PROJECT JUSTIFICATION

This attachment provides the project justification for the various Projects contained in this Proposal. This Attachment is organized as follows:

Project Summary Table – A table showing how each Project meets the various drought elements and IRWM Project Elements of the drought Solicitation. This table is consistent with PSP Table 4.

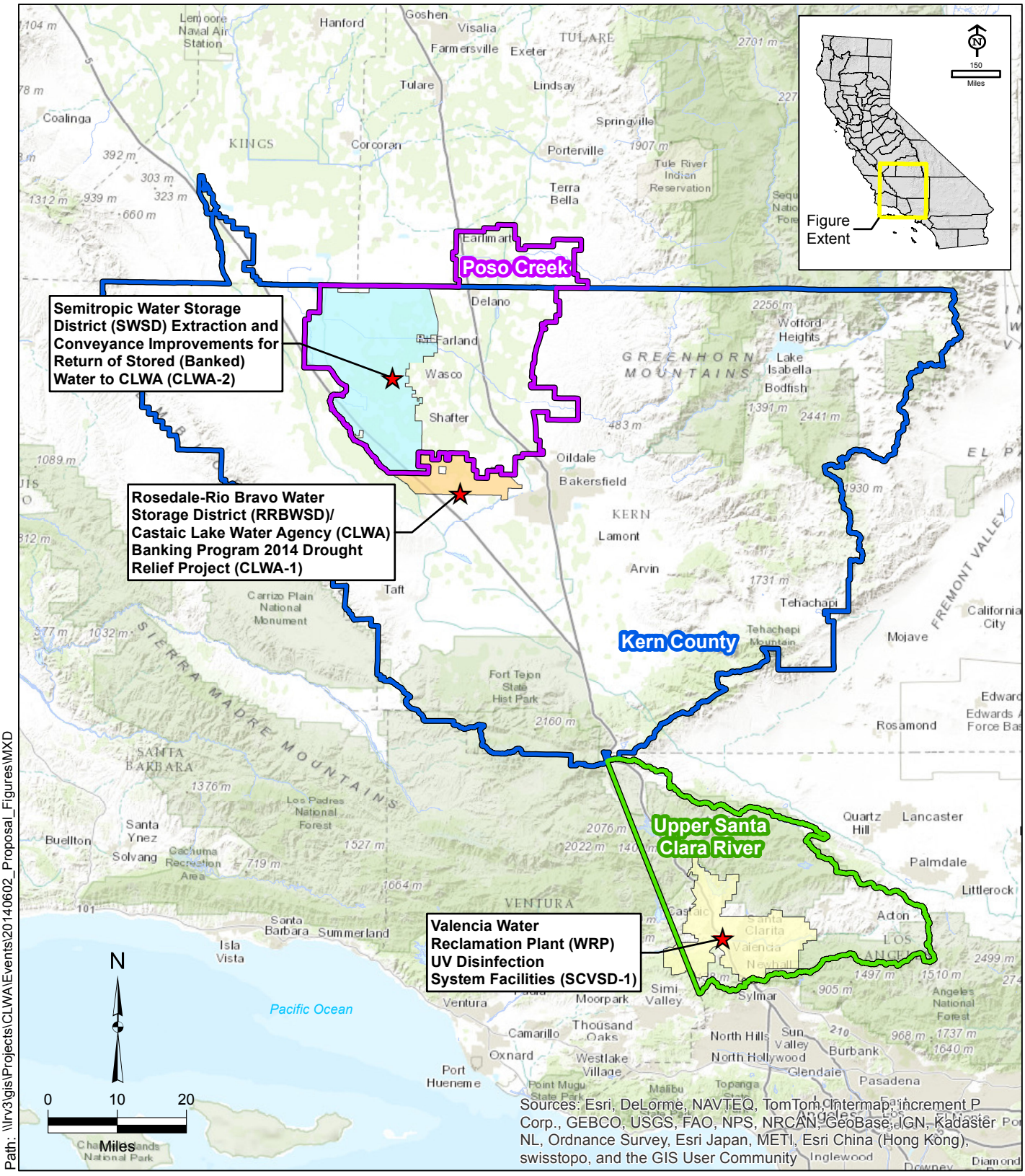
Project Description - A brief Project summary and description of how each Project will help alleviate the drought impact in the Region

Project Specific Information - The Project description, a description of Project physical benefits, the technical analysis of physical benefits claimed, and cost-effectiveness analysis for each Project.

Regional and Project Maps - An illustration of the IRWM regional boundary and the location of each Project is shown on Figure 1 (Page 3-3) as well as a map for each Project (Figures 2, 3, and 4) (Pages 3-5, 3-7, 3-9).

Project Summary Table

Table 4 – 2014 IRWM Drought Solicitation Project Summary Table				
	Drought Project Element	**RRBWSD/CLWA Banking Program 2014 Drought Relief Project**	**SWSD Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA**	**Valencia WRP UV Disinfection System Facilities Project**
D.1	Provide immediate regional drought preparedness	X	X	
D.2	Increase local water supply reliability and the delivery of safe drinking water	X	X	
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	X	X	X
	IRWM Project Element			
IR.1	Water supply reliability, water conservation, and water use efficiency	X	X	
IR.2	Stormwater capture, storage, clean-up, 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	X	X	
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users			X
IR.7	Water banking, exchange, reclamation, and improvement of water quality	X	X	X
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			



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Legend

- Project Location
- **IRWM Regions**
  - Kern County
  - Poso Creek
  - Upper Santa Clara River
- **Water District**
  - RRBWSD
  - SWSD
  - CLWA

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Regional Map
Overview of Project Locations

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Figure 1

Rosedale-Rio Bravo Water Storage District (RRBWSD)/ Castaic Lake Water Agency (CLWA) Banking Program 2014 Drought Relief Project

This Project is being implemented by the Rosedale-Rio Bravo Water Storage District (RRBWSD) and Castaic Lake Water Agency (CLWA).

Project Description

This Project will construct well, transmission and recharge facilities in the RRBWSD service area in order to provide additional CLWA banking program extraction capacity of 7,500 AFY.

Alleviation of Drought Impacts

Ongoing drought conditions have caused the CLWA's wholesale water supplies to become increasingly constrained and CLWA is facing difficulties in meeting projected water demands in future years with currently available recovery of banked water supplies. Approximately half of urban water demand is met with imported State Water Project (SWP) water, however due to allocation reductions CLWA cannot depend on these supplies to meet demands without more access to its banked supplies.

SWP allocations are far below projected allocations for single- and multiple-dry year scenarios in the CLWA 2010 Urban Water Management Plan (UWMP). During critical dry year conditions, CLWA is dependent on supplies from long-term groundwater banking programs in which it actively participates. However, due to the statewide drought conditions many agencies are calling on their dry-year banked supplies, thereby creating an intense demand for extraction capacity. As a result, accessing the much needed dry-year supplies is not possible without additional extraction capacity to CLWA's banking programs. Additionally, current operating plans for 2015 and 2016 require additional extraction capacity from the RRBWSD banking program to meet local water demand if the drought persists into those years.

Implementation of this Project will help alleviate these critical drought impacts, by improving recharge, conveyance, and recovery capacities for the RRBWSD/CLWA banking program. With this Project, CLWA will have access to an additional 7,500 AF during dry years at the RRBWSD Banking Program to meet its water demands. Additionally, the Project will enable recharge of the RRBWSD Banking Program's groundwater aquifer by an additional 7,500 AF during wet years.

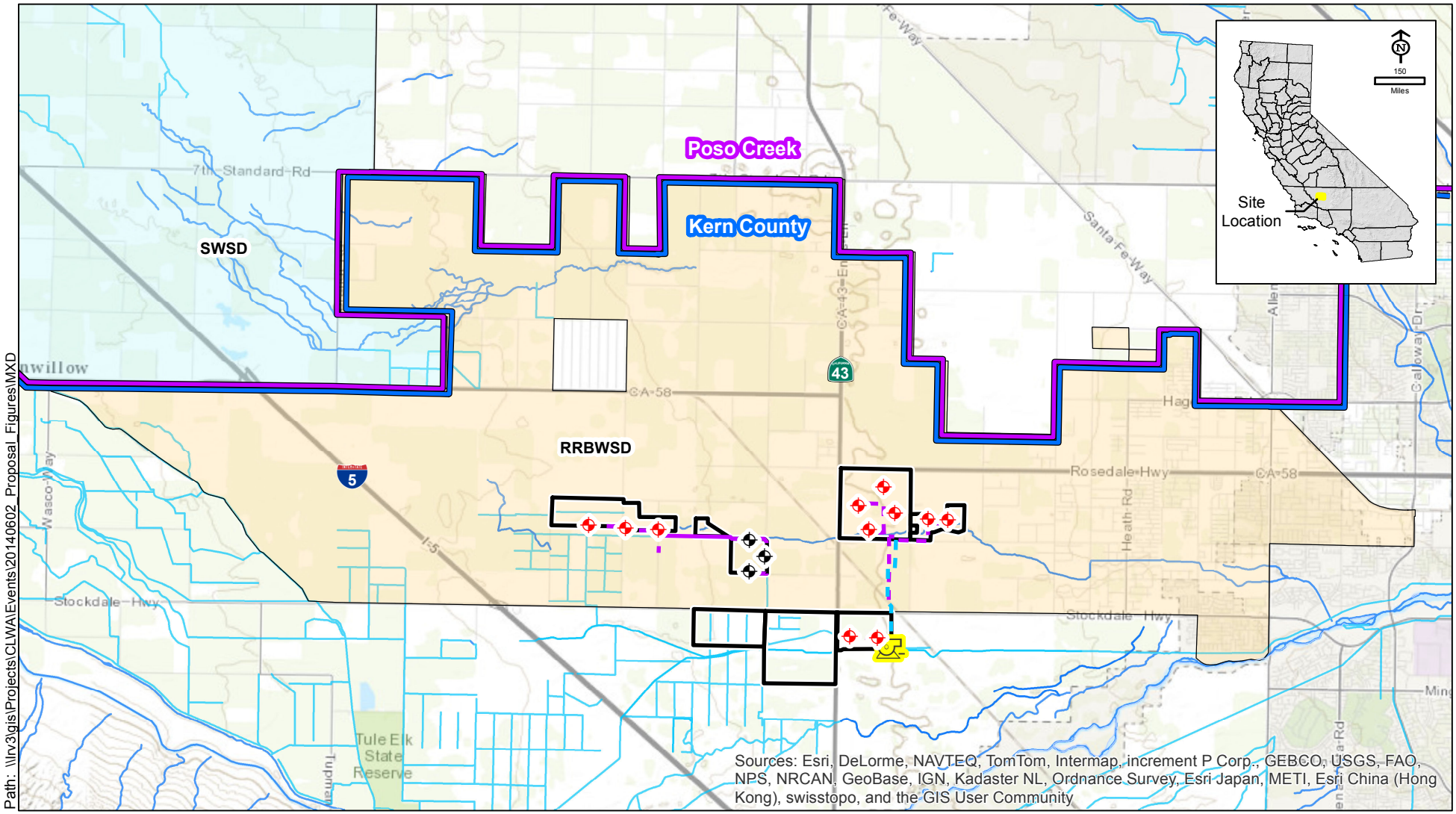
Drought Project Type

This Project will provide immediate regional drought response by enabling access to 7,500 AF of banked water supplies. It also enhances overall conjunctive water management in the both the CLWA and RRBWSD regions and supports future dry-year supplies by enabling recharge of additional 7,500 AFY to the RRBWSD Banking Program's groundwater aquifer during wet years.

Local water supply reliability is greatly improved by ensuring access to banked water supplies, particularly as imported water supplies and local groundwater supplies are limited. Implementation of this Project will bolster available supplies, increase reliability, and meet drinking water demands. Finally, creating more flexibility for the retrieval of banked supplies can help maintain local water supplies, thereby potentially reducing impacts to ecosystems dependent on those supplies.

Need for Expedited Funding

In order to have the Project constructed and on-line to access stored water supplies and prevent water shortages in 2015 and dry years beyond, the Project needs to be funded in 2014 and constructed in early 2015. No other grant programs are identified at this time that meets both the nature and timing of this Project. CLWA is in the process of recovering some of its water stored its banking program with RRBWSD. However to implement this Project and have access to supplies required during very dry years requires large expenditures, which would create a financial burden on CLWA without grant funding provided through this current grant opportunity.



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Legend

- Existing Well
- Proposed Well
- Pumping Plant
- Existing Pipeline
- Proposed Canal
- Proposed Pipeline
- Project Location

IRWM Regions

- Poso Creek
- Kern County

Water Districts

- RRBWSD
- SWSD

Water Features

- Stream/River
- Canal/Ditch

N

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Los Angeles County, California

Rosedale-Rio Bravo Water Storage District (RRBWSD)/ Castaic Lake Water Agency (CLWA) Banking Program 2014 Drought Relief Project

K/J 1444213*00
July 2014

Figure 2

Semitropic Water Storage District (SWSD) Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA

This Project is being implemented by the Semitropic Water Storage District (SWSD) and CLWA.

Project Description

This Project will construct well, transmission and recharge facilities in the SWSD service area in order to provide the CLWA banking program extraction and return capacity of 5,000 AFY.

Alleviation of Drought Impacts

Ongoing drought conditions have caused the CLWA's wholesale water supplies to become increasingly constrained and CLWA is facing difficulties in meeting projected water demands in future years with currently available recovery of banked water supplies. Approximately half of urban water demand is met with imported SWP water, however due to allocation reductions CLWA cannot depend on these supplies to meet demands without more access to its banked supplies.

SWP allocations are far below projected allocations for single- and multiple-dry year scenarios in the CLWA 2010 UWMP. During critical dry year conditions, CLWA is dependent on supplies from long-term groundwater banking programs in which it actively participates. However, due to the statewide drought conditions many agencies are calling on their dry-year banked supplies, thereby creating an intense demand for extraction capacity. As a result, accessing the much needed dry-year supplies is not possible without additional extraction capacity to SWSD/CLWA's banking programs. Additionally, current operating plans for 2015 and 2016 require additional extraction capacity from the SWSD banking program to meet local water demand if the drought persists into those years.

Implementation of this Project will help alleviate these critical drought impacts, by helping to ensure that CLWA's banked supplies can be extracted and delivered. The Agency will acquire shares in the Semitropic Banking Program that will pay for the construction of wells and transmission capacity in order to access to 5,000 AFY in banked supplies required to meet dry year demands.

