Attachment 7

Technical Justification of Projects

Implementation Grant, Round 2

Coachella Valley IRWM
Implementation Grant Proposal

Attachment

7

Coachella Valley Integrated Regional Water Management Implementation Grant Proposal – Round 2

Technical Justification of Projects

Attachment 7 consists of the following items:

✓ **Technical Justification**

This attachment provides a regional background and overview of the physical benefits associated with each individual project in this proposal, as well as a technical justification for these benefits.

This attachment contains information on the technical justification for the five projects contained in this Proposal. Please note that one project in this Proposal, the *Torres-Martinez Avenue 64 Water Supply Connection Project*, does not include physically or economically quantified benefits, as this project is a disadvantaged community (DAC) project and was evaluated with a Cost-Effectiveness Analysis in Attachment 8. The other four projects include a multitude of physical benefits, which were both physically and economically quantified.

A number of studies and documents have been used to support the projects included in this proposal. These studies and documents have been referenced as footnotes in this attachment, including specific references to the page locations and sections of the studies or documents that support the claims made in this attachment. **Please note that in accordance with guidance from DWR on Page 11 of the *Proposal Solicitation Package*, the documents referenced in this section have been provided in an electronic format only (on the supporting CD) and are not included within the printed hard copies that have been mailed to DWR**.

Regional Water Supply Background

The Coachella Valley IRWM Region is chiefly the same boundary as the Whitewater River watershed boundary, also known as the Coachella Valley. The area is drained primarily by the Whitewater River that flows southward to the Salton Sea. The Coachella Valley is characterized by low precipitation and high summer daytime temperatures.

Water supply for the Coachella Valley is generally pumped from subbasins of the Coachella Valley Groundwater Basin. Water is pumped from many wells around the region into each of the regional water purveyor's distribution systems. Each of the five water purveyors of the region – Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), Indio Water Authority (IWA), and Mission Springs Water District (MSWD) – operates its own water distribution system.

Groundwater is the largest source of water supply for the region. The Coachella Valley Groundwater Basin has an estimated storage capacity of 39 million acre-feet (AF) of water. Prior to 1949, groundwater levels steadily declined due to agricultural pumping. The Coachella branch of the All American Canal (Coachella Canal) was completed in 1949 and the first deliveries of Colorado River water to the Coachella Valley began in that year. As a result, groundwater pumping was significantly reduced from 1950 to the early 1980s, and water levels rose in the eastern Coachella Valley. However, since the 1980s,

increased pumping has caused water levels in the eastern Coachella Valley to decline despite recharge with Colorado River water sources. CVWD estimates the decrease in freshwater storage in the Coachella Valley Groundwater Basin for 1999 to be 137,000 AF, with a cumulative overdraft of nearly 4.8 million acre-feet between 1936 and 1999.[1]

Due to potentially significant consequences caused by groundwater overdraft, the region has developed water supplies to supplement and replenish groundwater supplies. CVWD and DWA obtain additional water supplies through two primary sources 1) Imported State Water Project (SWP) supply, which is exchanged for Colorado River water via the Metropolitan Water District of Southern California's (MWD) Colorado River Aqueduct and 2) Colorado River supply via the Coachella Canal.

Further, due to the importance of groundwater to the Region, all of the projects included in this proposal will address either the quantity or quality of groundwater in order to maximize benefits to the Region and address the Region's most critical issues.

[1] CVWD. 2002. Coachella Valley Water Management Plan.

Project 1: Non-potable Water Use Expansion Program

Background

Abstract

The proposed Non-potable Water Use Expansion Program is a form of source substitution - the delivery of an alternate source of water to users who currently depend on groundwater pumping. The substitution of an alternate non-potable water source reduces groundwater extraction and allows the groundwater to remain in storage, thus reducing overdraft. It also matches source to use by providing untreated Colorado River water (Canal water) and recycled water for outdoor irrigation in lieu of higher quality groundwater.

Canal water and recycled water are significant existing local resources that are underutilized for agricultural and golf course irrigation. Backbone distribution systems exist to deliver non-potable water, but funding is needed to connect potential customers to existing non-potable water distribution systems and further reduce groundwater pumping.

In the eastern portion of the Coachella Valley (generally east of Washington Street), the Coachella Canal (Canal) and its adjacent irrigation distribution system have delivered Canal water to the agricultural community since 1950. However, this system has not been fully utilized. In the western portion of the Coachella Valley, the backbone of the area's non-potable water system, the Mid-Valley Pipeline (MVP), was completed in 2008. It has the capacity to serve approximately 50 golf courses.

There are over 110 golf courses in the Coachella Valley with access to non-potable water. CVWD has entered a standardized non-potable water use agreement with 43 of these golf courses that requires them to meet at least 80% of their demand with non-potable water. Of these 43 courses, 14 receive water from the MVP system and 29 receive water from the Canal distribution system.

This project would fund three west Valley golf course connections (connections to the MVP), one improvement to the L4 Pump station, and four east Valley golf course connections (to the Canal system) that are more or less shovel ready:

Mid Valley Pipeline

1. *Desert Horizons Country Club* – this project extends the 24" distribution pipeline from the existing stub-out at the Coachella Valley Stormwater Channel to Fred Waring Drive and constructs a new pipeline and meter to the Desert Horizons Country Club.
2. *Indian Springs Country Club* – this project extends the 24" distribution pipeline from the existing stub-out at the Coachella Valley Stormwater Channel to Fiesta Drive and constructs a new pipeline and meter to the Indian Springs Country Club.
3. *The Lakes Country Club* – this project constructs two new sections of 12" pipeline and meters from the 24" high pressure pipeline and one new 12" pipeline and meter from the low pressure pipeline to the Lakes Country Club.

Canal System

4. *L4 Pump Station Improvements* – this project replaces the broken meter at Citrus Country Club and installs Variable Frequency Drives (VFDs) at the L4 Pump Station.
5. *L4 La Quinta Extensions* – this project extends Irrigation Lateral 120.8 from the relocated L4 Pump Station to Avenue 52 and includes three new meters for Canal water delivery to the La

Quinta Country Club, the La Quinta Resort Mountain Course, and the La Quinta Resort Dunes Course.

6. *Indian Palms Golf Course* – this project extends the 12" Irrigation Lateral 117.8 from Monroe Street to the Indian Palms Golf Course.

The three golf courses located in the western portion of CVWD's service area would receive 2,152 AFY of recycled water and 1,998 AFY of Canal water via the existing MVP. The four golf courses located in the eastern portion of the service area would receive a total of 3,900 AFY of Canal water. In total, the *Non-potable Water Use Expansion Program* will provide 8,050 AFY in non-potable water supplies.

Description and Relationship to Other Projects in the Proposal

This program would involve construction of facilities necessary to deliver additional non-potable water (including recycled water) to agricultural and golf course users. This program is directly connected to Project 2, the *Coachella Valley Salt & Nutrient Management Program*, as implementation of recycled water programs would not be possible without development of a Salt and Nutrient Management Plan consistent with the Recycled Water Policy.

Without Project Baseline

The purpose of the *Non-potable Water Use Expansion Program* is to allow more groundwater to remain in storage by reducing groundwater extraction, thus reducing overdraft and the need for additional groundwater recharge. In their 2010 *Urban Water Management Plan*, CVWD provides estimates for the change in storage in the aquifer, noting that in 2009, loss of storage in the groundwater basin was estimated to be 74,812 AFY.[2] Due to continued overdraft conditions, if the program is not implemented CVWD would need to offset the 8,050 AFY of groundwater currently used by the golf courses through groundwater recharge.

Imported water is the primary sources of groundwater recharge to the basin. Therefore, additional groundwater recharge to balance overdraft would involve increased purchases of SWP exchange water (which is imported from the Colorado River via the Colorado River Aqueduct). SWP supplies vary annually due to weather and runoff variations, as well as regulatory limitations on exports from the Sacramento-San Joaquin Bay Delta (Delta). Under current conditions, the SWP can only provide about 60% of CVWD's Table A contract allocation.[3] In the absence of state and federal actions in the Delta to increase SWP supplies, it is anticipated that CVWD's long-term SWP reliability (deliveries) could decrease to 50% of current Table A allocations.[4]

Without the *Non-Potable Water Use Expansion Program*, water purveyors in the Coachella Valley would continue to rely on local groundwater and SWP exchange water for groundwater recharge. Thus, water supply reliability would not improve within the CVWD service area as it would if the program were implemented. In addition, without the program, CVWD would need to construct five additional groundwater injection wells to facilitate the amount of water that would need to be recharged.

Without the program, the use of local water resources would not be maximized. Recycled water and Canal water delivered through Coachella Canal are significant existing local resources that are currently underutilized for agricultural and golf course irrigation. Backbone distribution systems exist to deliver

[2] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 4-10, Section 4.2.1.3 Overdraft.

[3] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 4-33, Section 4.6.2.2 Additional SWP Exchange Water.

[4] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 5-5, Section 5.2.3 State Water Program.

non-potable water, but funding is needed to connect potential customers to existing non-potable water distribution systems and further reduce groundwater pumping.

Without the project, the golf courses that would use non-potable water would continue to contribute to overdraft via localized groundwater pumping. In order to account for this overdraft, it is assumed that (without the project) the Region would implement localized groundwater recharge within the project area via the construction and operation of injection wells. It is assumed that one well would need to be installed every five years, beginning in 2014. Therefore, recharge activities via localized groundwater injection would not be complete until 2034, meaning that from 2014 to 2034 the groundwater basin would not be balanced, because the golf courses would extract more groundwater than would be recharged.

Finally, if the program is not implemented, increased use of imported water and groundwater pumping under the "without program" scenario would result in increased energy usage [and associated greenhouse gas (GHG) emissions]. The energy requirements would be much lower if locally generated recycled water and Canal water were used instead of groundwater combined with imported SWP Exchange water.

Potential Adverse Physical Effects of the Program

This program would facilitate existing and continued use of non-potable water. As such, any impacts associated with the program would be accounted for in the *Coachella Valley Water Management Plan Update Supplemental Program Environmental Impact Report* (2010) and the *Mid-Valley Pipeline Environmental Impact Report* (2007), along with supplemental environmental documentation created for individual non-potable alignments. Due to the scope and nature of these alignments, it is not anticipated that any significant, long-term adverse physical effects would result from implementation of this program.

Recent/ Historical Conditions

The MVP project was initially proposed by CVWD in 2000 in a study entitled *Conjunctive Use/Surplus Water Storage Study*, and was later incorporated as a preferred alternative into the 2002 *Coachella Valley Water Management Plan*.[5] This project was proposed to deliver water from the Coachella Canal to golf courses in the Mid-Valley for purposes of in lieu groundwater recharge (source substitution) through which golf courses would cease localized groundwater pumping and instead rely on Canal water for irrigation.[6] The original MVP concept only considered irrigation with Canal water; however, an updated concept paper produced in 2005 recommended blending of recycled water with Canal water to address seasonal fluctuations and allow for increased utilization of recycled water supplies for non-potable uses.[7] The backbone for the MVP, which consisted of a pipeline connecting the Coachella Canal to CVWD's Water Reclamation Plant-10 (WRP-10), was completed in 2009. This component of the MVP allows for delivery of Canal water to WRP-10 where it is blended with recycled water to create the non-potable water delivered by the MVP.[8] The blending of Canal water with recycled water varies; the 2005 concept paper demonstrates that additional Canal water is necessary in the summer months as the amount of recycled water available from WRP-10 is not sufficient to meet non-potable demands.[9] This report demonstrates that on a yearly average, the blending that occurs in the MVP is approximately 52%

[5] Coachella Valley Water District (CVWD). 2005. *Concept Paper: Mid-Valley Pipeline.* Page 1, Introduction.

[6] Coachella Valley Water District (CVWD). 2005. *Concept Paper: Mid-Valley Pipeline.* Page 1, Introduction.

[7] Coachella Valley Water District (CVWD). 2005. *Concept Paper: Mid-Valley Pipeline.* Page 3, Irrigation Water Use in Mid-Valley Area.

[8] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan 2010 Update.* Page 6-32, Section 6.5.3 Mid-Valley Pipeline.

[9] Coachella Valley Water District (CVWD). 2005. *Concept Paper: Mid-Valley Pipeline.* Page 9, Section 4.1 Required Canal Water Flow.

recycled water and 48% Canal water; although in the winter months (December, January, February) when irrigation demands are low, there is substantial recycled water to meet anticipated demands. [10]

The 2010 *Coachella Valley Water Management Plan Update* assumes that the MVP will continue to serve non-potable water, and, will, therefore continue to help the Region address groundwater overdraft via source substitution provided by this project. It is anticipated that the MVP will meet 72% of non-potable demands required by golf courses in the Mid-Valley area by the year 2045.[11]

The Coachella Canal has been delivering Canal water to irrigation customers since the 1950's and is considered in the *Coachella Valley Water Management Plan Update* as source substitution that (similar to the MVP) helps to alleviate groundwater overdraft by replacing localized groundwater use with Canal water. One of the underlying principles of groundwater management in the *Coachella Valley Water Management Plan Update* is to fully use the available Canal water supply, which can be achieved, in part, by using Canal water for irrigation of local golf courses.[12] Further, the *Coachella Valley Water Management Plan Update* states that one of the Region's groundwater management goals is to use 90% of the Region's allotted Canal water by 2015.[13]

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The backbone of the Mid-Valley Pipeline and irrigation system are complete. The scope of work included in the work plan (refer to Attachment 3) includes all infrastructure necessary to connect the seven identified golf courses to the CVWD non-potable water system.

Uncertainties in the Physical Benefits

Connecting the seven golf courses to the non-potable system is considered a high-priority component of the Region's efforts to reduce groundwater overdraft via source substitution. As such, while the specific monetized benefits associated with the *Non-Potable Water Use Expansion Program* may have uncertainties (refer to Attachment 8), given the priority nature of this program, it is highly likely that it would be successfully implemented and that the physical benefits described herein would be accrued.

Physical Benefits Overview

Table 7-1 provides a summary of the physical benefits of the *Non-Potable Water Use Expansion Program*, including quantification of the physical benefit where possible.

[10] Coachella Valley Water District (CVWD). 2005. *Final Concept Paper: Mid-Valley Pipeline.* Page 10, Chart 4-2: Expanded Recycled Water Distribution System using a blend of Recycled and Canal Water.

[11] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan 2010 Update.* Page 6-32, Section 6.5.3 Mid-Valley Pipeline.

[12] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan 2010 Update.* Page 6-27, Section 6.5.2 Groundwater to Canal Water Conversion.

[13] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan 2010 Update.* Page 6-28, Section 6.5.2.2 Golf Course Conversion.

Table 7-1: Physical Benefits
Non-Potable Water Use Expansion Program

Physical Benefit	Result of Physical Benefit	Quantification of Physical Benefit
Reduce Localized Groundwater Pumping and Associated Overdraft	A-Avoid Costs of Imported Water Purchases	8,050 AFY
	B-Avoid Groundwater Pumping	8,050 AFY
	C- Avoid Groundwater Replenishment	Five (5) Injection Wells
	D-Reduce Social Costs Associated with CO_2 Emissions	3,196 MT/year
	E-Provide Social Recreation or Access Benefits	Qualitative
	F-Help Avoid, Reduce, or Resolve Various Public Water Resources Conflicts	Qualitative
	G-Reduce Demand for Net Diversions from the Delta	Qualitative
	H-Provide a Long-Term Solution	Qualitative
	I-Improve Water Supply Reliability	Qualitative
Manage Groundwater Quality	J-Reduce Fertilizer Application	Qualitative
	K-Improve Water Quality	Qualitative

Physical Benefit 1: Reduce Localized Groundwater Pumping and Associated Overdraft

Amount/Volume and Unit: 8,050 AFY of non-potable water

Technical Justification of Physical Benefit

The groundwater supply of the Whitewater River Subbasin consists of a combination of natural runoff and returns from groundwater and imported water use. The supply is supplemented with artificial recharge with Colorado River water (SWP water exchanged with MWD). Total inflows are estimated to be about 331,000 acre-feet per year (AFY). Outflows from the basin consist of pumping, flows to the agricultural drainage system, evapotranspiration by native vegetation, and subsurface outflow to the Salton Sea. Total basin outflows are estimated to be 441,000 AFY.[14]

The *Coachella Valley Water Management Plan Update* identifies source substitution as one of the primary tools to address the Coachella Valley's overdraft issue and specifically recommends maximizing use of local sources of non-potable water for agricultural and golf course irrigation. [15] The *Non-Potable Water Use Expansion Program* would provide an alternative source of non-potable water supply to seven golf courses that currently depend on local groundwater for irrigation purposes. Three of these golf courses are located in the western portion of CVWD's service area and would receive a blend of recycled water and untreated surface water supplies from the Coachella Canal (Canal water) via the MVP. The other four golf courses are located in the eastern portion of CVWD's service area and would receive Canal water directly from the Coachella Canal.

[14] CVWD. 2010. *Coachella Valley Water Management Plan Update*. Section 4.1.6 Overdraft Status, page 4-11.
[15] CVWD. 2010. *Coachella Valley Water Management Plan Update*. Section 6.5 Source Substitution, page 6-24.

The purpose of this program is to allow more groundwater to remain in storage by reducing groundwater extraction, thus reducing overdraft and the need to import additional water for groundwater recharge. In total, the non-potable water supplied by this program would offset the use of 8,050 AFY of local groundwater and the subsequent purchase of 8,050 AFY of imported water that would otherwise be needed for groundwater recharge.

Table 7-2 shows the breakdown of water use by golf course for the proposed MVP and Coachella Canal connections. The water supply mix of MVP water is both recycled water and Canal water (approximately 52% recycled water and 48% Canal water), but the water supply provided by the Coachella Canal is only Canal water.[16] Table 7-3 below provides an overview of the approximate water supply mix of non-potable water provided by the program; the MVP non-potable water supply mix is considered approximate as the percent make-up of recycled water and Canal water varies throughout the year depending upon the availability of recycled water.

Table 7-2: Amount of Non-Potable Water Supplied by Conveyance Facility
Non-Potable Water Use Expansion Program

Facility and User	Amount Supplied (AFY)
Mid-Valley Pipeline	
Indian Springs	975
Desert Horizons	867
Lakes Country Club	2,308
Total	**4,150**
Coachella Canal	
La Quinta Country Club	975
La Quinta Resort Mountain Course	975
La Quinta Resort Dunes Course	975
Indian Palms	975
Total	**3,900**

[16] Coachella Valley Water District (CVWD). 2005. *Final Concept Paper: Mid-Valley Pipeline.* Page 10, Chart 4-2: Expanded Recycled Water Distribution System using a blend of Recycled and Canal Water.

Table 7-3: Approximate Water Supply Mix of Non-Potable Water
Non-Potable Water Use Expansion Program

Facility and User	Amount Supplied (AFY)	Total Amount of Recycled Water (AFY)	Total Amount of Canal Water (AFY)
Mid-Valley Pipeline			
Indian Springs	975	506	469
Desert Horizons	867	450	417
Lakes Country Club	2,308	1,197	1,111
MVP Subtotal	**4,150**	**2,152 (52%)**	**1,998 (48%)**
Coachella Canal			
La Quinta Country Club	975	0	975
La Quinta Resort Mountain Course	975	0	975
LA Quinta Resort Dunes Course	975	0	975
Indian Palms	975	0	975
Canal Subtotal	**3,900**	**0**	**3,900**
TOTAL	**8,050**	**2,152**	**5,898**

Source: CVWD. 2005. *Final Concept Paper: Mid-Valley Pipeline.* Table 2-1: Projected Mid-Valley Use of Irrigation Water (2015), page 4.

Capital components of the program include installation of water meters, pipelines, water level controllers, and related facilities necessary to connect each of the seven golf courses to the non-potable distribution system. In addition, the program includes expansion and improvements to an existing CVWD pump station that would be necessary to provide Canal water via the Coachella Canal.

The *Non-Potable Water Use Expansion Program* matches source to use by providing non-potable water for outdoor irrigation in lieu of higher quality groundwater. Canal water and recycled water are significant existing local resources that are currently underutilized. In the eastern portion of the Coachella Valley, the Coachella Canal and its adjacent irrigation distribution system have delivered Canal water to the agricultural community since 1950. In the western portion of the Coachella Valley, the backbone of the MVP was completed in 2008 and has the capacity to serve approximately 50 golf courses.

CVWD has already signed standardized non-potable water use agreements with 43 golf courses in the Coachella Valley. Of these 43 courses, 29 receive Canal water and 14 receive blended water from the MVP system. This program would fund additional golf course connections to the Coachella Canal and MVP systems to further utilize non-potable water.

In total, the non-potable water (recycled water and Canal water) supplied by this program would offset the use of 8,050 AFY of local groundwater.

Methods Used to Estimate the Physical Benefits

A-Avoid Costs of Imported Water Purchases

Information from the 2010 *Coachella Valley Water Management Plan Update* demonstrates that the Region already uses its full Colorado River and SWP allocations and purchases additional SWP transfers for additional recharge water.[17] As such, it is reasonable to assume that non-potable water provided by

[17] CVWD. 20120200a. *Coachella Valley Water Management Plan Update.* Page 4-15, Section 4.3, State Water Program.

this program would directly offset the need to purchase additional SWP transfer water for recharge, because the program would provide non-potable water for source substitution (in lieu groundwater recharge).

