, will greatly increase the District's ability to identify when and where water losses are occurring within its overall water distribution system. With strategically placed in-line water meters and new customer water meters, the District can perform accurate mass-balance accounting of water losses within isolated sections of its overall water system to determine when and where the losses are occurring and promptly repair or replace leaking pipes.
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?***
	If no, why? <u>*Projects A and B*</u>: No. The pipelines along the four Calles and five Patios need to be replaced. There are no alternatives to supplying water to the residents that live in the Calles and Patios areas without delivering water to them in a pipeline, in the alignment of the existing pipelines. The existing pipelines simply must be replaced with new pipelines. Constraints on local water supply sources and property in this small coastal community restrict other options to provide water supply reliably.
	If yes, list the methods (including the proposed project) and estimated costs. <u>*Project C*</u>: Yes. In 2006, the District prepared a reconnaissance-level investigation of a comprehensive set of Water Supply Options to supplement the District's existing sources of supply (Stetson Engineers, Inc., 2006). Several categories of Water Supply Options were evaluated, including supplemental surface water supplies, supplemental groundwater supplies, storage options, inter-tie connections, and various other water supply alternatives. In total, 24 water supply options were evaluated in the 2006 Stetson Engineers report for cost, yield, and cost-effectiveness. <u>*Project D*</u>: Yes. Alternatives for identifying where and when leaks are occurring within a water system are limited. The District has had leak detection surveys conducted on its system in the past; however, due to the small size of most of the pipelines in the District's water system and the sandy soil conditions in which the pipes were originally installed, leak detection audits have been relatively unsuccessful. An accurate accounting of water system input and customer water usage (based on new, accurate water meters) provides a strong basis for determining where UAF water is leaking.

Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** *Projects A and B*: The pipeline replacement Projects are the only and least cost alternatives. Different methods of installing the pipe were evaluated (trenching vs. trenchless) and the method of installation by trenching was determined by the District's engineering consultant to be the least-cost alternative, or comparable with the cost for the trenchless installation. *Project C*: The Groundwater Supply Options, as identified in the tables from the 2006 Draft Report (Stetson Engineers, Inc., 2006), were generally identified as the least cost alternatives and the most cost-effective alternatives when compared to all other water supply options. *Project D*: The Project is the least cost alternative, second only perhaps to a leak detection water audit, and past leak detection audits have met limited success.
Source: *Stetson Engineers, Inc., 2006*	

References Cited:

California Department of Water Resources (DWR), 2012a. Public Water System Statistics Report for Stinson Beach CWD, Calendar Year 2012.

California Department of Water Resources (DWR), 2012b. Leak Detection website. Available at: www.water.ca.gov/wateruseefficiency/leak/.

Stinson Beach County Water District (SBCWD), 2006. 2005 Urban Water Management Plan Stinson County Water District, p. 59. Prepared by Stetson Engineers, September.

SBCWD, 2010. Stinson Beach County Water District, Water Supply Accomplishments and Challenges.

Stetson Engineers, Inc., 2006. Draft Water Supply and Demand Management Options Stinson Beach County Water District. Reconnaissance Report. July.

Project Justification – Drought Preparedness Projects

Project descriptions, estimated physical benefits of the projects, justification of each project's technical feasibility, and a cost-effectiveness analysis are presented in this section for the projects listed below. These projects span all four sub-regions in the San Francisco Bay IRWM Region. The projects included in this section have several benefits related to potable water supply savings, energy savings, and greenhouse gas emission reduction.

Project ID#	Project Proponent	Project Title
10	StopWaste	Bay Area Regional Drought Relief Conservation Program
11	MMWD	WaterSMART Irrigation with AMI/AMR

Project 10 – Bay Area Regional Drought Relief Conservation Program

Project Description

Project Goals: The Bay Area Regional Drought Relief Conservation Program (Project) offers drought relief and long-term water savings in the form of water conservation projects that will improve water use efficiency throughout the Bay Area. This Project will help meet the statewide 20% drought demand reduction goal and reduce strains on local water supplies.

Project Description: The Project will be implemented by 12 Bay Area agencies and will leverage and expand existing incentive projects to meet the reduction goals for the current drought and ensure long-term savings, thus improving water supply reliability. A suite of Project elements will promote high-efficiency technologies and water conservation practices that improve indoor and outdoor water use efficiency. The Project will save approximately 1,200 AFY (or 24,000 AF over 20 years).

Element 1: Lawn to Landscape Conversions: Rebate incentives for customers to replace water-thirsty lawns with water-wise landscaping and replace inefficient spray irrigation with efficient drip irrigation. Replacement of about 2.28 million sq. ft. of lawn with water-efficient landscaping will save 250 AFY (or more than 5,000 AF over 20 years).

Element 2: High-Efficiency Toilet Rebates: Rebate incentive for customers to replace older, high-volume toilets with new WaterSense-certified, high-efficiency toilets that use only 1.28 gallons per flush. This will result in the installation of approximately 9,300 high-efficiency toilets and will save 250 AFY (or more than 5,000 AF over 20 years).

Element 3: High-Efficiency Toilet and Urinal Direct Installation: Install about 6,670 high-efficiency toilets that use 1.28 gallons per flush and urinals that use 0.125 gallon per flush, primarily in multi-family residential units and commercial properties. This element will save 150 AFY (or more than 3,000 AF over 20 years).

Element 4: High-Efficiency Washer Rebates: Rebate incentives for customers to purchase new high-efficiency clothes washers, which use less than half of the water compared to older machines. This will result in the installation of approximately 25,546 high-efficiency clothes washers, saving 550 AFY (or more than 11,000 AF over 20 years).

Element 5: Drought-Resistant Soil and Garden Marketplace Project: Provides lawn-to-garden rebates and promotes sheet mulching lawns in place to improve the drought resiliency of landscapes. This element will provide education and sheet mulch materials through regional professional and retail partnerships. Components include: Retail soil supply and nursery partnerships, sheet mulch stakeholder meetings, landscape professional events, and website tools. Results: Convert a minimum of 100 lawns and reach 8,000 consumers over an 18-month period for a projected water savings of 5 AF.