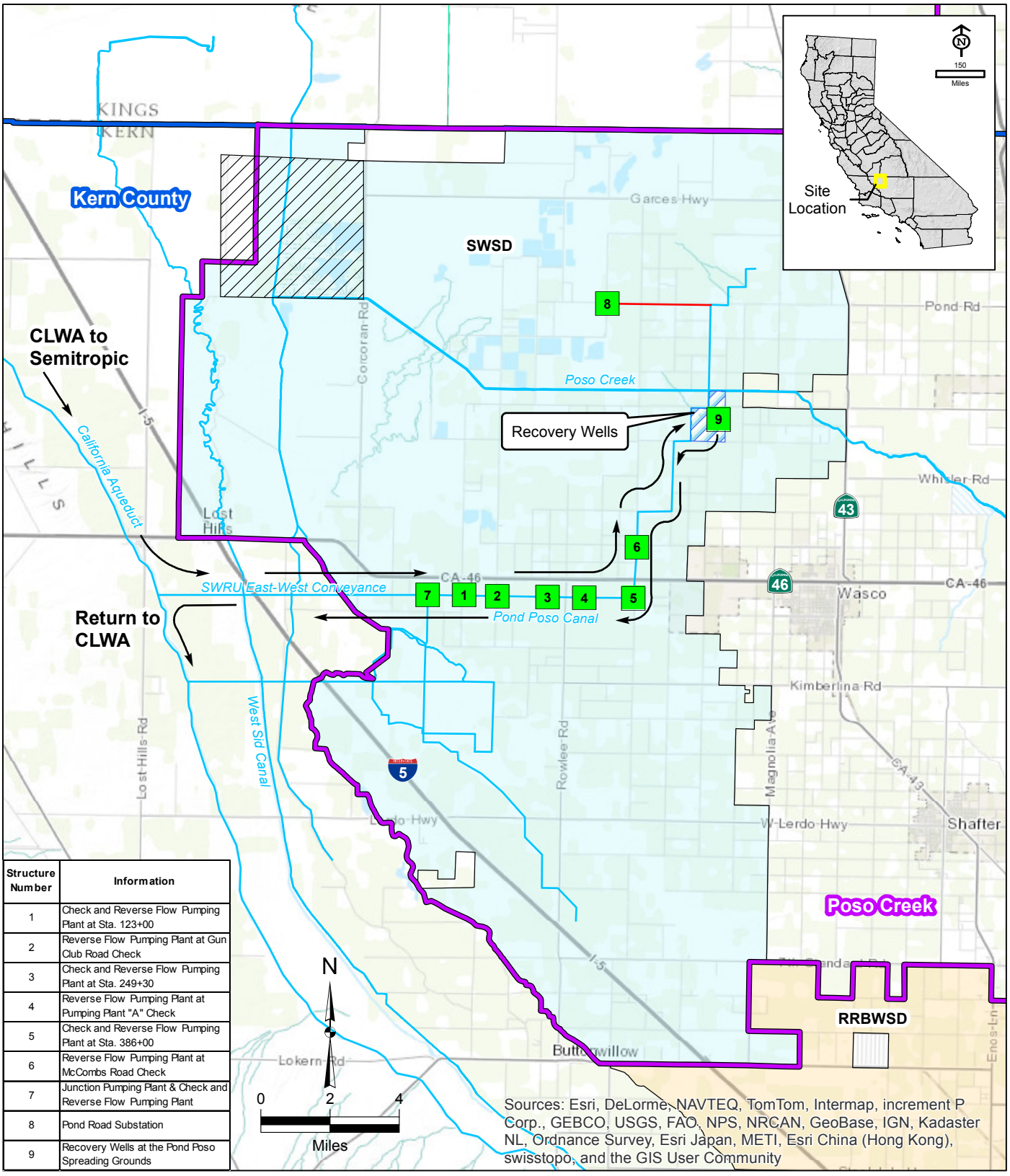
Access to planned supplies and water conservation are critical for meeting demands during dry year conditions. The Santa Clarita Valley (SCV) has implemented a voluntary water conservation program in 2014 to achieve a 20 percent decrease in demand and is preparing to implement more measures to meet the SWRCB requirements. Implementation of this Project will address the water supply side of dry year strategies, to ensure access to previously banked supplies.

Drought Project Type

This Project will provide immediate regional drought preparedness by enabling greater access to banked water supplies in order to meet demands during dry years. Local water supply reliability is considerably increased by having adequate recover of banked water supplies. In addition, this Project enhances overall conjunctive water management relied on in the region for meeting dry year demands in the future. Finally, creating more flexibility for the retrieval of banked supplies can help augment other local water supplies during droughts, thereby potentially reducing impacts to ecosystems dependent on those supplies.

Need for Expedited Funding

In order to have the Project constructed and on-line to access previously stored water supplies and prevent water shortages in 2015 and dry years beyond, the Project needs to be funded in 2014 and constructed in early 2015. No other grant programs are identified at this time that meets both the nature and timing of this Project. CLWA is in the process of making arrangements to access water stored its banking program with SWSD through the use of first priority rights held by Newhall Land. However, this has proven problematic in that costs of the use of this extraction capacity are high, CLWA is expected to provide additional water to the first priority partner, the time to negotiate agreements is lengthy and delays delivery of the water and the availability is not guaranteed in a given year when the banked supplies are needed in the CLWA service area.



Structure Number	Information
1	Check and Reverse Flow Pumping Plant at Sta. 123+00
2	Reverse Flow Pumping Plant at Gun Club Road Check
3	Check and Reverse Flow Pumping Plant at Sta. 249+30
4	Reverse Flow Pumping Plant at Pumping Plant "A" Check
5	Check and Reverse Flow Pumping Plant at Sta. 386+00
6	Reverse Flow Pumping Plant at McCombs Road Check
7	Junction Pumping Plant & Check and Reverse Flow Pumping Plant
8	Pond Road Substation
9	Recovery Wells at the Pond Poso Spreading Grounds

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LEGEND

- Structure
- Electrical Distribution Line
- Water Features
- Kern National Wildlife Refuge
- Spreading Basin

IRWM Regions

- Kern County
- Poso Creek

Water District

- RRBWSD
- SWSD

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Los Angeles County, California

Semitropic Water Storage District (SWSD) Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA

K/J 1444213*00
July 2014
Figure 3

Valencia Water Reclamation Plant UV Disinfection Facilities

This Project is being implemented by the Santa Clarita Valley Sanitation District.

Project Description

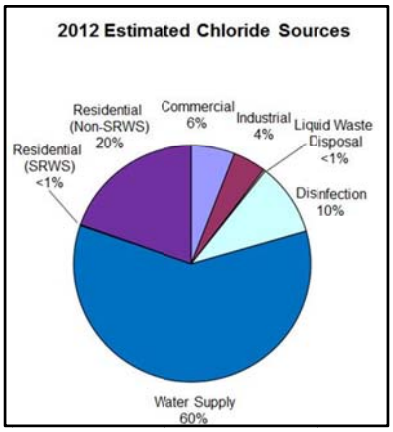
This Project will replace the chlorination system with UV disinfection to reduce chloride concentrations in treated wastewater discharged to the Santa Clara River.

Alleviation of Drought Impacts

The issue of chloride levels in the Santa Clara River has led to conflict with downstream agricultural interests for over fifteen years. During this period, the Regional Water Quality Control Board has established a Total Maximum Daily Load (TMDL) to address the elevated chloride concentrations in the Upper Santa Clara River, and the TMDL identified drought as the critical condition. The proposed Project would reduce chloride concentrations in treated wastewater discharged to Reach 5 of the Santa Clara River by up to 7 mg/L. By reducing chloride concentrations, this Project addresses water quality impacts and conflicts caused by the 2014 drought conditions and anticipated impacts, should drought or dry year conditions continue in 2015 and beyond.

The proposed Project would offset the increases in chloride loadings to the Water Reclamation Plant (WRP) that are contributed by drinking water supplied from the State Water Project (SWP). SWP chloride concentrations rise cyclically during droughts, as shown in the Attachment 2) and account for a significant proportion (60%) of chlorides in the water treated at the WRPs (as shown in the figure to the right), thus contributing to non-compliance with receiving water standards. The proposed Project, by reducing chloride concentrations in WRP effluent, will help alleviate drought impacts in the USCR Region.

Drought Project Type

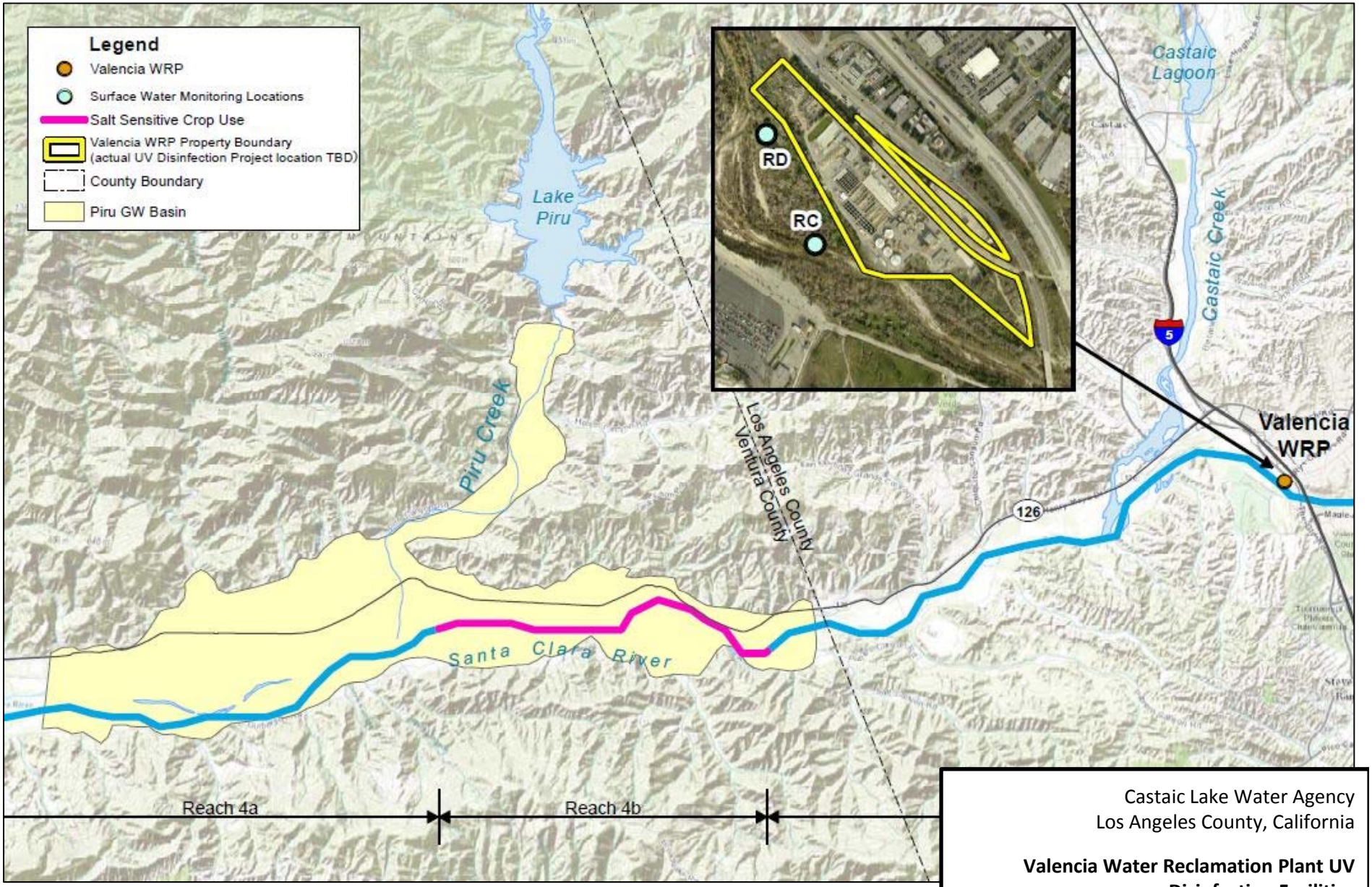


This Project falls under the D.4 drought project type. This Project addresses water quality impacts and conflicts caused by the current drought conditions and helps address anticipated impacts if the current drought or dry year conditions continue in 2015 and beyond. Due to the potential impacts on downstream agricultural interests, the issue of chloride levels in the Santa Clara River has led to conflict for over fifteen years. Although extensive source control efforts have been implemented in the Santa Clarita Valley, chloride concentrations are still above 100 mg/L, and during droughts this condition is exacerbated by water supply conditions. For instance, in 2011, SWP water delivered to the Santa Clarita Valley had chloride levels between 50 and 73 mg/L, but in the 12-month period from February 2013 to February 2014 that includes drought conditions, SWP water chloride levels ranged from 75 mg/L to 82 mg/L. Receiving water chloride levels at the Los Angeles-Ventura County line have risen commensurately. Drought periods dating back to the 1970s are associated with notable increases in chloride concentrations in the State Water Project, which subsequently impact chloride concentrations in the Region (e.g. Valencia WRP effluent). See figure in Attachment 2.

Thus, drought conditions have contributed to elevated chloride concentration in the Santa Clarita River. This Ultraviolet (UV) Project is one component of a suite of projects approved in October 2013 by the Board of Directors for the Santa Clarita Valley Sanitation District (SCVSD), which together will allow the Valencia WRP to comply with the requirements of the TMDL. Currently, disinfection at the Valencia WRP is accomplished by chlorination, which adds chloride to the effluent. The existing disinfection system at the Valencia WRP will be replaced with ultraviolet (UV) disinfection facilities that would reduce the addition of chloride during wastewater treatment and produce effluent with improved water quality.

Need for Expedited Funding

Expedited funding for this Project is crucial to addressing the chloride issues in the Santa Clara River watershed which are exacerbated by the current and potentially ongoing drought conditions. The current drought has caused a significant increase of chloride levels in the water supply and treated wastewater between early 2012 and March 2014, which has the effect of eclipsing a portion of the chloride reductions gains made in recent years in the Santa Clarita Valley as a result of the water softener removal program and other source control efforts. The SCVSD is moving forward as expeditiously as possible with the chloride compliance plan, including approving service charge rates necessary to pay for the local share of the chloride compliance plan which includes the Valencia WRP UV Disinfection Facilities, in order to mitigate the effects of this and future droughts on chloride concentrations in the SCR, and to comply with the requirements of the chloride TMDL.



Castaic Lake Water Agency
Los Angeles County, California

Valencia Water Reclamation Plant UV Disinfection Facilities

July 2014

Figure 4

Project Physical Benefits, Technical Justification, and Cost Effectiveness

RRBWSD/CLWA Banking Program 2014 Drought Relief Project (CLWA-1)

The following (quantifiable) physical benefits are expected from this Project:

1. Provide an additional 7,500 acre-feet (AF) of drought year supply
2. Recharge the RRBWSD Banking Program's groundwater aquifer by an additional 7,500 AF during wet years

In addition to the physically quantified benefits expected from this Project, the following non-quantifiable benefit is important to understanding the full value of the Project: the conjunctive use of the groundwater aquifer used in the RRBWSD Banking Program will recharge the basin during wet years, while during dry years, the Project provides a cooperative way to allocate water among several water agencies. In particular, the recharge of the basin will raise groundwater levels, which will provide benefits to farmers in the area such as lowering their pumping costs and enhance the availability of water. The cooperation of the water agencies during dry years will reduce the chances of water agencies not being able to meet their water demands.

Each Project physical benefit is discussed individually below, with an overview of each benefit expected over the project life, followed by a technical analysis of the physical benefit claimed.

A cost effectiveness analysis is provided for the RRBWSD/CLWA Banking Program 2014 Drought Relief Project (CLWA-1) following the Project benefits and technical analysis discussion.

Project Physical Benefits

Benefit 1: Provide an additional 7,500 AF of dry year water supply

As is shown in Table 3-1, with the Project, CLWA will have access to an additional 7,500 AF during dry years with the Project to meet its water demands.

Table 3-1 – Annual Project Physical Benefits (PSP Table 5)

Project Name: RRBWSD/CLWA Banking Program 2014 Drought Relief Project
Type of Benefit Claimed: Reduce the need to obtain 7,500 AF from another source during dry years
Units of the Benefit Claimed : Acre-feet

Additional Information About this Benefit: CLWA will obtain water from the RRBWSD Banking Program during dry years, which are predicted to occur in four years out of every ten

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2014	0	0	0
2015	5,000	9,500	4,500*
2016	5,000	12,500	7,500
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	5,000	12,500	7,500
2021	5,000	12,500	7,500
2022	0	0	0
2023	0	0	0
2024	0	0	0

Table 3-1 – Annual Project Physical Benefits (PSP Table 5)

Project Name: RRBWSD/CLWA Banking Program 2014 Drought Relief Project

Type of Benefit Claimed: Reduce the need to obtain 7,500 AF from another source during dry years

Units of the Benefit Claimed : Acre-feet

Additional Information About this Benefit: CLWA will obtain water from the RRBWSD Banking Program during dry years, which are predicted to occur in four years out of every ten

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2025	5,000	12,500	7,500
2026	5,000	12,500	7,500
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	5,000	12,500	7,500
2031	5,000	12,500	7,500
2032	0	0	0
2033	0	0	0
2034	0	0	0
2035	5,000	12,500	7,500

Comments:

* 4,500 represents less than a full year of operation in 2015.

Without the Project, CLWA can obtain approximately 5,000 AF each year from the Project. If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 45,000 AF, indicating that CLWA would forfeit almost 60,000 AF of water that CLWA placed into the RRBWSD Banking Program unless it found an alternative storage facility and move the water when it was not required into the service area.

With the Project, CLWA can obtain 12,500 AF each year from the RRBWSD Banking Program (9,500 AF in 2015 as project construction will not be complete until part way through the year.) If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 109,500 AF, meaning that CLWA would not forfeit any of the water placed into the bank prior to 2014.

Technical Analysis of Physical Benefits Claimed

Benefit 1: Provide an additional 7,500 AF of dry year water supply

The RRBWSD/CLWA Banking Program 2014 Drought Relief Project will increase CLWA's extraction and transmission capacity from the RRBWSD Banking Program by an additional 7,500 acre-feet per year (AFY). The additionally capacity would boost the extraction capacity dedicated to CLWA to approximately 12,500 AFY and nearly meets CLWA's 2010 Urban Water Management Plan (UWMP) for the SCV long-term goal of having 15,000 AFY of extraction capacity from the RRBWSD/CWLA Banking Program. CLWA plans to use this additional extraction and transmission capacity to help meet water needs during drought years, like the current one. Based on the historical 81-year hydrology provided by the SWP, it is assumed that CLWA will call upon its banked supplies for extraction of water in four out of every ten years.

