

Attachment 2 consists of the following items:

- ✓ **Project Justification.** This attachment includes a summary of the proposed projects, including the estimated physical benefits and a justification of how each project is technically feasible. This attachment also describes how the project can achieve the claimed level of benefits and explains whether the benefits will be attained through the least cost alternative.

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## Project Summary Table

Table 2-1 demonstrates how each project included in the Proposal meet the applicable IRWM Project Elements in accordance with Table 4 of the Proposal Solicitation Package (PSP).

**Table 2-1: Project Summary Table**

IRWM Project Element		MSWD Water Supply Reliability Program	Regional Turf Reduction Program	Regional Well Retrofit and Abandonment Program	DAC Septic Rehabilitation and Demand Reduction	Torres-Martinez Septic to Sewer Conversion Project	Shady Lane Water and Sewer Connection Project
IR.1	Water supply reliability, water conservation, and water use efficiency	✓	✓	✓	✓		
IR.2	Stormwater capture, storage, clean-up, treatment, and management						
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands		✓				
IR.4	Non-point source pollution reduction, management, and monitoring		✓	✓	✓	✓	✓
IR.5	Groundwater recharge and management projects						
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users	✓					
IR.7	Water banking, exchange, reclamation, and improvement of water quality						
IR.8	Planning and implementation of multipurpose flood management programs						
IR.9	Watershed protection and management			✓	✓	✓	✓
IR.10	Drinking water treatment and distribution	✓					✓
IR.11	Ecosystem and fisheries restoration and protection						



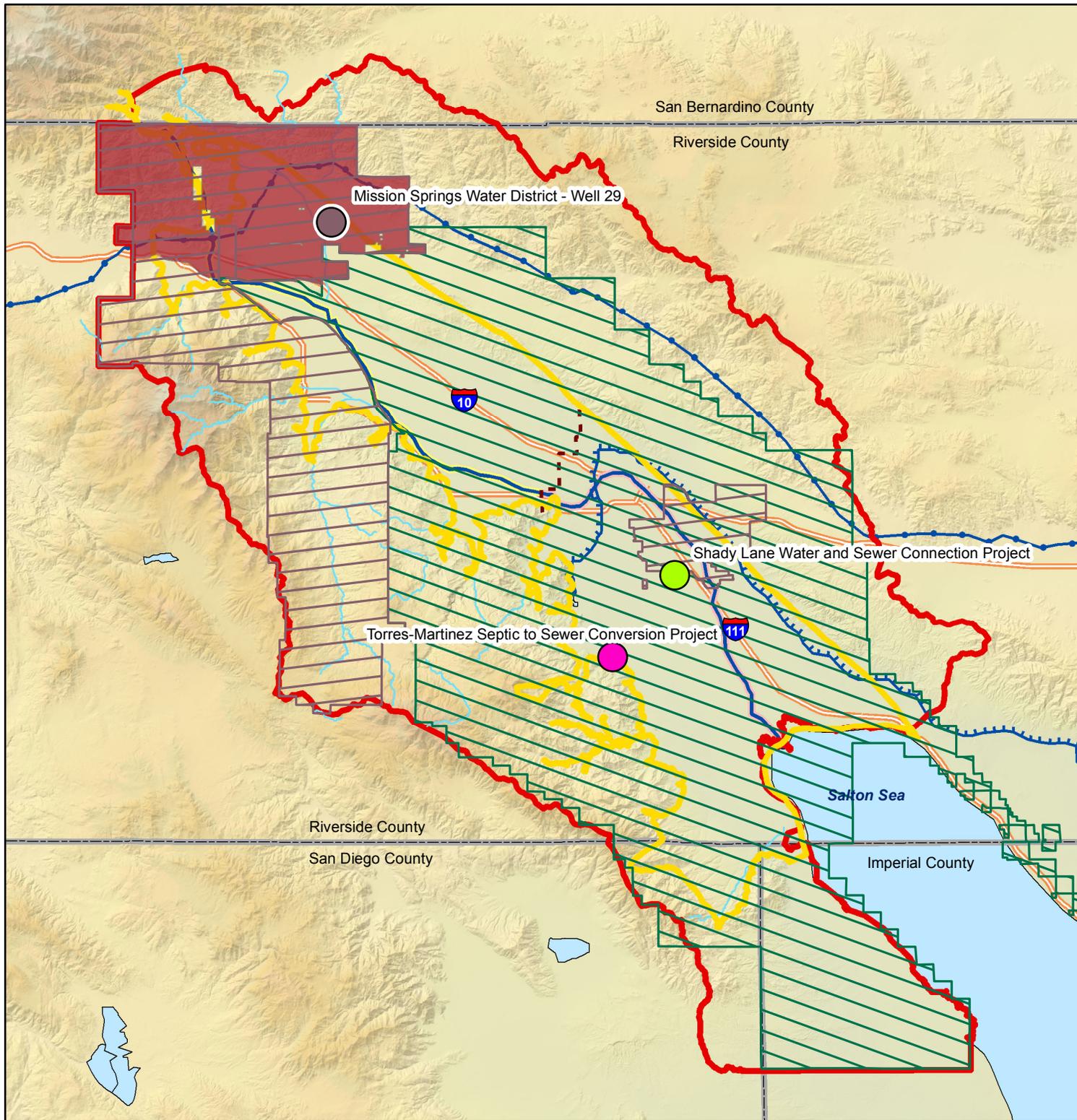
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## Regional Map

**Figure 2-1** includes the regional map of the projects included in the *Coachella Valley 2015 IRWM Implementation Grant Proposal* (Proposal). The regional map includes the following layers as required in the PSP: IRWM regional boundary and a marker identifying the location of each project contained in the Proposal. Please note the following specifics for the location of each project included in the Proposal:

- Project 1: MSWD Water Supply Reliability Program
  - This program includes two components. For Component 1 the project area is Well 29 and for Component 2 the project area is the Mission Springs Water District's entire service area.
- Project 2: Regional Turf Reduction Program
  - The project area for this project is the combined service area of the Desert Water Agency and the Coachella Water Authority.
- Project 3: Regional Well Retrofit and Abandonment Program
  - This is a rebate program that will be made available to well owners with wells located over drinking water basins. Therefore, the project area for this project is the area that encompasses the two medium-priority groundwater basins in the Region (the Indio Sub-basin and the Mission Creek Sub-basin).
- Project 4: DAC Septic Rehabilitation and Demand Reduction Project
  - This is a rebate program that will be made available to all disadvantaged communities (DACs) in the Region. Therefore, the project area is the area of the Region that is mapped as economically disadvantaged.
- Project 5: Torres-Martinez Septic to Sewer Conversion Project
  - This project is located at the intersection of Monroe Street and Avenue 64, and includes the Avenue 64 Housing Subdivision of the Torres-Martinez Tribal Nation.
- Project 6: Shady Lane Water and Sewer Connection Project
  - This project is located just outside of the Coachella Water Authority's service area, and is located south of Avenue 54 and east of Shady Lane just south of the City of Coachella.

**Figure 2-1:  
Regional Map**



-  Division between West and East Valley
-  Colorado River Aqueduct
-  Coachella and All American Canals
-  Whitewater River Storm Water Channel
-  Coachella Valley Storm Water Channel
-  Highways
-  Water Bodies
-  Coachella Valley IRWM Region
-  1 MSWD Water Supply Reliability Program
-  2 Regional Turf Reduction Program
-  3 Regional Well Retrofit and Abandonment Program
-  4 DAC Septic Rehabilitation and Demand Reduction
-  5 Torres-Martinez Septic to Sewer Conversion Project
-  6 Shady Lane Water and Sewer Connection Project





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## Project 1: MSWD Water Supply Reliability Program

Local Project Sponsor: Mission Springs Water District (MSWD)

### Brief Description

The program will install a treatment system for Well-29 to increase water supply to reduce chromium-6 concentrations and will implement an advanced metering pilot project.

### Project Map

**Figure 2-2** shows the project area for the *MSWD Water Supply Reliability Program*, the service areas of the project sponsor (MSWD), the project facilities, the project's relation to groundwater basins and surface water, DACs, and proposed monitoring locations. Please note the following specifics for information provided in **Figure 2-2**:

- Project Component 1: *Well 29 Chromium Wellhead Treatment* – this component will be located at Well 29 within MSWD's service area.
- Project Component 2: *Advanced Metering Technology Pilot Project* – this component will be implemented throughout MSWD's service area; therefore, the project area includes MSWD's entire service area.
- Groundwater Basins and Surface Water: Project will primarily affect groundwater located within the Mission Creek-Garnet Hill Sub-basin (Bulletin 118 Basin Number 7-21.02). Surface water would not be directly affected by the project.
- DACs: the entire MSWD service area is designated as an economically disadvantaged community per local mapping (see Attachment 7 for additional details)
- Proposed Monitoring Locations:
  - Component 1: Monitoring will take place at Well 29.
  - Component 2: Monitoring will take place at MSWD's Main Office where water use data will be compiled.

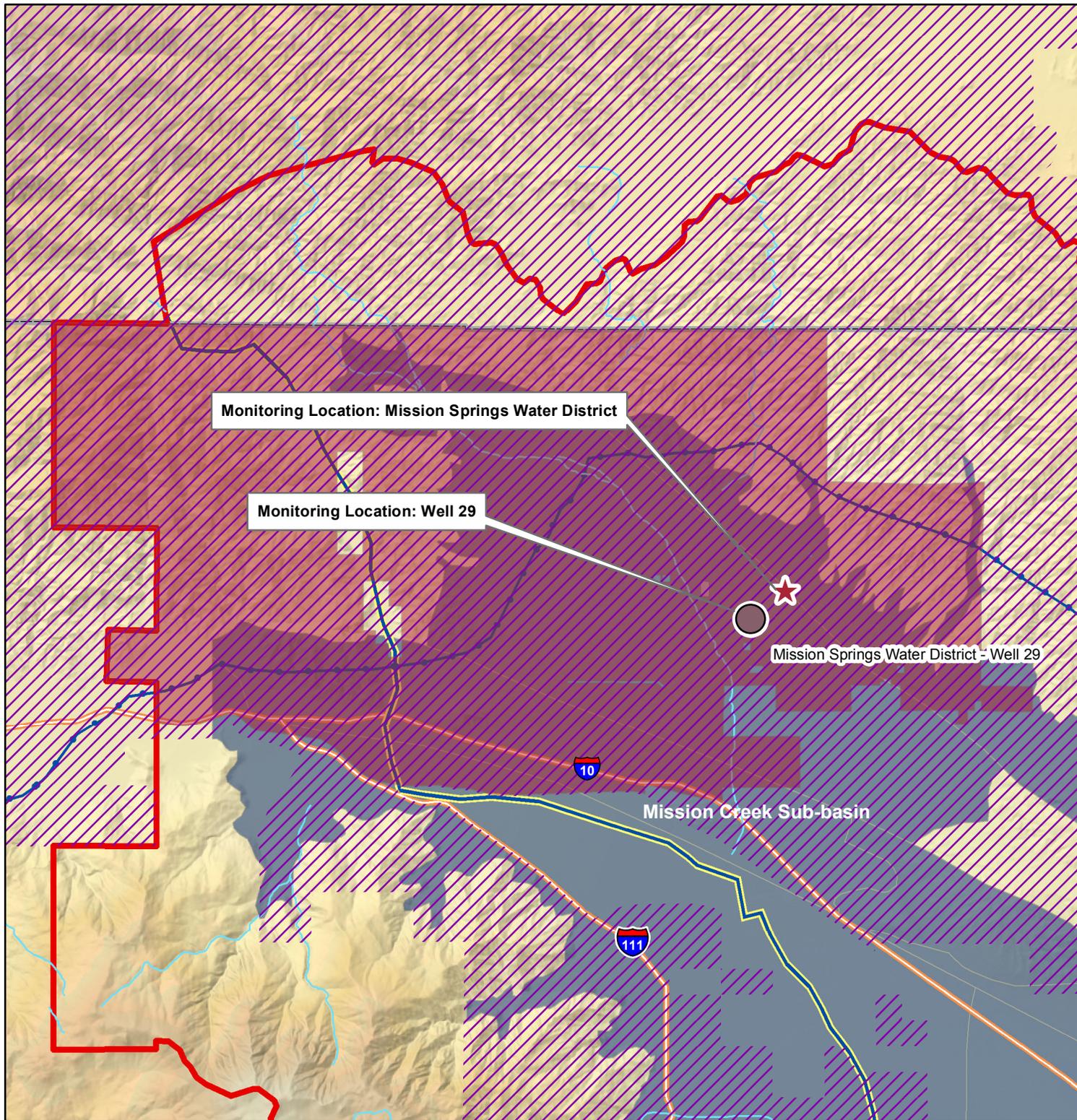
	<p><b>HydraMeter: Monitors and Controls water in real time.</b></p>
<p><b>Example of Chromium 6 Treatment Technology for Component 1</b></p>	<p><b>Example of Advanced Meter Technology for Component 2</b></p>

**Figure 2-2:  
MSWD Water Supply Reliability  
Program**

-  Colorado River Aqueduct
-  Whitewater River Storm Water Channel
-  River or Creek
-  Highways
-  Coachella Valley IRWM Region
-  Groundwater Basins
-  1 MSWD Water Supply Reliability Program
-  Mission Springs Water District
-  Disadvantaged Communities (DACs)

The MSWD Water Supply Reliability program will be monitored at the MSWD office and at Well 29.

**Source: 2013 U.S. Census Data - American Community Survey Median Household Income (MHI), by block group, census tract, and DAC Data from 2013 Coachella Valley DAC Outreach Program. DACs are defined as having MHI of 80% of Statewide MHI. For 2013, DACs were households earning \$48,875 or less per year.**





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## Project Description

MSWD is a small water district located in the northern portion of the Coachella Valley, providing water services to the City of Desert Hot Springs, 10 smaller communities in unincorporated Riverside County, and communities in the City of Palm Springs. As shown in **Figure 2-2** and discussed in Attachment 7, the entirety of MSWD's service area is classified as a DAC. Given the economic demographics of the area and its small size, MSWD is committed to maintaining system efficiency and is currently focused on implementing measures to ensure long-term water supply reliability at the lowest cost possible.

The *MSWD Water Supply Reliability Program* was developed to implement two project components that will increase long-term water supply reliability by addressing two of MSWD's most pressing issues: groundwater quality and water conservation. Details about each component are provided below.

### Component 1: Well 29 Chromium 6 Wellhead Treatment

MSWD is completing efforts to ensure compliance with a new maximum contaminant level (MCL) established by the Division of Drinking Water (DDW) for hexavalent chromium (Chrom 6) of 10 micrograms per liter ( $\mu\text{g/L}$ ), a lowering from 50  $\mu\text{g/L}$ . To remain compliant with the Chrom 6 MCL, MSWD has removed two production wells from service and has modified operations for two others.

MSWD's drinking water supply is currently provided entirely from local groundwater pumped primarily from the Mission Creek and Garnet Hill Sub-basins of the Coachella Valley Groundwater Basin. MSWD has ten well production facilities located in the Mission Creek-Garnet Hill basins. For four of these facilities (nearly 50% of overall production) untreated groundwater does not meet the new Chrom 6 MCL. As an interim means to meet compliance, MSWD has removed two wells (Well 27 and Well 29) from service and has modified operations at two other wells (Well 24 and Well 37). While removing wells from service has been acceptable on a short-term basis, to meet demands in its service area on a long-term basis, MSWD must either treat water supplies at the groundwater wells removed from service or create new supplies.

MSWD has determined that ion exchange treatment of groundwater supplies from Well 29 is the best option to ensure compliance with Chrom 6 regulations and bring this well back online to restore normal system operations. Well 29 was targeted as a priority for treatment, because it has the greatest Chrom 6 concentration of the wells in MSWD's service area (19  $\mu\text{g/L}$ ), and is one of the highest producing production facilities in the MSWD system, historically producing 1,350 AFY.

The method of Chrom 6 treatment chosen by MSWD for Well 29 was based on extensive research that has been conducted by MSWD and other agencies in the Region, recommending the use of ion exchange treatment. Specifically, MSWD has selected to implement a weak base anion (WBA) resin ion exchange process. The proposed treatment process would involve treating a portion of water from Well 29 with a single media use adsorption application, requiring pH reduction, followed by vessel resin adsorption of Chrom 6. Thereafter, the remaining non-treated water will be blended with the treated water to maintain a maximum level of Chrom 6 no greater than 8  $\mu\text{g/L}$ .

The primary outcome of the project is that wellhead treatment will be installed at Well 29, which will allow MSWD to reinstate service to the well. Reinstating service to Well 29 will increase groundwater production by 1,350 AFY. Implementing wellhead treatment at Well 29 will also improve water quality by 11  $\mu\text{g/L}$  (0.011 mg/L) by treating water with an existing Chrom 6 concentration of 19  $\mu\text{g/L}$  to 8  $\mu\text{g/L}$ .

### Component 2: Advanced Metering Technology Pilot Project

The Coachella Valley, along with the rest of California, is experiencing a severe drought with limited potable water resources. MSWD has been actively engaged in implementing conservation measures, and has conducted extensive outreach and engagement to customers on drought-related conservation restrictions. Through this outreach, MSWD has learned that undetected leaks are of significant concern to customers. MSWD's current meter reading system involves manual reading on a monthly basis, which can cause leaks to be undetected for many weeks, and result in high water bills for MSWD's DAC customers. As a result of these concerns, MSWD plans to implement a pilot project that will involve installation of advanced metering technology in 100 homes. The primary outcome of the project is that data from these homes will be collected and analyzed over a one year period, and an analysis will be conducted to determine the validity of expanding the program throughout MSWD's entire service area.



## Project Physical Benefits

The MSWD Water Supply Reliability Program will provide multiple benefits and include three of the project elements defined in Public Resources Code § 75026(a). Two of the project benefits have been quantified and are presented in **Tables 2-2** and **2-3**. The two quantified physical benefits are Water Quality (reduction in Chrom 6) and Water Supply (water supply produced).

**Table 2-2: Primary Physical Benefit – Water Quality Improvement  
MSWD Water Supply Reliability Program**

<b>Project Name:</b> MSWD Water Supply Reliability Program			
<b>Type of Benefit Claimed:</b> Water Quality Improvement (Chrom 6 reduction)			
<b>Units of the Benefit Claimed:</b> mg/L			
<b>Anticipated Useful Life of Project (years):</b> 20			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2017-2036	0.019 mg/L	0.008 mg/L	-0.011 mg/L
<b>Comments:</b> The concentration of Chrom 6 in Well 29 will be reduced from 0.019 mg/L to 0.008 mg/L through the Weak Based Anion exchange technology implemented as part of the project.			
The without-project baseline for the primary benefit (Water Quality) is based on recent sampling data reported by MSWD for Well 29, which show the Chrom 6 concentration to be 19 µg/L or 0.019 mg/L. <sup>1</sup> With the project, a WBA treatment system will be installed, which will be designed to reduce the concentration of Chrom 6 to 8 µg/L or 0.008 mg/L. As such, once the project is implemented, the water quality of water produced by Well 29 will be improved by 0.011 mg/L. Benefits will accrue from the time construction is complete (end of 2016) through the 20-year project life as shown in <b>Table 2-2</b> .			

**Table 2-3: Secondary Physical Benefit – Water Supply Produced  
MSWD Water Supply Reliability Program**

<b>Project Name:</b> MSWD Water Supply Reliability Program			
<b>Type of Benefit Claimed:</b> Water Supply Produced			
<b>Units of the Benefit Claimed:</b> AFY			
<b>Anticipated Useful Life of Project (years):</b> 20			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2017	12,423 AFY	13,773 AFY	1,350 AFY
2018	12,433 AFY	13,783 AFY	1,350 AFY
2019	12,443 AFY	13,793 AFY	1,350 AFY
2020	12,453 AFY	13,803 AFY	1,350 AFY
2021	12,571 AFY	13,921 AFY	1,350 AFY
2022	12,689 AFY	14,039 AFY	1,350 AFY
2023	12,807 AFY	14,157 AFY	1,350 AFY
2024	12,925 AFY	14,275 AFY	1,350 AFY
2025	13,043 AFY	14,393 AFY	1,350 AFY
2026	13,357 AFY	14,707 AFY	1,350 AFY
2027	13,649 AFY	14,999 AFY	1,350 AFY

<sup>1</sup> Mission Springs Water District. 2015. *Chromium 6 Additional Info Memo (7-10-15)*.



<b>Project Name:</b> MSWD Water Supply Reliability Program			
<b>Type of Benefit Claimed:</b> Water Supply Produced			
<b>Units of the Benefit Claimed:</b> AFY			
<b>Anticipated Useful Life of Project (years):</b> 20			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2028	13,941 AFY	15,291 AFY	1,350 AFY
2029	14,233 AFY	15,583 AFY	1,350 AFY
2030	14,503 AFY	15,853 AFY	1,350 AFY
2031	14,795 AFY	16,145 AFY	1,350 AFY
2032	15,087 AFY	16,437 AFY	1,350 AFY
2033	15,379 AFY	16,729 AFY	1,350 AFY
2034	15,671 AFY	17,021 AFY	1,350 AFY
2035	16,073 AFY	17,423 AFY	1,350 AFY
2036	16,427 AFY	17,777 AFY	1,350 AFY

**Comments:** Currently Well 29 is not operational due to water quality issues associated with Chrom 6. As the Chrom 6 concentration is brought below the MCL, Well 29 will become operational and produce 1,350 AFY of supply above existing conditions.

For the secondary benefit (Water Supply), the without-project baseline is based upon existing groundwater conditions provided by MSWD and projected groundwater production data from MSWD's 2010 Urban Water Management Plan (UWMP).<sup>2</sup> According to MSWD, Well 27 (average production of 287 AFY) and Well 29 (average production of 1,350 AFY) are currently offline due to compliance issues with Chrom 6. Therefore, the groundwater production in MSWD's service area has decreased by 1,637 AFY compared to groundwater production figures reported in MSWD's 2010 UWMP. Groundwater production figures for the Mission Creek-Garnet Hill basins (where Well 29 and Well 27 are located) are projected to increase over time per data in the 2010 UWMP, which shows groundwater production at 14,040 AFY in 2015 and steadily increasing to 17,710 by 2035.<sup>3</sup> However, under existing (without project) conditions, the groundwater production values are currently depressed by 1,637 AFY as a direct result of Well 27 and Well 29 being removed from service due to Chrom 6 compliance issues that were not accounted for in the 2010 UWMP.

Once the project is implemented, production levels at Well 29 will be restored to historical conditions, and groundwater production in the Mission Creek-Garnet Hills basins will increase by 1,350 AFY. As such, once the project is implemented, the amount of water supply produced from the Mission Creek-Garnet hills basins will be closer to the groundwater supply production values reported in the 2010 UWMP. Benefits will accrue from the time construction is complete (end of 2016) through the 20-year project life as shown in **Table 2-3**.

In addition to the quantified benefits presented in **Table 2-2** and **Table 2-3**, the project would provide substantial additional benefits associated with implementation of the *Advanced Metering Technology Pilot Project*. Benefits for the *Advanced Metering Technology Pilot Project* were not quantified, because the purpose of the project is to implement advanced metering in 100 DAC homes to determine cost-effectiveness and conservation savings that could accrue from implementing the project across MSWD's service area. As such, because this is a pilot project that will serve DACs, quantifiable benefits will be speculative until the pilot program is executed and data is collected and analyzed.

<sup>2</sup> Mission Springs Water District. 2011. *2010 Urban Water Management Plan*.

<sup>3</sup> Mission Springs Water District. 2011. *2010 Urban Water Management Plan*.



There is data available about potential water savings that can be achieved from advanced metering projects. This data can be used as a basis for providing an initial estimate of potential water savings that would accrue from implementation of the *Advanced Metering Technology Pilot Project*. Specifically, data from East Bay Municipal Utilities District indicates that on average, switching from standard metering to advanced metering resulted in household water use reductions between 3.5% and 6.5%.<sup>4</sup> Given that MSWD's projected multiple dry year demands from the 2010 UWMP are reported as 14,440 AFY for 2015, it is anticipated that implementation of an advanced metering program across MSWD's service area could save 433-722 AFY compared to existing conditions.<sup>5</sup> Further, data from MSWD based on customer correspondence shows that due to the age and nature of infrastructure in its service area, leaks in residential piping are common. Because MSWD relies upon monthly manual metering, it is not uncommon for leaks to go unnoticed for several weeks and for a substantial amount of water to be wasted during that period. As such, additional conservation information from MSWD indicates that water savings from full-scale implementation of this pilot program could be closer to 10% or 1,444 AFY.<sup>6</sup>

Given that 100% of the MSWD service area is economically disadvantaged, leaks in residential piping are a substantial economic burden to customers that may face steep water bills due to un-detected leaks. Per data in MSWD's 2010 UWMP, unaccounted for system losses range from 1,110 AFY to 1,700 AFY and can be caused by water that is lost from system leaks, main breaks, flushing, well starts/stops, and other causes.<sup>7</sup> The primary goal of the *Advanced Metering Technology Pilot Project* is to implement a low-cost option for achieving water savings and early detection of leaks, and aims to maintain the affordability of water for MSWD customers on a long-term basis.

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<sup>4</sup> East Bay Municipal Utilities District. 2013. Evaluation of East Bay Municipal Utility District's Pilot of WaterSmart Home Water Reports.

<sup>5</sup> Mission Springs Water District. 2011. *2010 Urban Water Management Plan*.

<sup>6</sup> Pers. Comm. John Soulliere, Public Relations Office for Mission Springs Water District.

<sup>7</sup> Pers. Comm. John Soulliere, Public Relations Office for Mission Springs Water District.



## Technical Analysis of Physical Benefits Claimed

### Project Need

Due to a variety of social, political, and technical issues faced by MSWD, similar to many agencies in California, the agency is looking for ways to increase water supply reliability on a long-term basis. Maintaining water supply reliability can be costly as infrastructure and other investments are often paid for via water rate increases, which can disproportionately impact economically disadvantaged communities. Given that 100% of MSWD's service area is classified as a DAC, the agency is actively engaged in implementation of measures that increase water supply reliability while maintaining the affordability of water for its customers.

### **Component 1: Well 29 Chromium 6 Wellhead Treatment**

Compliance with a new statewide MCL for Chrom 6 is an issue throughout the Coachella Valley, and extensive research has been conducted in the Region on potential compliance options. These regional studies have found that even with implementing lowest cost compliance options, customers can expect bills to increase by at least \$30-\$50 per month.<sup>8</sup> Currently, to comply with the standard, MSWD has removed two production wells from service and has modified operations for two others. Removing wells from operation is not a long-term nor a sustainable way to address groundwater management in MSWD's service area; as such, the agency is seeking cost-effective and long-term solutions to address this compliance issue.

Chrom 6 is a naturally-occurring substance that is found in geologic formations that underlie the Region; given the presence of this constituent in local geologic formations, Chrom 6 is also present in local groundwater that provides the majority of water supplies for the Region.<sup>9</sup> In July 2014 the State of California enacted a primary drinking water MCL for Chrom 6; the MCL requires that concentrations of the constituent do not exceed 10 µg/L in drinking water.

MSWD draws 100 percent of its water supply from groundwater, and operates three independent water distribution systems: 1) Desert Hot Springs, 2) Palm Springs Crest System, and 3) West Palm Springs Village System. The Desert Hot Springs system is primarily located over the Mission Creek Sub-basin, but also pulls water from the Garnet Hill Sub-basin. In total, the Desert Hot Springs system consists of ten groundwater wells with a historical production of 8,000 to 12,000 acre feet per year (AFY).<sup>10</sup> Given the small and integrated nature of the system, each facility is an essential element to MSWD's system operations.

Currently, four of the ten wells located in the Desert Hot Springs system (nearly 50% of overall production) are impacted by Chrom 6. The location of impacted wells and their relative Chrom 6 levels are shown in **Figure 2-3**. This figure indicates that wells 24, 27, 29, and 37 are currently impacted by Chrom 6. While not optimal on a long-term basis, to ensure immediate compliance with the Chrom 6 MCL, MSWD has removed Well 27 and Well 29 from service and has modified operations for Well 24 and Well 37.<sup>11</sup> Historically, Well 27 has an average production value of 287 AFY and a capacity of 1,100 gallons per minute (gpm) and Well 29 has an average production value of 1,350 AFY and a capacity of 1,700 gpm.<sup>12</sup> Therefore, Chrom 6 compliance issues have resulted in an overall loss in groundwater production in MSWD's service area of 1,637 AFY (1,350 AFY + 287 AFY).

<sup>8</sup> Coachella Valley Water District. 2015. *Coachella Valley Water District Chromium-6 Update*. Available: <http://www.cvwd.org/DocumentCenter/View/71>

<sup>9</sup> Coachella Valley Water District. 2015. *Notice of Preparation of a Draft Environmental Impact Report for the Coachella Valley Water District Chromium-6 Water Treatment Facilities Project*. Available: <http://www.cvwd.org/DocumentCenter/View/2488>

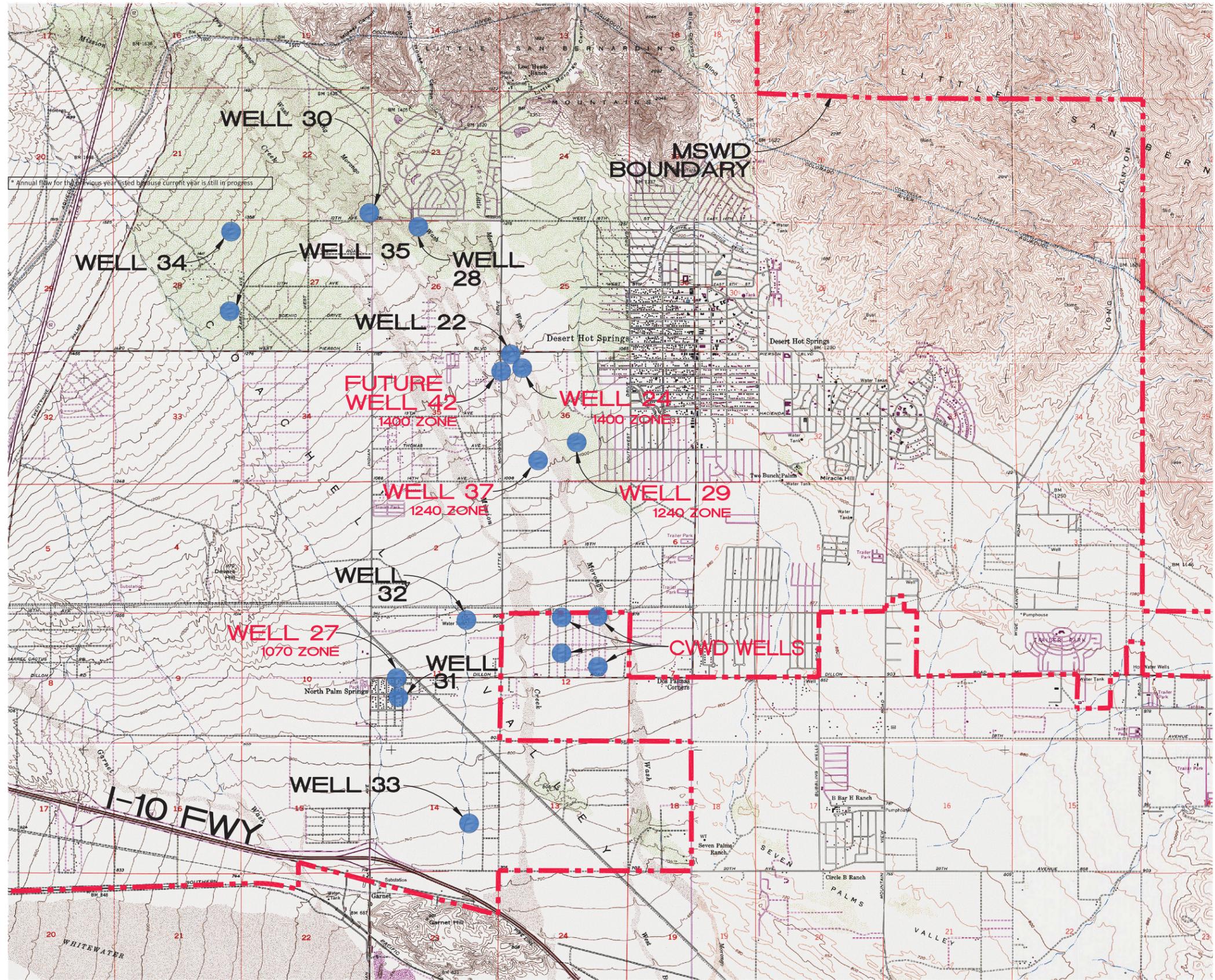
<sup>10</sup> Mission Springs Water District. 2011. *Mission Springs Water District 2010 Urban Water Management Plan*.

<sup>11</sup> Pers. Comm. Chris Deiter, TKE Engineering on behalf of Mission Springs Water District.

<sup>12</sup> Mission Springs Water District. 2011. *Mission Springs Water District 2010 Urban Water Management Plan*.

**Figure 2-3:  
Chromium 6 in MSWD's  
Service Area**

Well #	Sample Date	Chromium 6 Sample Result (ppb)	Water Produced Annually (AF)
22	05/29/14	9.6	951.38
	07/09/14	8.4	
24	05/29/14	11.0	1,130.47
	07/09/14	9.3	
25	05/29/14	3.1	41.24
	07/09/14	2.7	
25A	05/29/14	4.9	21.94
	07/09/14	4.3	
26	05/29/14	4.9	70.88
	07/09/14	4.1	
26A	05/29/14	2.0	13.65
	07/09/14	1.4	
27	05/29/14	14.0	287.04
	06/23/14	11.0	
28	07/09/14	12.0	57.12
	05/29/14	3.6	
29	05/29/14	19.0	1,345.76
	07/09/14	17.0	
31	05/29/14	5.8	603.63
	06/23/14	8.0	
32	07/09/14	4.9	1,292.98
	05/29/14	8.1	
33	05/29/14	7.5	202.12
	07/09/14	7.0	
34	05/29/14	2.0	754.48
	07/09/14	1.6	
35	No Data Available		
37	05/29/14	12.0	1,706.35
	07/09/14	10.0	



SCALE: 1" = 2,000'

**LEGEND:**  
--- MSWD SERVICE AREA

**TKE**  
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**MISSION SPRINGS WATER DISTRICT**  
  
CHROMIUM 6  
WELL EXHIBIT



Given that 100 percent of MSWD’s supplies are provided by groundwater, losses in groundwater production capacity are significant. Data from MSWD’s 2010 Urban Water Management Plan shows that based on historic groundwater production and future demands, groundwater production from the Mission Creek and Garnet Hill Sub-basins are anticipated to be 14,040 AFY in 2015 and steadily increase to 17,710 AFY in 2035.<sup>13</sup> The future demands and associated groundwater production values that are used to provide the without-project baseline for the analysis incorporate an assumption that per capita demands will be reduced by 20% by 2020 in accordance with provisions of Senate Bill x7-7. Because the long-term demands incorporate reduced demands as a result of conservation mandates, they are considered reasonable for use as a long-term baseline for this analysis. **Table 2-4** below shows yearly groundwater production from wells in the Mission Creek and Garnet Hill Sub-basins based on data from the 2010 UWMP.