Implementation Status: Project planning will begin in October 2014 or as soon as DWR announces grant award, and implementation will start in April 2015 and continue through June 2018 (3 years).

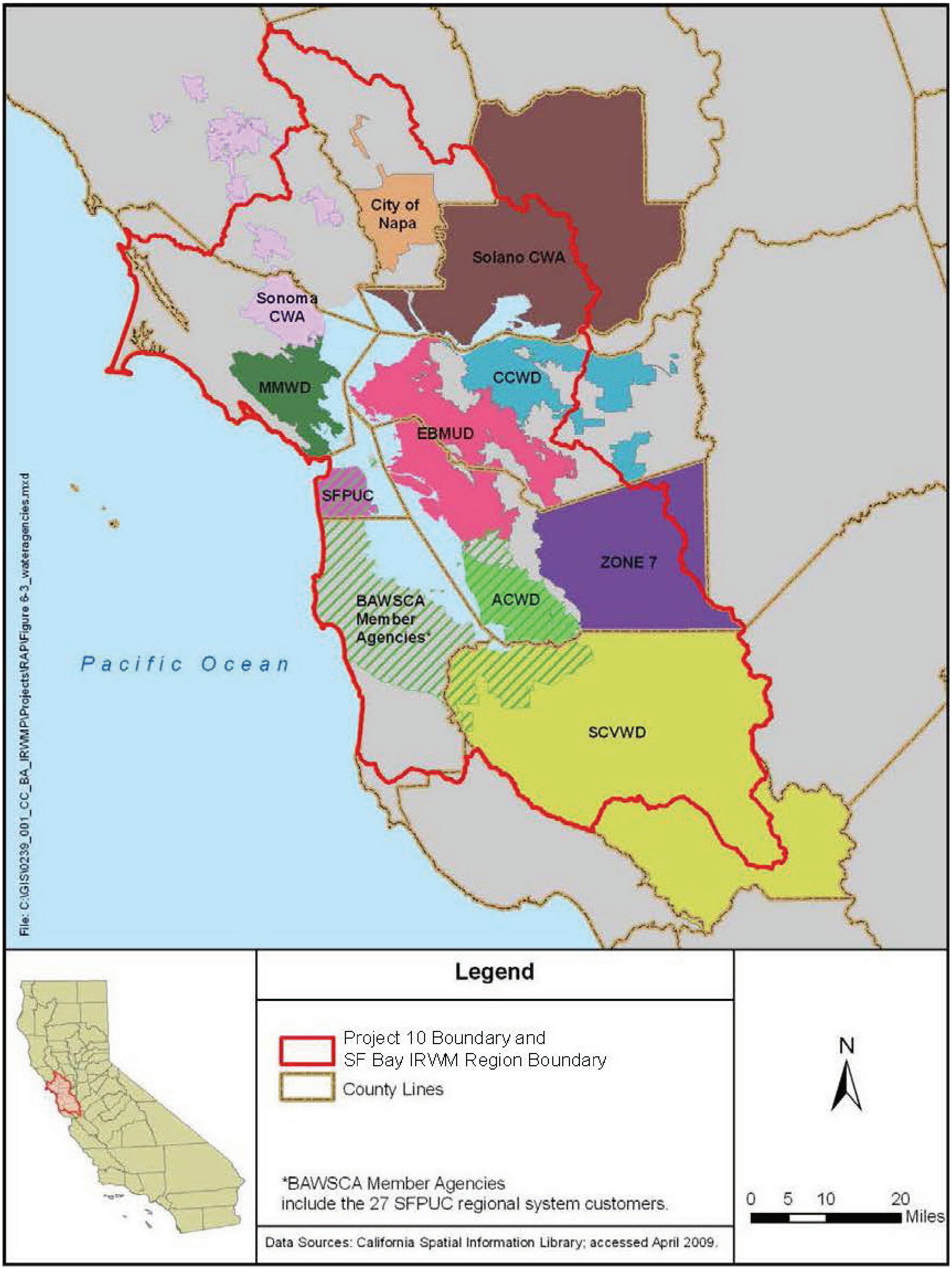
Funding Needs: Drought-related cost impacts on water agencies have resulted in increased expenditures and reduced revenue due to declining water sales throughout the Bay Area, leading to an immediate need for funding support. Water agencies need assistance to fund increased conservation activities that provide immediate savings as well as long-term drought resiliency. Operating revenue losses have also occurred due to reduced water sales following statewide drought declarations coupled with mandatory and voluntary water use restrictions. Expedited funding will allow participating agencies to increase Project activities that target immediate and long-term reduction in potable water demand.

Drought Eligibility: *Immediate regional drought preparedness* – Immediate and long-term reductions in potable water demand of approximately 1,200 AFY will be achieved as a result of this Project. The Project will assist customers in meeting water reductions goals throughout the region and will maximize available water supplies at the lowest cost.

Increase local water supply reliability and safe drinking water – The Project will increase local water supply reliability and quality as follows: Conservation elements provide immediate water supply benefits; conservation elements focus on the largest water-using fixtures; and less demand provides improved water quality benefits in the Delta. The Project will also relieve demand for potable water and facilitate increased access to safe drinking water supplies.

Reduce water quality/ecosystem conflicts – The Lawn to Landscape element of the Project will reduce runoff from urban landscapes that contain fertilizers, pesticides, and herbicides. This will have an immediate positive impact on local streams, thus reducing ecosystem conflicts and improving water quality.

Project Map


City of Napa
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EBMUD
SFPUC
ZONE 7
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BAWSCA Member Agencies*
Pacific Ocean
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Legend
Project 10 Boundary and
SF Bay IRWM Region Boundary
County Lines
*BAWSCA Member Agencies
include the 27 SFPUC regional system customers.
Data Sources: California Spatial Information Library; accessed April 2009.
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Project Physical Benefits

Primary and secondary Project physical benefits are summarized in **PSP Tables 5a and 5b**, below.

