APPENDIX I

Water Supply Assessment and
Water Supply Verification for the DSRT SURF Project

Prepared by

Terra Nova Planning & Research, Inc.
42635 Melanie Place, Suite 101
Palm Desert, CA 92211

March 4, 2019

Water Supply Assessment and Water Supply Verification

for the DSRT SURF Project

Prepared For:

Coachella Valley Water District (CVWD)
P.O. Box 1058
Coachella, California 92236

Prepared By:

Terra Nova Planning & Research, Inc.®
42635 Melanie Place, Suite #101
Palm Desert, California 92211

May 2019

Water Supply Assessment and Water Supply Verification for the DSRT SURF Project

List of Exhibits

List of Tables

List of Appendices

Executive Summary

This Water Supply Assessment and Water Supply Verification (WSA/WSV) has been prepared to assist the Coachella Valley Water District (CVWD) in satisfying the requirements of Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) for the DSRT SURF Specific Plan (Project) in the City of Palm Desert, Riverside County, California. The intent of SB 610 was to strengthen the process by which local agencies determine the adequacy, sufficiency and quality of current and future water supplies in order to meet current and future demands.

SB 610 amended California Water Code (CWC) sections 10910 and 10912 to create a direct relationship between water supply and land use. In general terms, prior to constructing developments, which meet certain development thresholds (residential units, square footage or acres of development), SB 610 requires a showing that there is an adequate 20-year water supply. The Coachella Valley Water District (CVWD) has determined that the Project meets with the intent of CWC Sections 10910 and 10912 and needs to prepare this WSA/WSV.

The Project site consists of approximately 17.69 acres of land in the City of Palm Desert and is under CVWD jurisdiction. At build-out, the Project will consist of hotel(s), residential villas, a surf lagoon, and surf center facilities which would generate a total water demand of approximately 165.21 acre-feet per year (AFY), or 9.34 acre-feet (AF) per acre. This represents approximately 0.14 percent of the projected total water demand of 114,600 AF for 2020, and 0.09 percent of the projected total water demand of 194,300 AF for 2040 as shown in CVWD's 2015 Urban Water Management Plan (UWMP). According to CVWD's UWMP, available water supplies are sufficient to meet the anticipated demand for 2020 through 2040 during normal, single dry, and multiple dry water years. Use of recycled water could provide source substitution for up to 8.54 AFY of the Project's potable water demand (groundwater) with a non-potable water supply. The Project could also implement a turf reduction program to replace up to 1,035,325 square feet of turf landscaping on two golf courses on the Desert Willow Golf Course property with desert landscaping, which would offset the Project's total water demand by approximately 106.75 AFY, for a net total water demand of approximately 58.46 AFY, which represents approximately 0.05 percent of the total projected water supply of 114,600 AF for 2020, and would represent 0.03 percent of the total projected water supply of 194,300 AF in 2040.

Based upon the supply/demand analyses conducted for this Project, CVWD finds that there are sufficient water supplies available to meet the water demands of the Project for the 20-year period between 2020 and 2040. In addition, CVWD has and will continue to invest resources in promoting water efficient practices throughout its service area, thereby reducing overall water demand. Also, through implementation of the landscape ordinance, turf reduction programs, and building code requirements, more stringent requirements will be placed on new development for all sectors, thereby further reducing future water demand.

This document will be reviewed every five years, or if CVWD determines that the planning assumptions of this document are no longer valid in accordance with SB 610, until the Project begins construction. The Project proponent shall notify CVWD when construction has begun. The review will ensure that the information included in this WSA/WSV remains accurate and no significant changes to either the Project or CVWD's water supply have occurred. If neither the Project proponent nor the lead agency contacts CVWD within five years of approval of this WSA/WSV, it will be assumed that the Project no longer requires the estimated water demand calculated and the WSA/WSV provided by this document will become invalid.

1. Introduction

1.1. Description of the Project

1.1.1. Location

The DSRT SURF Project (Project) site is located on approximately 17.69 acres of land on the west side of Desert Willow Drive within the Desert Willow Golf Course in the City of Palm Desert, Riverside County (Exhibits 1 through 4).

1.1.2. Project Description

1.1.2.1. Project Background

The Project site was originally part of the North Sphere Specific Plan, which was prepared for approximately 515.5 acres of undeveloped land in 1994. The land covered in the North Sphere Specific Plan was bounded by Frank Sinatra Drive and undeveloped land on the north, Cook Street and the Desert Falls Country Club on the east, Country Club Drive and Marriott Desert Springs Resort on the south, and Portola Avenue and the Palm Desert Greens on the west. The North Sphere Specific Plan divided the 515.5 acres land into fifteen (15) planning areas to allow mixed-use development. Currently, the majority of the planning areas are developed. Only three irregular shaped lots are currently undeveloped. The Project site is one of these lots located within the planning area 10 of the North Sphere Specific Plan.[1]

1.1.2.2. Project Description

The Project site consists of irregular shaped lots (Assessor's Parcel No. 620-420-023, 620-400-024 and 620-400-008). The Project site is partially developed and bounded by the Desert Willow Golf Course and a parking lot on the north; Desert Willow Golf Course and Desert Willow Drive on the east; Desert Willow Golf Course, the Westin Desert Willow Villas, and Willow Ridge Drive on the west; and Desert Willow Golf Course on the south (Exhibit 3).

The Project requires a Specific Plan that will guide the overall development of the Project, a Precise Plan for the lagoon and surf center, and a Tentative Parcel Map to subdivide the site into 5 parcels. The Specific Plan will set forth the planning principles, land use policies, development standards, and design guidelines for the proposed development and public improvements within the Specific Plan area. It will address maximum development densities (Table 1), which will be analyzed in this Water Supply Assessment (WSA). The land use, design, and development standards of the proposed surf lagoon will be regulated through a Precise Plan based on City's Municipal Code Section 25.72.030. A Precise Plan is similar to a Specific Plan, but further defines the goals and objectives of the Specific Plan to provide specific designs and plans that ultimately regulate the construction of the Project (Table 2).

The Project proposes the development of an approximately 5.5-acre surf lagoon and surf center facilities to include a restaurant, bar, retail and related facilities, up to 350 hotel rooms, and up to 88 residential villas (Exhibit 5). The Project will be implemented in two phases: Phase I includes development of the Surf Lagoon Planning Area (Planning Area 1), which will consist a surf lagoon and associated amenities on 11.85 acres. Phase II includes development of the Hotels and Villas Planning Area (Planning Area 2) which will result in the construction of the hotel(s) and villas on approximately 5.84 acres (Exhibit 5).

[1] North Sphere Specific Plan (1994).

Table 1 DSRT SURF Land Use and Development Standards	
Surf Lagoon Planning Area (11.85 acres)	**Max/Min Allowed**
Surf Lagoon	Max 6 acres
Surf Center Building	Max 35,000 SF; Max Height 50 feet
Café Juice Bar	1,750 SF
Restaurant (120 Occupants w/seats)	2,250 SF*
Bar (83 Occ w/seats, 180 Occs w/o seats)	1,250 SF**
Events (233 Occ w/seats, 500 Occs w/o seats)	2,750 SF***
Ancillary Restrooms/Changing Rooms/Locker Buildings	Max 1,500 SF
Ancillary Rental Building(s)	Max 1,500 SF
East Lagoon Café and Bar	Max 2,750 SF
Maintenance and Equipment Buildings	Max 12,500 SF
Landscaping/OS/Pool /Recreational Space	Minimum 20% Planning Area site coverage
Parking	Per SP parking development code
Hotel and Villas Planning Area (5.84 acres)	**Max/Min Allowed**
Hotels	Max 350 rooms, Max 200,000 SF; Max Height 50 feet
Hotel Spa	Max 12,500 SF
Villas	Max 88 Villas; 1 to 4 bedrooms
Villa Clubhouse	Max 3,125 SF
Maintenance and Equipment Buildings	Max 2,500 SF
Landscaping/OS/Pool /Recreational Space	Minimum 25% Planning Area site coverage
Parking	Per SP parking development code
* Restaurant = 2,000 SF built space plus 1,000 SF exterior non-built space, total of 3,000 SF of usable space. ** Bar = 1,000 SF built space plus 500 SF exterior non-built space, total of 1,500 SF of usable space. ***Events = 2,500 SF built space plus 1,000 SF exterior non-built space, total of 3,500 SF of usable space.	

Table 2 DSRT SURF Surf Lagoon Precise Plan Land Uses and Development Standards		
Land Use/Building	**SF**	**AC**
Surf Lagoon	239,580	5.50
Surf Center Building	31,500	0.88
Café Juice Bar	1,500	--
Restaurant (120 Occupants w/seats)	2,000	--
Bar (83 Occ w/seats, 180 Occs w/o seats)	1,000	--
Events (233 Occ w/seats, 500 Occs w/o seats)	2,500	--
Ancillary Restrooms/Changing Rooms/Locker Buildings	1,070	0.02
Ancillary Rental Building(s)	640	0.01

Table 2 DSRT SURF Surf Lagoon Precise Plan Land Uses and Development Standards		
Land Use/Building	**SF**	**AC**
East Lagoon Café and Bar	1,000	0.06
Maintenance and Equipment Buildings	1,600	0.21
Landscape/OS/Pools/Rec./Amenities	104,789	2.41
Roadways/Driveways/Parking (asphalt paved areas)	120,307	2.76
90 Surface Parking		
160 Underground Parking (not incl. in site total AC)		
TOTALS	**35,810**	**11.85**

The Project site is designated as Resort and Entertainment District on the City's General Plan Land Use Map, which allows bed and breakfast inns, recreational facilities, small retail, large retail, lodging, support retail, and commercial services along with specialized entertainment with a commercial floor area ratio (FAR) of up to 0.10, and multi-family residential land uses of up to 10 dwelling units per acre (DU/AC). The City's Zoning Map designates the site as Planned Residential (PR-5), allowing 5 units per acre.

Desert Willow Drive is a public street that provides access to the existing Desert Willow Clubhouse from Country Club Drive to the south. Desert Willow Drive terminates with a traffic circle at the clubhouse entrance, immediately northeast of the Project site. Public parking is provided adjacent to the clubhouse and is currently accessed via the Desert Willow traffic circle. The existing Desert Willow Golf Course parking lot will be reconfigured and a portion of the existing parking that is removed will be provided on the Project site. Two access driveways are proposed on Desert Willow Drive – one on the west side of the traffic circle, and one south of the traffic circle. An emergency access will also be provided at the southwestern portion of the Project, from the adjacent Westin project Willow Ridge roadway.

The Tentative Parcel Map will subdivide the site into 5 parcels, including the perimeter roadway, the surf lagoon and its associated buildings and facilities, the hotel(s) parcel, and multiple parcels for the residential villas.

This WSA is prepared because the proposed project meets the requirement of a "Project" under State Water Code Section 10912 - Senate Bill 610.

1.1.2.3. Off-Site Improvements

The Project will also include off-site improvements and activities, such as stormwater management, pool/lagoon discharge, golf course turf reduction, landscaping improvements, special events parking, and soil removal/storage. Golf course turf reduction is designed to offset the proposed Project's water demand which will be discussed further in this WSA.