**Table 2-4: Projected Groundwater Production in the Mission Creek and Garnet Hill Sub-basins**

Year	2010 UWMP Projected Groundwater Production (AFY)	Existing Projected Groundwater Production (AFY)
2017	14,060	12,423
2018	14,070	12,433
2019	14,080	12,443
2020	14,090	12,453
2021	14,208	12,571
2022	14,326	12,689
2023	14,444	12,807
2024	14,562	12,925
2025	14,680	13,043
2026	14,994	13,357
2027	15,286	13,649
2028	15,578	13,941
2029	15,870	14,233
2030	16,140	14,503
2031	16,432	14,795
2032	16,724	15,087
2033	17,016	15,379
2034	17,308	15,671
2035	17,710	16,073
2036	18,064	16,427

Source: MSWD. 2011. *2010 Urban Water Management Plan*.

The groundwater production values reported in **Table 2-4** from MSWD’s 2010 UWMP do not take into consideration reduced production as a result of Chrom 6, because Chrom 6 was not a regulated drinking water constituent at the time the 2010 UWMP was finalized. Current data from 2015 shows that groundwater production has dropped by 1,637 AFY as a direct result of Well 27 and Well 29 being removed from service; existing projected groundwater production that incorporates losses from Well 27 and Well 29 is also shown in **Table 2-4**. Given that 100% of MSWD’s supplies are provided by groundwater, this reduction in groundwater production translates to a total loss in supplies.

Under current drought conditions, which include restrictions on activities and additional demands (new development), MSWD has been able to meet existing demands without Well 27 and Well 29 in operation. However, as the drought subsides and water restrictions are reduced, it is anticipated that demands in

<sup>13</sup> Mission Springs Water District. 2011. *Mission Springs Water District 2010 Urban Water Management Plan*.

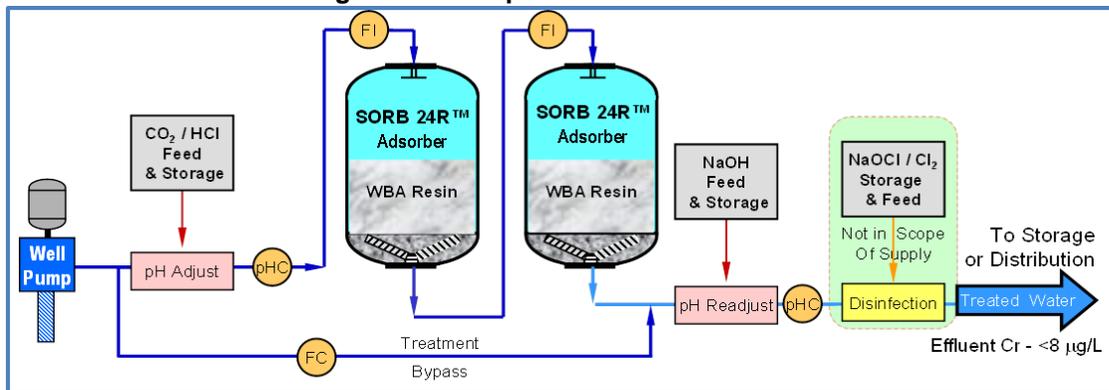


MSWD’s service area will increase to levels similar to those projected in MSWD’s 2010 Urban Water Management Plan (UWMP). MSWD has targeted Well 29 for wellhead treatment to get this facility back online as soon as possible. Well 29 was chosen as a priority facility for installation of a treatment system because it has the greatest Chrom 6 concentrations of the four affected wells and is also one of the best production facilities in the MSWD system, historically producing 1,350 AFY.<sup>14</sup> The 2010 UWMP shows that the groundwater production capacity will need to increase to meet demands, and as explained previously, groundwater production from Well 29 was part of the overall supply anticipated to meet future projected demands.<sup>15</sup> MSWD is committed to resolving water quality compliance issues for Well 29 as soon as possible so that this facility is back online before demands increase.

Two extensive studies have been completed in the Coachella Valley by local agencies (CVWD, CWA, and IWA) to determine the feasibility and effectiveness of different treatment options. Both of these studies have recommended implementation of wellhead ion-exchange treatment (either strong-base or weak-base anion exchange) as the best option for compliance, because it is a state-approved technology and has relatively low cost and operational complexity compared to other treatment options.<sup>16 17</sup> Based upon this research, MSWD has selected a weak base anion (WBA) treatment system for Well 29. CVWD’s analysis of Chrom 6 treatment has found that WBA is the preferred treatment technology in the Desert Hot Springs Area compared to strong base anion (SBA) in other parts of the Coachella Valley. The Desert Hot Springs Area in CVWD’s service area, which is located adjacent (immediately south) of MSWD’s service area, has naturally high sulfate levels.<sup>18</sup> For this reason, SBA is not feasible and WBA is the most appropriate treatment technology.<sup>19</sup>

MSWD has completed conceptual-level analyses of the proposed wellhead treatment system based on data and information from CVWD, CWA, and IWA. To maximize use of water from Well 29 and reduce overall operational costs, MSWD is proposing a wellhead treatment system configuration that treats a portion of water from Well 29, with the balance of the well flow bypassed for blending. The treatment system influent would be adjusted for pH and treated by cartridge filters to remove residual particulates from the well, followed by treatment by the ion exchange media for Chrom 6. The ion exchange media would be a single pass synthetic WBA resin. After treatment by the WBA resin, the pH would be adjusted again as needed, blended with the bypass stream to achieve the target Chrom 6 concentration of 0.008 mg/L or less, and dosed with sodium hypochlorite to provide a disinfection residual prior to introduction into the MSWD potable water system. A schematic of the proposed treatment system is provided below in **Figure 2-4**.

**Figure 2-4: Proposed Well 29 Treatment Train**



<sup>14</sup> Mission Springs Water District. 2015. *Chromium 6 Additional Info Memo (7-10-15)*.  
<sup>15</sup> Mission Springs Water District. 2011. *Mission Springs Water District 2010 Urban Water Management Plan*.  
<sup>16</sup> Coachella Valley Water District. 2015. *Coachella Valley Water District Chromium-6 Update*. Available: <http://www.cvwd.org/DocumentCenter/View/71>  
<sup>17</sup> Indio Water Authority. 2015. *Evaluation of Cr6 Treatment Alternatives for Wells 13A, AA, and 1E*.  
<sup>18</sup> Pers. Comm. Christopher Deiter, TKE Engineering on behalf of Mission Springs Water District.  
<sup>19</sup> Coachella Valley Water District. 2015. *Notice of Preparation of a Draft Environmental Impact Report for the Chromium-6 Water Treatment Facilities Project*. Available: <http://www.cvwd.org/DocumentCenter/View/2488>



Implementation of the *Well 29 Chromium 6 Wellhead Treatment* component will allow Well 29 to be restored as a water source for MSWD by reducing the Chrom 6 concentration to below the MCL. The Well 29 WBA treatment system will allow for sustainable, long-term use of an existing water source and will directly address water quality issues.

### **Component 2: Advanced Metering Technology Pilot Project**

As a result of SWRCB Emergency Resolution 2015-0013 that was adopted on March 17, 2015, water suppliers such as MSWD are required to enact various drought restrictions and ultimately, to reduce overall water demands. MSWD has completed substantial customer outreach and education efforts to increase awareness about the drought and water restrictions in its service area, including awareness campaigns about recent amendments to multiple sections of its Water Regulations and Service Ordinance 93-3 to reduce overall water use. MSWD also completed public hearings and outreach prior to adopting Resolution 2015-06 to implement restrictions for potable water application to outdoor landscape and codify civil penalties for violations of mandatory actions.<sup>20</sup>

Through MSWD's outreach efforts, MSWD customers have alerted the agency to issues associated with residential piping water breaks and leaks. Specifically, many residents have expressed frustration associated with undetected leaks that resulted in high water bills.<sup>21</sup> Currently, MSWD relies upon manual water meters that are read on a monthly basis by MSWD field staff. As a result of the geologic conditions in MSWD's service area compounded with the age and condition of residential piping and infrastructure, water line breaks are not uncommon.<sup>22</sup> Data from MSWD's 2010 UWMP shows that total unaccounted-for water loss was projected to be 14,300 AFY in 2015 and increase to 22,600 AFY by 2035.<sup>23</sup> While MSWD has an existing Report Water Waste tool available on its website, this tool is most useful for above-ground breaks that are noticed and reported by private citizens.<sup>24</sup> Because soils in MSWD's service area are highly permeable, sub-surface pipeline leaks or breaks could go unnoticed and would likely not be detected or reported with MSWD's existing online reporting tool.

To address customer-related concerns associated with undetected leaks and enact additional measures to save water in accordance with the SWRCB's mandate, MSWD's current focus for water conservation is eliminating water waste to save water and maintain water affordability. Implementation of advanced metering technology has proven to be a valid tool in leak detection and water conservation, and could potentially move MSWD forward in its overall goal to eliminate water waste. An example of the proposed customer interface that would be available for view and use by customers with implementation of the *Advanced Metering Technology Pilot Project* is shown below in **Figure 2-5**. MSWD proposes a platform that will have multiple tools to help MSWD customers track and understand their water use patterns. Further, the platform will be set-up with alert systems to notify customers and MSWD when there is a spike in water use that could be attributed to a water leak. Through the advanced metering tool, MSWD staff and customers will have the ability to remotely shut water off to individual meters to stop leaks until somebody can arrive onsite and assess the cause of water spikes.

Because MSWD's service area is classified as an economically disadvantaged community, it is important to the District to spend money wisely and implement conservation techniques that can save water at a low cost to customers. As such, MSWD intends to implement advanced metering technology as a pilot project; the pilot project will install advanced water meters and associated reporting technology at no charge to 100 of MSWD's DAC customers. The pilot project will include an initial educational seminar with a comprehensive discussion on data available to customers, operating instructions, and MSWD monthly summary reports. The program will provide a comprehensive record of water use for each program participant. A condition of the pilot program will be that MSWD secures approval from customers to collect

<sup>20</sup> Mission Springs Water District. 2015. Staff Report for the Special Board Meetings of April 27, 2015. Available: <https://www.mswd.org/Board/04%2027%202015%20Spcl%20Mtg%20Packet.pdf>

<sup>21</sup> Pers. Comm. John Soulliere, Public Relations Office for Mission Springs Water District.

<sup>22</sup> Pers. Comm. John Soulliere, Public Relations Office for Mission Springs Water District.

<sup>23</sup> Mission Springs Water District. 2011. *Mission Springs Water District 2010 Urban Water Management Plan*.

<sup>24</sup> Mission Springs Water District. 2015. *Report Water Waste Tool*. Available: <https://www.mswd.org/waterwaster.aspx>



and analyze their water use data for a one year period. Thereafter, an analysis will be conducted to determine the validity of expanding the program throughout MSWD's entire service area, and specifically will analyze potential water savings as they relate to costs for MSWD's customer base. The ultimate purpose of the program is to validate the effectiveness of advanced metering technology and to determine costs associated with implementing the program on a District-wide scale. Data collected through this study will also be made available to regional water suppliers, and therefore could provide a model for full-scale implementation across the Region.

### Without Project Conditions

Without the *MSWD Water Supply Reliability Program*, efforts to improve water supply reliability throughout MSWD's service area would be more difficult to implement. Without the project, MSWD would not secure financial support necessary to implement high-priority projects that will address long-term water supply reliability in its service area.

MSWD is committed to implementing water treatment technology at Well 29 and restoring operations at this facility. As mentioned previously, in order to meet projected long-term demands outlined in MSWD's 2010 UWMP, MSWD will need to add supplies to its system beyond existing conditions. Given that Well 29 is an existing, high-functioning production facility, installation of a Chrom 6 treatment system to address water quality concerns is the most efficient and cost-effective method for ensuring that an additional 1,350 AFY can be added to MSWD's supplies. Without the *Well 29 Chromium 6 Wellhead Treatment* component, MSWD could feasibly implement treatment technology and restore service to the other well that has been taken offline as a result of Chrom 6 issues (Well 27); however, this well has substantially lower production levels, producing 287 AFY of supply on average as shown in **Figure 2-3**. Therefore, without the project, MSWD's groundwater production would remain at current levels, which are depressed compared to long-term supply projections. In order to meet future projected demands on a long-term basis, MSWD would have to find multiple additional projects to implement to increase supplies by 1,350 AFY.

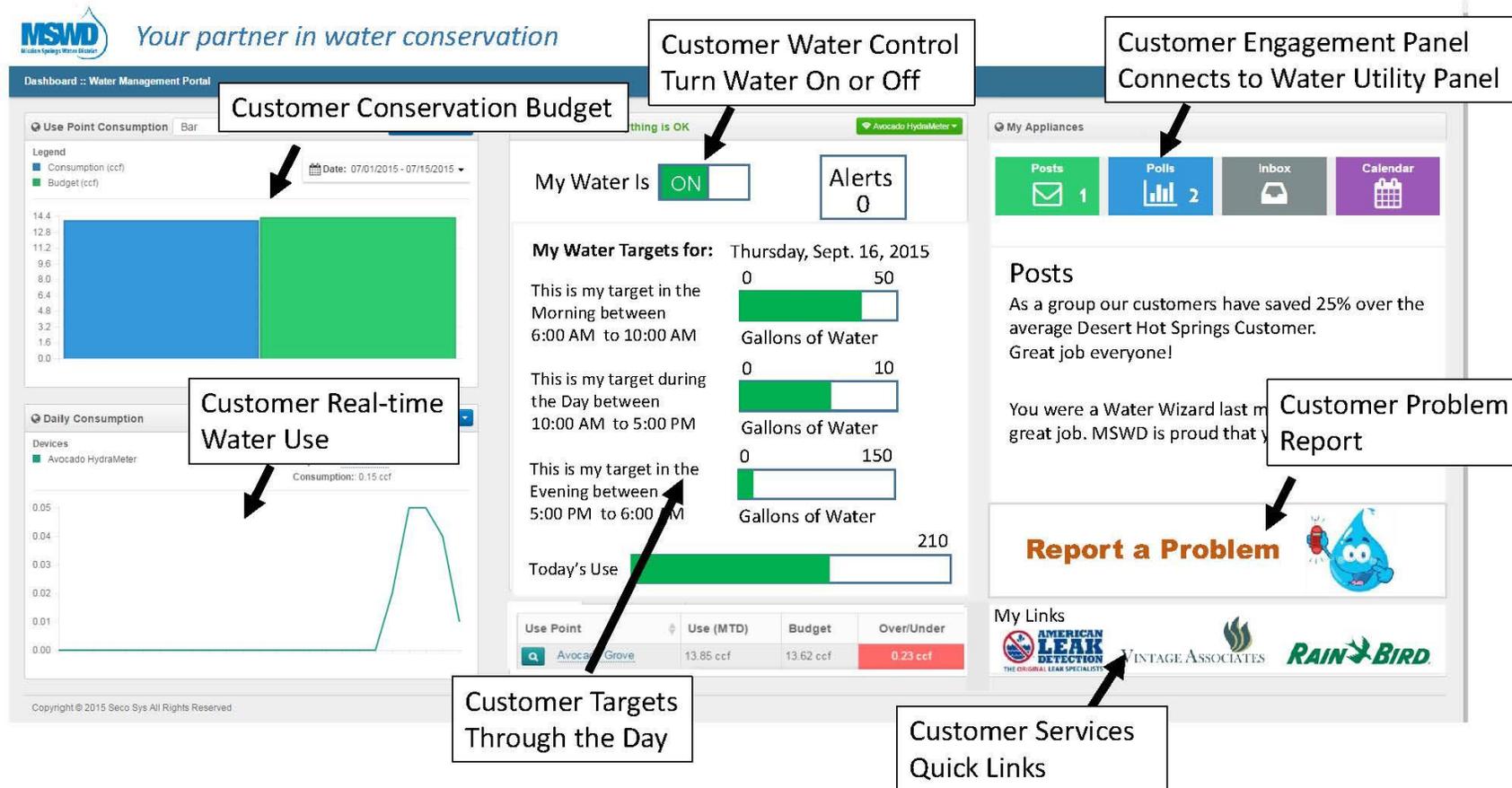
MSWD is also committed to eliminating water waste at the lowest potential cost to its customers. Without implementation of the *Advanced Metering Technology Pilot Project* MSWD would continue its efforts to reduce water waste via its established online reporting tool.<sup>25</sup> The existing water waste reporting tool has proven effective in reporting above-ground leaks and breaks; however, this reporting is limited to leaks that are visible to customers. Advanced metering that can detect underground leaks is necessary to move MSWD forward toward its ultimate goal of eliminating water waste. Further, without the pilot program and testing components of the *Advanced Metering Technology Pilot Project*, MSWD would not have the data needed to validate the effectiveness of such a program. Without this data, it may be more difficult from a political and public acceptance perspective to justify additional expenses associated with implementing the program on a District-wide scale. Therefore, without the pilot project, it can reasonably be assumed that conservation efforts would be limited to MSWD's existing efforts to reduce water use and waste.

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<sup>25</sup> Mission Springs Water District. 2015. *Report Water Waste Tool*. Available: <https://www.mswd.org/waterwaster.aspx>



Figure 2-5: Example of Customer Dashboard for the Advanced Metering Technology Pilot Project





## Methods to Estimate Physical Benefits

### **Primary Benefit: Water Quality Improved**

The primary benefit of water quality improvement is the removal of an average of 0.011 mg/L of Chrom 6 from potable groundwater supplies produced at Well 29. This water quality benefit was calculated by comparing existing Chrom 6 levels detected at Well 29 with the post-implementation water quality once the proposed WBA system is installed on the well.

Groundwater produced at Well 29 currently has Chrom 6 levels of 0.019 mg/L as reported by MSWD staff.<sup>26</sup> The project would reduce Chrom 6 levels from their current concentration to 0.008 mg/L using a weak base anion exchange treatment system to ensure that residents receive water meeting the drinking water standard for Chrom 6 of 0.010 mg/L. Bench-scale studies completed by the American Water Works Association (AWWA) show that there are four technologies that are best-suited for removing Chrom 6 from drinking water supplies: anion exchange, coagulation and precipitation of reduced chromium-3, adsorption via sulfur modified iron media, and membrane treatment.<sup>27</sup> Local data from CVWD shows that anion exchange is the preferred approach for Chrom 6 treatment from a cost and long-term operational perspective.<sup>28</sup>

Preliminary feasibility studies completed by MSWD for Well 29 show that once implemented, the proposed WBA system would reduce Chrom 6 levels to no greater than 0.008 mg/L, therefore reducing Chrom 6 levels by 0.011 mg/L. The treatment system is anticipated to have a lifecycle of 20 years based upon data from the previous-referenced AWWA bench-scale studies for Chrom 6 treatment.<sup>29</sup> Therefore, it is estimated that the Chrom 6 reduction benefit of 0.011 mg/L would accrue from the time that the well treatment is installed (end of 2016) through the 20-year useful life of the project as shown in **Table 2-2**.

### **Secondary Benefit: Water Supply Produced**

The secondary benefit of the *MSWD Water Supply Reliability Program* is analogous to the amount of water supply that would be produced from Well 29. As explained previously, to comply with the Chrom 6 MCL, MSWD has removed two wells from service: Well 27 and Well 29. Historic production from Well 27 and Well 29 was 287 AFY and 1,350 AFY, respectively. Therefore, as shown above in **Table 2-4**, as a result of removing Well 27 and Well 29 from service, MSWD has lost 1,637 AFY of its groundwater production capabilities (supplies). The data in **Table 2-4** shows groundwater production projections from MSWD's 2010 UWMP compared to existing conditions under which groundwater production has been reduced by 1,637 AFY. Once Well 29 is brought back online, water supplies will increase by 1,350 AFY, to 13,773 AFY in 2017 and will continue to increase on an annual basis per the increased groundwater production rate calculated in MSWD's 2010 UWMP as shown in **Table 2-3**.<sup>30</sup> It is estimated that this benefit will accrue from the time that the well treatment is installed (end of 2016) through the 20-year useful life of the project.

## New Facilities, Policies, and Actions

The budget provided in Attachment 4 includes costs associated with implementation of the WBA system at Well 29, which, once implemented will accrue both water quality and water supply benefits. The budget estimate does not include costs associated with ongoing operations and maintenance (O&M) of the treatment system, because these costs are ineligible costs per DWR's 2015 PSP and Guidelines. Therefore, in addition to the costs explained in Attachment 4, MSWD will be required to purchase materials for the treatment system and dispose of those materials on an ongoing basis. Materials that will need to be purchased and replaced include the WBA resin (estimated every 12 to 18 months), pH adjustment with sodium hydroxide and either compressed carbon dioxide or hydrochloric acid, and regular replacement of cartridge or bag filters upstream of the resin vessels. The total O&M cost for these replacement activities is

<sup>26</sup> Pers comm. Danny Friend, MSWD Engineer.

<sup>27</sup> American Water Works Association. 2007. *Hexavalent Chromium Removal Using Anion Exchange and Reduction with Coagulation and Filtration*. Available: <http://www.glendaleca.gov/home/showdocument?id=14798>

<sup>28</sup> Coachella Valley Water District. 2015. *Notice of Preparation of a Draft Environmental Impact Report for the Chromium-6 Water Treatment Facilities Project*. Available: <http://www.cvwd.org/DocumentCenter/View/2488>

<sup>29</sup> American Water Works Association. 2007. *Hexavalent Chromium Removal Using Anion Exchange and Reduction with Coagulation and Filtration*. Available: <http://www.glendaleca.gov/home/showdocument?id=14798>

<sup>30</sup> Mission Springs Water District. 2011. *Mission Springs Water District 2010 Urban Water Management Plan*.



anticipated to be on the order of \$300/AF, or approximately \$280,000/year.<sup>31</sup> The treatment system itself is anticipated have a lifecycle of 20 years, which has been described as the useful life of the project as part of this analysis.<sup>32</sup>

### **Potential Adverse Physical Effects**

There are no significant, long-term adverse physical effects anticipated from implementation of the *Well 29 Chromium 6 Wellhead Treatment* component. The Well 29 site is located at an existing MSWD facility that does not contain habitat and is maintained to remove all vegetation on a consistent basis.<sup>33</sup> This facility is also located at a substantial distance from residential uses and is eligible for a CEQA categorical exemption. While there may be temporary effects associated with construction of the WBA wellhead treatment system, such as noise or odors from construction equipment, these effects are anticipated to be minor as they fall under a CEQA categorical exemption and would be temporary in nature.

Once the WBA treatment system is installed, operations of the Well 29 treatment system will be consistent with existing operations of well facilities within MSWD's service area, and are not anticipated to be significant compared to existing conditions. The project will allow MSWD to reinstall service to an existing facility that has historically pumped 1,350 AFY of groundwater from local sources. MSWD has an existing permit from DDW for operation of Well 29 as part of its municipal supply system. As part of the project, MSWD will amend its existing permit to include provisions for WBA wellhead treatment, and will ensure that Well 29 is operated per the terms of the permit and consistent with DDW's goals to protect human health. Therefore, on a long-term basis the project is not anticipated to have adverse impacts.

For the *Advanced Metering Technology Pilot Project*, no construction activities are anticipated and no potential adverse physical effects would occur. On an operational basis this project is anticipated to lessen physical effects associated with air quality and greenhouse gas emissions. This is because if the project is implemented on a District-wide scale, it would substantially reduce worker vehicle trips associated with manual meter reading.

### **Long-Term Drought Preparedness**

The *MSWD Water Supply Reliability Program* meets three of the Drought Preparedness elements defined by DWR: 1) promote water conservation, 2) achieve long-term reduction of water use, and 3) efficient groundwater basin management.

The *MSWD Water Supply Reliability Program* will achieve efficient groundwater basin management by restoring the use of a currently unusable local groundwater source. MSWD currently relies upon groundwater as its only source for potable water, making groundwater management a high priority. DDW's new MCL for Chrom 6 is 10 µg/L, a lowering from 50 µg/L; nearly half of the wells in MSWD's Desert Hot Springs system exceeds the new Chrom 6 MCL. Well 29, one of MSWD's highest producing facilities, has a Chrom 6 concentration of 19 µg/L and was therefore removed from service. In order to make efficient use of the available local groundwater supply, water quality must be improved and Chrom 6 concentrations need to comply with the MCL. This project will install a treatment system on Well 29 to reduce Chrom 6 concentration to 8 µg/L, rendering Well 29 in compliance with the MCL, and allowing for this water source to contribute to MSWD's water supply and providing more efficient use of the available groundwater.

The *MSWD Water Supply Reliability Program* will promote water conservation and achieve long-term reduction of water use through the implementation of the *Advanced Metering Technology Pilot Program*. The Coachella Valley, along with the rest of California, is experiencing a severe drought. MSWD and other agencies in the Region have been actively pursuing measures to conserve water and reduce water waste. Eliminating water waste is an essential component to better managing the limited water resources in the Coachella Valley. MSWD currently uses manual water meters to monitor water use, which is inefficient and allows leaks to go undetected for up to a month before the meter is re-read. Undetected leaks can produce

<sup>31</sup> American Water Works Association. 2007. *Hexavalent Chromium Removal Using Anion Exchange and Reduction with Coagulation and Filtration*. Available: <http://www.glendaleca.gov/home/showdocument?id=14798>

<sup>32</sup> American Water Works Association. 2007. *Hexavalent Chromium Removal Using Anion Exchange and Reduction with Coagulation and Filtration*. Available: <http://www.glendaleca.gov/home/showdocument?id=14798>

<sup>33</sup> Pers comm. Danny Friend, MSWD Engineer.



substantial amounts of water waste. This project will allow MSWD to implement a pilot program to install 100 automated water meters with data collection systems. The data collected from the installed meters will allow MSWD and the program participants to monitor water use and detect leaks promptly, thereby eliminating a substantial source of water waste and conserving MSWD's potable water resources. The pilot program will also contribute to achieving long-term reduction of water use, because the project includes a public outreach component to inform and educate program participants on how to use the water meter data to reduce water use. Additionally, MSWD will analyze the data collected over a one year period. If analysis shows a substantial water savings the program may be expanded throughout MSWD's service area to contribute further to long-term water use reductions.

### Direct Water-Related Benefit to a DAC

An analysis of the extent of DACs within the project area is included in *Attachment 7 Disadvantaged Communities*. The results of this analysis show that 100% of MSWD's service area qualifies as DAC by geography. The *MSWD Water Supply Reliability Program* will provide benefits throughout MSWD's service area by providing an additional supply source and a pilot program to reduce District-wide water use. Benefits are therefore anticipated to be distributed across MSWD's service area, providing direct benefits to DACs.

This project will directly address two major water-related DAC needs explained in the *2014 Coachella Valley IRWM Plan*: water supply reliability and maintaining water affordability. While water supply reliability is a priority throughout the Coachella Valley, it is a particular concern for DACs, because additional emergency water measures such as purchasing bottled water can be cost-prohibitive for DACs. The primary goal of the *MSWD Water Supply Reliability Program* is to address two major threats to water supply reliability, and implement cost-effective solutions to address these threats on a long-term basis. As such, the project meets a major water-related need of DACs by implementing priority actions to address water supply reliability in a small water district that is 100% economically disadvantaged.

Maintaining water affordability is also a primary concern for DACs in the Region, and is a priority among the water supply agencies in the Coachella Valley. MSWD is committed to implementing solutions that maintain water affordability in its service area. As described previously, the installation of a wellhead treatment system at Well 29 to improve water quality is considered an affordable solution to help MSWD increase local water supplies on a long-term basis. Furthermore, the main focus of the *Advanced Metering Technology Pilot Project* is to implement a pilot study that will evaluate the cost-effectiveness of improving metering and water leak detection in MSWD's service area. As such, the project meets a major water-related need of DACs by implementing cost-effective solutions that are aimed at maintaining affordability of water in a small water district that is 100% economically disadvantaged.

### Project Performance Monitoring Plan

Benefits from the project will begin once the Well 29 Chrom 6 wellhead treatment system is operational and Well 29 is restored to service (anticipated January 2017). When operational, the project will provide the full water quality and water supply benefits; because the full-scale project benefits will accrue upon implementation, interim targets are not practical for this project. As such, the targets provided in **Table 2-6** represent full-scale project benefits that will be calculated upon project completion. However, MSWD will prepare a DWR-compliant Project Performance Monitoring Plan for the project as part of Task 9 (see Attachment 3). The targets and information in **Table 2-6** are, therefore, subject to change pending DWR review and approval of the deliverables associated with Task 9.

As a water purveyor, MSWD regularly monitors well production. Through MSWD's existing monitoring system, MSWD will monitor well output for Well 29 and will track and store this data in accordance with established operating procedures. For water quality improvement, MSWD will regularly sample the product water from the WBA treatment system. These samples will be tested for Chrom 6 concentrations on a regular basis in accordance with MSWD's permits from DDW and other regulatory agencies. This monitoring data will be archived by MSWD following MSWD protocols and will be reported as required to demonstrate compliance with the Chrom 6 MCL. These monitoring tools and methods will provide quantitative backing of the claimed benefits over the 20-year lifetime of the project.



**Table 2-5: Project Performance Monitoring Plan  
 MSWD Water Supply Reliability Program**

<b>Table 6 – Project Performance Monitoring Plan</b>		
<b>Project Name: MSWD Water Supply Reliability Program</b>		
<b>Proposed Physical Benefits</b>	<b>Targets</b>	<b>Measurement Tools and Methods</b>
Water Supply	1,350 AFY production	MSWD will monitor well output by pumping flow logs and regular calibration of Well 29's flow metering equipment. The addition of the well will increase MSWD's potable water delivery capacity and will therefore increase water supply in the Region. MSWD will gather pumping reports from Well 29 and report them to DWR on an annual basis as part of post-project performance monitoring.
Water Quality	Average reduction of 0.011 mg/L for Chrom 6 (drinking water concentration of 0.008 mg/L for Chrom 6)	MSWD will regularly sample the product water from the WBA Chrom 6 removal system to determine Chrom 6 concentration, which must be below the MCL of 0.010 mg/L. The proposed WBA system will be designed to produce product water that has Chrom 6 levels that do not exceed 0.008 mg/L. Given that existing Chrom 6 levels are 0.019 mg/L, the project is anticipated to result in a reduction of 0.011 mg/L of Chrom 6.  MSWD will publicly report water quality data from Well 29 in its annual water quality reports, which will be gathered and submitted to DWR as part of post-project performance monitoring.

### Cost Effectiveness Analysis

**Table 2-6: Cost Effectiveness Analysis  
 MSWD Water Supply Reliability Program**

<b>Table 7 – Cost Effective Analysis</b>	
<b>Project Name: MSWD Water Supply Reliability Program</b>	
Question 1	<u>Types of benefits provided as shown in Table 5</u> Benefit 1: 1,350 AFY of water supply produced from Well 29 Benefit 2: 0.011 mg/L reduction in Chromium 6
Question 2	<u>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?</u> Yes.
	<u>If yes, list the methods (including the proposed project) and estimated costs.</u> MSWD explored a multitude of solutions for the Chrom 6 issue in their service area. These solutions included blending, drilling new wells, and different treatment options. MSWD's analysis determined that treatment would be the best option. Once treatment was selected as the preferred option, MSWD analyzed potential alternative treatment methods.  One of MSWD's data sources to analyze treatment alternatives involved reviewing information from CVWD for their <i>Chromium-6 Water Treatment Facilities Project</i> and information contained within a draft report from CWA and IWA titled <i>Indio and Coachella Water Authorities' Chromium-6 Treatment and Compliance Study</i> to evaluate alternative methods and costs.



**Table 7 – Cost Effective Analysis**

**Project Name:** *MSWD Water Supply Reliability Program*

	<p>Further, MSWD worked with local vendors to understand potential treatment options given the particularities of MSWD’s system.</p> <p>CVWD’s efforts have concluded that ion exchange treatment is the best approach for removing Chrom 6 from local groundwater resources due to cost and operational considerations.<sup>34</sup> CVWD, IWA, and CWA all evaluated two methods of ion exchange treatment, both a Strong Base Anion Exchange (SBA) and a Weak Base Anion Exchange (WBA). These results have found that SBA is the most economical treatment approach considering both operations and maintenance costs. The CWA/IWA study found that treatment for a well with a capacity of 1,000 gallons per minute would have an annualized cost of \$460/AF for the WBA system and \$240/AF for the SBA system. However, these findings only hold true for groundwater sources tested in the aforementioned studies, and do not apply directly to MSWD’s system as a result of sulfate levels that are naturally occurring in the Mission Creek and Garnet Hills basins.</p> <p>In addition, as described above, in addition to considering different treatment technology, MSWD also considered additional actions beyond installing treatment at Well 29 to increase groundwater production by 1,350 AFY. One of the options would be installing treatment at the other well that has been removed from service (Well 27); however, this alternative is not preferred as it would result in a substantially lower water supply (287 AFY). Further, MSWD could feasibly drill another well in a portion of the basin that is not impacted by Chrom 6. Based on previous agency experience, well replacement costs average \$1,000,000 per well.<sup>35</sup></p>
<p>Question 3</p>	<p><u>If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.</u></p> <p>The information described above demonstrates that the WBA system selected for the <i>MSWD Water Supply Reliability Program</i> is not the least cost alternative compared to a SBA system alternative based on quantitative information from other regional studies. However, WBA treatment is the preferred alternative due to feasibility issues associated with the water quality in MSWD’s service area. The CVWD, CWA, and IWA studies all conclude that SBA treatment is effective treatment for water that contains lower concentrations of sulfate, while WBA treatment is more effective for water with greater concentrations of sulfate. The CVWD analysis has recommended implementation of SBA systems throughout its service area, except for in the Desert Hot Springs area located adjacent to MSWD’s service area. Despite its higher cost, CVWD recommended WBA in the Desert Hot Springs area due to naturally high sulfate levels that render SBA ineffective.<sup>36</sup> Therefore, given the water quality conditions in MSWD’s groundwater basins, WBA is the preferred alternative given that it is the only type of feasible ion exchange treatment technology available.</p> <p>As described above under Question 2, WBA treatment at Well 29 is the least cost alternative when considering other options to increase water supply in MSWD’s service area by 1,350 AFY. Specifically, the alternative of using a SBA treatment system would not be feasible due to sulfate levels in MSWD’s groundwater basins. In addition, drilling a new well in a portion of the groundwater basin that is not impacted by Chrom 6 could feasibly provide an equal level of water supply benefits. However, local information about well drilling shows that installation of a WBA system at Well 29 would be the least cost alternative as it would be substantially less costly than drilling a new well.</p>

<sup>34</sup> Coachella Valley Water District. 2015. *Notice of Preparation of a Draft Environmental Impact Report for the Chromium-6 Water Treatment Facilities Project*. Available: <http://www.cvwd.org/DocumentCenter/View/2488>

<sup>35</sup> Coachella Valley Regional Water Management Group. 2011. *Proposition 84-Round 1 Implementation Grant Application for the Coachella Valley*.