Technical Basis of the Project

The Project will increase the amount of water that CLWA can recover during drought years from the water it has banked with the RRBWSD Banking Program. Currently, CLWA has more than 100,000 AF currently banked in the RRBWSD Banking Program. In order to do this, RRBWSD will construct three additional wells and associated transmission capacity dedicated to CLWA. Each of the wells will have a capacity of 3,000 AFY (RRBWSD, 2014a, pg. 10); although it is assumed that under realistic conditions the three wells will only be able to extract 7,500 AFY collectively. RRBWSD will install, own, and maintain the wells as part of its agreement with CLWA (RRBWSD, 2010, pg. 3, 4), while CLWA will have rights to the wells' extraction capacity and associated transmission capacity (RRBWSD, 2014a, pg. 10).

Recent and Historical Conditions

CLWA has more than 100,000 AF currently banked in the RRBWSD Banking Program. CLWA's 2010 UWMP calls for CLWA to obtain 15,000 AFY from the RRBWSD Banking Program in a single-dry year. However, CLWA only received about 5,000 AF from the RRBWSD Banking Program in 2014 due to extraction and transmission capacity constraints. CLWA's agreement with the RRBWSD Banking Program expires in 2035, and CLWA will forfeit all of their water left in the bank at that time. Therefore, CLWA needs to increase the amount it can extract if it hopes to get back all of the water that it has placed in the bank.

Estimates of Without Project Conditions

Without the additional 7,500 AFY extraction capacity from the RRBWSD Banking Program, the SCV will be unable to access dry-year supplies as needed in the single-dry year and multiple-dry year scenarios in the 2010 UWMP. Additionally, current operating plans for 2015 and 2016 require additional extraction capacity from both the RRBWSD/CLWA Banking Program 2014 Drought Relief Project and the Semitropic Water Storage District (SWSD) Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA Project (CLWA-2) to meet local water demand if the drought persists into those years.

Without the Project, CLWA can obtain a maximum of approximately 5,000 AF each year from the RRBWSD Banking Program. If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 45,000 AF, meaning that CLWA could potentially forfeit almost 60,000 AF of water CLWA placed into the RRBWSD Banking Program.

CLWA has no alternative dry-year water supply that is both reliable and cost effective to replace banked supplies. Obtaining additional water from the SWP during drought years is improbable and local groundwater pumping is already planned to increase during dry years (Kennedy/Jenks Consultants, 2011, pg. 6-2). One potential alternative is for CLWA to bank water through a different groundwater banking program and then get this water back in dry years; another alternative is for CLWA to produce recycled water. The costs for these alternatives are presented in the cost effectiveness analysis section of this attachment.

Descriptions of Methods Used to Estimate Physical Benefits

With the Project, the three additional wells and transmission capacity to be constructed will extract 9,000 AFY (RRBWSD, 2014a, pg. 10); however, in order to account for maintenance and repair time, the capacity of the wells and transmission is conservatively estimated to be 7,500 AFY.

The number of years in which CLWA will request extraction of its banked water from the RRBWSD Banking Program is assumed to be four out of every ten years. This assumption is based on the need for extraction from the Semitropic Water Bank over the last ten years, and in consideration of the 81-year hydrology for deliveries of the SWP (typically in years with an SWP delivery of greater than 40% CLWA could be expected to recharge its banking programs, and in years with a low delivery, less than 35%, would recover water from the banking programs. CLWA extracted 4,950 AF total in 2009 and 2010 (Luhdorff and Scalmanini, 2014) and will do so again in 2014 and 2015 (4,950 AF total) by using Newhall Lands first priority extraction. However utilization of

these supplies requires large expenditures, which would create a financial burden on CLWA, in addition to being time consuming and unreliable.

With the Project, CLWA can obtain a total 12,500 AFY from the RRBWSD Banking Program. If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 109,500 AF, meaning that CLWA would not forfeit any of the water placed into the bank prior to 2014.

Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

The Project does not require any new facilities, policies or actions to obtain the physical benefits, other than those to be implemented with the Project. Water would be delivered by the Kern County Cross Valley Canal to the SWP Aqueduct and then to Castaic Lake. The Project requires three wells and the corresponding transmission capacity to extract and convey 7,500 AF during dry years.

Description of Any Potential Adverse Physical Effects

No potential adverse physical effects are anticipated from operation of the water bank (SAIC, 2005, pg. ES-5).

Project Physical Benefits

Benefit 2: Benefit: Recharge the RRBWSD Banking Program's groundwater aquifer by an additional 7,500 AF during wet years

As is shown in Table 3-2, with the Project, CLWA will be able to place an additional 7,500 AFY during wet years into the RRBWSD Banking Program in order to later recover the water during future dry years. Without the Project, CLWA may not be able to most effectively use its water supply during wet years when CLWA's water supply exceeds demands.

Table 3-2 – Annual Project Physical Benefits (PSP Table 5)

Project Name: RRBWSD/CLWA Banking Program 2014 Drought Relief Project

Type of Benefit Claimed: Recharge the RRBWSD Banking Program's aquifer by an additional 7,500 AF during wet years

Units of the Benefit Claimed : *Acre-feet*

Additional Information About this Benefit: CLWA will place water into the RRBWSD Banking Program during wet years (which are predicted to occur in one year out of every ten)

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	5,000	12,500	7,500
2019	0	0	0
2020	0	0	0
2021	0	0	0
2022	0	0	0
2023	0	0	0
2024	0	0	0

Table 3-2 – Annual Project Physical Benefits (PSP Table 5)

Project Name: RRBWSD/CLWA Banking Program 2014 Drought Relief Project

Type of Benefit Claimed: Recharge the RRBWSD Banking Program's aquifer by an additional 7,500 AF during wet years

Units of the Benefit Claimed : *Acre-feet*

Additional Information About this Benefit: CLWA will place water into the RRBWSD Banking Program during wet years (which are predicted to occur in one year out of every ten)

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	5,000	12,500	7,500
2029	0	0	0
2030	0	0	0
2031	0	0	0
2032	0	0	0
2033	0	0	0
2034	0	0	0
2035	0	0	0

Comments: Without the Project, CLWA will place 5,000 AFY into the RRBWSD Banking Program aquifer in select years, while with the Project; CLWA will place 12,500 AFY into the aquifer.

Technical Analysis of Physical Benefits Claimed

Benefit 2: Recharge the RRBWSD Banking Program's groundwater aquifer by an additional 7,500 AF during wet years

The RRBWSD/CLWA Banking Program 2014 Drought Relief Project will increase capacity to recharge the RRBWSD Banking Program's aquifer by an additional 7,500 AFY. CLWA plans to place more water into the aquifer during those wet years when CLWA has a greater water supply than demand. Based on the historical 81-year hydrology provided by the SWP and historical demands, for this analysis, it is assumed that CLWA will place water into the RRBWSD Banking Program in one out of every ten years.

Technical Basis of the Project

In addition to the increased extraction capability during dry years, the Project allows for greater recharge into the RRBWSD Banking Program during wet years. The additional recharge capacity will be 7,500 AFY.

Recent and Historical Conditions

At the end of 2014, CLWA will have 94,000 AF out of a maximum of 100,000 AF banked under their original banking arrangement at the RRBWSD Banking Program. CLWA also has a 2:1 banking arrangement at RRBWSD where CLWA only can extract half the water that it places into the bank. At the end of 2014, CLWA will have 9,500 extractable AF in the 2:1 banking arrangement. Approximately 90% of the water that CLWA has placed into the RRBWSD Banking Program is originally SWP water.

Estimates of Without Project Conditions

Without the Project, CLWA will not bank an additional 7,500 AF of its Table A allocation of SWP water or Buena Vista/Rosedale-Rio Bravo supplies. This will reduce the total supply of banked water that CLWA will have available in dry years.

Descriptions of Methods Used to Estimate Physical Benefits

With the Project, the three additional wells and transmission capacity that will be built will actually be able to extract 9,000 AFY (Rosedale-Rio Bravo Water Storage District, 2014a, pg. 10); however, in order to account for maintenance and repair time, the wells and transmission capacity is estimated at 7,500 AFY.

The number of years in which CLWA will place water into the RRBWSD Banking Program is assumed to be one year out of every ten. CLWA assumes that it will be able to bank water when SWP allocations are greater than 40%. According to the historical record, SWP Table A deliveries to CLWA have been greater than 40% in roughly 2 out of every 10 years, on average (DWR, 2013, pg. 102, 103). It is conservatively assumed that CLWA will bank surplus water one out of every 10 years. RRBWSD may choose to recharge in years that CLWA does not use the facilities for recharge.

Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

The Project does not require any new facilities, policies or actions to obtain the physical benefits, other than those to be implemented with the Project. The Project requires three wells and the corresponding transmission capacity to both extract and recharge 7,500 AF during wet years.

Description of Any Potential Adverse Physical Effects

No potential adverse physical effects anticipated from operation of the RRBWSD Banking Program (SAIC 2005, pg. ES-5).

Non-quantified Benefits

The RRBWSD/CLWA Banking Program 2014 Drought Relief Project has an important non-quantified benefit: the Project will increase the conjunctive use of the RRBWSD Banking Program's groundwater aquifer. During wet years, the additional water placed into the aquifer will recharge the basin. The recharging of the basin will raise groundwater levels, which will reduce groundwater pumping costs to farmers in the area.

During dry years, the Project provides a cooperative way to allocate scarce water among several water agencies, including CLWA. The cooperation of the water agencies during dry years will reduce the chances of water agencies not being able to meet the water demands of their customers.

Cost Effectiveness Analysis

The cost effectiveness analysis for the RRBWSD/CLWA Banking Program 2014 Drought Relief Project is summarized in Table 3-3 below, with a more complete narrative description for each option provided below.

Table 3-3 – Cost Effectiveness Analysis (PSP Table 6) **Project name:** RRBWSD/CLWA Banking Program 2014 Drought Relief Project	
Question 1	*Types of benefits provided as shown in Table 3-3:* 1) Reduce the need to obtain 7,500 AF from another source during dry years; 2) Recharge the RRBWSD Banking Program's aquifer by an additional 7,500 AF during wet years
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 no, why? N/A
	If yes, list the methods (including the proposed project) and estimated costs. Proposed Project is increasing CLWA's extraction and transmission capacity at the RRBWSD Banking Program. Total capital and operations and maintenance cost are approximately $9.8 million in present value. Alternative Projects include: **Alternative 1** – receiving banked water from another water bank that has a cost of approximately $14.7 million in present value. **Alternative 2 –** producing recycled water that has a cost of approximately $120.3 million in present value. Neither alternative project would make use of water that CLWA has already stored with the RRBWSD Banking Program.
Question 3	*If the proposed project is not the least cost alternative, why is it the preferred alternative?* The proposed Project is the least cost alternative.

This section presents a cost-effectiveness analysis comparing relevant project alternatives to the proposed Project. The Project alternatives considered are (1) receiving banked water from another water bank and (2) producing additional recycled water.

The capital cost for the Project, consisting of three wells and the corresponding transmission capacity, is $6.5 million (RRBWSD, 2014b, pg. 3). The capital costs include approximately $0.2 million for direct project administration costs, $0.4 million for land easement costs, approximately $0.2 for planning/design/engineering/environmental documentation, and approximately $5.7 million for construction/implementation. In present value 2014 dollars, the capital costs total $6.2 million.

In addition, there are operations and maintenance costs for extracting water, as well as placing water into the RRBWSD Banking Program aquifer. Approximately 64,500 AF will be extracted as a result of the Project over the expected project lifetime. CLWA must pay the energy and transmission costs associated with moving the water from the RRBWSD Banking Program aquifer and through the Kern County Cross Valley Canal, which connects to the California Aqueduct. At typical groundwater depth, the energy costs are $55 per AF (RRBWSD, 2010, pg. 12), while the transmission costs are $35 per AF. The combined energy and transmission costs are $90 per AF, or $5.8 million total for the 64,500 AF; in present value, these costs are $3.3 million. Finally, the operations and maintenance costs for placing water into the aquifer are $30 per AF (RRBWSD, 2010, pg. 11). Over the course of the project's lifetime, an additional approximate 15,000 AF will be placed into the RRBWSD Banking Program. The cost is $0.5 million total for the 15,000 AF; in present value, these costs are approximately $0.3 million.

Therefore, as is shown in Table 3-4, the total capital and operations and maintenance cost over the course of the Project's life is $12.8 million; in present value, the total costs are approximately $9.8 million.

Table 3-4 – Annual Costs of Project
(All costs should be in 2014 Dollars)
Project: RRBWSD/CLWA Banking Program 2014 Drought Relief Project

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$1,991,648	$ -	$ -	$ -	$ -	$ -	$ -	$1,991,648	1.000	**$1,991,648**
2015	$4,493,501	$ -	$ -	$405,000	$ -	$ -	$ -	$4,898,501	0.943	**$4,619,287**
2016	$15,411	$ -	$ -	$675,000	$ -	$ -	$ -	$690,411	0.890	**$614,466**
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.840	**$ -**
2018	$ -	$ -	$ -	$225,000	$ -	$ -	$ -	$225,000	0.792	**$178,200**
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.747	**$ -**
2020	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.705	**$475,875**
2021	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.665	**$448,875**
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.627	**$ -**
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.592	**$ -**
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.558	**$ -**
2025	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.527	**$355,725**
2026	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.497	**$335,475**
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.469	**$ -**
2028	$ -	$ -	$ -	$225,000	$ -	$ -	$ -	$225,000	0.442	**$99,450**
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.417	**$ -**
2030	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.394	**$265,950**
2031	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.371	**$250,425**
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.350	**$ -**
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.331	**$ -**
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.312	**$ -**
2035	$ -	$ -	$ -	$675,000	$ -	$ -	$ -	$675,000	0.294	**$198,450**
								Total Present Value of Discounted Costs (Sum of column (j))		**$9,833,826**

Comments:

Alternative 1

One alternative to the RRBWSD/CLWA Banking Program 2014 Drought Relief Project might be for CLWA to pursue contracting with a different groundwater bank to obtain water during drought years. This is problematic for several reasons. First, utilizing another water bank does not make use of water that CLWA has already stored in the RRBWSD Banking Program and needs to extract before the expiration date of the program or risk losing the water. Without the Project, CLWA can obtain 5,000 AF each year from the RRBWSD Banking Program. If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 45,000 AF, meaning that CLWA would potentially forfeit almost 60,000 AF of water CLWA placed into the RRBWSD Banking Program. With the Project, CLWA can retrieve by 2035 all of the water it placed into the RRBWSD Banking Program before 2014.

Second, the RRBWSD Banking Program has lower costs for moving water into and out of its bank than other banks in the region. For example, the Antelope Valley Water Bank, administered by the Semitropic-Rosamond Water Bank Authority, sells shares for $2,078 (Rozman et al., 2011, pg. 21). A single share gives the owner 1 AFY of extraction, 1 AFY of recovery, and 5 AF of storage. In order to match the extraction and recovery of CLWA's proposed Project through the RRBWSD Banking Program, CLWA would have to purchase 7,500 shares. As is shown in Table 3-5, the total cost to purchase these 7,500 shares is $15.6 million; in present value, the cost is approximately $14.7 million. The $2,078 per share figure does not include management or maintenance fees, or the cost to extract or recharge water. If included, the combined management and maintenance fee is $24.52 per share, while the cost to extract or recharge an AF of water is approximately $80, without including the energy costs which CLWA would have to pay (Boschman, 2011, pg. 70).

Moreover, the other potential groundwater banks, such as the Antelope Valley Water Bank, are located near the East Branch of the California Aqueduct, downstream of CLWA's position. Because of this, if CLWA used these alternative groundwater banks, CLWA would need to contract with a third party in order to be able to obtain an equivalent amount of banked water via exchange, adding more cost and feasibility considerations to the alternative.