RIVERSIDE COUNTY

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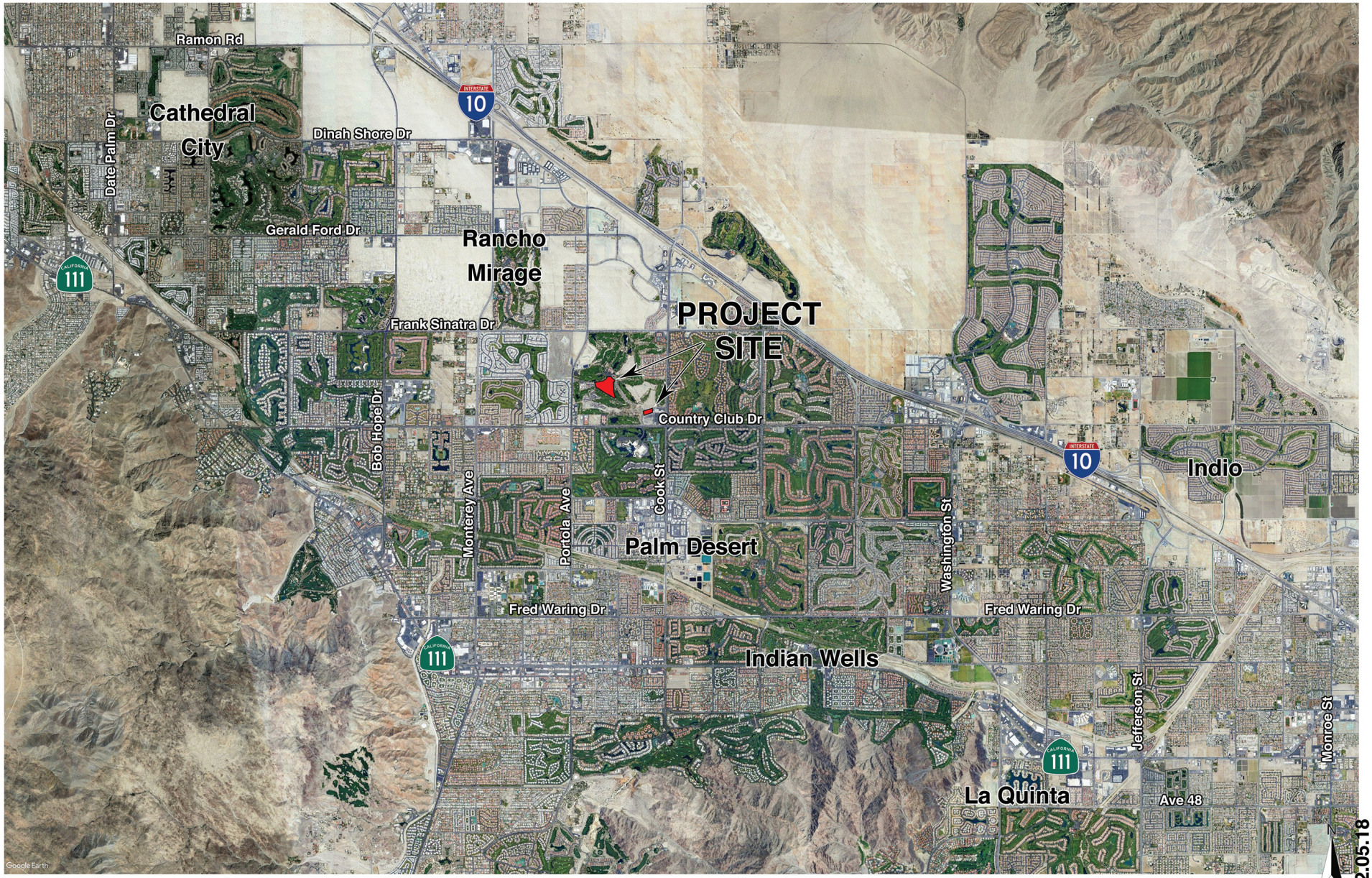
DSRT SURF
Specific Plan WSA and WSV
Regional Location Map
Palm Desert, California

Exhibit

1



Source: Google Earth, 2018

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DSRT SURF Specific Plan WSA and WSV
Vicinity Map
Palm Desert, California

DSRT SURF

Exhibit
2

Source: Google Earth, 2018

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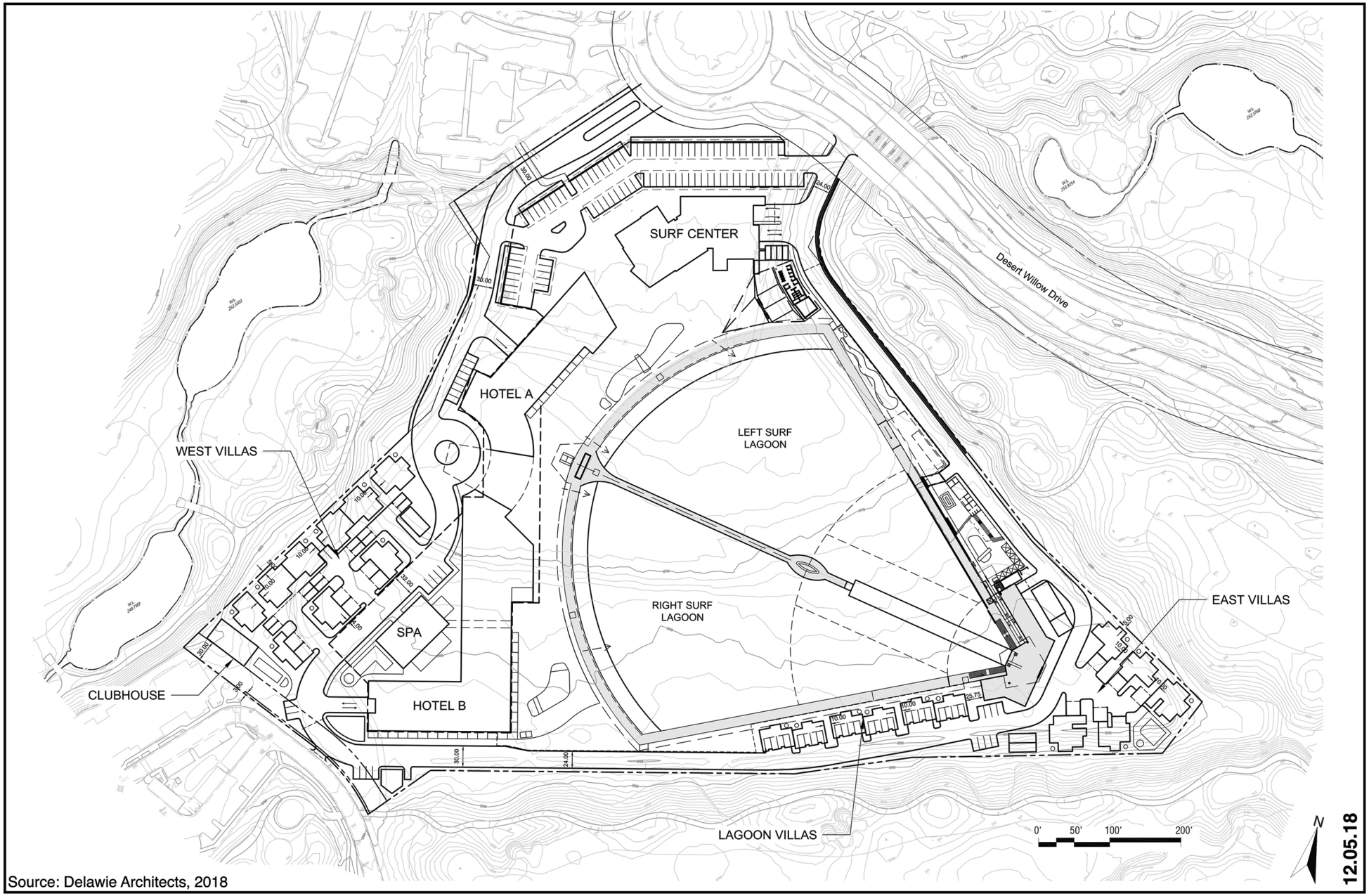
DSRT SURF Specific Plan WSA and WSV
Project Location Map
Palm Desert, California

DSRT SURF

Exhibit
3



Source: Delawie Architects, 2018

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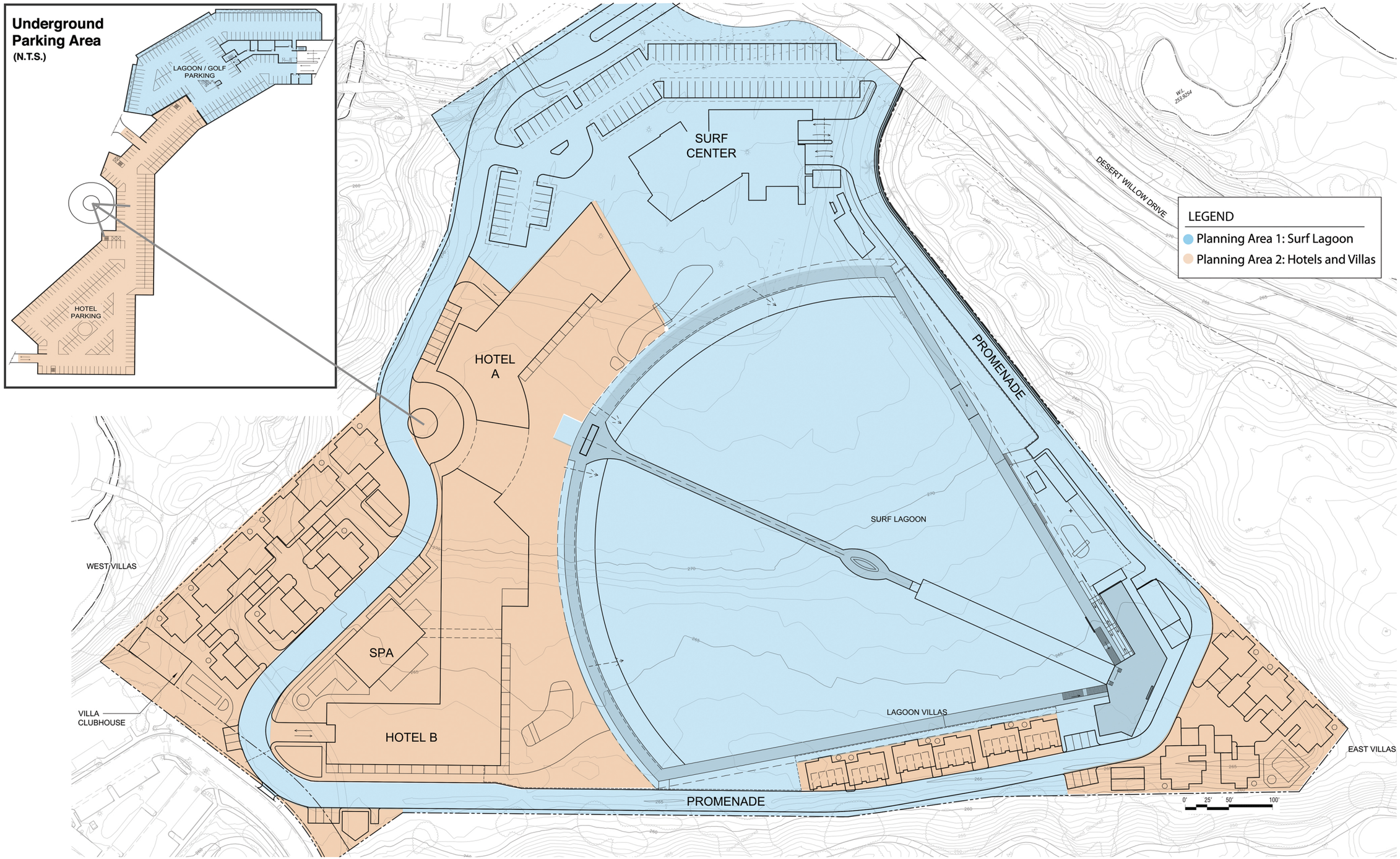
DSRT SURF Specific Plan WSA and WSV
Conceptual Site Plan
Palm Desert, California