<sup>36</sup> Coachella Valley Water District. 2015. *Notice of Preparation of a Draft Environmental Impact Report for the Chromium-6 Water Treatment Facilities Project*. Available: <http://www.cvwd.org/DocumentCenter/View/2488>



## Project 2: Regional Turf Reduction Program

Local Project Sponsor: Desert Water Agency (DWA) and Coachella Water Authority (CWA)

### Brief Description

The project will provide rebates to remove turf and reduce water use throughout DWA and CWA's service areas, with an emphasis on outreach to DACs.

### Project Map

Figure 2-6 shows the project area for the *Regional Turf Reduction Program*, the service areas of the project sponsors (DWA and CWA), the project facilities, the project's relation to groundwater basins and surface water, DACs, and proposed monitoring locations. Please note the following specifics for information provided in Figure 2-6:

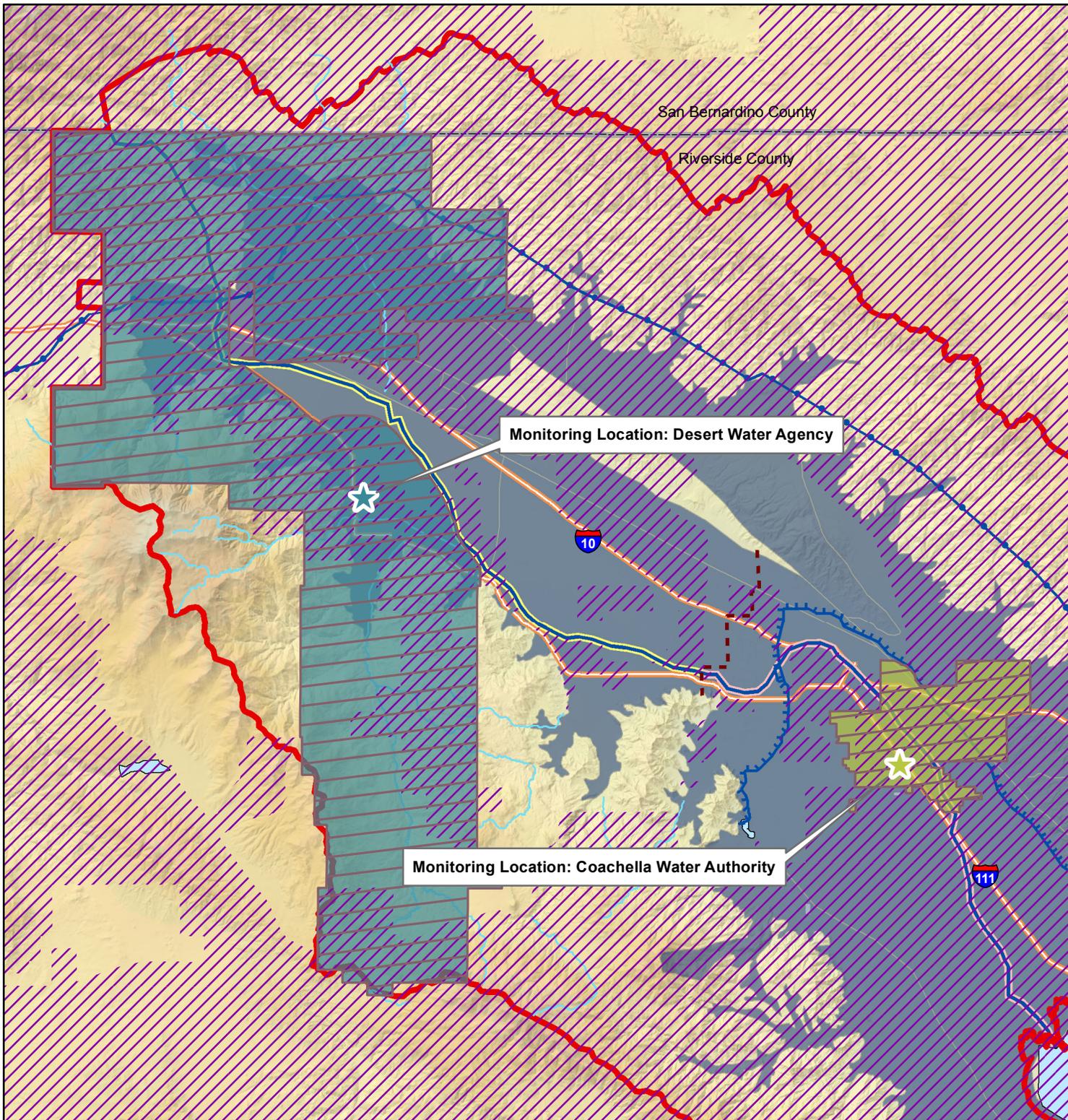
- Project Location: Turf rebates available through this project will be made available throughout CWA and DWA's collective service area.
- Project Facilities: Project involves rebates that are eligible throughout DWA and CWA's service area, and will target distribution of at least 25% of all rebate dollars to DACs.
- Groundwater Basins and Surface Water: Project will primarily affect groundwater located within the Indio Sub-basin (Bulletin 118 Basin Number 7-21.01). Surface water would be indirectly improved by the project; primary surface water bodies are the Whitewater River and the Coachella Valley Stormwater Channel.
- DACs: the majority of CWA's service area and a large portion of DWA's service area is designated as an economically disadvantaged community per local mapping (see Attachment 7 for additional details)
- Proposed Monitoring Locations: Monitoring for rebates will take place at DWA and CWA's Main Offices, because this is where water use data will be compiled.



***Example of Water-Wise Desert Landscaping  
Promoted by the Regional Turf Reduction Program<sup>37</sup>***

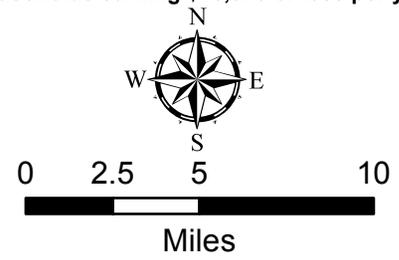
<sup>37</sup> Source: [www.cwatercounts.com](http://www.cwatercounts.com)

**Figure 2-6:  
Regional Turf Reduction  
Program**



- Division between West and East Valley
- Colorado River Aqueduct
- Coachella and All American Canals
- Whitewater River Storm Water Channel
- Coachella Valley Storm Water Channel
- River or Creek
- Highways
- Water Bodies
- Groundwater Basins
- Coachella Valley IRWM Region
- 2 Regional Turf Reduction Program
- Desert Water Agency
- Coachella Water Authority
- Desert Water Agency
- Coachella Water Authority
- Disadvantaged Communities (DACs)

Source: 2013 U.S. Census Data - American Community Survey Median Household Income (MHI), by block group, census tract, and DAC Data from 2013 Coachella Valley DAC Outreach Program. DACs are defined as having MHI of 80% of Statewide MHI. For 2013, DACs were households earning \$48,875 or less per year.





## Project Description

On May 5, 2015, the SWRCB adopted an emergency regulation to implement the mandatory 25 percent statewide reduction in potable urban water use called for by Governor Jerry Brown in his April 1, 2015 Executive Order. The SWRCB's emergency regulations establish conservation standards for each urban water supplier that ranges from 4-36% based on existing residential water use figures from the SWRCB. In accordance with these regulations, DWA and CWA must reduce water use by 36% and 24%, respectively. Given that over half of California's urban water deliveries are used on landscape irrigation, the Governor also called on citizens to convert 50 million square feet of lawn to drought-tolerant landscaping statewide.

As part of the *Regional Conservation Program* that was implemented by water supply agencies in the Coachella Valley and funded through a Proposition 84-Round 1 Implementation Grant, several of the Coachella Valley Regional Water Management Group (CVRWMG) water suppliers developed turf reduction programs that offer rebates to customers to replace water-intensive turf with water-wise, desert-friendly landscape more suitable for the arid climate of the Coachella Valley. Due to the success of turf rebate programs and an increasing need to reduce water demands, in 2014 the CVRWMG applied for and received additional grant funding for the *Regional Turf Reduction Program* (through a Proposition 84-Drought Solicitation Implementation Grant), which made turf rebates available across the Region. The grant funding requested as part of this Proposal is an extension of the previously-funded *Regional Conservation Program* and *Regional Turf Reduction Program*, and would extend rebates to high-demand areas within DWA and CWA's service areas. Additional rebates are necessary to meet an extremely high level of demand in the Region. For example, DWA opened its turf rebate program in August 2014 to distribute funding available through the aforementioned grant programs; the program was so successful that \$1,000,000 in rebate funding was allocated in 60 days and DWA had to suspend the program until more funding could be dedicated to rebates.<sup>38</sup>

Through previous efforts and grant funding from DWR, both DWA and CWA have developed robust turf rebate programs, and have established program guidelines and specifications, rebate applications, and outreach programs. The DWA turf rebate is \$2 per square foot of turf removed up to \$3,000 for residential properties and up to \$10,000 per project for commercial properties. All projects require a 25% funding match. The CWA turf rebate is \$1 per square foot with a maximum of \$750 for residential properties only. The grant funding requested as part of this Proposal is targeted at direct implementation of these existing turf rebate programs, and will be used almost entirely on implementation efforts. The primary purpose of this project is to remove turf and reduce water demands in the Coachella Valley consistent with Governor Brown's order to convert 50 million square feet of lawn to drought-tolerant landscaping. Information about each agency's existing turf rebate program is publically available via their public websites: <http://www.dwa.org/turf> and <http://conservecoachella.com/>. Furthermore, information about CWA, DWA, and other regional conservation efforts are available via the regional water conservation website <http://cvwatercounts.com/>.

For this specific solicitation, DWA and CWA will target turf removal within DACs. CWA's service area is classified 90% DAC per mapping with U.S. Census Data (refer to Attachment 7 for more information). DWA's service area is 71% DAC. Both agencies will ensure that at least 25% of the rebates distributed within their service areas are provided to DACs. This solicitation also includes outreach efforts that are important to make residents aware of both conservation opportunities in the Coachella Valley, and to demonstrate to customers the beauty and simplicity of desert-friendly landscaping.

The primary outcome of the project is that DWA and CWA will distribute rebates to remove 800,000 square feet of turf, which will save 137 AFY of water once the program is fully implemented in 2019. The turf will be replaced with desert-friendly landscaping that will be able to withstand physical conditions in the Coachella Valley with minimal irrigation. The desert-friendly landscape will replace existing turf monoculture, and therefore will also improve 800,000 square feet (18.37 acres) of habitat, because the improved landscape will provide shelter, food, and other benefits not provided by turf grass.

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<sup>38</sup> Desert Water Agency. 2014. *Staff Report to Desert Water Agency Board of Directors on the Turf Buy Back Program – November 4, 2014.*



## Project Physical Benefits

The *Regional Turf Reduction Program* will provide multiple benefits and include three of the project elements defined in Public Resources Code § 75026(a). Two of the project benefits have been quantified and are presented in **Tables 2-7** and **2-8**. The two quantified physical benefits are Water Supply (water saved) and Habitat Improved.

**Table 2-7: Primary Physical Benefit – Water Supply Saved**  
**Regional Turf Reduction Program**

<b>Project Name:</b> <i>Regional Turf Reduction Program</i> <b>Type of Benefit Claimed:</b> Water Supply Saved <b>Units of the Benefit Claimed:</b> AFY <b>Anticipated Useful Life of Project (years):</b> 13 years			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2015	57,984 AFY	57,970 AFY	-14 AFY
2016	58,916 AFY	58,875 AFY	-41 AFY
2017	59,748 AFY	59,680 AFY	-68 AFY
2018	60,579 AFY	60,483 AFY	-96 AFY
2019	61,311 AFY	61,174 AFY	-137 AFY
2020	62,143 AFY	62,006 AFY	-137 AFY
2021	62,966 AFY	62,829 AFY	-137 AFY
2022	63,789 AFY	63,652 AFY	-137 AFY
2023	64,512 AFY	64,375 AFY	-137 AFY
2024	65,335 AFY	65,198 AFY	-137 AFY
2025	68,558 AFY	68,421 AFY	-137 AFY
2026	69,180 AFY	69,043 AFY	-137 AFY
2027	70,001 AFY	69,864 AFY	-137 AFY
2028	70,823 AFY	70,700 AFY	-123 AFY
2029	71,644 AFY	71,548 AFY	-96 AFY
2030	72,666 AFY	72,598 AFY	-68 AFY
2031	73,185 AFY	73,144 AFY	-41 AFY

**Comments:** The without-project baseline for the primary benefit (Water Supply) is based upon projected water demands from CWA and DWA's 2010 UWMPs. 2015 demands are anticipated to total 2,884 AFY for CWA and 55,100 AFY for DWA, and that these demands are anticipated to increase through 2035, totaling 3,360 AFY and 73,400 AFY, respectively.<sup>39,40</sup> As described in each agency's 2010 UWMP, demands are projected to increase over time, largely as a result of population growth.<sup>41,42</sup> The demands that are used to provide the baseline for the analysis incorporate an assumption that per capita demands will be reduced by 20% by 2020 in accordance with provisions of SBx7-7. The conservation savings that will be realized through implementation of the *Regional Turf Reduction Program* represent additional conservation on top of the SBx7-7 mandate to respond to recent conservation mandates established by

<sup>39</sup> Coachella Water Authority. 2011. *2010 Urban Water Management Plan*.

<sup>40</sup> Desert Water Agency. 2011. *2010 Urban Water Management Plan*.

<sup>41</sup> Coachella Water Authority. 2011. *2010 Urban Water Management Plan*.

<sup>42</sup> Desert Water Agency. 2011. *2010 Urban Water Management Plan*.



<b>Project Name:</b> <i>Regional Turf Reduction Program</i>			
<b>Type of Benefit Claimed:</b> Water Supply Saved			
<b>Units of the Benefit Claimed:</b> AFY			
<b>Anticipated Useful Life of Project (years):</b> 13 years			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
<p>the SWRCB. For this reason, it is reasonable to use long-term demand projections from each agency's 2010 UWMP for the demand baseline against which conservation provided by the project will be compared.</p> <p>With implementation of the project, 800,000 square feet of turf will be removed and replaced with water-wise landscaping. Water savings are based on Southern Nevada Water Authority's observed savings of 55.8 gallons/square-foot/year for a climate similar to the Coachella Valley.<sup>43</sup> Therefore, in total the project will save 137 AFY of water.<sup>44</sup> By the end of 2015, 10% of the rebates are anticipated to be issued. From that point, it was assumed that turf replacements would increase over time, culminating in the maximum amount of benefits accruing in 2019. Assuming that average home ownership lasts for 13 years, it is anticipated that benefits would accrue over 13 years per retrofit.<sup>45</sup> Benefits will be assumed to phase out the same way in which they phase in, because each individual turf replacement is estimated to have a 13-year project life.</p>			

**Table 2-8: Secondary Physical Benefit – Habitat Improved**  
***Regional Turf Reduction Program***

<b>Project Name:</b> <i>Regional Turf Reduction Program</i>			
<b>Type of Benefit Claimed:</b> Habitat Improved			
<b>Units of the Benefit Claimed:</b> acres			
<b>Anticipated Useful Life of Project (years):</b> 13 years			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2015	5,558 acres per year	5,556 acres per year	1.84 acres per year
2016	5,558 acres per year	5,552 acres per year	5.51 acres per year
2017	5,558 acres per year	5,549 acres per year	9.18 acres per year
2018	5,558 acres per year	5,545 acres per year	12.86 acres per year
2019-2027	5,558 acres per year (50,022 acres)	5,540 acres per year (49,857 acres)	18.37 acres per year (165 acres)
2028	5,558 acres per year	5,541 acres per year	16.53 acres per year
2029	5,558 acres per year	5,545 acres per year	12.86 acres per year
2030	5,558 acres per year	5,549 acres per year	9.18 acres per year
2031	5,558 acres per year	5,552 acres per year	5.51 acres per year

<sup>43</sup> Southern Nevada Water Authority. 2005. *Xeriscape Conversion Study Final Report*.

<sup>44</sup> Southern Nevada Water Authority. 2005. *Xeriscape Conversion Study Final Report*.

<sup>45</sup> U.S. Department of Housing and Urban Development. 2004. *The Sustainability of Homeownership: Factors Affecting the Duration of Homeownership and Rental Spells*.



<b>Project Name:</b> <i>Regional Turf Reduction Program</i> <b>Type of Benefit Claimed:</b> Habitat Improved <b>Units of the Benefit Claimed:</b> acres <b>Anticipated Useful Life of Project (years):</b> 13 years			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
<p><b>Comments:</b> Habitat improvement is based on information from the California Native Plant Society, which demonstrates that in addition to water supply improvements, replacing turf grass with native landscapes can attract wildlife such as birds and other pollinators. By the end of 2015, 10% of the rebates are anticipated to be issued. From that point, it was assumed that turf replacements would increase over time, culminating in the maximum amount of benefits accruing in 2019. Assuming that home ownership lasts for 13 years, it is anticipated that benefits would accrue over 13 years.<sup>46</sup></p> <p>For the secondary benefit (Habitat Improvement), the without-project baseline is based upon the existing land use data from the Southern California Association of Governments, which shows that currently, there is a total of 5,558 acres of habitat in the collective service areas of CWA and DWA. With implementation of the project, habitat improvement will be achieved by converting monoculture turf to diverse, desert-friendly landscape. Data from the California Native Plant Society demonstrates that in addition to water savings, converting monoculture turf yards to climate-appropriate landscaping (in this case, desert landscaping) provides a diversity of vegetation that attracts wildlife such as birds.<sup>47</sup> Once the project is complete, a total of 800,000 square feet, or 18.37 acres of turf will be removed. Given that the removed turf will be replaced with agency-approved desert-friendly landscapes, it is estimated that the amount of habitat that is improved is equivalent to the amount of turf that is removed. Benefits will phase in from 2015 through project completion in 2019 and will accrue over the 13-year project life as shown in <b>Table 2-8</b>. Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual turf retrofit has a useful life of 13 years.</p>			

<sup>46</sup> U.S. Department of Housing and Urban Development. 2004. *The Sustainability of Homeownership: Factors Affecting the Duration of Homeownership and Rental Spells*.

<sup>47</sup> California Native Plant Society. *Creating Buzzing Gardens: Increasing Native Plants and Pollinators*.



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## Technical Analysis of Physical Benefits Claimed

### Project Need

Water conservation has been and continues to be a priority for urban water suppliers in the Coachella Valley. Urban water suppliers that are part of the CVRWMG have undertaken a variety of efforts across the Region to reduce demands and conserve water. In 2011 the CVRWMG worked together to develop the *Regional Conservation Program*, which includes a variety of conservation elements aimed at furthering efforts to meet Senate Billx7-7 (SBx7-7) 20% by 2020 water conservation targets.

As part of the *Regional Conservation Program*, several of the CVRWMG water suppliers developed turf reduction programs to offer rebates to customers for replacing water-intensive grass and turf with water-wise landscape more suitable for the arid climate of the Coachella Valley. Due to the success of turf rebate programs and an increasing need to reduce water demands, in 2014 the CVRWMG again worked together to develop the *Regional Turf Reduction Program*, which is a regional project to expand turf removal efforts across the Coachella Valley. The grant funding requested as part of this Proposal is an extension of the previously-developed *Regional Turf Reduction Program*, and would extend rebates to high-demand areas within DWA and CWA's service areas.

The collaborative effort among the CVRWMG agencies to increase conservation in the Coachella Valley is comprehensive and Valley-wide, and has resulted in many efficiencies. For example, through implementation of the *Regional Conservation Program*, the CVRWMG agencies learned that there was some confusion among customers about the various rebates and conservation programs for which they would potentially be eligible. To respond to this issue and provide clarifications for customers about the availability and terms of various rebate programs, the CVRWMG added a feature to its regional conservation website ([www.cvwatercounts.com](http://www.cvwatercounts.com)) that allows customers to enter their address, find the service area within which they are located, and then link directly to program information about rebates for which they would be eligible to receive.<sup>48</sup> While this web feature has greatly increased outreach to and connection with customers, it has also resulted in an extremely high-level of demand for various rebates and conservation programs. Currently, demands are so high for turf rebate programs in the Coachella Valley that all of the public turf rebate programs ran out of funding and had to be temporarily suspended until additional funding could be acquired or allocated to rebates.<sup>49</sup>

The *Regional Turf Reduction Program* would provide additional funding for turf rebates, and will therefore allow DWA and CWA to extend their existing rebate programs. Because these programs have already been developed, 100% of the grant funding requested in this project would be allocated directly to rebate programs and result in the maximum amount of turf replacement possible (see *Attachment 4, Budget* for additional details). Replacement of turf landscapes with drought tolerant landscapes will conserve potable water supplies in accordance with recent water conservation mandates enacted by the SWRCB. Examples of outreach materials and terms and conditions of DWA and CWA's existing turf rebate programs are provided in **Figure 2-7** through **Figure 2-10** on the following pages.

In May 2015 the SWRCB implemented mandatory water reductions to reduce potable urban water usage by 25% statewide. The conservation savings for all urban water suppliers are allocated across nine tiers of increasing levels of residential water use to reach the statewide 25% reduction mandate. The amount of savings required for each water supplier is based on the average residential water use per person per day (gpcd). Per these restrictions, DWA is required to reduce water usage by 36% and CWA is required to reduce water usage by 24% over 2013 levels.

The new SWRCB regulations target outdoor uses in alignment with Governor Brown's order to convert 50 million square feet of lawn to drought-tolerant landscaping. The *Regional Turf Reduction Program* will promote removal of water intensive turf landscapes by providing financial incentives to residents to replace

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<sup>48</sup> Coachella Valley Regional Water Management Group. 2015. *Coachella Valley Water Conservation Water Rebate Map*. Available: <http://cvwatercounts.com/water-map/>

<sup>49</sup> Rojas, Paulina. 2015. *Coachella Valley Turf-Removal Rebate Programs Run Dry*. Available: <http://www.desertsun.com/story/news/environment/2015/05/17/coachella-valley-turf-buyback-water-cutbacks/27410919/>



turf with water-wise desert landscapes, thereby moving each agency forward in meeting their mandated conservation restrictions. The *Xeriscape Conversion Study* completed by the Southern Nevada Water Agency, which serves a desert area very similar to the Coachella Valley, found that conversion of turf landscapes to drought-tolerant plants reduced water consumption by 30% on average.<sup>50</sup> Significant reductions in consumption were realized immediately following landscape conversion and remained stable over time, showing that the *Regional Turf Reduction Program* will provide immediate water savings that will remain in effect as long as the landscapes are not re-converted to turf.

The replacement of turf will not only contribute to DWA and CWA's water conservation requirements, but will also improve habitat for use by native species. Conventional landscaping primarily consists of monoculture non-native grasses, which are not considered to be climate appropriate for the arid Coachella Valley. These simplistic landscapes do not provide the vegetation variation and complexity necessary to attract and support native wildlife; a study titled *SmartScape Design Provides Improved Avian Habitat* study found that landscapes planted with diverse, climate-appropriate plants supported a significantly higher avian diversity, abundance, and species richness than non-native, turf dominated landscapes.<sup>51</sup> Further, research from the California Native Plant Society demonstrates that diverse native landscapes also attract an array of pollinators, native bees, and butterflies.<sup>52</sup>

To analyze species in the project area that could potentially utilize habitat that is improved as part of the project, an analysis of the California Natural Diversity Database (CNDDB) was completed in July 2015. This analysis found that in total, there are 14 bird species that fall within the project area (within CWA and DWA's service areas) that could reasonably benefit from habitat improved through implementation of the *Regional Turf Reduction Program*. The 14 bird species that could utilize habitat improved by the project include: Cooper's hawk, Southern California rufous-crowned sparrow, burrowing owl, black swift, prairie falcon, loggerhead shrike, elf owl, black-tailed gnatcatcher, vermilion flycatcher, yellow warbler, Bendire's thrasher, Crissal thrasher, Le Conte's thrasher, and least Bell's vireo. It is anticipated that the habitat benefits provided by the project will accrue once turf conversions are completed, and that benefits will continue to be provided as long as the landscapes are not re-converted to turf.

### **Without Project Conditions**

This project would conserve 137 AFY of water and improve 18.37 acres of habitat once all turf removal and landscape improvements are complete. The water savings provided by the project will reduce overall water demand in the Region, and therefore provide benefits across the Region as they will help to reduce overall demands for groundwater. Similarly, the habitat benefits associated with the project would benefit the entire Region by improving habitat throughout CWA and DWA's service areas. Without this project, CWA and DWA would need to implement other conservation measures or programs to meet the State's mandatory use reductions, which may be less cost-effective or take longer to implement if such efforts are new; opposed to implementation of turf rebate programs, which are existing programs that can be implemented immediately. The Region's other existing water conservation programs are not known to provide habitat-related benefits; therefore, additional habitat-targeted projects would need to be implemented to provide similar habitat benefits to the *Regional Turf Reduction Program*.

Given the high demand for rebates in the Region, it is anticipated that without grant funding, CWA and DWA would continue to find ways to fund turf rebates through operating budgets or other means. Based on information from each agency, these programs would likely be smaller and not implemented as quickly when compared to the turf rebate program proposed through the *Regional Turf Reduction Program*. Therefore, water supply benefits would not be as great as water supply savings would take longer to realize, and until funding is allocated, high water demands for turf irrigation would continue. Alternatively, if water cuts are implemented and existing turf allowed to die, property values could decrease as a result of diminished curb appeal. Further, if turf remains intact or simply allowed to die, as could happen without this project, the additional habitat provided by conversion from turf to climate appropriate landscaping would not be realized, and there would be less habitat available across the Region for native species.

<sup>50</sup> Southern Nevada Water Authority. 2005. *Xeriscape Conversion Study: Final Report*.

<sup>51</sup> Haller, Andrea D. 2012. *SmartScape Design Provides Improved Avian Habitat*. June.

<sup>52</sup> California Native Plant Society. *Creating Buzzing Gardens: Increasing Native Plants and Pollinators*.



Figure 2-7: DWA Turf Rebate Program Brochure

**DWA'S TURF BUY BACK PROGRAM** aims to reduce water use by paying customers to convert their water-guzzling grass into beautiful water-wise landscape.

Property owners will receive a **\$2-per-square-foot rebate for each square foot of turf removed** and are required to pay a minimum of 25 percent of the project expenses. The rebate amount is subject to a post-conversion inspection. Keep reading to find out more about how you can get a rebate for planting desertscape.

**FIVE EASY STEPS TO GET CASH TO DITCH YOUR GRASS**

- 1 Submit an application to DWA.
- 2 DWA will conduct a pre-conversion inspection to ensure the project is eligible and measure the turf area that will be replaced.
- 3 Complete your project.
- 4 DWA will conduct a post-conversion inspection to ensure all program criteria have been met.
- 5 Your rebate will be issued.

**GET CASH TO DITCH YOUR GRASS!**  
Learn more at [www.dwa.org/turf](http://www.dwa.org/turf)

**DESERT WATER AGENCY'S TURF BUY BACK PROGRAM**

**GET CASH TO DITCH YOUR GRASS!**

**YOUR PARTNER IN CONSERVING DESERT WATER**

1200 S Gene Autry Trail, Palm Springs, CA 92264  
760.323.4971 | [www.dwa.org](http://www.dwa.org) | @DWAwater

[www.dwa.org/turf](http://www.dwa.org/turf)

**YOUR PARTNER IN CONSERVING DESERT WATER**

PRINTED ON RECYCLED STOCK



Figure 2-8: DWA Turf Rebate Program Requirements

Reduce water use by converting your water-guzzling grass into beautiful water-wise landscape



## DWA'S TURF BUY BACK PROGRAM

TO PARTICIPATE IN THE PROGRAM, YOUR TURF REMOVAL PROJECT WILL HAVE TO MEET THE FOLLOWING CRITERIA:



**1 Landscape Requirements**

- ✓ Replace existing water-guzzling grass with **water-wise landscaping**. For examples, see the book Lush and Efficient, visit DWA's Operation Center Demonstration Gardens or visit Lowe's garden section.
- ✓ Participants must plant enough desert plants to **cover half of the conversion area** once the plants are full-grown. Each plant will be measured using the estimated square footage the plant will reach at full-maturity.
- ✓ Tamarisk trees are **prohibited** in the conversion area.
- ✓ The landscape area must be covered with **mulch that is permeable to air and water**. Some examples include rock, bark, ungrouted pavers, or synthetic turf. Rebates will not be issued for non-permeable hardscape areas, such as grouted patios.
- ✓ **Permeable weed barriers are required**. Plastic weed barriers are prohibited.



**2 Irrigation System Requirements**

- ✓ A **low-flow irrigation system** must be installed on the conversion area. Drip emitters must not exceed 20 gallons per hour.
- ✓ A **pressure regulator and filter are required** to be installed to prevent damage to the low-flow irrigation system.
- ✓ The new area must be on a **separate irrigation valve** from any existing remaining turf.
- ✓ Customers must install a **Smart Irrigation Controller**, which DWA will provide and install free of charge. To apply for a Smart Irrigation Controller, please visit [www.dwa.org/controller](http://www.dwa.org/controller) or contact DWA's offices.



**3 Proof-of-Purchase Requirements**

- ✓ **Save all of your project receipts** and provide them to the DWA representative conducting your post-conversion inspection.
- ✓ If you are not present at your post-conversion inspection, you can mail your sales receipts to DWA's offices.

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**4** If you have questions about our new **Turf Buy Back Program**, please visit our website or contact us at the number below.

**760.323.4971 | [www.dwa.org/turf](http://www.dwa.org/turf)**  
1200 S Gene Autry Trail  
Palm Springs, CA 92264

GET CASH TO DITCH YOUR GRASS!



**\$2 PER SQUARE FOOT REBATE**



**Figure 2-9: CWA Turf Rebate Program Brochure**

## Residential Turf Removal Rebate Program

The City of Coachella Utilities Department is proud to offer a turf removal rebate program for residents who want to replace their grass with water- friendly plants. The purpose of this rebate program is to provide examples of water- wise planting alternatives to turf in parkways and front yards.

Are you interested in participating in the City of Coachella turf removal rebate program? Follow these steps to get your rebate:

1. **Read** all the terms and conditions of the program and think about how you want to convert your landscaping.
2. **Complete and submit the Application** —Rebate Reservation by **DEADLINE EXTENDED**. Funding is limited and is available on a first come first serve basis. We encourage you to submit your application as soon as possible. **Do NOT start killing or removing turf until you receive confirmation from the City of Coachella**
3. **Check** your mailbox or your email. We'll send you a Rebate Reservation Confirmation with your Reservation Number, your start date, your expiration date and an estimated rebate amount. Don't forget to contact Dig-Alert! at 811 to get clearance for your project before you start.
4. **Transform** your water- loving grass into a beautiful water- friendly landscape. Kill your lawn, plant water- friendly plants, retrofit your irrigation system, and put down mulch.
5. **Finish** your project within 120 days (4 months) from the date on your Rebate Reservation Confirmation.
6. **Complete and submit** —Rebate Request.
7. **We'll call you!** Once we receive your Rebate Request, we'll call you to schedule an appointment for a post- conversion visit. We'll measure the area you converted and confirm your plantings and irrigation system.
8. **Check** your mailbox for your rebate check!

**We're here to help!**

If you have any questions along the way, please call us at (760) 501-8100

**City of Coachella Utilities Department  
53-462 Enterprise Way  
Coachella, CA 92236**





**Figure 2-10: CWA Turf Rebate Program Requirements**



## Terms and Conditions

Eligibility
<ul style="list-style-type: none"><li>• Rebates are available for residential properties only (single- family detached homes, townhomes, duplexes, triplexes and four-plexes) that have received an approved rebate reservation number. <b>Projects that were completed prior to rebate reservation approval are not eligible.</b></li><li>• The residential property must receive water service from the City of Coachella</li><li>• Areas to be converted must have turf being irrigated with potable water at the time the rebate reservation number is provided.</li><li>• Conversions must comply with all applicable laws, codes, policies, covenants, conditions, and restrictions.</li><li>• Only property owners may apply for the rebate.</li><li>• Only front yard and parkway projects are eligible. Backyard projects are not eligible for this program.</li><li>• The converted area must contain enough plants to create at least 50% living plant cover when plants are fully grown. Trees do not count toward coverage. This rebate does not apply to conversions that use only mulch or rock. See page 7 for a coverage calculation worksheet.</li></ul>
Minimum Requirements
<ul style="list-style-type: none"><li>• The converted area may not include any live or synthetic turf.</li><li>• Prior to conversion, turf must be sterilized to ensure that it will not grow back.</li><li>• If you plan to remove over 750 square feet of turf or convert more than 50% of your irrigated area, please contact the City of Coachella Utilities Department for additional information</li><li>• Plants used in the yard must be from the water- friendly plants</li><li>• Spray and rotor irrigation systems must be retrofitted to low volume drip systems.</li><li>• All exposed soil must be covered with a 3" layer of mulch.</li><li>• Impermeable surfaces are not covered by the rebate. Converted areas must be permeable to air and water. Weed barriers must be permeable. Concrete, plastic sheeting or other impermeable surfaces do not qualify.</li><li>• DO NOT remove or in any way damage existing City street trees.</li><li>• All fire hydrants must have a 3 foot (on center) clear area surrounding them, where no plantings should be placed. A layer of 3" mulch surrounding fire hydrants is acceptable.</li></ul>
Program Terms
<ul style="list-style-type: none"><li>• Only one Turf Removal rebate per address will be issued. Please apply for the maximum area you plan to convert while the rebate reservation is valid (120 days).</li><li>• <b>Application Part 1 must be submitted on or before November 30, 2012.</b> Funding is limited and is available on a first come first serve basis. We encourage you to submit your application as soon as possible.</li><li>• If your application is approved, the City will provide you with a rebate reservation number and anticipated rebate amount. <b>Do not start your project until you receive a rebate reservation number.</b></li><li>• <b>The rebate amount is \$1 per square foot of turf removed. The maximum rebate amount is \$750.00</b></li><li>• Rebate reservations are valid for 120 days. Projects must be completed and Application Part 2—Rebate Request must be submitted prior to the reservation expiring.</li><li>• Converted area and irrigated area measurements are subject to inspection and verification by the City.</li><li>• The converted area must remain in compliance with all program conditions for a period of 5 years, and must be properly maintained during that time. If this requirement is violated, you may be required to refund all or a portion of the rebate, which may be recovered by the City through the addition of a surcharge on your water bill over whatever period of time is deemed appropriate by the City. The requirement to refund some or all of a previously granted rebate will cease upon transfer of ownership to an unrelated party.</li><li>• If you are a member of a homeowners association (HOA), be sure to get approval prior to proceeding with your project. HOAs are required to comply with City landscape rules, but participation in this program still requires compliance with HOA rules.</li></ul>

2



## Methods to Estimate Physical Benefits

### Primary Benefit: Water Supply Produced

The primary benefit of the *Regional Turf Reduction Program* is the amount of water supply that would be conserved by removing water-consumptive turf grass and replacing it with desert-friendly landscapes.