PSP Table 5a. Primary Annual Project Physical Benefits			
Project Name: Bay Area Regional Drought Relief Conservation Program **Primary Benefit Claimed:** Potable water savings **Units of the Benefit Claimed:** Acre-feet per year (AFY) **Additional Information About this Benefit:** None.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2015 – 2035	0	1,200 AFY	1,200 AFY potable water saved in the first year, with total savings of nearly 24,000 AF.
Comments: *Over 20 years, a total of 24,000 AF of potable water will be saved.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: Potable water savings will result from retrofit of poorly performing toilets, urinals, clothes washers, landscape irrigation equipment, and high-water-use turf grass with high-efficiency fixtures and climate adapted drought-tolerant landscapes. Additional water savings and reductions in non-point-source urban runoff pollution will result from the distribution of educational materials and training on methods to sheet-mulch turf grass and install and maintain drought-tolerant landscapes.

The calculation of a 20-year improvement life for all Project elements is a nominal period and is based on the reasonable assumption that the majority of plumbing fixture and landscape efficiency upgrades made possible with this project are unlikely to revert to a less water-efficient condition in the future. This assumption is reinforced by the fact that legislative mandates and conservation code requirements are now, or will soon be, in place statewide and at all participating project agencies that require manufacturers and customers to increase levels of water efficiency. The purpose of the Project is to provide customer incentives that will accelerate the conversion to high-efficiency technology, yielding greater water and energy savings earlier to respond to the pervasive drought conditions.

Without the Project, customers will likely not have sufficient financial resources or incentive to upgrade outdated equipment or convert high-water-using landscapes, resulting in delay and reduction in water and energy savings. The cost-effectiveness of this Project is calculated by comparing the total project costs to the total water saving benefit, and neither the costs nor the benefits have been discounted. A detailed economic valuation (per DWR's Economic Analysis Guidebook) is not explicitly included, but can be performed if required (DWR 2008).

General References:

High-Efficiency Toilets and Urinals:

- Seattle home water conservation study of the impacts of high-efficiency plumbing fixture retrofits in single-family homes (California Urban Water Conservation Council [CUWCC], 2000)
- Alliance for Water Efficiency Savings Model – Default specifications, Active library, AWE tool/guidebook
- Veritec/Canadian Mortgage and Housing Corporation (CUWCC, 2002) Dual-flush Toilet Project
- Evaluation of Potential Best Management Practices, High Efficiency Plumbing Fixtures, Koeller & Co (2005)

Lawn-to-Landscape Conversions:

- California Single-Family Water Use Efficiency Study, Aquacraft Consulting - Outdoor Model (EBMUD, 2011a: p. 220)
- Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act (EPA, 2009: pp. 8-9)

High-Efficiency Clothes Washers:

- Residential BMP Coverage Requirements (CUWCC, 2014)
- California Single-Family Water Use Efficiency Study, Conclusions (EBMUD, 2011b: pp. 272-282)
- Household water use and conservation models using Monte Carlo Techniques (Hydrology and Earth Sciences, 2013: Abstract, p. 1).

Recent and historical conditions: California experienced the lowest levels of precipitation in recorded history in 2013, and climate change may cause long-term drought and threaten the stability of potable water supplies statewide (DWR, 2014b).

Estimates of without-project conditions: Without substantial reductions in potable water demand, the ability of water agencies in the Bay Area to continue meeting immediate and long-term human and environmental needs is at significant risk (California Natural Resources Agency, 2009).

Methods used to estimate physical benefits: Potable water savings will result from retrofitting or replacement of poorly performing toilets, urinals, clothes washers, landscape irrigation equipment, and high-water-use turf grass with high-efficiency fixtures and climate-adapted drought-tolerant landscapes. Additional water savings and reductions in non-point-source urban runoff pollution will result from the distribution of educational materials and training on methods to sheet-mulch turf grass and install and maintain drought-tolerant landscapes. See references cited for "Technical Basis of the Project," above.

Water savings were estimated based on the number of rebates anticipated to be issued over the life of the program. Detail for these estimates is provided in the table below. First year water savings is 1,189 AF (rounded to 1,200 AF) and 23,775 AF of water savings (rounded to 24,000 AF) is estimated after 20 years. Estimated length of water savings: high-efficiency toilet rebate and direct installs = 20 years, lawn-to-landscape conversion = 13 years, high-efficiency washer savings = 13 years.

Summary of Program Rebates and Water Savings Estimates					
Rebate Type	**Total Number of Rebates**	**Unit Description**	**Total Annual Water Savings (AF/yr)**	**Life of Savings (yrs)**	**Total Life Savings (AF)**
Landscape Rebates	2,281,000	Per Square Foot	236	20	4,716
Toilet/Urinal Rebates	9,364	Per Toilet or Urinal	165	20	3,307
Toilet/Urinal Direct Installation	6,670	Per Toilet or Urinal	162	20	3,243
Washer Rebates	25,546	Per Washer	625	20	12,509
Total Water Savings from the Regional Conservation Rebate Program			**1,189**	**20**	**23,775**

New facilities, policies, and actions required to obtain the physical benefits: No new facilities or policies are required. Additional actions taken as a result of implementing the proposed project will result in obtaining the physical benefits.

Potential adverse effects: No adverse effects are associated with this Project, as it has been determined to be categorically exempt under CEQA.

PSP Table 5b. Secondary Annual Project Physical Benefits			
Project Name: Bay Area Regional Drought Relief Conservation Program **Primary Benefit Claimed:** Energy Savings and Greenhouse Gas Reduction **Units of the Benefit Claimed:** Megawatt-hours (MWh) of Electrical Energy and Million Pounds per Year of CO_2 **Additional Information About this Benefit:** None.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
20% Savings per Year for 20 years	Electrical Energy: 0 CO_2: 0	Electrical Energy Saved: 3,812 MWh CO_2 Reduced: 1.7 million pounds	Electrical Energy: 3,812 MWh reduced CO_2: 1.7 million pounds reduced
**PG&E System wide average at 445 pounds CO_2/MWh in 2012 (The Climate Registry, 2012).* ***9,750 KWh/Million Gallons or 9.75 MWh/Million Gallons (U.S. Department of Energy, 2006).*			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: Due to the large amounts of energy required to transport and treat water, reductions in water demand also directly reduce energy demand and the associated greenhouse gas emissions (DWR, 2012). The Bay Area Regional Drought Relief Conservation Program would reduce an estimated 1,200 AFY and 24,000 AF after 20 years.