Exhibit
4



Source: Delawie Architects, 2018

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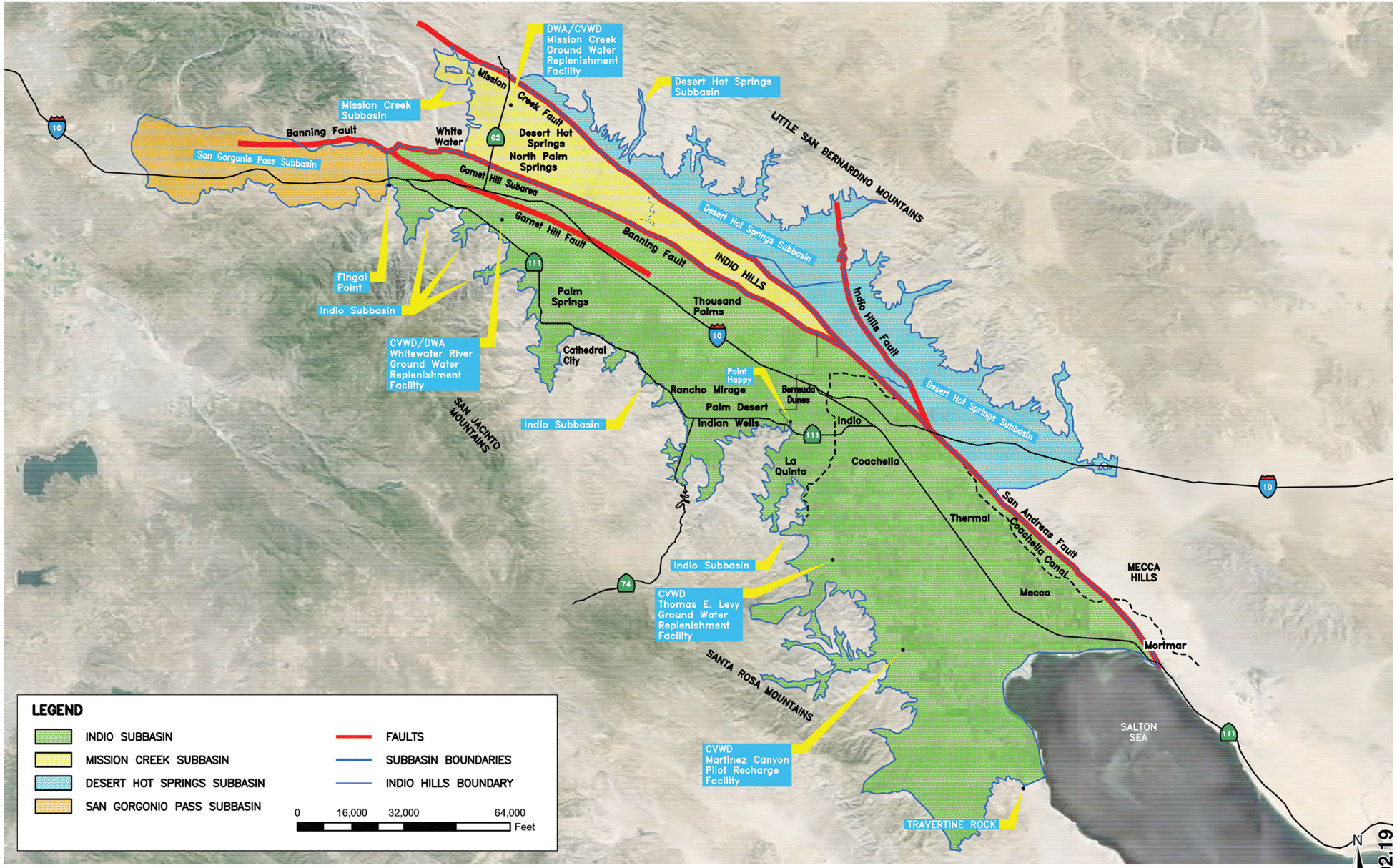
DSRT SURF Specific Plan WSA and WSV
Planning Area Site Plan
Palm Desert, California

Exhibit
5



Source: Indio Subbasin Annual Report for Water Year 2017-2018 (March 2019)

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DSRT SURF Specific Plan WSA and WSV
Coachella Valley Groundwater Subbasins
Palm Desert, California

DSRT SURF

Exhibit
6

1.2. Regulatory Requirements

1.2.1. Senate Bill 610

California Water Code (CWC) section 10910 et seq., commonly referred to as Senate Bill 610 (SB 610), requires the preparation of a WSA for certain new development projects.[2,3] As stated in SB 610, the purpose of a WSA is to determine whether the Public Water System's (PWS) "total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the Proposed Project, in addition to the PWS's existing and planned future uses, including agricultural and manufacturing uses."[4]

State Water Code Section 10912 defines a "Project" as any of the following:[5]

1. A proposed residential development of more than 500 dwelling units;
2. A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
3. A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
4. A proposed hotel or motel, or both, having more than 500 rooms;
5. A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
6. A mixed-use project that includes one or more of the projects specified in this subdivision; and
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

As the PWS for the project, the Coachella Valley Water District (CVWD) has determined that a WSA is necessary to comply with the CWC section 10910 et seq.

Effective January 1, 2017, SB 1262 amends CWC Section 10910, the WSA statute, to require that Sustainable Groundwater Management Act (SGMA)-related information be included in a WSA if a water supply for a proposed project includes groundwater from a basin that is not adjudicated and is designated medium or high-priority, as discussed earlier. This Project will use groundwater from the Whitewater River (Indio) Subbasin, which is designated medium priority by the California Department of Water Resources (DWR) and is not adjudicated.[6]

1.2.2. Senate Bill 221

Senate Bill 221 (SB 221) was enacted in 2001 and became effective as of January 1, 2002. SB 221 amends Section 11010 of the Business and Professional Code, and amends Section 65867.5 to add Section 66455.3 and 66473.7 to the Government Code. SB221 establishes the relationship between the WSA prepared for a project and project approval under the Subdivision Map Act. Pursuant to California Government Code Section 66473.7, the PWS must provide a written verification of sufficient water supply prior to the approval of a new subdivision.

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2 Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001.

3 See CWC §§ 10910(a), 10912.

4 See CWC § 10910(c)(3).

5 Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to assist water suppliers, cities, and counties in integrating water and land use planning, prepared by the California Department of Water Resources in 2003.

6 Sustainable Groundwater Management Act 2018 Basin Prioritization Report by California Department of Water Resources (January 2019).

SB 221 states that "a Water Supply Verification (WSV) is required prior to the approval of a tentative subdivision map, or a parcel map for which a tentative map was not required, or a development agreement for a subdivision of property of more than 500 dwelling units, except as specified, including the design of the subdivision or similar type of improvement." The proposed Project involves a Tentative Parcel Map and, therefore, a WSV is required.

1.2.3. 2015 Urban Water Management Plan

CVWD completed its 2015 Urban Water Management Plan (2015 UWMP) in compliance with the Urban Water Management Planning Act established in 1983 and most recently amended by Senate Bill x7-7 (SBx7-7), which requires a 20 percent reduction in per-capita water use by 2020. CVWD also maintains a separate water management planning document, the 2010 Coachella Valley Water Management Plan Update (2010 CVWMP Update). These two planning documents are the primary reference documents for this WSA.

1.2.4. State Water Project Delivery Capability Report

The DWR issues its Final State Water Project Delivery Capability Report (SWPDCR) generally every two years.[7] The final 2017 SWPDCR was released in March 2018. The 2015 SWPDCR was utilized in the 2015 UWMP. For this Project, the 2017 SWPDCR contains the most recent information and accounts for the impacts to water delivery capability through 2035 associated with climate change and recent federal litigation. According to the draft 2017 SWPDCR, the estimated demands by State Water Project (SWP) contractors for deliveries of Table A water from the Sacramento-San Joaquin River Delta (Delta) under existing conditions is assumed to be the maximum SWP Table A delivery amount for the 2017 SWPDCR. Estimated demands for SWP Table A water is one (1) thousand acre-feet per year (AFY) higher than the 2015 SWPDCR because the maximum Table A demand amount for some SWP contractors has changed.[8]

1.2.5. Sustainable Groundwater Management Act (SGMA)

Effective January 1, 2017, SB 1262 amended Water Code Section 10910, the WSA statute, to require that information regarding the Sustainable Groundwater Management Act (SGMA) be included in a WSA if a water supply for a proposed project includes groundwater from a basin that is not adjudicated and is designated medium or high-priority.[9] The water supply for this Project will come from the Whitewater River (Indio) Subbasin, which is an unadjudicated, medium priority subbasin (Exhibit 7, 8, and 9). The Whitewater River (Indio) Subbasin is located within the Coachella Valley Groundwater Basin. CVWD is a participating member of the Coachella Valley Regional Water Management Group (CVRWMG) and is a cooperating Groundwater Sustainability Agency (GSA) in the Whitewater River (Indio) Subbasin. CVWD, Desert Water Agency (DWA), Coachella Water Authority (CWA), and Indio Water Authority (IWA) jointly submitted the 2010 CVWMP Update to DWR as the Alternative to a Groundwater Sustainability Plan (Alternative Plan) for the Whitewater River (Indio) Subbasin on December 29, 2016.[10]

1.3. Purpose and Validity of Document

The purpose of this document is to evaluate the water demand and supplies for the proposed Project pursuant to the requirements of SB 610 and SB 221. The document also evaluates whether the total projected water supplies available to CVWD during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed Project, in addition to CVWD's existing and planned future uses, including commercial and landscape uses.