Water savings that would accrue as a result of the turf rebates are based on success of other programs in the Region and regions with similar weather and water use patterns. Water savings that would result from implementation of the project were estimated assuming 55.8 gallons of water per year are saved per square foot (sqft) of turf that is removed, based on a study done in the desert region served by the Southern Nevada Water Authority (SNWA).<sup>53</sup> As explained in Attachment 4 and shown in **Table 2-9** below, a total of \$1,333,332 of the overall budget would be spent on direct turf rebate costs; 100% of the \$1,000,000 grant request for this project would be provided for the rebates, and customers that receive the rebates would be required to provide a 25% funding match. Given these stipulations, it is expected that the project would result in a cumulative removal of 800,000 square feet of turf and would reduce water consumption by 137 AFY once the project is fully implemented.

**Table 2-9: Calculation of Water Savings for the *Regional Turf Reduction Program***

Agency	Total Grant Request	Funding Match	Total Funding	Rebate Provided (per sqft)	Total Amount of Turf Removed (sqft)	Estimated Annual Water Savings (gallons)	Estimated Water Savings (AFY)
CWA	\$200,000	\$66,666	\$266,666	\$1	266,666	14,879,963	46
DWA	\$800,000	\$266,666	\$1,066,666	\$2	533,333	29,759,981	91
<b>TOTAL</b>	<b>\$1,000,000</b>	<b>\$333,332</b>	<b>\$1,333,332</b>	<i>variable</i>	<b>800,000</b>	<b>44,640,000</b>	<b>137</b>

The project benefit of water conservation described above is compared to total existing demands as shown in **Table 2-7**. The demands are based upon information from CWA and DWA's 2010 UWMPs. As described in each agency's 2010 UWMPs, demands are projected to increase over time, largely as a result of population growth.<sup>54 55</sup> The demands that are used to provide the baseline for the analysis incorporate an assumption that per capita demands will be reduced by 20% by 2020 in accordance with provisions of SBx7-7. The conservation savings that will be realized through implementation of the *Regional Turf Reduction Program* represent additional conservation on top of the SBx7-7 mandate to respond to recent conservation mandates established by the SWRCB. For this reason, it is reasonable to use long-term demand projections from each agency's 2010 UWMP for the demand baseline against which conservation provided by the project will be compared. **Table 2-10** shows how the overall projected demands were calculated; this table shows that the demand values were pulled directly from each agency's 2010 UWMP and then added together to get a value for overall demands within CWA and DWA's service areas.

**Table 2-10: Baseline Demand Calculations**

Year	CWA Demands (AFY)	DWA Demands (AFY)	Total Demands (AFY)
2015	2,884	55,100	57,984
2016	2,916	56,000	58,916
2017	2,948	56,800	59,748
2018	2,979	57,600	60,579
2019	3,011	58,300	61,311

<sup>53</sup> Southern Nevada Water Authority. 2005. *Xeriscape Conversion Study: Final Report*.

<sup>54</sup> Coachella Water Authority. 2011. *2010 Urban Water Management Plan*.

<sup>55</sup> Desert Water Agency. 2011. *2010 Urban Water Management Plan*.



Year	CWA Demands (AFY)	DWA Demands (AFY)	Total Demands (AFY)
2020	3,043	59,100	62,143
2021	3,066	59,900	62,966
2022	3,089	60,700	63,789
2023	3,112	61,400	64,512
2024	3,135	62,200	65,335
2025	3,158	65,400	68,558
2026	3,180	66,000	69,180
2027	3,201	66,800	70,001
2028	3,223	67,600	70,823
2029	3,244	68,400	71,644
2030	3,266	69,400	72,666
2031	3,285	69,900	73,185

Source: Coachella Water Authority. 2011. *2010 Urban Water Management Plan* and Desert Water Agency. 2011. *2010 Urban Water Management Plan*.

Information from the Southern Nevada Water Agency, which serves an area with climate similar to the Coachella Valley, explains that water savings from turf replacements were realized immediately following landscape conversion and remained stable over time, showing that conservation savings from turf replacement remain in effect as long as the landscapes are not re-converted to turf.<sup>56</sup> The turf rebates made available for the *Regional Turf Reduction Program* are available for residential, commercial, and municipal uses; of the three uses, residential turf conversions are considered to be the most likely to be re-converted and therefore have the shortest useful life. This assumption is based on information from CWA and DWA that show commercial and municipal turf conversions to be stable over the long-term due to economic benefits associated with reduced water consumption. Therefore, the useful life of the project is conservatively assumed to be analogous to the average length of homeownership, which is 13 years according to HUD.<sup>57</sup>

In total, assuming the project will be phased in from 2015 to 2019, the primary physical benefit of water supply saved through turf replacement is shown over the project's 13-year useful project life in **Table 2-7**. Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual turf retrofit has a useful life of 13 years.

**Secondary Benefit: Habitat Improved**

The secondary benefit of the *Regional Turf Reduction Program* is the amount of habitat that would be improved by removing monoculture turf grass and replacing it with desert-friendly landscapes that attract birds and other wildlife species.

As described in detail in *Attachment 3, Work Plan*, both CWA and DWA have developed established turf rebate programs, including requirements for landscaping and approved plant palettes. Both agencies require a pre-conversion inspection to ensure the project is eligible and also to measure the turf area that will be replaced. Furthermore, both agencies encourage residents to visit various Desert Demonstration Gardens throughout the Region, and require that installations involve water-efficient desert landscaping. The landscaping requirements established by DWA and CWA are based upon information and requirements in the Water Efficient Landscape Ordinance that is in effect in the Region and was

<sup>56</sup> Southern Nevada Water Authority. 2005. *Xeriscape Conversion Study: Final Report*.

<sup>57</sup> U.S. Department of Housing and Urban Development. 2004. *The Sustainability of Homeownership: Factors Affecting the Duration of Homeownership and Rental Spells*.



promulgated by the Coachella Valley Association of Governments (CVAG). This ordinance notes that local landscapes can, among other things, replace ecosystems lost to development.<sup>58</sup>

Information from the California Native Plant Society shows that conversions from non-native plants to climate-appropriate landscaping can increase the diversity and abundance of native insects and birds by attracting these species to plants.<sup>59</sup> Quantitative data is also available on the benefits of replacing turf with climate-appropriate landscaping. A scientific research study found that regional, climate-appropriate landscapes provide improved habitat for bird species.<sup>60</sup> This study concluded that habitat benefits could be attributed to the fact that native plant gardens generally provide a more diverse mix of plants that offer birds a wide range of textures and vertical variation for shelter and nesting opportunities. Additionally, the study noted that diverse, climate appropriate habitat (vs. turf monoculture) can provide food resources such as nectar, seeds, and insects that are not provided by turf grass. As described above, a CNDDDB search was conducted for the Coachella Valley, finding the presence of 14 bird species that could potentially use improved habitat for the uses described above in published scientific literature.

Given the desert climate of the Coachella Valley and the fact that turf grass is both non-native and non-climate appropriate (not naturally occurring in the Region), this analysis assumes that every square foot of turf that is removed represents a square foot of habitat that is improved as a direct result of project implementation. In total, the project is anticipated to replace 800,000 square feet, or 18.37 acres of turf in CWA and DWA's collective service areas.

The project benefits of improved habitat described above are compared to total existing acres of habitat currently available in the project area as shown in **Table 2-8**. For this analysis, 2008 land use data from the Southern California Association of Governments was analyzed in GIS; this analysis measured the area (in acres) that is classified as "habitat". Per that analysis, currently there are 5,558 acres of total area in CWA and DWA's collective service areas that qualify as habitat. This value was used as the baseline without-project conditions shown in **Table 2-8**. There is no regionally-available data that accurately tracks and projects overall changes in habitat over time in the Coachella Valley. Furthermore, as the economy rebounds in the Region and development continues, it is likely that habitat acreage in CWA and DWA's service areas will decline over time. For reasons associated with uncertainty, this analysis conservatively assumes that the total area of 5,558 acres of existing habitat remains constant through the useful life of the project.

Assuming the project will be phased in from 2015 to 2019, the secondary physical benefit of habitat improved through turf replacement is shown over the course of the project life in **Table 2-8**. This analysis assumes that the useful life of the project is 13 years, which is based on the length of average homeownership estimated by HUD.<sup>61</sup> Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual turf retrofit has a useful life of 13 years.

### **New Facilities, Policies, and Actions**

The quantified physical benefits are directly realized through turf conversions that would take place from distribution of rebate funding. Implementation of the rebate program would not require any additional facilities, polices, or actions beyond those contained within the Work Plan (see *Attachment 3 Work Plan*) in order to realize the benefits described above. This project continues existing turf rebate programs that have proven successful in the past, and will therefore be able to continue within the existing policies and utilize existing facilities. The physical benefits would require participants to complete their individual turf replacement projects; CWA and DWA staff will conduct site inspections, and rebates will not be issued until projects are complete. Therefore, no other facilities, policies, or actions would be required to obtain the physical benefits described in this attachment.

<sup>58</sup> Coachella Valley Association of Governments. *Draft Model Water Efficient Landscape Ordinance*.

<sup>59</sup> California Native Plant Society. *Creating Buzzing Gardens: Increasing Native Plants and Pollinators*.

<sup>60</sup> Haller, Andrea D. 2012. *SmartScape Design Provides Improved Avian Habitat*. June.

<sup>61</sup> U.S. Department of Housing and Urban Development. 2004. *The Sustainability of Homeownership: Factors Affecting the Duration of Homeownership and Rental Spells*.



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### **Potential Adverse Physical Effects**

There are no anticipated sustained adverse physical effects from this project. There may be temporary effects associated with turf replacement, such as noise or odors from equipment required for removing, hauling, and disposal of turf; however these effects are anticipated to be minor and temporary in nature. As discussed in *Attachment 3, Work Plan*, this project does not qualify as a “project” per the California Environmental Quality Act, and therefore would not require mitigation, analysis, or any other measures to address physical effects.

### **Long-Term Drought Preparedness**

The *Regional Turf Reduction Program* project meets two of the Drought Preparedness elements defined by DWR: 1) promoting water conservation, and 2) achieving long-term reduction of water use. The project will provide long-term drought preparedness benefits by incentivizing turf replacement with native, water-wise landscapes, thereby promoting water conservation, and reducing water use on a long-term basis.

The *Regional Turf Reduction Program* will promote water conservation and long-term reduction of water use by providing incentives for the replacement of turf with native, water efficient landscapes within the DWA and CWA service areas. Both DWA and CWA primarily obtain water supplies from groundwater (the Indio Sub-basin). The current, on-going drought contributes to existing groundwater overdraft conditions that are of regional significance. As documented extensively in the *2014 Coachella Valley IRWM Plan*, overdraft of groundwater supplies can result in serious consequences, including increased water costs, land subsidence, and reduced water reliability. The Region is working to eliminate groundwater overdraft to avoid or minimize these issues, and has identified long-term reductions in water demands as an important strategy.

The drought has also resulted in additional conservation efforts, especially those required to address new mandatory water conservation regulations that require agencies to reduce water use over 2013 levels. Over half of California’s urban water is used for landscape irrigation, and reducing irrigation water demands is a priority for both the State and for the Coachella Valley. In order to reach their respective water conservation targets, DWA and CWA have developed extensive conservation programs, including turf rebates when funding is available. This project will provide funding to continue implementation of the agencies’ existing turf removal programs and provide funds necessary to keep these high-demand programs going. Rebates will allow CWA and DWA customers, including DACs, to replace water intensive turf landscapes with water-wise landscapes, including native plants that are adapted to the Region’s climate and require substantially less water. Conversion to water-wise landscapes is considered to be a long-term conservation strategy as once turf is removed, it will no longer require water for irrigation unless turf is re-installed at a later date.

### **Direct Water-Related Benefit to a DAC**

As described in *Attachment 7 Disadvantaged Communities*, an analysis was conducted to determine how much of the project area is classified as a DAC. CWA’s service area is classified 90% DAC per mapping with U.S. Census Data and DWA’s service area is 71% DAC, and both agencies will ensure that at least 25% of the rebates distributed within their service areas are provided to DACs. Due to the structure of the rebate program, at least 25% of the total project area is DAC by population. While the turf rebate program is an existing program for CWA and DWA, both agencies are placing an emphasis on providing rebates to DACs in an effort to increase DAC participation in the program.

Therefore, the primary water-related benefit that will be provided to DACs as a result of this program is financial support to implement turf rebates, and therefore maintain water affordability. Maintaining affordability of water is an important regional priority for DACs, which was documented extensively in the *2014 Coachella Valley IRWM Plan*. Maintaining water affordability is one of the objectives of the *2014 Coachella Valley IRWM Plan*, and CWA and DWA are committed to addressing this regional issue. The project, by providing financial incentives targeted to DACs, will help maintain water affordability by providing financial support for DACs to install water-saving landscapes. In addition to direct financial benefits provided by the rebates, this project will also help DACs maintain water affordability on a long-term basis by reducing water use and therefore water bills. This is increasingly important as the drought and ongoing mandates have required some agencies to increase water rates. Increases in water rates are known to impact DACs



at a higher level compared to other customers; implementation of this project and others throughout the Region will, therefore help agencies meet conservation goals without increasing water rates.

### Project Performance Monitoring Plan

Benefits will begin accruing as water-intensive grass and turf lawns are converted to water-wise landscape. The total area of converted turf will continue to increase through project implementation in 2019. At least half the rebates are targeted to be processed by 2017 to ensure full implementation of the rebate program's funds and the associated water savings.

Project benefits will be measured through inspections by CWA and DWA staff or supporting staff performing pre- and post-site inspections to measure the total area (in square feet) that is converted from turf to water-wise landscaping. Furthermore, both CWA and DWA track customer meter data, and track pre- and post-turf conversion water use. This data is regularly compiled and made publically available at meetings of DWA's Board of Directors and the Coachella City Council.

Pre- and post- conversion water use will be tracked and used to monitor project-related water savings. The overall area of turf replaced will be tracked during pre-and post-implementation site reports. The square feet of turf replaced will be used to measure habitat benefits and will be converted to habitat improvement at a 1:1 ratio.

Because water supply and habitat benefits associated with the project will take a substantial amount of staff time to compile and prepare, interim targets are not reasonable to track for this project. Rather, the targets provided in **Table 2-11** represent full-scale project benefits that will be calculated upon project completion. However, CWA and DWA will prepare a DWR-compliant Project Performance Monitoring Plan for the project as part of Task 9 (see Attachment 3). The targets and information in **Table 2-11** are, therefore, subject to change pending DWR review and approval of the deliverables associated with Task 9.

**Table 2-11: Project Performance Monitoring Plan  
 Regional Turf Reduction Program**

Table 6 – Project Performance Monitoring Plan			
Project Name: <i>Regional Turf Reduction Program</i>			
Proposed Physical Benefits	Targets		Measurement Tools and Methods
	Per Agency	Total	
Water Supply	46 AFY for CWA and 91 AFY for DWA	137 AFY	For CWA: CWA will perform pre-inspection and post-inspection of turf replacement sites within their service area to ensure the amount of square footage of turf is replaced per terms of the rebate program. Individual customer pre- and post-inspection reports will also include data about the customer's water use before and after turf has been removed. The difference in water use before and after turf replacements have been completed will be used to track and measure overall water savings resulting from program implementation.  For DWA: DWA will perform pre-inspection and post-inspection of turf replacement sites within their service area to ensure the amount of square footage of turf is replaced per terms of the rebate program. Individual customer pre- and post-inspection reports will also include data about the customer's water use before and after turf has been removed. The difference in water use before and after turf replacements have been completed will be used to track and measure overall water savings resulting from program implementation.



<b>Table 6 – Project Performance Monitoring Plan</b>			
<b>Project Name: <i>Regional Turf Reduction Program</i></b>			
<b>Proposed Physical Benefits</b>	<b>Targets</b>		<b>Measurement Tools and Methods</b>
	<b>Per Agency</b>	<b>Total</b>	
Habitat	6.13 acres for CWA and 12.24 acres for DWA	18.37 acres	<p>For CWA: CWA will perform pre-inspection and post-inspection of turf replacement sites within their service area to ensure the amount of square footage of turf is replaced per terms of the rebate program. The total area (in square feet) of turf that is replaced will be converted to habitat improvements using a 1:1 ratio.</p> <p>For DWA: DWA will perform pre-inspection and post-inspection of turf replacement sites within their service area to ensure the amount of square footage of turf is replaced per terms of the rebate program. The total area (in square feet) of turf that is replaced will be converted to habitat improvements using a 1:1 ratio.</p>

### Cost Effectiveness Analysis

**Table 2-12: Cost Effectiveness Analysis  
*Regional Turf Reduction Program***

<b>Table 7 – Cost Effective Analysis</b>	
<b>Project Name: <i>Regional Turf Reduction Program</i></b>	
Question 1	<p><u>Types of benefits provided as shown in Table 5</u></p> <p>Benefit 1: 137 AFY water conserved Benefit 2: 18.37 acres of habitat improved</p>
Question 2	<p><u>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?</u></p> <p>Yes.</p> <p><u>If yes, list the methods (including the proposed project) and estimated costs.</u></p> <p>As described in the <i>Without Project Conditions</i> section above, the primary alternative to the project would be to implement other conservation programs. There are many available conservation programs in the Region; these programs are generally targeted to different end-users and different types of water use. DWA’s 2010 UWMP states that, “DWA studies have concluded that as much as 80 percent of all residential water use is for landscape irrigation. Therefore, DWA has concluded that it is more cost effective to concentrate its efforts on reducing outdoor water consumption.”<sup>62</sup> Therefore, while there are a variety of conservation programs available in the Region that could potentially be implemented, the <i>Regional Turf Reduction Program</i> is preferred in that it will address major water users in the Region and is considered the most cost-effective conservation program.</p>

<sup>62</sup> Desert Water Agency. 2011. *2010 Urban Water Management Plan*.



**Table 7 – Cost Effective Analysis**

**Project Name:** *Regional Turf Reduction Program*

	<p>As also described in the <i>Without Project Conditions</i> section above, due to the importance of turf rebates to CWA and DWA, without implementation of the <i>Regional Turf Reduction Program</i>, CWA and DWA would likely continue to offer turf rebates, but at a lesser magnitude (less money available) and at a slower pace (rebates not issued as quickly). Therefore, without the project it would take longer to achieve the magnitude of water savings provided by the project.</p> <p>In addition, other available conservation programs are largely educational (classrooms, seminars, etc.) or are for indoor uses (low flow appliances, etc.). These types of conservation programs would not result in the habitat improvement benefits that would accrue from implementation of the <i>Regional Turf Reduction Program</i>.</p>
<p>Question 3</p>	<p><u>If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.</u></p> <p>This program is the preferred alternative, because it is the most cost-effective (least cost alternative) compared to other conservation programs per data from DWA. Further, the program would also provide secondary benefits associated with improved habitat, which would not be accrued by other types of conservation such as indoor water conservation.</p>



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## Project 3: Regional Well Retrofit and Abandonment Program

Local Project Sponsor: Coachella Valley Water District (CVWD)

### Brief Description

The project will retrofit improperly sealed or abandoned water supply wells to reduce the risk of groundwater contamination and groundwater loss throughout Coachella Valley.

### Project Map

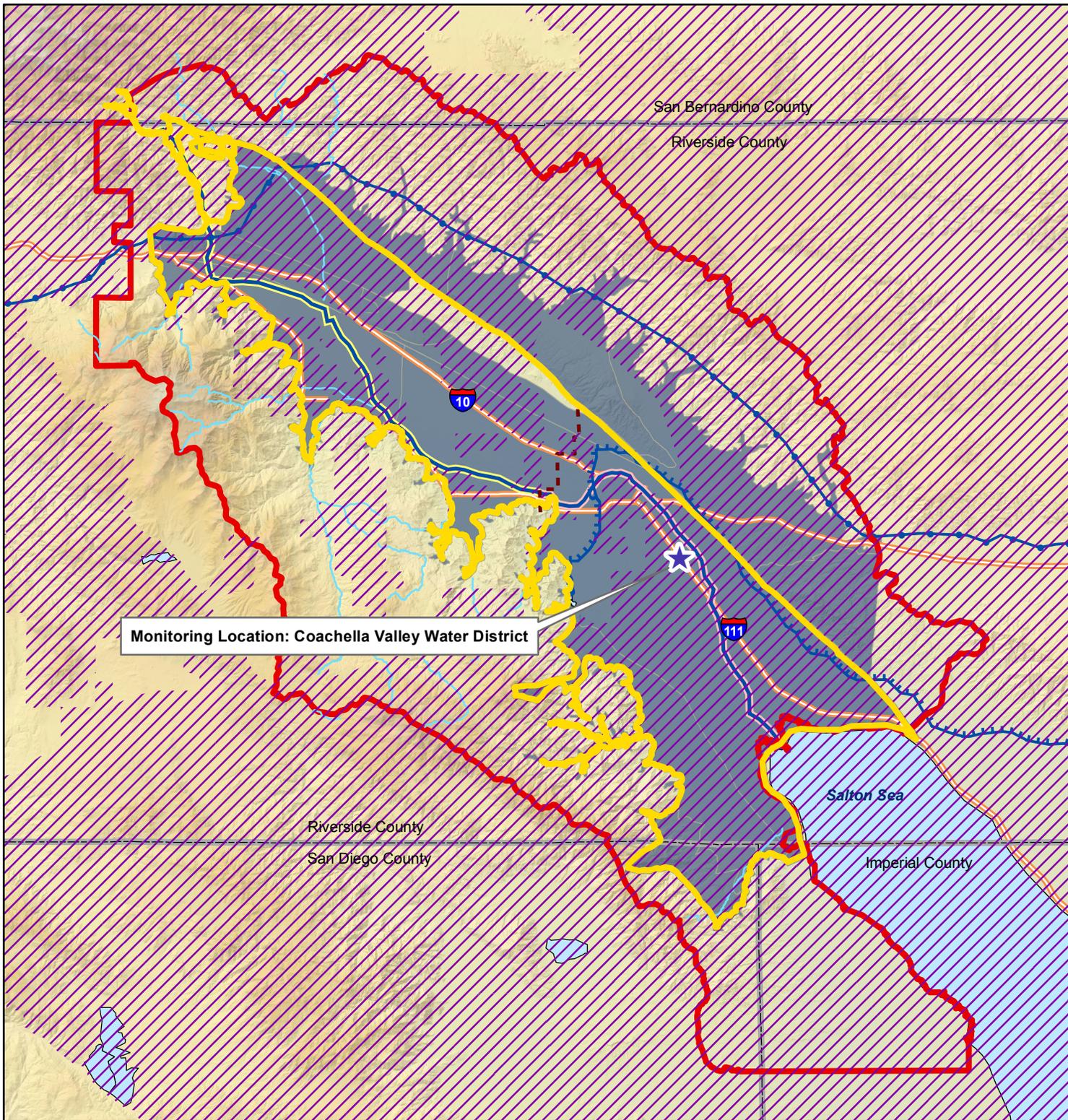
**Figure 2-11** shows the project area for the *Regional Well Retrofit and Abandonment Program*, the service areas of the project sponsor (CVWD), the project facilities, the project's relation to groundwater basins and surface water, DACs, and proposed monitoring locations. Please note the following specifics for information provided in **Figure 2-11**:

- **Project Location:** Wells to be incorporated in this project are located throughout the cumulative area covered by the Region's two medium-priority basins (Indio Sub-basin and Mission Creek Sub-basin).
- **Project Facilities:** Project involves rebates that are eligible throughout the area covered by the Indio and Mission-Creek sub-basins, and will target distribution of at least 25% of all rebate dollars to areas that are mapped as DACs.
- **Groundwater Basins and Surface Water:** Project will primarily affect groundwater located within the Indio Sub-basin (Bulletin 118 Basin Number 7-21.01) and the Mission-Creek Sub-basin (Bulletin 118 Basin Number 7-21.02). Surface water would be indirectly improved by the project; primary surface water bodies are the Whitewater River and the Coachella Valley Stormwater Channel.
- **DACs:** per DAC mapping, 80% of the overall project area is classified as DAC; CVWD is committed to reserving a minimum of 25% of the grant rebates under this program for well retrofits in DACs.
- **Proposed Monitoring Locations:** Monitoring for rebates will take place at CVWD's Main Office, because this is where rebate data and information will be compiled.



**Example of an Artesian Well that would be Addressed by the Regional Well Retrofit and Abandonment Program**

**Figure 2-11:  
Regional Well Retrofit and  
Abandonment Program**

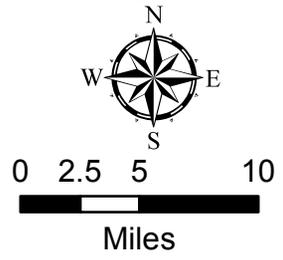


- Division between West and East Valley
- Colorado River Aqueduct
- Coachella and All American
- Whitewater River Storm Water Channel
- Coachella Valley Storm Water Channel
- River or Creek
- Highways
- Water Bodies
- Groundwater Basins
- Coachella Valley IRWM Region
- 3 Regional Well Retrofit and Abandonment Program
- Disadvantaged Communities (DACs)

Monitoring Location: Coachella Valley Water District

The regional well program will be monitored from CVWD headquarters.

Source: 2013 U.S. Census Data - American Community Survey Median Household Income (MHI), by block group, census tract, and DAC Data from 2013 Coachella Valley DAC Outreach Program. DACs are defined as having MHI of 80% of Statewide MHI. For 2013, DACs were households earning \$48,875 or less per year.





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## Project Description

Groundwater is the primary water supply source for the Coachella Valley. Historically, the demand for groundwater has exceeded the natural recharge of the basin, causing overdraft to occur. Overdraft management through various methods has been a priority of the CVRWGM agencies to ensure the Region's water supply reliability and to avoid negative impacts associated with overdraft. Managing overdraft is a priority in the Region, but has also led to issues associated with artesian conditions in the Region. Artesian wells are formed when a well is located in an aquifer that is under pressure with a water table level that rises above the surface of the ground. When this occurs, water can flow freely from the well, causing water waste. CVWD has documented the issue of artesian wells in the 2010 Water Management Plan, noting a potential return to artesian conditions in a large portion of the eastern Coachella Valley.

As part of the 2014 Coachella Valley IRWM Plan, the CVRWGM prepared a Technical Memorandum (TM) for the proposed Coachella Valley Well Retrofit and Abandonment Program. The impetus of the TM was that the two groundwater management plans in the Region acknowledge that there are a number of supply wells in the Coachella Valley that are improperly sealed or abandoned, posing issues associated with water waste for artesian wells and also posing a water quality risk as these wells could be a conduit through which constituents can enter the basin. The purpose of the TM was to document potential projects that could be implemented to properly seal and abandon wells, and therefore reduce water waste and water quality issues posed by these facilities.

Through the process of developing the TM, the CVRWGM also analyzed the potential to retrofit unused wells for monitoring purposes. Specifically, the CVRWGM analyzed the potential to convert wells to monitoring wells for use in the California Statewide Groundwater Elevation Monitoring (CASGEM) program. The 2014 Coachella Valley IRWM Plan also included an analysis of groundwater monitoring gaps; therefore, the TM specifically looked at the location of abandoned wells with respect to identified monitoring gaps to identify candidate wells that could be retrofitted for their use in the CASGEM network.

The TM mapped the location of various improperly sealed and abandoned wells and recommended three methods to address the wells: 1) retrofitting for inclusion in the CASGEM network, 2) proper sealing, and 3) destruction in cases where retrofitting and sealing are not feasible. The purpose of the *Regional Well Retrofit and Abandonment Project* is to implement findings of the TM by providing permitting support and rebates to private well owners to incentivize implementation of one of the three aforementioned methods. In total, this project will provide permitting support for modification of 87 wells; it is anticipated that 21 wells will be retrofit for inclusion in the CASGEM network, 62 wells will be properly sealed, and 4 wells will be destroyed. All improperly sealed or abandoned wells in the Region's medium-priority basins (Indio and Mission Creek basins) will be eligible to receive funding through the retrofit program; however, CVWD will target artesian wells that can be properly sealed as this is the least cost retrofit option and also provides water supply benefits by eliminating water waste. In total, it is anticipated that 45 artesian wells will be sealed or destroyed, resulting in water savings of 100 AFY per well (4,500 AFY). These water savings will result in water quality benefits by reducing the overall concentration of salts in the groundwater basin over time as water storage increases. The water quality benefits increase over time as shown in **Table 2-14**

In 2011 CVWD partnered with the Coachella Valley Mosquito and Vector Control District (CVMVCD) to implement the Artesian Well Rebate Program. CVWD has found a lack of participation in the Artesian Well Rebate Program; therefore, the rebate program established through the *Regional Well Retrofit and Abandonment Program* will build upon lessons learned from the previous program. CVWD will develop program application forms and guidelines to evaluate each candidate well and determine the most appropriate method to implement (monitoring, sealing, or destruction). Further, CVWD will provide permitting assistance to well owners to overcome regulatory barriers that have impeded the existing program. CVWD will conduct pre- and post-installation site visits to ensure that wells have been modified according to the program guidelines. CVWD also will conduct extensive outreach efforts to increase awareness for the rebate program and its importance to regional groundwater management. The primary outcome of the project will be successful implementation of a rebate program to address major water supply and water quality issues explained in the Region's two groundwater management plans and improve long-term management of the Region's precious groundwater resources.



## Project Physical Benefits

The *Regional Well Retrofit and Abandonment Program* will provide multiple benefits and include three of the project elements defined in Public Resources Code §75026(a). Two of the project benefits have been quantified and are presented in **Tables 2-13** and **2-14**. The two quantified physical benefits are Water Supply (water supply conserved) and Water Quality (reduction in total dissolved solids).

**Table 2-13: Primary Physical Benefit – Water Supply Saved  
*Regional Well Retrofit and Abandonment Program***

Project Name: <i>Regional Well Retrofit and Abandonment Program</i>			
Type of Benefit Claimed: Water Supply Saved			
Units of the Benefit Claimed: AFY			
Anticipated Useful Life of Project (years): 60			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2016	-11,200 AFY	-10,750 AFY	450 AFY
2017	-11,573 AFY	-9,503 AFY	2,070 AFY
2018	-11,947 AFY	-9,877 AFY	3,690 AFY
2019	-12,320 AFY	-10,250 AFY	4,500 AFY
2020	-12,693 AFY	-10,623 AFY	4,500 AFY
2021	-13,067 AFY	-10,997 AFY	4,500 AFY
2022	-13,440 AFY	-11,370 AFY	4,500 AFY
2023	-13,813 AFY	-11,743 AFY	4,500 AFY
2024	-14,187 AFY	-12,117 AFY	4,500 AFY
2025	-14,560 AFY	-12,490 AFY	4,500 AFY
2026	-14,933 AFY	-12,863 AFY	4,500 AFY
2027	-15,307 AFY	-13,237 AFY	4,500 AFY
2028	-15,680 AFY	-13,610 AFY	4,500 AFY
2029	-16,053 AFY	-13,983 AFY	4,500 AFY
2030	-16,427 AFY	-14,357 AFY	4,500 AFY
2031	-16,800 AFY	-14,730 AFY	4,500 AFY
2032	-17,173 AFY	-15,103 AFY	4,500 AFY
2033	-17,547 AFY	-15,477 AFY	4,500 AFY
2034	-17,920 AFY	-15,850 AFY	4,500 AFY
2035	-18,293 AFY	-16,223 AFY	4,500 AFY
2036	-18,667 AFY	-16,597 AFY	4,500 AFY
2037	-19,040 AFY	-16,970 AFY	4,500 AFY
2038	-19,413 AFY	-17,343 AFY	4,500 AFY
2039	-19,787 AFY	-17,717 AFY	4,500 AFY
2040	-20,160 AFY	-18,090 AFY	4,500 AFY
2041	-20,533 AFY	-18,463 AFY	4,500 AFY
2042	-20,907 AFY	-18,837 AFY	4,500 AFY
2043	-21,280 AFY	-19,210 AFY	4,500 AFY
2044	-21,653 AFY	-19,583 AFY	4,500 AFY
2045	-22,027 AFY	-19,957 AFY	4,500 AFY



<b>Project Name:</b> <i>Regional Well Retrofit and Abandonment Program</i> <b>Type of Benefit Claimed:</b> Water Supply Saved <b>Units of the Benefit Claimed:</b> AFY <b>Anticipated Useful Life of Project (years):</b> 60			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2046	-22,400 AFY	-20,330 AFY	4,500 AFY
2047	-22,773 AFY	-20,703 AFY	4,500 AFY
2048	-23,147 AFY	-21,077 AFY	4,500 AFY
2049	-23,520 AFY	-21,450 AFY	4,500 AFY
2050	-23,893 AFY	-21,823 AFY	4,500 AFY
2051	-24,267 AFY	-22,197 AFY	4,500 AFY
2052	-24,640 AFY	-22,570 AFY	4,500 AFY
2053	-25,013 AFY	-22,943 AFY	4,500 AFY
2054	-25,387 AFY	-23,317 AFY	4,500 AFY
2055	-25,760 AFY	-23,690 AFY	4,500 AFY
2056	-26,133 AFY	-24,063 AFY	4,500 AFY
2057	-26,507 AFY	-24,437 AFY	4,500 AFY
2058	-26,880 AFY	-24,810 AFY	4,500 AFY
2059	-27,253 AFY	-25,183 AFY	4,500 AFY
2060	-27,627 AFY	-25,557 AFY	4,500 AFY
2061	-28,000 AFY	-25,930 AFY	4,500 AFY
2062	-28,373 AFY	-26,303 AFY	4,500 AFY
2063	-28,747 AFY	-26,677 AFY	4,500 AFY
2064	-29,120 AFY	-27,050 AFY	4,500 AFY
2065	-29,493 AFY	-27,423 AFY	4,500 AFY
2066	-29,867 AFY	-27,797 AFY	4,500 AFY
2067	-30,240 AFY	-28,170 AFY	4,500 AFY
2068	-30,613 AFY	-28,543 AFY	4,500 AFY
2069	-30,987 AFY	-28,917 AFY	4,500 AFY
2070	-31,360 AFY	-29,290 AFY	4,500 AFY
2071	-31,733 AFY	-29,663 AFY	4,500 AFY
2072	-32,107 AFY	-30,037 AFY	4,500 AFY
2073	-32,480 AFY	-30,410 AFY	4,500 AFY
2074	-32,853 AFY	-30,783 AFY	4,500 AFY
2075	-33,227 AFY	-31,157 AFY	4,500 AFY
2076	-33,600 AFY	-31,530 AFY	3,690 AFY
2077	-33,973 AFY	-31,903 AFY	2,070 AFY
2078	-34,347 AFY	-32,277 AFY	450 AFY

**Comments:** For the primary benefit (Water Supply), the without-project baseline is based upon the TM that was completed for the *Regional Well Retrofit and Abandonment Program* as well as Engineer's Reports from CVWD, and CVWD's *2010 Water Management Plan (2010 WMP)*. The TM identified 60 improperly abandoned artesian wells in the Region that could benefit from a program to properly retrofit



<b>Project Name:</b> <i>Regional Well Retrofit and Abandonment Program</i> <b>Type of Benefit Claimed:</b> Water Supply Saved <b>Units of the Benefit Claimed:</b> AFY <b>Anticipated Useful Life of Project (years):</b> 60			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
<p>and abandon wells.<sup>63</sup> In addition, the 2013 <i>Engineer’s Report on Water Supply and Replenishment Assessment for the Lower Whitewater River Sub-basin Area of Benefit</i> (2013 Engineer’s Report) identified 52 known artesian wells in the Lower Whitewater River area, which is also referred to as the East Valley.<sup>64</sup> In total, this data shows that under existing conditions there are 112 improperly abandoned wells under artesian pressure. Data from CVWD’s 2010 WMP explains that in 2009 there were very few portions of the East Valley under artesian pressure, but that as overdraft subsides and groundwater levels rise, artesian conditions will increase.<sup>65</sup> The 2010 WMP estimated that by 2045 most of the East Valley would be under artesian pressure, and therefore all abandoned wells and improperly designed wells would spill water and cause water waste. However, as indicated in the 2013 Engineer’s Report, groundwater levels have risen much more quickly than anticipated in the 2010 WMP as there were already 52 observed artesian wells in 2013. This analysis conservatively assumes that by the end of the project life (2078) artesian conditions will return to the East Valley and that the number of improperly sealed wells under artesian conditions will triple to a total of 336.</p> <p>Data from CVWD indicates that on average, wells that are abandoned or improperly designed and subject to artesian conditions waste approximately 100 AFY of water due to leaking.<sup>66</sup> Therefore, the existing 112 abandoned artesian wells are anticipated to lose 11,200 AF per year. Given the amount of wells in the East Valley and local data about well abandonment and the condition of existing wells, it is estimated that as artesian conditions return to the East Valley, an increasing amount of wells will become artesian. Therefore, the amount of water loss caused by artesian conditions and abandoned or improperly sealed wells will continue to increase through 2078, and is assumed to triple over the project life per data from the 2010 WMP.</p> <p>Implementation of the project would retrofit 87 wells throughout the Indio and Mission Creek Sub-basins; this analysis assumes that 45 of those total wells (approximately ½) are located in the East Valley where artesian conditions exist and will continue to increase. Therefore, once the project is implemented, 45 wells in the Region that waste water under artesian conditions would be retrofitted or properly abandoned to eliminate 100 AFY of water waste per well, or a total of 4,500 AFY of water saved. Benefits will phase in from 2016 through project completion in 2019 and will accrue over the 60-year project life as shown in <b>Table 2-13</b>. Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual well retrofit has a useful life of 60 years.</p>			

<sup>63</sup> Coachella Valley Regional Water Management Group (CVRWMG). 2014. *Coachella Valley Well Retrofit and Abandonment Program – Technical Memorandum*. June 30, 2014.