Without considering any groundwater banking or contractual fees, purchasing the necessary shares in another groundwater bank, at a present value of $14.7 million, would cost more than the cost of the proposed Project. Also note that the $14.7 million cost does not include the cost of purchasing the water to be placed into the bank. The reason that this cost is not included is that a large portion of the water placed into the bank would likely be SWP water obtained by CLWA in wet years. As CLWA is obligated to pay for all of its SWP Table A amount, regardless of how much CLWA receives of it, this cost should not be assigned to this Project alternative, though contingency on the alternative bank's location, there could be additional transportation costs.

Table 3-5 – Annual Cost of Project Alternative 1
(All costs should be in 2014 Dollars)
Project: RRBWSD/CLWA Banking Program 2014 Drought Relief Project
Alternative (1): Receiving Banked Water from Another Water Bank

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.000	**$ -**
2015	$15,585,000	$ -	$ -	$ -	$ -	$ -	$ -	$15,585,000	0.943	**$14,696,655**
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.890	**$ -**
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.840	**$ -**
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.792	**$ -**
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.747	**$ -**
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.705	**$ -**
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.665	**$ -**
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.627	**$ -**
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.592	**$ -**
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.558	**$ -**
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.527	**$ -**
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.497	**$ -**
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.469	**$ -**
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.442	**$ -**
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.417	**$ -**
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.394	**$ -**
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.371	**$ -**
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.350	**$ -**
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.331	**$ -**
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.312	**$ -**
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.294	**$ -**
								Total Present Value of Discounted Costs (Sum of column (j))		**$14,696,655**

Comments: Assumes shares in the water bank chosen cost $2,078/AF.

Alternative 2

Another potential Project alternative is the production of recycled water. CLWA estimated the capital cost to produce 12,364 AFY of recycled water at $102.1 million (Lee and Ro, 2013, p. 12). Scaling this to the 7,500 AFY that would be obtained from the bank during dry years from the RRBWSD/CLWA Banking Program 2014 Drought Relief Project, the capital cost of recycled water production is approximately $60.6 million or $58.4 million in present value. Based on transmitting and distributing recycled water at CLWA's Valencia and Saugus Water Reclamation Plants, O&M costs are assumed to be 0.5% of the capital costs, or $309,669 per year. The production of 64,500 AF, as would be obtained if CLWA proceeded with the RRBWSD/CLWA Banking Program 2014 Drought Relief Project, would cost $3.3 million; in present value, the cost is approximately $1.7 million. Therefore, as is shown in Table 3-6, producing recycled water would cost $65.2 million total; in present value, the total costs are approximately $60.3 million. (With this alternative, the recycled water is assumed to be produced only in the same years as the water banking alternative would be withdrawing or recharging water)

As with the alternative water bank alternative, utilizing recycled water as the Project alternative would result in CLWA forfeiting almost 60,000 AF that CLWA has already paid for to RRBWSD. Without the Project, CLWA can obtain 5,000 AF each year from the RRBWSD Bank. If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 45,000 AF of the 103,500 AF that CLWA will have in the bank at the end of 2014.

However, with the Project, CLWA can obtain 12,500 AF each year from the RRBWSD Banking Program (9,500 AF in 2015 as Project construction will not be complete until part way through the year). If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 109,500 AF. (This number is greater than 103,500 because it includes 6,000 AF placed into the RRBWSD Banking Program in years after 2014).

Table 3-6 – Annual Costs of Project Alternative 2
(All costs should be in 2014 Dollars)
Project: RRBWSD/CLWA Banking Program 2014 Drought Relief Project
Alternative (2) Producing Recycled Water

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.000	**$ -**
2015	$61,933,840	$ -	$ -	$185,802	$ -	$ -	$ -	$62,119,642	0.943	**$58,578,822**
2016	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.890	**$275,606**
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.840	**$ -**
2018	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.792	**$245,258**
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.747	**$ -**
2020	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.705	**$218,317**
2021	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.665	**$205,930**
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.627	**$ -**
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.592	**$ -**
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.558	**$ -**
2025	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.527	**$163,196**
2026	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.497	**$153,906**
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.469	**$ -**
2028	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.442	**$136,874**
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.417	**$ -**
2030	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.394	**$122,010**
2031	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.371	**$114,887**
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.350	**$ -**
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.331	**$ -**
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.312	**$ -**
2035	$ -	$ -	$ -	$309,669	$ -	$ -	$ -	$309,669	0.294	**$91,043**
								Total Present Value of Discounted Costs (Sum of column (j))		**$60,305,847**

Comments: Assumes O&M for producing recycled water is $1,680/AF.

Summary of Annual Project Physical Benefits and Cost Effectiveness Analysis

The physical benefits claimed for this Project include reducing the need to obtain 7,500 AF from another source during dry years, recharging the RRBWSD Banking Program's aquifer by 7,500 AF during wet years, and increasing the conjunctive use of the RRBWSD Banking Program's aquifer basin. The Project alternatives presented in the cost-effectiveness analysis included receiving banked water from another water bank and producing recycled water. The proposed Project was determined to be more cost-effective than either of the alternatives.

References

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Science Applications International Corporation. 2005. Environmental Impact Report: Castaic Lake Water Agency Rosedale-Rio Bravo Water Storage District Water Banking and Exchange Program. Prepared for Castaic Lake Water Agency. August.

Reference Documentation for the RRBWSD/CLWA Banking Program 2014 Drought Relief Project is provided in Att3_DG_ProJust_2of4.

SWSD Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA

The following (quantifiable) physical benefits are expected from this Project:

1. Provide CLWA with access to an additional 5,000 AF of drought year banked water supply
2. Recharge SWSD's groundwater aquifer by 5,000 AF during wet years

In addition to the physically quantified benefits expected from this Project, the following non-quantifiable benefits are important to understanding the full value of the Project: the conjunctive use of SWSD's groundwater aquifer will recharge the basin during wet years, while during dry years the Project provides a cooperative way to allocate water among several water agencies. In particular, the recharge of the basin will raise groundwater levels, which will provide benefits to farmers in the area including reduced pumping costs and enhanced water supply availability. The Project also provides environmental benefits to the Kern County National Wildlife Refuge, part of which is located in SWSD's service area, and other native undeveloped land.

Each Project physical benefit is discussed individually below, with an overview of each benefit expected over the Project life, followed by a technical analysis of the physical benefit claimed.

A cost effectiveness analysis is provided for the Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2) following the Project benefits and technical analysis discussion.

Project Physical Benefits

Benefit 1: Provide access to an additional 5,000 AF of drought year banked water supply

As shown in Table 3-7, with the Project, CLWA will have access to an additional 5,000 AFY during dry years with the Project to meet its water demands.

Table 3-7 – Annual Project Physical Benefits

Project Name: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)

Type of Benefit Claimed: Provide an additional 5,000 AF of drought year supply

Units of the Benefit Claimed: Acre-feet

Additional Information About this Benefit: CLWA will obtain water from SWSD during dry years (which are predicted to occur in four years out of every ten)

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014	0	0	0
2015	0	5,000	5,000
2016	0	5,000	5,000
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	0	5,000	5,000
2021	0	5,000	5,000
2022	0	0	0

Table 3-7 – Annual Project Physical Benefits

Project Name: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)

Type of Benefit Claimed: Provide an additional 5,000 AF of drought year supply

Units of the Benefit Claimed: Acre-feet

Additional Information About this Benefit: CLWA will obtain water from SWSD during dry years (which are predicted to occur in four years out of every ten)

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2023	0	0	0
2024	0	0	0
2025	0	5,000	5,000
2026	0	5,000	5,000
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	5,000	5,000
2031	0	5,000	5,000
2032	0	0	0
2033	0	0	0
2034	0	0	0
2035	0	0	0

Comments: Without the Project, CLWA cannot take water from SWSD in dry years using its own second priority shares as the entire extraction capacity of the Semitropic Groundwater Storage Bank is taken by water agencies with first priority shares. By 2024, CLWA will forfeit the approximately 36,000 AF that it will have remaining in the Semitropic Groundwater Storage Bank unless its agreement for the existing program is extended.

With the Project, CLWA can obtain 5,000 AF each year from the SWRU. If CLWA only obtained water in dry years, by 2035, CLWA would have extracted 40,000 AF, meaning that CLWA would not forfeit any of the water placed into the bank prior to 2014. By acquiring shares in the SWRU, CLWA will have rights to move the water to a first priority program and recovery water through 2035. (CLWA may also place more water into SWRU during wet years after 2014, increasing the total amount in the bank above 36,000 AF.)

Technical Analysis of Physical Benefits Claimed

Benefit 1: Provide access to an additional 5,000 AF of drought year banked water supply

The SWSD Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA Project will provide CLWA with 5,000 AFY of first priority extraction capacity in SWSD's new groundwater banking program, the Semitropic Water Recovery Unit (SWRU). CLWA plans to use the priority extraction rights to help meet its water demand during drought years, like the current one. Based on the historical 81-year hydrology provided by the SWP, it is assumed that CLWA will call upon its banked supplies for extraction of water in four out of every ten years.

Technical Basis of the Project

The Semitropic Groundwater Storage Bank is SWSD's original groundwater bank, which began operations in 1994. At the end of 2014, CLWA expects to have 35,970 AF banked in the SWSD Groundwater Storage Bank, which is difficult to extract during dry years (Luhdorff and Scalmanini, 2014, Table 4-1). CLWA is a second priority partner in the banking program meaning that it cannot extract water but must use a first priority partner's extraction capacity. In order to utilize the SWSD Groundwater Storage Bank, CLWA is expected to use the Newhall Land's first priority extraction capacity of 4,950 AF as documented in the 2010 Santa Clarita Valley Urban Water Management Plan (Kennedy/Jenks Consultants et al. 2011, p. 3-2, 3-41). This has proven problematic in that costs of the use of this extraction capacity are high, CLWA is expected to provide additional water to the first priority partner, the time to negotiate agreements is lengthy and delays delivery of the water and the availability is not guaranteed in a given year when the banked supplies are needed in the CLWA service area. In order to ensure that the CLWA service area has access to banked supplies during critical dry years, like the current one, it is imperative that CLWA acquire first priority access to its banked supplies. Therefore, CLWA will obtain 5,000 AF of first priority extraction capacity in the SWRU, allowing the Agency to more readily recover the banked water it has already placed in the Semitropic Groundwater Storage Bank. CLWA will purchase 5,000 shares in SWRU, which provides the 5,000 AFY of extraction, 5,000 AFY of recharge capacity as well as 15,000 AF of storage capacity.

Recent and Historical Conditions

CLWA has two groundwater banking agreements with the SWSD in Kern County where in 2002 and 2003, CLWA banked more than 50,000 AF into the Semitropic Groundwater Storage Bank (Kennedy/Jenks Consultants et al., 2011, pg. 3-40). In accordance with those amended agreements, over a twenty-year period (until 2022/2024), CLWA could withdraw this stored water to meet future Valley demands when needed. At the end of 2014, CLWA will have rights to 35,970 AF in the Semitropic Groundwater Storage Bank, after recovering 4,950 AF in 2009/2010 (Luhdorff and Scalmanini, 2014, pg. 74) and recovering another 4,950 AF in 2014 along with a payment of an additional 5,000 AF (in addition to monetary cost) to Newhall Land for the use of its first priority recovery capacity. The 2010 UWMP states that CLWA plans to obtain 11,500 AFY of banked water from SWSD under the multiple-dry years scenario and 15,000 AFY under the single-dry year scenario through 2023 (Kennedy/Jenks Consultants et al., 2011, pg. 6-5).

However, CLWA is unable to obtain these amounts banked water in dry years from the Semitropic Groundwater Storage Bank, because CLWA has only second priority shares in the bank. Instead, in most dry years, the extraction capacity of the Semitropic Groundwater Storage Bank is completely used by entities with first priority extraction capacity in the bank, either for their own use or to sell to third parties.

Estimates of Without Project Conditions

Without the Project, CLWA cannot take water from SWSD in dry years using its own second priority shares as the entire extraction capacity of the Semitropic Groundwater Storage Bank is used by water agencies with first priority shares. Thus, CLWA will need to obtain 5,000 AF of drought year supply from another source. Additionally, current operating plans for 2015 and 2016 require additional supplies from both this Project, and the RRBWSD/CLWA Banking Program (CLWA-1) if the drought persists into those years. However, CLWA has no alternative water supply that is both reliable and cost effective to replace banked supplies. Obtaining additional water from the SWP during drought years is improbable and groundwater pumping is already planned to increase during dry years (Kennedy/Jenks Consultants et al., 2011, pg. 6-2).

Descriptions of Methods Used to Estimate Physical Benefits

CLWA wishes to purchase 5,000 first priority shares in SWRU. One share allows 1 AF per year of recovery, 3 AF of storage, and 1 AF per year of recharge capacity (Semitropic Water Storage District, 2014a, pg. 2). Thus, CLWA will have first priority extraction rights to 5,000 AF per year of recovery, and 15,000 AF of storage.

The number of years in which CLWA will request extraction of its banked water from SWSD Banking Program is assumed to be four out of every ten years. This assumption is based on CLWA's need for extraction from the Semitropic Groundwater Storage Bank over the last ten years, and in consideration of the 81-year hydrology for deliveries of the SWP (typically in years with an SWP delivery of greater than 40% CLWA could be expected to recharge is banking programs (provided there is capacity in those programs), and in years with a low delivery, less than 35% would likely recover water from the banking program (DWR, 2013, pg. 106, 107). CLWA extracted 4,950 AF total in 2009 and 2010 (Luhdorff and Scalmanini, 2014) and will do so again in 2014 and 2015 (4,950 AF total) by using Newhall Lands first priority extraction. However utilization of these supplies requires large expenditures, which would create a financial burden on CLWA, in addition to being time consuming and unreliable. The analysis runs through 2035, the year that CLWA's new agreement for the SWRU with SWSD will expire.

Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

No new facilities, policies or actions are required to obtain the physical benefits of the Project, other than those facilities that will be constructed as part of the Project. Water would be delivered by the Pond Poso Canal to the SWP Aqueduct and then to Castaic Lake. CLWA will purchase shares from SWSD, who will construct the needed conveyance, recharge, extraction, and return facilities in SWRU so that CLWA has extraction capacity of 5,000 AFY. Specifically, SWSD will equip and plumb wells, install pump and motor units and variable frequency drives, and construct a substation and electrical distribution line. The facilities will allow CLWA to obtain 5,000 AF in as few as 25 days from requesting the extraction if needed.

Description of Any Potential Adverse Physical Effects

No potential adverse physical effects are anticipated from this Project. In 2010, when CLWA wished to extend the year by which CLWA would be required to remove all of its water from the Semitropic Groundwater Storage Bank, the CEQA Initial Study/Negative Declaration found "no substantial evidence that the Project may have a significant effect on the environment" (Kennedy/Jenks Consultants, 2010, pg. 10). CLWA will write an addendum to the 2010 CEQA Initial Study/Negative Declaration to confirm that the changes to the banking program will not result in any significant environmental effects.

Project Physical Benefits

Benefit 2: Recharge SWSD's Groundwater Banking Program's groundwater aquifer by 5,000 AF during wet years

As shown in Table 3-8, with the Project, CLWA will be able to place an additional 5,000 AF during wet years into SWRU in order to later recover the water during future dry years. (Only 90% of the water that CLWA banks, or 4,500 AF in years when CLWA banks the maximum, is recoverable.) Without the Project, CLWA may not be able to most effectively use its water supply during wet years when CLWA's water supply exceeds demands. The program would also permit CLWA to move its second tier banked supplies (up to the 15,000 AF of capacity) into the SWRU allowing for prompt access to that banked water during drought years.

Table 3-8 – Annual Project Physical Benefits

Project Name: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)

Type of Benefit Claimed: Recharge SWSD's aquifer by 5,000 AF during wet years

Units of the Benefit Claimed: Acre-feet

Additional Information About this Benefit: CLWA will place water into the SWRU during wet years (which are predicted to occur in one year out of every ten)

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	5,000	5,000
2019	0	0	0
2020	0	0	0
2021	0	0	0
2022	0	0	0
2023	0	0	0
2024	0	0	0
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	0	5,000	5,000
2029	0	0	0
2030	0	0	0
2031	0	0	0
2032	0	0	0
2033	0	0	0
2034	0	0	0
2035	0	0	0

Comments: CLWA will place 5,000 AF into the SWSD's aquifer in 2018 and 2028; only 90% of this water, or 4,500 AF, is ultimately recoverable.