Recent and historical conditions: Since the beginning of the Industrial Revolution, burning of fossil fuels, deforestation, expanding agriculture, and other human activities have contributed to rapid increases in CO2 and methane concentrations. For example, as the largest producer and supplier of water in the Bay Area, EBMUD is typical of all the water agencies participating in the Project (at a smaller scale). EBMUD

> "delivers drinking water to more than 1.3 million people in 20 cities and 16 unincorporated communities in parts of Alameda and Contra Costa counties in the eastern part of the San Francisco Bay Area. The average water consumption in this service area is 220 million gallons per day (mgd) and consumption peaks at 341 mgd. EBMUD operates six water treatment plants, nearly 4,000 miles of water mains, and 135 pumping stations. Two EBMUD hydroelectric plants generate 185 gigawatt-hours (GWh) of electricity in a median year. The electricity generated is sold into the wholesale market. Delivering water on this scale requires enormous amounts of energy, mostly in the form of electricity. In 2004 EBMUD spent about $12 million purchasing electricity; approximately two-thirds, or $8 million, of that amount was required for pumping water through the distribution system. The consumption of electricity represents the single largest, non-labor expense in EBMUD's operations and maintenance department." (Water Research Foundation, 2005)

Estimates of without-project conditions: Additional electrical generation of 3,812 MWh will be required and 1.7 million pounds of CO_2 will be released to the atmosphere annually (The Climate Registry, 2012; U.S. Department of Energy, 2006).

Methods used to estimate physical benefits: The calculations of secondary benefits in PSP Table 5b, for energy and CO_2 savings, are based on the average amount of electrical energy (MWh/Million Gallons) used by all water agencies in California for potable water conveyance, treatment and distribution (U.S. Department of Energy, 2006) and the PG&E system average amount of CO_2 emissions in 2012, 445 lbs CO2/MWh (The Climate Registry, 2012). The total water savings after 20 years of Program implementation were evaluated against these average estimates to calculate the total electrical energy and emission reductions resulting from the Program.

New facilities, policies, and actions required to obtain the physical benefits: No new facilities or policies are required. Additional actions taken as a result of implementing the proposed project will result in obtaining the physical benefits.

Potential adverse effects: No adverse effects are associated with this Project, and all Project elements are categorically exempt under CEQA.

Cost Effective Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

<table>
<tr><th colspan="2">PSP Table 6. Cost Effective Analysis</th></tr>
<tr><td colspan="2">Project name: Bay Area Regional Drought Relief and Conservation Project</td></tr>
<tr><td>Question 1</td><td>Types of benefits provided as shown in PSP Tables 5a and 5b:
<u>Water Supply</u>: Benefits will include avoided water supply purchase costs, including those for environmental purposes; avoided costs of water supply projects, avoided water shortage costs, avoided operations and maintenance costs, or water revenue from water sales to another purveyor or third party. Immediate and long-term drought relief will be achieved by reducing demand on limited water supplies by approximately 1,200 AFY for a 20-year Project total of approximately 24,000 AF, resolving water-related conflicts by improving landscape irrigation efficiency.
<u>Ecosystem Improvement/Environmental Benefits</u>: The proposed project will immediately and permanently reduce dependence on Delta water supplies as a result of reduction in urban water demand. The Bay Area is highly dependent upon the Delta and its tributaries for surface water supplies. About 70% of the region's urban water supply is derived from these Delta and major tributary (Tuolumne and Mokelumne river) sources. About half of that surface water is withdrawn from the statutory delta (State Water Project, Federal Central Valley Project, and other U.S. Bureau of Reclamation facilities), with the balance coming from upstream of the Delta from the Tuolumne River (SFPUC and its contractors) and the Mokelumne River (EBMUD). Additionally, replacing wasteful lawn sprinklers with high-efficiency drip irrigation will protect riparian habitat by significantly reducing non-point-source pollution from urban runoff.
<u>Energy Produced or Saved</u>: The proposed project will reduce the energy demands caused by pumping and treating water, lessening energy demands by approximately 3,812 MWh and reducing greenhouse gas emissions by 1.7 million pounds of CO_2 annually for 20-year Project totals of approximately 76,240 MWh and 34 million pounds of CO_2, respectively*.</td></tr>
<tr><td rowspan="2">Question 2</td><td>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?</td></tr>
<tr><td>Yes; simply allowing natural rates of replacement to occur alone, via state and local plumbing codes requirements to increased fixture efficiencies, has been considered, but this method would require a longer time period and achieve fewer savings than will occur in conjunction with this project.</td></tr>
<tr><td>Question 3</td><td>If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.
Yes; conservation projects are the least costly water supply alternatives. At a total Project cost of $10,892,986 to reduce consumption by 24,000 AF over the 20-year nominal Project period, the simple average cost per AF saved is $454 ($10,892,986/24,000).** The project generated energy savings, greenhouse gas reductions, and avoided impacts of non-point source pollution reduction are value-added but beyond the scope of this benefit/cost analysis. Normal upkeep and replacement of the hardware and landscape elements incentivized by this project will be required over the 20-year nominal time period; however, all maintenance and replacement expenses during and after this Project period will be paid by the agency customers who receive incentives with this Project. The cost effectiveness of this Project has been calculated by comparing the initial Project costs to the total projected water saving benefit, and neither the costs nor the benefits have been discounted. A detailed economic valuation (DWR, 2008) has not been performed, but can be completed if required.</td></tr>
<tr><td colspan="2">Comments:
*PG&E System wide average @ 393 pounds CO_2/MWh (The Climate Registry, 2012).
**Water savings are as follows: First year 1,189 AF (rounded to 1,200 AF). Estimated length of water savings: lawn-to-landscape conversion = 13 years, high-efficiency toilet rebate and direct installs = 20 years, high-efficiency washer savings = 13 years. Also see the detailed table provided with the Budget Summary in Attachment 5.</td></tr>
</table>

References Cited:

Alliance for Water Efficiency, 2010. Savings Model – Default specifications, Active library, AWE tool/guidebook, 2010.