Specifically, in order to account for the avoided imported water purchases that would be required as a result of this program, 8,050 AFY of additional water would need to be imported from outside the Region. The Region already uses its full SWP imported water allocations, so additional recharge water needs to be acquired from other external sources. This is done by acquiring rights to SWP water held by other entities, and exchanging these purchased rights with MWD for locally-available Colorado River water. It is assumed that water demands would remain consistent and that non-potable water use would be directly offset by additional imported water.

As discussed in the "Without Project Baseline" section, without this project, CVWD would need to construct five groundwater injection wells in order to accommodate infiltration of 8,050 AFY of water into the groundwater aquifer to offset the golf course extractions from the basin. These wells would be built over a 20-year period (with one well being constructed every 5 years). Each well would provide about 1,610 AFY of infiltration capacity. Thus, the first well, which would be constructed in 2014 will allow for 1,610 AFY of groundwater recharge beginning in 2016 when the avoided imports start to accrue (note that assumed recharge timing starts in 2016, not 2015, due to the project construction schedule). When the second well is completed in 2019, total infiltration capacity will amount to 3,220 AFY (beginning in 2020). This will continue through 2034, when the fifth well is completed. As demonstrated in Table 7-4, together, the wells would provide a cumulative infiltration capacity of 8,050 AFY, which would offset the full amount of water used by the golf courses (see also C-Avoid Groundwater Replenishment below).

Given the construction schedule for the infiltration wells, the program would avoid a total of 425,040 AF of SWP exchange water over its expected 60-year project life.

Table 7-4: Physical Benefits for A-Avoid Costs of Imported Water Purchases
Non-Potable Water Use Expansion Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Program (AFY)**	**With Program (AFY)**	**Change Resulting from Program (AFY)**
2016 - 2019	Avoid Additional Water Imports	1,610	0	1,610
2020 - 2024	Avoid Additional Water Imports	3,220	0	3,220
2025 - 2029	Avoid Additional Water Imports	4,830	0	4,830
2030 - 2034	Avoid Additional Water Imports	6,440	0	6,440
2035 - 2077	Avoid Additional Water Imports	8,050	0	8,050

B-Avoid Groundwater Pumping

By offsetting the use of local groundwater at the seven golf courses participating in this program, the *Non-Potable Water Use Expansion Program* would avoid the need for local groundwater pumping that currently occurs at these golf courses to provide water for non-potable (irrigation) purposes. For the golf courses that currently receive non-potable water from local groundwater pumping, CVWD has estimated that average groundwater pumping costs are approximately $53.08 per acre-foot.[18] This value is estimated based upon pumping costs provided by Southern California Edison and are an average of pumping costs

[18] CVWD. 2012. *Non-Potable Water Agreement Charges and Details.*

for 19 golf courses within the CVWD service area. Table 7-5 provides an overview of measured pumping costs for golf courses within CVWD's service area, which were used as the basis of the cost analysis associated with this benefit (refer to Attachment 8).

Table 7-5: Average Pumping Costs from CVWD Data (2012)
Non-Potable Water Use Expansion Program

No.	Customer Name	Pumping Charge ($/AF)
1	Del Webb Sun City (P.D.) (WRP 7)	$54.60
2	Shadow Hills (Sun City) (WRP 7)	$52.76
3	Desert Wouldow	$57.36
4	Casa Blanca	$52.76
5	Marriot's Desert Springs	$52.76
6	Silver Sands HOA	$57.48
7	Vista Del Montanas HOA	$55.21
8	Santa Rosa C.C. Inc.	$48.79
9	Portola C.C.	$52.76
10	P.D.Greens Assoc.	$56.64
11	P.D.High School	$71.64
12	Indian Ridge C.C.	$50.40
13	Golf Center	$52.76
14	Toscana C.C.	$52.76
15	Mt. View Falls HOA	$50.23
16	CVWD PDO & PDA	$40.23
17	Palm Desert Country Club	$43.21
18	Classic Club	$54.60
19	Indian Wells Golf Resort	$52.76
Average		$53.08

It is assumed that recycled water would be phased according to project construction, and therefore 2,311 AF would be provided in 2016, 7,281 would be provided in 2017, and 8,050 AF would be provided from 2018 through 2077. It is assumed that groundwater pumping would cease in a similar fashion. Table 7-6 provides an overview of the phasing assumptions and associated groundwater pumping offsets for the project.

Table 7-6: Physical Benefits for B-Avoid Groundwater Pumping
Non-Potable Water Use Expansion Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Program (AFY)**	**With Program (AFY)**	**Change Resulting from Project (AFY)**
2016	Avoid Groundwater Pumping	2,311	0	2,311
2017	Avoid Groundwater Pumping	7,281	0	7,281
2018 - 2077	Avoid Groundwater Pumping	8,050	0	8,050

C-Avoid Groundwater Replenishment

To accommodate the increased groundwater recharge that would be necessary if the program were not implemented, CVWD may need to construct additional groundwater injection wells to manage local groundwater overdraft that may occur within the area covered by the golf courses. A report conducted by the United States Geological Survey (USGS) indicates that there is localized land subsidence in the Palm Desert, Indian Wells, and La Quinta areas of the Coachella Valley.[19] With respect to this issue, the USGS report states that, "although the localized character of the subsidence signals is typical of the type of subsidence characteristically caused by localized ground-water pumping, the subsidence may also be related to tectonic activity in the valley."[20] Therefore, while it is not confirmed, local groundwater pumping in the aforementioned areas of the Coachella Valley (which would be served by the *Non-Potable Water Use Expansion Program*) may have resulted in groundwater overdraft and localized land subsidence.

The *Coachella Valley Water Management Plan Update* notes that surface recharge facilities are only effective in areas where the geology is suitable.[21] Significant portions of the East Valley are underlain by relatively thick clay and silt which impedes the vertical percolation of water into the deep aquifers from which most groundwater is produced. Consequently, most surface recharge facilities are located in the West Valley and on the fringes of the East Valley where these clay and silt layers are not present. As an alternative, the groundwater basin can be recharged by injection through either dedicated recharge wells or aquifer storage and recovery (ASR) wells which can be used for both recharge and groundwater production.[22] Injection has the benefit of placing replenishment water at the same location where pumping has occurred, which means that groundwater injection could be employed to address areas of acute overdraft that are experiencing localized land subsidence.

As described below, localized groundwater replenishment in the Mid-Valley would require both capital and O&M components. Capital components are those that would be required to construct necessary groundwater recharge facilities (injection wells). O&M components are those that would be necessary to fund groundwater replenishment conducted by CVWD. CVWD recuperates costs associated with groundwater replenishment via leverage of a replenishment assessment charge (RAC) that is assessed per basin.

Capital Components

In 2012, the Indio Water Authority (a CVRWMG agency and partner in the *Non-Potable Water Use Expansion Program*) investigated the costs associated with constructing an injection well as part of the planned Aquifer Storage and Recovery (ASR) program at Posse Park and Municipal Golf Course.[23] A preliminary injection well budget was provided which assumes a hydraulic conductivity estimate of 10 ft/day which constrains injection to about 1,000 gpm injection rate per well.

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[19] United States Geological Survey (USGS). 2007. *Detection and Measurement of Land Subsidence Using Global Positioning System Surveying and Interferometric Synthetic Aperture Radar, Coachella Valley, California, 1996-2005.* Page 22, InSAR Results.

[20] United States Geological Survey (USGS). 2007. *Detection and Measurement of Land Subsidence Using Global Positioning System Surveying and Interferometric Synthetic Aperture Radar, Coachella Valley, California, 1996-2005.* Page 1, Abstract.

[21] CVWD. 2010. *Coachella Valley Water Management Plan Update*. Section 6.2.2 East Valley Recharge Facilities, page 6-35.

[22] CVWD. 2010. *Coachella Valley Water Management Plan Update*. Section 6.2.2 East Valley Recharge Facilities, page 6-35.

[23] Daniel B. Stephens & Associates. 2012. *Memorandum re: IWA Aquifer Storage and Recovery Program, Preliminary Hydrogeologic Scope Cost Estimate*.

Replenishment of 8,050 AFY would require an injection rate of 5,000 gpm, assuming that groundwater is being pumped on a continuous basis. As such, if the *Non-Potable Water Use Expansion Program* were not implemented, CVWD would need to install five (5) injection wells of a capacity of 1,000 gpm each in order to provide for onsite local groundwater replenishment of the same magnitude provided by the program.

Operations and Maintenance Components (Replenishment Assessment Charge)

CVWD currently levies a Replenishment Assessment Charge, which is used to partially fund groundwater replenishment activities. CVWD has three separate RACs, which vary based upon geography.[24] Mapping information for this project (refer to Attachment 3) demonstrates that the Desert Horizons and Lakes Country Club golf courses would be located within the Upper Whitewater River Subbasin (Upper), while the remaining five golf courses would be located within the Lower Whitewater River Subbasin (Lower). Therefore, in order to assess the RACs that would be avoided as a result of the program, this analysis relied upon a weighted average RAC that was calculated based upon the RAC per basin (Upper vs. Lower) and the estimated annual usage for each golf course (refer to Table 7-2). Table 7-7 provides an overview regarding how the weighted average RAC for all 8,050 AFY ($66.50/AF) avoided by the program was calculated.

Table 7-7: Average Replenishment Assessment Charges
Non-Potable Water Use Expansion Program

Golf Course Name	Location	RAC ($/AF)	Annual Usage (AFY)	Annual RAC Charge ($/Year)
Desert Horizons	Upper	$110.26	867	$95,595
Lakes Country Club	Upper	$110.26	2,308	$254,480
Indian Springs	Lower	$38.00	975	$37,050
La Quinta Country Club	Lower	$38.00	975	$37,050
La Quinta Resort Mountain Course	Lower	$38.00	975	$37,050
LA Quinta Resort Dunes Course	Lower	$38.00	975	$37,050
Indian Palms	Lower	$38.00	975	$37,050
Total Across all Seven Golf Courses			**8,050**	**$535,325**
Average 2012 RAC ($/AF)				**$66.50**
Average Avoided Costs ($/year)				**$535,325**

Assuming that the O&M costs associated with groundwater replenishment (RAC) would phase in according to how groundwater replenishment would phase in, the total average avoided RAC ($535,325 per year) would not start accruing until 2035 when all five injection would be installed. As such, the RAC charges would phase in such that one-fifth (1/5) of the total RAC ($107,065) would be avoided from 2015-2019, 2/5 of the total RAC ($214,130) would be avoided from 2020-2024, 3/5 of the total RAC ($321,195) would be avoided from 2025-2029, 4/5 of the total RAC ($428,260) would be avoided from 2030-2034. Table 7-8 provides an overview of the phasing of avoided O&M costs associated with groundwater replenishment.

[24] Coachella Valley Water District (CVWD). 2012. *Replenishment Assessment Charge.* Available: http://www.cvwd.org/news/rac.php

Table 7-8: Physical Benefits for C-Avoid Groundwater Replenishment
Non-Potable Water Use Expansion Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Program**	**With Program**	**Change Resulting from Project**
2015 - 2019	Avoid Groundwater Replenishment	1 well	0 wells	-1 well
2020 - 2024	Avoid Groundwater Replenishment	2 wells	0 wells	-2 wells
2025 - 2029	Avoid Groundwater Replenishment	3 wells	0 wells	-3 wells
2030 - 2034	Avoid Groundwater Replenishment	4 wells	0 wells	-4 wells
2035 - 2077	Avoid Groundwater Replenishment	5 wells	0 wells	-5 wells

D-Reduce Social Costs Associated with CO_2 Emissions

The *Non-Potable Water Use Expansion Program* would provide non-potable water to seven golf courses within the Coachella Valley. The provision and use of non-potable water would offset the use of local groundwater by these golf courses, as well as the conveyance of additional SWP exchange water for groundwater recharge purposes. As a result, this program would avoid energy requirements associated with groundwater pumping, as well as the energy requirements associated with transporting SWP exchange water to the Region. This in turn would result in avoided greenhouse gases (GHGs) – namely carbon dioxide (CO_2) emissions – associated with reduced energy consumption.

For this analysis, it is assumed that energy requirements associated with delivering and using Colorado River water (including Canal water) are 2.0 mega-watt hours per acre-foot (MWh/AF), energy requirements associated with delivering and using both recycled water and local groundwater are 0.8 MWh/AF.[25] As demonstrated in Table 7-9, both the use of recycled water and the use of Canal water would reduce energy consumption and result in GHG emissions reductions. The energy savings were determined by calculating the amount of energy saved by offsetting both exchanged (imported) water and groundwater pumping, and subtracting the amount of energy that would be required to implement the program. As described previously, this project will provide 2,152 AFY of recycled water, which would be blended with 1,998 AFY of Canal water, through the MVP. An additional 3,900 AFY of Canal water will be supplied directly from the Coachella Canal. From 2015 through 2034, the project will also avoid increasing levels of imported SWP exchange water associated with groundwater recharge. Beginning in 2034 (following completion of the fifth injection well under the "without project" scenario), the program will result in a net energy savings of 9,030 MWh per year. Cumulative energy savings will amount to 407,940 MWh over the 60-year life of the program.

To calculate avoided CO_2 emissions associated with the program, the amount of energy that would be saved due to implementation of the program (column e) was multiplied by the average carbon emissions rate associated with energy production in California (0.354 megatons of CO_2 per megawatt-hour of energy (MT/MWh)).

[25] Energy use estimates for alternative water supply sources are based on estimates provided in CEC 2005, Navigant 2006, and Equinox 2010. The estimates used for this analysis are as follows: Imported Colorado River Water 2.0 MWh/AF (used for both water supplied via CRA and Coachella Canal), groundwater pumping 0.80 MWh/AF; recycled water treatment and distribution 0.80 MWh/AF.

By avoiding 8,050 AFY of groundwater pumping and imported SWP exchange water, the program would result in a net reduction in CO_2 emissions of 3,196 MT per year beginning in 2018. Given the schedule for program construction (with non-potable water delivery beginning in 2017), total net CO_2 emissions reductions amount to 188,957 MT over the 60-year program life (2016-2077).

Table 7-9: Energy and Emissions Savings Estimates
Non-Potable Water Use Expansion Program

Year	Program Components	Amount Supplied (AFY) a.	Energy Requirements (MWh/yr) b.	Imported Energy Offsets* (MWh/yr) c.	Groundwater Pumping Offsets** (MWh/yr) d.	Cumulative Energy Savings (MWh/yr) c.+d. – b.	Cumulative CO_2 Savings (MT/yr)
2016	Recycled Water	230	184	460	184	460	163
	Canal Water	2,081	4,162	4,162	1,665	1,665	589
						Subtotal	**752**
2017	Recycled Water	1,758	1,406	3,516	1,406	3,516	1,245
	Canal Water	5,523	11,046	11,046	4,418	4,418	1,564
						Subtotal	**2,809**
2018 - 2077	Recycled Water	2,158	1,726	4,316	1,726	4,316	1,528
	Canal Water	5,892	11,784	11,784	4,714	4,714	1,669
						Subtotal per Year (2018-2077)	**3,196**
						Program Total (60-year lifetime)	**188,957**

* Imported Energy Offsets were calculated based on an assumption of 2.0 MWh/AF
** Groundwater Pumping Offsets were calculated based on an assumption of 0.8 MWh/AF

Table 7-10: Physical Benefits for D-Reduce Social Costs Associated with CO_2 Emissions
Non-Potable Water Use Expansion Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Program (MT)**	**With Program (MT)**	**Change Resulting from Project (MT)**
2016	Avoid CO_2 Emissions	2,291	1,538	752
2017	Avoid CO_2 Emissions	7,217	4,408	2,809
2018 - 2077	Avoid CO_2 Emissions	7,979	4,783	3,196

E-Provide Social Recreation or Access Benefits

The golf course industry is an important part of the local and regional economy in the Coachella Valley. The hotel and amusement industry, which includes golf courses, hotels, resorts, Indian gaming, and other entertainment venues, is the second largest employer in the Region.[26] The *Non-Potable Water Use Expansion Program* would design and construct infrastructure to provide an additional 8,050 AFY of non-potable water to seven golf courses that currently rely on local groundwater pumping for irrigation purposes.

[26] Coachella Valley Economic Partnership (CVEP). 2011. *Compete and Prosper: Coachella Valley 2011 Economic Report.* Page 74, Appendix – Employment and Payroll Details. Available: http://cvep.com/LiteratureRetrieve.aspx?ID=107804

Non-potable water for landscape irrigation provided by CVWD is provided at 85% of the cost of groundwater pumping as a financial incentive to promote non-potable water use and offset groundwater pumping.[27] Therefore, the program would help to reduce water costs at the seven golf courses served by the program, which could help the local golf course industry from a financial point of view, preventing increased golf course charges or golf course closures that could result from escalating groundwater pumping costs. Such impacts (increased fees or closures) would potentially restrict social recreation access within the Region, which directly infers that the *Non-Potable Water Use Expansion Program* would benefit the Region's recreation industry by maintaining an affordable source of reliable local water (non-potable water) for golf courses.

Further, non-potable water supplies are not considered to be highly impacted by climatic variations (drought). Recycled water is not substantially impacted in times of drought as wastewater generation would continue to occur during drought conditions.[28] Canal water is also not substantially impacted in times of drought as the Region currently lacks infrastructure to deliver Canal water to customers, and therefore does not utilize the full amount of Canal water allocated to the Region (refer to Recent/Historical Conditions).[29] Thus, golf courses served by this program could continue to irrigate landscape/turf areas regardless of drought condition, which would allow them to remain green during dry periods. This would improve the aesthetics and enjoyment of the courses and, in extreme cases, may avoid closures that would otherwise be necessary to prevent further turf damage.

Data was not available to accurately quantify the cost savings that would be associated with providing the social recreation and access benefits describe above. Therefore, this benefit has not been economically or physically quantified.

F-Help Avoid, Reduce, or Resolve Various Public Water Resources Conflicts

The *Non-Potable Water Use Expansion Program* would help to meet goals set forth in the Recycled Water Policy to increase use of recycled wastewater by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030.[30]

Compliance with statewide statutes and mandates has the potential to generate conflicts associated with incompatible interests or resource availability. Therefore, because the program would facilitate implementation of activities to help meet mandates and goals of a statewide statute, it would help to resolve potential public water resources conflicts related to recycled water use.

G-Reduce Demand for Net Diversions from the Delta

This program involves implementation of source substitution with non-potable water, which would directly reduce local groundwater pumping and groundwater extractions. Reduced groundwater pumping in turn reduces aquifer drawdown and thus lessens the amount of imported water that is needed for groundwater recharge. CVWD and DWA have contracts for imported water supplies from the SWP, which is exchanged with MWD for Colorado River water delivered at turnouts from MWD's Colorado River Aqueduct. Because the Region already receives its entire imported water entitlements (as they are

[27] Coachella Valley Water District (CVWD). 2011b. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-29, Section 4.5.3, Recycled Water Customer Incentives.

[28] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 5-21, Section 5.5 Drought Planning.

[29] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 3-13, Section 3.3.2.3 Non-Potable Water Demand Programs.

[30] State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

available) and also purchases additional SWP Table A water from other agencies[31], any additional imported water needed to balance groundwater extraction would be purchased and transferred from the SWP. Transfers or leases from north of or within the Sacramento-San Joaquin Bay-Delta (Delta) could potentially affect the water quantity or quality of the Delta.

As the program would reduce demand for additional imported water that would ultimately be delivered from the Delta, the program could impart water quantity and water quality benefits to the Delta associated with reduced net diversions. In addition, due to the current vulnerability of the Delta, reducing future demands on this water resource would directly benefit the Region by reducing reliability issues that would occur if a catastrophic event such as a levee collapse or an earthquake were to substantially damage Delta-related infrastructure.

H-Provide a Long-Term Solution

By increasing use of locally-available resources rather than increasing imported water demands for groundwater recharge, this program helps to provide a long-term solution to the Region's groundwater overdraft. SWP supplies vary annually due to weather and runoff variations and are also impacted by regulatory limitations on exports from the Delta. Under current conditions, the SWP can only provide about 60% of CVWD's Table A contract allocation.[32] In the absence of state and federal actions in the Delta to increase SWP supplies, it is anticipated that CVWD's long-term SWP reliability (deliveries) could decrease to 50% of current Table A allocations. [33]

Local groundwater is also limited in the Coachella Valley, which is apparent due to storage (capacity) loss that the basin has experienced. In their *2010 Urban Water Management Plan*, CVWD provides estimates for the change in storage in the aquifer, noting that in 2009, loss of storage in the groundwater basin was estimated to be 74,812 AFY.[34]

Reduced reliability of SWP supplies and overdraft conditions in the groundwater basin highlight the need for additional (reliable) sources of water to meet current and future demands under all hydrologic conditions. The *Non-Potable Water Use Expansion Program* would provide infrastructure for the distribution and use of two sources of supply that are currently underutilized – recycled water and Canal water. Increasing the distribution and use of these non-potable sources is considered a long-term solution to issues associated with SWP reliability and groundwater overdraft, and is a long-term means to sustainably meet Regional water demands.