Technical Analysis of Physical Benefits Claimed

Benefit 2: Recharge SWSD's Groundwater Banking Program's groundwater aquifer by 5,000 AF during wet years

The Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA Project will allow CLWA to store 15,000 AF in SWRU, with an annual maximum recharge amount of 5,000 AF (Semitropic Water Storage District, 2014a, pg. 2). CLWA plans to place water into the aquifer during wet years when CLWA has a greater water supply than demand. Based on the historical 81-year hydrology provided by the SWP and historical demands, for this analysis, it is assumed that CLWA will place water into the SWRU in one

out of every ten years. The program would also permit CLWA to move its second tier banked supplies (up to the 15,000 AF of capacity) into the SWRU allowing for prompt access to that banked water during drought years.

Technical Basis of the Project

With the purchase of 5,000 AFY of first priority extraction capacity, CLWA can put 5,000 AFY back into SWSD's aquifer through in-lieu recharge at SWRU. In-lieu recharge means that CLWA would provide to SWSD 5,000 AF, who would then distribute this water to farmers. In return, the farmers would reduce their groundwater pumping by the same amount, resulting in less water leaving the groundwater basin. For giving SWSD 5,000 AF when CLWA does not need the water, CLWA can later extract 90% of this water, or 4,500 AF, in dry years (Semitropic Water Storage District, 2014a, pg. 2) and can continue at that rate for as long as it has banked supplies remaining in the program.

Recent and Historical Conditions

In 2002 and 2004, CLWA banked more than 50,000 AF into the Semitropic Groundwater Storage Bank (Kennedy/Jenks Consultants et al., 2011, pg. 3-40). About 36,000 AF of that amount will not been extracted by the end of 2014. With this Project, CLWA can bank 5,000 AF per year in SWRU during wet hydrology, providing CLWA with a place to store water when CLWA's demand is less than its total supply.

Estimates of Without Project Conditions

Without this Project, CLWA would not bank any more water with SWSD (even in wet years). CLWA currently cannot extract in dry years the large quantity of water CLWA currently owns in the Semitropic Groundwater Storage Bank. CLWA wants to recover this water before its shares in the bank expire and have the ability to provide adequate supplies in drought years consistent with the 2010 UWMP. Therefore, without the Project, CLWA will not have flexibility to store water in years when CLWA has a greater supply than demand for its water. In these years, once CLWA has banked as much water as possible through banking arrangements, CLWA must reduce the amount of water it takes from the SWP. While reducing water taken from the SWP has benefits, these benefits are minimized during wet years when the overall supply of water throughout California is maximized and the supplies stored by CLWA in the SWP are at risk due to "spill" during these wet years. Moreover, not having adequate banking capacity could be damaging to CLWA in dry years when CLWA needs as much banked water as possible.

Descriptions of Methods Used to Estimate Physical Benefits

CLWA wishes to purchase 5,000 first priority shares in SWRU. One share allows 1 AF per year of recovery, 3 AF of storage, and 1 AF per year of recharge (Semitropic Water Storage District, 2014a, pg. 2). Thus, CLWA will have rights to store up to 5,000 AF per year of water in the bank up to a total of 15,000 AF. The program would also permit CLWA to move its second tier banked supplies (up to the 15,000 AF of capacity) into the SWRU allowing for prompt access to that banked water during drought years.

The number of years in which CLWA will place water into SWRU is assumed to be one out of every ten years. CLWA assumes that it will be able to bank water when SWP allocations are greater than 40%. According to the historical record, SWP Table A deliveries to CLWA have been greater than 40% in roughly 2 out of every 10 years, on average (DWR, 2013, pg. 102, 103). It is conservatively assumed that CLWA will bank surplus water one out of every 10 years. In these years, CLWA will bank 5,000 AF. The analysis runs through 2035, the year that CLWA's contract with SWSD concerning SWRU will expire.

Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

No new facilities, policies or actions are required to obtain the physical benefits of the Project, other than those facilities that will be constructed as part of the Project. CLWA will purchase shares from SWSD, who will construct the needed conveyance, recharge, extraction, and return facilities in SWRU so that CLWA has recharge

capacity of 5,000 AFY. Specifically, SWSD will equip and plumb wells, install pump and motor units and variable frequency drives, and construct a substation and electrical distribution line (Kennedy/Jenks Consultants et al., 2014, pg. 1).

Description of Any Potential Adverse Physical Effects

No potential adverse physical effects are anticipated from this Project. In 2010, when CLWA wished to extend the year by which CLWA had to remove the water from the Semitropic Groundwater Storage Bank, the CEQA Initial Study/Negative Declaration found "no substantial evidence that the Project may have a significant effect on the environment" (Kennedy/Jenks Consultants, 2010, pg. 10). CLWA will write an addendum to the 2010 CEQA Initial Study/Negative Declaration to confirm that the changes to the banking program will not result in any significant environmental effects.

Non-quantified Benefits

The Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA Project has important non-quantified benefits. First, the Project will increase the conjunctive use of SWSD's groundwater aquifer. During wet years, the additional water placed into the aquifer will recharge the basin. The recharging of the basin will raise groundwater levels, which will reduce groundwater pumping costs to farmers in the area. During dry years, the Project provides a cooperative way to allocate scarce water among several water agencies, including CLWA. The cooperation of the water agencies during dry years will reduce the chances of water agencies not being able to meet the water demands of their customers.

Second, the Project provides environmental benefits to the Kern County National Wildlife Refuge, part of which is located in SWSD's service area, and other native undeveloped land that SWRU is located on (Semitropic Water Storage District, 2014b, pg. 1). In particular, as part of SWRU's development, SWSD proposed a Habitat Conservation Plan to protect into perpetuity much of the land on which SWRU is located, and mitigate for any disturbance created by the Project (Semitropic Water Storage District, 2014c, pg. 1). The bank is located on the Pacific Flyway and provides important wintering habitat for migratory waterfowl (U.S. Fish and Wildlife Service, 2005, pg. 3). Through the purchase of shares in the bank, CLWA contributes towards SWSD's environmental efforts.

Cost Effectiveness Analysis

The cost effectiveness analysis for the Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA is summarized in Table 3-9 below, with a more complete narrative description for each option provided below.

Table 3-9 – Cost Effective Analysis

Project name: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)

Question 1	*Types of benefits provided as shown in Table 5.* 1) Provide CLWA an additional 5,000 AF of drought year supply; 2) Recharge SWSD's aquifer by 5,000 AF during wet years
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 no, why? N/A

Table 3-9 – Cost Effective Analysis **Project name:** Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)	
	If yes, list the methods (including the proposed project) and estimated costs. CLWA proposes to purchase first priority extraction capacity in the SWRU that will allow CLWA to extract water that CLWA already has banked with SWSD. The present value capital and operations and maintenance costs total approximately $10.8 million. Alternative projects include: **Alternative 1** – purchasing use of Newhall Land's first priority extraction priority that has a present value cost of $16.3 million, **Alternative 2** – receiving banked water from another water bank that has a present value cost of $9.8 million, which is likely underestimated in that it does not account cost for 3rd party assistance physically supplying the water to CLWA by exchange, and, **Alternative 3** – producing recycled water that has a present value cost of $40.0 million. None of these project alternatives would make use of water that CLWA has already stored at the Semitropic Groundwater Storage Bank, which CLWA would forfeit if it cannot extract.
Question 3	*If the proposed project is not the least cost alternative, why is it the preferred alternative?* The cost for alternative 2, receiving banked water from another water bank, is likely underestimated in that it does not include the cost for 3rd party assistance in enabling CLWA to physically receive stored water that is on the other side of the valley. Most importantly, using an alternative water bank and not purchasing first priority shares at SWRU would result in CLWA potentially forfeiting all 36,000 AF that CLWA will have banked at the Semitropic Groundwater Storage Bank. The program would permit CLWA to move it second tier banked supplies (up to the 15,000 AF of capacity) into the SWRU allowing for prompt access to that banked water during drought years.

This section presents a cost-effectiveness analysis comparing relevant project alternatives to the proposed Project. The project alternatives considered are (1) purchasing Newhall Land's first priority extraction priority, (2) receiving banked water from another water bank, and (3) producing recycled water.

The capital cost for the proposed Project, which consists of purchasing first priority extraction capacity in SWRU, is $8.45 million, or $8.0 million in present value 2014 dollars. In addition, CLWA must pay an annual cost of $70,850 in management and maintenance fees (Semitropic Water Storage District, 2014a, 3). CLWA must also pay $123.32 per AF plus energy costs when stored water is extracted, which is expected to be 20,000 AF over the 2015 to 2024 period (Semitropic Water Storage District, 2014a, 3). Excluding energy costs, all other annual costs are approximately $4.0 million, or $2.8 million in present value.

Therefore, as is shown in Table 3-10, the total capital and operations and maintenance cost over the course of the project's life is approximately $12.4 million; in present value, the total costs are approximately $10.8 million.

Table 3-10 – Annual Costs of Project
(All costs should be in 2014 Dollars)
Project: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replace-ment	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.000	**$ -**
2015	$8,450,000	$ -	$ -	$616,600	$70,850	$ -	$ -	$9,137,450	0.943	**$8,616,615**
2016	$ -	$ -	$ -	$616,600	$70,850	$ -	$ -	$687,450	0.890	**$611,831**
2017	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.840	**$59,514**
2018	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.792	**$56,113**
2019	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.747	**$52,925**
2020	$ -	$ -	$ -	$616,600	$70,850	$ -	$ -	$687,450	0.705	**$484,652**
2021	$ -	$ -	$ -	$616,600	$70,850	$ -	$ -	$687,450	0.665	**$457,154**
2022	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.627	**$44,423**
2023	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.592	**$41,943**
2024	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.558	**$39,534**
2025	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.527	**$37,338**
2026	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.497	**$35,212**
2027	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.469	**$33,229**
2028	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.442	**$31,316**
2029	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.417	**$29,544**
2030	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.394	**$27,915**
2031	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.371	**$26,285**
2032	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.350	**$24,798**
2033	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.331	**$23,451**
2034	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.312	**$22,105**
2035	$ -	$ -	$ -	$ -	$70,850	$ -	$ -	$70,850	0.294	**$20,830**
Total Present Value of Discounted Costs (Sum of column (j))										**$10,776,728**

Alternative 1

Without the Project, in each dry year CLWA would investigate purchasing the use of Newhall Land's first priority extraction capacity of 4,950 AFY in the Semitropic Groundwater Storage Bank. In order to obtain dry-year supplies in 2014, CLWA bought one year's rights to Newhall Land's first priority extraction capacity for $1.3 million and was required to give Newhall Land 5,000 AF of CLWA's water stored in the Semitropic Groundwater Storage Bank. While CLWA has to give up money and water to Newhall Land, the deal is attractive because it allows CLWA to recover the water it has placed in the Semitropic Groundwater Storage Bank. However, there is no guarantee that Newhall Land would be willing to make this deal with CLWA in future dry years, and there is no guarantee that Newhall would offer the same terms for the deal. Additionally, the negotiation and execution of any agreement to use Newhall Land's extraction capacity is time consuming and the ability to deliver drought-year supplies is often delayed.

Assuming that Newhall Land gives CLWA the same selling terms, CLWA has enough water stored in the Semitropic Groundwater Storage Bank to purchase the use of Newhall Land's first priority extraction capacity four times, except that in the fourth dry year, CLWA will not be able to make a full purchase. Because CLWA gives up a total of 9,950 AF of banked Semitropic water in this deal (5,000 AFY to Newhall, plus extraction of 4,950 AFY), CLWA will only have 6,120 AF remaining in the Semitropic Groundwater Storage Bank after the first three purchases. In the fourth dry year, it is assumed that CLWA will exhaust all of the remaining banked water, purchasing 3,060 AF of first priority extraction capacity in exchange for giving Newhall Land $0.8 million and 3,060 AF.

Assuming an AF of CLWA's stored water is worth roughly $850, which is CLWA's marginal water supply cost for attaining additional SWP water when it is available, the water given to Newhall Land in the deal is assumed to be worth $15.4 million. Including the fee paid to Newhall, the total cost to obtain Newhall Land's first priority extraction capacity is $20.0 million or approximately $16.3 million in present value, as shown in Table 3-11.

This alternative is not feasible for CLWA, from several perspectives. First, compared to the proposed Project, CLWA loses 18,060 AF from its SWSD storage over the first four dry years and gets no water in future dry years (because it has run out of banked water). Therefore, this option does not provide dry year supply for the same amount of years into the future as the proposed Project. The Newhall Land alternative would provide dry year supply until 2021, whereas the proposed Project would provide dry year supply through the year 2035. Additionally, as a public agency, CLWA must undertake significant internal review before each agreement with Newhall Land can be completed. CLWA is concerned that this process could be sufficiently lengthy in the future that CLWA will not be able to obtain the first priority extraction rights from Newhall Land when CLWA most needs water.

Table 3-11 – Annual Costs of Project Alternative 1
(All costs should be in 2014 Dollars)
Project: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)
Alternative (1): Purchasing Newhall Land's first priority extraction priority

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.000	$ -
2015	$ -	$ -	$ -	$5,550,000.00	$ -	$ -	$ -	$5,550,000.00	0.943	**$5,233,650**
2016	$ -	$ -	$ -	$5,550,000.00	$ -	$ -	$ -	$5,550,000.00	0.890	**$4,939,500**
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.840	$ -
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.792	$ -
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.747	$ -
2020	$ -	$ -	$ -	$5,550,000.00	$ -	$ -	$ -	$5,550,000.00	0.705	**$3,912,750**
2021	$ -	$ -	$ -	$3,396,600.00	$ -	$ -	$ -	$3,396,600.00	0.665	**$2,258,739**
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.627	$ -
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.592	$ -
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.558	$ -
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.527	$ -
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.497	$ -
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.469	$ -
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.442	$ -
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.417	$ -
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.394	$ -
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.371	$ -
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.350	$ -
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.331	$ -
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.312	$ -
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.294	$ -
								Total Present Value of Discounted Costs (Sum of column (j))		**$16,344,639**

Comments: In this alternative, CLWA purchases first priority extraction capacity from Newhall Land four times between 2015-2024. The first three times Newhall Land charges CLWA a $1.3 million fee and 5,000 AF per time. As CLWA does not have sufficient banked water, the fourth time, Newhall Land charges a $0.8 million fee and 3,060 AF. Each AF is valued at $850.

Alternative 2

Another alternative that CLWA could pursue without the Project is using another groundwater bank from which to obtain water during drought years. For this alternative, CLWA would have to buy shares in another water banking program, like the Antelope Valley Water Bank. Shares in the Antelope Valley Water Bank, which is administered by the Semitropic-Rosamond Water Bank Authority, cost $2,078 (Rozman et al., 2011, pg. 21). A single share gives the owner 1 AFY in extraction, 1 AFY in recovery, and 5 AF in storage. In order to match the extraction and recovery of CLWA's proposed Project through SWRU, CLWA would have to purchase 5,000 shares. The total cost to purchase these 5,000 shares is $10.39 million; in present value, the cost is approximately $9.8 million. These costs are shown in Table 3-12. (The $2,078 per share figure does not include management or maintenance fees, or the cost to extract or recharge water. The combined management and maintenance fee is $24.52 per share, while the cost to extract or recharge an AF of water is approximately $80, without including the energy costs which CLWA would have to pay (Boschman, 2011, pg. 70).)

Moreover, the other potential groundwater banks, including the Antelope Valley Water Bank, are located near the East Branch of the California Aqueduct, downstream of CLWA's SWP delivery location at Castaic Lake. Because of this, if CLWA used these alternative groundwater banks, CLWA would need to contract with a third party in order to be able to obtain an equivalent amount of banked water via exchange. If it proves feasible to agree with a third party on a deal, this could add significant cost to this option and potential delay in delivery of banked supplies. This cost could not be quantified for this analysis because possible terms for a deal with a third party are not known. Additionally, the SWP transportation costs would likely increase.

The monetizable cost for this Project alternative totals $9.8 million in present value 2014 dollars, and appears to cost about $1 million less than the proposed Project. However, costs for this option do not include any groundwater banking or contractual fees, or the cost of contracting with third-parties to gain physical access to the water stored through exchange. Once all of these costs are added into the alternate water banking option, the Semitropic option will likely become the least-cost option in this analysis.

In addition, utilizing an alternate water bank and not obtaining first priority shares in SWSD's SWRU would likely mean that CLWA would have to forfeit, or pay the high costs of using Newhall Land's extraction capacity to recover all of the water it has placed into the Semitropic Groundwater Storage Bank in addition to this alternative's cost. This fact severely reduces the feasibility of this alternate banking project option for CLWA.