California Department of Water Resources (*DWR*)*, 2008*. *Economic Analysis Guidebook,* page 34.

__________, 2012. Phase 1 Greenhouse Gas Emissions Reduction Plan, pages 9-11.

__________, 2014a. Guidelines, 2014 IRWM Drought Solicitation, Integrated Regional Water Management Implementation Grant Program, Funded by Proposition 84, June 2014, pages 35,54,55,67.

__________, 2014b. Climate Change, Breaking Drought News.

California Natural Resources Agency, 2009. Climate Adaptation Strategy, page 79.

California Urban Water Conservation Council (CUWCC), 2000. Seattle home water conservation study the impacts of high efficiency Plumbing Fixture Retrofits In Single-Family Homes, pages xiii-xv.

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__________, 2014. MOU Exhibit 1, BMP 3, Residential BMP Coverage Requirements.

East Bay Municipal Utility District (EBMUD), 2011a. California Single-Family Water Use Efficiency Study, Aquacraft Consulting - Outdoor Model, page 220.

__________, 2011b. California Single-Family Water Use Efficiency Study, Conclusions pages. 272-282.

Hydrology and Earth Sciences, 2013. Household water use and conservation models using Monte Carlo Techniques, Abstract, page 1.

Koeller & Co., 2005. Evaluation of Potential Best Management Practices, High Efficiency Plumbing Fixtures, pages 18-25.

The Climate Registry, 2012. PG&E system wide average, 2012.

U.S. Department of Energy, Energy Demands on Water Resources, 2006, page 25.

U.S. Environmental Protection Agency (EPA), 2009. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act, pages 8-9.

Water Research Foundation, 2005. Energy and Water Quality Management System (EWQMS) Saves Electricity Dollars, 2005.

Project 11 – WaterSMART Irrigation with AMI/AMR

Project Description

Project Goals: The Marin Municipal Water District's (MMWD's) WaterSMART Irrigation with AMI/AMR Project (Project) will alleviate drought impacts in MMWD's service area by permanently reducing commercial landscape sector potable water demand. The Project goal is to achieve a 25% reduction in average landscaping water use through the installation of SMART irrigation equipment and AMI/AMR technology.

Project Description: The Project will be implemented at 800 sites throughout MMWD's service area in Marin County and includes installation of SMART irrigation equipment retrofits at landscaped sites. Conversion to an Advanced Metering Infrastructure/Advanced Meter Reading (AMI/AMR) system will allow consumers to track water usage and allow MMWD to track conservation efforts, be more proactive in monitoring, finding and responding to leaks, and reduce vehicle emissions associated with meter reading and service calls. The Project includes acquisition and installation of electronic radio transmitters and data loggers (AMR devices) at 800 dedicated irrigation water meters. This Project involves several major elements that when implemented together will significantly improve water management and efficiency in the service area:

- Conversion of existing manual-read landscape irrigation water meters to AMI/AMR reading system, including installation of data storage and radio transmission devices, installation of all ancillary communications infrastructure, software and delivery of meter reading data and analysis functionality, and creation of a new internet data portal that will allow staff and customers to manage irrigation water use with online accounts.
- Retrofitting with SMART irrigation equipment at project sites receiving AMI/AMR technology. This includes launching and administering an Irrigation Equipment Rebate Program for project irrigation account customers. This SMART irrigation equipment will include a combination of high-efficiency sprinkler nozzles, low-volume drip irrigation, and SMART controllers.
- Analysis of irrigation water requirements at project sites and development and establishment of new Water Budgets associated with each site. The new water budgets will reflect higher efficiencies and demand reductions made possible by the SMART irrigation equipment element of the project.
- Outreach with project irrigation account customers regarding project parameters, to ensure transition to water efficient irrigation equipment, to educate about using the new technology to monitor and track water use, and for collaboration in establishing new water budgets.

With implementation of this project, MMWD will have a complete "tool kit" for landscape water management that will facilitate an average reduction in annual water used for dedicated irrigation meters of 25% (300 AFY). Upon Project completion, MMWD staff will conduct all routine maintenance and incorporate the advanced technology this Project brings, into daily operations to foster water use savings.

Implementation Status: MMWD is ready to proceed with the Project as soon as an agreement is finalized. Implementation will be completed within approximately 18 months from the agreed upon start date.