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7 California Department of Water Resources; http://baydeltaoffice.water.ca.gov/swpreliability/; Accessed January 2018.
8 Table 4-1- California State Water Project Bulletin 132.
9 California Department of Water Resources, http://www.water.ca.gov/groundwater/sgm/gsa.cfm; Accessed November 2018.
10 Engineer's Report on Water Supply and Replenishment Assessment 2017-2018 Mission Creek, West Whitewater River, and East Whitewater River Subbasin Areas of Benefit.

This document must be reviewed every five (5) years or in the event the water planning assumptions have changed, until the Project begins construction. The Project applicant shall notify CVWD when construction has begun. The review will ensure that the information included in the WSA/WSV remains accurate and no significant changes to either the Project or CVWD's water supply have occurred. If neither the Project applicant nor the lead agency contacts CVWD within five years of approval of this WSA/WSV, it will be assumed that the Project no longer exists, and the water supply assessment and verification provided by this documentation will become invalid.

1.4. Water System And Supply

1.4.1. Water System

The CVWD PWS is the water system that will be used to supply the Project. All the off-site and in-tract water distribution facilities will be shown on subsequent improvement plans and will be designed and constructed in accordance with CVWD requirements.

CVWD's existing water supply and conveyance systems include, or will include, adequate capacity for daily demands and emergency fire protection. This includes groundwater wells, transmission pipelines, distribution storage, pump stations, and pipelines proposed within the Project. In the future, CVWD's supply and conveyance system may also include delivery of Colorado River water treated for municipal use.

1.4.2. Water Supply

As discussed above, CVWD is the PWS for the area in which the Project site is located. CVWD provides six services to customers within its service boundaries, including: (1) domestic (drinking) water, (2) wastewater (sanitation), (3) irrigation (canal water) and drainage, (4) non-potable (recycled) water, (5) storm water protection, and (6) groundwater replenishment.

The CVWD service area encompasses roughly 640,000 acres and includes the central and eastern portions of the Coachella Valley within Riverside County, as well as small portions of Imperial and San Diego counties (Exhibit 9).[11]

CVWD currently has approximately 109,000 domestic water connections.[12] CVWD obtains water from the Whitewater River (Indio) Subbasin and Mission Creek Subbasin which has a total groundwater storage capacity of 32,400,000.[13] CVWD serves all of the Cities of Rancho Mirage, Thousand Palms, Palm Desert, Indian Wells, La Quinta, and portions of the Cities of Desert Hot Springs, Cathedral City, Indio and Coachella. CVWD also serves other rural communities, including Thermal, Mecca, Oasis, Desert Shores, Salton Sea Beach, Salton City, North Shore, Bombay Beach, Hot Mineral Springs and other portions of unincorporated Riverside County (Exhibits 9).

Development throughout the Coachella Valley has been dependent on groundwater as a source of supply. The demand for groundwater has annually exceeded the limited natural recharge of the groundwater basin. Therefore, imported water is used to recharge the aquifer and reduce groundwater overdraft. CVWD and the DWA work in conjunction with SWP contractors to import SWP water supplies for recharge in the western Coachella Valley.

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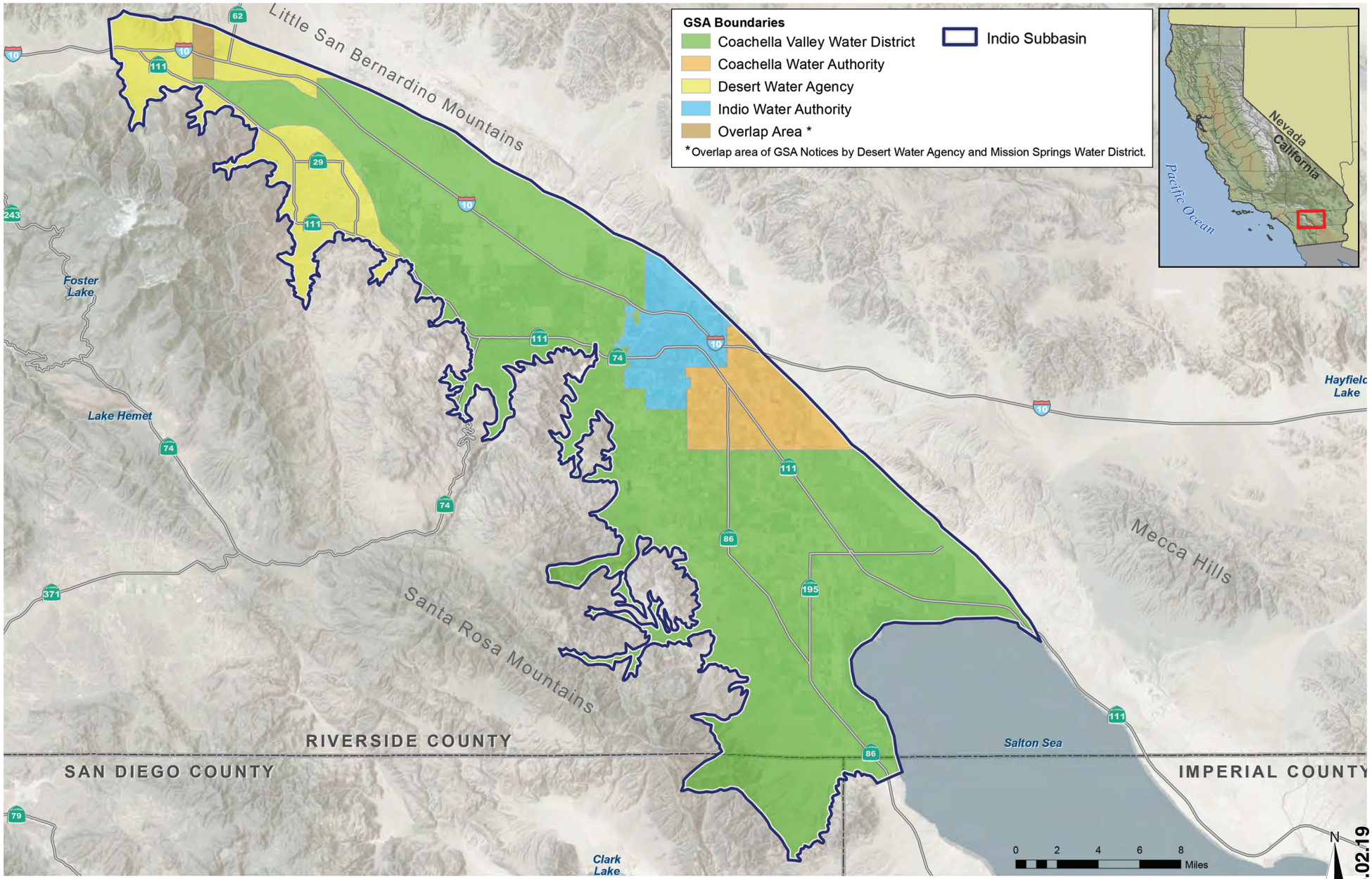
11 CVWD Urban Water Management Plan Final Report (2015).
12 CVWD Website – Rates – Domestic Water Rates; http://www.cvwd.org/198/Rates; Accessed October 2018.
13 Indio Subbasin Annual Report for Water Year 2017-2018 (March 2019) - Table 2-1.



Source: Indio Subbasin Annual Report for Water Year 2017-2018 (March 2019)

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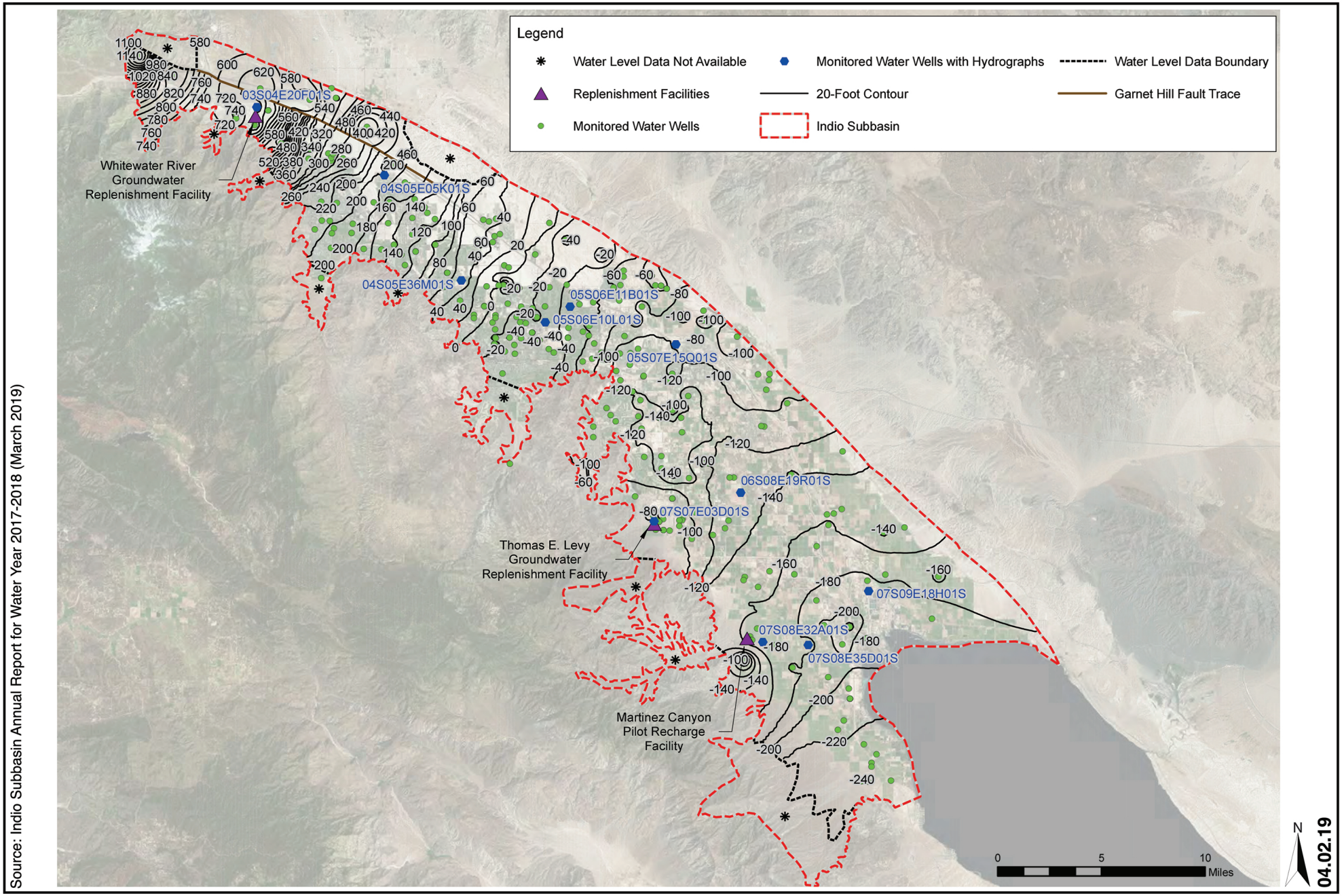
DSRT SURF Specific Plan WSA and WSV
Indio and Whitewater River Subbasins
Palm Desert, California

DSRT SURF

Exhibit

7



Source: Indio Subbasin Annual Report for Water Year 2017-2018 (March 2019)