Table 3-12 – Annual Costs of Project Alternative 2
(All costs should be in 2014 Dollars)
Project: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)
Alternative (2): Receiving Banked Water from Another Water Bank

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.000	**$ -**
2015	$10,390,000	$ -	$ -	$ -	$ -	$ -	$ -	$10,390,000	0.943	**$9,797,770**
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.890	**$ -**
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.840	**$ -**
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.792	**$ -**
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.747	**$ -**
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.705	**$ -**
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.665	**$ -**
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.627	**$ -**
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.592	**$ -**
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.558	**$ -**
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.527	**$ -**
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.497	**$ -**
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.469	**$ -**
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.442	**$ -**
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.417	**$ -**
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.394	**$ -**
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.371	**$ -**
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.350	**$ -**
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.331	**$ -**
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.312	**$ -**
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.294	**$ -**
								Total Present Value of Discounted Costs (Sum of column (j))		**$9,797,770**

Comments: Assumes shares in the water bank chosen cost $2,078/AF.

Alternative 3

A third potential project alternative is the production of recycled water. With this alternative, the recycled water is assumed to be produced only in the same years as the water banking alternative would be withdrawing water. CLWA estimated the capital cost to produce 12,364 AFY at $102.1 million (Lee and Ro, 2013, pg.12). Scaling this to the 5,000 AFY that would be obtained from the bank during dry years from the proposed Project, the capital cost of recycled water production is approximately $41.3 million or $38.9 million in present value. Based on transmitting and distributing recycled water at CLWA's Valencia and Saugus Water Reclamation Plants, O&M costs are assumed to be 0.5% of the capital costs, or $206,446 per year. The production of 40,000 AF, as would be obtained if CLWA proceeded with the CLWA Semitropic Water Banking Extraction Enhancement Project, would cost $1.7 million; in present value, the cost is approximately $1.0 million. Therefore, as is shown in Table 3-13, producing recycled water would cost $42.9 million total; in present value, the total costs are approximately $40.0 million.

As with the other two project alternatives, utilizing an expanded water recycling alternative and not obtaining first priority shares in SWSD's SWRU would mean that CLWA may have to forfeit, or pay the high costs of using Newhall Land's extraction capacity to recover all of the water it has placed into the Semitropic Groundwater Storage Bank in addition to this alternative's cost. This fact severely reduces the feasibility of this alternate as a project option for CLWA.

Table 3-13 – Annual Costs of Project Alternative 3
(All costs should be in 2014 Dollars)
Project: Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA (CLWA-2)
Alternative (3) Producing Recycled Water

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	1.000	**$ -**
2015	$41,289,227	$ -	$ -	$206,446	$ -	$ -	$ -	$41,495,673	0.943	**$39,130,420**
2016	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.890	**$183,737**
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.840	**$ -**
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.792	**$ -**
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.747	**$ -**
2020	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.705	**$145,545**
2021	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.665	**$137,287**
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.627	**$ -**
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.592	**$ -**
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.558	**$ -**
2025	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.527	**$108,797**
2026	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.497	**$102,604**
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.469	**$ -**
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.442	**$ -**
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.417	**$ -**
2030	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.394	**$81,340**
2031	$ -	$ -	$ -	$206,446	$ -	$ -	$ -	$206,446	0.371	**$76,592**
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.350	**$ -**
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.331	**$ -**
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.312	**$ -**
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0.294	**$ -**
Total Present Value of Discounted Costs (Sum of column (j))										**$39,966,320**

Summary of Annual Project Physical Benefits and Cost Effectiveness Analysis

The physical benefits claimed for this Project include providing CLWA an additional 5,000 AF of drought year supply and recharging SWSD's aquifer by 5,000 AF during wet years. In addition, the Project increases the conjunctive use of SWSD's aquifer basin provides environmental benefits to the Kern County National Wildlife Refuge and other native undeveloped land. The project alternatives presented in the cost-effectiveness analysis included purchasing Newhall Land's first priority extraction priority, receiving banked water from another water bank, and producing recycled water. While the alternative of receiving banked water from another water bank appears to cost less than the proposed Project, significant costs for third party assistance with physically obtaining water through that option have not been estimated, and would likely show that the SWRU option is the least cost option. Additionally, each of project alternatives presented except the proposed Project would result in CLWA potentially forfeiting all of the water it has banked in the Semitropic Groundwater Storage Bank, which is not a feasible outcome for CLWA.

References

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U.S. Fish and Wildlife Service. 2005. Kern and Pixley National Wildlife Refuges: Final Comprehensive Conservation Plan. February.

Reference Documentation for the Semitropic Extraction and Conveyance Improvements for Return of Stored (Banked) Water to CLWA is provided in Att3_DG_ProJust_3of4.

Valencia Water Reclamation Plant UV Disinfection Facilities

The following (quantifiable) physical benefits are expected from the Valencia Water Reclamation Plant UV Disinfection Facilities:

1. Reduction of up to 7mg/L in effluent chloride concentration from the disinfection process
2. Water saving through decreased reverse osmosis (RO) concentrate brine disposal

Each Project physical benefit is discussed individually below, with an overview of each benefit expected over the project life, followed by a technical analysis of the physical benefit claimed.

A cost effectiveness analysis is provided for the Valencia Water Reclamation Plant UV Disinfection Facilities following the Project benefits and technical analysis discussion.

Project Physical Benefits

Benefit 1: Reduction of up to 7mg/L in effluent chloride concentration from the disinfection process

As shown in Table 3-14, this Project will reduce the chloride loading in the Valencia Water Reclamation Plant (WRP) effluent by up to 7 mg/L.

Table 3-14 – Annual Project Physical Benefits (PSP Table 5)

Project Name: Valencia Water Reclamation Plant UV Disinfection Facilities

Type of Benefit Claimed: Reduction in the concentration of chlorides in the effluent from Valencia WRP

Units of the Benefit Claimed : milligrams per liter (mg/L)

Additional Information About this Benefit: Conversion to UV would result in reduction of concentration of chlorides in effluent from Valencia WRP in order to help meet the concentration limit of 100 mg/L in the chloride TMDL for the Santa Clara River.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2019-2048	0	up to 7 mg/L	up to 7 mg/L

Comments: Source: Santa Clarita Valley Sanitation District Chloride Compliance Facilities Plan and EIR, page 6-28.

Technical Analysis of Physical Benefits Claimed

Benefit 1: Reduction of up to 7mg/L in effluent chloride concentration from the disinfection process

Use of ultraviolet (UV) will allow a decrease in chlorine disinfection at the Valencia Water Reclamation Plant (WRP), with subsequent reduction in chloride production. Chloride is naturally present in the drinking water supplied to Santa Clarita homes and businesses from the SWP and from local groundwater basins. This source of chloride contributes an average of about 60% of the chloride present in treated wastewater. When wastewater leaves homes and businesses and enters the sewer system, the chloride level is higher than the water supply due to additions from regular human activities. Chloride is also added during wastewater treatment, such as during the disinfection process. This chloride increment contributes to chloride concentrations in the treated wastewater above the 100 mg/L limit. The current chlorine disinfection process at the Valencia WRP contributes

approximately 11 milligrams per liter (mg/L) chloride in the effluent. With UV, the dose of chlorine can be substantially reduced, with chloride concentration estimated to be as low as 3-4 mg/L chloride. This is equivalent to up to a 7 mg/L reduction of chloride concentration that would be discharged into the Upper Santa Clara River (SCVSD Facilities Plan, 2013, pages 6-28). We are expressing this in terms of mg/L because the goal in meeting the state mandated Total Maximum Daily Load (TMDL) is to reduce the concentration of chloride in the effluent. However, assuming an effluent flow increase at Valencia WRP from 16.1 million gallons per day (mgd) to 21.8 mgd over the 30-year lifetime of the Project, this equates to an estimated total of 6,463 tons of chloride that could be removed from the Upper Santa Clara River over the Project life.

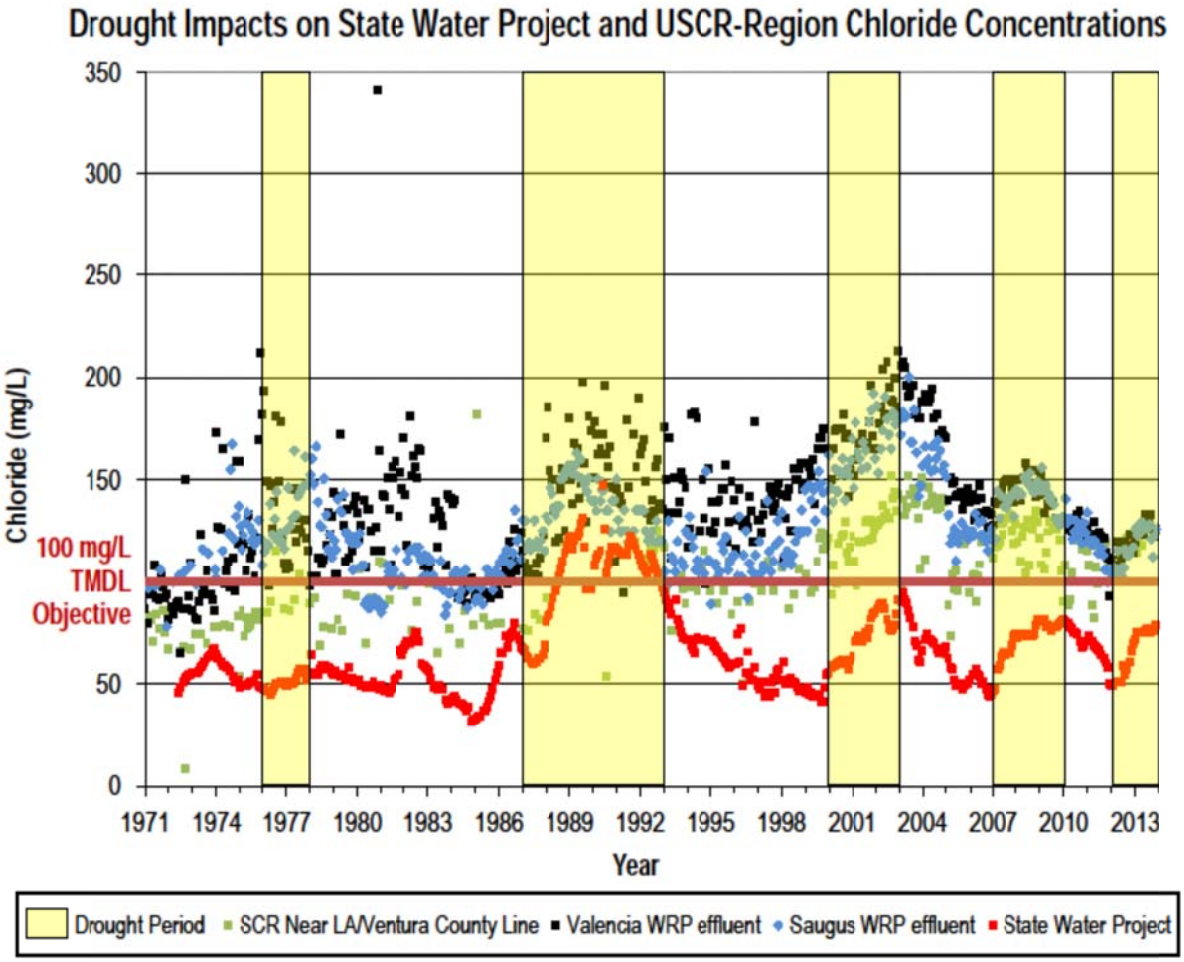
Technical Basis of the Project

Use of UV technology for disinfection is well-established and growing in the United States. The technology was pioneered in the U.S. and Canada in the late 1970's and1980's, and the number of UV treatment plants operating in North America more than tripled from 12 in 2002 to 37 in 2005 (Raucher et al., 2008, pg. 30). UV is effective at eliminating most viruses, cysts and spores, and has proven to be more effective at inactivation of some pathogens, including Cryptosporidium, than other more commonly used disinfectants, such as chlorine (Raucher et al., 2008). UV is a physical process rather than a chemical disinfectant. And so, while providing good disinfection, UV allows chlorine use to be avoided, which avoids adding salts including chlorides to the effluent discharge.

Recent and Historical Conditions

The California Regional Water Quality Control Board (RWQCB, 2008) established a TMDL to address the elevated chloride concentration in the Upper Santa Clara River, and the TMDL identified drought as the critical condition. The chloride water quality standard was set at a level of 100 mg/L to protect salt-sensitive agricultural crops grown in the lower Santa Clara River watershed. Due to the potential impacts on downstream agricultural interests, the issue of chloride concentration in the Santa Clara River has led to conflict for over fifteen years. Although extensive source control efforts have been implemented by the SCVSD in the Santa Clarita Valley, chloride concentrations are still above 100 mg/L, and during droughts this condition is exacerbated by water supply conditions.

Chloride levels in the water supply fluctuate over time in concert with periodic drought conditions. These fluctuations are reflected in treated wastewater chloride levels. (See figure below.) Since the chloride TMDL was adopted, the SCVSD has aggressively pursued local source reduction efforts, including the adoption of two ordinances that led to a complete ban on the use of self-regenerating (also known as automatic) water softeners in the SCVSD's service area and discharges from this type of softeners in any area tributary to the SCVSD's wastewater system (SCVSD Facilities Plan, 2013, pages 6-11). As a result of the community's removal of over 8,000 automatic water softeners, chloride levels in the WRP discharge dropped significantly, but not enough to meet the 100 mg/L chloride limit.



As shown in the figure above, the current drought has caused a significant increase in chloride concentrations in the water supply and treated wastewater between early 2012 and March 2014, which has the effect of eclipsing a portion of the chloride reductions gains made in recent years in the Santa Clarita Valley as a result of the water softener removal program and other source control efforts.

The SCVSD Facilities Plan provides a plan of action needed to comply with the Santa Clara River Chloride TMDL. This plan was developed by SCVSD through negotiations with the RWQCB. The SCVSD is moving forward as expeditiously as possible with the chloride compliance plan (known as "Alternative 2" in the SCVSD Facilities Plan), which includes the Valencia WRP UV Disinfection Facilities, in order to mitigate the effects of this and future droughts on chloride levels in the Santa Clara River and to comply with the requirements of the chloride TMDL.

Estimates of Without Project Conditions

If the SCVSD took no additional actions to comply with the chloride TMDL, SCVSD facilities would exceed the chloride TMDL limit (100 mg/L Cl) and violate discharge requirements set by RWQCB- Los Angeles Branch (LA) pursuant to the federal Clean Water Act and the state's Porter Cologne Act (SCVSD Facilities Plan, 2013, pages 6-14). Violations would result in fines to the SCVSD, which would be passed on to the SCVSD's

ratepayers. Water quality would not be improved in the Upper Santa Clara River, which would result in non-attainment of the chloride water quality objective in the Santa Clara River located downstream of the Valencia WRP. Taking no additional actions is therefore not a viable alternative.

Without pursuing the preferred Alternative 2 in the SCVSD Facilities Plan that includes UV disinfection (i.e. the alternative that includes the proposed Project from this grant application), SCVSD would implement another alternative that would rely solely on microfiltration and reverse osmosis (MF/RO) treatment, which would be a more costly solution (see Alternative 1 in the cost effectiveness analysis section of this attachment).

Descriptions of Methods Used to Estimate Physical Benefits

The reduction of up to 7 mg/L chloride concentration in the Valencia WRP effluent was estimated by comparing the chloride concentration with the existing chlorine disinfection system against the anticipated chloride concentration reduction when UV disinfection is used. The existing chlorine disinfection system contributes approximately 11 mg/L chloride to the effluent discharge from the use of chlorine. The Valencia WRP UV Disinfection Facilities would reduce the chloride concentration of the Valencia WRP effluent to approximately 3 to 4 mg/L chloride, which would represent up to a 7 mg/L reduction in chloride concentration (SCVSD Facilities Plan, 2013, pages 6-28).

Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

This Project is a portion of a suite of projects (referred to as Alternative 2) approved by SCVSD's Board of Directors (2013) to comply with the TMDL. The following facilities are necessary in conjunction with the UV treatment facility to achieve the 100 mg/L chloride concentration limit: 1) advanced treatment via MF/RO facilities at the Valencia WRP, 2) blending of MF/RO and tertiary-treated wastewater, 3) brine disposal from the MF/RO facilities via deep well injection (DWI), 4) UV disinfection at both the Saugus and Valencia WRPs.