I-Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The *Non-Potable Water Use Expansion Program* would help address reliability issues for the Region by facilitating the additional distribution and use of a drought-resistant and underutilized source of local supply (non-potable water). This would reduce reliance on local groundwater, offsetting the need for SWP exchange water for groundwater recharge purposes.

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[31] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-19, Section 4.2.3.2 Other SWP Transfers.

[32] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 4-33, Section 4.6.2.2 Additional SWP Exchange Water.

[33] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 5-5, Section 5.2.3 State Water Program.

[34] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 4-10, Section 4.2.1.3 Overdraft.

Although interest in water supply reliability is increasing due to increasing water demands and concerns over climate-related events, only a few studies have directly attempted to quantify its value.[35] The challenge in applying these values to determine a value of increased reliability as a result of the *Non-Potable Water Use Expansion Program* is recognizing how to reasonably interpret these survey-based household monetary values. The values reflect a willingness to pay per household to ensure complete reliability (zero drought-related use restrictions in the future), whereas the *Non-Potable Water Use Expansion Program* only enhances overall reliability and does not guarantee 100% reliability. Thus, if applied directly to the number of households within the CVWD service area, the dollar values from the studies would overstate the reliability value provided by the program.

A simple way to roughly adjust for this "whole versus part" problem is to attribute a portion of the total value of reliability to the portion of the problem that is solved by the program. To adjust for the partial improvement in reliability from the *Non-Potable Water Use Expansion Program*, it is assumed that household willingness to pay for improved reliability is directly proportional to the amount of non-potable water that would offset imported water, as a percentage of the total non-potable water demand. This represents the percentage of total supply that has been improved in terms of overall reliability (i.e., by offsetting imported water demand with non-potable sources).

For example, the program would offset approximately 8,050 AFY of imported SWP water at full implementation. In 2020, total potable water demand within the CVWD service area would be about 319,400 AFY.[36] Thus, about 2.5% of total non-potable water demand would be met by non-potable water provisions provided by the program.

Due to the uncertainty involved in applying quantified economic numbers to the water supply reliability benefits that the Region would accrue as a result of the *Non-Potable Water Use Expansion Program*, this benefit estimate has been provided here to give an idea of the potential magnitude of this benefit but has not been monetized within the overall cost-benefit ratio for this program.

Physical Benefit 2: Manage Groundwater Quality

Methods Used to Estimate the Physical Benefits

J-Reduce Fertilizer Application

Fertilizing compounds commonly present in recycled water (e.g., nitrogen, phosphorus, potassium) are typically not found in potable water at levels of significance. Thus, the use of recycled water for irrigation could reduce fertilizer costs for the golf courses serviced by the MVP portion of the program (i.e., The Lake Country Club, Desert Horizons, and Indian Springs).

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[35] Carson, R.T.; Mitchell, R.C. *Economic Value of Reliable Water Supplies for Residential Water Users in the State Water Program Service Area*; SWC Exhibit Number 54;

The Metropolitan Water District of Southern California, Los Angeles, 1987.

CUWA. *The Value of Water Supply Reliability: Results of a Contingent Valuation Survey of Residential Customers*, California Urban Water Agencies, Sacramento, CA. [Online] 1994, http://www.cuwa.org/library/TheValueofWaterSupplyReliabilityAug94.pdf (accessed October 1, 2009).

Griffin, R.C.; Mjelde, J.W. Valuing Water Supply Reliability. *American Journal of Agricultural Economics* 2000, *82*, 414–426

Raucher, R., J. Clements, and others. 2013. *The Value of Water Supply Reliability in the Residential Sector.* WateReuse Research Foundation. Program WRF-08-09.

Wolff, G. 2007. Calculating constant-reliability water supply unit costs. *Water Policy*. International Water Association, London, UK

[36] Coachella Valley Water District (CVWD). 2011. C*oachella Valley Water District 2010 Urban Water Management Plan Final Report*. Page 3-14, Table 3-17 Projected Non-Potable Water Demand.

The exact offset of fertilizer use from using recycled water is difficult to predict due to daily and seasonal nutrient variations in the recycled water, and because the recycled water provided by the MVP will be blended with Canal water that does not have the same level of nutrients. In addition, the water supplied via the MVP could have a higher or lower concentration of recycled water, depending on the time of year. Thus, this benefit is not monetized.

K-Improve Water Quality

The 2010 *Coachella Valley Water Management Plan Update* indicates that groundwater pumping in some areas can cause water quality issues associated with constituents such as nitrates, as pumping may cause nitrate to leach into higher quality groundwater due to pressure changes in the basin.[37] Without the project, the golf courses will continue to contribute to overdraft problems in the basin through 2034, when enough infiltration capacity is brought online to be able to fully offset the full 8,050 AFY of groundwater pumping with imported water. This will result in further water quality degradation in the aquifer.

Beginning in 2034, the overall balance of the groundwater basin will be restored on an annual basis, with or without the program, as groundwater recharge would either occur due to importation of additional SWP exchange water or via the source substitution with non-potable water. While the *Non-Potable Water Use Expansion Program* would not change the overall water balance of the basin, it would abate localized groundwater pumping and therefore could prevent pumping activities from causing nitrate-contaminated water from coming into contact with the basin's high-quality deep aquifer.

Currently, there is no available information regarding local groundwater in the program area and how water pressure in this area may impact water quality. As such, benefits that would accrue to water quality have not been physically or economically quantified.

[37] Coachella Valley Water District (CVWD) 2010. *Coachella Valley Water Management Plan 2010 Update.* Page 5-13, Section 5.1.3.5 Nitrate.

Project 2: Coachella Valley Salt & Nutrient Management Program

Background

Abstract

The *Coachella Valley Salt & Nutrient Management Program* will implement the analytical and planning tasks needed to develop a SNMP for the Coachella Valley Groundwater Basin that is compliant with the State's Recycled Water Policy. Key tasks to be undertaken by the CVRWMG include:

1. *Establish a collaborative process* of Valley stakeholders interested in groundwater management, which will entail setting up working groups, conducting technical review meetings and conference calls, conducting stakeholder workshops, and program management.
2. *Characterize the groundwater basins*, including identifying the groundwater basins to be evaluated, collecting and reviewing existing groundwater data, documenting beneficial uses, characterizing groundwater quality and occurrences, identifying constituents of concern, and establishing baseline conditions.
3. *Identify salt/nutrient loading and trends* by first identifying salt/nutrient sources, and then quantifying salt/nutrient source loads and developing a plan for data gaps.
4. *Identify water management goals and potential strategies*, which would entail developing a list of potential management strategies, evaluating the feasibility of those potential management strategies, and then conducting an assimilative capacity analysis.
5. *Conduct anti-degradation process*, which includes assessing load reduction and water quality improvements, and identifying preferred management strategies.
6. *Finalize the SNMP*, which includes developing an implementation plan, identifying metrics and developing a monitoring plan, developing data management, reporting, and audit processes, determining CEQA/NEPA compliance needs, and producing the SNMP document.

Successful completion of the SNMP is necessary to ensure compliance with the Recycled Water Policy. Compliance with this policy is necessary for continued Colorado River RWQCB approval of recycled water permits in the Basin. Therefore, developing the SNMP will enable continued use and expansion of the Valley's water recycling efforts, which are an important component of the Region's groundwater management strategy.

Development of the Coachella Valley SNMP would be a collaborative process driven by stakeholders that have already been identified during Phase I activities. This program allows the Region's water and wastewater agencies to better manage salts and nutrients in the groundwater basin to preserve the high quality groundwater supply used for potable purposes.

Description and Relationship to Other Projects in the Proposal

This program is connected with other projects in this proposal, because this program will allow the Coachella Valley IRWM Region to maintain compliance with the state's Recycled Water Policy. Therefore, this program will allow the Region to continue existing and future planned use of recycled water. This program is therefore connected to Project 1, the *Non-Potable Water Use Expansion Program*, as implementation of recycled water projects would not be possible without implementation of the *Coachella Valley Salt & Nutrient Management Program*.

Without Project Baseline

Without the *Coachella Valley Salt & Nutrient Management Program*, the Region would not be in compliance with the State's Recycled Water Policy and therefore would not be able to use recycled water as currently permitted by the Colorado River RWQCB.

Potential Adverse Physical Effects of the Project

This program would facilitate existing and continued use of recycled water, and would not directly result in the provision of additional recycled water. As such, any impacts associated with the program would be accounted for in environmental documentation created for individual recycled water projects. Therefore, it is not anticipated that any significant, long-term adverse physical effects would result from implementation of this program.

Recent/ Historical Conditions

In order to be compliant with the State's Recycled Water Policy, a Salt and Management Plan must be developed on a watershed- or basin-wide basis.[38] The purpose of the Recycled Water Policy is to "provide direction to the Regional Water Boards, proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects".[39] As such, it can be inferred that without development of a SNMP, the Regional Board may not continue to permit the Region's recycled water projects, and the Region would therefore not be able to distribute its current permitted volume of recycled water.

Information from the 2010 *Coachella Valley Water Management Plan Update* demonstrates that the Region already uses its full Colorado River and State Water Project (SWP) allocations, and purchases additional SWP transfers and purchases for additional recharge water.[40] As such, it is reasonable to assume that losing a substantial existing water source (recycled water) would require CVWD and/or DWA to purchase additional imported water supplies.

Data collected in the Region has shown that nitrate levels and salt levels are increasing in the Region's groundwater basins. Specifically, since 2007, CVWD has inactivated four groundwater wells due to increasing nitrate levels.[41] A number of other wells are being monitored on a monthly basis, with some approaching triggers for removing them from service. Without this SNMP and the implementation of strategies to reduce nutrient levels, additional wells may need to be taken out of service due to nitrate contamination.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The Region's 2010 recycled water use, which is the basis of this estimate, is the result of existing recycled water projects that are already constructed and permitted. As such, no other new facilities, policies, or actions would be required to obtain the physical benefits described herein. The only additional action that would be required in order for the Region to continue its existing recycled water use is the development of a SNMP in compliance with the Recycled Water Policy. Development of that planning document is included in the scope of work for this program (refer to Attachment 3) and no additional facilities,

[38] State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

[39] State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

[40] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan Update.* Page 4-15, Section 4.3, State Water Project.

[41] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District Water Quality Section Memorandum: Annual Nitrate Report for CVWD Domestic Wells.*

policies, or actions would be required to obtain the physical benefits associated with the *Coachella Valley Salt & Nutrient Management Program*.

Uncertainties in the Physical Benefits

Compliance with the salt and nutrient management plan provisions of the Recycled Water Policy is required by 2014. As the deadline for compliance has not yet occurred, no precedent has been set for the consequences associated with non-compliance (i.e. not completing a SNMP). However, it is realistic to assume that non-compliance with the Recycled Water Policy would, at a minimum, jeopardize the Region's existing use of recycled water, and would likely also jeopardize the Region's future use of recycled water. As recycled water use in the Region is expected to increase to 42,800 AFY by 2030 (almost 200% compared to 2010 values)[42], the physical benefits calculated herein are notably conservative, as they only consider the loss of existing recycled water sources and do not consider long-term costs associated with non-compliance.

Physical Benefits Overview

Table 7-11 provides a summary of the physical benefits of the *Coachella Valley Salt & Nutrient Management Program*, including quantification of the physical benefit where possible.

Table 7-11: Physical Benefits
Coachella Valley Salt and Nutrient Management Program

Physical Benefit	Result of Physical Benefit	Quantification of Physical Benefit
Maintain ability to use recycled water	A-Maintain use of recycled water and avoid additional imports	14,268 AFY
	B-Reduce social costs associated with CO2 emissions	10,356 megatons per year
	C-Prevent stranded assets	$45-$90 million
	D-Provide social recreation or access benefits	Qualitative
	E-Help avoid, reduce, or resolve various public water resources conflicts	Qualitative
	F-Improve the overall, long-term management of California groundwater resources	Qualitative
	G-Reduce demand for net diversions for the regions from the Delta	Qualitative
	H-Provide a long-term solution in place of a short-term one	Qualitative
	I-Improve water supply reliability	Qualitative
Manage groundwater quality to protect existing infrastructure	J-Avoid cost of drilling new municipal wells	1 new well
	K-Promote social health and safety	Qualitative
	L-Improve groundwater quality	Qualitative

[42] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-26, Table 4-13, Historical and Future Recycled Water Production.

Physical Benefit 1: Maintain Ability to Use Recycled Water

Amount/Volume and Unit: 14,268 AFY of recycled water

Technical Justification of Physical Benefit

Implementation of the *Coachella Valley Salt & Nutrient Management Program* would maintain the Region's current ability to distribute recycled water for non-potable uses. The 2010 recycled water usage figures are derived from each of the five water purveyors' *2010 Urban Water Management Plans*. According to these planning documents, only CVWD and DWA provided recycled water for irrigation purposes in 2010. CVWD and DWA provided 9,768 AFY[43] and 4,500 AFY[44] of recycled water, respectively.

Methods Used to Estimate the Physical Benefits

A-Maintain Use of Recycled Water and Avoid Additional Imports

Information from the 2010 *Coachella Valley Water Management Plan Update* demonstrates that the Region already uses its full Colorado River and SWP allocations, and purchases additional SWP transfers for additional recharge water.[45] As such, it is reasonable to assume that losing a substantial existing water source (recycled water) would require regional water purveyors to purchase additional imported water.

Specifically, in order to account for the loss of recycled water that would occur without implementation of this program, 14,268 AFY of additional water would need to be imported from outside the Region. The Region already uses its full imported water allocations, so additional recharge water needs to be acquired from other external sources such as the Colorado River or the State Water Project (SWP). It is assumed that water demands would remain consistent, and that recycled water use would be directly offset by additional imported water.

This analysis assumes that if non-compliance with the Recycled Water Policy resulted in temporary revoking of recycled water permits by the Colorado River RWQCB, the Region's water and wastewater agencies would expedite preparation a Policy-compliance SNMP. As such, a maximum of five years of potential recycled water loss (and associated imported water purchase) would result without implementation of the *Coachella Valley Salt & Nutrient Management Program* and before the Region's water purveyors took other steps to restore recycled water use.

[43] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-26, Table 4-13, Historical and Future Recycled Water Production.

[44] Desert Water Agency (DWA). 2011. *Desert Water Agency 2010 Urban Water Management Plan.* Page VII-6, Table 35, Recycled Water Uses.

[45] Coachella Valley Water District (CVWD). 2010a. *Coachella Valley Water Management Plan Update.* Page 4-15, Section 4.3, State Water Project.

Table 7-12: Physical Benefits for A-Maintain Use of Recycled Water and Avoid Additional Imports
Coachella Valley Salt and Nutrient Management Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project (AFY)**	**With Project (AFY)**	**Change Resulting from Project (AFY)**
2015	Maintain Use of Recycled Water and Avoid Additional Imports	0	14,268	14,268
2016	Maintain Use of Recycled Water and Avoid Additional Imports	0	14,268	14,268
2017	Maintain Use of Recycled Water and Avoid Additional Imports	0	14,268	14,268
2018	Maintain Use of Recycled Water and Avoid Additional Imports	0	14,268	14,268
2019	Maintain Use of Recycled Water and Avoid Additional Imports	0	14,268	14,268

B-Reduce Social Costs Associated with CO_2 Emissions

The *Coachella Valley Salt and Nutrient Management Program* would ensure current and future use of recycled water within the Region through development of a SNMP compliant with the State's Recycled Water Policy. Without this project, golf courses and other irrigation-related recycled water customers would shift to private groundwater wells or use municipally-supplied potable water. Recycled water is currently used as a means of managing the Region's groundwater overdraft, as recycled water use directly offsets both groundwater pumping from private wells and groundwater pumping associated with municipal potable water supplies. Additional groundwater pumping that would be required to replace recycled water would also require the Region to import additional water supplies to the Region. Cumulatively, these actions would increase net emissions, because they would directly increase pumping and associated energy requirements, and would also require energy associated with transporting additional imported water supplies to the Region. This project would also avoid the importation of additional SWP exchange water for groundwater recharge purposes. As a result, this program would avoid energy requirements associated with groundwater pumping, as well as the energy requirements associated with transporting SWP exchange water to the Region. This in turn would result in avoided carbon dioxide (CO_2) emissions (a greenhouse gas (GHG)) associated with the without-project water sources (groundwater pumping and additional SWP exchange water).

For this analysis, it is assumed that energy requirements associated with delivering and using Colorado River water (the source of SWP exchange water) are 2.0 mega-watt hours per acre-foot (MWh/AF), energy requirements associated with delivering and using both recycled water and local groundwater are 0.8 MWh/AF.[46] The following table provides an overview of the cumulative energy and carbon dioxide savings that would result from the program.

To calculate avoided CO_2 emissions associated with the program, the amount of energy that would be saved due to implementation of the program (29,256 MWh per year) was multiplied by the average carbon emissions rate associated with energy production in California (0.354 megatons of CO_2 per

[46] As described in Attachment 7, energy use estimates for alternative water supply sources are based on estimates provided in CEC 2005, Navigant 2006, and Equinox 2010. The estimates used for this analysis are as follows: Imported Colorado River Water 2.0 MWh/AF (used for both water supplied via CRA and Coachella Canal), groundwater pumping 0.80 MWh/AF; recycled water treatment and distribution 0.80 MWh/AF.

megawatt-hour of energy (MT/MWh)). By avoiding 14,628 AFY of groundwater pumping and imported SWP exchange water, the program would result in a net reduction in CO_2 emissions of 10,356 MT/year.

Table 7-13: Energy and Emissions Savings Estimates
Coachella Valley Salt and Nutrient Management Program

Program Components	Amount Supplied (AFY) a.	Energy Requirements* (MWh/year) b.	Imported Energy Offsets** (MWh/year) c.	Groundwater Pumping Offsets*** (MWh/year) d.	Cumulative Energy Savings (MWh/year) c.+d. – b.	Cumulative CO_2 Savings (MT/year)
Recycled Water Produced and Used	14,628	11,702	29,256	11,702	29,256	10,356
					Program Total (per year)	**10,356**
					Program Total (5-year lifetime)	**51,780**

*Energy requirements were calculated based on an assumption of 0.8 MWh/AF for pumping associated with use of reclaimed water
** Imported Energy Offsets were calculated based on an assumption of 2.0 MWh/AF for importation of Colorado River Water
*** Groundwater Pumping Offsets were calculated based on an assumption of 0.8 MWh/AF for well pumping that would occur without this project.

Table 7-14: Physical Benefits for D-Reduce Social Costs Associated with CO_2 Emissions
Coachella Valley Salt and Nutrient Management Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Program (MT)**	**With Program (MT)**	**Change Resulting from Project (MT)**
2015 - 2019	Avoid CO_2 Emissions	14,500	4,143	10,356

C-Prevent Stranded Assets

CVWD has invested $42 million in the Mid-Valley Pipeline to date, and this recycled water pipeline asset would be stranded (i.e., would not be used) if water recycling was discontinued for any extended period of time (refer to Project 1, *Non-Potable Water Use Expansion Program*, for more information). Further, in addition to facilities such as the Mid-Valley Pipeline, the Region has considerable recycled water infrastructure consisting of pump stations, storage tanks, distribution pipelines, and other necessary appurtenances that would be stranded if recycled water could not be used within the Region. The 2012 *CVWD Comprehensive Annual Financial Report* demonstrates that CVWD's total sanitation assets were valued at $451 million in 2012.[47] Verbal estimations from CVWD indicate that recycled water infrastructure and facilities account for approximately 10-20% of CVWD's total sanitation assets.[48] Estimates from DWA indicate that they have invested approximately $26 million (unadjusted for depreciation) in their tertiary treatment facilities and associated distribution system.[49]

[47] Coachella Valley Water District (CVWD). 2012a. *Coachella Valley Water District Comprehensive Annual Financial Report – for the Fiscal Year Ended June 30, 2012.* Page 14, Statement of Net Assets.
[48] Patti Reyes, CVWD Director of Planning and Special Programs, email dated February 15, 2013
[49] Katie Ruark, Public Information Officer, Desert Water Agency, email dated February 13, 2013.

D-Provide Social Recreation or Access Benefits

The golf course industry is an important part of the local and regional economy in the Coachella Valley. The hotel and entertainment industry, which includes golf courses, hotels, resorts, Indian gaming, and other entertainment venues, is the second largest employer in the Region[50] Recycled water is used by golf courses, particularly in the mid-valley portion of the Region, to offset local (private) groundwater pumping.[51]Without the availability of recycled water, golf courses would likely revert to private groundwater pumping and would incur costs associated with increased energy needed for pumping. Additional pumping would also contribute to further overdraft of the Region's groundwater aquifer, thereby exacerbating pumping issues as groundwater elevation lowers as a result.