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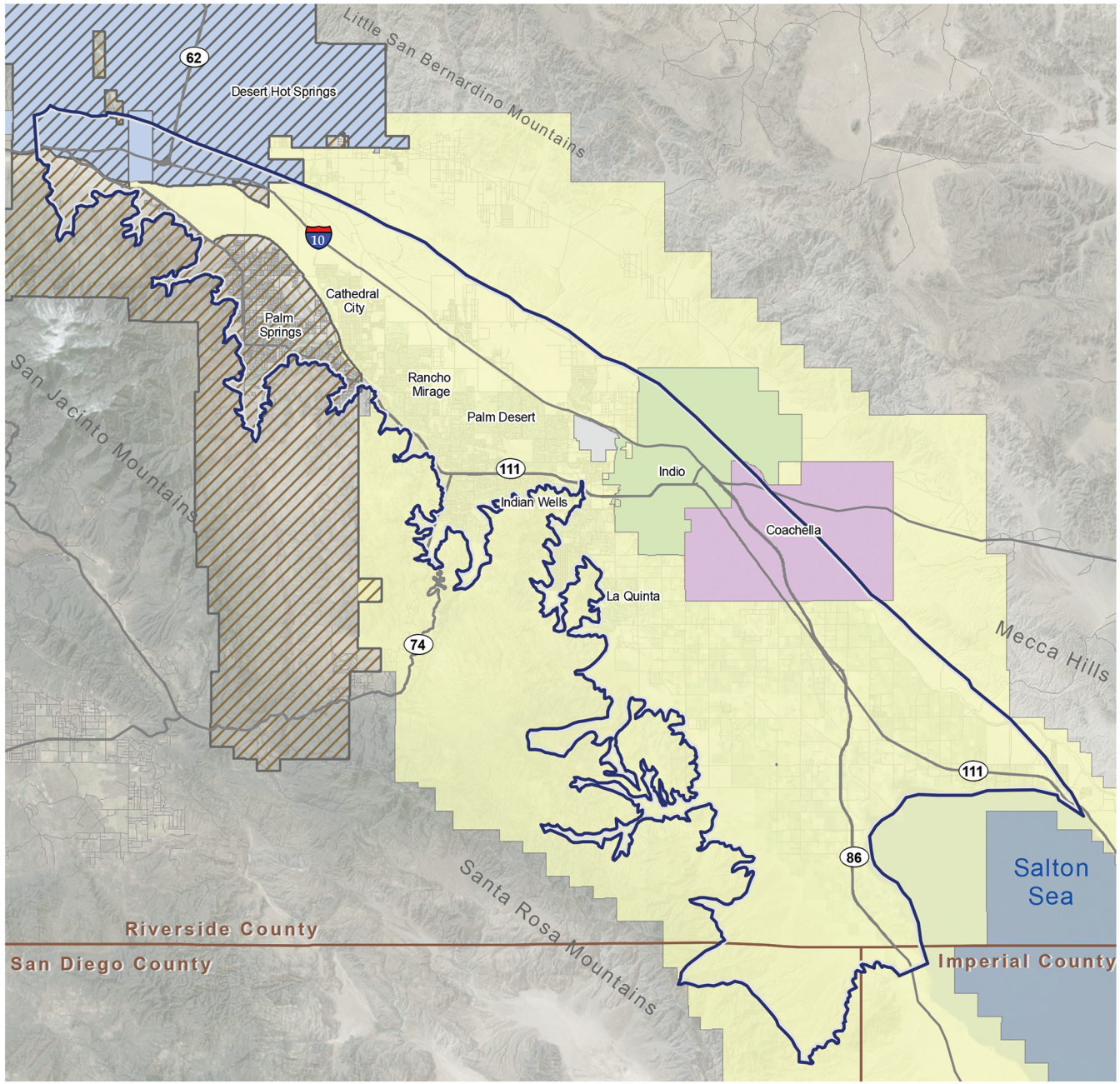
DSRT SURF Specific Plan WSA and WSV
2017-18 Average Groundwater Elevation
Palm Desert, California

Exhibit
8



Water Service Areas and Cities

Service Areas

- Coachella Valley Water District
- Coachella Water Authority
- Desert Water Agency (DWA)
- Indio Water Authority
- Mission Springs Water District (MSWD)
- Myoma Dunes Water District

- Indio Subbasin
- Highway
- County Boundary
- Waterbody

0 2.5 5 10 Miles

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Source: MWH Global, 2017

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DSRT SURF Specific Plan WSA and WSV
Coachella Valley Water District Service Area
Palm Desert, California

DSRT SURF

Exhibit

9

1.5. Historical Context

The need to enhance the public water supply in the Coachella Valley has been recognized for many years. The formation of CVWD in 1918 was a direct result of the concern of local residents about a plan to export water from the Whitewater River to Imperial County.[14] Early on, Coachella Valley residents also recognized that action was needed to stem the decline of the water table, which was occurring as a result of local pumping in the eastern Coachella Valley. As a result, CVWD entered into an agreement for the construction of the Coachella Branch of the All-American Canal in order to bring Colorado River water to the Coachella Valley. Since 1949, the Coachella Canal has been providing water for irrigation use in the area that generally encompasses the Cities of Indio and La Quinta southerly to the Salton Sea. Colorado River water is delivered to the Coachella Valley via the All-American and Coachella Canals and distributed through an underground irrigation distribution piping system to farms and a growing number of golf courses in the Coachella Valley. In recent years, CVWD has begun a program of recharging the aquifer in the eastern Coachella Valley with this source.

The need for additional water supplies was recognized due to the onset of development in the western Coachella Valley. As a result, in 1963 CVWD and DWA entered into separate contracts with the State of California in order to ensure that SWP water would be available. Because a direct pipeline from the SWP system to the Coachella Valley does not exist, CVWD and DWA entered into an exchange agreement with the Metropolitan Water District of Southern California (MWD) to receive water from the MWD Colorado River Aqueduct, which crosses the northern portion of the Coachella Valley near Whitewater. In exchange, CVWD and DWA have their SWP water allotment delivered to MWD. Since 1973, in exchange for their SWP water, CVWD and DWA have been receiving Colorado River water from MWD's Colorado River Aqueduct turnout located at Whitewater Canyon to replenish groundwater in the Coachella Valley.

In addition, CVWD has recognized the need to provide other sources of water to supplement its water supplies. CVWD has been recycling reclaimed wastewater since 1967 and currently operates five (5) water reclamation plants, two (2) of which currently recycle water. Recycled water is currently used for golf course and greenbelt irrigation in the Cities of Palm Desert, Indian Wells, and Indio, thereby reducing demand on groundwater in the basin.

1.5.1. 2010 Coachella Valley Water Management Plan Update

In the early 1990s, CVWD initiated its first water management planning process to address the overdraft conditions in the Coachella Valley Groundwater Basin and to ensure that there would be adequate water supplies in the future. The plan is a 35-year blueprint for wise water management and the basis for all CVWD's efforts to preserve the Coachella Valley's groundwater source.

On September 2002, the CVWD Board of Directors adopted the Coachella Valley Water Management Plan (CVWMP). A Programmatic Environmental Impact Report was prepared for the CVWMP and certified under the California Environmental Quality Act (CEQA). The goal of the CVWMP is to reliably meet current and future water demands in a cost effective and sustainable manner. This goal will be met by achieving the following objectives:

- Meet current and future water demands with a 10 percent supply buffer;
- Eliminate long term groundwater overdraft;
- Manage and protect water quality;
- Comply with state and federal laws and regulations;
- Mange future costs; and
- Minimize adverse environmental impacts.

[14] CVWD website updates; http://www.cvwd.org/288/About-CVWD; Accessed October 2018.

The CVWD Board of Directors recognized the need to update the CVWMP periodically to respond to changing external and internal conditions. The 2010 CVWMP Update meets that need. It defines how the CVWMP goal will be met given changing conditions and new uncertainties regarding water supplies, water demands, and evolving federal and state regulations.

The 2010 CVWMP Update calls for a multifaceted approach including:

- Increased water conservation by all types of water users;
- Increased imported water supply from the Coachella Canal and State Water Project;
- Increased use of the imported supply and recycled water, instead of groundwater, for irrigation; and
- Expanded groundwater replenishment and source substitution efforts.

The 2010 CVWMP Update identifies several water conservation measures to reach the goal of reducing overall water consumption by 20 percent by 2020, and the goal of maintaining this level of reduction through 2045. These measures include water efficient landscaping and irrigation controls, water efficient plumbing, tiered or seasonal water pricing, public information and education programs, alternative water supplies, water restrictive municipal development policies, appointing a CVWD conservation coordinator and refining the maximum water allowance budget for landscaped and recreational areas. The 2010 CVWMP Update reduces reliance on groundwater sources by fully utilizing Colorado River water, SWP Exchange Water and recycled water supplies, and implementing more conservation over the long term.

The 2010 CVWMP Update (Executive Summary, Appendix B) emphasizes cooperation with municipalities, local water agencies, and tribes in regional planning and implementation. The following are among some of the recommended activities outlined in the update for the CVWD Board of Directors to consider over the next 35 years:

- Provide incentives and support to agricultural customers to conserve water, such as through converting from flood/sprinkler irrigation to more efficient micro-sprinkler/drip systems;
- Encourage existing golf courses to convert landscaping to meet the most current landscape ordinance, requiring no more than 4 acres of grass per hole and 10 acres of grass per practice area;
- Expand landscape conversion rebates for domestic customers to encourage less grass and more desert appropriate landscaping; and
- Complete construction of subsequent phases of the Mid-Valley Pipeline system to provide a blend of recycled and Colorado River water for up to 50 golf courses in lieu of groundwater.

The 2010 CVWMP Update recognizes that groundwater storage makes up the difference between demand and supply. The demand not met with imported water used for irrigation and groundwater recharge, or with recycled water, is obtained from the groundwater basin. The Whitewater River (Indio) Subbasin has a capacity of approximately 29.8 million acre-feet (AF).[15] It is capable of meeting the water demands of the Coachella Valley for extended periods, thereby buffering the groundwater resource during periods of varying water availability.

The 2010 CVWMP Update discusses many CVWD programs to maximize the water resources available including:

- Recharge of Colorado River and SWP supplies;
- Recycled wastewater and conversion of groundwater uses to canal water; and
- Water conservation including tiered water rates, landscaping ordinance, outreach and education.

The 2010 CVWMP Update and CVWD's Groundwater Replenishment Program establish a comprehensive and managed effort to eliminate overdraft. These programs allow CVWD to maintain the groundwater basin as its

[15] Engineer's Report On Water Supply And Replenishment Assessment 2018-2019 Mission Creek, West Whitewater River, and East Whitewater River Subbasin Area of Benefit by CVWD.

primary water supply and to recharge the groundwater basin with imported water allocations from the Colorado River and SWP. For reference, the Executive Summary of the 2010 CVWMP Update is provided in Appendix B.