There are two regulatory and policy actions required to implement the Project and obtain the physical benefits: modification of the NPDES permit for the Valencia WRP to reflect the change in the disinfection process, which will be done by the time the UV facilities will be completed in July 2019; and approval by the SCVSD Board of Directors of rate increases to pay for the local share of the cost of the Project, which were approved by the SCVSD Board on July 7, 2014.

Description of Any Potential Adverse Physical Effects

No adverse physical effects from the Project are anticipated.

Project Physical Benefits

Benefit 2: Water saving through decreased RO concentrate brine disposal

As is shown in Table 3-15, this Project would decrease the amount of brine disposal by 0.1 mgd, compared to the without-project alternative. Over the 30-year lifetime of the Project this would be equivalent to 1,095 million gallons (mg) (69.4 AFY) and would increase the flow being discharged into the Upper Santa Clara River.

Table 3-15 – Annual Project Physical Benefits (PSP Table 5)			
Project Name: Valencia Water Reclamation Plant UV Disinfection Facilities			
Type of Benefit Claimed: Water saving through decreased RO concentrate brine disposal			
Units of the Benefit Claimed : millions of gallons per day (mgd)			
Additional Information About this Benefit: Conversion to UV would result in reduction of brine disposal.			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (b) – (c)**
2019	0.3 mgd	0.25 mgd	0.05 mgd
2020	0.6 mgd	0.5 mgd	0.1 mgd
2021	0.6 mgd	0.5 mgd	0.1 mgd
2022	0.6 mgd	0.5 mgd	0.1 mgd
2023	0.6 mgd	0.5 mgd	0.1 mgd
2024	0.6 mgd	0.5 mgd	0.1 mgd
…..	0.6 mgd	0.5 mgd	0.1 mgd
…..	0.6 mgd	0.5 mgd	0.1 mgd
…..	0.6 mgd	0.5 mgd	0.1 mgd
2047	0.6 mgd	0.5 mgd	0.1 mgd
2048	0.6 mgd	0.5 mgd	0.1 mgd
Last Year of Project Life 2049	0.3 mgd	0.25 mgd	0.05 mgd
Comments: **a)** This calculation assumes that the rate of brine disposal will remain constant over the lifetime of the Project. With the most likely scenario being that the volume (and related savings) will increase with time, a conservative estimate has been provided in this table. **b)** The facility is expected to begin operation July 1, 2019, and so a half year of benefits is claimed in the 1st and 31st year of operation in order to claim at total of 30 years of benefit.			

Technical Analysis of Physical Benefits Claimed

Benefit 2: Water saving through decreased RO concentrate brine disposal

Technical Basis of the Project

Conversion to UV disinfection would reduce the size of the MF/RO facilities from 7.1 mgd to 5.6 mgd and the amount of brine from the primary RO system from 1.3 to 1.0 mgd (SCVSD Facilities Plan, 2013, pages 6-42). The second-pass RO system would produce 0.5 mgd of brine as opposed to 0.6 mgd for an option without UV. The brine would be disposed of via deep well injection (DWI). Reduced brine production means that less water is used in brines, and therefore is left in the effluent. This option would result in a savings of 0.1 mgd, or 69.4 acre-feet per year (AFY). The water saved would be released into the Upper Santa Clara River.

Recent and Historical Conditions

As stated for Benefit 1, the current drought has caused a significant increase of chloride levels in the water supply and treated wastewater between early 2012 and March 2014, which has the effect of eclipsing a portion of the chloride reductions gains made in recent years in the Santa Clarita Valley as a result of the water softener removal program and other source control efforts. The SCVSD is moving forward as expeditiously as possible with the chloride compliance plan, which includes the Valencia WRP UV Disinfection Facilities, in order to mitigate the effects of this and future droughts on chloride levels in the Santa Clara River and to comply with the requirements of the chloride TMDL.

Estimates of Without Project Conditions

Without UV disinfection, the size of the membrane facility would increase, and the amount of brine produced would increase by approximately 0.1 mgd. Because of this increase in volume, brine disposal via pipeline would become the preferred disposal option. Brine from the MF/RO facilities would be disposed via a pipeline to an existing trunk sewer within the Joint Outfall System. From there, brine would flow to the Sanitation Districts' Joint Water Pollution Control Plant (JWPCP) in the City of Carson, and eventually to the ocean using the JWPCP's existing ocean outfall. This is the option shown as Alternative 1 in the alternatives analysis, as discussed in the cost-effectiveness analysis section of this attachment.

Descriptions of Methods Used to Estimate Physical Benefits

The volume of RO reject water and second–pass RO system was determined in the alternatives analysis (SCVSD Facilities Plan, 2013, page 6 - 47). Without UV, approximately 0.6 mgd of brine would be produced. With UV and the subsequent reduction in the size of the RO facility, 0.5 mgd of brine would be produced.

Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

This Project is a portion of a suite of projects approved by SCVSD's Board of Directors to comply with the TMDL. A portion of the Valencia WRP's tertiary-treated wastewater would receive advanced treatment via MF/RO facilities to remove chloride. The low chloride RO product water would be combined with the remaining tertiary-treated wastewater to produce a blend that meets the effluent TMDL limit of 100 mg/L for chloride. Brine from the MF/RO facilities would be disposed via deep well injection (DWI). UV disinfection would replace the existing chlorine-based disinfection systems at both the Valencia and Saugus WRPs.

Brine would be conveyed to the DWI site via a pump station located at the Valencia WRP and an 8-inch diameter, 2.5-mile long force main. Five injection wells ranging between 9,000 and 12,000 feet in depth would be constructed at the DWI site along with appurtenant facilities such as injection pumps, chemicals storage tanks, and electrical switchgear. The RO product water conveyance system would require construction of a pump station at the Valencia WRP and 3.5 miles of 14-inch diameter pipeline (SCVSD Facilities Plan, 2013, page 7-7).

Description of Any Potential Adverse Physical Effects

No adverse physical effects from the Project are anticipated.

Cost Effectiveness Analysis

The cost effectiveness analysis for the Valencia WRP UV Disinfection Facilities is summarized in Table 3-16, with a more complete narrative description for each alternative provided below.

Table 3-16 – Cost Effective Analysis (PSP Table 6) **Project name:** Valencia Water Reclamation Plant UV Disinfection Facilities	
Question 1	*Types of benefits provided as shown in Table 5* 1) Reduction in chloride loading from the disinfection process, 2) Water saving through decreased RO concentrate brine disposal
Question 2	*Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?* Yes. A detailed alternatives analysis was conducted with 4 feasible alternatives. All four of the alternatives evaluated addressed chloride loading and alternatives for brine disposal. This Project is contained in Alternative 2, which is the least-cost alternative.
	If no, why? N/A
	If yes, list the methods (including the proposed project) and estimated costs. The sum of capital and O&M costs over the Project lifetime are shown in present value 2014 dollars. **Alternative 1** – MF/RO With Brine Disposal via Pipeline - $178 million. **Alternative 2** (this Project) – MF/RO and UV With Brine Disposal via DWI - $160 million. **Alternative 3** – MF/RO and UV With Brine Disposal via Trucking - $187 million. **Alternative 4** - AWRM (Phase I & II) - $216 million.
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 Valencia WRP UV Disinfection Facilities is the least cost alternative.

This section presents a cost-effectiveness analysis comparing relevant project alternatives to the proposed Valencia WRP UV Disinfection Facilities. Costs are presented in this section based on the alternatives identified in the SCVSD Facilities Plan, 2013, including the alternative identified that includes the Valencia WRP UV Disinfection Facilities proposed in this application. The goal of the Project is to contribute to the chloride reduction goal so the UV Project does not stand alone as an option for complying with the chloride TMDL. Therefore, the fully developed alternatives as presented in the EIR are presented here with accompanying cost information.

Four alternatives were identified in the SCVSD Facilities Plan, 2013. The Valencia WRP UV Disinfection Facilities presented here is part of Alternative 2. Alternative 2 was originally presented as the backup to the recommended project (Alternative 4) and originally was the second lowest cost alternative, compared to Phase I of Alternative 4. However, Alternative 4 became infeasible due to the lack of required support from key stakeholders, and a determination that it would not garner the necessary regulatory approvals, resulting in Alternative 2 being the low cost alternative and the recommended Project.

The present value of capital costs for the Valencia WRP UV portion of Alternative 2, as proposed in this grant application, is $20 million in undiscounted 2012 dollars, or a present value of $17.45 million in 2014 dollars using a 6% discount rate. O&M costs of this alternative total $557,000 per year in undiscounted 2012 dollars. The present value of O&M costs for the Project in 2014 dollars totals $11.75 million. Thus, as is shown in Table 3-17, the present value of capital and O&M costs for the project alternative totals $29.2 million in 2014 dollars. The present value cost of that alternative as shown in Table 3-18 is $160 million, with $115 million in present value capital cost, and $45 million in present value O&M cost. Thus, the present value of the Valencia WRP UV Disinfection Facilities in this grant application is 18.3 percent of the full Alternative 2 cost.

Table 3-17 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2014	$306,000	$ -	$ -	$ -	$ -	$ -	$ -	$306,000	1.000	**$306,000**
2015	$510,000	$ -	$ -	$ -	$ -	$ -	$ -	$510,000	0.943	**$480,930**
2016	$7,956,000	$ -	$ -	$ -	$ -	$ -	$ -	$7,956,000	0.890	**$7,080,840**
2017	$7,752,000	$ -	$ -	$ -	$ -	$ -	$ -	$7,752,000	0.840	**$6,511,680**
2018	$3,876,000	$ -	$ -	$ -	$ -	$ -	$ -	$3,876,000	0.792	**$3,069,792**
2019	$ -	$ -	$1,020	$41,820	$41,820	$141,780	$57,630	$284,070	0.747	**$212,200**
2020	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.705	**$799,639**
2021	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.665	**$754,270**
2022	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.627	**$711,168**
2023	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.592	**$671,470**
2024	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.558	**$632,906**
2025	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.527	**$597,744**
2026	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.497	**$563,717**
2027	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.469	**$531,959**
2028	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.442	**$501,334**
2029	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.417	**$472,978**
2030	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.394	**$446,891**
2031	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.371	**$420,803**
2032	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.35	**$396,984**
2033	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.331	**$375,433**
2034	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.312	**$353,883**
2035	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.294	**$333,467**

Table 3-17 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2036	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.278	**$315,319**
2037	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.262	**$297,171**
2038	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.247	**$280,157**
2039	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.233	**$264,278**
2040	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.22	**$249,533**
2041	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.207	**$234,788**
2042	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.196	**$222,311**
2043	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.185	**$209,834**
2044	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.174	**$197,358**
2045	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.164	**$186,015**
2046	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.155	**$175,807**
2047	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.146	**$165,599**
2048	$ -	$ -	$568,140	$83,640	$83,640	$283,560	$115,260	$1,134,240	0.138	**$156,525**
Last Year of Project Life 2049	$ -	$ -	$1,020	$41,000	$41,000	$139,000	$56,500	$278,520	0.130	**$36,208**
								Total Present Value of Discounted Costs (Sum of column (j))		**$29,216,991**

Table 3-18 – Cost-Comparison Table			
Option	**Capital Cost**	**O&M Cost**	**Total Cost***
Alternative 1	$132 million	$46 million	$178 million
Alternative 2 - Preferred Option	$115 million	$45 million	$160 million
Alternative 3	$93 million	$94 million	$187 million
Alternative 4 (Phases I and II)	$172 million	$44 million	$216 million

The following project alternatives considered are discussed below:

- Alternative 1 – MF/RO With Brine Disposal via Pipeline
- Alternative 2 – MF/RO and UV With Brine Disposal via DWI
- Alternative 3 – MF/RO and UV With Brine Disposal via Trucking
- Alternative 4 - Alternative Water Resources Management Plan (AWRM) (Phase I & II) – Also known as the alternative compliance plan

Alternative 1 – MF/RO with Brine Disposal via Pipeline

In this alternative, a portion of the Valencia WRP's tertiary-treated wastewater would receive advanced treatment via MF/RO facilities to remove chloride. The low chloride RO product water would be combined with the remaining tertiary-treated wastewater to produce a blend that meets the chloride TMDL limit of 100 mg/L for chloride. Brine from the MF/RO facilities would be disposed via a pipeline to an existing trunk sewer within the Joint Outfall System JOS. From there, brine would flow to the Sanitation Districts' JWPCP in the City of Carson, and eventually to the ocean using the JWPCP's existing ocean outfall. MF/RO facilities would be constructed at the Valencia WRP site. The primary MF/RO facilities would be sized to produce 7.1 mgd of RO product water, which would result in 1.3 mgd of brine. This brine would be treated by a second-pass RO system located adjacent to the primary MF/RO facilities. The second-pass RO system would produce 0.6 mgd of RO product water and 0.6 mgd of brine. The product water from the primary and second-pass RO systems would be combined and blended with tertiary-treated wastewater to meet discharge limits. Brine from the second-pass RO system would be disposed via a 37-mile pipeline consisting of 6-inch diameter force main and 10-inch diameter gravity sections. A pump station at the Valencia WRP and an offsite booster pump station would be constructed to convey brine over the Newhall Pass. The existing chlorine-based disinfection systems would remain at the Valencia WRP and Saugus WRP. To meet chloride TMDL requirements for Saugus WRP discharge, approximately 2.3 mgd of the RO product water would be pumped to the Saugus WRP for blending with tertiary-treated wastewater. The RO product water conveyance system would consist of a pump station at the Valencia WRP and 3.5 miles of 16-inch diameter pipeline.

As is shown in Table 3-19, the present value of capital costs for this project alternative are projected to be $132 million, and the present value of operations and maintenance costs are projected to be $46 million over the expected 30-year life of the alternative.

Table 3-19 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 1 (MF/RO With Brine Disposal via Pipeline)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2014	$4,080,000	$ -	$ -	$ -	$ -	$ -	$ -	$4,080,000	1.000	**$4,080,000**
2015	$15,300,000	$ -	$ -	$ -	$ -	$ -	$ -	$15,300,000	0.943	**$14,427,900**
2016	$41,820,000	$ -	$ -	$ -	$ -	$ -	$ -	$41,820,000	0.890	**$37,219,800**
2017	$61,200,000	$ -	$ -	$ -	$ -	$ -	$ -	$61,200,000	0.840	**$51,408,000**
2018	$30,600,000	$ -	$ -	$ -	$ -	$ -	$ -	$30,600,000	0.792	**$24,235,200**
2019	$ -	$ -	$6,120	$293,505	$293,505	$428,400	$1,155,660	$2,177,190	0.747	**$1,626,361**
2020	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.705	**$3,069,838**
2021	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.665	**$2,895,663**
2022	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.627	**$2,730,196**
2023	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.592	**$2,577,793**
2024	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.558	**$2,429,744**
2025	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.527	**$2,294,758**
2026	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.497	**$2,164,127**
2027	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.469	**$2,042,204**
2028	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.442	**$1,924,636**
2029	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.417	**$1,815,776**
2030	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.394	**$1,715,626**
2031	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.371	**$1,615,475**
2032	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.350	**$1,524,033**
2033	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.331	**$1,441,300**
2034	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.312	**$1,358,567**
2035	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.294	**$1,280,188**
2036	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.278	**$1,210,518**
2037	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.262	**$1,140,848**

Table 3-19 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 1 (MF/RO With Brine Disposal via Pipeline)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2038	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.247	**$1,075,532**
2039	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.233	**$1,014,571**
2040	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.220	**$957,964**
2041	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.207	**$901,357**
2042	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.196	**$853,458**
2043	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.185	**$805,560**
2044	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.174	**$757,662**
2045	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.164	**$714,118**
2046	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.155	**$674,929**
2047	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.146	**$635,739**
2048	$ -	$ -	$12,240	$587,010	$587,010	$856,800	$2,311,320	$4,354,380	0.138	**$600,904**
Last Year of Project Life 2050	$ -	$ -	$6,120	$293,505	$293,505	$428,400	$1,155,660	$2,177,190	0.130	**$283,035**
								Total Present Value of Discounted Costs (Sum of column (j))		**$177,503,379**

Alternative 2 – MF/RO and UV with Brine Disposal via Deep Well Injection (DWI)

In this alternative, a portion of the Valencia WRP's tertiary-treated wastewater would receive advanced treatment via MF/RO facilities to remove chloride. The low chloride RO product water would be combined with the remaining tertiary-treated wastewater to produce a blend that meets the chloride TMDL limit of 100 mg/L for chloride. Brine from the MF/RO facilities would be disposed via DWI. UV disinfection would replace the existing chlorine-based disinfection systems at both WRPs and would be located within the existing WRPs property boundary. Conversion to UV disinfection would reduce the size of the MF/RO facilities to 5.6 mgd and the amount of brine from the primary RO system to 1.0 mgd. The second-pass RO system would produce 0.5 mgd of RO product water and 0.5 mgd of brine. MF/RO facilities would be constructed at the Valencia WRP site. The DWI site would be located on a portion of the Tournament Players Golf Club in Santa Clarita Valley and is expected to accommodate up to seven injection wells. Brine would be conveyed to the DWI site via a pump station located at the Valencia WRP and an 8-inch diameter, 2.5-mile long force main. Five injection wells ranging between 9,000 and 12,000 feet in depth would be constructed at the DWI site along with appurtenant facilities such as injection pumps, chemicals storage tanks, and electrical switchgear. To meet the chloride TMDL requirements for Saugus WRP discharge, approximately 1.8 mgd of the RO product water would be pumped to the Saugus WRP for blending with tertiary-treated water. The RO product water conveyance system would require construction of a pump station at the Valencia WRP and 3.5 miles of 14-inch diameter pipeline.