Non-potable water (including recycled water) for landscape irrigation provided by CVWD is provided at 85% of the cost of groundwater pumping as a financial incentive to promote non-potable water use and offset groundwater pumping.[52] The current price DWA's customers pay for recycled water is one half the potable water rate ($0.645/100 CF).[53] Additional costs borne by golf courses that would be required to convert back to groundwater pumping could potentially harm the golf course industry from a financial point of view, causing increased golf course charges or putting golf courses out of business entirely. Such impacts would potentially restrict social recreation access within the Region, which directly infers that the Salt and Nutrient Management Program will benefit the Region's recreation industry by maintaining an affordable source of reliable local water (recycled water) for golf courses.

Data was not available to accurately quantify the number of golf courses that would increase costs or go out of business as a result of recycled water reductions possible without implementation of the *Coachella Valley Salt & Nutrient Management Program*. Therefore, this benefit has not been physically or economically quantified. However, given that the economic importance of the golf course industry in the Coachella Valley, it is likely that golf course closures would have a substantial impact on the Region's economy.

E-Help Avoid, Reduce, or Resolve Various Public Water Resources Conflicts

This program would ensure compliance with the State of California's Recycled Water Policy, which requires that salt and nutrient management plans be developed to manage salts, nutrients, and other significant chemical compounds on a watershed- or basin-wide basis.[54] These plans are intended to help streamline permitting of new recycled water projects while ensuring compliance with water quality objectives and protection of beneficial uses. For each groundwater basin, a SNMP is to be provided to the relevant Regional Water Quality Control Board (RWQCB) no later than May 2014. An extension of up to 2 years may be granted by the RWQCB if the Region demonstrates substantial progress by the May 2014 deadline.[55]

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[50]Coachella Valley Economic Partnership (CVEP). 2011. *Compete and Prosper: Coachella Valley 2011 Economic Report.* Page 74, Appendix – Employment and Payroll Details. Available: http://cvep.com/LiteratureRetrieve.aspx?ID=107804

[51]Coachella Valley Water District (CVWD). 2005. *Final Concept Paper: Mid-Valley Pipeline, Coachella Valley, California.* Page ii, Executive Summary.

[52]Coachella Valley Water District (CVWD). 2011b. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-29, Section 4.5.3, Recycled Water Customer Incentives.

[53] Katie Ruark, Public Information Officer, Desert Water Agency, email dated February 13, 2013.

[54]State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

[55]State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

Stakeholder involvement is a key component of the SNMP. Stakeholders will include those whose activities and operations may impact salt and nutrient loading to the Region's groundwater, including the water purveyors, wastewater and agricultural interests, private well owners, environmental groups, regulatory staff, and the general public. Stakeholder involvement in the program will increase awareness and collaboration among these parties in addressing the Region's water quality and water supply issues.

Data was not available to accurately quantify the benefits associated with resolving public water resources conflicts associated with preparing a compliant SNMP. Therefore, this benefit has not been physically or economically quantified.

F-Improve the Overall, Long-Term Management of California Groundwater Resources

The SNMPs are intended to help streamline permitting of new recycled water projects while ensuring compliance with water quality objectives and protecting beneficial uses. The SNMP included in this scope of work will identify and rank overall management goals and strategies to be achieved within the Coachella Valley Groundwater Basin. Desired goals may focus on source load reduction, treatment, providing other forms of water quality protection, or increased recycled water use. As such, this program will complete actions that will work to improve management of the Region's primary groundwater basin, which will assist in improving the long-term management of California's groundwater resources.

As the Region has not yet identified or evaluated the groundwater management activities that will be included in the SNMP, accurate data regarding the potential benefits that this program may have on California's groundwater resources is not known at this time.

G-Reduce Demand for Net Diversions from the Bay-Delta

This program is required for the continued use of recycled water for golf and other irrigation applications, thus offsetting the need for groundwater extraction. Reduced groundwater pumping in turn reduces aquifer drawdown and thus lessens the amount of imported water that is needed for groundwater recharge. CVWD and DWA have contracts for imported water supplies from the SWP, which is exchanged with MWD for Colorado River water delivered at turnouts from MWD's Colorado River Aqueduct. Because the Region already receives its entire imported water entitlements (as they are available) and also purchases additional SWP Table A water from other agencies[56], any additional imported water needed to balance groundwater extraction would be purchased and transferred from the SWP. Transfers or leases from north of or within the Bay-Delta could potentially affect Bay-Delta water quantity or quality. The SNMP, however, will enable continued use of the local recycled water supply and reduce the demand for additional imported water, which would ultimately be delivered from the Bay-Delta via a SWP water exchange. Therefore, the program will reduce net diversions from the Bay-Delta.

Data was not available to accurately quantify the benefits associated with reducing net diversion from the Bay-Delta as a result of the *Coachella Valley Salt & Nutrient Management Program*. Therefore, this benefit has not been physically or economically quantified.

H-Provide a Long-Term Solution in Place of a Short-Term Solution

The 2010 *Coachella Valley Water Management Plan Update* reports that TDS concentrations in groundwater throughout the Coachella Valley averaged less than 250 mg/L in the 1930s and have increased in recent years to about 834 mg/L in the upper aquifer and 355 mg/L in the lower

[56] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-19, Section 4.2.3.2 Other SWP Transfers.

aquifer.[57] The 2010 *Coachella Valley Water Management Plan Update* recommends that the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, prepare a SNMP in compliance with the Recycled Water Policy to address basin salinity.[58] SNMP that will be completed as part of this program is intended to be long-term planning document to manage salts, nutrients, and other significant chemical compounds throughout the groundwater basin. A collaborative process will be executed to establish the goals and objectives, gather input on technical analysis tasks, and develop implementation and basin management measures. This collaborative process will help to ensure that long-term solutions are identified and implemented to manage salts, nutrients, and other relevant water quality constituents in the Region's most important water-related asset, the Coachella Valley Groundwater Basin.

This benefit has not been physically or economically quantified.

I-Improve Water Supply Reliability

The availability of imported water is becoming increasingly unreliable as a long-term permanent water supply solution. *The 2010 Coachella Valley Water Management Plan Update* states that the reliability of imported water supply from the SWP has declined due to a combination of extended drought, climate change, legal and environmental restrictions and risk of levee failure in the Bay-Delta.[59] Local recycled water use, which would be supported by this project, would reduce the need for additional imported water deliveries. The program would also reduce supply uncertainty and variability because recycled water yields are not impacted by weather factors such as drought and snowpack levels. Therefore, this program would considerably enhance local water supply reliability by facilitating current and future use of recycled water use within the Region, and reducing future additional dependence on unreliable imported water sources.

Data was not available to accurately quantify the benefits associated with improving water supply reliability as a result of the SNMP. This benefit has not been physically or economically quantified.

Physical Benefit 2: Manage Salt and Nutrients in the Region's Primary Groundwater Basin

Amount/Volume and Unit: Protection of one (1) existing groundwater well

Technical Justification of Physical Benefit:

Data collected in the Region has shown that nitrate levels are increasing. The *Coachella Valley Water District Water Quality Section Memorandum: Annual Nitrate Report for CVWD Domestic Wells* shows that since 2007, CVWD has inactivated four wells due to increasing nitrate levels.[60] A number of other groundwater wells within CVWD's service area are being monitored on a monthly basis, with some approaching nitrate concentration levels (triggers) that would require removing them from service. Without implementation of this program and associated management strategies to reduce nutrient levels, additional wells may need to be taken out of service.

[57] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan Update.* Page5-5, Section 5.1.2.1 Impacts of Colorado River Water Recharge.

[58] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan Update.* Page5-5, Section 5.1.2 Salinity Management. Page 5-23, Table 5-4, Summary of Emerging Issues.

[59] Coachella Valley Water District (CVWD). 2010. *Coachella Valley Water Management Plan Update.* Page6-1, Section 6-1 Need for Flexibility.

[60] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District Water Quality Section Memorandum: Annual Nitrate Report for CVWD Domestic Wells.*

Methods Used to Estimate the Physical Benefits

J-Avoid Cost of Drilling New Municipal Wells

Information from the CVRWMG agencies demonstrates that wellhead treatment for nitrates requires advanced water treatment that is prohibitively expensive on an individual well-by-well basis.[61] As such, when wells become contaminated (generally with nitrates), the agencies will tend to drill a new well in non-contaminated areas rather than invest in additional treatment at the contaminated site. Four wells are of particular concern within CVWD's service area, and without this program may need to be replaced in the next 20 years.[62] Therefore, over the assumed five year course of this project, it is estimated that one new well would need to be drilled.

Table 7-15: Physical Benefits for K-Avoid Cost of Drilling New Municipal Wells
Coachella Valley Salt and Nutrient Management Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2018	Avoid Cost of Drilling New Municipal Wells	1 well	0 wells	-1 well

K-Promote Social Health and Safety

The purpose of the salt and nutrient management plan provision of the Recycled Water Policy is to cumulatively manage salts and nutrients across groundwater basins.[63]The 2010 *Coachella Valley Water Management Plan Update* reports data on nutrients and salts (total dissolved solids [TDS]) that shows these constituents are increasing in the Region.[64] Without the *Coachella Valley Salt & Nutrient Management Program*, the Region would not undertake the regional planning process to address salts and nutrients in groundwater and, therefore, water quality degradation could continue to occur, and potentially create social health and safety issues within the Region.

Data was not available to accurately quantify the benefits associated with promoting social health and safety benefits associated with preparing a compliant SNMP. Therefore, this benefit has not been physically or economically quantified.

L-Improve Groundwater Quality

The purpose of the salt and nutrient management plan provision of the Recycled Water Policy is to cumulatively manage salts and nutrients across groundwater basins.[65] The 2010 *Coachella Valley Water Management Plan Update* reports data on nutrients and salts (total dissolved solids [TDS]) showing that

[61]Coachella Valley Water District (CVWD). 2010a. *Coachella Valley Water Management Plan Update.* Page 8-12 and 8-13, Section 8.1.4.3 Nitrate Remediation/Treatment.

[62] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District Water Quality Section Memorandum: Annual Nitrate Report for CVWD Domestic Wells.*

[63]State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

[64]Coachella Valley Water District (CVWD). 2010a. *Coachella Valley Water Management Plan Update.* Page5-5, Section 5.1.2.1 Impacts of Colorado River Water Recharge.

[65] State Water Resources Control Board (SWRCB). 2009. *Recycled Water Policy.* Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy

loading of these constituents is increasing in the Region.[66] Without the program, the Region would not undertake a regional planning process to address salt and nutrient loading in groundwater and, therefore, water quality degradation would likely continue to occur without exportation of these constituents. Without this program, additional water would be needed to balance inflow and outflow in the groundwater basin. This would most likely come from the Colorado River, which has higher total dissolved solids (TDS) than recycled water. CVWD's *Coachella Canal at Avenue 52 East – Water Quality Data* shows that TDS in the Colorado River water delivered via the Coachella Canal has a TDS ranging from 625-975 milligrams per liter (mg/L).[67] In contrast, recycled water has an average TDS of 450-500 mg/L.[68] Therefore, the use of recycled water instead of Colorado River water would be beneficial in terms of loading as the *Coachella Valley Salt and Nutrient Management Program* would reduce the need for additional recharge activities by facilitating source substitution with recycled water.

As the Region has not yet completed a cumulative anti-degradation analysis, accurate data regarding the potential water quality benefits that recycled water may have on water quality is not known at this time. Therefore, this benefit has not been physically or economically quantified.

[66] Coachella Valley Water District (CVWD). 2010a. *Coachella Valley Water Management Plan Update.* Page5-5, Section 5.1.2.1 Impacts of Colorado River Water Recharge.

[67] Coachella Valley Water District (CVWD). 2012b. *Coachella Canal at Avenue 52 East – Water Quality Data.*

[68] Coachella Valley Water District (CVWD). 2010b. *Coachella Valley 2010 WMP Update Draft Subsequent Program EIR.* Page 6-58, Section 6.4.4.6, Impact of Recycled Water Use.

Project 3: Groundwater Quality Protection Program – Subarea D2

Background

Abstract

The City of Desert Hot Springs is classified as an economically disadvantaged community (DAC), located within the Mission Springs Water District (MSWD) service area, which is located within the Colorado River Basin. This community overlays the Desert Hot Springs groundwater aquifer, a hot-water groundwater basin containing hot mineral water with temperatures exceeding 100 degrees Fahrenheit. This water serves as the economic basis of the City of Desert Hot Springs, because it draws visitors to the City's numerous spa resorts and hotels.

The Colorado River Basin Regional Water Quality Control Board's (RWQCB) *Water Quality Control Plan for the Colorado River Basin* (Basin Plan) notes septic system impacts to groundwater as a critical regional issue, and specifically states that septic systems within the Colorado River Basin have the potential to negatively impact groundwater. [69] Portions of the City of Desert Hot Springs have septic tank densities that are 2.3 to 2.8 times higher than the density recommended by the RWQCB. As such, the high density of the septic systems potentially threatens the water quality of the local groundwater supply, and therefore the local economy, which is highly dependent on hot mineral water to support the spa and hotel industry.

As a response to local issues associated with high-density septic systems, Assessment District 12 was approved by voters in 2004, providing approximately $28 million of matching funds that expires in 2014. This money was used to fund engineering design of a wastewater collection system that will abate approximately 6,000 on-site septic systems. Design of 10 sub-areas that make up the Assessment District is complete, and funds are now needed for construction. Environmental compliance documentation was completed in 1998 and re-certified in 2007.

The project area, Subarea D2, consists of 582 parcels and 382 existing on-site septic systems that will be converted to sewers by connecting to the existing MSWD sewer system. Wastewater collected by the MSWD sewer system would be sent to the existing Horton Wastewater Treatment Plant (HWWTP), where it would be beneficially reused via percolation. Project construction includes installing 18,555 linear feet of 8-inch vitrified clay pipe (VCP) sewer, 15,281 lineal feet of 4-inch VCP sewer laterals, 70 manholes, and all appurtenances. Final design work for Subarea D2 was completed in 2010, and construction is currently ready to bid.

Description and Relationship to Other Projects in the Proposal

This program will involve replacing high-density septic systems with sewers in a DAC. Several of the other projects – *Torres-Martinez Avenue 64 Water Supply Connection Project* and *San Antonio del Desierto DAC Sewer Extension Project* – both also serve the Region's DACs by providing healthy and sanitary municipal water and wastewater services. The Coachella Valley IRWM Plan identifies the critical need to serve the Region's DACs (IRWM Plan Objective L) and this funding application helps the Region to accomplish that goal.

[69] Colorado River RWQCB. 2006. *Water Quality Control Plan for the Colorado River Basin (Region 7).* Includes Amendments through June 2006. Section III: Regional Board Issues, A: Septic System Impacts to Groundwater Basins, page 5-2. Section II. Point Source Controls, H: Septic Systems, page 4-5.

This project also links to the *Coachella Valley Salt & Nutrient Management Program* in that it will be removing a source of nutrient and salt loading in the subbasin. Reducing this loading will help the Coachella Valley Groundwater Basin to meet overall Basin Plan objectives.

Without Project Baseline

This project will eliminate septic tanks that threaten contamination of groundwater supplies, by connecting properties located in Subarea D2 to the existing MSWD collection system and wastewater treatment plant. Cumulatively, the project will connect 564 parcels to the MSWD wastewater collection system and abate 382 on-site septic systems. The Without Project Baseline would include continued use (and potential leaking and/or failure) of existing individual septic systems within Subarea D2.

Without the project, wastewater from Subarea D2 would continue to be disposed of via septic systems, and would not be sent to the HWWTP. Effluent from septic tanks is known to contain relatively high concentrations of nitrite, nitrate, and nitrogen as ammonia, which can leach into the local groundwater, thereby causing increased nitrate concentrations in groundwater. Further, leaking or failing septic tanks could potentially leach raw sewage into the local groundwater, which would pose further water quality issues associated with fecal matter contamination and associated pathogens. Without the project, leaking or failing septic systems in Subarea D2 would continue to pose a potential contamination threat to the Desert Hot Springs and Mission Creek subbasins.

While not used as potable water, the Desert Hot Springs subbasin is important to the local economy, because it contains naturally hot mineral water that supports the local hotel and spa industry. Contamination of this aquifer, especially from pathogens, would be highly detrimental to the local hotel and spa industry, an important component of the Desert Hot Springs economy. Further, any contamination of the groundwater with pathogens could potentially pose a human health threat as the hot mineral water within the Desert Hot Springs subbasin is not treated prior to use.

Without the project, wastewater flows from Subarea D2 would infiltrate into the non-potable Desert Hot Springs subbasin and not be beneficially reused at HWWTP. Beneficial reuse of wastewater supplies is an important component of the Region's overall groundwater management strategy, and without the project, the Region would continue to rely upon imported water for groundwater recharge.

Without the project, residents would continue to pay to operate and maintain their individual septic systems. Septic systems need to be maintained (pumped) approximately every 5 years. Without the project, residents would also continue to need to replace septic systems approximately every 25 years.

Potential Adverse Physical Effects of the Project

This project would include construction of 18,555 linear feet of 8-inch vitrified clay pipe (VCP) sewer, 15,281 lineal feet of 4-inch VCP sewer laterals, 70 manholes, and all appurtenances. An environmental analysis for the project was completed in 1998 and re-certified in 2007, and demonstrated that the project would have no significant and unavoidable impacts. It is not anticipated that the project would result in any significant, long-term physical effects.

Recent/ Historical Conditions

The Coachella Valley IRWM region lies within Region 7 (Colorado River Basin) of the California Regional Water Quality Control Board (RWQCB). In 2006, the RWQCB last adopted the *Water Quality Control Plan for the Colorado River Basin* (Basin Plan), outlining water quality objectives for the region and putting forth an Implementation Program that would assist in achieving those objectives. The Basin Plan notes Septic System Impacts to Groundwater Basins as a critical regional issue and that unsewered

communities within Region 7 have the potential to negatively impact groundwater.[70] The Basin Plan specifically prohibits individual disposal systems on parcels (less than one-half acre) that overlie the Mission Creek and Desert Hot Springs groundwater aquifers and mandates connection to the municipal sewer system.[71]

Water quality in the Mission Creek Subbasin is being impacted by a on-site wastewater disposal systems (septic systems) within the Mission Creek Subbasin and potentially from the neighboring Desert Hot Springs subbasin, which contributes a small amount of inflow (approximately 1,800 AFY) to the unconfined Mission Creek aquifer.[72] On-site disposal systems are increasing nitrate contamination levels in local water supply wells. The *Groundwater Quality Protection Program – Subarea D2* will capture and treat wastewater flows, and then recharge them in the Mission Creek Subbasin. The project will result in groundwater quality protection by treating wastewater and preventing wastewater effluent from entering the high-quality Mission Creek subbasin.

MSWD's 2010 *Urban Water Management Plan* notes that the Desert Hot Springs Subbasin is a hot-water basin, containing hot mineral water with temperatures exceeding 100 degrees Fahrenheit.[73] This water serves as the economic basis of Desert Hot Springs because it draws visitors to the City's numerous spa resorts and hotels. Therefore, protecting the groundwater quality within the Desert Hot Springs aquifer will not only protect the local water supply but will also protect hot mineral water that is the economic basis of the community's spa industry.

Water quality both in the water supply (Mission Creek) and hot water (Desert Hot Springs) subbasins are vital to the area's economic vitality. In addition, because Desert Hot Springs qualifies as a disadvantaged community (DAC), this project will also protect residents of a DAC from significant costs that would result if treatment of the potable groundwater supply were necessary due to contamination of groundwater supplies.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The project has completed 100% design and is ready for construction. Further, the assessment district created to fund the remaining project components was already formed by voters. While MSWD will be constructing the sewer main and laterals to provide connections for Desert Hot Springs residents, there are additional decommissioning and costs totaling approximately $2.4 million (undiscounted) associated with the on-site septic systems (refer to Attachment 8).

Uncertainties in the Physical Benefits

The volume of wastewater collected and treated by the proposed *Groundwater Quality Protection Project – Subarea D2* project is uncertain because it cannot be guaranteed that all 382 existing septic systems will connect to the municipal sewer system. Although the Colorado River RWQCB and MSWD require that customers connect to wastewater collection systems once they are available to their property, some may not do so within the timeframe assumed in this economic analysis.

[70] Colorado River RWQCB. 2006. *Water Quality Control Plan for the Colorado River Basin (Region 7).* Includes Amendments through June 2006. Section III: Regional Board Issues, A: Septic System Impacts to Groundwater Basins, page 5-2. Section II. Point Source Controls, H: Septic Systems, page 4-5.

[71] Colorado River RWQCB. 2006. *Water Quality Control Plan for the Colorado River Basin (Region 7).* Includes Amendments through June 2006. Section II. Point Source Controls, H: Septic Systems, page 4-5.

[72] MSWD. 2011. *2010 Urban Water Management Plan.* Page 2-7, Table 2.1-1, Mission Creek Subbasin Inflows/Outflows.

[73] MSWD. 2011. 2010 *Urban Water Management Plan*. June 2011. Section 2.1.1 Groundwater, page 2-1.