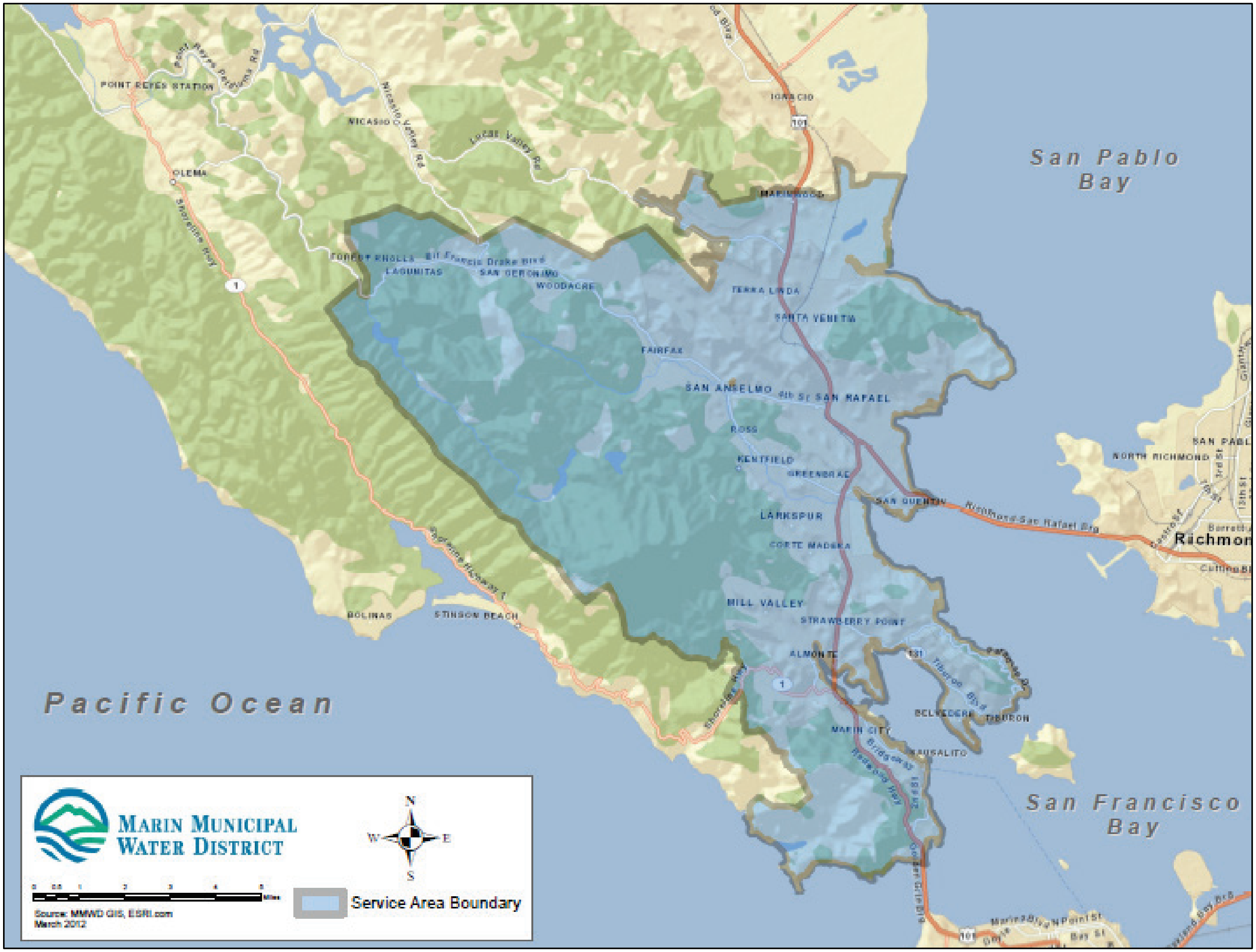
Funding Needs: MMWD has no capacity to fund the Project with its current budget.

Drought Eligibility: *Immediate regional drought preparedness* – This Project will immediately improve landscape irrigation efficiency and achieve a long term reduction of water use, facilitating an average reduction in annual water used for dedicated irrigation meters of approximately 25% (300AFY). The Project will establish high-efficiency consumption baselines and create an enforceable tracking system to quickly detect leaks and eliminate excessive use. The Project will require commercial irrigation customers to adhere to strict efficiency standards.

Increase local water supply reliability and safe drinking water – Implementation of the Project will reduce potable water consumption by 300 AF during the first irrigation season and every year thereafter, enabling safe drinking water to be available for other uses. After 15 years of implementation, an estimated 4,500 AF will be conserved as a direct result of this Project.

Reduce water quality/ecosystem conflicts – The Project will reduce potable water consumption by 300 AFY during the driest season, thereby freeing up this supply for other uses. Under a 1995 SWRCB Order, the District must release water from Kent Lake to support endangered aquatic species in Lagunitas Creek. In early 2014, MMWD was preparing to launch mandatory rationing and a request to the SWRCB for an emergency reduction in amount of required stream releases. The Project could reduce the need for future emergency reductions of stream releases for environmental uses.

Project Map


San Pablo Bay
Pacific Ocean
San Francisco Bay
POINT REYES STATION
NICASIO
OLEMA
IGNACIO
MARINWOOD
FOREST KNOLLS
LAGUNITAS
SAN GERONIMO
WOODACRE
TERRA LINDA
SANTA VENETIA
FAIRFAX
SAN ANSELMO
SAN RAFAEL
ROSS
KENTFIELD
GREENBRAE
SAN QUENTIN
LARKSPUR
CORTE MADERA
MILL VALLEY
STRAWBERRY POINT
ALMONTE
BELVEDERE
TIBURON
MARIN CITY
SAUSALITO
BOLINAS
STINSON BEACH
NORTH RICHMOND
Richmond
MARIN MUNICIPAL WATER DISTRICT
N
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Service Area Boundary
Source: MMWD GIS, ESRI.com
March 2012

Project Physical Benefits

Primary and secondary Project physical benefits are summarized in **PSP Tables 5a and 5b***,* below.

PSP Table 5a - Primary Annual Project Physical Benefits			
Project Name: WaterSMART Irrigation with AMI/AMR **Primary Benefit Claimed:** Water Supply Savings **Units of the Benefit Claimed:** Acre-feet per year (AFY) **Additional Information About this Benefit:** None.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2015 – 2030 (15-year horizon)	0 AFY potable water saved	300 AFY	300 AFY of potable water saved
Comments: *Over the next 15 years, 4,500 AF of potable water will be saved cumulatively.*			

Technical Analysis of Primary Physical Benefits Claimed

Technical basis of the Project: Potable water savings will result from the retrofit of existing manual read water meters, poorly performing landscape irrigation equipment, and the issuance of scientific water budgets based on seasonal plant demand at all sites with dedicated landscape irrigation meters. Automatically-read meters (AMI/AMR) will record water consumption data on an hourly basis that will be entered into MMWD's SAP computer system, allowing staff to monitor, analyze, report, and enforce water use patterns at each site with a high level of accuracy and data resolution. Upgrading landscape equipment to a high efficiency standard provides the necessary tools to sustain landscape plants in a healthy condition with the minimum amount of supplemental water. Additional reductions in non-point urban runoff pollution will result by reducing the volume of water containing nutrients and sediment that flows off the landscape into adjacent water bodies.

Implementation of this Project is anticipated to facilitate an average reduction in annual irrigation water use by 25% or 300 AFY. This estimate is based on a projected 20% water savings from commercial landscape irrigation (dedicated irrigation meters) and 5% water savings from residential/commercial landscape (mixed indoor/outdoor irrigation meters). The water savings estimates are based on the average of actual water used by MMWD's 117 dedicated commercial irrigation landscape water meters and 2,294 mixed indoor/outdoor residential landscape water meters. The 20% water savings estimate is based on a comparison of 2008-2010 water use versus 2011-2013 water use (MMWD unpublished data). The 5% water savings estimate is based on published, peer-reviewed evaluation of residential irrigation water use (Deoreo and Mayer, 2010).