As is shown in Table 3-20, the present value of capital costs for this project alternative are projected to be $115 million, and the present value of operations and maintenance costs are projected to be $45 million over the expected 30-year life of the alternative.

Table 3-20 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 2 (MF/RO and UV With Brine Disposal via DWI)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$2,040,000	$ -	$ -	$ -	$ -	$ -	$ -	$2,040,000	1.000	**$2,040,000**
2015	$19,380,000	$ -	$ -	$ -	$ -	$ -	$ -	$19,380,000	0.943	**$18,275,340**
2016	$46,920,000	$ -	$ -	$ -	$ -	$ -	$ -	$46,920,000	0.890	**$41,758,800**
2017	$46,920,000	$ -	$ -	$ -	$ -	$ -	$ -	$46,920,000	0.840	**$39,412,800**
2018	$17,340,000	$ -	$ -	$ -	$ -	$ -	$ -	$17,340,000	0.792	**$13,733,280**
2019	$ -	$ -	$7,140	$357,000	$357,000	$375,870	$1,011,840	$2,108,850	0.747	**$1,575,311**
2020	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.705	**$2,973,479**
2021	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.665	**$2,804,771**
2022	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.627	**$2,644,498**
2023	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.592	**$2,496,878**
2024	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.558	**$2,353,477**
2025	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.527	**$2,222,728**
2026	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.497	**$2,096,197**
2027	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.469	**$1,978,101**
2028	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.442	**$1,864,223**
2029	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.417	**$1,758,781**
2030	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.394	**$1,661,774**
2031	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.371	**$1,564,767**
2032	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.350	**$1,476,195**
2033	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.331	**$1,396,059**
2034	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.312	**$1,315,922**
2035	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.294	**$1,240,004**
2036	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.278	**$1,172,521**
2037	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.262	**$1,105,037**
2038	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.247	**$1,041,772**

Table 3-20 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 2 (MF/RO and UV With Brine Disposal via DWI)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2039	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.233	**$982,724**
2040	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.220	**$927,894**
2041	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.207	**$873,064**
2042	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.196	**$826,669**
2043	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.185	**$780,275**
2044	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.174	**$733,880**
2045	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.164	**$691,703**
2046	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.155	**$653,744**
2047	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.146	**$615,784**
2048	$ -	$ -	$14,280	$714,000	$714,000	$751,740	$2,023,680	$4,217,700	0.138	**$582,043**
Last Year of Project Life 2050	$ -	$ -	$7,140	$357,000	$357,000	$375,870	$1,011,840	$2,108,850	0.130	**$274,151**
Total Present Value of Discounted Costs (Sum of column (j))										**$159,904,643**

Alternative 3 – MF/RO and UV with Brine Disposal via Trucking

In this alternative, a portion of the Valencia WRP's tertiary-treated wastewater would receive advanced treatment via MF/RO facilities to remove chloride. The low chloride RO product water would be combined with the remaining tertiary-treated wastewater to produce a blend that meets the chloride TMDL limit of 100 mg/L for chloride. Brine would be disposed via trucking to an unloading terminal. From there, brine would be conveyed to the JWPCP via the existing sewage system and eventually to the ocean using the JWPCP's existing ocean outfall. UV disinfection would replace the existing chlorine-based disinfection systems at both WRPs and would be located within the existing WRPs property boundary. Conversion to UV disinfection would reduce the size of the MF/RO facilities to 5.6 mgd and the amount of brine from the primary RO system to 1.0 mgd. The second-pass RO system would produce 0.5 mgd of RO product water and 0.5 mgd of brine. MF/RO facilities would be constructed at the Valencia WRP site. The trucking operation would require acquisition and development of properties for truck loading and unloading terminals. The loading terminal would be located on a one-acre property adjacent to the northern boundary of the Valencia WRP and would consist of four brine loading stations, paving and fencing. A 500,000 gallon brine storage tank (approximately 70-foot in diameter) would be constructed at the Valencia WRP or at the loading terminal to accommodate disruptions in the trucking operation. A pump station at the Valencia WRP and a brine conveyance pipeline would be constructed to deliver brine to the loading terminal. The unloading terminal would require a two-acre property located in the unincorporated Los Angeles County community of City Terrace. The unloading terminal would also consist of four brine loading stations, paving and fencing. An 18-inch diameter pipeline would be constructed from the unloading terminal to the City Terrace Trunk Sewer. The trucking operation would involve 90 truck trips per day during peak conditions and 60 trips per day on average.

As is shown in Table 3-21, the present value of capital costs for this project alternative are projected to be $93 million, and the present value of operations and maintenance costs are projected to be $94 million over the expected 30-year life of the alternative.

Table 3-21 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 3 (MF/RO and UV With Brine Disposal via Trucking)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2014	$5,100,000	$ -	$ -	$ -	$ -	$ -	$ -	$5,100,000	1.000	**$5,100,000**
2015	$16,320,000	$ -	$ -	$ -	$ -	$ -	$ -	$16,320,000	0.943	**$15,389,760**
2016	$30,600,000	$ -	$ -	$ -	$ -	$ -	$ -	$30,600,000	0.890	**$27,234,000**
2017	$36,720,000	$ -	$ -	$ -	$ -	$ -	$ -	$36,720,000	0.840	**$30,844,800**
2018	$18,360,000	$ -	$ -	$ -	$ -	$ -	$ -	$18,360,000	0.792	**$14,541,120**
2019	$ -	$ -	$15,300	$766,275	$766,275	$375,870	$2,529,090	$4,452,810	0.747	**$3,326,249**
2020	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.705	**$6,278,462**
2021	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.665	**$5,922,237**
2022	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.627	**$5,583,824**
2023	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.592	**$5,272,127**
2024	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.558	**$4,969,336**
2025	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.527	**$4,693,262**
2026	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.497	**$4,426,093**
2027	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.469	**$4,176,736**
2028	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.442	**$3,936,284**
2029	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.417	**$3,713,644**
2030	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.394	**$3,508,814**
2031	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.371	**$3,303,985**
2032	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.350	**$3,116,967**
2033	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.331	**$2,947,760**
2034	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.312	**$2,778,553**
2035	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.294	**$2,618,252**
2036	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.278	**$2,475,762**
2037	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.262	**$2,333,272**

Table 3-21 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 3 (MF/RO and UV With Brine Disposal via Trucking)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2038	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.247	**$2,199,688**
2039	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.233	**$2,075,009**
2040	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.220	**$1,959,236**
2041	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.207	**$1,843,463**
2042	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.196	**$1,745,502**
2043	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.185	**$1,647,540**
2044	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.174	**$1,549,578**
2045	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.164	**$1,460,522**
2046	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.155	**$1,380,371**
2047	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.146	**$1,300,221**
2048	$ -	$ -	$30,600	$1,532,550	$1,532,550	$751,740	$5,058,180	$8,905,620	0.138	**$1,228,976**
Last Year of Project Life 2050	$ -	$ -	$15,300	$766,275	$766,275	$375,870	$2,529,090	$4,452,810	0.130	**$578,865**
								Total Present Value of Discounted Costs (Sum of column (j))		**$187,460,271**

Alternative 4 –AWRM (Phase I & II)

This alternative would consist of two phases: Phase I and Phase II. Based on predictions of future water supply chloride levels, Phase I elements were estimated to be sufficient to meet a chloride limit of 117 mg/L at Reach 4B of the Santa Clara River. Phase II represented a formal backup plan in case Phase I facilities could not consistently provide water quality in the Santa Clara River that complies with the modified chloride limits.

Phase I would include construction of UV disinfection facilities at the Valencia WRP and Saugus WRP, salt management facilities in the Piru Subbasin, and use of supplemental water. UV disinfection facilities would be located within the existing WRP's property boundary. Salt management facilities would consist of approximately five groundwater extraction wells in the eastern portion of the Piru Subbasin, approximately six groundwater extraction wells in the western portion of the Piru Subbasin, at least one pump station for each well field, and a 36-inch diameter, 6-mile long pipeline to deliver blended groundwater to a point in the Santa Clara River with perennial flow (near the Fillmore Fish Hatchery). The supplemental water system would consist of a 24-inch diameter pipeline less than 1 mile long to two or three existing or new groundwater wells. The low chloride water provided by these wells would be added to the Valencia WRP discharge to meet the required limit at Reach 4B of the Santa Clara River during peak conditions. To replace this water and ensure no net loss of water supply to the SCV, additional water would be imported by CLWA on the SCVSD's behalf. This replacement water would be obtained from the Buena Vista-Rosedale (BV-R) Project in the Central Valley of California under existing agreements between CLWA and the BV-R operator and would be conveyed using existing infrastructure.

Phase II would include MF/RO facilities at the VWRP, a brine disposal system, and an RO product water conveyance system to Ventura County. For the purposes of cost estimating and evaluating alternatives, MF/RO facilities producing 2 mgd of product water and 0.4 mgd of brine are assumed, and would be located as described for Alternative 1. Similar to Alternatives 1, 2 and 3, the MF/RO facilities are assumed to include second-pass RO for brine minimization, which would reduce brine flows to 0.2 mgd. DWI is the recommended method of brine disposal. Similar to Alternative 2, brine would be conveyed to DWI Site A via a pump station located at the VWRP and a 6-inch diameter, 2.5-mile long force main. Three injection wells would be constructed at Site A along with appurtenant facilities such as injection pumps, chemical storage tanks, and electrical switchgear. The RO product water conveyance system to Ventura County may be needed to supply low-chloride water for users of river water during drought if SCR chloride levels are expected to exceed 117 mg/L after implementation of MF/RO facilities. The conveyance system would consist of a 24-inch diameter, 12-mile pipeline from the VWRP to the eastern portion of the Piru Subbasin.

As is shown in Table 3-22, the present value of capital costs for this project alternative are projected to be $172 million, and the present value of operations and maintenance costs are projected to be $44 million over the expected 30-year life of the alternative.

Table 3-22 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 4 (AWRM Phase I & II)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2014	$2,040,000	$ -	$ -	$ -	$ -	$ -	$ -	$2,040,000	1.000	**$2,040,000**
2015	$6,120,000	$ -	$ -	$ -	$ -	$ -	$ -	$6,120,000	0.943	**$5,771,160**
2016	$25,500,000	$ -	$ -	$ -	$ -	$ -	$ -	$25,500,000	0.890	**$22,695,000**
2017	$49,980,000	$ -	$ -	$ -	$ -	$ -	$ -	$49,980,000	0.840	**$41,983,200**
2018	$30,600,000	$ -	$ -	$ -	$ -	$ -	$ -	$30,600,000	0.792	**$24,235,200**
2019	$4,080,000	$ -	$ -	$ -	$ -	$ -	$ -	$4,080,000	0.747	**$3,047,760**
2020	$19,380,000	$ -	$ -	$ -	$ -	$ -	$ -	$19,380,000	0.705	**$13,662,900**
2021	$36,720,000	$ -	$ -	$ -	$ -	$ -	$ -	$36,720,000	0.665	**$24,418,800**
2022	$36,720,000	$ -	$ -	$ -	$ -	$ -	$ -	$36,720,000	0.627	**$23,023,440**
2023	$18,360,000	$ -	$ -	$ -	$ -	$ -	$ -	$18,360,000	0.592	**$10,869,120**
2024	$ -	$ -	$95,370	$427,890	$427,890	$160,140	$1,699,320	$2,810,610	0.558	**$1,568,320**
2025	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.527	**$2,962,383**
2026	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.497	**$2,793,746**
2027	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.469	**$2,636,352**
2028	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.442	**$2,484,579**
2029	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.417	**$2,344,049**
2030	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.394	**$2,214,761**
2031	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.371	**$2,085,473**
2032	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.350	**$1,967,427**
2033	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.331	**$1,860,624**
2034	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.312	**$1,753,821**
2035	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.294	**$1,652,639**
2036	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.278	**$1,562,699**
2037	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.262	**$1,472,760**

Table 3-22 – Annual Costs of Project
(All costs shown in 2014 Dollars)
Project: Valencia Water Reclamation Plant UV Disinfection Facilities
Alternative 4 (AWRM Phase I & II)

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grand Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor[3]	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2038	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.247	**$1,388,441**
2039	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.233	**$1,309,744**
2040	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.220	**$1,236,668**
2041	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.207	**$1,163,593**
2042	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.196	**$1,101,759**
2043	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.185	**$1,039,926**
2044	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.174	**$978,092**
2045	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.164	**$921,880**
2046	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.155	**$871,289**
2047	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.146	**$820,698**
2048	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.138	**$775,728**
2049	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.130	**$730,759**
2050	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.123	**$691,410**
2051	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.116	**$652,062**
2052	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.109	**$612,713**
2053	$ -	$ -	$190,740	$855,780	$855,780	$320,280	$3,398,640	$5,621,220	0.103	**$578,986**
Last Year of Project Life 2054		$ -	$95,370	$427,890	$427,890	$160,140	$1,699,320	$2,810,610	0.097	**$272,629**
								Total Present Value of Discounted Costs (Sum of column (j))		**$216,252,589**

Summary of Annual Project Physical Benefits and Cost Effectiveness Analysis

The physical benefits claimed for the Valencia Water Reclamation Plant UV Disinfection Facilities include:

- Reduction in chloride loading from the disinfection process - This Project would reduce the chloride loading in the Valencia WRP effluent by up to 7 mg/L. We are expressing this in terms of mg/L because of the goal in meeting the TMDL. This equates to a total of 6,463 tons of chloride (assuming that flow increases from 16.1 mgd to 21.8 mgd) that would be removed for the Upper Santa Clara River over the 30-year lifetime of the Project.
- Water saving through decreased RO concentrate brine disposal - This Project would save approximately 0.1 mgd from decreasing the amount of brine disposal. Over the 30 year lifetime of the Project this would be equivalent to 1,095 mg (36.5 mg/ year)

The Project alternatives presented in the cost-effectiveness analysis were

- Alternative 1 – MF/RO With Brine Disposal via Pipeline
- Alternative 2 – MF/RO and UV With Brine Disposal via DWI
- Alternative 3 – MF/RO and UV With Brine Disposal via Trucking
- Alternative 4 - AWRM (Phase I & II) – Also known as the alternative compliance plan

The proposed Project, as part of Alternative 2, was determined to be the most cost-effective alternative after Alternative 4 became infeasible due to the lack of required support from key stakeholders and a determination that it would not garner the necessary regulatory approvals.

References

Board of Directors of Santa Clarita Valley Sanitation District of Los Angeles County (2013). “Minutes of the adjourned regular meeting of the Board of Directors of Santa Clarita Valley Sanitation District held at the Santa Clarita City Hall.” October 28, 2013.

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Raucher, R, J. Cromwell, K. Cooney, P. Thompson, L. Sullivan, B. Carrico, M. MacPhee, R. Wilkinson. 2008. Risks and Benefits of Energy Management for Drinking Water Utilities. Prepared for the American Water Works Association Research Foundation. AwwaRF Project #3058.

Reference Documentation for the Valencia Water Reclamation Plant UV Disinfection Facilities is provided in Att3_DG_ProJust_4of4.