Physical Benefits Overview

Table 7-16 provides a summary of the physical benefits of the *Groundwater Quality Protection Project – Subarea D2*, including quantification of the physical benefit where possible.

Table 7-16: Physical Benefits
Groundwater Quality Protection Project – Subarea D2

Physical Benefit	Result of Physical Benefit	Quantification of Physical Benefit
Facilitate Beneficial Reuse of Wastewater Flows	A-Avoid Cost of Imported Water for Recharge	158 AFY
	B-Reduce Demand for Net Diversions from the Bay-Delta	Qualitative
	C- Improve Water Supply Reliability	Qualitative
Prevent Wastewater Flows from Entering the Local Groundwater Basin	D-Avoid Loss of Hotel Revenue and Transient Occupancy Tax	$5,466,164
	E-Avoid O&M Costs to Septic Tank Owners	$2,222,099
	F-Avoid Groundwater Treatment	Qualitative
	G-Provide Social Recreation Benefits	Qualitative
	H-Promote Social Health and Safety	Qualitative
	I-Avoid Losses in Spa Economy	Qualitative
	J-Benefit Wildlife or Habitat Through Recharge	Qualitative
	K-Improve Groundwater Quality and Protect Beneficial Uses	Qualitative
	L-Improve the Overall, Long-Term Management of California's Groundwater Resources	Qualitative
	M-Provide a Long-Term Solution	Qualitative

Physical Benefit 1: Facilitate Beneficial Reuse of Wastewater Flows

Amount/Volume and Unit: 158 AFY of wastewater diverted to the HWWTP

Technical Justification of Physical Benefit

Implementation of the *Groundwater Quality Protection Project – Subarea D2* would prevent all wastewater flows that are currently disposed of via septic systems from entering the underlying Desert Hot Springs groundwater aquifer. As described above, a non-potable mineral hot springs aquifer that provides the economic basis for the spa and resort economy of the economically disadvantaged community of Desert Hot Springs.[74] The wastewater flows from Subarea D2 were calculated based on engineering and design studies that have been completed for the project (see Figure 3-12).[75] Once the project is constructed, these additional wastewater flows would be sent to the HWWTP, where they would flow via percolation beds to the Mission Creek groundwater aquifer.[76]

[74] MSWD. 2011. 2010 *Urban Water Management Plan*. June 2011. Section 2.1.1 Groundwater, page 2-1.
[75] MSWD. 2013. *Groundwater Protection Program Sewer Exhibit.*
[76] MSWD. 2011. *Mission Springs Water District 2010 Urban Water Management Plan.* Page 8-2, Section 8.2.3 Projected use of Recycled Water.

Methods Used to Estimate the Physical Benefits

A-Avoid Cost of Imported Water for Recharge

The MSWD groundwater protection program involves septic-to-sewer conversions that will increase wastewater flows to the HWWTP. MSWD's 2010 *Urban Water Management Plan* shows that wastewater produced at the HWWTP is currently placed in percolation ponds that are located over the Mission Creek groundwater aquifer.[77] Therefore, flows are currently used for recharge and are beneficially reused, as MSWD primarily uses water from the Mission Creek aquifer.[78] Without the project, wastewater flows from Subarea D2 would infiltrate into the non-potable Desert Hot Springs groundwater aquifer, which is not used as a water supply source. Therefore, the water would not be beneficially reused.

The 2010 *Urban Water Management Plan* shows that MSWD is pursuing Title XVI funding for upgrades to the HWWTP to generate tertiary-treated recycled water for irrigation purposes. [79] According to the *Urban Water Management Plan*, these upgrades should be completed and the HWWTP should be producing tertiary-treated recycled water by 2020.[80] For the purposes of the *Urban Water Management Plan*, MSWD assumed they would reclaim and reuse all of the wastewater generated within the service area for irrigation of golf courses and other suitable landscaping purposes, less 10% to account for treatment system losses.[81]

This project will connect 582 parcels and 382 septic systems to MSWD wastewater collection system. Information from the engineering and design work completed to date for the project shows that the total wastewater flows from Subarea D2 are 0.141 million gallons per day (mgd) or 158 acre-feet per year (AFY).[82] Applying MSWD's assumption that 10% would be lost during treatment, Subarea D2 will provide 142.2 AFY in future recycled water supply. It is assumed that approximately 25% of Subarea D2 customers would connect each year from 2018 – 2021, therefore staggering this supply contribution through those first four years.

As described above, MSWD currently percolates treated effluent into the Mission Creek subbasin. Though this does not reduce the demand for pumped groundwater (as would distribution of recycled water), it does provide recharge that benefits basin as a whole and lessens the impact of pumping.[83] Without this project, additional water may need to be imported from outside the basin to balance extraction. Regional water purveyors already use their full Colorado River water allocations, so additional groundwater recharge water would need to be acquired from other external sources.[84] This would be done by acquiring rights from State Water Project (SWP) water held by other entities, and exchanging these purchased rights with MWD for locally-available Colorado River water.

Table 7-17 provides a summary of the avoided imported water that may need to be purchased for recharging the Mission Creek basin in order to balance extractions and curb groundwater overdraft.

[77] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.
[78] MSWD. 2011. *2010 Urban Water Management Plan.* Page 2-1, Section 2.1.1 Groundwater.
[79] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.
[80] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.
[81] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.
[82] MSWD. 2013. *Groundwater Protection Program Sewer Exhibit.*
[83] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.
[84] Coachella Valley Water District (CVWD). 2010a. *Coachella Valley Water Management Plan Update.* Page 4-15, Section 4.3, State Water Project.

Table 7-17: Physical Benefits for A- Avoid Cost of Imported Water for Recharge
Groundwater Quality Protection Project – Subarea D2

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project (AF)**	**With Project (AF)**	**Change Resulting from Project (AF)**
2018	Avoid Cost of Imported Water for Recharge	35.55 AF	0	-35.55 AF
2019	Avoid Cost of Imported Water for Recharge	71.1 AF	0	-71.1 AF
2020	Avoid Cost of Imported Water for Recharge	106.65 AF	0	-106.65 AF
2021-2078	Avoid Cost of Imported Water for Recharge	142.2 AF	0	-142.2 AF

B-Reduce Demand for Net Diversions from the Bay-Delta

The *Groundwater Quality Protection Project – Subarea D2* involves septic-to-sewer conversions that will allow for beneficial reuse (direct and indirect groundwater recharge) of wastewater flows that would otherwise be lost to the Desert Hot Springs subbasin. Beneficial reuse would occur in two ways: 1) from 2018 to 2020 wastewater flows would be sent to the HWWTP where they would recharge the Mission Creek subbasin through percolation ponds, or 2) after the HWWTP is upgraded to tertiary treatment and is able to produce recycled water (anticipated in 2020), wastewater flows would be used for irrigation purposes to offset groundwater pumping and would therefore be considered as in lieu groundwater recharge.[85] This additional recharge would amount to 158 AFY beginning in 2018, and would offset the need to import additional water for groundwater recharge purposes. CVWD and DWA have contracts for imported water supplies from the SWP, which is exchanged with MWD for Colorado River water delivered at turnouts from MWD's Colorado River Aqueduct. Because the Region already receives its entire imported water entitlements (as they are available) and also purchases additional SWP Table A water from other agencies[86], any additional imported water needed to balance groundwater extraction would be purchased and transferred from the SWP. Transfers or leases from north of or within the Delta could potentially affect Delta water quantity or quality.

By reducing the need to import additional water for groundwater recharge, the project would directly offset demands for additional SWP water to balance basin extraction. Therefore, this project would offset net diversions from the Bay-Delta and help preserve this vital resource.

C-Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The project will help address reliability issues by offsetting the need for additional future use of imported water for groundwater recharge. The reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations and water rights determinations.

[85] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.

[86] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-19, Section 4.2.3.2 Other SWP Transfers.

Physical Benefit 2: Prevent Wastewater Flows from Entering the Local Groundwater Basin

Amount/Volume and Unit: 158 AFY of wastewater diverted to the HWWTP

Technical Justification of Physical Benefit

Implementation of the *Groundwater Quality Protection Project – Subarea D2* would prevent all wastewater flows that are currently disposed of via septic systems from entering the underlying Desert Hot Springs groundwater aquifer. As described above, this aquifer is a non-potable mineral hot springs aquifer that provides the economic basis for the spa and resort economy of the economically disadvantaged community of Desert Hot Springs.[87] The wastewater flows from Subarea D2 were calculated based on engineering and design studies that have been completed for the project (see Figure 3-12).[88] Once the project is constructed, these additional wastewater flows would be sent to the HWWTP, where they would flow via percolation beds to the Mission Creek groundwater aquifer.[89]

Methods Used to Estimate the Physical Benefits

D-Avoid Loss of Hotel Revenue and Transient Occupancy Tax

The Desert Hot Springs subbasin, over which Subarea D2 lies, contains natural mineral hot springs. The Desert Hot Springs community contains an estimated 24 businesses that are marketed for spa and other services associated with the natural mineral hot springs. If the Desert Hot Springs subbasin and the associated mineral hot springs were to become contaminated by contaminants from septic discharges, the tourism-related business of the Desert Hot Springs community would be substantially impacted.

The hotel industry in Desert Hot Springs for fiscal year (FY) 2011 brought in $9,066,667 in revenue to the region. The calculation for estimated lost revenue is based on the Transit Occupancy Tax (TOT) and sales tax revenues for the *City of Desert Hot Springs Annual Financial Report* from 2011. This report shows that hotel revenue in Desert Hot Springs included $1,088,000 for TOT revenue in 2011 from a 12% hotel tax, which represents tax collected on hotel revenue of $9,066,667 (12% of $9,066,667 = $1,088,000).[90] A 1% loss of this income would be $90,667/year. In addition to this loss in hotel revenue there also would be a loss in the TOT, which was 12% of the hotel revenue in 2011. For FY 2011, the TOT received from the hotel industry in Desert Hot Springs was $1,088,000, and 1% of this amount is $10,880.91 Therefore, given the assumed probability and extent of impact, the expected benefit received by preventing contamination of the Desert Hot Springs subbasin would be $101,547 per year.

For purposes of assessing the benefits of this project, it was assumed that there is 2% risk in any given year that 50% of the businesses would be impacted by septic-related contamination and forced to close without this project, starting in 2018 after project construction and spanning over the 60 year lifetime of this project. This is equivalent to 12 businesses being impacted over the course of this project, or 0.24 businesses per year. This would equivalent to a 1% loss in the mineral hot springs-related tourism industry revenue per year (0.24/24 X 100).

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[87] MSWD. 2011. 2010 *Urban Water Management Plan*. June 2011. Section 2.1.1 Groundwater, page 2-1.

[88] MSWD. 2013. *Groundwater Protection Program Sewer Exhibit.*

[89] MSWD. 2011. *Mission Springs Water District 2010 Urban Water Management Plan.* Page 8-2, Section 8.2.3 Projected use of Recycled Water.

[90] City of Desert Hot Springs. 2011. *Financial Statements Year Ended June 30, 2011.* Page 4, Statement of Activities, Transient Occupancy Taxes.

[91] City of Desert Hot Springs. 2011. *Financial Statements Year Ended June 30, 2011.* Page 4, Statement of Activities, Transient Occupancy Taxes.

Once contaminated, it is assumed that each individual business would suffer a five- year reduction in business. This five-year period would be needed to provide time to explore and implement alternatives such as on-site treatment and then rebuild consumer confidence in the water quality and the local mineral hot springs spa industry. Therefore, the total risk of loss without this project would be 5% annually (5 years x 1% loss per year). However, taking a conservative approach and assuming that since the risk of contamination is first monetized starting in 2018, then the losses start at one percentage and increase by 1% per year until the 5 % maximum is reached (1% in 2018, 2% in 2019, etc.).

Table 7-18: Physical Benefits for B- Avoid Loss of Hotel Revenue and Transient Occupancy Tax
Groundwater Quality Protection Project – Subarea D2

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2018	Avoid Loss of Hotel Revenue and Transient Occupancy Tax	1% loss in tourism and TOT revenue	0	Avoid 1% loss in tourism and TOT revenue
2019	Avoid Loss of Hotel Revenue and Transient Occupancy Tax	2% loss in tourism and TOT revenue	0	Avoid 2% loss in tourism and TOT revenue
2020	Avoid Loss of Hotel Revenue and Transient Occupancy Tax	3% loss in tourism and TOT revenue	0	Avoid 3% loss in tourism and TOT revenue
2021	Avoid Loss of Hotel Revenue and Transient Occupancy Tax	4% loss in tourism and TOT revenue	0	Avoid 4% loss in tourism and TOT revenue
2022-2078	Avoid Loss of Hotel Revenue and Transient Occupancy Tax	5% loss in tourism and TOT revenue	0	Avoid 5% loss in tourism and TOT revenue

E-Avoid O&M Costs to Septic Tank Owners

By replacing septic systems with sewer connections, the *Groundwater Quality Protection Program – Subarea D2* project would eliminate costs to septic tank owners associated with O&M and replacement costs of septic tanks. The proposed project area (Subarea D2) is included as part of a larger project area, Assessment District 12 (AD-12). Of the 6,000 septic tanks in AD-12, this project would replace 382 septic tanks associated with 582 parcels. It is assumed that approximately 25% of the individual septic systems would be replaced with municipal service connections each year from 2018 - 2021.

MSWD estimates that septic system replacement costs average $10,000 over a 25-year period, or approximately $400 per year.[92] This project would replace 382 septic tanks, therefore resulting in an annualized avoided cost of $152,800 per year ($400 x 382). It is assumed that approximately 25% of Subarea D2 customers would connect each year from 2018 – 2021, therefore staggering this avoided cost through those first four years.

MSWD also estimates that for 382 septic systems, the annualized O&M costs are estimated to be $500 for pumping every three to five years, indicating an average maintenance cost of $125 per year per septic

[92] Personal communication from John Soulliere, Admin Officer/Public Relations, Mission Springs Water District

tank.[93] Therefore the net benefit would be $525/year per septic tank avoided ($400 per year + $125 per year).

This project assumes that 25% (95.5) of septic systems will be connected per year to this project between 2018-2021, so net avoided cost benefits begin in 2018 and increase on an annual basis from 2018-2021.

Table 7-19: Physical Benefits for C- Avoid O&M Costs to Septic Tank Owners
Groundwater Quality Protection Project – Subarea D2

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2018	Avoid O&M Costs to Septic Tank Owners	25% of septic O&M costs	0	25% of septic O&M costs
2019	Avoid O&M Costs to Septic Tank Owners	50% of septic O&M costs	0	50% of septic O&M costs
2020	Avoid O&M Costs to Septic Tank Owners	75% of septic O&M costs	0	75% of septic O&M costs
2021-2078	Avoid O&M Costs to Septic Tank Owners	100% of septic O&M costs	0	100% of septic O&M costs

F-Avoid Groundwater Treatment Costs

By eliminating wastewater from entering the groundwater aquifer within the project area, the *Groundwater Quality Protection Program – Subarea* D2 project would potentially reduce or eliminate the need to conduct groundwater treatment to remove nitrate, pathogens, and other constituents. The primary purpose of this project is to remove a source of contaminates (wastewater) from coming into contact with groundwater in the Desert Hot Springs aquifer. If the project were not implemented, it is possible that groundwater users such as local hotels and spas would install onsite treatment devices to remove contaminants such as nitrates, pathogens, and other constituents from the water. Although not economically monetized, such treatment activities would likely be expensive, potentially prohibitively expensive to the residents and business owners within Desert Hot Springs, an economically disadvantaged community.

At this time it is not know what type of treatment would be required, because the specific type of contaminants present in the groundwater are not known. Further, it is not known what the treatment capacity would need to be since this value is dependent upon the impacted well in question, which is hypothetical at this time. Due to the uncertainty involved in applying these numbers to this situation, this benefit has not been monetized.

G-Provide Social Recreation Benefits

The Desert Hot Springs subbasin, which underlies Subarea D2, contains natural mineral hot springs. The community of Desert Hot Springs contains an estimated 24 businesses that are marketed as a spa and other services associated with the natural mineral hot springs. If the Desert Hot Springs subbasin and the associated hot springs were to become contaminated from leaking or failing septic tanks in Subarea D2, the tourism-related business of the Desert Hot Springs community would be substantially impacted. The conversion of Subarea D2 to a municipal sewer system reduces the probability of contamination and associated loss of tourism and recreation. Direct monetized benefits associated with hotel revenue and

[93] Personal communication from John Soulliere, Admin Officer/Public Relations, Mission Springs Water District

transient occupancy tax revenue associated with tourism are provided in the preceding section. However, the mineral hot springs that would be protected by this project also provide other social benefits such as therapeutic recreation benefits that have not been monetized, because they are qualitative in nature.

H-Promote Social Health and Safety

If the Desert Hot Springs groundwater aquifer were contaminated with nitrates, pathogens, or other constituents from leaking or failing septic systems, those constituents could impact the public health of spa users that would come into direct contact with contaminated water.

I-Avoid Losses in Spa Economy

As shown in Figure 3-2 in Attachment 3, the City of Desert Hot Springs is a DAC whose households earn less on average than the Statewide median household income of $48,706. The City of Desert Hot Springs Financial Statements for FY 2011 also show that faced a $5.9 million deficit in 2011.[94] Because the city of Desert Hot Springs is a DAC, loss of revenue to this economy would be particularly burdensome and could cause catastrophic social and economic impacts. The project would help to avoid these impacts by protecting hotel revenues and transient occupancy tax revenue.

J-Benefit Wildlife or Habitat Through Recharge

A RWQCB staff report on the Salton Sea Transboundary Watershed shows that the Coachella Valley IRWM Region is located within the Salton Sea Transboundary Area, meaning that Subarea D2 is hydrologically connected to the Salton Sea.[95] This staff report also discusses water quality issues such as nutrient impairment and eutrophication within the Salton Sea, which are from constituents such as nitrates often found in septic effluent.[96] Without the project, water quality constituents from leaking or failing septic tanks in Subarea D2 would continue to infiltrate into the Desert Hot Springs groundwater aquifer, and could eventually enter the Salton Sea.

Groundwater extraction in the Region also has the potential to impact the continued viability of mesquite hummocks, which provide important habitat for locally-important species that include the Coachella Valley fringe-toed lizard, Palm Springs pocket mouse, and Coachella Valley round-tailed ground squirrel.[97] These mesquite hummocks often occur along fault zones where groundwater is forced to the surface, such as the mesquite hummocks along the Banning Fault in the Willow Hole Conservation Area. The vegetation structure of the mesquite traps sand that has been transported by wind from sand deposited or exposed by flood events in Mission Creek and Morongo Wash floodplains on the south side of the Banning Fault forming dunes and hummocks along the fault line. The mesquite associated with sand dunes enhances conditions that provide habitat for the aforementioned species.[98] The *Supplemental EIR/EIS for the Coachella Valley Multiple Species Habitat Conservation Plans/Natural Community*

[94] City of Desert Hot Springs. 2012. *City of Desert Hot Springs Financial Statements, Year Ending June 30, 2011.* Page 4, "Change in Net Assets"

[95] Regional Water Quality Control Board (RWQCB). 2000. *California Environmental Protection Agency Regional Water Quality Control Board Colorado River Basin Region – Staff Report: Water Quality Issues in the Salton Sea Transboundary Watershed.*

[96] Regional Water Quality Control Board (RWQCB). 2000. *California Environmental Protection Agency Regional Water Quality Control Board Colorado River Basin Region – Staff Report: Water Quality Issues in the Salton Sea Transboundary Watershed.*

[97] Coachella Valley Association of Governments. 2013. *Supplemental Environmental Impact Report/Supplemental Environmental Impact Statement for a Major Amendment to the Coachella Valley Multiple Species Habitat Conservation Plans/Natural Community Conservation Plan*. Page 4.2-10.

[98] Coachella Valley Association of Governments. 2013. *Supplemental Environmental Impact Report/Supplemental Environmental Impact Statement for a Major Amendment to the Coachella Valley Multiple Species Habitat Conservation Plans/Natural Community Conservation Plan*. Page 4.2-10.

Conservation Plan acknowledges that potential threats to the mesquite hummocks natural community in the Region include competition for subsurface water from non-native tamarisk and the drawdown of the groundwater table within the Mission Creek subbasin.

As described above, MSWD currently percolates treated effluent into the Mission Creek subbasin. Though this does not reduce the demand for pumped groundwater (as would distribution of recycled water), it does provide recharge that benefits basin as a whole and lessens the impact of pumping.[99] The proposed project would contribute wastewater flows to the HWWTP which would in turn either recycle it for beneficial reuse (planned to begin in 2020)[100] or continue to percolate it at the plant. These activities will contribute to the long-term health of the mesquite hummocks and other groundwater-dependant habitats within the Coachella Valley.

K-Improve Groundwater Quality and Protect Beneficial Uses

Effluent from septic tanks is known to contain relatively high concentrations of nitrite, nitrate, and nitrogen as ammonia, which can leach into the local groundwater, thereby causing increased nitrate concentrations in groundwater. Further, leaking or failing septic tanks could potentially leach raw sewage into the local groundwater, which would pose further water quality issues associated with fecal matter contamination and associated pathogens. By removing this potential source of nitrate, the project will help improve water quality within the Desert Hot Springs and Mission Creek groundwater aquifers.