Quantifiable water savings will be verified by comparing actual water meter consumption data from each dedicated irrigation meter before and after the proposed project is implemented. MMWD has historic consumption records for all irrigation meters in the SAP enterprise system dating back more than 20 years. Historic consumption data will be normalized by calculating the past 5-years average use. Average use will be compared to consumption data collected after all efficiency equipment retrofits, site audits, and water budgets have been completed and implemented. MMWD intends to collect and analyzed water use data using standard comparative descriptive statistical analysis methods, and include the results in semi-annual performance reports distributed to irrigation customers.

Recent and historical conditions: The current drought in Marin began in early 2013. Precipitation in 2013 was the lowest ever recorded in Marin, and rainfall in 2014 is also well below average with current year-to-date rainfall at only 65 percent of normal. In January 2014 the MMWD Board of Directors activated Phase 1 of the district's Water Shortage Contingency Plan and requested customers to voluntarily reduce their water usage by 25 percent. Rainfall received in February 2014 improved the water supply situation somewhat, however, local surface water storage remains below normal and MMWD intends to continue to request voluntary water use reductions at least through the end of 2014.

Estimates of without-project conditions: Without this project, excessive potable water will continue to be used to irrigate landscapes due to inefficient equipment, and MMWD will continue to experience an inability to monitor and enforce drought restrictions in a timely and effective manner. Pollutants from excess and non-point source pollution runoff will continue to impact waterways, and additional energy and greenhouse gas emissions associated with potable water treatment and distribution will occur.

Without this project, irrigation customers will likely not have sufficient financial resources or incentive to upgrade outdated equipment and will not be provided with weekly irrigation schedule updates by MMWD in the foreseeable future. A detailed economic valuation (per DWR's Economic Analysis Guidebook) is explicitly not included, but can be performed if required.

Methods used to estimate physical benefits: The project is anticipated to result in water savings over a 15-year period. Normal upkeep and replacement of hardware and software components will be required over this time period, however, given the fact that the efficiency of these technologies is continuously improving, and that any replacement of initially installed equipment over the 15 year nominal project life will be made using materials of equal or greater efficiency, it is assumed that the improvements made possible with this project will be permanent. Future capital expenses for AMI/AMR hardware and software replacements and upgrades will come from MMWD's capital improvement budget, and irrigation customers will be responsible for the costs of maintaining and replacing irrigation equipment at their sites as required.

The estimated 15-year project savings is projected to be 4,500 AF. This is calculated from the estimated 25% water savings from the Project, as explained above, and applying the historical average actual water use from MMWD irrigation accounts (1,200 AFY). When projected over 15 years, 25% reduction in the average 1,200 AFY water use equates to a total water savings of 4,500 AF, and an annual water savings of 300 AF.

New facilities, policies, and actions required to obtain the physical benefits: None.

Potential adverse effects: The Project would not result in any potential adverse effects.

PSP Table 5b - Secondary Annual Project Physical Benefits			
Project Name: WaterSMART Irrigation with AMI/AMR **Primary Benefit Claimed:** Energy Savings and Greenhouse Gas Reduction **Units of the Benefit Claimed:** MWh Electrical Energy saved, and Pounds CO_2 per year reduced **Additional Information About this Benefit:** None.			
Year	**Physical Benefits**		
	Without Project	**With Project**	**Change Resulting from Project**
2015 – 2030	Energy: 0 CO_2: 0	Energy saved: 225 MWh (300 AF @.75 MWh/AF)* CO_2: 85,500 lbs/year (380 lbs CO_2 /MWh)**	Energy: 225 MWh saved per year* CO_2: 85,500 pounds reduced per year
Comments: * 750 kWh/AF (.75 MWh/AF) is the 12-year average electrical use by MMWD to produce an average of 29,000 AFY: per internal engineering records and calculations by MMWD staff. ** 380 lbs CO_2/MWh (Marin Clean Energy, 2012)			

Technical Analysis of Secondary Physical Benefits Claimed

Technical basis of the Project: Reduced demand for potable water will result in reduced electrical energy used by MMWD to produce and distribute water supplies. Reduced electricity generation will subsequently result in reduced greenhouse gas emissions.

Recent and historical conditions: MMWD is the largest energy consumer in the County of Marin, due to the high amounts of electricity required to produce and deliver drinking water in the service area. Seventy-five percent of MMWD's water supply comes from local rainfall on Mt. Tamalpais and in West Marin, which is captured in MMWD's seven reservoirs. The remaining approximately twenty-five percent of supply is purchased from Sonoma County Water Agency and is piped to MMWD's service area from Sonoma County. Raw water from Kent Lake or Nicasio Reservoir is treated at San Geronimo Treatment Plant and must then be pumped up and over steep hills in order to reach most of the service area. It takes a great deal of energy (750 kWh/AF) just to pump the potable water up and over the hill to make it available for distribution to most of the service area. Because so many of Marin County's residential areas are located in and around a multitude of hills and valleys, potable water coming into the area must be pumped from the main supply lines to smaller storage tanks. Ninety individual pump/lift stations pump the water up to 125 individual storage tanks located at high elevations, from which the water then flows by gravity down into residential neighborhoods. Additionally, MMWD operates a recycled water treatment and distribution system, which includes another five pump stations and three storage tanks. The great amount of energy needed to treat and pump potable and recycled water to all these local tank sites is a primary reason that MMWD uses so much energy. Reductions in amount of water used by consumers directly equates to reduced energy consumption by MMWD, as less water would be treated, pumped, and delivered.

Estimates of without-project conditions: Without the project, an additional 225 MWh of electricity per year will be generated from the water transmission system to meet irrigation demands. This would result in 85,500 pounds of CO_2 released to the atmosphere annually. Without the Project, a cumulative total of 3,375 MWh and 1,282,500 pounds of CO_2 would be emitted over the 15-year nominal Project lifetime.