CVWD prepared the 2014 and 2016 CVWMP Status Reports to evaluate the effectiveness of the 2010 CVWMP Update, including progress on eliminating overdraft for CVWD's Mission Creek Subbasin, West Whitewater River Subbasin, and East Whitewater River Subbasin Areas of Benefit (AOBs). Both Status Reports demonstrated that the 2010 CVWMP Update is working and that continued implementation ensures that overdraft will be eliminated within 10 years. The status of the Annual Change in Water Storage has been updated annually in CVWD's Engineer's Report on Water Supply and Replenishment Assessment, and also in the Indio Subbasin Annual Report for Water Year 2016-2017 prepared in accordance with the Sustainable Groundwater Management Act (SGMA). Over the ten-year period preceding 2014, there was no overdraft mainly as a result of increases in urban conservation and increases in imported water deliveries to the Coachella Valley. Between 2014 and 2017, imported water deliveries were significantly reduced as a result of the statewide drought; however, groundwater pumping was also significantly reduced due to the Governor's drought restrictions.

Groundwater levels have increased in the City of Palm Springs area and in the eastern Coachella Valley. However, water levels are still declining in the mid-Coachella Valley areas near the Cities of Rancho Mirage, Palm Desert, and Indian Wells. Groundwater levels in this area will continue to decline until full implementation of mid-Coachella Valley (between eastern and western Coachella Valley) programs that reduce pumping take effect. These programs include source substitution programs including non-potable water system expansion to golf courses and additional recharge. The 2014 and 2016 CVWMP Status Reports are publicly available at CVWD's website.

1.5.2. Coachella Valley Water District 2015 Urban Water Management Plan, Senate Bill X7-7, and Water Shortage Contingency Ordinance

The 2015 CVWD UWMP was approved by the State on September 29, 2016. CWC Section 10910 (c)(2) states that, if demand from potential future growth is accounted for in the most recently adopted 2015 UWMP, the water supplier may incorporate the requested information from the 2015 UWMP in preparing WSAs. CVWD demand projections contained in the 2015 UWMP take into account the increased growth throughout its service area.

In November 2009, SBx7-7 was approved and adopted by the State. DWR provides alternative water use reduction targets for urban water suppliers to select, and guidance to achieve the target goal. The legislation includes requirements to improve the management of CVWD water resources by monitoring groundwater basins, developing agricultural water management plans, reducing statewide per capita water consumption by 2015 and 2020, and reporting water diversions and uses in the Delta.

SBx7-7 creates a framework of future planning and actions by urban and agricultural water suppliers to reduce California's water use. This bill requires the development of agricultural water management plans and requires urban per capita water consumption to be reduced by 20 percent by the year 2020.

The recent drought that began in 2013 resulted in record low precipitation both statewide and in the Coachella Valley, and in implementation of severe water use restrictions mandated by the State Water Resources Control Board (SWRCB).

On January 17, 2014, the governor proclaimed a State of Emergency and on April 1, 2015, the governor issued Executive Order B-29-15, which ordered the SWRCB to adopt emergency regulations imposing restrictions to achieve a 25 percent reduction in potable urban water usage across the State. Agencies assigned to Tier 9, including CVWD, having residential water use above 215 gallons per capita per day (gpcd), were required to

reduce water use by 36 percent compared to 2013 water use. This reduction was reduced to 32 percent in February 2016 and became locally implemented in May 2016.

On April 7, 2017, Governor Brown proclaimed an end to the drought state of emergency, with the exception of Fresno, Kings, Tulare, and Tuolumne counties. Water reporting requirements and prohibitions on wasteful practices remain in place.

On May 31, 2018, Governor Brown signed Assembly Bills (AB) 1668 and SB 606, which are jointly designed to overhaul California's approach to conserving water and to make water conservation a "way of life" in California.[16]

CVWD's urban water shortage contingency planning efforts are described in detail in Section 8 of CVWD's 2015 UWMP and Chapter 2 of CVWD's Engineer's Report on Water Supply and Replenishment Assessment 2018-2019, including a description of each ordinance CVWD adopted during Governor Brown's drought emergency declaration, stages of implementation, and restrictions and prohibitions on end users.

Currently, none of the subbasins in the Coachella Valley are listed as being in "critical overdraft" by the DWR[17]. Even though the State is not currently in an "exceptional drought," and the Coachella Valley's subbasins are not being "critically-overdrafted," CVWD and other agencies continue to control overdraft in the subbasins by implementing water management and landscape policies.

1.5.3. Integrated Regional Water Management Plan

Integrated Regional Water Management (IRWM) is a collaborative effort to identify and implement water management solutions on a regional scale that increase regional self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives. IRWM is the application of Integrated Water Management (IWM) principles on a regional scale.

In 2008, the five public water agencies in the Coachella Valley (including CVWD) formed the Coachella Valley Regional Water Management Group (CVRWMG). In 2010, they adopted the Coachella Valley Integrated Regional Water Management Plan (IRWMP). The IRWMP was updated in 2014 and 2018.[18] These efforts ensure that the Coachella Valley as a whole will focus on sustainable water resources. All water agencies in the Coachella Valley work together, share information, discuss concerns and viewpoints, and build consensus in supporting future projects that benefit the entire region. Since its formation, the CVRWMG has added Valley Sanitary District (VSD) as a member.

1.5.4. Sustainable Groundwater Management Act Alternative Plan

In September 2014, Governor Brown signed three-bills into law: AB 1739 (Dickinson), SB 1319 and SB 1168 (Pavley), that became collectively known as the Sustainable Groundwater Management Act (SGMA), creating a framework for sustainable, local groundwater management for the first time in California history.

The SGMA was adopted by the California Legislature in 2014 in response to the severe over-pumping of groundwater in what was then the third year of an historic drought. That overdraft led to groundwater subsidence of several feet in some parts of the state, and the drying up of more than 1,500 wells in Tulare County (accounting for more than half of dry wells in the state), leaving thousands of Californians without water from their taps. The final legislation created a framework that requires the most heavily used groundwater basins in

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16 California Water Boards Website - California Statutes on Making Conservation a California Way of Life - Assembly Bill (AB) 1668 and Senate Bill (SB) 606-May 31, 2018.

17 "Indio Subbasin Annual Report for Water Year 2016-2017" prepared by Stantec, March 2019.

18 VOLUME 1: IRWM/SWR Plan Chapters 2018 Coachella Valley Integrated Regional Water Management & Stormwater Resource Plan – Public Draft August 2018, http://www.cvrwmg.org/docs/2018_08_20_CVRWMG-2018IRWM-SWRPlanPublicDraft_150844.pdf, Accessed November 2018.

the state (127 of the 515 basins identified by the DWR in its Bulletin 118 Groundwater Update) to be managed sustainably by 2042 (or 2040 for the most critically overdrafted basins). SGMA was amended in 2015 by SB 13 (Pavley).

SGMA established a process for local agencies to develop an Alternative to a Groundwater Sustainability Plan (Alternative Plan) (see Water Code §10733.6) for evaluation by DWR. According to the SGMA, an Alternative Plan is required to be submitted to DWR for review no later than January 1, 2017, and every 5 years thereafter. In general, Alternative Plans must be consistent with one of the following (Water Code §10733.6(b)):

1. A plan developed pursuant to Part 2.75 (commencing with Section 10750) or other law authorizing groundwater management;
2. Management pursuant to an adjudication action; or
3. An analysis of basin conditions that demonstrates that the basin has operated within its sustainable yield over a period of at least 10 years.

SGMA requires local agencies to establish a new governance structure, known as Groundwater Sustainability Agencies (GSA), and to develop Groundwater Sustainability Plans (GSPs) or Alternative Plans for groundwater basins or sub-basins that are designated as medium or high priority.

The Whitewater River (Indio) Subbasin has been designated by DWR as a medium priority subbasin. Pursuant to CWC section 10723.8 of the SGMA, CVWD filed a notice on November 6, 2015 of its election to serve as a GSA for the portions of the Indio Subbasin (DWR Sub-Basin No. 7-21.01) underlying the CVWD boundary.[19] DWA, CWA, and IWA separately filed a notice of election to serve as a GSA for the portions of the Indio Subbasin underlying their service boundaries.[20]

CVWD, DWA, CWA, and IWA jointly submitted the 2010 CVWMP Update to DWR as an Alternative Plan for the Whitewater River (Indio) Subbasin.

1.5.5. City of Palm Desert

The City of Palm Desert has adopted by reference the CVWD Ordinance No. 1302.3 and incorporates CVWD's water management planning efforts in the City's General Plan Updates.

1.5.6. County of Riverside

The County of Riverside Ordinance No. 859, Water Efficient Landscape Requirements Ordinance, establishes provisions for water management practices and water waste prevention for new and rehabilitated landscapes and to implement the requirements of the California Water Conservation in Landscaping Act 2006 and the California Code of Regulations Title 23, Division 2, Chapter 2.7. The County also incorporates CVWD's water management planning efforts in its General Plan Updates.

[19] Notice of Election to become a Groundwater Sustainability Agency; http://www.water.ca.gov/groundwater/sgm/gsa_notification/039_Coachella_Valley_Water_District_GSA_2015-11-06.pdf; Accessed November 2018.

[20] SGMA Alternative GSP – Bridge Document for the Indio Subbasin (2016), prepared by Stantec in 2016.

2. Water Demands

2.1. Project-Specific Water Demand Estimate

The DSRT SURF Project (Project) proposes a mixed-use development with land uses consisting of a surf lagoon and associated amenities, up to 350 hotel rooms, and up to 88 residential villas on approximately 17.69 acres. The Project will be implemented in two phases: Phase I includes development of the Surf Lagoon Planning Area (Planning Area 1), and Phase II includes development of the Hotel and Villas Planning Area (Planning Area 2) (see Exhibit 5). Project-related water demands and proposed water conservation measures are discussed below.

2.1.1. Phase I - Development of the Surf Lagoon Planning Area

The Surf Lagoon Planning Area will be developed in Phase I to include a surf lagoon and associated amenities on 11.85 acres.

Surf Lagoon
The surf lagoon will be a water pool of approximately 236,720 square feet area in which consistent surfing waves of variable height would be generated in quick succession. Currently, no standard water demand factor for surf lagoons is available; therefore, Cloward H_2O Water Perfected (Cloward H_2O) prepared a water demand analysis for the proposed surf lagoon (Appendix C). Based on the Cloward H_2O analysis, the proposed surf lagoon will require approximately 6,900,000 gallons of water for the initial filling. It would lose an average of 1,121 gallons/day from backwash and 45,177 gallons/day from evaporation, for a total of 46,298 gallons/day (16,898,770 gallons/year). Total annual water demand for the operation of the lagoon would be approximately 23,798,770 gallons, or 73.04 acre-feet per year (AFY), as shown below in Table 3. This is a conservative estimate that assumes the surf lagoon will require complete filling each year.