Further, due to the project's location within the Salton Sea Transboundary Watershed, groundwater within the Desert Hot Springs groundwater aquifer is hydrologically connected to the Salton Sea, meaning that constituents from septic tanks could eventually enter the Salton Sea. The Salton Sea is already challenged with water quality issues such as nutrient impairment and eutrophication, which result in low dissolved oxygen, high ammonia levels, and foul odors.[101] Further inputs of nitrates into the sea could exacerbate these issues.

L-Improve the Overall, Long-Term Management of California's Groundwater Resources

The *Groundwater Quality Protection Project – Subarea D2* involves septic-to-sewer conversions that will increase the amount of treated wastewater that can be used for groundwater recharge and for recycled water when the HWWTP upgrades to tertiary treatment in the future.[102] Recharge from the HWWTP will supplement supplies in the Mission Creek groundwater aquifer that serves as the primary source of water for users within the MSWD service area. Further, future recycled water provided by the HWWTP will be used by irrigation customers to offset groundwater pumping, and will therefore also benefit water users within the MSWD service area and Valley-wide.

These benefits will help to manage California's groundwater resources (Mission Creek groundwater aquifer is Basin 7-21.02 as designated by DWR Bulletin 118[103]) on a long-term basis as they will help recharge the local groundwater basin or provide for source substitution due to recycled water provisions from HWWTP that would be used to offset localized groundwater pumping from the Mission Creek groundwater aquifer.

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[99] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.

[100] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.

[101] Regional Water Quality Control Board (RWQCB). 2000. *California Environmental Protection Agency Regional Water Quality Control Board Colorado River Basin Region – Staff Report: Water Quality Issues in the Salton Sea Transboundary Watershed.*

[102] MSWD. 2011. *2010 Urban Water Management Plan.* Section 2.2.4 Recycled Water, page 2-19.

[103] California Department of Water Resources. 2013. *Basins and Subbasins of the Colorado River Hydrologic Region*. Available: http://www.water.ca.gov/groundwater/bulletin118/colorado_river.cfm

M-Provide a Long-Term Solution

The *Groundwater Quality Protection Project – Subarea D2* involves septic-to-sewer conversions that will provide sustainable long-term management of local wastewater (in lieu of septic systems) and increases beneficial reuse of wastewater flows, thereby reducing dependence on imported water necessary for recharging the groundwater basin. As such, this project provides a long-term solution to local wastewater management in the Desert Hot Springs community and will provide infrastructure that will help the Region to manage its groundwater resources on a long-term basis.

Project 4: San Antonio del Desierto DAC Sewer Extension Project

Background

Abstract

The San Antonio del Desierto (St. Anthony) Mobile Home Park is located along Highway 111, south of Avenue 66 and north of Avenue 68 in the eastern Coachella Valley in an unincorporated portion of Riverside County known as Mecca. This mobile home park, which contains approximately 400 residents, is considered an economically disadvantaged community (DAC) per requirements established by DWR. The mobile home park is owned by the Pueblo Unido Community Development Corporation (PUCDC), which is in the process of acquiring legal permitting for the mobile home park in the form of a Conditional Use Permit (CUP) from the County of Riverside. One of the conditions of the CUP is that the mobile home park must convert to a sanitary wastewater system, as the mobile home park currently relies upon five (5) anaerobic wastewater treatment lagoons for wastewater treatment and disposal.

The existing wastewater lagoons are in extremely close proximity (within 150 feet) to the mobile home park residents. Inadequate design of the lagoons, including lack of proper lining, location, and unstable dikes, make contamination from the lagoons a serious public health threat, and urge the need to provide a sanitary and reliable wastewater disposal and treatment system for residents of the mobile home park. Inadequate design of the lagoons not only provides concerns relating to the health and safety of mobile home park residents, but also presents water quality concerns within and surrounding the project area. Due to the project's location within the eastern Coachella Valley, the project area is underlain by a shallow groundwater aquifer with a high water table. As such, inadequate lagoon conditions pose a potential threat to groundwater quality within the surrounding area as wastewater and associated contaminants from the lagoons could potentially contaminate the groundwater due to the lack of an adequate barrier lining the lagoons. Due to the proximity of the mobile home park to the Coachella Valley Water District's (CVWD's) sewer sanitary collection system, connecting to the CVWD municipal wastewater system is the best option for meeting project-related needs.

The project proposes the installation of a gravity sewer pipeline, lift station, and a sewer force main pipeline that would collect wastewater from the St. Anthony Mobile Home Park. The project would provide sewer service to the residents and convey the wastewater to CVWD's Water Reclamation Plant No. 4 (WRP-4).

Description and Relationship to Other Projects in the Proposal

Though not explicitly connected with other projects in this proposal, this project would provide necessary sanitary sewer service to a disadvantaged community. Several of the other projects – *Groundwater Quality Protection Program – Subarea D2* and *Torres-Martinez Avenue 64 Water Supply Connection Project* – both also serve the Region's DACs by providing healthy and sanitary municipal water and wastewater services. The Coachella Valley IRWM Plan identifies the critical need to serve the Region's DACs (IRWM Plan Objective L) and this funding application helps the Region to accomplish that goal.

Without Project Baseline

The *San Antonio del Desierto DAC Sewer Extension Project* would serve an economically disadvantaged mobile home park in the unincorporated community of Mecca within Riverside County. The main purpose of this project is to replace the existing onsite wastewater lagoon system at the St. Anthony Mobile Home Park with municipal sewer service. The existing conditions at the wastewater lagoon

system and the mobile home park are the baseline for the physical benefits described in this attachment and economic cost benefit analysis contained in Attachment 8.

Without the project, the most significant impact would most likely be that the St. Anthony Mobile Home Park would not be able to receive a CUP from the County of Riverside, and would therefore likely close. The current wastewater lagoons fail to meet regulatory requirements, pose a health and safety threat to residents, and therefore do not represent acceptable wastewater treatment infrastructure per the County of Riverside. The pending CUP from the County of Riverside (CUP#03645) indicates that one of the conditions of approval for the CUP is the assumption that the mobile home park would connect to the CVWD wastewater system.[104] Absent conversion of the on-site wastewater system to a sanitary sewer system, this mobile park would not be able to meet conditions of the CUP, would not be permitted, and therefore could be shut down by the County of Riverside.

The community of Mecca, and the majority of the eastern Coachella Valley is underlain by a shallow groundwater aquifer that has limited groundwater percolation due to silt and clay layers (an aquitard).[105] Due to the aquitard, surface water in this area percolates into the shallow groundwater aquifer and may eventually drain into the Salton Sea. Although there is no site-specific water quality data for the wastewater lagoons, it is suspected that wastewater from the lagoons percolates to and potentially contaminates the underlying shallow groundwater aquifer. Further, as there has been observed erosion on the banks of the lagoons, it is possible that the wastewater also drains off the surface of these ponds. The presence of high groundwater and poor percolation rates in the vicinity can negatively impact the operation of the onsite wastewater lagoons, and may result in the subsurface flow of water from the lagoons to adjacent agricultural drains. Agricultural drains in the south eastern Coachella Valley that do not drain to the Coachella Valley Stormwater Channel (CVSC) flow directly to the Salton Sea.[106] Further, there is an 85-acre freshwater-salt water habitat complex near the mouth of the CVSC, which was constructed and is still operated by the Torres-Martinez Desert Cahuilla Indians (the Torres-Martinez wetlands). These wetlands remove nutrients and pollutants from drain water from the CVSC, and could potentially be impacted from contaminants in the subsurface and surface water runoff from the existing wastewater lagoons at the St. Anthony Mobile Home Park.[107]

For purposes of this analysis, it is assumed that wastewater flows from the project would be treated to tertiary levels at WRP-4 and beneficially reused as recycled water. However, please note that currently WRP-4 is a secondary wastewater treatment plant and does not have the ability to produce recycled water. CVWD's 2010 *Urban Water Management Plan* shows that wastewater that is sent to WRP-4 is currently discharged to the CVSC after undergoing secondary treatment. CVWD intends to upgrade WRP-4 to tertiary treatment to produce recycled water for beneficial reuse. It is anticipated that WRP-4 would produce approximately 1,760 acre-feet per year (AFY) of tertiary-treated recycled water by 2015.[108]

[104] County of Riverside Planning Department. 2011. *CZ07738/CUP03645 – PC Staff Report: May 25, 2011.* Page 3 of 4, Finding No. 5.

[105] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update.* Page 4-3, Section 4.1 Local Groundwater, Section 4.1.1 Whitewater River Subbasin.

[106] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update.* Page 4-5, Section 4.1 Local Groundwater, Section 4.1.1.2 Thermal Subarea.

[107] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update.* Page 8-12, Section 8.1.3 Environmental Enhancement and Mitigation Projects.

[108] Coachella Valley Water District. 2011. *2010 Urban Water Management Plan.* Page 4-24 and Page 4-26, Section 4.5.1.5 WRP-4 and Table 4-13 Historical and Future Recycled Water Production.

Potential Adverse Physical Effects of the Project

This project would include installation of a gravity sewer pipeline, lift station, and a sewer force main pipeline that would collect wastewater from the St. Anthony Mobile Home Park and transport it to WRP-4. A mitigated negative declaration was completed for the project in 2011 in accordance with the California Environmental Quality Act, which demonstrated that the project would not result in any significant and unavoidable impacts.[109] Due to the size and nature of the project, is not anticipated that the project would result in any significant, long-term physical effects.

Recent/ Historical Conditions

In 2011, Pueblo Unido Community Development Corporation applied for a Conditional Use Permit with the County of Riverside to obtain proper permitting for the St. Anthony Mobile Home Park, an unpermitted mobile home park located within the unincorporated community of Mecca in the eastern Coachella Valley. Due to existing conditions within the St. Anthony Mobile Home Park, conditions of the CUP require that the park be connected to the CVWD sanitary sewer system before the CUP can be obtained. [110] The primary purpose of this project is to connect the St. Anthony Mobile Home Park to the CVWD sanitary sewer system, thereby facilitating future obtainment of a CUP for the park.

By facilitating successful obtainment of a CUP for the St. Anthony Mobile Home Park, the project would help to ensure safe and affordable housing for the some 400 economically disadvantaged residents of the park. Providing safe and affordable housing to existing residents is an important issue as the residents are economically disadvantaged, and therefore do not have many other readily-available housing options. The issue of securing safe and affordable housing is not just an issue specific to the St. Anthony Mobile Home Park, but is a pervasive issue in the eastern Coachella Valley. Regarding this issue, a comprehensive market study completed for the community of Mecca stated, "the proposed San Antonio del Desierto (St. Anthony Mobile Home Park) project is an innovative approach which effectively responds to the need of housing preservation and a compelling strategy to prevent potential displacement of families." [111]

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The project included in this scope of work (refer to Attachment 3) includes design, engineering, and construction for all facilities necessary to connect the St. Anthony Mobile Home Park to the CVWD municipal sewer system. Additional facilities necessary to treat and convey recycled from WRP-4 are not included in this project.

Uncertainties in the Physical Benefits

The volume of wastewater that would be collected and treated by the project is uncertain, because it is based on an average flow per dwelling unit estimation rather than on actual flows from the mobile home park. However, as described below, the average flow per dwelling unit used in this analysis is conservative as it is on the low end of the range reported by a local agency (the City of Coachella). Further, avoided cost estimates pertaining to replacing the existing wastewater lagoons were estimated as described in Attachment 8.

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[109] County of Riverside Planning Department. 2011. *Environmental Assessment Form: Initial Study.* Page 3, Environmental Factors Potentially Affected.

[110] County of Riverside Planning Department. 2011. *CZ07738/CUP03645 – PC Staff Report: May 25, 2011.* Page 3 of 4, Finding No. 5.

[111] Gross, Elena Blank. N.D. *Market Study: the Unincorporated Community of Mecca.* Executive Summary and Conclusions.

Physical Benefits Overview

Table 7-20 provides a summary of the physical benefits of the *San Antonio del Desierto DAC Sewer Extension Project*, including quantification of the physical benefit where possible.

Table 7-20: Physical Benefits
San Antonio del Desierto DAC Sewer Extension Project

Physical Benefit	Result of Physical Benefit	Quantification of Physical Benefit
Facilitate Beneficial Reuse of Wastewater Flows	A-Avoid Cost of Imported Water for Recharge	38 AFY
	B-Reduce Demand for Net Diversions from the Bay-Delta	Qualitative
	C- Improve Water Supply Reliability	Qualitative
Capture, Treat, and Use Onsite Wastewater	D-Promote Social Health and Safety	Qualitative
	E- Other Social Benefits Associated with Displacing DACs	Qualitative
	F-Benefit Wildlife or Habitat at Torres-Martinez Wetlands	Qualitative
	G-Improve Groundwater Quality and Protect Beneficial Uses	Qualitative
	H- Provide a Long-Term Solution for DACs	Qualitative
Prevent More Costly Infrastructure	I-Avoid Cost of Rehabilitating Existing Lagoons	5 wastewater lagoons

Physical Benefit 1: Facilitate Beneficial Reuse of Wastewater Flows

Amount/Volume and Unit: 38 AFY

Technical Justification of Physical Benefit

Implementation of the *San Antonio del Desierto DAC Sewer Extension Project* would provide sanitary sewer service to the St. Anthony Mobile Home Park by connecting this residential area to the CVWD municipal wastewater system. Specifically, the project would provide sanitary sewer service to 136 units at the park.

The *City of Coachella General Plan Update 2012* states that the wastewater generation factor for other local agencies within the Coachella Valley ranges from 250 gallons per day (gpd) per equivalent dwelling unit (EDU) to 300 gpd/EDU.[112] For purposes of this analysis, it is assumed that wastewater generation from the St. Anthony Mobile Home Park would be 250 gallons per day or 38 AFY for the entire mobile home park. This is anticipated to begin in 2017, after project construction, and extend for the 60-year lifetime of the project.

Methods Used to Estimate the Physical Benefits

A-Avoided Cost of Imported Water for Recharge

The *San Antonio del Desierto DAC Sewer Extension Project* involves connecting the St. Anthony Mobile Home Park to the CVWD municipal wastewater treatment system, and therefore increasing wastewater flows to WRP-4. CVWD's 2010 *Urban Water Management Plan* shows that wastewater that is sent to

[112] City of Coachella. 2012. *City of Coachella General Plan Update Environmental Impact Report Existing Settings - Wastewater.* Page 2.14-1, Section 2.14 – Wastewater.

WRP-4 is currently discharged to the CVSC after undergoing secondary treatment. While these flows are not currently beneficially reused, CVWD intends to upgrade WRP-4 to tertiary treatment to produce recycled water for beneficial reuse. It is anticipated that WRP-4 would produce approximately 1,760 acre-feet per year (AFY) of tertiary-treated recycled water by 2015.[113] Given that the project would be complete in 2017, it is assumed that all of the flows from the project would be treated to a tertiary level and recycled.

The *City of Coachella General Plan Update 2012* states that the wastewater generation factor for other local agencies within the Coachella Valley ranges from 250 gallons per day (gpd) per equivalent dwelling unit (EDU) to 300 gpd/EDU.[114] For purposes of this analysis, it is assumed that wastewater generation from the St. Anthony Mobile Home Park would be 250 gallons per day or 38 AFY for the entire mobile home park. This is anticipated to begin in 2017, after project construction, and extend for the 60-year lifetime of the project.

Currently, recycled water is used within the Region for irrigation purposes in accordance with Title 22 of the California Code of Regulations. This recycled water use is considered as source substitution as its use directly avoids groundwater pumping. As such, recycled water use offsets the need for the Region to import additional water to replenish the groundwater aquifer.

Without this project, all wastewater flows (38 AFY) would be lost to the Salton Sea. Therefore, without the project, additional water may need to be imported from outside the basin to balance groundwater extraction, and would most likely come from exchanges of acquired rights for SWP water in order to obtain Colorado River water. Regional water purveyors already use their full Colorado River water allocations for groundwater recharge, so additional groundwater recharge water would need to be acquired from other external sources.[115] This would be done by acquiring rights from to SWP water held by other entities, and exchanging these purchased rights with MWD for locally-available Colorado River water.

Table 7-21 provides a summary of the avoided imported water that may need to be purchased for recharging to abate groundwater overdraft.

Table 7-21: Physical Benefits for Benefit A- Avoid Cost of Imported Water
San Antonio del Desierto DAC Sewer Extension Project

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2077	Avoid Cost of Imported Water for Recharge	38 AFY	0 AFY	-38 AFY

[113] Coachella Valley Water District. 2011. *2010 Urban Water Management Plan.* Page 4-24 and Page 4-26, Section 4.5.1.5 WRP-4 and Table 4-13 Historical and Future Recycled Water Production.

[114] City of Coachella. 2012. *City of Coachella General Plan Update Environmental Impact Report Existing Settings - Wastewater.* Page 2.14-1, Section 2.14 – Wastewater.

[115] Coachella Valley Water District (CVWD). 2010a. *Coachella Valley Water Management Plan Update.* Page 4-15, Section 4.3, State Water Project.

B-Reduce Demand for Net Diversions from the Bay-Delta

The *San Antonio del Desierto DAC Sewer Extension Project* involves sewer connections that will allow for beneficial reuse of wastewater flows, thereby reducing dependence on imported water necessary for recharging the groundwater basin. Beneficial reuse would after the WRP-4 is upgraded to tertiary treatment and is able to produce recycled water. It is anticipated that WRP-4 would produce approximately 1,760 acre-feet per year (AFY) of tertiary-treated recycled water, assuming that WRP-4 is upgraded to recycled water service beginning in 2015.[116] Additional recharge from the 38 AFY of wastewater flows from St Anthony's Mobile Home Park would begin in 2017 after construction of the sewer main and lift station are complete. CVWD and DWA have contracts for imported water supplies from the SWP, which is exchanged with MWD for Colorado River water delivered at turnouts from MWD's Colorado River Aqueduct. Because the Region already receives its entire imported water entitlements (as they are available) and also purchases additional SWP Table A water from other agencies[117], any additional imported water needed to balance groundwater extraction would be purchased and transferred from the SWP. Transfers or leases from north of or within the Bay-Delta could potentially affect Bay-Delta water quantity or quality.

By reducing the need to import additional water for groundwater recharge, the project would directly offset demands for additional SWP water to balance basin extraction. Therefore, this project would offset net diversions from the Bay-Delta and help preserve this vital resource.

C-Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The project will help address reliability issues by offsetting the need for additional future use of imported water for groundwater recharge. The reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations and water rights determinations.

Physical Benefit 2: Capture, Treat, and Use Onsite Wastewater

Amount/Volume and Unit: 38 AFY

Technical Justification of Physical Benefit

Implementation of the *San Antonio del Desierto DAC Sewer Extension Project* would provide sanitary sewer service to the St. Anthony Mobile Home Park by connecting this residential area to the CVWD municipal wastewater system. Specifically, the project would provide sanitary sewer service to 136 units at the park.

The *City of Coachella General Plan Update 2012* states that the wastewater generation factor for other local agencies within the Coachella Valley ranges from 250 gallons per day (gpd) per equivalent dwelling unit (EDU) to 300 gpd/EDU.[118] For purposes of this analysis, it is assumed that wastewater generation from the St. Anthony Mobile Home Park would be 250 gallons per day or 38 AFY for the entire mobile

[116] Coachella Valley Water District. 2011. *2010 Urban Water Management Plan.* Page 4-24 and Page 4-26, Section 4.5.1.5 WRP-4 and Table 4-13 Historical and Future Recycled Water Production.

[117] Coachella Valley Water District (CVWD). 2011. *Coachella Valley Water District 2010 Urban Water Management Plan Final Report.* Page 4-19, Section 4.2.3.2 Other SWP Transfers.

[118] City of Coachella. 2012. *City of Coachella General Plan Update Environmental Impact Report Existing Settings - Wastewater.* Page 2.14-1, Section 2.14 – Wastewater.

home park. This is anticipated to begin in 2017, after project construction, and extend for the 60-year lifetime of the project.

Methods Used to Estimate the Physical Benefits

D-Promote Social Health and Safety

The current wastewater lagoons provide a health and safety threat to the residents of the mobile home park and the surrounding community of Mecca. Contaminants located within the wastewater such as nitrates and pathogens could potentially become airborne as the lagoons dry up and sediment that has been in contact with wastewater becomes airborne. Such airborne contaminants have the potential to affect not only the residents within the St. Anthony Mobile Home Park, but also other nearby residents within the community of Mecca. In addition, contaminants located within the wastewater could potentially come into contact with community members due to spills from the lagoons. A recent large storm event eroded banks of lagoons, furthering potential for overflow.

By connecting the St. Anthony Mobile Home Park to the CVWD municipal sewer, all wastewater flows generated from the park would be captured and conveyed to WRP-4. Therefore, the project would directly remove this potential contaminant source from coming into contact with community members. Although this benefit has not been quantified or monetized, it is anticipated that this impact would be substantial as the proximity of the wastewater lagoons to St. Anthony Mobile Home Park residents and the poor physical condition of the lagoons pose a serious health risk to the community.