<sup>64</sup> Coachella Valley Water District. 2013. *Engineer’s Report on Water Supply and Replenishment Assessment – Lower Whitewater River Sub-basin Area of Benefit 2013-2014*.

<sup>65</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>66</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.



**Table 2-14: Secondary Physical Benefit – Water Quality  
Regional Well Retrofit and Abandonment Program**

<b>Project Name:</b> <i>Regional Well Retrofit and Abandonment Program</i> <b>Type of Benefit Claimed:</b> Water Quality (levels of TDS reduced) <b>Units of the Benefit Claimed:</b> AFY <b>Anticipated Useful Life of Project (years):</b> 60			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2016	9.9787 mg/L	9.9779 mg/L	-0.0008 mg/L
2017	19.8097 mg/L	19.8058 mg/L	-0.0039 mg/L
2018	29.4930 mg/L	29.4830 mg/L	-0.0101 mg/L
2019	39.0286 mg/L	39.0097 mg/L	-0.0189 mg/L
2020	48.4773 mg/L	48.4469 mg/L	-0.0304 mg/L
2021	57.7783 mg/L	57.7338 mg/L	-0.0445 mg/L
2022	66.9315 mg/L	66.8704 mg/L	-0.0611 mg/L
2023	75.9371 mg/L	75.8568 mg/L	-0.0802 mg/L
2024	84.7949 mg/L	84.6932 mg/L	-0.1017 mg/L
2025	93.5050 mg/L	93.3795 mg/L	-0.1255 mg/L
2026	102.0674 mg/L	101.9158 mg/L	-0.1516 mg/L
2027	110.4821 mg/L	110.3022 mg/L	-0.1799 mg/L
2028	118.7490 mg/L	118.5387 mg/L	-0.2103 mg/L
2029	126.8683 mg/L	126.6255 mg/L	-0.2428 mg/L
2030	134.7148 mg/L	134.4377 mg/L	-0.2771 mg/L
2031	142.3397 mg/L	142.0266 mg/L	-0.3130 mg/L
2032	149.7430 mg/L	149.3923 mg/L	-0.3507 mg/L
2033	156.9248 mg/L	156.5349 mg/L	-0.3899 mg/L
2034	164.0433 mg/L	163.6123 mg/L	-0.4310 mg/L
2035	171.0984 mg/L	170.6245 mg/L	-0.4739 mg/L
2036	178.0903 mg/L	177.5716 mg/L	-0.5186 mg/L
2037	185.0188 mg/L	184.4537 mg/L	-0.5652 mg/L
2038	191.8841 mg/L	191.2706 mg/L	-0.6135 mg/L
2039	198.6860 mg/L	198.0225 mg/L	-0.6635 mg/L
2040	205.4438 mg/L	204.7285 mg/L	-0.7153 mg/L
2041	212.1758 mg/L	211.4069 mg/L	-0.7689 mg/L
2042	218.8821 mg/L	218.0577 mg/L	-0.8244 mg/L
2043	225.5626 mg/L	224.6810 mg/L	-0.8816 mg/L
2044	232.2173 mg/L	231.2767 mg/L	-0.9407 mg/L
2045	238.8721 mg/L	237.8705 mg/L	-1.0016 mg/L
2046	245.5268 mg/L	244.4625 mg/L	-1.0644 mg/L
2047	252.1815 mg/L	251.0525 mg/L	-1.1290 mg/L
2048	258.8363 mg/L	257.6407 mg/L	-1.1956 mg/L
2049	265.4910 mg/L	264.2270 mg/L	-1.2640 mg/L
2050	272.1457 mg/L	270.8114 mg/L	-1.3343 mg/L



<b>Project Name:</b> <i>Regional Well Retrofit and Abandonment Program</i> <b>Type of Benefit Claimed:</b> Water Quality (levels of TDS reduced) <b>Units of the Benefit Claimed:</b> AFY <b>Anticipated Useful Life of Project (years):</b> 60			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2051	278.8005 mg/L	277.3940 mg/L	-1.4065 mg/L
2052	285.4552 mg/L	283.9746 mg/L	-1.4806 mg/L
2053	292.1099 mg/L	290.5534 mg/L	-1.5565 mg/L
2054	298.7647 mg/L	297.1304 mg/L	-1.6343 mg/L
2055	305.4194 mg/L	303.7054 mg/L	-1.7140 mg/L
2056	312.0741 mg/L	310.2786 mg/L	-1.7956 mg/L
2057	318.7289 mg/L	316.8499 mg/L	-1.8790 mg/L
2058	325.3836 mg/L	323.4193 mg/L	-1.9643 mg/L
2059	332.0383 mg/L	329.9868 mg/L	-2.0515 mg/L
2060	338.6931 mg/L	336.5525 mg/L	-2.1405 mg/L
2061	345.3478 mg/L	343.1163 mg/L	-2.2315 mg/L
2062	352.0025 mg/L	349.6783 mg/L	-2.3243 mg/L
2063	358.6573 mg/L	356.2384 mg/L	-2.4189 mg/L
2064	365.3120 mg/L	362.7966 mg/L	-2.5154 mg/L
2065	371.9667 mg/L	369.3529 mg/L	-2.6138 mg/L
2066	378.6215 mg/L	375.9074 mg/L	-2.7141 mg/L
2067	385.2762 mg/L	382.460 mg/L	-2.8162 mg/L
2068	391.9309 mg/L	389.0107 mg/L	-2.9202 mg/L
2069	398.5857 mg/L	395.5596 mg/L	-3.0260 mg/L
2070	405.2404 mg/L	402.1066 mg/L	-3.1338 mg/L
2071	411.8951 mg/L	408.6518 mg/L	-3.2433 mg/L
2072	418.5499 mg/L	415.1951 mg/L	-3.3548 mg/L
2073	425.2046 mg/L	421.7365 mg/L	-3.4681 mg/L
2074	431.8593 mg/L	428.2761 mg/L	-3.5832 mg/L
2075	438.5141 mg/L	434.8250 mg/L	-3.6891 mg/L
2076	445.1688 mg/L	441.3949 mg/L	-3.7739 mg/L
2077	451.8235 mg/L	447.9868 mg/L	-3.8367 mg/L
2078	458.4783 mg/L	454.5850 mg/L	-3.8932 mg/L



<b>Project Name:</b> <i>Regional Well Retrofit and Abandonment Program</i> <b>Type of Benefit Claimed:</b> Water Quality (levels of TDS reduced) <b>Units of the Benefit Claimed:</b> AFY <b>Anticipated Useful Life of Project (years):</b> 60			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
<p><b>Comments:</b> The without-project baseline for the secondary benefit (Water Quality) is provided from conditions reported in the <i>Coachella Valley Groundwater Basin Salt and Nutrient Management Plan</i> (SNMP). The SNMP quantifies total salt loading into the Coachella Valley Groundwater Basin (which includes the Indio and Mission Creek Sub-basins), and describes ways in which salinity concentrations can be reduced throughout the Region. The SNMP reports existing and future anticipated total salt loading, showing decreasing levels of salt loading over time as management strategies are implemented.<sup>67</sup> Salt loading figures for the Region’s three primary basins are estimated in the SNMP for the 2015-2020 interval as 115,600 tons per year for the West Whitewater (West Indio) Sub-basin, 299,400 tons per year for the East Whitewater (East Indio) Sub-basin, and 4,700 tons per year for the Mission Creek Sub-basin.<sup>68</sup> The SNMP provides salt loading values for each basin for the 2020-2030, 2030-2040, and 2040-2045 intervals. The projected salt loading figures from the SNMP (reported in tons per year) were translated into milligrams per year as shown in <b>Table 2-14</b> and linearized to gradually change over the aforementioned intervals. As shown in the following table, under the without-project conditions, although salt loading will decrease over time, the concentration of salts in the basin will continue to increase due to additional loading; however, because loading is decreasing over time, the rate at which salt concentration increases will decrease over time.</p> <p>One of the management strategies recommended in the SNMP is that salinity loading be reduced by conserving water and reducing groundwater losses. By reducing losses to groundwater, water would instead be retained in the groundwater basin, effectively increasing storage. Consequently, the annual salt loading into the basin would be diluted into a greater total volume of water, thereby resulting in a lower salt concentration (expressed as total dissolved solids, or TDS).<sup>69</sup> Therefore, the water quality improvements provided by the project would accrue, because the project would effectively reduce the rate at which salt concentration increases in the Indio and Mission Creek basins due to water conservation. This analysis takes into consideration the water savings provided by the project to calculate overall TDS savings that can be directly attributed to the water savings provided by the project. Benefits will phase in from 2016 through project completion in 2019 and will accrue over the 60-year project life as shown in <b>Table 2-14</b>. Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual well retrofit has a useful life of 60 years.</p>			

<sup>67</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.

<sup>68</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.

<sup>69</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.



## Technical Analysis of Physical Benefits Claimed

### Project Need

There are two medium-priority groundwater basins in the Coachella Valley: the Indio Sub-basin (also referred to as the Whitewater River Sub-basin) and the Mission Creek Sub-basin. Both aquifers are confined and are part of the larger Coachella Valley Groundwater Basin described by DWR as basin 7-21. Given the confined nature of these basins, if water exists under positive pressure, artesian conditions can occur wherein the positive pressure in the aquifer pushes water to the surface. Historical data from CVWD demonstrates the presence of artesian conditions, particularly in the Eastern Coachella Valley. As a result of increased groundwater use and subsequent overdraft, artesian conditions in the Region steadily declined through the 1900's.<sup>70</sup> As actions are taken throughout the Region to address groundwater overdraft and restore water levels, groundwater levels in the deep aquifers will once again become higher than the ground elevation, resulting in artesian conditions. Recently, evidence of a return to artesian flowing conditions has been observed in the East Valley.<sup>71</sup> The image provided below demonstrates a physical example of artesian conditions observed in the East Valley in 2014.



**Example of an Artesian Well**

Artesian wells are addressed as a management issue of concern in both of the groundwater management plans for the Region; together the plans address the area covered by the Indio and Mission Creek basins. The plans both indicate that wells that are not properly equipped to deal with artesian pressure can result in water loss, property damage, and can pose water quality threats associated with constituents entering the basin.

In addition to artesian wells, both groundwater management plans also acknowledge that throughout the Region there is an abundance of wells that were not properly constructed or abandoned and that these wells present a physical danger as they can provide a conduit through which groundwater constituents can enter the basin. The *2010 Coachella Valley Water Management Plan* suggested that rather than destroying improperly abandoned wells, these wells could be capped or rehabilitated for continued use as a groundwater monitoring tool.<sup>72</sup> The Water Management Plan envisioned implementation of a cooperative program to identify and cap wells that are no longer being used for groundwater production.

<sup>70</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>71</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>72</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.



As a result of the recommendations of the Water Management Plan, in 2011 CVWD partnered with the Coachella Valley Mosquito and Vector Control District (CVMVCD) to implement an Artesian Well Rebate Program. The program offers a rebate of up to \$3,000 per well and requires inspections, metering for wells that are used for groundwater production, and the design and implementation of a mosquito management plan. CVWD has not received any applications for the Artesian Well Rebate Program as of June 2014. CVWD Staff indicated that well owners that are financially able or willing to retrofit their artesian wells to prevent standing water and associated health hazards have done so or are in the process of repairing their wells and have not expressed interest in the rebate program. Furthermore, the partnership with CVMVCD also requires that recipients of the rebate complete a Mosquito Reduction Best Management Plan Agreement, which is believed to prohibit some users from agreeing to participate in the rebate program. Finally, private well owners have expressed that high costs associated with well destruction in addition to regulatory challenges associated with permitting also reduce participation in the Artesian Well Rebate Program.

Since the time that the Water Management Plan was published, additional regulations regarding groundwater monitoring have come into effect. Specifically, the California Statewide Groundwater Elevation Monitoring (CASGEM) program has gone into effect, requiring agencies to track seasonal and long-term trends in groundwater elevations. The intent of CASGEM is to establish a permanent, locally-managed program of regular and systematic monitoring in all alluvial groundwater basins.

Recognizing an opportunity to implement a well capping program as suggested in the Water Management Plan that would also assist local agencies in meeting the needs of the CASGEM program, in 2014 the CVRWGM produced a TM that addressed the issue of improperly constructed or abandoned wells, focusing on those under artesian conditions that also result in water waste.<sup>73</sup> The TM seeks to establish a regional well retrofit and abandonment program for the purposes of creating a larger monitoring network for CASGEM, properly sealing wells that are not needed for elevation monitoring or are under artesian conditions, and destroying wells that are not suitable for CASGEM monitoring or sealing. The TM included the following three major components:

1. **Identification of Candidate Retrofit Wells and Wells to be Abandoned** – Agencies and stakeholders within the Region were surveyed to provide a list of candidate wells for the program. Through this analysis, wells were identified as artesian, as improperly abandoned, or closed by CVRWGM agencies, as needing abandonment by Riverside County, or as retired public supply wells that are not currently accessible for CASGEM monitoring. The applicable candidate wells were mapped alongside the existing CASGEM network to demonstrate target locations to fill in monitoring data gaps within the network. The location of additional candidate wells that were identified as being improperly abandoned or closed by the CVRWGM agencies were also solicited; these wells are identified on **Figure 2-12**.
2. **Establishment of Retrofit Needs** – To determine if wells would qualify for the program, retrofit needs and abandonment needs were identified on an individual basis. Information was collected for each well through the agency, or private owner. Once well construction details were collected along with any information regarding well issues, similar well characteristics were grouped to find possible retrofit solutions. For wells that were not selected for the CASGEM network, well sealing or destruction requirements were described to assess needs for those wells.
3. **Structural Development of the Regional Well Retrofit and Abandonment Program** – Final recommendations included the estimated cost to retrofit wells for monitoring, properly seal wells, and destroy those wells that are not eligible for retrofitting or sealing. This analysis found that the average cost to convert a well to a CASGEM monitoring well is \$8,805, the average cost to properly seal a well is \$3,750, and the average cost to destroy a well is \$35,000. The analysis also determined potential rebate program costs and outreach efforts that could be implemented to increase participation in the retrofit program and to address previous implementation issues faced by the existing Artesian Well Rebate Program.

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<sup>73</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Well Retrofit and Abandonment Program – Technical Memorandum*. June 30, 2014.



The TM identified a total of 60 leaking artesian wells, all located in the eastern portion of the Indio Sub-basin, which is also referred to in the Region as the Eastern Coachella Valley or the Lower Whitewater River Sub-basin.<sup>74</sup> The location of artesian wells in the East Valley that were identified in the TM is shown in **Figure 2-12**. The location of artesian wells in the East Valley had been previously identified by CVWD and other local agencies; **Figure 2-13** shows the location of previously-identified leaking artesian wells in the East Valley as identified by CVWD, showing a total of 52 wells.<sup>75</sup> Combined, the two documents show that there are at least 112 known leaky artesian wells in the Coachella Valley. For purposes of the *Regional Well Retrofit and Abandonment Program*, CVWD will first target artesian wells that can be properly sealed as this is the least cost retrofit option. The budget assumes that a total of 62 wells will be sealed, and that 21 wells will be retrofit and added to the CASGEM monitoring network. While well destruction is an expensive solution compared to capping, the budget includes funds to destroy 4 wells that, for technical reasons would not be candidate wells for sealing (compromised or under extreme artesian pressure).

The County of Riverside currently oversees Well Destruction Permits and typically sees about five water supply wells per year permitted for destruction (not including environmental monitoring wells).<sup>76</sup> The wells permitted for destruction are typically unused agricultural wells that exist on parcels undergoing development. The County does not have a database of wells needing proper abandonment/destruction, but is very interested in supporting a grant program that would provide property owners with funds through a rebate program to assist in completing proper well abandonment activities. Therefore, the County is considered a strong partner for the identification of candidate wells for the program as they are the Well Destruction Permitting agency for the area.

*The Regional Well Retrofit and Abandonment Program* focuses on artesian wells, because these wells currently waste water through leaking. The artesian wells are located in the East Valley, which is underlain by a 100-200 foot-thick impervious clay layer (aquitar) that prevents groundwater infiltration. Data from the *Coachella Valley Water Management Plan* shows that surfacing groundwater in the East Valley is essentially lost from the Region, because it ultimately drains to the Salton Sea once it surfaces.<sup>77</sup> The amount of water that is lost as a result of leaking artesian wells has been quantified in the *Coachella Valley Water Management Plan*. The Water Management Plan has data from 21 wells and 3 springs (24 total facilities) that were cumulatively estimated to result in 2,400 AFY of water loss in the 1960's as a result of artesian conditions.<sup>78</sup> Therefore, on average, each well was found to result in an annual loss of 100 AF. The Water Management Plan further demonstrates the return to artesian conditions found in the East Valley, which is anticipated to continue to increase over time as water levels increase.<sup>79</sup> The Water Management Plan conservatively estimates that by 2045 the East Valley water levels will have returned to 1960 levels and that artesian conditions will be prevalent across the area at that time.<sup>80</sup> This estimate is conservative, because as of CVWD's *2014 Engineer's Report*, monitoring shows water levels in the East Valley are already under artesian pressure; this is significant considering that 2009 reporting data from the 2010 Water Management Plan showed very few artesian wells in the area.<sup>81</sup> Furthermore, the *2010 Coachella Valley Water Management Plan* includes hydrographs that show the area within the East Valley that is anticipated to be subject to artesian conditions over time. This information demonstrates that by 2045, most of the East Valley will have returned to artesian conditions; therefore, all wells in the area that are abandoned or are not properly sealed or constructed to handle artesian pressure will result in leaking and subsequent water waste as water levels increase. Given that the East Valley is already demonstrating a return to artesian conditions, there is a need to cap and seal wells now to both address wells that are

<sup>74</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Well Retrofit and Abandonment Program – Technical Memorandum*. June 30, 2014.

<sup>75</sup> Coachella Valley Water District. 2013. *Engineer's Report on Water Supply and Replenishment Assessment – Lower Whitewater River Sub-basin Area of Benefit 2013-2014*.

<sup>76</sup> Pers. Comm. Mark Abbott. Riverside County Department of Environmental Health.

<sup>77</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>78</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>79</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>80</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>81</sup> Coachella Valley Water District. 2014. *Engineer's Report on Water Supply and Replenishment Assessment – Lower Whitewater River Sub-basin Area of Benefit 2014-2015*.



currently facing artesian conditions, and also to ensure that as groundwater levels increase over time, the artesian conditions in the East Valley do not result in widespread water loss.

While reducing water waste is always a concern in the Coachella Valley, current drought conditions have increased the need to conserve as much water as possible across the Region. Furthermore, recent information that has been provided in the Region's SNMP underlines the need for conservation. The SNMP was prepared for the entire Coachella Valley Groundwater Basin in accordance with the Recycled Water Policy.<sup>82</sup> The SNMP addresses overall salt and nutrient loading in the Coachella Valley Groundwater Basin, and includes recommendations for ways in which overall salt loading can be reduced to improve groundwater quality. One of the recommendations of the SNMP is water conservation, which offsets withdrawals from the basin and subsequently helps to improve groundwater storage. The anti-degradation analysis provided in the SNMP shows that with implementation of SNMP recommendations, it is anticipated that overall salt loading will decrease over time. While salt loading will decrease, there will be continual salt loading into the basin, and over time the concentration of salts in the basin will increase (albeit at a slower rate over time).<sup>83</sup> Actions taken to reduce overall salt loading will continue to slow down the rate of salt loading, and therefore reduce the concentration of salts in the basin over time. Therefore, in addition to direct water supply benefits, the *Regional Well Retrofit and Abandonment Program* will help to improve groundwater quality by increasing overall groundwater storage, and therefore reducing salt concentrations in the basin.

The *Regional Well Retrofit and Abandonment Program* will provide an additional water quality benefit that is not possible to quantify at this time due to lack of technical data. This benefit would arise from retrofits that are made to abandoned or improperly sealed wells. As mentioned previously, the Region's two groundwater management plans have noted that abandoned or improperly sealed wells present a water quality risk as they could provide a conduit through which constituents can enter the basin. With regard to this issue, the 2010 WMP specifically states, "improperly constructed wells can result in poor yield and contaminated groundwater by establishing a pathway for pollutants to enter a well, allow communication between aquifers of varying quality, or the unauthorized disposal of waste into the well. Inactive or improperly abandoned wells present a physical danger and can allow groundwater pollution." The project will implement recommendations of the Region's groundwater management plans by implementing a rebate program to properly seal or destroy wells that pose water quality risks to the Region's groundwater resources. Given that there is no existing data about the specific, quantifiable water quality risks posed by these types of wells, this water quality benefit was not quantified as part of this analysis.

### Without Project Conditions

This project would conserve 4,500 AFY of water and reduce the overall concentration of TDS in local groundwater once all well retrofits have been completed; benefits would accrue over the 60-year lifetime of the project.

Without the project, water would continue to be lost from leaking artesian wells. Currently, it is estimated that there are 112 leaking artesian wells that result in 11,200 AFY of average losses. As groundwater levels rise in the East Valley, artesian conditions will return and will result in additional water losses for wells that are abandoned or improperly sealed. It is estimated that the total amount of abandoned or improperly designed wells that will be subject to artesian conditions will triple over the 60-year project life, resulting in a total of 33,600 AFY of loss by 2076. Without the project, CVWD would need to implement other conservation measures or programs to address groundwater loss through artesian conditions, which may be less effective; the currently proposed project was developed to address issues with a previously-implemented Artesian Well Rebate Program and therefore is anticipated to be more effective than other alternatives.

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<sup>82</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.

<sup>83</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.



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Without the project, artesian wells would also continue to pose water quality issues in the Region. While TDS benefits have been quantified, information from the Region's groundwater management plans shows that improperly sealed and abandoned wells pose acute water quality concerns as these wells provide a conduit through which constituents could enter the basin. At this time, the additional water quality benefits have not been quantified because the supporting documentation (groundwater management plans) only have qualitative information about this issue and no quantitative data is available. While the issue of salt loading to the basin could be addressed by other planned projects in the Region, the water quality risk from improperly sealed and abandoned wells cannot be addressed by means other than properly sealing or destroying the wells. Therefore, without the project, these water quality risks would continue to persist.

Figure 2-12: Mapping Results from the Retrofit Program Technical Memorandum

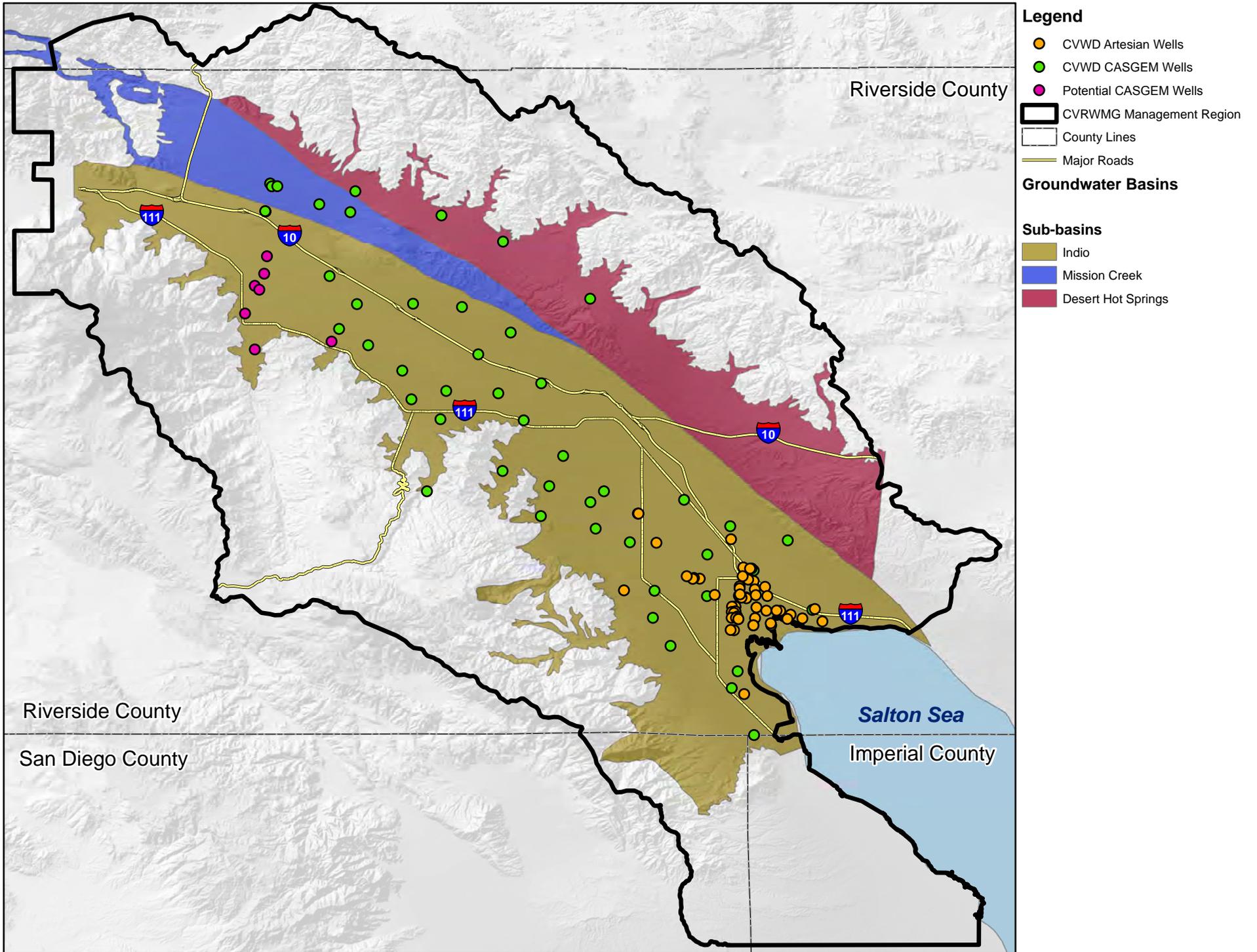
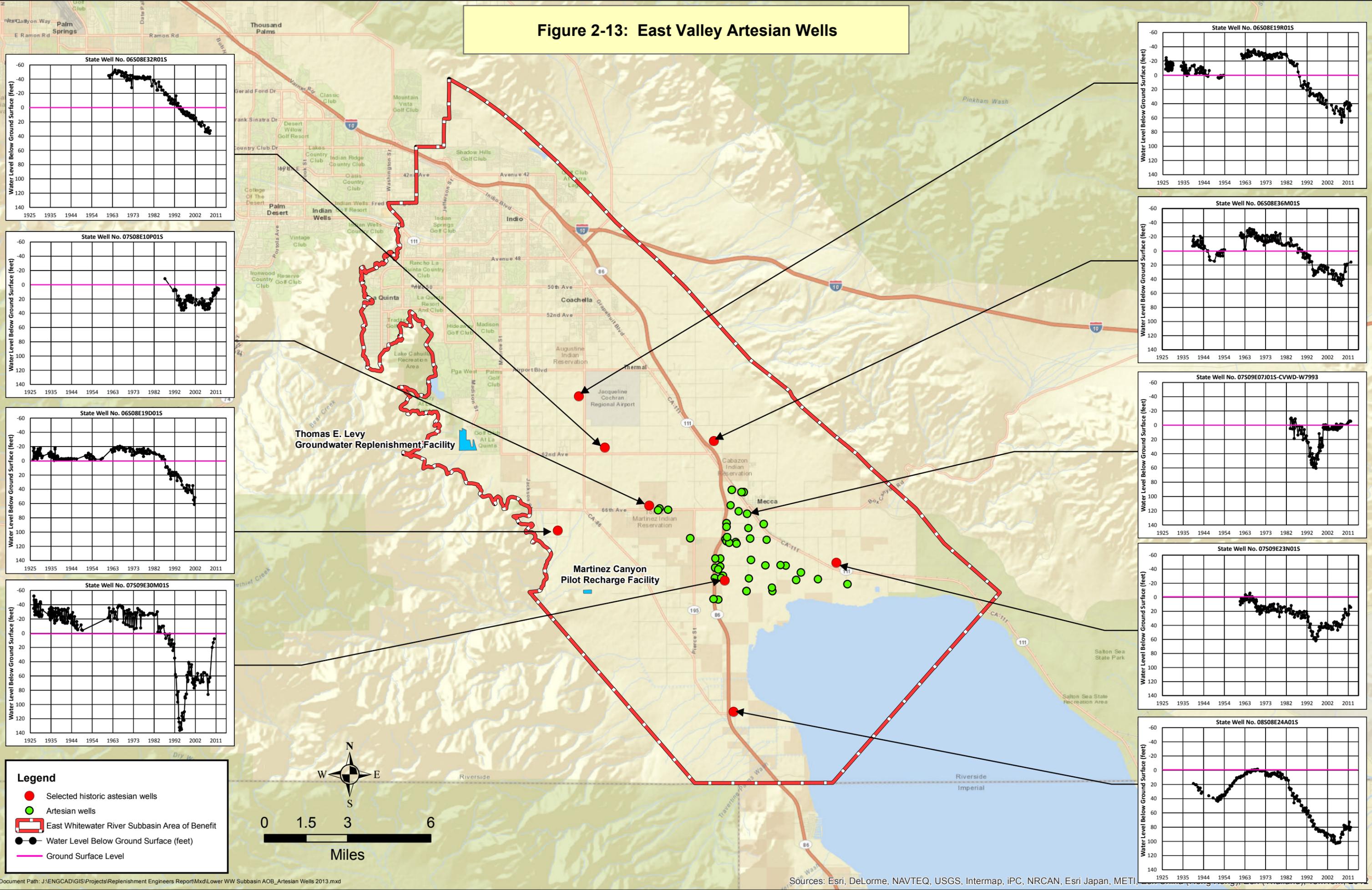


Figure 2-13: East Valley Artesian Wells





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## Methods to Estimate Physical Benefits

### **Primary Benefit: Water Supply Saved**

The primary benefit of the *Regional Well Retrofit and Abandonment Program* is the amount of water supply that would be conserved by properly sealing or destroying artesian wells. Water savings that would accrue as a result of the well retrofit rebates are based upon quantitative data from the *Coachella Valley Water Management Plan* that documents average water waste from artesian conditions to be 100 AFY per well. Conditions of the well rebate program will be structured such that once retrofits are installed, artesian conditions have ceased; therefore, this analysis assumes that all wells that are retrofit, sealed, or destroyed as a result of the rebate program will no longer waste water or have the potential to waste water as a result of artesian conditions. Although data and mapping of artesian wells (see **Figure 2-12** and **Figure 2-13**) shows the prevalence of artesian wells in the East Valley (112 estimated to date), this analysis conservatively assumes that of the total wells that will be retrofit through the rebate program, only 45 (approximately 50%) will be artesian wells that currently waste water. Applying this number to quantitative estimates provided in the Water Management Plan, it is assumed that once the rebate program is fully implemented (in 2019), that the project will result in an average water savings of 4,500 AFY compared to existing conditions.

The project benefits of water supply saved by the project that are described above are compared to a baseline identified from the Technical Memorandum for the project and Engineer's Reports prepared by CVWD. The Technical Memorandum identifies a total of 60 artesian wells in the Region that can be retrofit or destroyed.<sup>84</sup> The 2013 Engineer's Reports from CVWD for the Lower Whitewater River basin (East Valley) identify a total of 52 leaking artesian wells.<sup>85</sup> Combined, the two documents show that there are at least 112 known leaky artesian wells in the Coachella Valley. Applying this number of wells to the average loss per well of 100 AFY, it is assumed that in total 11,200 AFY of water is currently lost due to artesian conditions. Over time as groundwater levels rise and artesian conditions return to the East Valley, it is estimated that the total amount of wells that are subject to artesian conditions and are either abandoned or improperly sealed will triple, resulting in a loss of 33,600 AFY in 2076. The estimate of artesian wells tripling over time is based upon hydrographs from the *2010 Coachella Valley IRWM Plan* that show the overall area facing artesian conditions tripling between 2009 and 2045.<sup>86</sup>

Due to the hydrologic conditions of the East Valley and the presence of the large aquitard, the *2010 Coachella Valley Water Management Plan* explains that surfacing groundwater and surface water in this area flows to the Coachella Valley Stormwater Channel and to the Salton Sea, and is therefore lost from the Region. Therefore, modifications to artesian wells that allows them to withstand artesian pressure, effectively results in water conservation (increased groundwater storage) as it eliminates water loss caused by artesian wells leaking water to the Salton Sea where it can no longer be used as a water source. With implementation of the project, 45 of the wells either currently facing artesian conditions or that will face artesian conditions would be modified to either be destroyed or properly sealed. CVWD will conduct site inspections to verify that well retrofits conducted through the project eliminate artesian conditions and water loss, resulting in 4,500 AFY of water conservation once all retrofits have been completed in 2019.