Table 3
Surf Lagoon Projected Annual Water Demand

	Annual Filling (gallons)	Replacement Water (water lost to backwash and evaporation)[1] (gallons/year)	Total Water Demand (gallons/year)	Total Water Demand (AFY)
Surf Lagoon	6,900,000	16,898,770	23,798,770	73.04

[1] Based on estimated backwash and evaporation loss of 46,298 gallons/day for a 236,720 sq. ft. surf lagoon
Source: Cloward H_2O Water Perfected (Cloward H_2O) 2018 Water Analysis

It should be noted that water loss at an open pool like the proposed surf lagoon is dependent on the surface area of the pool and factors that increase or decrease evaporation, like temperature and humidity level.

Proposed Onsite Well
The Project will provide water for the surf lagoon in one of three ways: installation of a new groundwater well at the southeastern corner of the site; connection to the existing Desert Willow groundwater well located south of the site near Country Club Drive; or utilization of potable water from CVWD.

Water demand for the surf lagoon is projected to be approximately 73.04 AFY. If the Project installs a new groundwater well on the site, then the groundwater well will be metered and reported in compliance with requirements of CVWD's Groundwater Replenishment Program in accordance with California Water Code Sections 31630-31639. CVWD is permitted by the California Water Code to replenish the groundwater basin and to levy and collect water replenishment assessments from any non-exempt groundwater producer or surface water diverter (> 25 AFY) within its jurisdiction who benefits from replenishment of groundwater. Other components of the Project will be connected to CVWD's water distribution system.

If the Project connects to the existing Desert Willow groundwater well located south of the site near Country Club Drive, then the Project would need construction and extension of underground pipes to supply approximately 73.04 AFY.

Otherwise, CVWD would provide approximately 73.04 AFY of water for the surf lagoon.

Surf Lagoon Associated Amenities

The Surf Lagoon Planning Area will also include a surf center building, ancillary restrooms/changing rooms/locker buildings, ancillary rental building(s), East lagoon café and bar, and maintenance and equipment buildings. Based on the American Water Works Association Research Foundation (AWWARF) water demand factors, the surf lagoon associated amenities would generate a water demand of approximately 15.28 AFY.

Table 4 Surf Lagoon Associated Amenities Projected Annual Water Demand					
Land Use/Building	**Size/Unit Number**	**Factor**		**Total Water Demand (gallons/year)**	**Total Water Demand (AFY)**
	Square Feet	**Quantity**	**Basis**		
Surf Center Building:					
Café Juice Bar**	1,750	230.00	gallons per square foot per year	402,500	1.24
Restaurant**	2,250	230.00	gallons per square foot per year	517,500	1.59
Bar**	1,250	230.00	gallons per square foot per year	287,500	0.88
All other uses*	29,750	0.19	gallons per square foot per day	2,063,163	6.33
Ancillary Restrooms/Changing Rooms/Locker Buildings*	1,500	0.19	gallons per square foot per day	104,025	0.32
Ancillary Rental Building(s)*	1,500	0.19	gallons per square foot per day	104,025	0.32
East Lagoon Café and Bar**	2,750	230.00	gallons per square foot per year	632,500	1.94
Maintenance and Equipment Buildings*	12,500	0.19	gallons per square foot per day	866,875	2.66
				Total Water Demand (AFY)	**15.28**
Sources: * Water Demand Factor (0.19 gallons per square foot per day) based on American Water Works Association Research Foundation (AWWARF) for commercial use. **Water Demand Factor based on American Water Works Association Research Foundation (AWWARF). An efficient restaurant would use approximately 130 to 331 gallons of water per square foot of building area per year. The average (230 gallons per SF per year) is used for the Project.					

Planning Area 1 will also include a swimming pool/spa and landscaping which will consume water. Water consumption estimates for these features are discussed in Section 2.1.3.

Summary

Based on the analyses shown in Tables 3 and 4, the Planning Area 1 (Surf Lagoon Planning Area) surf lagoon and associated amenities would generate a water demand of approximately 88.32 AFY. This is a conservative estimate that assumes the surf lagoon would require complete filling each year.

2.1.2. Phase II - Development of the Hotel and Villas Planning Area

The Hotel and Villas Planning Area will be developed in Phase II to include a hotel(s), hotel spa, villas, villa clubhouse, maintenance and equipment buildings, and swimming pools on 5.84 acres. Based on the water demand factors for similar types of development in recent CVWD-approved WSAs, Phase II of the project, excluding the swimming pools and landscaping irrigation (see Section 2.1.3), would generate a water demand of approximately 60.99 AFY.

Table 5
Hotel and Villas Planning Area
Projected Annual Water Demand

Land Use/Building	Size/Unit Number		Factor		Water Demand (gallons per year)	Water Demand (AFY)
	Square Feet	Rooms	Quantity	Basis		
Hotels****	200,000	350	115.00	gallons per room per day	14,691,250	45.09
Hotel Spa***	12,500	--	0.26	gallons per square foot per day	1,186,250	3.64
Villas♣	105,000	88	117.70	gallons per unit per day	3,780,524	11.60
Villa Clubhouse♣	3,125	1	117.70	gallons per unit per day	42,961	0.13
Maintenance and Equipment Buildings	2,500	--	0.19	gallons per square foot per day	173,375	0.53
				Total Water Demand (AFY)		**60.99**

Sources:
♣ PD 80 Project's Residential Water Demand Factor. For analysis purposes, water consumption by the Villa Clubhouse is considered to be equivalent to water consumption of one villa.
***CVWD Travertine WSA Water Demand Factor.
**** PD 80 Project's Hotel Water Demand Factor.

Planning Area 2 II will also include swimming pools/spas and landscaping which will consume water. Water consumption estimates for these features are addressed in Section 2.1.3.

2.1.3. Swimming Pools/Spas and Landscaping

Both Planning Area 1 and 2 will include swimming pools/spas and landscaping that will consume water. Water consumption estimates for both phases (combined) are provided below.

Swimming Pools and Spas
Planning Area 1 and 2 propose a combined total of 26,725 square feet of pools and spas with an average depth of 6 feet. The number of square feet that will be built in Planning Area 1versus Planning Area 2 is unknown at this time; therefore, total square footage for both planning areas are analyzed as a single value. Currently, there is no standard water demand factor for swimming pools and spas. Water consumption by these facilities depends on their size and type (open or closed), the evaporation rate, and site-specific activities. For this Project, water demand for swimming pools and spas is projected based on the assumptions used in a similar CVWD-approved project (Millennium Village Palm Desert Master Plan WSA). As shown in Table 6, 26,725 square feet of swimming pools and spas would generate a water demand of approximately 7.36 AFY.

Table 6 Swimming Pools and Spas Projected Annual Water Demand							
Land Use	**Area (SF)**	**Average Depth (feet)**	**Water Volume (cubic feet)**	**Water Demand (gallons per year)***	**Water Lost due to 100% evaporation (gallons per year)**	**Annual Water Demand (gallons per year)****	**Annual Water Demand (AFY)****
Pool/Spa	26,725	6	160,350	1,199,418	1,199,418	2,398,836	7.36
						Total Water Demand (AFY)	**7.36**
* 1 cubic foot = 7.48 gallons **Assumes one fill plus total loss annually. Source: CVWD approved project (Millennium Village Palm Desert Master Plan WSA).							

Landscape Irrigation Water Demands

Average annual precipitation in the Coachella Valley can vary from four (4) inches on the valley floor to more than thirty (30) inches in the surrounding mountains.[21] The region can experience extremely high temperatures with large daily temperature fluctuations; in the summer months, monthly average temperatures can exceed 100 degrees Fahrenheit (F). Total potential evapotranspiration levels are well above total rainfall amounts due to high temperatures and abundant sunlight. The Coachella Valley never experiences a water surplus condition with respect to precipitation versus evapotranspiration. Prime evapotranspiration sites include lakes, golf courses, and well-watered lawns.

The Project landscape plans will include low water demand landscaping, such as shrubs, cactus, succulents, groundcover, and vines. It is assumed that the Project's plant species would comply with City, County of Riverside, CVWD, and State of California water conservation requirements by including water efficient and drought-tolerant plant species. These include, but are not limited to:

- City of Palm Desert Ordinance, Chapter 25.52 (Landscaping);
- County of Riverside Ordinance No. 859 (Water Efficient Landscape Requirements);
- County of Riverside Storm Water Quality Best Management Practice Design Handbook for Low Impact Development; and
- State of California Code of Regulations Title 23, Division 2, Chapter 2.7 (Model Water Efficient Landscape Ordinance).

These elements will be further detailed at the submittal of site development plans or other discretionary permits for each phase of development.

Landscape water demand for the Project is estimated in Table 7 using the Project's landscape irrigation area and water usage equations of the CVWD's Ordinance No.1302.3 (Landscape and Irrigation System Design Criteria). The overall goal of the ordinance is to reduce landscape water use, reduce or eliminate runoff in streets, and limit turf use. The Maximum Applied Water Allowance (MAWA) formula, as outlined in the ordinance, is a calculative tool used to estimate outdoor irrigation usage.

As planned, the Project will have approximately 120,159 square feet of landscaped area, including 11,795 square feet of turf and 108,364 square feet of native plant materials. Based on the MAWA equation, the annual water demand for Project landscaping is projected to be 8.54 AFY, as shown below.

[21] Engineer's Report on Water Supply and Assessment 2017-2018 Mission Creek, West Whitewater River, and East Whitewater River Subbasin Areas of Benefit by CVWD.

Table 7 Projected Annual Landscape Water Demand							
	ETo	**ETAF**	**LA (SF)**	**Conversion Factor (gal per SF)**	**Conversion Factor (CCF)**	**MAWA (CCF)**	**MAWA (AFY)**
Total Landscaped Area	83	0.45	120,159	0.62	748	3,720	8.54
					Total Water Demand (AFY)		**8.54**
MAWA = [(ETo) x (0.45) x (LA) x (.62)]/(748), where: ETo = Reference Evapotranspiration (inches per year). The proposed Project is in ETo Zone #5 (annual water consumption = 83 inches). 0.45 = ET adjustment factor LA = Landscape Area (SF) 0.62 Conversion factor (to gallons per SF) 748 = Conversion factor (to hundred cubic feet)							

Currently, the Desert Willow Golf Course is using CVWD's recycled water for landscaping. The Project landscaping pipelines will also be connected to the existing CVWD's recycled water system at Desert Willow Golf Course. It is anticipated that the Project will use up to 8.54 AFY of recycled water for landscaping in-lieu of potable water sources.

To reduce water waste, the City of Palm Desert has adopted a water efficient landscaping ordinance as part of its Municipal Code that addresses all landscaping for residential and non-residential developments, public parkways, median islands, and landscaping maintenance requirements in the City. The ordinance was adopted in accordance with the State's Model Water Efficient Landscape Ordinance and CVWD's Ordinance 1302.3. The guidelines used by the City encourage use of low water demand plants for landscaping; such plants would be used in the Project's landscaping to minimize water consumption.