E-Have Other Social Benefits

Without the *San Antonio del Desierto DAC Sewer Extension Project*, the mobile home park would not meet permitting requirements established by the County of Riverside, and therefore may need to close down. The pending CUP from the County of Riverside (CUP#03645) indicates that one of the conditions of approval for the CUP is the assumption that the mobile home park would connect to the CVWD wastewater system.[119]

If the mobile home park were to shut down, approximately 400 economically disadvantaged residents would be displaced. As there is currently a shortage of affordable housing for low-income residents in the area (the eastern Coachella Valley), the 400 displaced residents would not have readily available access to other housing options.[120] Therefore, the project would provide other social benefits associated with facilitating proper permitting for the St. Anthony Mobile Home Park, which would help to provide housing security to mobile home park residents that do not have many other housing options.

Obtaining a compliant CUP from the County of Riverside via the infrastructure improvements associated with this project could provide extended affordable housing benefits beyond the St. Anthony Mobile Home Park. This is because infrastructure investments in the project area could potentially help to catalyze proper permitting for other similar mobile home parks in the eastern Coachella Valley, which could help to create new opportunities for affordable housing in the vicinity. Therefore, the project would not just help to provide reliable housing to residents within the existing St. Anthony Mobile Home Park, but could also spur other infrastructure and development upgrades necessary to obtain proper permitting, which could help meet affordable housing shortages throughout the eastern Coachella Valley.

[119] County of Riverside Planning Department. 2011. *CZ07738/CUP03645 – PC Staff Report: May 25, 2011.* Page 3 of 4, Finding No. 5.

[120] Gross, Elena Blank. N.D. *Market Study: the Unincorporated Community of Mecca.* Page 19, Section IV Market Area Economy, Section E. Available Affordable Housing.

The CUP that has been filed and is being processed by the County of Riverside involves infrastructure development within the existing 100-unit St. Anthony Mobile Home Park, and would include expansion to a 136-unit mobile home park along with a 6,200 square-foot community center with a child care center, community park, and recreation facilities. Therefore, the project would not just provide housing support to local residents, but would also facilitate development of infrastructure and facilities within the park that could help to contribute to improving the quality of life of residents within the area.

Lastly, the residents of the St. Anthony Mobile Home Park and other similar developments within the eastern Coachella Valley are largely low-income migratory agricultural workers, which are vital to the local economy. The agricultural industry contributed nearly $4.3 billion to the Riverside County economy and created nearly 30,000 jobs in 2011.[121] Without suitable infrastructure and housing, agricultural workers could potentially leave the area, which would potentially harm the local economy if there were not enough agricultural workers to support this large and labor-intensive industry.

While these benefits have not been monetized, for the reasons described above, they are substantial and would not be possible without completion of the project.

F-Benefit Wildlife or Habitat at Torres-Martinez Wetlands

Due to the project's location in the eastern Coachella Valley, flows from the wastewater lagoons currently flow to the Salton Sea via the Coachella Valley Stormwater Channel (CVSC) or flow directly to the Salton Sea via local agricultural drainages.[122] The flows that enter the Salton Sea via the CVSC also come into contact with the Torres-Martinez wetlands, an 85-acre freshwater-salt water habitat complex near the mouth of the CVSC, which was constructed and is still operated by the Torres-Martinez Desert Cahuilla Indians. These wetlands remove nutrients and pollutants from drain water from the CVSC.[123]

The project would benefit both the Salton Sea and the Torres-Martinez wetlands by capturing wastewater flows from the St. Anthony's Mobile Home Park and diverting them to WRP-4 where they would be treated and reused as recycled water, assuming that WRP-4 is upgraded to recycled water service beginning in 2015. Due to the hydrologic connectivity of the Region to the Salton Sea, it is likely that some of the recycled water applied as irrigation would still drain to the Salton Sea, although on a greatly reduced scale as compared to existing conditions. Further, as these flows would be treated to tertiary levels, the quality of these flows would be greatly improved as a result of the project.

The Salton Sea currently suffers from water quality issues such as nutrient impairment and eutrophication from constituents such as nitrates often found in wastewater effluent.[124] Therefore, without the project, water quality constituents from the sewage lagoons could flow, untreated, to the Salton Sea, where they could further exacerbate existing impairments such as eutrophication. In addition, any flows from the project that enter the CVSC could potentially contaminate the Torres-Martinez wetlands that are used to remove pollutants from drain water from the CVSC. The project would, therefore, provide benefits to wildlife and habitat within the Torres-Martinez wetlands and the Salton Sea by removing a potential source of nutrients and other contaminants that may negatively affect these wildlife areas.

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[121] Riverside County. 2011. *Agricultural Production Report* - 2011. Page 1, Agricultural Commissioner's Office Letter.

[122] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update.* Page 4-5, Section 4.1 Local Groundwater, Section 4.1.1.2 Thermal Subarea.

[123] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update.* Page 8-12, Section 8.1.3 Environmental Enhancement and Mitigation Projects.

[124] Regional Water Quality Control Board (RWQCB). 2000. *California Environmental Protection Agency Regional Water Quality Control Board Colorado River Basin Region – Staff Report: Water Quality Issues in the Salton Sea Transboundary Watershed.*

The benefits described above are not readily monetizable due to a lack of available data regarding the specific benefits that the project would impart to the Salton Sea and the Torres-Martinez wetlands. While these benefits have not been monetized, for the reasons described above, they are substantial and would not occur without completion of the project.

G-Improve Groundwater Quality and Protect Beneficial Uses

The community of Mecca and the majority of the eastern Coachella Valley is underlain by a shallow groundwater aquifer that has limited groundwater percolation due to silt and clay layers (an aquitard).[125] Due to the aquitard, surface water in this area percolates into the shallow groundwater aquifer and may eventually drain into the Salton Sea. Although there is no site-specific water quality data on the wastewater lagoons, it is suspected that wastewater from the lagoons percolates to and potentially contaminates the underlying shallow groundwater aquifer. Further, as there has been observed erosion on the banks of the lagoons, it is possible that the wastewater also drains off the surface of these ponds, potentially contaminating agricultural drains in the area.

The project would, therefore, improve both the quality of the shallow groundwater aquifer and local agricultural drains by diverting wastewater flows to WRP-4 where they would receive additional treatment before being beneficially reused as recycled water, assuming that WRP-4 is upgraded to recycled water service beginning in 2015.

H- Provide a Long-Term Solution for DACs

The *San Antonio del Desierto DAC Sewer Extension Project* involves conversion of a mobile residential community to sewer service that will provide sustainable long-term management of local wastewater (in lieu of lagoons) and increases beneficial reuse of wastewater flows, thereby reducing dependence on imported water necessary for recharging the groundwater basin. As such, this project provides a long-term solution to local wastewater management in the disadvantaged Mecca community and will provide infrastructure that will help the Region to manage its groundwater resources on a long-term basis.

Physical Benefit 3: Prevent More Costly Infrastructure

Amount/Volume and Unit: 5 wastewater lagoons

Technical Justification of Physical Benefit:

As explained previously, the need for the project is primarily based on the need to successfully permit the St. Anthony Mobile Home Park via a CUP with the County of Riverside. Although the pending CUP states that it is assumed the mobile home park would connect to the CVWD municipal wastewater system, it is possible that the mobile home park could be permitted via other means. Specifically, it is possible that the existing wastewater lagoons could be rehabilitated such that these lagoons are legally compliant with applicable regulations.

Implementation of the project would negate the need to implement other potential options for compliant on-site wastewater treatment at the St. Anthony Mobile Home Park. Therefore, the project would avoid potential costs associated with completing more costly infrastructure improvements associated with lagoon rehabilitation.

[125] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update.* Page 4-3, Section 4.1 Local Groundwater, Section 4.1.1 Whitewater River Subbasin.

Photo 1: Existing wastewater lagoons and their proximity to the mobile homes located within St. Anthony's Mobile Home Park.

Methods Used to Estimate the Physical Benefits

I-Avoid Cost of Rehabilitating Existing Lagoons

The existing lagoons are compromised in many aspects including inadequate lining, proximity to dwelling units, unstable dikes and potential for groundwater contamination due to a very high water table. One alternative to connecting to the CVWD sewer system involves rehabilitating the existing lagoons and re-applying for County authorization for continued service. Without a full assessment of the operating system, it is difficult to scope the rehabilitation needed. Thus, for the purpose of this study it is assumed that a new liner be installed with an anchoring system. The rehabilitation process involves four elements:

- ***Draining and evaporation***: The physical configuration of the lagoons provides roughly 28 million gallons (MG) of storage capacity. However, since they are rotated in and out of service all of the lagoons are never completely full. All of the lagoons could be placed into service to maximize the benefit of evaporation, which for this region averages 6 to 8 feet per year. Assuming the lagoons are two-thirds full, and a side water depth of 10 feet there is a with a total capacity of 17.3 MG with the top 5 + feet being evaporated (11 MG), leaving the remaining 4 + feet, less residual to be pumped (6 MG) and discharged to sewer. The residual sludge will be left behind to dry out before hauling to a landfill, there will be a maximum of 6 MG to pump to the sewer.

  Draining of each lagoon would involve drawing the water down to facilitate the installation of a small sump to allow the pump to be placed below the bottom of the lagoon and result in near complete dewatering. The pumping rate would be limited to a maximum of 100 gpm to prevent

any surcharging of the sewer system and would require a duration of 40 days. The water quality would be monitored for the quantity of discharge as well as to prevent discharging excessive amounts of solids or silt from within the lagoons. Other parameters could be monitored such as pH and conductivity.

- ***Solar drying of the sludge***: Because of the solids content in the water and the difficulty in removing all of the water, it is estimated that there will be approximately 3 inches of water left in the bottom of each lagoon after draining. After each lagoon is drained, the remaining volume is approximately 300,000 gallons and would be left in the lagoons to dry out to reduce the disposal costs at a landfill certified to accept the biosolids (sludge). Approximately 3 inches of water would dry out and leave behind about one-half of an inch of dried material that will crack similar to a dried mud flat and resemble a field of potato chips that can easily be scraped with conventional construction equipment.
- ***Removal of the dried residual and disposal:*** The dried sludge would be scraped and hauled to a landfill. With an estimate of 85% solids, the dry weight of the sludge totals approximately 13 tons. It is anticipated that some of the native material will be removed during the scraping operation. Thus as much as 26 tons should be anticipated to be removed and disposed.
- ***Construction of new liner and anchoring system:*** A concrete ring and anchors would be installed, along with a high-density polyethylene (HDPE) liner, to prevent contamination of the underlying groundwater aquifer.

Although the wastewater lagoons could potentially be rehabilitated, it should be noted that there are significant barriers to this alternative:

- the wastewater lagoons are outside of the St. Anthony's property boundaries;
- the owner of the lagoon property is allowing PUCDC time to connect to CVWD prior to decommissioning, but is not interested in selling the property so that they can continue use; and
- the approved CUP03645 mandates connection to CVWD.

Table 7-22: Physical Benefits for F-Avoid Cost of Rehabilitating Existing Lagoons
San Antonio del Desierto DAC Sewer Extension Project

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2014	Avoid Cost of Rehabilitating Existing Lagoons	5 lagoons	0	-5 lagoons

Project 5: Torres-Martinez Avenue 64 Water Supply Connection Project

Background

Abstract

The *Torres-Martinez Avenue 64 Water Supply Connection Project* would provide funding to design and engineer the development of a new water supply for the Torres-Martinez Avenue 64 potable water system (PWS) located at the intersection of Avenue 64 and Monroe Street. This new supply source would be from the CVWD municipal water system through the construction of approximately 5,400 feet of 12" Ductile Iron (DI) water main along Monroe Street from an existing CVWD 24" DI water main at the intersection of Monroe Street and Avenue 62 to the Avenue 64 Subdivision. CVWD would own the 5,400-foot extension of 12" DI water main and the master water meter that would be connected at two points to the existing Avenue 64 PWS. The Torres-Martinez Desert Cahuilla Indians (DCI) would own and maintain the 4" polyvinyl chloride (PVC) distribution system from the CVWD meter throughout the Avenue 64 Subdivision.

This new water main would be connected at two points of the existing water distribution system that currently serves the Torres-Martinez subdivision, one for the domestic water supply and one for fire protection service. The subdivision includes 33 single occupancy homes with a population estimate of 100 people and a church that is owned and operated by the Torres-Martinez DCI.The subdivision is a tribal disadvantaged community (DAC) located on Torres-Martinez tribal lands in the eastern Coachella Valley.

The existing wells, pumping system, and storage tanks currently servicing the Avenue 64 PWS wereevaluated through several studies and reported to be suffering from a lack of maintenance and upkeep, which impart several health and safety benefits to residents within the Avenue 64 Subdivision. The conclusions in the Preliminary Engineering Report (PER) conducted by Indian Health Services (IHS) for the Avenue 64 PWSdetermined that "upgrades to the existing system would be prohibitively expensive, or would only solve some of the system's many existing issues. In addition, the existing water source for the Tribal system would be permanently disconnected from the (regional) distribution system"[126]As such, the PER concludes that the most effective long-term solution to providing safe and reliable drinking water to the Avenue 64 Subdivision would be to connect the subdivision to the CVWD municipal system, as proposed in this project.

CVWD would own the 5,400-foot extension of 12" DI water main and the master meter. The Tribe would own and maintain the 4" PVC distribution system from the meter throughout the subdivision.

Many planning and assessment tasks are complete or ongoing for the project, including biological and cultural/archaeological surveys, records searches, and aerial mapping of the project area. These tasks are being completed by funds from a United States Environmental Protection Agency (USEPA)Clean Water Act grant for a sewer project along the same proposed alignment (Monroe Street). The program will take place in two phases:

- Phase I-Planning and Design: Currently ongoing. This application is primarily for funds for this phase, which includes design and environmental compliance tasks.

[126] Indian Health Service (IHS). 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 21, Section VIII Conclusions and Recommendations.

- Phase II-Construction: The plans and specifications generated by Phase I will provide the basis for Phase II construction.

Description and Relationship to Other Projects in the Proposal

Though not explicitly connected with other projects in this proposal, this program will provide high quality municipal water supply for a disadvantaged tribal community. Several of the other projects – *Groundwater Quality Protection Program – Subarea D2* and *San Antonio del Desierto DAC Sewer Extension Project* – both also serve the Region's DACs by providing healthy and sanitary municipal water and wastewater services. The Coachella Valley IRWM Plan identifies the critical need to serve the Region's tribes (IRWM Plan Objective K) and DACs (IRWM Plan Objective L) and this funding application helps the Region to accomplish that goal.

Without Project Baseline

Without this project, the following issues would continue to occur during operation of the existing tribal water supply system, all of which contribute to public health and safety hazards. Each of the without project conditions outlined below corresponds to the physical benefits that would occur as a result of this project, and are largely documented in the 2012 *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision* that was conducted by IHS.

Water Outages

The Torres-Martinez DCIreports water outages several times per month, and there is no single cause for the water outages. Sometimes outages are related to power surges or loss of commercial power, and sometimes outages are due to failure of the existing onsite PWS (booster pumps or primary well pump). Water outages occur at random and inconvenient times, leaving the homes and other facilities within the Avenue 64 Subdivision with no access to water until service is restored, which may be a few hours.[127]

The 2012 *Preliminary Engineering Report* addressing water supply demonstrates that these recurring water outages are not only inconvenient to homeowners, but that they represent a real risk to human health. When a water system has an outage and loses positive pressure, groundwater, drainage water, or sewage collected near water pipes can infiltrate into the water distribution system.[128]A separate 2012 *Preliminary Engineering Report*addressing sewer service demonstrates that there are failing septic systems in the community, so it is possible that septic effluent, and potentially even raw sewage, couldcontaminate the water distribution system.[129] This contaminated water would then be used and consumed by homeowners once the water system is restored to service and pressure returns to normal.As such, the water outages associated with the existing PWS within the Avenue 64 Subdivision could cause substantial public health issues associated with consuming contaminated water, which could lead to numerous gastrointestinal diseases with significant and potentially fatal consequences.[130]

[127] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9, Section IV.A.1. Need for Project: Water Outages.

[128] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9, Section IV.A.1. Need for Project: Water Outages.

[129] IHS. 2012b. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision.* Page 5, Section III.Existing Facilities, Subsection C. Condition of Facilities.

[130] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9, Section IV.A.1. Need for Project: Water Outages.

Insufficient Backup Water Supply Source

The 2012 *Preliminary Engineering Report*demonstrates that the backup well included within the Avenue 64 Subdivision PWS does not have sufficient capacity to meet community demands without severely stressing the well pump.[131] If the primary groundwater well were to run dry, collapse, or become inoperable for more than a few days, the backup well would likely not be able to meet the community's water demands, and water shortages and/or water outages would result.[132]

Inoperable Components

The2012 *Preliminary Engineering Report*demonstrates that there are a number of inoperable components in the existing Avenue 64 Subdivision PWS.[133]The most substantial inoperable component is the existing fire pump, which has not been operable since 2004. If there were a fire in the Avenue 64 Subdivision, there would not be capacity to effectively fight the fire, because there is no fire pump and the existing booster pumps cannot provide sufficient water flows for firefighting needs.[134] Without adequate fire suppression capacity, there is increased risk of property damage, serious injury, and death if a fire were to occur in the Avenue 64 Subdivision.

Safety and Security Risks

The 2012 *Preliminary Engineering Report* reports that there are numerous open electrical connections and junction boxes without lids throughout the pump house that is the primary component of the Avenue 64 PWS. In addition, there is extensive corrosion of many electrical components throughout the PWS. Each of these issues represents an electrical shock hazard for the water operator, who frequently conducts operations and maintenance activities to the PWS without an assistant. An electrical shock experienced by the operator while unaccompanied could result in hospitalization or could potentially be fatal.[135]

There are also substantial safety concerns regarding the patch on the hydropneumatic water tank, whichis currently leaking, and does not havea pressure relief value. This combination could result in an explosion in the large steel water tank, which could be lethal to anybody near, and would result in a massive and difficult to repair water system leak.[136]

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[131] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9 and Page 10, Section IV.A.1. Need for Project: Insufficient Backup Water Source.

[132] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9 and Page 10, Section IV.A.1. Need for Project: Insufficient Backup Water Source.

[133] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 10, Section IV.A.1. Need for Project: Inoperable Components.

[134] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 10, Section IV.A.1. Need for Project: Inoperable Components.

[135] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 10 and Page 11, Section IV.A.1. Need for Project: Safety and Security Risks.

[136] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 10 and Page 11, Section IV.A.1. Need for Project: Safety and Security Risks.

Additionally, neither water storage tank is secured to prevent public access to climb the tank or to open the roof hatch; creating a concern for a fall risk to unauthorized individuals as well as a potential health risk to all users if vandalism or other potential contamination that could occur in the tank.[137]

Water Quality Potential Risks

The 2012 *Preliminary Engineering Report* states that the backup well for the Avenue 64 PWS is not chlorinated and cannot be easily reconfigured to do so.[138] If the primary well were to go offline and the backup well were used, disinfection would only be providedthrough mixing that would occur between the groundwater and the chlorinated water already in the system. If the backup well were used for more than a day or two, the chlorinated water in the system and therefore the chlorine residual would be exhausted, and the entire system would containdrinking water that was not disinfected. Providing disinfected groundwater would be a violation of the USEPA Groundwater Rule, and would represent a significant health threat to water system users.[139] Drinking water that has notbeen disinfected is associated with higher rates of gastrointestinal disease as well as skin and eye infections.

Perchlorate is also present in the groundwater at levels the Torres-Martinez DCI is concerned about; with levels reaching 6.9 parts per billion (ppb), which exceeds the State of California Maximum Contaminant Level (MCL) for this constituent, which is currently set at 6.0 ppb.[140] Ingestion of water with excessive levels of perchlorate is associated with inhibition of thyroid function, which can disrupt metabolic processes and damage fetuses' and infants' brain development.[141] In addition, chromium levels are consistently around 10 ppb in this water system. Chromium can cause allergic dermatitis and the Chromium-6 valence (hexavalent chromium) has been determined to be a likely carcinogen. USEPA is currently adjusting the regulatory limit for chromium and perchlorate, which could result in the Avenue 64 PWS being in violation of the Federal MCL standards for these constituents in the future.[142]

Operations and Maintenance Issues

Due to funding and staffing issues, the Torres-Martinez DCI has few resources available to conduct O&Mactivities. The lack of resources available for O&M of the Avenue 64 PWS is a significant contributing factor to many of the issues described in the preceding sections.[143]In a 2011 letter from the USEPA to the Torres-Martinez DCI, the USEPA noted that, "there currently is no Torres Martinez Water Department, Water Board, or Public Works governing structure to oversee and ensure that the water

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[137] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 10 and Page 11, Section IV.A.1. Need for Project: Safety and Security Risks.