As shown in **Table 2-13**, it is estimated that benefits would phase in from 2016-2019 as the program is implemented and that benefits would accrue over a 60-year period. While data and information from DWR suggests that well retrofit and abandonment can be considered permanent, the analysis uses a conservative 60-year project life as this is a generally assumed lifetime of water-related infrastructure.<sup>87</sup> **Table 2-13** also assumes that benefits will phase out in the same manner that they will phase in, because it is assumed that each individual well retrofit has a useful life of 60 years.

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<sup>84</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Well Retrofit and Abandonment Program – Technical Memorandum*. June 30, 2014.

<sup>85</sup> Coachella Valley Water District. 2013. *Engineer's Report on Water Supply and Replenishment Assessment – Lower Whitewater River Sub-basin Area of Benefit 2013-2014*.

<sup>86</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.

<sup>87</sup> Department of Water Resources. N.D. *Water Well Standards-CHAPTER II. STANDARDS: Section 23. Requirements for Destroying Wells*.



**Secondary Benefit: Water Quality Improved**

The secondary benefit of the *Regional Well Retrofit and Abandonment Program* is the quantifiable water quality benefit (reduced salt concentrations) that would be achieved by conserving 4,500 AFY of groundwater over the 60-year project life.

As described above, the project would reduce water loss by 4,500 AFY due to proper sealing or destruction of 45 wells that lose water at a rate of 100 AFY per well. The recently completed SNMP demonstrates the nexus between water conservation and overall salt concentrations in the basin, and states that by improving conservation and therefore increasing overall groundwater storage, salt levels in the basin can be effectively diluted.<sup>88</sup> The physical quantification of this benefit is provided by taking into account the existing storage of the Indio and Mission Creek Sub-basins, the existing and projected salt loading into these basins, and calculating the difference in overall storage that would result from implementation of the project. The increased basin storage that would be provided by the project (via water conservation) would effectively dilute total dissolved solids or TDS in the basin. The effect of this dilution would be cumulative, providing the greatest benefit in the last years of the project life.

Existing storage in the Indio and Mission Creek Sub-basins was determined from each basin’s Water Management Plan. Per these plans, the storage of the Indio Sub-basin is 30,000,000 AF and the storage of the Mission Creek Sub-basin is 1,400,000 AF for a total storage of 31,400,000 AF. The acre feet storage values from the Water Management Plans were translated into liters as shown below. The analysis assumes that groundwater basin storage remains fixed at 31,400,000 AF for the without-project conditions. This was done so that water storage benefits included in the analysis could be contributed solely to the *Regional Well Retrofit and Abandonment Program*.

Existing Groundwater Basin Storage:

$$30,000,000 \text{ AF} + 1,400,000 \text{ AF} = 31,400,000 \text{ AF} * 1,233,481.8375475 \text{ liters/AF} \\ = 3.8731 * 10^{13} \text{ liters}$$

Salt loading figures for the aforementioned basins are estimated in the SNMP for the 2015-2020 interval as 115,600 tons per year for the West Whitewater (West Indio) Sub-basin, 299,400 tons per year for the East Whitewater (East Indio) Sub-basin, and 4,700 tons per year for the Mission Creek Sub-basin.<sup>89</sup> The SNMP provides salt loading values for each basin for the 2020-2030, 2030-2040, and 2040-2045 intervals. The tons per year values from the SNMP were translated into milligrams per year and linearized to gradually increase over the five-year intervals explained in the SNMP. This calculation was conducted every year for the project as shown in **Table 2-14**, taking into account both gradual increases in TDS concentrations and existing groundwater storage in the basins without the project. The calculation below shows the calculation provided for 2016 as an example of how annual without-project conditions were calculated.

Without-Project 2016 Salt Loading:

$$117,337 \frac{\text{tons}}{\text{year}} + 303,899 \frac{\text{tons}}{\text{year}} + 4,771 \frac{\text{tons}}{\text{year}} = 426,006 \frac{\text{tons}}{\text{year}}$$

$$426,006 \frac{\text{tons}}{\text{year}} * 907,184,740 \frac{\text{mg}}{\text{ton}} = 3.8649 * 10^{14} \text{ mg/year}$$

Without-Project 2016 TDS Concentration:

$$\frac{3.8649 * 10^{14} \text{ mg per year}}{3.8731 * 10^{13} \text{ liters}} = 9.9787 \frac{\text{mg}}{\text{L}} \text{ for 2016}$$

<sup>88</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.

<sup>89</sup> Coachella Valley Water District, Desert Water Agency, and Indio Water Authority. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*.



With implementation of the project, in the first year, storage would increase by 450 AF per project phasing described in Attachment 5; these benefits would increase each year through 2019 when all of the retrofits would be completed. Adding the increase in storage provided by the project to the existing storage, and assuming that salt loading varies linearly per information in the SNMP, the project would result in reduced concentrations of TDS over time. This calculation was conducted every year for the project as shown in **Table 2-14**, taking into account both gradual increases in TDS concentrations and annual groundwater storage benefits provided by the project. The calculation below shows the calculation provided for 2016 as an example of how annual with-project conditions were calculated.

Additional Groundwater Basin Storage Provided by Project:

$$450 \text{ AF} * 1,233,481 \text{ liters/AF} = 5.5507 * 10^8 \text{ liters}$$

With-Project Groundwater Basin Storage:

$$3.8731 * 10^{13} \text{ liters} + 5.5507 * 10^8 \text{ liters} = 3.8732 * 10^{13} \text{ liters}$$

With-Project 2016 TDS Loading Impact on Concentrations:

$$\frac{\sum \text{salt loading/year}}{\sum \text{water saved/year}} = \frac{3.8649 * 10^{14} \text{ mg/year}}{3.8732 * 10^{13} \text{ liters}} = 9.9779 \frac{\text{mg}}{\text{L}} \text{ per year}$$

Therefore, as shown in the calculation provided above in **Table 2-14**, the total TDS concentration improvement for 2016 is 9.9779 mg/L – 9.9787 mg/L per year or a water quality improvement of 0.0008 mg/L.

The water quality benefits provided increase gradually as conservation associated with the project continually increases storage over time. By 2078, which is the last useful life of the project, the project-related benefit increases as shown below.

2078 Salt Loading:

$$\sum \text{salt loading from 2016} - 2078 = 1.7757 * 10^{16} \text{ mg}$$

Without-Project 2078 net TDS Loading Impact on TDS Concentration:

$$\frac{1.7757 * 10^{16} \text{ mg}}{3.8731 * 10^{13} \text{ liters}} = 458.4783 \frac{\text{mg}}{\text{L}}$$

With implementation of the project, overall storage would increase by 4,500 AFY once the project is fully implemented; benefits would phase in and phase out as shown in **Table 2-13**. Adding this increase in storage provided by the project to the existing storage and assuming that salt loading decreases over time as explained in the SNMP, the project would result in a total reduction of salt loading of 3.8932 mg/L in 2078. Below are details showing how the 2078 benefit was calculated.

Additional Groundwater Basin Storage Provided by Project:

$$450 \text{ AF} + 2,070 \text{ AF} + 3,690 \text{ AF} + (4,500 \text{ AFY} * 60 \text{ years}) + 3,690 \text{ AF} + 2,070 \text{ AFY} + 450 \text{ AF} \\ = 282,420 \text{ AF} * 1,233,481.8375475 \text{ liters/AF} = 3.3171 * 10^{11} \text{ liters}$$

With-Project Groundwater Basin Storage:

$$3.8731 * 10^{13} \text{ liters} + 3.3171 * 10^{11} \text{ liters} = 3.9064 * 10^{13} \text{ liters}$$

With-Project 2078 TDS Loading Impact on Concentrations:

$$\frac{1.7757 * 10^{16} \text{ mg}}{3.9064 * 10^{13} \text{ liters}} = 454.5850 \frac{\text{mg}}{\text{L}} \text{ per year}$$



Therefore, as shown in the calculation provided above in **Table 2-14**, the total TDS concentration improvement for 2078 is 454.5850 mg/L per year – 458.4783 mg/L per year, or a water quality improvement of 3.8932 mg/L.

As shown in **Table 2-14**, the benefit will be phased, as not all well retrofits will occur in one year. For this reason, the installation rate is non-uniform, with 10% installation occurring in the first year, as the program establishes momentum and publicity. Following this initial year in which the project begins, it is assumed that well retrofit rebates are distributed evenly through the end of July 2019, by which point all of the rebates will have been issued. While data and information from DWR suggests that well retrofit and abandonment can be considered permanent, the analysis uses a conservative 60-year project life as this is a generally assumed lifetime of water-related infrastructure.<sup>90</sup> **Table 2-14** also assumes that benefits will phase out in the same manner that they will phase in, because it is assumed that each individual well retrofit has a useful life of 60 years.

### **Potential Adverse Physical Effects**

There are no anticipated sustained adverse physical effects from this project. There may be temporary effects associated with well retrofits, such as noise or odors from equipment required for the retrofits; however these effects are anticipated to be minor and temporary in nature. As discussed in *Attachment 3, Work Plan*, this project does not qualify as a “project” per the California Environmental Quality Act, and therefore would not require mitigation, analysis, or any other measures to address physical effects.

### **Long-Term Drought Preparedness**

The *Regional Well Retrofit and Abandonment Program* project meets two of the Drought Preparedness elements defined by DWR: 1) achieve long-term reduction of water use, and 2) efficient groundwater basin management.

The *Regional Well Retrofit and Abandonment Program* will result in a long-term reduction of water use by properly retrofitting, sealing, or destroying 45 existing artesian wells that result in a cumulative loss of 4,500 AFY. The artesian wells are located in the Eastern Coachella Valley where there is a large aquitard that prevents groundwater infiltration. Therefore, groundwater that surfaces through artesian wells is not able to infiltrate back into the groundwater basin, and instead flows out of the Region and into the Salton Sea. The water that is conserved through the project will be conserved in the Region on a long-term basis and will ultimately increase groundwater storage.

The project will achieve efficient groundwater basin management by retrofitting wells to expand the monitoring network for CASGEM and by properly sealing and abandoning supply wells that pose a water quality risk to the Region’s groundwater resources. The CASGEM program is a monitoring network that collects seasonal and long-term data on California’s groundwater basin elevations. The Mission Creek and Indio sub-basins are both designated as Medium Priority under DWR’s CASGEM Basin Prioritization Process. Expanding the Region’s CASGEM network will provide a larger dataset to better monitor changes and trends in water quality and use, and to ultimately improve management of groundwater resources.

### **Direct Water-Related Benefit to a DAC**

As described in *Attachment 7 Disadvantaged Communities*, an analysis was conducted to determine how much of the project area is classified as a DAC. The total area that would be served by the project is 80% DAC. Despite the large amount of DACs in the project area, CVWD is also committed to ensuring that at least 25% of the rebates distributed through the program are provided to areas that are mapped as DACs. Therefore, CVWD is certain that at least 25% of the total project area is DAC by population.

This project will directly address two major water-related DAC needs explained in the *2014 Coachella Valley IRWM Plan*: water supply reliability and maintaining water affordability. While water supply reliability is a priority throughout the Coachella Valley, it is a particular concern for DACs, because additional emergency water measures such as purchasing bottled water can be cost-prohibitive for DACs. The primary goal of

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<sup>90</sup> Department of Water Resources. N.D. *Water Well Standards-CHAPTER II. STANDARDS: Section 23. Requirements for Destroying Wells.*



the *Regional Well Retrofit and Abandonment Program* is to address major groundwater management issues identified in the Region (leaking artesian wells and improperly sealed or abandoned wells) and implement cost-effective rebates to properly seal and destroy wells in perpetuity. As such, the project meets a major water-related need of DACs by implementing priority actions to address water supply reliability on a long-term basis.

Maintaining water affordability is also a primary concern for DACs in the Region, and is a priority among the water supply agencies in the Coachella Valley. CVWD is committed to implementing solutions that maintain water affordability in its service area. As described previously, rebates provided by this program will make long-term (permanent) improvements to wells and provide both water quality and water supply benefits on a long-term basis. Therefore, the project meets a major water-related need of DACs by implementing cost-effective solutions that are aimed at improving groundwater basin manage that is critical to maintaining affordability of water.

### Project Performance Plan

The benefits associated with this project will be phased, due to the gradual nature of rebate programs. It is anticipated that greater than half of the retrofits rebates will be issued by 2018. The well retrofits will be monitored through pre- and post-implementation inspections by either CVWD staff or contractors to verify that permits have been secured and that wells have been properly retrofitted, sealed, or destroyed. These reports will be compiled into site visit installation reports. As part of these inspections, the artesian sites will be noted and later analyzed to ensure leaks are no longer occurring. The water quality benefit is based on the monitoring data and estimated water savings. The project benefit will be determined based on the number of artesian wells retrofitted or closed.

Because water supply and water quality benefits associated with the project will take a substantial amount of staff time to compile and prepare, interim targets are not reasonable to track for this project. Rather, the targets provided in **Table 2-15** represent full-scale project benefits that will be calculated upon project completion. However, CVWD will prepare a DWR-compliant Project Performance Monitoring Plan for the project as part of Task 9 (see Attachment 3). The targets and information in **Table 2-15** are, therefore, subject to change pending DWR review and approval of the deliverables associated with Task 9.

**Table 2-15: Project Performance Monitoring Plan  
 Regional Well Retrofit and Abandonment Program**

Table 6 – Project Performance Monitoring Plan			
Project Name: <i>Regional Well Retrofit and Abandonment Program</i>			
Proposed Physical Benefits	Targets		Measurement Tools and Methods
	Per Well	Total	
Water Supply	100 AFY	4,500 AFY	The savings will be monitored by pre and post inspections at the well sites, which will include categorization of the well site as artesian. This data will be analyzed to determine the total number of artesian wells retrofitted or closed. Based on the number of artesian wells that are improved by the project, CVWD will calculate water savings by assuming that each well retrofit to an artesian well results in 100 AFY of water savings.



Table 6 – Project Performance Monitoring Plan			
Project Name: <i>Regional Well Retrofit and Abandonment Program</i>			
Proposed Physical Benefits	Targets		Measurement Tools and Methods
	Per Well	Total	
Water Quality	-	-3.8932 mg/L TDS by 2078	The water quality benefit will be a result of water savings and water storage benefits provided by the project. Increased water storage is anticipated to dilute salt loading to the Indio and Mission Creek Sub-basins by 3.8932 mg/L over the project lifetime. Water quality benefits will be estimated based on the number of artesian wells closed and retrofitted, and subsequently the amount of storage added to the Region’s basins. The benefit varies per year based upon estimated salt loading values provided in the SNMP.

### Cost Effectiveness Analysis

**Table 2-16: Cost Effectiveness Analysis**  
*Regional Well Retrofit and Abandonment Program*

Table 7 – Cost Effective Analysis	
Project Name: <i>Regional Well Retrofit and Abandonment Program</i>	
Question 1	<p>Types of benefits provided as shown in Table 5</p> <p>Benefit 1: 4,500 AFY of water conserved</p> <p>Benefit 2: Variable reduction of TDS through dilution of salt loaded to aquifer</p>
Question 2	<p><u>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?</u></p> <p>Yes.</p>
	<p><u>If yes, list the methods (including the proposed project) and estimated costs.</u></p> <p>CVWD’s existing artesian well rebate program offers \$3,000 rebate for well retrofits and closure of abandoned wells. This rebate has proven to be too low to accomplish its objective, as there have been no applications to date and the program is currently inactive. Furthermore, the program involved a partnership with a local agency that required additional best management plan reporting that is thought to have hindered participation.</p> <p>In light of lessons learned from the previous program, the rebate proposed under the <i>Regional Well Retrofit and Abandonment Program</i> will be increased to cover up to 80% of total well retrofit costs. Well retrofits can cost between \$3,750 and \$35,000, meaning the new rebate limit can provide a greater incentive to encourage a well retrofit or closure. Furthermore, additional reporting beyond what is required for permitting will not be required as a condition of the rebate program. CVWD staff will also provide permitting support to recipients of the rebates to help overcome regulatory hurdles that are thought to have hindered the existing artesian well rebate program.</p>



<b>Table 7 – Cost Effective Analysis</b>	
<b>Project Name: <i>Regional Well Retrofit and Abandonment Program</i></b>	
Question 3	<p><u>If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.</u></p> <p>The <i>Regional Well Retrofit and Abandonment Program</i> is not the least cost alternative, as it is a new iteration of a less successful rebate program, but represents a rebate that would sufficiently incentivize the retrofit of wells that would not otherwise be fixed. Further, CVWD will dedicate staff time to develop guidelines, assist with permitting, conduct outreach, etc. While CVWD's additional staff support will increase overall program costs, additional efforts will help to ensure that people are made aware of the rebate and to further encourage proper destruction and abandonment of groundwater wells throughout the Region.</p> <p>In total, the <i>Regional Well Retrofit and Abandonment Program</i> is the preferred alternative even though it is not the least cost alternative, because it includes additional rebate funding, permitting support, outreach, and other components to increase program success compared to an existing unsuccessful rebate program for artesian wells.</p>



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## Project 4: DAC Septic Rehabilitation and Demand Reduction Project

Local Project Sponsor: Coachella Valley Water District (CVWD)

### Brief Description

This project will make rebates available to DACs to evaluate septic systems to address issues of failing septic systems and install greywater systems for reuse.

### Project Map

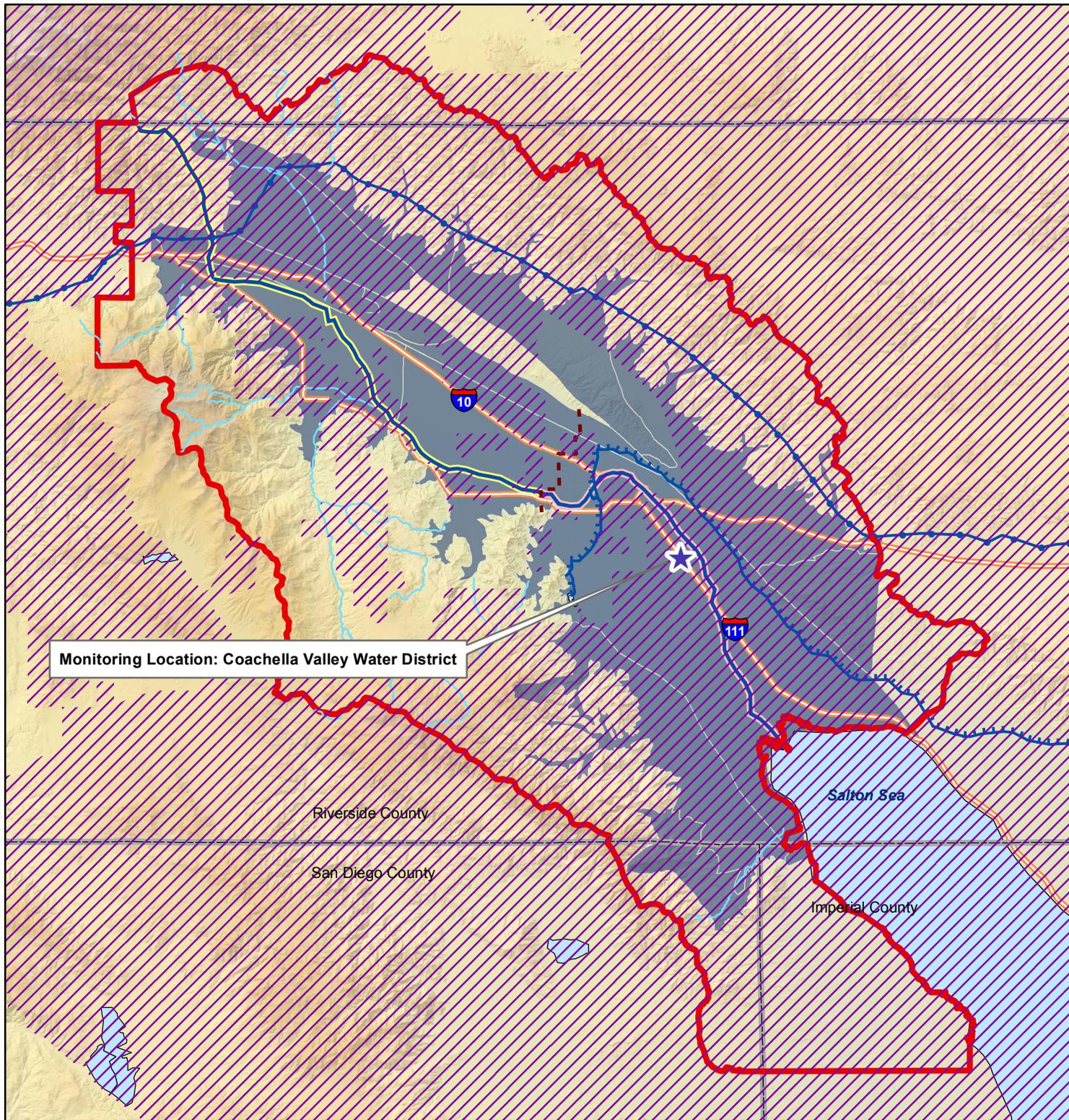
**Figure 2-14** shows the project area for the *DAC Septic Rehabilitation and Demand Reduction Project*, the service areas of the project sponsor (CVWD), the project facilities, the project's relation to groundwater basins and surface water, DACs, and proposed monitoring locations. Please note the following specifics for information provided in **Figure 2-14**:

- Project Location: Rebates provided by this project are available to DACs in the Region; therefore, the project location is consistent with the portion of the Region that is mapped as DAC.
- Project Facilities: Project involves rebates that are eligible throughout the portion of the Region mapped as DAC.
- Groundwater Basins and Surface Water: Project will primarily affect groundwater located within the Indio Sub-basin (Bulletin 118 Basin Number 7-21.01) and the Mission-Creek Sub-basin (Bulletin 118 Basin Number 7-21.02). Surface water would be indirectly improved by the project; primary surface water bodies are the Whitewater River and the Coachella Valley Stormwater Channel.
- DACs: 100% of the overall project area is classified as DAC; rebates from this program will only be made available to DACs.
- Proposed Monitoring Locations: Monitoring for rebates will take place at CVWD's Main Office, because this is where rebate data and information will be compiled.



**Example of Surfacing Wastewater from an Undersized Septic System**

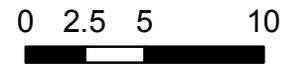
**Figure 2-14:  
DAC Septic Rehabilitation and  
Demand Reduction Project**



Monitoring Location: Coachella Valley Water District

- Division between West and East Valley
- Colorado River Aqueduct
- Coachella and All American Canals
- Whitewater River Storm Water Channel
- Coachella Valley Storm Water Channel
- River or Creek
- Highways
- Water Bodies
- Groundwater Basins
- Coachella Valley IRWM Region
- Disadvantaged Communities (DACs)

Source: 2013 U.S. Census Data - American Community Survey Median Household Income (MHI), by block group, census tract, and DAC Data from 2013 Coachella Valley DAC Outreach Program. DACs are defined as having MHI of 80% of Statewide MHI. For 2013, DACs were households earning \$48,875 or less per year.



Miles





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## Project Description

In 2011, the CVRWMG received a grant from DWR to implement a *Disadvantaged Community Outreach Demonstration Program* (DAC Outreach Program). Completed in 2013, the goal of the DAC Outreach Program was to develop and implement methods to improve DAC participation in the Coachella Valley IRWM planning process. The DAC Outreach Program identified potential project concepts that could be implemented to directly benefit DACs and resolve high priority water-related issues in DACs. To move the project concepts forward, the DAC Outreach Program scope included additional work to develop in-depth engineering and design for priority DAC projects.

One of the project concepts that was selected for additional engineering work was a program to evaluate rehabilitation or replacement of onsite wastewater treatment systems (septic systems) to address issues associated with aging or failing systems. This concept was selected, because aging or failing septic systems that result in surfacing wastewater have been cited as a serious public health concern and a source of water quality constituents, such as bacteria and nitrates, in local water resources. Due to the importance of public health and water quality throughout the Coachella Valley, there is a need to rehabilitate or replace aging or failing septic systems to protect local residents and the Region's water supplies and prevent constituents of concern from entering the Coachella Valley Stormwater Channel and the Salton Sea in areas where failing septic systems are located in the shallow groundwater aquifer.

The technical work that was completed for the DAC Outreach Program included an overall assessment of current issues with failing septic systems and potential actions that could be taken to resolve septic system issues, including replacing, rehabilitating, or performing maintenance on the systems. One of the major findings of this technical work was that the primary source of over-loading into septic systems is water from washing machines. High flows from washing machines compounded with non-percolating clay-like soils in the eastern Coachella Valley (located over an aquitard) can lead to surfacing wastewater from septic systems that cannot handle the flow volumes coming from washing machines.

While work was underway on the DAC Outreach Program, the State of California entered a severe multi-year drought that is still ongoing. As a result of the drought and conservation restrictions in the Region, many residents have been looking for ways to increase water reuse and conserve water in accordance with statewide mandates. As a result of the drought and findings of the DAC Outreach Program, it was suggested by local stakeholders that a program be implemented to retrofit mobile home parks in the Region to install greywater systems with flows from washing machines (laundry-to-landscape systems). The installation of greywater systems would provide water supply benefits by providing a source of reuse water (greywater) for amenities such as fruit trees, and would also address findings of the DAC Outreach Program associated with septic systems. By removing washing machine flows from entering septic systems, a major source of overloading would be removed, making this nuisance water available for reuse.

The primary outcome of the *DAC Septic Rehabilitation and Demand Reduction Program* will be to issue rebates to DACs in the Region and implement measures to resolve issues associated with septic system overflows. The project will involve development of program guidelines and forms by CVWD to establish a method for evaluating potential projects for feasibility and onsite retrofit needs. CVWD and its contractors will administer the rebate program and will conduct site visits to evaluate retrofit needs and onsite conditions. The initial site visits will be conducted to determine the current status of the septic systems, occurrences of overflows, overall flows into the systems, and flow reductions that would accrue from removing washing machine flows. If the initial site visit determines that reducing washing machine flows would not be sufficient to resolve septic system overflows, a rebate will be made available to complete a full septic system retrofit. It is estimated that five septic systems will be retrofitted through the project. If the initial site visit determines that installation of a greywater system would be feasible given onsite conditions and would resolve septic system overflows, a rebate will be made available to complete the greywater system installation. It is estimated that 175 greywater systems will be retrofitted through the project.

The installation of 175 greywater systems will make 8.8 AFY of water available for reuse. Further, the project will resolve water quality issues associated with surfacing wastewater by eliminating septic system overflows. This benefit has been quantified as a reduction in total suspended solids of 83 mg/L as shown in **Table 2-17**.



## Project Physical Benefits

The *DAC Septic Rehabilitation and Demand Reduction Project* will provide multiple benefits and include three of the project elements defined in Public Resources Code § 75026(a). Two of the project benefits have been quantified and are presented in **Tables 2-17** and **2-18**. The two quantified physical benefits are Water Quality (reduction in total suspended solids or TSS) and Water Supply (water recycled).

**Table 2-17: Primary Physical Benefit – Water Quality Improved  
*DAC Septic Rehabilitation and Demand Reduction Project***

<b>Project Name:</b> <i>DAC Septic Rehabilitation and Demand Reduction Project</i>			
<b>Type of Benefit Claimed:</b> Total Suspended Solids (TSS) Reduction			
<b>Units of the Benefit Claimed:</b> mg/L			
<b>Anticipated Useful Life of Project (years):</b> 12 years			
<b>(a)</b>	<b>(b)</b>	<b>(c)</b>	<b>(d)</b>
<b>Year</b>	<b>Without Project</b>	<b>With Project</b>	<b>Change Resulting From Project (c) – (b)</b>
2016-2033	83 mg/L	0 mg/L	-83 mg/L
<p><b>Comments:</b> The primary benefit (Water Quality) is a direct result of installation of greywater systems and septic system retrofits that will eliminate septic system overflows. Wastewater overflows from septic systems present immediate public health concerns and water quality issues, because local residents could come into contact with the effluent and associated water quality constituents. The pre-site visits that will take place for the <i>DAC Septic Rehabilitation and Demand Reduction Project</i> will evaluate the ability of greywater systems, and subsequent removal of washing machine flows, to prevent septic system failures. If greywater systems would prevent overflows, simple laundry-to-landscape greywater systems would be installed for 175 homes. If greywater systems would not be sufficient to prevent overflows, a rebate would be provided to retrofit up to 5 community septic systems. Due to the structure of the program, this analysis reasonably assumes that implementation of the project would eliminate septic system overflows for 175 homes.</p> <p>The project-related water quality benefit is based upon scientific research that documents the average concentration of constituents present in septic effluent.<sup>91</sup> It is assumed that with implementation of the project, septic effluent (and constituents included in effluent) will no longer surface, and therefore public health risks associated with surfacing wastewater will be eliminated. The benefit that has been quantified is total suspended solids (TSS); this constituent was quantified because it can be quantified within DWR's unit requirements of mg/L. In addition to TSS, nitrogen, phosphorous, and fecal coliform will also be reduced.<sup>92</sup> Without the project, it is assumed that the average concentration of each of the aforementioned constituents is present in surfacing septic effluent at each of the 175 homes that will benefit from the project. Because the project would eliminate overflows, it is assumed that with the project, the concentration of these constituents would drop to 0. Given the overall magnitude of the benefits, this analysis assumes that benefits begin accruing when implementation begins and continue to accrue each year over the 12-year project life as shown in <b>Table 2-17</b>.</p> <p>Due to the project's location in the Eastern Coachella Valley (over the aquitard), standing water that is present above-ground during wet weather events ultimately runs into the Coachella Valley Stormwater Channel (CVSC) and into the Salton Sea. The CVSC is currently listed on the 303(d) list of impaired water bodies for bacteria (<i>E. coli</i>); a Total Maximum Daily Load was implemented for this water body in</p>			

<sup>91</sup> State Water Resources Control Board. 2002. *Review of Technologies for the Onsite Treatment of Wastewater in California*. Available:

[http://www.waterboards.ca.gov/sandiego/water\\_issues/programs/wine\\_country/docs/updates081910/owts\\_review.pdf](http://www.waterboards.ca.gov/sandiego/water_issues/programs/wine_country/docs/updates081910/owts_review.pdf)

<sup>92</sup> State Water Resources Control Board. 2002. *Review of Technologies for the Onsite Treatment of Wastewater in California*. Available:

[http://www.waterboards.ca.gov/sandiego/water\\_issues/programs/wine\\_country/docs/updates081910/owts\\_review.pdf](http://www.waterboards.ca.gov/sandiego/water_issues/programs/wine_country/docs/updates081910/owts_review.pdf)



<b>Project Name:</b> <i>DAC Septic Rehabilitation and Demand Reduction Project</i>			
<b>Type of Benefit Claimed:</b> Total Suspended Solids (TSS) Reduction			
<b>Units of the Benefit Claimed:</b> mg/L			
<b>Anticipated Useful Life of Project (years):</b> 12 years			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2012, which among other things notes that septic systems contribute to bacteria loading to the CVSC. <sup>93</sup> Therefore, the project would also result in a long-term reduction in bacteria loading to the CVSC and would, therefore, assist the Region in meeting its <i>E. coli</i> TMDL and improving surface water quality. Data from the State Water Resources Control Board shows that septic effluent has an average concentration of bacteria of 10 <sup>6</sup> colony-forming units/100mL. <sup>94</sup> While the bacteria-related water quality benefit is the most important public health and surface water quality benefit provided by the project, it is not the benefit quantified in <b>Table 2-17</b> , because this benefit cannot be quantified in the units of mg/L.			