Methods used to estimate physical benefits:_The calculations of the Project energy and CO_2 savings, are based on the average amount of electrical energy (MWh) used by MMWD to pump one acre-foot of water and the average amount of greenhouse gases (CO_2) produced by the local electric utility in Marin County (Marin Clean Energy, a public agency that provides 50% renewable electricity to Marin County and the City of Richmond) to generate the electrical energy used by MMWD. The data used in this calculation was derived from production water meter readings, and the 2012 emissions report published by Marin Clean Energy (Marin Clean Energy, 2012).

Per internal engineering records and calculations by MMWD staff, 750 kWh/AF (.75 MWh/AF) is the 12-year average electrical use by MMWD to produce an average of 29,000 AFY (agency average water production). The estimated annual water savings from the AMI/AMR Project (300 AFY) was multiplied by .75 MWh/AF to arrive at the energy savings estimate of 225 MWh per year.

The Project is estimated to reduce greenhouse gas emissions by 85,500 lbs per year. This is based on the Marin County Clean Energy's GHG emission estimates from 2012: 380 lbs of CO_2 emissions generated per MWh (Marin Clean Energy, 2012). This estimate assumes electricity used by the water transmission system originates from 50% renewable energy content (Light Green power supply sources). In 2012, the Light Green electricity volume used in Marin County was 559,836 MWh, which equates to 380 lbs of CO_2 emissions/MWh. The Project will save an estimated 225 MWh per year. This equates to a savings of 85,500 lbs of CO_2 emissions per year.

New facilities, policies, and actions required to obtain the physical benefits: None.

Potential adverse effects: None.

Cost Effective Analysis

PSP Table 6 evaluates whether the physical benefits provided by the Project are provided at the least possible costs.

PSP Table 6 - Cost Effective Analysis	
Project name: WaterSMART Irrigation with AMI/AMR	
Question 1	***Types of benefits provided as shown in Table 5:*** Direct water supply savings resulting from the Project: • Average reduction in annual water used for dedicated irrigation meters of 25% (300 AFY). • 4,500 AF of supply reduction over 15 years • Savings will offset locally and imported water supplies
Question 2	***Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?*** Yes. MMWD is continuously evaluating methods to reduce demand and increase efficiency, and is continuously implementing new strategies as possible. This project represents a big step towards fully adopting AMI/AMR in the service area. MMWD conducted an extensive cost/benefit analysis of leak detection and landscape incentive programs in 2009. The present value cost of these programs ranged from $654 to $1,745 /AF saved, depending on the amount of the incentive offered and staff time required to operate the programs (Maddaus Water Management, 2009)
Question 3	***If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.*** The Project is the least cost alternative. During the first 15 years of operation, the Project will save an estimated 4,500 AF of water at an average cost of $250-$500 per AF saved, which compares to approximately $250/AF for water produced locally and over $1,200 /AF for the next incremental supply of imported water.
Comments: Savings and supply costs in Question 3 are not discounted.	

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Project Justification – Grant Administration

The grant administration description is provided in this section. Discussion of physical benefits and cost effectiveness of grant administration is not applicable.

Project ID#	Project Proponent	Project Title
12	ABAG/SFEP	Grant Administration

Project 12 – Grant Administration

Project Description

This grant administration effort will ensure that Bay Area Integrated Regional Water Management (IRWM) grant funds are properly managed and administered in accordance with California Department of Water Resources (DWR) guidelines and requirements. The Bay Area Drought Relief Program consists of 11 projects addressing immediate regional drought relief efforts for increased local water supply, delivery of safe drinking water, implementation of conservation programs, and reduced water supply and quality conflicts.

Grant Administrator and Grant Recipient: The Association of Bay Area Governments (ABAG) is the official Council of Governments (COG) representing the San Francisco Bay Area's nine counties and 101 cities and towns. ABAG holds the distinction of being the first COG in California and is the Bay Area's official regional planning agency. Its mission is to strengthen cooperation and coordination among local governments and address social, environmental, and economic issues that transcend local borders. The San Francisco Estuary Partnership (SFEP), administered by ABAG, is one of 28 national programs under the U.S. Environmental Protection Agency's (U.S. EPA's) National Estuary Program. SFEP's mission is to protect and restore the natural resources of the San Francisco Bay Estuary. SFEP staff members are ABAG employees. ABAG/SFEP has participated in the regional IRWM planning effort since its inception.

Oversight and Coordination Committee: ABAG is a voluntary membership and advisory organization with limited statutory authority. The agency is governed by a General Assembly and Executive Board with standing and interagency committees all comprised of local elected officials. The Bay Area Local Project Sponsors and ABAG will form a Local Project Sponsor Oversight & Coordination Committee that will meet in person or by conference call, as needed, to review progress/quarterly reports, resolve grant reimbursement or invoicing issues, and resolve outstanding matters. In addition, the ABAG/SFEP Grant Manager will provide grant oversight and coordination with all Local Project Sponsors, ensuring completeness of reporting and invoicing and ensuring that project progress is being made according to schedule and concomitant with progress reports and field visits.

Local Project Sponsor Agreements: The Local Project Sponsor Agreements between ABAG and each Local Project Sponsor will ensure that matching funds are committed and grant requirements are satisfied, which will reduce risk exposure to ABAG in executing a grant agreement with the State on behalf of the Local Project Sponsors. All agreements will have similar general conditions, but each agreement will also be tailored to the specific funding and grant requirements applicable to that project. Generally, Local Project Sponsor Agreements will address issues affecting a specific project. Issues affecting more than one project will be addressed by the Local Project Sponsor Oversight & Coordination Committee. Agreements with Local Project Sponsors will be established by ABAG staff as described below:

- Negotiate and finalize Local Project Sponsor Agreements with each Local Project Sponsor that will receive IRWM Drought grant funding, and obtain approval from the ABAG Executive Board and the governing body of each Local Project Sponsor. Each Local Project Sponsor will be expected to execute such an agreement before reimbursement is requested or distributed.
- Each Local Project Sponsor Agreement will include standard formats for reporting project progress and making reimbursement requests, dispute resolution, and other conditions as specified in the Grant Agreement between ABAG and DWR.

A discussion of project physical benefits and cost-effectiveness analysis has not been provided as these components are not applicable to the grant administration task.