[138] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 11, Section IV.A.1. Need for Project: Water Quality Potential Risks.

[139] United States Environmental Protection Agency (EPA). 2006. Page 65602. *Ground Water Rule (GWR).*Page Available: http://water.epa.gov/lawsregs/rulesregs/sdwa/gwr/index.cfm

[140] IHS. 2012c. *Amendment 1 to Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 1.

[141] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 11, Section IV.A.1. Need for Project: Water Quality Potential Risks.

[142] United States Environmental Protection Agency (EPA). 2011. *Guidance for Public Water Systems on Enhanced Monitoring for Chromium-6 (Hexavalent Chromium) in Drinking Water.* Available: http://water.epa.gov/drink/info/chromium/upload/memorandum_2011_petesilva_pws_chromium6guidance.pdf

[143] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 11 and Page 12, Section IV.A.1. Need for Project: System O&M.

systems remain reliable and safe."[144] The 2012 *Preliminary Engineering Report* further elaborates on this point, noting that there is a lack of structure in many elements of the Torres-Martinez DCI's operations and maintenance activities, which would make an operations and maintenance of a functioning on-site PWS difficult even if the existing failing system were replaced with new facilities.[145]

Potential Adverse Physical Effects of the Project

This project would complete design and engineering to facilitate future implementation of water supply facilities to the Torres-Martinez Avenue 64 Subdivision, and would not directly result in the provision of municipal water supplies to the subdivision. However, potential adverse physical effects associated with the overall *Torres-Martinez Avenue 64 Water Supply Connection Program* would be accounted for in environmental documentation that will be conducted as part of this project. In compliance with the applicable statutes such as CEQA and NEPA, any anticipated impacts would be reduced, avoided, or mitigated to the extent practical. Due to the size and scope of the overall program, it is anticipated that any impacts would be short-term in nature and related to project construction. It is not anticipated that the project would result in any significant, long-term physical effects.

Recent/ Historical Conditions

As explained above, there are several planning and assessment tasks either completed or ongoing for the Avenue 64 PWS.A specific planning task for the project (the 2012 *Preliminary Engineering Report*) indicates that this project is the best alternative to address existing issues outlined above in the Without Project Baseline. Further, documentation from EPA in 2011 indicates the need for solutions to be implemented to alleviate concerns with the existing onsite PWS. In addition, CVWD has indicated support and identified the need for this project both through a regional planning document and through a letter to the EPA indicating their willingness to provide water service to the Avenue 64 Subdivision.

In 2012, Indian Health Service was retained by Torres-Martinez DCI to complete a *Preliminary Engineering Report* for the Avenue 64 PWS. The *Preliminary Engineering Report* provides extensive details on the existing water system, issues with the system, and potential solutions to address these issues. The ultimate conclusion is that there is a need to find an alternative water supply for the Avenue 64 Subdivision due to health and safety issues and O&M issues associated with the existing system. Ultimately, the *Preliminary Engineering Report* concludes that the best option is for the subdivision to connect to a nearby municipal water system that is owned and operated by CVWD.[146]

In 2011, the USEPA issued a letter to Torres-Martinez DCI, which was a follow-up to Sanitary Survey Reports completed for the Avenue 64 PWS in 2006. This letter indicates that there were several system deficiencies documented by the USEPA in 2006, which as of 2011 had still not been corrected. Further, this letter indicates the following recommendation, "a thorough review of the PWS financial, technical, and managerial capacity and status needs to be completed. Adequate funding and personnel need to be

[144] United States Environmental Protection Agency (EPA). 2011. *Transmittal of January 27, 2011 Sanitary Survey Reports for Avenue 64 and Torres Martinez Clinic Water Systems (PWSs 0605116 and 0605130); Calling Special Attention to Operational Deficiencies which Place These Systems at Risk.*

[145] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 11 and Page 12, Section IV.A.1. Need for Project: System O&M.

[146] IHS. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 13, Section V. Alternatives Considered.

provided to meet the requirements of the PWS. Improved maintenance of the equipment needs to be a priority of the PWS."[147]

In 2010,CVWD completed the *Coachella Valley Water Management Plan Update*. This document represents a long-term analysis of CVWD's water supplies that is used to assist CVWD in meeting its responsibilities for securing and protecting water supplies into the future. The 2010 *Coachella Valley Water Management Plan Update* notes that there are water quality concerns within private groundwater wells located in the eastern Coachella Valley, and specifically mentions that CVWD is working with the Torres-Martinez DCI on federal grants to expand the CVWD municipal water system to tribal lands.[148]CVWD has also explicitly indicated their support for a project that would involve connecting the Avenue 64 Subdivision to the CVWD municipal water system via a letter to the USEPA that was issued in January 2012. This letter provides an overview of the available options to connect the subdivision to CVWD facilities, and concludes with expressing CVWD's willingness to own, operate, and maintain the on-site domestic water system if so desired by Torres-Martinez DCI. Further, this letter indicates that the precise sizing of both the water and sewer systems is not known at this time, and that CVWD will perform hydraulic modeling to determine appropriate facility sizes.[149]

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

As described in the project abstract, and in detail in the Work Plan (refer to Attachment 3), the work included in the *Torres-Martinez Avenue 64 Water Supply Connection Project* constitutes Phase I of a two-phased effort. Therefore, all construction activities included in Phase II will be required to obtain the physical benefits described herein. Please note, however, that the Torres-Martinez DCI anticipates using grant funding assistance from USDA or possibly USEPA to complete Phase II. As USDA does not provide grant funding for design and engineering purposes, the work included in this project is essential to facilitate procurement of future grant funding for project construction. Due to the economically disadvantaged nature of the tribe, it is not likely that construction of the overall water supply connection program to the subdivision would be possible without grant assistance.

Uncertainties in the Physical Benefits

The physical benefits described below are derived from issues documented by IHS in the 2012*Preliminary Engineering Report* and described in detail in the preceding sections. Given that the project would be engineered and designed to address existing issues, it is very likely that the project, when implemented as described in the PER, would result in the benefits explained below.

Physical Benefits Overview

Table 7-23 provides a summary of the physical benefits of the *Torres-Martinez Avenue 64 Water Supply Connection Project.* Please note that due to the completion of a cost-effectiveness analysis for this project (refer to Attachment 8), none of the benefits described below have been monetized.

[147] United States Environmental Protection Agency (EPA). 2011. *Transmittal of January 27, 2011 Sanitary Survey Reports for Avenue 64 and Torres Martinez Clinic Water Systems (PWSs 0605116 and 0605130); Calling Special Attention to Operational Deficiencies which Place These Systems at Risk.*

[148] Coachella Valley Water District. 2010. *Coachella Valley Water Management Plan Update Draft Report.*Pages 6-38 and 6-39, Section 6.7 Groundwater Quality and Treatment.

[149] Coachella Valley Water District.2012a. *Avenue 64 & Monroe Street – Domestic Water and Sewer Service.*

Table 7-23: Summary Table of Types of Physical Benefits being Claimed
Torres-Martinez Avenue 64 Water Supply Connection Project

Physical Benefit	Result of Physical Benefit	Quantification of Physical Benefit
Provision of municipal water supply to tribal areas	A. Increase in Drinking Water Health and Safety	Qualitative
	B. Increase in Water Supply Reliability	Qualitative
	C. Increase in Water Supply Adequacy	Qualitative
	D. ProvideLong-Term Water Management Solution	Qualitative
Abandonment of existing onsite potable water supply system	E. Decrease in Hazardous Physical Conditions	Qualitative
	F. Avoid Pump Station Rehabilitation and Deeper Drilling of Current Well	Qualitative
	G. Avoided Additional Treatment Necessary to Address Water Quality Concerns	Qualitative
	H. Avoided Ongoing Operations And Maintenance	Qualitative

Physical Benefit 1: Provision of Municipal Water Supply to Tribal Areas

As described in Attachment 3, this project only includes engineering and design tasks to serve municipal water supply to 33 single family homes and a church. As final engineering has not yet been completed for this project, it is unknown at this time how much water would be served by the project. As indicated in the project-related letter provided from CVWD to Torres-Martinez DCI, CVWD will conduct hydraulic modeling to determine the appropriate size of the water supply facilities to adequately serve the tribal residents.[150] Therefore, all of the project benefits pertaining to provision of municipal water supplies are qualitative in nature (not physically or economically quantified).

The primary purpose of the *Torres-Martinez Avenue 64 Water Supply Connection Project* is to provide safe and reliable long-term water supplies to the Avenue 64 Subdivision by connecting this subdivision to the CVWD municipal water system. The benefits described below are directly related to existing issues with the Avenue 64 PWS, which are described in detail in the Without Project Baseline.

Methods Used to Estimate the Physical Benefits

A - Increase in Drinking Water Health and Safety

The existing water system that serves the Avenue 64 Subdivision poses multiple health and safety hazards to the subdivision residents and to the operators who run the system. These health and safety risks are documented extensively in the USEPA Sanitary Survey Information[151] and correspondence from USEPA[152] to the Torres Martinez DCI. In the latter, USEPA notified the Torres-Martinez DCI that the

[150] Coachella Valley Water District. 2012a. *Avenue 64 & Monroe Street – Domestic Water and Sewer Service.*

[151] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Appendix A.

[152] United States Environmental Protection Agency (EPA). 2011. *Transmittal of January 27, 2011 Sanitary Survey Reports for Avenue 64 and Torres Martinez Clinic Water Systems (PWSs 0605116 and 0605130); Calling Special Attention to Operational Deficiencies which Place These Systems at Risk.*

deficiencies in the water system and its management pose a critical risk to human health.[153]The Tribe was given 120 days to respond with concrete actions to address the many deficiencies in the system or face a formal enforcement action from USEPA.

The 2012 *Preliminary Engineering Report*f urther explains the specific drinking water health and safety issues that are posed by the existing Avenue 64 PWS. Those issues are described in detail in the Without Project Baseline. All of the existing drinking water health and safety concerns associated with the Avenue 64 PWS would be resolved by the project, as described below.

- *Water Outages that Potentially Allow Contaminated Water to Enter the Avenue 64 PWS*: the Avenue 64 Subdivision would connect to the CVWD municipal water system, and would therefore no longer have a local water system that would be exposed to on-site contaminants such as raw sewage that may be present due to leaking or failing septic systems. Further, the CVWD municipal water system would not be susceptible to the same water outages that currently occur, since water outages within the Avenue 64 PWS are due to onsite electrical issues (power surges or loss of commercial power) or onsite issues with the PWS (failure of the booster pumps or primary well pump).[154]
- *Lack of Chlorination for Back-Up Water Supply*: domestic water provided by CVWD meets all applicable state and federal drinking water standards, including applicable disinfection standards.[155] As such, by connecting to the CVWD municipal water system, water provided to the Avenue 64 Subdivision would no longer have potential disinfection issues associated with a lack of chlorination.
- *Chromium and Perchlorate Levels in the Well*: Torres-Martinez DCI has expressed concerns with perchlorate and chromium levels in their existing PWS, but do not have the necessary means to treat the existing groundwater to address such concerns. In contrast, domestic water provided by CVWD meets all applicable state and federal drinking water standards, including those established for chromium, perchlorate, and other constituents of concern in the eastern Coachella Valley such as arsenic.[156] Therefore, connecting to the CVWD municipal water system would alleviate current and future water quality concerns expressed by the Torres-Martinez DCI.

B - Increase in Water Supply Reliability

As described in the Without Project Baseline, the existing PWS for the Avenue 64 Subdivision experiences frequent water outages that occur several times per month. These outages have been difficult to resolve to date as they are not from a single cause, but rather are due to ongoing operational failures of the PWS or onsite electrical issues. These water supply reliability issues directly impact Avenue 64 Subdivision residents, who may be without water for several hours several times per month.[157] Connecting to the CVWD municipal water system as part of this project would resolve existing water supply reliability issues, as CVWD has conducted extensive water supply reliability and water storage

[153] United States Environmental Protection Agency (EPA). 2011. *Transmittal of January 27, 2011 Sanitary Survey Reports for Avenue 64 and Torres Martinez Clinic Water Systems (PWSs 0605116 and 0605130); Calling Special Attention to Operational Deficiencies which Place These Systems at Risk.*

[154] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9, Section IV.A.1. Need for Project: Water Outages.

[155] Coachella Valley Water District (CVWD). 2012b. *Coachella Valley Water District 2011-12 Annual Review.*Page 6, 2012 Domestic Water Quality Report.

[156] Coachella Valley Water District (CVWD). 2012b. *Coachella Valley Water District 2011-12 Annual Review.*Page 6, 2012 Domestic Water Quality Report.

[157] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9, Section IV.A.1. Need for Project: Water Outages.

contingency planning consistent with requirements of the California Water Code to ensure thatsuch water outages would not occur.[158]

C - Increase in Water Supply Adequacy

As described in the Without Project Baseline, the existing PWS for the Avenue 64 Subdivision does not constitute an adequate long-term water supply as there is not an adequate back-up system in place in the event that the primary groundwater well and pumping station were to run dry, collapse, or become inoperable for more than a few days.[159]Connecting to the CVWD municipal water system as part of this project would resolve existing water supply reliability issues, as CVWD has expressed their willingness to serve water to the Avenue 64 Subdivision.[160]Given the robust and extensive nature of the CVWD municipal water system, water supplies provided by CVWD are considered adequate and reliable on a long-term basis.

D - Provide Long-Term Water Management Solution

Connecting to the CVWD municipal water system will address not only the current infrastructure deficiencies associated with the existing Avenue 64 PWS, but will provide a long-term reliable water supply to the Avenue 64 Subdivision, which is an economically disadvantaged tribal community. During development of the 2010 *Coachella Valley IRWM Plan*, stakeholders, particularly those representing DACs in the eastern Coachella Valley, stated that connecting to a municipal water system was a long-term goal, as this would resolve water supply and water quality issues experienced in the eastern Coachella Valley on a long-term basis.[161] Therefore, this project, which will involve connecting to the CVWD municipal water system, provides a sustainable long-term water supply solution for a tribal DAC.

Physical Benefit 2: Abandonment of Existing Onsite Potable Water Supply System

In addition to providing municipal water supplies to the Avenue 64 Subdivision, this project will also involve abandonment of the existing onsite potable water system. The 2012 *Preliminary Engineering Report* indicated that abandonment of the PWS and connection to the CVWD municipal water supply system was the best option for the Avenue 64 Subdivision, as it would resolve the entire suite of issues currently presented by the existing PWS.[162]The following sections provide information regarding the specific physical benefits that would result from abandonment of the existing PWS. Please note that due to the cost-effectiveness analysis completed for this project and the fact that engineering and design work has not been completed, the benefits provided below have not been physically or economically quantified.

[158] CVWD. 2011. *Coachella Valley Water District 2010 Urban Water Management Plan.*Page 5-1, Section 5, Water Supply Reliability and Water Storage Contingency Planning.

[159] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 9 and Page 10, Section IV.A.1. Need for Project: Insufficient Backup Water Source.

[160] Coachella Valley Water District. 2012a. *Avenue 64 & Monroe Street – Domestic Water and Sewer Service.*

[161] Coachella Valley Regional Water Management Group (CVRWMG). 2010. *Coachella Valley Integrated Regional Water Management Plan.* Page 3-18, Section 3.1.8 Issues Groups, Disadvantaged Communities.

[162] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 21, Section VIII Conclusions and Recommendations.

Methods Used to Estimate the Physical Benefits

E - Decrease in Hazardous Physical Conditions

There are numerous open electrical connections and junction boxes without lids throughout the existing PWS, as well as extensive corrosion of many electrical components throughout the system. Each of these issues represents an electrical shock hazard for the water operator who frequently conducts operations and maintenance activities without an assistant. An electrical shock experienced by the operator while unaccompanied could result in hospitalization or could potentially be fatal.[163] One of the primary purposes of the project is to connect the Avenue 64 Subdivision to the existing CVWD municipal system, thereby abandoning the existing PWS and eliminating the need for onsite O&M. Therefore, the project would directly and permanently resolve issues associated with O&M hazards, as the existing PWS would be properly abandoned, and an onsite operator would no longer be required to conduct work under existing hazardous conditions.

In addition, the current system is inadequate for providing fire protection to the Avenue 64 Subdivision as the fire pump has not been operable since 2004, and the existing booster pumps do not have the capacity (required flow) to provide water for firefighting needs.[164]With the project, the Avenue 64 Subdivision would receive water from CVWD. CVWD water systems are required to be installed in accordance with the American Water Works Manual such that they provide sufficient flows for fire protection and firefighting needs.[165] As such, the existing physical hazards associated with inadequate fire protection would be effectively resolved with implementation of the project.

The 2012 *Preliminary Engineering Report*indicates that there are substantial safety concerns regarding thehydropneumatic water tank, which could potentially explode as it is leaking and does not have a pressure relief valve. IHS has concluded that together the leaking tank without a pressure relief valve could potentially result in an explosion in the existing water tank, which could be lethal to anybody near, and would result in a massive and difficult to repair water system leak.[166] By abandoning this existing system and connecting to the CVWD municipal water system, the project would directly alleviate potential health and safety risks associated with the existing steel water tank, as abandonment activities would involve ceasing of existing pumping activities, thereby alleviating pressure in the system that could potentially cause an explosion within the steel tank.

The 2012 *Preliminary Engineering Report*also indicates that there is a lack of security within the existing water storage tank, making this facility potentially open to public access via climbing the tank or opening the roof hatch. This lack of security creates direct health and safety concerns associated with a fall risk to unauthorized individuals or a potential health risk to all users if vandalism or other potential

[163] Indian Health Service (IHS). 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 10 and Page 11, Section IV.A.1. Need for Project: Safety and Security Risks.

[164] Indian Health Service (IHS). 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.*Page 10, Section IV.A.1. Need for Project: Inoperable Components.

[165] Coachella Valley Water District (CVWD). 2012c. *Coachella Valley Water District Regulations Governing Domestic Water Service.* Page 10-1, Part 10 private Fire Protection Service Connection and Residential Fire Sprinkler System.

[166] Indian Health Service (IHS). 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 10 and Page 11, Section IV.A.1. Need for Project: Safety and Security Risks.

contamination were to occur in the tank.[167] Abandonment activities associated with the project would involve restricting public access to the existing PWS, which would eliminate a potential fall risk to unauthorized individuals. Further, the CVWD system is a secure system that is not considered at risk to vandalism or contamination as it undergoes regular monitoring and is protected to the maximum extent feasible.

F - Avoid Pump Station Rehabilitation and Deeper Drilling of Current Well

One of the potential methods identified by IHS in the PER to address concerns with the existing Avenue 64 PWS is to rebuild the existing infrastructure, including drilling a new (deeper) well, provide a suitable backup water supply (pump station), and make other necessary onsite infrastructure improvements.[168] Implementation of the project would avoid the need to complete the aforementioned onsite improvements, as the existing PWS would be abandoned and the Avenue 64 Subdivision would be connected to the existing CVWD municipal system. This would be considered a direct benefit associated with avoided construction and operational costs to replace the existing onsite PWS.

G - Avoid Additional Treatment Necessary to Address Water Quality Concerns

As mentioned above, one of the potential methods identified by IHS in the 2012 *Preliminary Engineering Report* to address concerns with the existing Avenue 64 PWS is to rebuild the existing infrastructure, including making infrastructure improvements to address potential water quality issues concerning the Torres-Martinez DCI (perchlorate and chromium).[169]The *Preliminary Engineering Report*indicates that such system improvements would be very costly and difficult to operate and maintain. As the project would connect the Avenue 64 Subdivision to the CVWD municipal water system, the project would provide CVWD domestic water supplies to the subdivision. Domestic water provided by CVWD meets all applicable state and federal drinking water standards, including those established for chromium, perchlorate, and other constituents of concern in the eastern Coachella Valley such as arsenic.[170]Therefore, the project would effectively avoid the need to construct and operate additional infrastructure necessary to treat groundwater for applicable water quality concerns. This would be considered a direct benefit associated with avoided construction and operational costs to upgrade the existing onsite PWS for water treatment purposes.

H - Avoid Ongoing O&M of Tribal Water System

In the *Preliminary Engineering Report*, IHS noted that rebuilding the existing PWS infrastructure was not considered in-depth, in part due to the fact that this alternative would not alleviate O&M issues faced by the tribe due to their lack of resources available to conduct such activities. IHS did, however, note that connection to the CVWD system would, "address not only the infrastructure deficiencies, but also the O&M problems facing the Tribe."[171]This would be considered a direct benefit associated with avoided O&M needs that would be required if the tribe were to upgrade the existing onsite PWS.

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[167] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 10 and Page 11, Section IV.A.1. Need for Project: Safety and Security Risks.

[168] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 13, Section V. Alternatives Considered.

[169] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 13, Section V. Alternatives Considered.

[170] Coachella Valley Water District (CVWD). 2012b. *Coachella Valley Water District 2011-12 Annual Review.*Page 6, 2012 Domestic Water Quality Report.

[171] IHS. 2012a. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla Indians: CVWD Water Main Extension to Avenue 64 Housing Subdivision.* Page 13, Section V. Alternatives Considered.