**Table 2-18: Secondary Physical Benefit – Water Supply Recycled  
*DAC Septic Rehabilitation and Demand Reduction Project***

<b>Project Name:</b> <i>DAC Septic Rehabilitation and Demand Reduction Project</i>			
<b>Type of Benefit Claimed:</b> Water Supply Recycled			
<b>Units of the Benefit Claimed:</b> AFY			
<b>Anticipated Useful Life of Project (years):</b> 12 years			
(a)	(b)	(c)	(d)
Year	Without Project	With Project	Change Resulting From Project (c) – (b)
2016	0 AFY	0.88 AFY	0.88 AFY
2017	0 AFY	4.05 AFY	4.05 AFY
2018	0 AFY	7.22 AFY	7.22 AFY
2019-2030	0 AFY (0AF)	8.8 AFY (105.6 AF)	8.8 AFY (105.6 AF)
2031	0 AFY	7.92 AFY	7.92 AFY
2032	0 AFY	4.75 AFY	4.75 AFY
2033	0 AFY	1.58 AFY	1.58 AFY
<b>Comments:</b> For the secondary benefit (Water Supply), the without-project baseline is considered to be zero. The benefit provided by this project is water reuse through installation of greywater systems in DACs. Rebates will only be provided to DACs that do not currently have greywater systems; therefore, this analysis assumes that currently none of the homes that will receive rebates as a result of the project have reuse water available to them. As described previously, it is estimated that 175 homes will be retrofit with greywater systems as a result of this project. Information from the United States Environmental Protection Agency (USEPA) shows that an average household does 400 loads of laundry per year and			

<sup>93</sup> Colorado River Regional Board. 2013. *Total Maximum Daily Load Progress Report: Coachella Valley Stormwater Channel Bacteria TMDL*. Available: [http://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1213/plan\\_assess/docs/fy1213/11112\\_r7\\_cvsc\\_bacteria.pdf](http://www.waterboards.ca.gov/about_us/performance_report_1213/plan_assess/docs/fy1213/11112_r7_cvsc_bacteria.pdf)

<sup>94</sup> State Water Resources Control Board. 2002. *Review of Technologies for the Onsite Treatment of Wastewater in California*. Available: [http://www.waterboards.ca.gov/sandiego/water\\_issues/programs/wine\\_country/docs/updates081910/owts\\_review.pdf](http://www.waterboards.ca.gov/sandiego/water_issues/programs/wine_country/docs/updates081910/owts_review.pdf)



<b>Project Name:</b> <i>DAC Septic Rehabilitation and Demand Reduction Project</i>			
<b>Type of Benefit Claimed:</b> Water Supply Recycled			
<b>Units of the Benefit Claimed:</b> AFY			
<b>Anticipated Useful Life of Project (years):</b> 12 years			
<b>(a)</b>	<b>(b)</b>	<b>(c)</b>	<b>(d)</b>
<b>Year</b>	<b>Without Project</b>	<b>With Project</b>	<b>Change Resulting From Project (c) – (b)</b>
<p>that each load of laundry uses 41 gallons of water.<sup>95</sup> The aforementioned statistic from the USEPA assumes that laundry machines are not high-efficiency, low-flow systems; this assumption is appropriate because the systems that will be retrofitted are located in DACs and that likely do not have newer, low-flow appliances. Once the entire project is implemented, it will increase local availability of greywater by 8.8 AFY. Benefits will be phased in from the time that implementation begins (2016) through full implementation in 2019; benefits will accrue over the 12-year project life as shown in <b>Table 2-18</b>. Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual greywater system has a useful life of 12 years.</p>			

<sup>95</sup> United States Environmental Protection Agency. 2012. *Laundry Room & Basement*. Available: <http://www.epa.gov/greenhomes/Basement.htm>



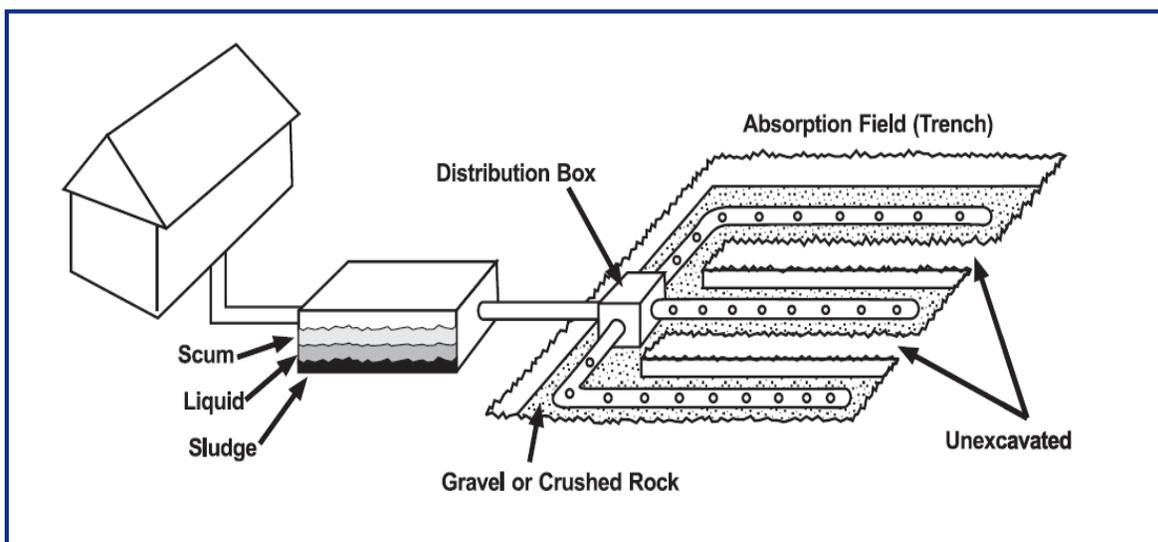
## Technical Analysis of Physical Benefits Claimed

### Project Need

Through the DAC Outreach Program, the CVRWMG and its partners conducted extensive interviews throughout the Coachella Valley with the ultimate goal of determining major DAC issues and determining potential projects that could be implemented to address those issues. Through this outreach effort, it was determined that the primary water-related concerns of DACs in the Region were access to reliable and safe water supply (drinking water), proper wastewater disposal, flooding, and water affordability. With regards to wastewater issues, many residents, particularly those in the East Valley, reported experiencing frequent septic system failures. In June 2013, the CVRWMG and non-profit partners hired to work on the Coachella Valley DAC Outreach Program developed general project concepts that could be implemented to address major issues identified by DAC stakeholders pertaining to water resources management. Septic system rehabilitation or replacement was identified as one of the concepts that could be implemented to address issues associated with aging or failing septic systems. This concept was moved forward for further technical work, because aging or failing septic systems have been cited as a serious public health concern and a potential source of water quality constituents such as TSS, bacteria, and nitrates in local waterways.<sup>96</sup>

As a result of the recommended project concepts, a separate technical study, the *Regional Program for Septic System Rehabilitation*, was completed. One of the goals of this technical study was to assess current issues with failing septic systems, determine why failures occur, and recommend actions necessary to resolve septic system issues.<sup>97</sup> Onsite visits and interviews with residents of mobile home parks revealed that clothes washing machines are the largest contributor to septic systems, and could potentially be the largest contributor to overflows. In addition to onsite visits, the analysis also looked at three community septic systems (serving five or more units) in detail and determined average retrofit costs to repair the systems; this analysis found that on average, it costs \$15,000 to retrofit one communal septic system in a small mobile home park.<sup>98</sup>

A schematic of a typical, conventional septic system is provided below:



Source: USEPA. 2002. *Onsite Wastewater Treatment System Manual*.

<sup>96</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Disadvantaged Community Outreach Demonstration Project: Regional Program for Septic System Rehabilitation*.

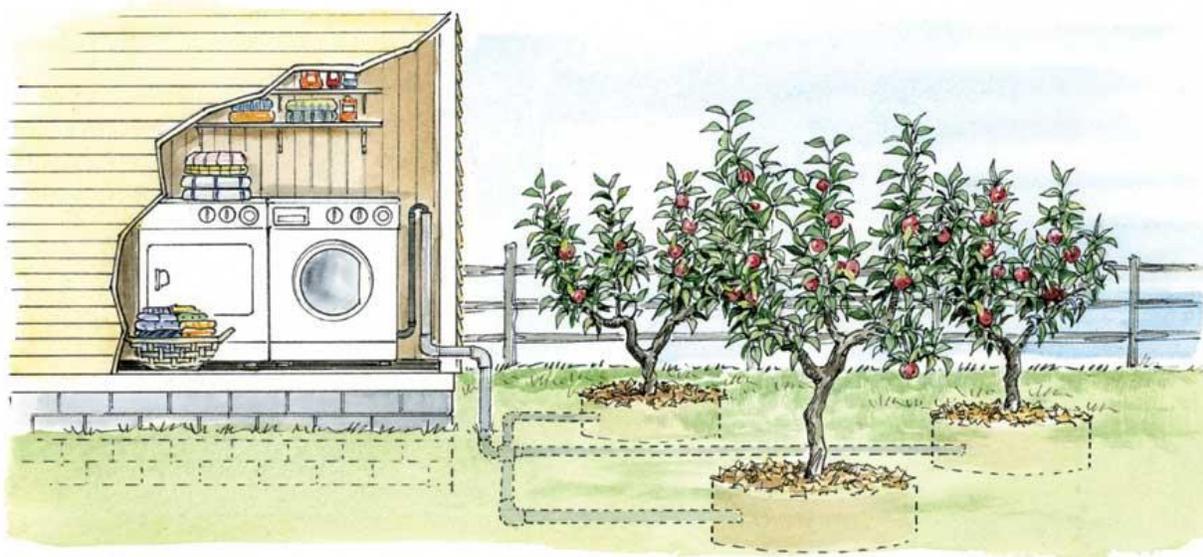
<sup>97</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Disadvantaged Community Outreach Demonstration Project: Regional Program for Septic System Rehabilitation*.

<sup>98</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Disadvantaged Community Outreach Demonstration Project: Regional Program for Septic System Rehabilitation*.



Since the time that the DAC Outreach Program was completed, a major multi-year drought has continued in California. At the same time, regulations pertaining to greywater systems have been streamlined such that simple systems, referred to as “laundry to landscape” systems, do not require permitting. These simple systems involve one connection from the hose of a washing machine to a three-way valve that can divert greywater either to the septic system (or sewer) or to an outdoor greywater system. There are restrictions regarding where greywater can be placed; the most common use for these systems is to irrigate tree roots. In the Eastern Coachella Valley many of the small mobile home park communities provide housing to migrant farm workers that work in nearby farms. Due to the climate of the Region and the fertile soils in the Eastern Coachella Valley, it is not uncommon for the communities to have small stands of fruit trees (primarily citrus) or nut trees. Therefore, it is anticipated that greywater systems would be used to irrigate fruit trees and other trees potentially present onsite in mobile home park communities. Given the simplicity of the laundry to landscape systems, they are relatively simple and affordable to install; installation costs are estimated to be up to \$2,000 per system.<sup>99</sup>

An example of a typical laundry to landscape greywater system is shown in the figure below:



Source: Elayne Sears: <http://www.motherearthnews.com/green-homes/home-design/greywater-zm0z11zphe.aspx?SlideShow=5>

In 2015, while projects were being solicited for the Coachella Valley IRWM Region, local stakeholders in conjunction with the CVRWGM conceptualized a project that would both address drought needs and DAC-specific issues associated with failing septic systems. The project that was conceptualized is the project presented herein, the *DAC Septic Rehabilitation and Demand Reduction Project*. Given reduced restrictions regarding greywater systems and the fact that these systems would provide water reuse benefits, the project proposes to implement a rebate program that would provide funding for a limited amount of septic retrofits (5) and a larger amount of greywater retrofits (175). Based upon information provided in the *Regional Program for Septic System Rehabilitation*, it is anticipated that most septic system overflow issues can be resolved by diverting the primary source of water (washing machine flows) from septic systems, and instead reuse the water in simple greywater systems. The rebates would be made available exclusively to DACs and would implement a high-priority multi-benefit project that would address both critical water supply and water quality needs of local DACs.

Part of the pre-installation visits conducted for the rebate program will include an analysis of onsite conditions to determine the current status of the septic systems, occurrences of overflows, overall flows

<sup>99</sup> Greywater Action. *Greywater FAQ: How Much Does a Greywater System Cost?* Available: <http://greywateraction.org/greywater-faq/>



into the systems, and flow reductions that would accrue from removing washing machine flows. If the initial site visit determines that reducing washing machine flows would not be sufficient to resolve septic system overflows, a rebate will be made available to complete a full septic system retrofit. If the initial site visit determines that installation of a greywater system would be feasible given onsite conditions and would resolve septic system overflows, a rebate will be made available to complete the greywater system installation. Therefore, the rebate program will be designed such that after implementation of either a septic system rehabilitation or a greywater system, the mobile home parks that receive rebates will no longer experience septic system failures that result in surfacing of septic system effluent. Given the price difference between septic rehabilitation and greywater system installation, the rebate program will target mobile home parks that can substantially benefit from installation of a greywater system as this is considered the least cost alternative to addressing septic system overflows.

Eliminating septic system overflows is important for addressing local DAC needs associated with public health and access to functional wastewater system, and also provides surface water quality benefits. Due to the hydrologic conditions of the East Valley and the presence of the large aquitard, the *2010 Coachella Valley Water Management Plan* explains that surfacing water (including septic system effluent) in this area flows to local waterways, including the CVSC. The CVSC is currently listed on the 303(d) list of impaired water bodies for bacteria (*E. coli*); a TMDL was implemented for this water body in 2012, which among other things notes that septic systems are responsible for *E. coli* loading to the CVSC.<sup>100</sup> Therefore, eliminating septic system overflows in DACs that are located in the Eastern Coachella Valley will also result in qualitative water quality benefits associated with local surface water bodies.

### **Without Project Conditions**

Without the *DAC Septic Rehabilitation and Demand Reduction Project*, 175 DAC homes would not receive rebates for greywater systems and 5 mobile home parks would not receive rebates for septic system rehabilitation needs. Without the project, septic system failures would continue to occur and would present public health and surface water quality issues. Furthermore, without the project 8.8 AFY of water would not be made available for reuse and would therefore not provide water supply reliability benefits to local DACs.

Issues with surfacing wastewater due to inadequately sized or poorly designed septic systems are prevalent in the eastern Coachella Valley, and present health risks to local residents and water quality issues to the Region. Septic system retrofits are fairly expensive, costing approximately \$15,000 for a small communal system serving five or more mobile home units.<sup>101</sup> Without the project, it would be feasible to implement a program to address septic system overflows through widespread retrofits. However, this project would be more expensive than the *DAC Septic Rehabilitation and Demand Reduction Project*, and also would not provide reuse benefits associated with installation of greywater systems.

### **Methods to Estimate Physical Benefits**

#### ***Primary Benefit: Water Quality Improved***

The primary benefit of water quality improvement is calculated based on the assumption that septic system overflows would no longer occur once the project is implemented. This assumption is reasonable, because information gathered as part of the *Coachella Valley DAC Outreach Program* found that clothes washing machines are the single largest contributor to septic systems.<sup>102</sup> Therefore, by removing this large contributor of loading to onsite systems, it is anticipated that overflows will no longer occur. Further, the rebate program described in this Proposal also includes funding to retrofit and rehabilitate onsite septic systems that have failure issues beyond what can be resolved with implementation of greywater systems.

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<sup>100</sup> Colorado River Regional Board. 2013. *Total Maximum Daily Load Progress Report: Coachella Valley Stormwater Channel Bacteria TMDL*. Available: [http://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1213/plan\\_assess/docs/fy1213/11112\\_r7\\_cvsc\\_bacteria.pdf](http://www.waterboards.ca.gov/about_us/performance_report_1213/plan_assess/docs/fy1213/11112_r7_cvsc_bacteria.pdf)

<sup>101</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Disadvantaged Community Outreach Demonstration Project: Regional Program for Septic System Rehabilitation*.

<sup>102</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Disadvantaged Community Outreach Demonstration Project: Regional Program for Septic System Rehabilitation*.



The pre-site visits that will be conducted as part of the project will verify that actions implemented with the rebates will be sufficient to resolve septic system overflows and subsequent surfacing of septic effluent.

The project will provide water quality and public health benefits associated with eliminating septic system overflows. Information from the SWRCB indicates that septic tank effluent has the following average water quality parameters<sup>103</sup>:

- Total Suspended Solids: 83 mg/L
- Total Nitrogen as N: 70 mg/L
- Total Phosphorous as P: 16 mg/L
- Fecal Coliform: 10<sup>6</sup> colony-forming units/100mL

The largest benefit from the project will be the elimination of exposure to fecal coliform and other pathogens from septic effluent, which is considered a public health threat and a local water quality issue for the CVSC. However, this benefit is not considered in the quantification as it is not available in the units of mg/L. Therefore, the benefit that has been quantified is elimination of TSS present in septic effluent. Given that the average concentration of TSS in septic effluent is 83 mg/L, the project would result in a reduction of 83 mg/L of TSS by reducing wastewater overflows. It is estimated that this benefit will accrue from the time that retrofits begin (2016) through the 12-year useful life of the project. This number was used based on the average lifespan of the drip irrigation systems (12-15 years) that would be used to deliver greywater to onsite uses.<sup>104</sup> The lower end value of 12 years was used to be conservative.

#### **Secondary Benefit: Water Supply Produced**

The secondary benefit of the *DAC Septic Rehabilitation and Demand Reduction Project* is the amount of water that would be available once the project is implemented. The source of water provided by the project is greywater. The simplest type of greywater system is referred to as a “laundry to landscape” system, which involves a single connection from a clothes washer to appropriate outdoor uses. Because the laundry to landscape systems are simple, easy to install, and do not require permits, the rebates will be limited to this type of system.

Appropriate outdoor uses for laundry to landscape greywater include subsurface flows, which are commonly applied to tree roots. Part of the pre-site inspection reports will include an analysis of the onsite conditions and ability to utilize greywater to irrigate the sub-surface roots of onsite trees. These inspections will ensure that greywater provided by the project is beneficially reused, and is not used for unpermitted purposes. As such, the amount of water that would be available for reuse as part of the project is equivalent to the amount of greywater provided, or the average amount of water produced by a clothes washing machine per year.

Data from the USEPA demonstrates that an average home does 400 loads of laundry per year; assuming that high efficiency, low-flow systems are not used, an average washing machine uses 41 gallons of water per load.<sup>105</sup> Applying these figures to the number of greywater systems that would be installed as part of the project (175), the total amount of water recycled as part of the project can be calculated. In total, the project would recycle 8.8 AFY once it is fully implemented.

The calculations used in this analysis are provided below:

$$\frac{400 \frac{\text{loads}}{\text{year}}}{\text{house}} * 41 \frac{\text{gallons}}{\text{load}} = \frac{16,400 \frac{\text{gallons}}{\text{year}}}{\text{house}} * 175 \text{ houses} = 2,870,000 \text{ gallons per year}$$

<sup>103</sup> State Water Resources Control Board. 2002. *Review of Technologies for the Onsite Treatment of Wastewater in California*. Available:

[http://www.waterboards.ca.gov/sandiego/water\\_issues/programs/wine\\_country/docs/updates081910/owts\\_review.pdf](http://www.waterboards.ca.gov/sandiego/water_issues/programs/wine_country/docs/updates081910/owts_review.pdf)

<sup>104</sup> Reich, D., Godin, R., Chávez, J.L., Broner, I. 2014. *Subsurface Drip Irrigation (SDI)*. Available:

<http://www.ext.colostate.edu/pubs/crops/04716.html>

<sup>105</sup> United States Environmental Protection Agency. 2012. *Laundry Room & Basement*. Available:

<http://www.epa.gov/greenhomes/Basement.htm>



$$2,870,000 \text{ gallons per year} * 3.06888 * 10^{-6} \frac{AF}{\text{gallon}} = 8.8 \text{ AFY}$$

The useful project life used in this analysis is 12-years. This number was used based on the average lifespan of the drip irrigation systems (12-15 years) that would be used to deliver greywater to onsite uses.<sup>106</sup> The lower end value of 12 years was used to be conservative. Benefits will phase out in the same manner that they will phase in, because it is assumed that each individual greywater system has a useful life of 12 years.

### **New Facilities, Policies, and Actions**

The quantified physical benefits are directly realized through the provision of rebates and technical support to retrofit septic systems and install greywater systems. Implementation of the rebate program would not require any additional facilities, policies, or actions beyond those contained within the Work Plan (see *Attachment 3 Work Plan*) in order to realize the benefits described above. This project implements a recommendation of a regional feasibility study, which did not identify additional facilities or policies that would need to be enacted to implement the program. The physical benefits would require participants to complete their individual retrofits and secure permits as necessary; CVWD will provide technical support and will conduct site inspections, and rebates will not be issued until projects are complete. Therefore, no other facilities, policies, or actions would be required to obtain the physical benefits described in this attachment.

### **Potential Adverse Physical Effects**

There are no anticipated sustained adverse physical effects from this project. There may be temporary effects associated with greywater installation or septic system retrofits, such as noise or odors from equipment; however these effects are anticipated to be minor and temporary in nature. As discussed in *Attachment 3, Work Plan*, this project does not qualify as a “project” per the California Environmental Quality Act, and therefore would not require mitigation, analysis, or any other measures to address physical effects.

### **Long-Term Drought Preparedness**

The *DAC Septic Rehabilitation and Demand Reduction* project meets two of the Drought Preparedness elements defined by DWR: 1) promote reuse and recycling, and 2) efficient groundwater basin management.

The project will promote water reuse and recycling by installing greywater systems and providing 8.8 AFY of greywater for appropriate onsite uses. Greywater systems will provide a non-potable water source for landscape irrigation, thereby reducing potable water use.

The *DAC Septic Rehabilitation and Demand Reduction* project will achieve efficient groundwater basin management by addressing water quality issues associate with failing septic systems. Septic systems have been cited as a serious public health concern and a potential source of water quality constituents such as bacteria and nitrates in local water resources. By retrofitting septic systems and installing greywater systems, the project will improve groundwater basin management by effectively controlling surfacing of constituents.

### **Direct Water-Related Benefit to a DAC**

As described in *Attachment 7 Disadvantaged Communities*, an analysis was conducted to determine how much of the project area is classified as a DAC. 100% of the area that would be served by the project is DAC, as the rebates will only be made available to economically disadvantaged communities.

This project will directly address two major water-related DAC needs explained in the *2014 Coachella Valley IRWM Plan*: water supply reliability and failing onsite septic systems. While water supply reliability is a priority throughout the Coachella Valley, it is a particular concern for DACs, because additional emergency water measures such as purchasing bottled water can be cost-prohibitive for DACs. A goal of the *DAC*

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<sup>106</sup> Reich, D., Godin, R., Chávez, J.L., Broner, I. 2014. *Subsurface Drip Irrigation (SDI)*. Available: <http://www.ext.colostate.edu/pubs/crops/04716.html>



*Septic Rehabilitation and Demand Reduction Project* is to provide a new source of recycled water (greywater) to DACs for appropriate irrigation uses such as watering tree roots. Through installation of greywater systems, the project will provide a new source of locally-generated water to DACs for onsite uses. As such, the project meets a major water-related need of DACs by implementing priority actions to address water supply reliability on a long-term basis.

The primary goal of this project is to address a major water-related issue of DACs associated with failing onsite septic systems. Septic systems are used heavily by DACs, especially in communities in the eastern Coachella Valley that do not have access to municipal sewer systems. In these DAC areas, which also have hard, clay soils, septic systems are often undersized and overused, resulting in frequent system failures and surfacing wastewater. The issue of surfacing wastewater has been thoroughly documented in the *2014 Coachella Valley IRWM Plan*, and is known to cause public health, aesthetic, and other issues in DACs. The project proposes installation of greywater systems to both provide water supply benefits and to remove a major source of loading to septic systems, thereby eliminating system failures. In addition, sites will be analyzed to determine if full-scale retrofits are necessary to eliminate issues associated with septic tank failure. Through these two mechanisms, the project will ensure that all homes that receive the rebates no longer experience septic system failures.

### Project Performance Monitoring Plan

The benefits provided by the *DAC Septic Rehabilitation and Demand Reduction Project* will increase with time as more DACs complete the rebate process and install greywater systems and rehabilitate septic systems. Due to the improvements occurring on private land, CVWD will not be able to monitor water supply or water quality benefits on-site. Further, the DACs that will receive rebates as part of this project would not reasonably be able to afford the equipment or labor required to perform qualitative monitoring. For these reasons, benefits provided by the project will be based on pre and post site inspections of the greywater systems. These results will be compiled into site visit installation reports, which will be compiled and sent to DWR on an annual basis once the project is complete.

Because water quality and water supply benefits associated with the project will take a substantial amount of staff time to compile and prepare, interim targets are not reasonable to track for this project. Rather, the targets provided in **Table 2-19** represent full-scale project benefits that will be calculated upon project completion. However, CVWD will prepare a DWR-compliant Project Performance Monitoring Plan for the project as part of Task 9 (see Attachment 3). The targets and information in **Table 2-19** are, therefore, subject to change pending DWR review and approval of the deliverables associated with Task 9.

**Table 2-19: Project Performance Monitoring Plan  
 DAC Septic Rehabilitation and Demand Reduction Project**

<b>Table 6 – Project Performance Monitoring Plan</b>			
<b>Project Name:</b> <i>DAC Septic Rehabilitation and Demand Reduction Project</i>			
<b>Proposed Physical Benefits</b>	<b>Targets</b>		<b>Measurement Tools and Methods</b>
	<b>Per System</b>	<b>Total</b>	
Water Supply	0.05 AFY	8.8 AFY	Water savings will assured through pre- and post-inspections of the retrofit sites to ensure proper installation of the greywater laundry systems, drip irrigation system, and septic system retrofits. The pre-installation inspection will ensure that there are appropriate irrigation uses (such as tree roots) available and the post-installation inspection will ensure that drip irrigation systems were properly installed and are delivering greywater to the appropriate irrigation uses.



<b>Table 6 – Project Performance Monitoring Plan</b>			
<b>Project Name: DAC Septic Rehabilitation and Demand Reduction Project</b>			
<b>Proposed Physical Benefits</b>	<b>Targets</b>		<b>Measurement Tools and Methods</b>
	<b>Per System</b>	<b>Total</b>	
			CVWD will closely track the number of greywater systems that have been retrofit through the rebate program, and will use this data to calculate overall greywater production and reuse resulting from the project based upon data from the USEPA and reported previously.
Water Quality	83 mg/L of TSS	83 mg/L of TSS	<p>The initial site visits will be conducted to determine the current status of the septic systems, occurrences of overflows, overall flows into the systems, and flow reductions that would accrue from removing washing machine flows. Based on the initial site visit, a recommendation will be made about what type of improvement (septic rehabilitation or greywater system) should be installed to eliminate septic system overflows.</p> <p>The post-installation site reports will inspect system installation and survey residents about the frequency of septic system overflows. This data collected by residents will be used to verify project success with regards to eliminating septic overflows and providing water quality benefits.</p> <p>The physical water quality benefit derived from eliminating septic system overflows will be calculated by CVWD with data from the SWRCB about average concentration of TSS and other constituents in septic effluent. The benefit will be applied to all successful rebate executions, and catalogued by CVWD in site visit installation reports.</p>

## Cost Effectiveness Analysis

**Table 2-20: Cost Effectiveness Analysis  
 DAC Septic Rehabilitation and Demand Reduction Project**

<b>Table 7 – Cost Effective Analysis</b>	
<b>Project Name: DAC Septic Rehabilitation and Demand Reduction Project</b>	
Question 1	<p><u>Types of benefits provided as shown in Table 5</u></p> <p>Benefit 1: 8.8 AFY of water recycled (greywater used)</p> <p>Benefit 2: 83.0 mg/L of TSS reduced at ground surface through prevention of septic tank overflows</p>
Question 2	<p><u>Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?</u></p> <p>No.</p>
	<p><u>If no, why?</u></p> <p>No other project could simultaneously address the issues of failing septic systems and water reuse for DACs. Failing septic systems present serious health concerns, as they can lead to exposure of humans to pathogens and other constituents found in effluent.</p>



<b>Table 7 – Cost Effective Analysis</b>	
<b>Project Name:</b> <i>DAC Septic Rehabilitation and Demand Reduction Project</i>	
	The installation of simple laundry-to-landscape greywater systems presents a multi-benefit solution for addressing septic system overflows in that it will directly contribute to water recycling by providing a new source of water and will also offload major flows to failing septic systems. This project was identified by the CVRWMG in association with local DACs, and is considered to be a unique, one-of-a-kind multi-benefit project to address two high-priority DAC issues.
Question 3	<p><u>If the proposed project is not the least cost alternative, why is it the preferred alternative?</u>  <u>Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.</u></p> <p>No other alternatives were considered.</p>



## Project 5: Torres-Martinez Septic to Sewer Conversion Project

Local Project Sponsor: Torres Martinez Desert Cahuilla Indians (DCI)

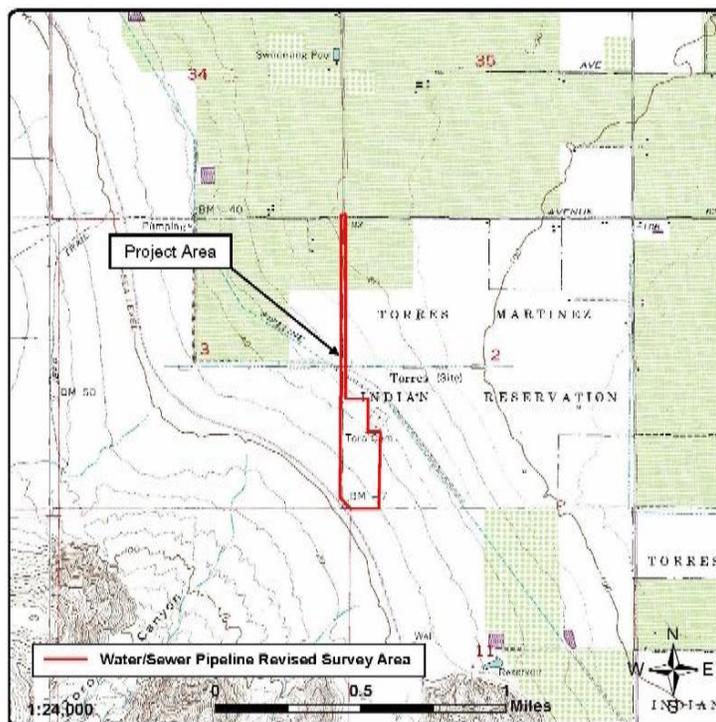
### Brief Description

This project will provide environmental, design, and engineering work to connect the residents of a disadvantaged Tribal community to the municipal sewer system.

### Project Map

Figure 2-15 shows the project area for the *Torres-Martinez Septic to Sewer Conversion Project*, the service areas of the project sponsor (Torres Martinez Desert Cahuilla Indians), the project facilities, the project's relation to groundwater basins and surface water, DACs, and proposed monitoring locations. Please note the following specifics for information provided in **Figure 2-15**:

- Project Location: The project is located along Monroe Street from Avenue 64 to Avenue 62.
- Project Facilities: No facilities will be constructed as a part of this project as this is a DAC project that involves engineering, design, and environmental documentation. Ultimately, this project provides pre-construction work for a sewer main that would connect an economically disadvantaged Tribal community (the Avenue 64 Housing Subdivision) to CVWD's existing sewer main located at the intersection of Avenue 62 and Monroe Street.
- Groundwater Basins and Surface Water: Project will primarily affect groundwater located within the Indio Sub-basin (Bulletin 118 Basin Number 7-21.02). Surface water would be indirectly improved by the project; the primary surface water body that would benefit from project implementation is the Coachella Valley Stormwater Channel.
- DACs: the entire Torres Martinez Desert Cahuilla Reservation area is designated as an economically disadvantaged community per local mapping (see Attachment 7 for additional details).
- Monitoring Location: No monitoring location is necessary as this is a DAC non-construction project.



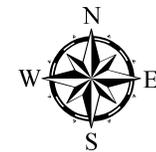
Project Area for the Torres Martinez Septic to Sewer Conversion Project

**Figure 2-15:  
Torres Martinez Septic  
to Sewer Conversion Project**

-  Coachella and All American Canals
-  Water Bodies
-  Groundwater Basins
-  5 Torres Martinez Septic to Sewer Conversion Project
-  Disadvantaged Communities (DACs)

No monitoring location is necessary as this is a design project.

**Source: 2013 U.S. Census Data - American Community Survey Median Household Income (MHI), by block group, census tract, and DAC Data from 2013 Coachella Valley DAC Outreach Program. DACs are defined as having MHI of 80% of Statewide MHI. For 2013, DACs were households earning \$48,875 or less per year.**



Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



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## Project Description

The *Torres-Martinez Septic to Sewer Conversion Project* is a planning and design project that would serve a Tribal community that is 100% economically disadvantaged (see Attachment 7). The project provides engineering, design, and environmental services for a project that would ultimately connect Tribal residents to municipal sewer services provided by CVWD. This project qualifies as a “planning DAC” project per the PSP as it would provide direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation.

The site that would be served by the project is known as the Avenue 64 Housing Subdivision, which is located within Tribal reservation land owned by the Torres-Martinez DCI. The Tribal population living within the reservation boundaries is approximately 400 and is spread out throughout the reservation, with higher population density (approximately 33 single occupancy homes) in the Avenue 64 Housing Subdivision.

The Coachella Valley Region’s Proposition 84-Round 2 Implementation Grant, which was awarded grant funding from DWR, provided funding to the Avenue 64 Housing Subdivision to fund planning and design work for a project that would connect the Tribe to the CVWD municipal water system. The previously-funded project is inter-related to the currently proposed project in that the Tribe has both failing onsite water and wastewater systems and has conducted substantial analyses and work to determine that a connection to the municipal system would be the most feasible long-term solution for resolving onsite issues associated with providing adequate water and wastewater services to the Avenue 64 Housing Subdivision.

Preliminary reports specific to the wastewater system for the Avenue 64 Housing Subdivision have been completed, including a Preliminary Engineering Report that was completed by IHS in 2012. The 2012 PER noted that many of the septic systems in the Avenue 64 Housing Subdivision are failing, and that there is evidence of surfacing sewage and hydraulic overloading in and outside of homes, which presents acute public health and safety concerns. As a result of the size and location of the housing subdivision, the report noted that connecting to CVWD’s nearby sewer system would address all of the existing health and safety needs of the Tribe associated with onsite wastewater services. The proposed sewer main would connect to an existing CVWD-owned 33-inch sewer main located at the intersection of Avenue 62 and Monroe Street. The new sewer main would be built within the Monroe Street right-of-way between Avenue 64 and Avenue 62 and would connect to an internal sewer collection system constructed with IHS and Environmental Protection Agency funds. The PER indicated that the new sewer main would be a gravity sewer main and would require construction of approximately 5,000 feet of 10” vitrified clay pipe (VCP) from the existing 33” VCP sewer main to the intersection of Avenue 64 and Monroe. The PER also noted that the new sewer main would need to include manholes located at least every 500 feet, and would also require manholes at the intersections with sewer laterals. After construction of the new sewer main, the existing septic systems would need to be properly abandoned per requirements of Riverside County.

As noted previously, a project is currently underway and is being partially funded with Proposition 84-Round 2 funding that would connect the Avenue 64 Subdivision to CVWD’s municipal water system. The water system pipelines would be co-located with the proposed sewer main and therefore have similar environmental resources issues and concerns. The ongoing project related to the water main connection is currently stalled due to cultural resources concerns that have been raised by the State Historic Preservation Office (SHPO). Therefore, since the time that the 2012 PER was completed, cultural issues have arisen that were not known at the time that the PER was completed. As a result of this issue, additional cultural resources studies need to be completed to meet SHPO’s concerns. The additional cultural resources studies may impact the originally proposed design and pipeline alignment described in the PER to avoid sensitive cultural resources. The primary outcome of the *Torres-Martinez Septic to Sewer Conversion Project* will be to complete a directed cultural resources report, a biological resources report, environmental documentation via an Initial Study-Mitigated Negative Declaration/Environmental Assessment (IS-MND/EA), final design work, and preparation of a PER per standards of the USDA. Completing the aforementioned engineering, design, and environmental work will allow the Tribe to overcome cultural resources concerns and complete work that is necessary to move the project forward toward construction. Because this project is a planning DAC project, it would not result in direct physical benefits. However, it is anticipated that water quality and water supply benefits would accrue once the project is constructed.



## Project Physical Benefits

This project will provide direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation. As per information on Page 20 of the PSP, benefits quantification and completion of Table 5 is not required. A qualitative description of the proposed work and anticipated benefits of the project upon completion of construction has been provided. It is anticipated that once the project is constructed, it will provide quantifiable water quality and water supply benefits; those benefits are described below.

### Water Quality

The 2012 PER completed by IHS for the Avenue 64 Housing Subdivision notes that many of the septic systems in the subdivision are failing, causing sewage to surface in the backyard area of homes. Surfacing sewage that ponds near residential areas can cause numerous diseases by direct contact and by fostering disease-carrying vectors such as mosquitoes. Furthermore, the PER reports that children and animals may run through mud standing over failed septic systems and bring sewage-contaminated dirt and dust into the home, further increasing the chance of exposure to pathogens.<sup>107</sup> Due to the project's location in the Eastern Coachella Valley, standing water that is present above-ground during wet weather events ultimately runs into the Coachella Valley Stormwater Channel (CVSC) and into the Salton Sea. The CVSC is currently listed on the 303(d) list of impaired water bodies for bacteria (*E. coli*); a Total Maximum Daily Load (TMDL) was implemented for this water body in 2012, which among other things calls for controlling, monitoring, and characterizing *E. coli* from Federal and Tribal lands by 2022.<sup>108</sup>

The project would provide a long-term, permanent solution to the existing onsite public health and offsite *E. coli* water quality issues associated with the ponding of untreated water from failing septic systems. The project would connect the Avenue 64 Housing Subdivision to CVWD's existing municipal sewer system, and therefore would reduce localized public health concerns and loading of *E. coli* into the CVSC, on a permanent, long-term basis.

### Recycled Water Supply

The Torres Martinez DCI has secured a Sanitation Agreement from CVWD that indicates CVWD's commitment to maintaining ownership of the proposed sewer system on a long-term basis.<sup>109</sup> Given the project site's location in the Coachella Valley, wastewater flows from the Avenue 64 Housing Subdivision would be sent to CVWD's Water Reclamation Plant (WRP) 4 that is located in Thermal. Although wastewater treated at WRP-4 is not currently reused as recycled water, CVWD intends to develop and implement tertiary treatment at this facility within the next five years.<sup>110</sup> Therefore, it is likely that by the time the Avenue 64 Sewer Extension is completed, wastewater flows from the Avenue 64 Housing Subdivision could be recycled and made available for reuse.

Wastewater flows from the Avenue 64 Subdivision are currently discharged to the ground via septic systems. Given the project's location in the East Valley and the location of onsite septic systems within the aquitard, the wastewater flows do not currently return to the basin. Rather, on the long-term they flow to the CVSC and out to the Salton Sea.<sup>111</sup> Connecting the Avenue 64 Subdivision to the municipal wastewater system will, therefore, make for reuse of water that is currently discharged to the CVSC and out of the Region where it is not reused.

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<sup>107</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

<sup>108</sup> Colorado River Regional Board. 2013. *Total Maximum Daily Load Progress Report: Coachella Valley Stormwater Channel Bacteria TMDL*. Available: [http://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1213/plan\\_assess/docs/fy1213/11112\\_r7\\_cvsc\\_bacteria.pdf](http://www.waterboards.ca.gov/about_us/performance_report_1213/plan_assess/docs/fy1213/11112_r7_cvsc_bacteria.pdf)

<sup>109</sup> Coachella Valley Water District. 2015. *Special Sanitation Agreement between the Coachella Valley Water District and the Torres Martinez Desert Cahuilla Indians*.

<sup>110</sup> Coachella Valley Water District. 2011. *Coachella Valley Water District 2010 Urban Water Management Plan*.

<sup>111</sup> Coachella Valley Water District. 2012. *2010 Coachella Valley Water Management Plan Update – Final Report*.



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## Technical Analysis of Physical Benefits Claimed

### Project Need

Onsite water and wastewater issues for the Avenue 64 Housing Subdivision have been extensively documented by Indian Health Services. As a result of discussions with IHS, CVWD, and Torres-Martinez DCI, IHS prepared a 2012 PER that examined issues with failing onsite septic systems.<sup>112</sup>

There are thirty-three single occupancy homes in the Avenue 64 Housing Subdivision, with an estimated population of 100 people, and that there are additional facilities including a church, a park, a ball field, and a cemetery near the housing units.<sup>113</sup> All of the homes and non-residential units in the subdivision dispose of wastewater via onsite septic systems, each of which is comprised of a 1,000-gallon or 1,500-gallon concrete septic tank, 4" PVC solid sewer pipe, and 4" perforated pipe with septic rock serving as the drainfield.<sup>114</sup>

The subdivision was constructed in the 1980's and currently, many of the septic systems are failing. IHS reviewed soil testing data that was taken over a 20-year period. Through this analysis, IHS found that many of the soils cannot feasibly accept a septic system and those that can would require a very large drainfield (400-500 linear feet). Given the soil restrictions and large drainfield requirements, the 2012 PER concluded that there is not sufficient room within existing property lines to support new septic systems and meet required drainfield requirements. As such, the 2012 PER recommended that the site be connected to a nearby CVWD municipal sewer main to resolve issues with onsite failing septic systems.<sup>115</sup>

The 2012 PER also outlined the need for the project, citing health, sanitation, and security as the primary drivers for needing to connect the subdivision to CVWD's municipal sewer system. With regards to health, sanitation, and security, IHS reported that there has been substantial documentation of septic system failures and that these failures present serious health and sanitation issues as currently the community is consistently exposed to untreated wastewater. Furthermore, the subdivision also has substantially documented water supply issues as the onsite water supply system experiences frequent outages.<sup>116</sup> The issue of sanitation becomes more immediate with regards to water supply outages; IHS has evidence that during water supply outages, loss of water pressure can cause groundwater or standing sewage around water lines to infiltrate into the water distribution lines. When the water system is returned to service the contaminated water can then enter the water system and be consumed by residents.<sup>117</sup> The compounding issue of water and wastewater issues within the subdivision present security issues to the local community, and need to be resolved on a long-term, permanent basis.

Issues associated with standing wastewater from failing septic systems also presents larger water quality issues for the Region. CVWD's Water Management Plan documents the hydrologic conditions of the eastern Coachella Valley, noting that due to the hard, clay aquitard east of La Quinta, surface water flows in the East Valley ultimately flow to the CVSC and to the Salton Sea<sup>118</sup>. A schematic that helps demonstrate this effect is provided on the following page, showing the location of the Avenue 64 Housing Subdivision with respect to the aquitard and other communities in the Region.

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<sup>112</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

<sup>113</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

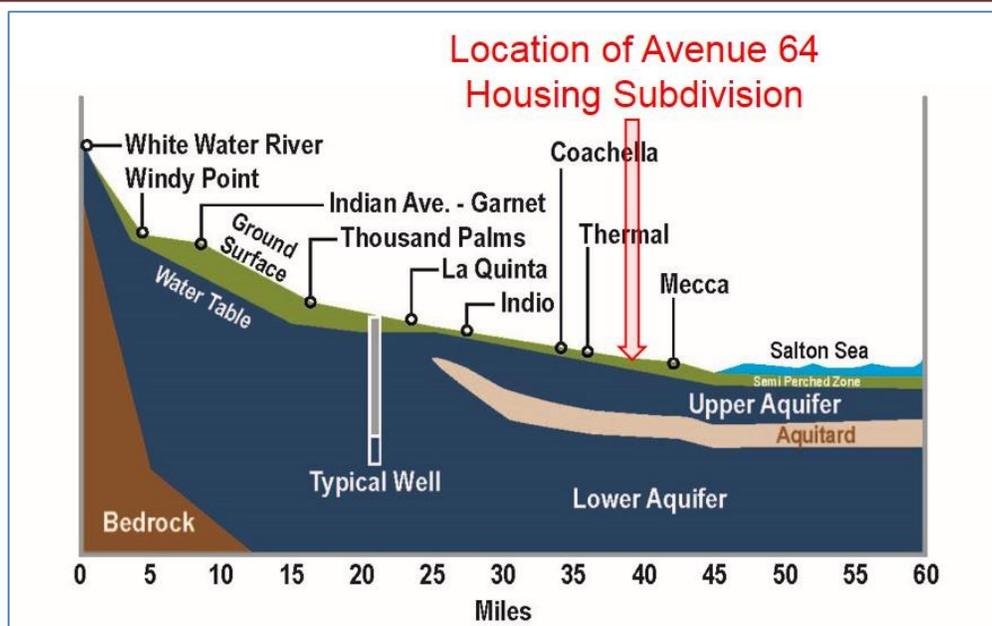
<sup>114</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

<sup>115</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

<sup>116</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

<sup>117</sup> Indian Health Services. 2012. *Preliminary Engineering Report for the Torres-Martinez Desert Cahuilla: CVWD Sewer Main Extension to Avenue 64 Housing Subdivision*

<sup>118</sup> Coachella Valley Water District. 2015. *Special Sanitation Agreement between the Coachella Valley Water District and the Torres Martinez Desert Cahuilla Indians.*



Source: Coachella Valley Water District. 2002. Coachella Valley Water Management Plan

Given the location of the Avenue 64 Housing Subdivision and hydrologic conditions in the area, it is reasonable to assume that during wet weather events standing water (including overflows from septic systems) that are onsite at the Avenue 64 Housing Subdivision are conveyed to the CVSC and ultimately to the Salton Sea.

A TMDL for bacteria has been in effect for the CVSC since 2012; the TMDL notes that primary sources of bacteria loading to the CVSC are: wastewater treatment plants and water reclamation plants, fish farms, Cal-Trans, City of Coachella, agricultural runoff, federal lands, Tribal land, and septic systems.<sup>119</sup> While wastewater treatment plants and water reclamation plants provide a source of bacteria to the CVSC, these plants include disinfection treatment systems that substantially reduce the concentration of bacteria compared to untreated effluent from septic systems. By removing onsite septic systems and diverting wastewater to a Water Reclamation Plant, the project will reduce the concentration of constituents from entering the CVSC and will, therefore, assist the Region in meeting the terms of the TMDL.

Wastewater flows from the Avenue 64 Subdivision are currently discharged to the ground via septic systems. As explained above, considering the project's location, flows that are discharged into the semi perched zone ultimately flow to the CVSC and to the Salton Sea, which is located outside of the Coachella Valley IRWM Region. Therefore, wastewater flows from the subdivision are essentially lost (discharged out of the Region) under existing conditions. With implementation of the project, flows would be captured in CVWD's sewer system and sent to CVWD's WRP-4. CVWD has near-term plans to upgrade WRP-4 to add tertiary treatment necessary to produce recycled water so that wastewater at the plant can be beneficially reused.<sup>120</sup> By capturing wastewater flows, the project will provide additional water supplies to WRP-4 and therefore will contribute to future reuse in the Region.

<sup>119</sup> Colorado River Regional Board. 2013. *Total Maximum Daily Load Progress Report: Coachella Valley Stormwater Channel Bacteria TMDL*. Available: [http://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1213/plan\\_assess/docs/fy1213/11112\\_r7\\_cvsc\\_bacteria.pdf](http://www.waterboards.ca.gov/about_us/performance_report_1213/plan_assess/docs/fy1213/11112_r7_cvsc_bacteria.pdf)

<sup>120</sup> Coachella Valley Water District. 2011. *Coachella Valley Water District 2010 Urban Water Management Plan*.



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## Direct Water-Related Benefit to a DAC

As described in *Attachment 7 Disadvantaged Communities*, an analysis was conducted to determine how much of the project area is classified as a DAC. 100% of the area that would be served by the project is DAC as the entire area included within the Avenue 64 Housing Subdivision is DAC.

This project will directly address a major water-related DAC need explained in the *2014 Coachella Valley IRWM Plan*: failing onsite septic systems. Extensive outreach and research conducted for the DAC Outreach Program found that septic systems are used heavily by DACs, especially in communities in the eastern Coachella Valley that are not connected to municipal sewer systems. In these DAC areas, which also have hard, clay soils, septic systems are often undersized and overused, resulting in frequent system failures and surfacing wastewater. The issue of surfacing wastewater has been thoroughly documented in the *2014 Coachella Valley IRWM Plan*, and is known to cause public health, aesthetic, water quality, and other issues in DACs. The project proposes a permanent, long-term solution to the issue of failing septic systems by connecting the Avenue 64 Housing Subdivision to CVWD's municipal sewer system and transferring ownership of the sewer main to CVWD. Replacing the onsite septic systems with a connection to the municipal sewer system will remove water quality issues associated with failing septic systems on a long-term basis and will also contribute to overall regional long-term water supply (recycled water).

This project will also address an issue that is important in the Coachella Valley and throughout the State of California: access to clean drinking water. The Human Right to Water Policy that is in effect in California calls for access to safe, affordable water for drinking, bathing, sanitation, and cooking for all residents.<sup>121</sup> The PER completed for the Avenue 64 Housing Subdivision found that effluent from failing septic systems poses risks to the local drinking water system and to public health. Given that the subdivision experiences frequent power outages and subsequent pressure losses to water lines, it is possible that effluent from overflowing septic systems can seep into the water lines, then into tap water once the water system is restored. Therefore, the failing septic systems can potentially prohibit access to safe drinking water to residents if septic system effluent enters water lines. The project will address the issue of clean and reliable drinking water for the residents of the Avenue 64 Housing Subdivision on a long-term basis by providing a connection to CVWD's municipal sewer system and eliminating the existing onsite septic systems. Removing the failing septic systems will effectively remove septic system effluent from the site so that the effluent can no longer infiltrate into water lines and pose risks to drinking water quality.

## Project Performance Monitoring Plan

This project is providing direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation. As per information on Page 21 of the PSP a Project Performance Monitoring Plan (Table 6) is not required.

## Cost Effectiveness Analysis

This project is providing direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation. As per information on Page 21 of the PSP a Cost Effectiveness Analysis (Table 7) is not required.

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<sup>121</sup> [http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201120120AB685](http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB685)



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## Project 6: Shady Lane Water and Sewer Connection Project

**Local Project Sponsor: Coachella Water Authority**

**Partners: Shady Lane Mobilehome Park, Inc.**

### Brief Description

This project will provide planning, environmental, design, and engineering work to connect the residents of a disadvantaged community to CWA water and sewer services.

### Project Map

**Figure 2-16** shows the project area for the *Shady Lane Water and Sewer Connection Project*, the service areas of the project sponsor (Coachella Water Authority), the project facilities, the project's relation to groundwater basins and surface water, DACs, and proposed monitoring locations. Please note the following specifics for information provided in **Figure 2-16**:

- **Project Location:** The project is located in unincorporated Riverside County, south of the City of Coachella city limits at the Shady Lane Mobile Home Park. Note that while the Shady Lane site is located outside of the City of Coachella, it is located within the Sphere of Influence of CWA.
- **Project Facilities:** No facilities will be constructed as a part of this project as this is as this is a DAC project that involves engineering, design, and environmental documentation. Ultimately this project provides design work for a sewer and water line that would connect an economically disadvantaged community (Shady Lane Mobilehome Park) to CWA's water and sewer system.
- **Groundwater Basins and Surface Water:** Project will primarily affect groundwater located within the Indio Sub-basin (Bulletin 118 Basin Number 7-21.02). Surface water would be indirectly improved by the project; the primary surface water body that would benefit from project implementation is the Coachella Valley Stormwater Channel.
- **DACs:** the entire Shady Lane Mobile Home Park is designated as an economically disadvantaged community per local mapping (see Attachment 7 for additional details).
- **Monitoring Location:** No monitoring location is needed as this is a DAC non-construction project.



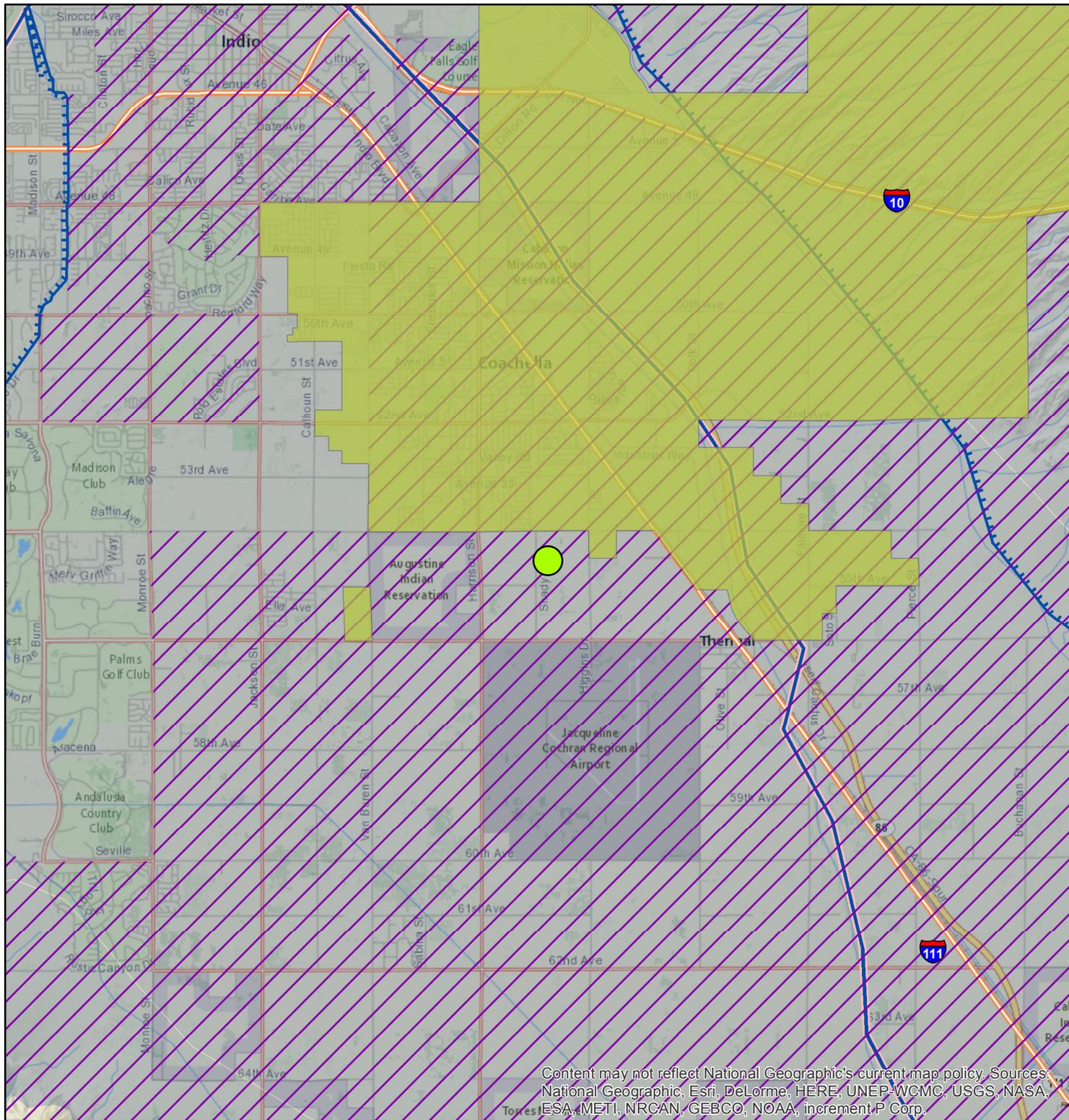
**Example of a Mobile Home Park Unit within the Shady Lane Mobile Home Park**

**Figure 2-16:  
Shady Lane Water and  
Sewer Connection Project**

-  Coachella and All American
-  Coachella Valley Storm Water Channel
-  Highways
-  Groundwater Basins
-  City of Coachella
-  6 Shady Lane Water and Sewer Connection Project
-  Disadvantaged Communities (DACs)

No monitoring location needed as this is a design project. The entire map scope is underlain by groundwater basins, resulting in the uniform darkening of the baselayer.

**Source: 2013 U.S. Census Data - American Community Survey Median Household Income (MHI), by block group, census tract, and DAC Data from 2013 Coachella Valley DAC Outreach Program. DACs are defined as having MHI of 80% of Statewide MHI. For 2013, DACs were households earning \$48,875 or less per year.**



Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



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## Project Description

The *Shady Lane Water and Sewer Connection Project* is a planning and design project that would serve a mobile home park that is 100% economically disadvantaged (see Attachment 7 for more information). The project provides engineering, design, and environmental services for a project that would connect the Shady Lane site to municipal water and sewer services provided by CWA.

The Shady Lane site, also referred to as the Garcia Mobile Home Park or Rancho Garcia, is located in unincorporated Riverside County. The project site lies south of the city limit of the City of Coachella, but within CWA's sphere of influence (SOI). CWA is a joint powers authority that was originally formed by the City of Coachella and the Coachella Redevelopment Agency to deliver water to the City of Coachella. CWA has statutory authority over water supply and wastewater, and has a SOI that extends beyond the limits of the City of Coachella. The project area is a mobile home park community with 86 lots with an area of about 8.8 acres and is located south of Avenue 54 and east of Shady Lane.

On September 3, 2012, there was a lawsuit filed against the owners of the mobile home park for multiple causes of action concerning operation of the park, including issues with onsite sewer and water services. This case was settled in 2015, the result of which is that ownership of the park will be transferred to the Shady Lane Mobilehome Park, Inc., a non-profit organization dedicated to ensuring that the residents of this community can remain in their homes at an affordable price. Shady Lane Mobilehome Park, Inc. has been working with applicable agencies in the Coachella Valley, such as the County of Riverside, to secure proper permitting for the park, and specifically, to connect the park to CWA's water and wastewater system. In 2012 CWA completed a Technical Memorandum (TM) for the *Shady Lane Sewer Improvement Project*. The purpose of the TM was to evaluate a potential sewer system design that would connect the park to the municipal sewer system and provide a preliminary opinion on construction costs.

The project site is currently served wastewater services by onsite septic tanks. In 2014, a local Consulting Sanitary Engineer completed a report to evaluate the existing facilities at the Shady Lane site. This evaluation found that most of the wastewater facilities were constructed prior to 1973, consisting of single compartment septic tanks that serve two or more mobile home units. The report also noted that many residents report septic tanks overflows, especially during rain events, and that the surfacing wastewater poses an imminent danger to public health of local residents. The project site is currently served water services by a single onsite groundwater well. Water quality of the well has been tested, revealing that water quality exceeds maximum contaminant levels (MCLs) for both arsenic and hexavalent chromium. The water quality issues associated with the onsite water system are also considered a public health issue.

Preliminary reports and findings from CWA, consultants, and other local experts recommend connection of the mobile home park to CWA's municipal water and sewer system. This connection would allow local residents to receive proper wastewater and water services that would alleviate existing public health concerns on a long-term basis. Further, connecting the site to the municipal system would move Shady Lane Mobilehome Park, Inc. forward in securing a Conditional Use Permit for the mobile home park, which will allow the existing residents to remain in their homes in perpetuity.

The main goal of the project is to complete design, engineering, and environmental reports that detail efforts necessary to connect the Shady Lane site to CWA's municipal water and sewer system. The design work will include completion of 100% design documents as well as coordination with CWA to ensure that design plans meet CWA's standard specifications. The engineering work will include completion of a Preliminary Engineering Report that meets USDA standard requirements. The environmental work will include cultural and biological resources reports, and completion of an Initial Study-Mitigated Negative Declaration/Environmental Assessment meeting both CEQA and NEPA standards. Therefore, the main outcome of this project will be to finalize planning work with assistance from Proposition 84 funding, which would make the project eligible for USDA Rural Assistance funding to complete construction activities. This model of leveraging IRWM funding to acquire additional funding to complete local DAC projects has been successful in the past as IRWM funding from the Round 2 Proposition 84 solicitation was used in a similar manner for a mobile home park in Mecca. Because this project is a planning DAC project, it would not result in direct physical benefits. However, it is anticipated that water quality and water supply benefits would accrue once the project is constructed.



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## Project Physical Benefits

This project is providing direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation. As per information on Page 20 of the PSP, benefits quantification (Table 5) is not required. A qualitative description of the proposed work and anticipated benefits of the project upon completion of construction has been provided. It is anticipated that once the project is constructed, it will provide quantifiable water quality and water supply benefits; those benefits are described below.

### Water Quality

The evaluation of existing facilities at the Shady Lane site completed by a local sanitary engineer notes that many residents have reported onsite septic system failures and subsequent surfacing of untreated wastewater, which is not unexpected given the age, size, and location of the facilities.<sup>122</sup> Surfacing and ponding sewage can cause numerous diseases by direct contact and by fostering disease-carrying vectors such as mosquitoes. Furthermore, due to the project's location in the Eastern Coachella Valley, standing water that is present above-ground during wet weather events ultimately runs into the Coachella Valley Stormwater Channel (CVSC) and into the Salton Sea. The CVSC is currently listed on the 303(d) list of impaired water bodies for bacteria (*E. coli*); a Total Maximum Daily Load was implemented for this water body in 2012, which among other things calls for controlling, monitoring, and characterizing *E. coli* from wastewater treatment plants, Caltrans, the City of Coachella, and Federal and Tribal lands by 2022.<sup>123</sup>

The project would provide a long-term, permanent solution to the existing onsite public health and offsite *E. coli* water quality issues associated with the ponding of untreated water from failing septic systems. The project would ultimately connect the Shady Lane site to CWA's existing municipal sewer system, and therefore would reduce localized public health concerns and loading of *E. coli* into the CVSC, on a permanent, long-term basis.

### Water Supply

The evaluation of existing facilities at the Shady Lane site completed by a local sanitary engineer also notes that residents are provided water by one local groundwater well (CA Water System Number CA 3301990). This well has been recently found to exceed drinking water standards for arsenic and the new drinking water MCL for Chrom 6 of 10 µg/L; information from the UCI Law School reports Chrom 6 levels of 19 µg/L, well above the regulated standard.<sup>124</sup> Given the levels of arsenic and Chrom 6 that are naturally occurring throughout the Coachella Valley, the water is not considered safe to drink. Because the residents living within this mobile home park are economically disadvantaged, they must either choose between purchasing expensive bottled water or drinking unsafe water from the onsite well.

The project would provide a long-term, permanent solution to water supply issues currently faced by residents of the Shady Lane Mobile Home Park by providing a connection to CWA's municipal water system that has a history of providing clean and reliable water to its customers.

## Technical Analysis of Physical Benefits Claimed

### Project Need

The Shady Lane Mobile Home Park is located in unincorporated Riverside County, immediately south of the City of Coachella but within the sphere of influence of CWA. The project area is a mobile home park community with 86 lots with an area of about 8.8 acres and is located south of Avenue 54 and east of Shady Lane near the address of 54596 Shady Lane, Coachella, CA. This mobile home park, is considered an economically disadvantaged community (DAC) per requirements established by DWR. Ownership of the property is currently being transferred to the Shady Lane Mobile Home Park, Inc., which is in the process

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<sup>122</sup> Dickson, Bonneau. 2014. *Report on the Evaluation of Wastewater Facilities at Rancho Garcia*.

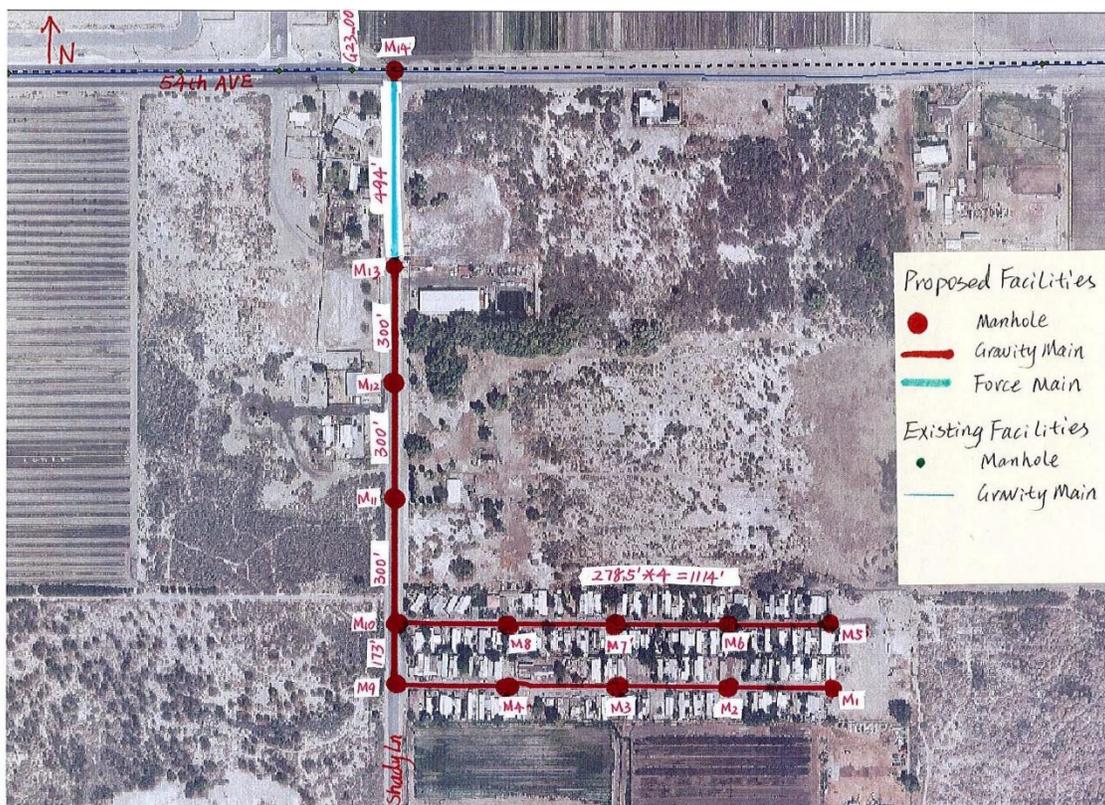
<sup>123</sup> Colorado River Regional Board. 2013. *Total Maximum Daily Load Progress Report: Coachella Valley Stormwater Channel Bacteria TMDL*. Available: [http://www.waterboards.ca.gov/about\\_us/performance\\_report\\_1213/plan\\_assess/docs/fy1213/11112\\_r7\\_cvsc\\_bacteria.pdf](http://www.waterboards.ca.gov/about_us/performance_report_1213/plan_assess/docs/fy1213/11112_r7_cvsc_bacteria.pdf)

<sup>124</sup> Pers comm. Anna Rea, J.D. Candidate 2016, UC Irvine Law School.



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 be retrofitted to resolve issues associated with water and wastewater conditions. Specifically, Shady Lane Mobile Home Park, Inc. must resolve septic system failure issues and find a way to provide clean, standards-compliant drinking water to residents before a CUP can be secured.<sup>125</sup>

An analysis of the Shady Lane site by a local engineer recommended connection to CWA's municipal wastewater system to address issues associated with undersized and failing septic systems.<sup>126</sup> This alternative was recommended, because the site is within close proximity to CWA's existing sewer mains, and municipal connection is preferred by residents as it would reduce onsite operations and maintenance costs and would resolve onsite wastewater issues on a long-term basis. In 2012, CWA completed a TM for the *Shady Lane Sewer Improvement Project*. The purpose of the TM was to evaluate a potential sewer system design that would connect the park to the municipal sewer system and provide a preliminary opinion on construction costs.<sup>127</sup> The TM proposed that new sewer lines from the Shady Lane site be connected to CWA's existing 12-inch gravity sewer main along Avenue 54. The proposed sewer improvements would include installation of approximately 3,300 linear feet of new 8-inch diameter gravity sewer, approximately 500 linear feet of new 4-inch diameter force main, 14 manholes, and 86 lateral service connections with a diameter of 4 inches. This sewer would flow by gravity westerly in the community towards Shady Lane, and then northerly to south of Avenue 54. A new manhole in Shady Lane immediately south of Avenue 54 would serve as a wet well for sewer pumps to lift the flow through a short force main to a new manhole installed in the existing sewer main in Avenue 54.<sup>128</sup> A draft schematic of the proposed sewer facilities is provided below.



Coachella Water Authority. 2012. *Draft Technical Memorandum – Shady Lane Sewer Improvement*.

<sup>125</sup> Pers comm. Anna Rea, J.D. Candidate 2016, UC Irvine Law School.

<sup>126</sup> Dickson, Bonneau. 2014. *Report on the Evaluation of Wastewater Facilities at Rancho Garcia*.

<sup>127</sup> Coachella Water Authority. 2012. *Draft Technical Memorandum – Shady Lane Sewer Improvement*.

<sup>128</sup> Coachella Water Authority. 2012. *Draft Technical Memorandum – Shady Lane Sewer Improvement*.



In addition to onsite wastewater (septic system) issues, the residents of the Shady Lane site are also experiencing issues with drinking water quality. Currently, water is provided by a single private groundwater well; water from this well does not currently meet drinking water standards for arsenic or Chrom 6, and therefore presents immediate health threats to residents of the site. In 2015, CWA completed a preliminary cost estimate to determine potential costs to connect the site to CWA's municipal water system, which is also located along Avenue 54. This assessment also recommended that design and environmental evaluation be completed before moving forward with project construction.

The project, once implemented, would provide long-term water quality and water supply benefits and would directly address critical water quality and water supply issues of local DACs. In addition, the project will also provide social benefits associated with affordable housing. As indicated previously, proper permitting via a CUP is in process for the site; however, one of the conditions of the CUP is that the residents must be served adequate water and wastewater services. It is the ultimate goal of the Shady Lane Mobile Home Park Inc. to complete activities necessary to allow the current residents to remain in their homes at an affordable cost. 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 Shady Lane Mobile Home Park, but is a pervasive issue in the eastern Coachella Valley.<sup>129</sup> Therefore, in addition to water-related benefits, implementation of this project will also address pressing DAC needs in the Coachella Valley associated with affordable housing.

### **Direct Water-Related Benefit to a DAC**

As described in *Attachment 7 Disadvantaged Communities*, an analysis was conducted to determine how much of the project area is classified as a DAC. 100% of the area that would be served by the project is DAC as the entire area included within the Shady Lane Mobile Home Park is DAC.

This project will directly address two major water-related DAC needs explained in the *2014 Coachella Valley IRWM Plan*: 1) failing onsite septic systems, and 2) access to safe drinking water. Extensive outreach and research conducted for the DAC Outreach Program found that septic systems are used heavily by DACs, especially in communities in the eastern Coachella Valley that do not have access to municipal sewer systems. In these DAC areas, which also have hard, clay soils, septic systems are often undersized and overused, resulting in frequent system failures and surfacing wastewater. The issue of surfacing wastewater has been thoroughly documented in the *2014 Coachella Valley IRWM Plan*, and is known to cause public health, aesthetic, and other issues in DACs. The project proposes a permanent, long-term solution to the issue of failing septic systems by connecting the Shady Lane Mobile Home Park to CWA's municipal sewer system. Replacing the onsite septic systems with a connection to the municipal sewer system will remove water quality issues associated with failing septic systems on a long-term basis and will also contribute to overall regional water quality issues associated with the CVSC on a long-term basis.

This project will address an issue that is important in the Coachella Valley and throughout the State of California: access to clean drinking water. The Human Right to Water Policy that is in effect in California calls for access to safe, affordable water for drinking, bathing, sanitation, and cooking for all residents.<sup>130</sup> During outreach efforts for the DAC Outreach Program many residents expressed concern with the safety of their onsite water sources (largely private wells), but also noted that they oftentimes still drank the water as they had no other reasonable alternatives.<sup>131</sup> The project will address the issue of clean and reliable drinking water for the residents of the Shady Lane Mobile Home Park on a long-term basis by providing a connection to CWA's municipal water system. This connection will ensure that DACs in the community receive access to clean drinking water. Furthermore, CWA and Shady Lane Mobile Home Park, Inc. are

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<sup>129</sup> Benoit, John. 2013. *Amendment to the Housing Review Committee Advisory Council for the Unincorporated Area of the Coachella Valley*. Available: [http://rivcocob.org/proceeds/2013/p2013\\_06\\_04\\_files/03-59001.pdf](http://rivcocob.org/proceeds/2013/p2013_06_04_files/03-59001.pdf)

<sup>130</sup> [http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201120120AB685](http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB685)

<sup>131</sup> Coachella Valley Regional Water Management Group. 2014. *Coachella Valley Disadvantaged Community Outreach Demonstration Project: Final Report*.



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both committed to maintaining the affordability of water for local residents, and will implement measures as feasible to keep water costs down once municipal connections are established.

### **Project Performance Monitoring Plan**

This project is providing direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation. As per information on Page 21 of the PSP, a Project Performance Monitoring Plan (Table 6) is not required.

### **Cost Effectiveness Analysis**

This project is providing direct water-related benefits to a project area entirely comprised of a DAC, is in the planning/design phase, and does not intend to complete construction with this solicitation. As per information on Page 21 of the PSP, a Cost Effectiveness Analysis (Table 7) is not required.



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