2.2. Water Conservation Measures

2.2.1. Desert Landscaping: Native and Other Drought-Tolerant Plants

Over the last several years, CVWD has expanded conservation outreach, education, and other strategies to provide public and private consumers with information necessary to help conserve water through the use of drought-tolerant plant species native to the desert (xeriscape), efficient irrigation systems, indoor water usage rebates, and turf removal rebate programs. The Project's adherence with the CVWD conservation programs will further enforce the water conservation ideology. As discussed in Section 3.1.2.4., the 2010 CVWMP Update identifies conservation measures with the objective of reducing urban water demand by 20 percent by 2020.

2.2.2. Project-Specific Water Conservation and Groundwater Reduction Measures

Turf Reduction Plan

On April 1, 2015, the Governor's Executive Order B-29-15 was passed to initiate Turf Reduction Programs in California. This program directs the California Department of Water Resources (DWR) to lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes. The DWR also provides funding to allow for lawn replacement programs in underserved communities.[22]

[22] California Drought - Executive Order B-29-15, Directive #3, April 1, 2015 (Turf Replacement Initiative).

The Project site is located on the Desert Willow Golf Course property which has two golf courses: Firecliff Course and Mountain View Course. The City is planning to replace turf areas on both golf courses with desert landscaping (low water demand plants) which will reduce irrigation water consumption and offset the water demand of the proposed Project (See Appendix A). Table 8 quantifies the number of square feet proposed for conversion to desert landscaping.

Table 8
Total Area of Golf Course for Turf Reduction

Firecliff Golf Course			
Holes 1-9	**Total Area (Square Feet)**	**Holes 10-18**	**Total Area (Square Feet)**
Hole #1	35,271	Hole #10	50,606
Hole #2	30,965	Hole #11	41,470
Hole #3	9,836	Hole #12	36,522
Hole #4	29,796	Hole #13	25,719
Hole #5	13,446	Hole #14	5,698
Hole #6	7,812	Hole #15	15,971
Hole #7	45,527	Hole #16	47,850
Hole #8	16,755	Hole #17	0
Hole #9	13,393	Hole #18	12,525
Totals #1 - #9	202,801	Totals #10 - #18	236,361
		Totals #1-#18	**439,162**
Mountain View Golf Course			
Holes 1-9	**Total Area (Square Feet)**	**Holes 10-18**	**Total Area (Square Feet)**
Hole #1	54,778	Hole #10	14,311
Hole #2	46,606	Hole #11	8,693
Hole #3	34,008	Hole #12	40,749
Hole #4	27,605	Hole #13	8,056
Hole #5	8,922	Hole #14	78,257
Hole #6	15,524	Hole #15	52,216
Hole #7	42,273	Hole #16	24,510
Hole #8	22,720	Hole #17	29,963
Hole #9	21,149	Hole #18	65,823
Totals #1 - #9	273,585	Totals #10 - #18	322,578
		Totals #1-#18	**596,163**
		Total Turf Area to be Converted to Desert Landscaping	**1,035,325**

Source: Firecliff and Mountain View Turf Reduction Data provided by the City of Palm Desert. See Appendix A.

As shown in Table 9, replacement of 439,162 square feet of turf with desert landscaping (drought tolerant plants) in the Firecliff Golf Course will save approximately 45.28 AFY of water which could be used to offset the proposed Project's water demand.

Table 9 Water Demand of Turf vs. Desert Landscaping Firecliff Golf Course								
	ETo	**PF**	**LA (square feet)**	**Conv. Factor (gal per SF)**	**Conv. Factor (CCF)**	**IE**	**ETWU (CCF)**	**ETWU (AF)**
Turf	83	0.7	439,162	0.62	748	0.8	26,436.32	60.69
Low/Native	83	0.2	439,162	0.62	748	0.9	6,713.99	15.41
							Difference	**45.28**

In addition, replacement of 596,163 square feet of turf with desert landscaping in the Mountain View Golf Course could save approximately 61.46 AFY of water which could be used towards the proposed Project's water demand (Table 10).

Table 10 Water Demand of Turf vs. Desert Landscaping Mountain View Golf Course								
	ETo	**PF**	**LA (square feet)**	**Conv. Factor (gal per SF)**	**Conv. Factor (CCF)**	**IE**	**ETWU (CCF)**	**ETWU (AF)**
Turf	83	0.7	596,163	0.62	748	0.8	35,887.34	82.39
Low/Native	83	0.2	596,163	0.62	748	0.9	9,114.24	20.92
							Difference	**61.46**

Table 11 Water Demand of Turf vs. Desert Landscaping Both Golf Courses (Combined)	
	AFY
Total Existing Water Demand for Turf (both golf courses)	143.08
Projected Water Demand for Replaced Low/Native Landscape (both golf courses)	36.33
Difference	**106.75**

Currently, approximately 143.08 AFY of water is being used to irrigate the 1,035,325 square feet of turf at both the Firecliff and Mountain View Golf Courses (Table 11). If the turf is replaced with desert landscaping, approximately 36.33 AFY would be required, resulting in water usage reductions of approximately 106.75 AFY. This water savings could be used to offset water demand by the proposed Project. Project water demand is estimated to be 165.21 AFY (Table 12). If the 106.75 AFY of water "saved" from the Turf Reduction Program is redirected to the proposed Project, the Project's water demand would be 58.46 AFY (Table 12).

2.2.1. Summary of Project Water Demand

Table 28 provides a summary of the Project's projected total water demand. In total, the Project would require approximately 165.21 AFY, or 9.34 AF per acre, of water at buildout. This is approximately 0.14 percent of CVWD's anticipated 2020 total urban water demand of 114,600 AF, and approximately 0.09 percent of CVWD's anticipated 2040 total urban water demand of 194,300 AF.[23] After applying the water demand offsets associated with implementation of the proposed turf reduction program at the Desert Willow Golf Course (106.75 AFY), the net total water demand for the Project is expected to be 58.46 AFY. This represents approximately 0.05 percent of the total projected water supply of 114,600 AF for 2020, and would represent 0.03 percent of the total projected water supply of 194,300 AF for 2040.

[23] CVWD's 2015 Urban Water Management Plan.

Table 12 Total Projected Water Demand						
Land Use/Building	**Size/Unit Number**		**Factor**		**Water Demand (gallons per day/AFY)**	**Water Demand (AFY)**
	Square Feet	**Rooms**	**Quantity**	**Source/Basis**		
PLANNING AREA 1						
Surf Lagoon	--	--	--	Cloward Calculations	23,798,770	73.04
Surf Center Building						
Café Juice Bar	1,750	--	230.00	gallons/sf/yr	402,500	1.24
Restaurant	2,250	--	230.00	gallons/sf/yr	517,500	1.59
Bar	1,250	--	230.00	gallons/sf/yr	287,500	0.88
All other uses	29,750	--	0.19	gallons/sf/yr	2,063,163	6.33
Ancillary Restrooms/Changing Rooms/Locker Buildings	1,500	--	0.19	gallons/sf/yr	104,025	0.32
Ancillary Rental Building(s)	1,500	--	0.19	gallons/sf/yr	104,025	0.32
East Lagoon Café & Bar	2,750	--	230.00	gallons/sf/yr	632,500.00	1.94
Maintenance and Equipment Buildings	12,500	--	0.19	gallons/sf/yr	866,875	2.66
					Total Water Demand (AFY)	**88.32**
PLANNING AREA 2						
Hotels	200,000.00	350.00	115.00	gallons/room	14,691,250	45.09
Hotel Spa	12,500.00	--	0.26	gallons/sf/yr	1,186,250.00	3.64
Villas	105,000.00	88.00	117.70	gpd/unit	3,780,524	11.60
Villa Clubhouse	3,125.00	1.00	117.70	gallons/sf/yr	42,961	0.13
Maintenance and Equipment Buildings	2,500.00	--	0.19	gallons/sf/day	173,375	0.53
					Total Water Demand (AFY)	**60.99**
Pool/Spa	--	--	--	PD 80	--	7.36
Landscape	120,159	--	--		--	8.54
					Total Project Water Demand (AFY)	**165.21**
WATER DEMAND REDUCTIONS/OFFSETS						
					Turf Reduction Program (AFY)	106.75
					Net Total Project Water Demand (AFY)	**58.46**

3. Water Supply Assessment

3.1. General

Having established in Section 1 of this Water Supply Assessment/Water Supply Verification (WSA/WSV) that the 2010 Coachella Valley Water Management Plan (CVWMP) Update, Coachella Valley Water District (CVWD) 2015 Urban Water Management Plan (UWMP), Senate Bill 1262 (SB 1262), and the Whitewater River (Indio) Subbasin Alternative to a Groundwater Sustainability Plan (Alternative Plan)[24] are applicable to this Project, the next requirement of a WSA/WSV is to identify and describe the water supply sources available to the CVWD that will serve the Project. California Water Code (CWC) Section 10910(d) requires a WSA/WSV to include identification of any existing water supply: groundwater; water rights; water service contracts; State Water Project (SWP) Table A amounts; and alternate sources (recycled water) relevant to the identified water supply for the Project. The WSA/WSV must also include a description of the quantities of water received in prior years by the Public Water System (PWS). According to the CVWD's 2015 UWMP, the aquifer and other sources of supply are adequate for an average year, single dry year, and multiple dry years for a twenty-year period.

3.2. Identification of Water Sources

The primary source of water supply for this Project is groundwater obtained from the Whitewater River (Indio) Subbasin. The Whitewater River (Indio) Subbasin is dependent on both natural and artificial recharge.[25] In the Coachella Valley, the groundwater basin is recharged by Colorado River water, reclaimed water, and SWP Exchange Water. Colorado River water is also available for potential direct domestic use if treated. Colorado River water via the Coachella Canal supplies water for irrigation of the eastern Coachella Valley, for groundwater recharge, and for in-lieu recharge in the mid-Coachella Valley via the Mid-Valley Pipeline.

The western portion of the Whitewater River (Indio) Subbasin is recharged with SWP Exchange Water at the Whitewater River Groundwater Replenishment Facility (WRGRF) just north of the City of Palm Springs.

3.3. Analysis of Water Supply

3.3.1. Groundwater

Since the early part of the 20th century, the Coachella Valley has been dependent primarily on groundwater as a source of domestic water supply. Groundwater is also used to supply water for crop irrigation, fish farms, duck clubs, golf courses, greenhouses, and industrial uses in the Coachella Valley.

CWC Section 10910(f) requires that additional information be included in the analysis when a groundwater basin is cited as the water supply source for a project. Information should include: a description of the basin; the rights of the Public Water System (PWS) to use the basin; the overdraft status of the basin; any past or planned overdraft mitigation efforts; historical use of the basin by the PWS; projected use of the basin by the project; and a sufficiency analysis of the basin that is to supply the project.

CWC Section 10910(f) was also amended by Senate Bill (SB) 1262 (Pavley) to require that where projects would be drawing water from basins designated as high or medium priority, a WSA/WSV shall provide information regarding the following:

- Whether the groundwater basin has been identified as being subject to critical conditions of overdraft;

[24] SGMA Alternative Groundwater Sustainability Plan Bridge Document for the Indio Subbasin (December 2016).

[25] Engineer's Report Groundwater Replenishment and Assessment Program for the Garnet Hill Subbasin Desert Water Agency 2015/2016 by DWA.

- If a Groundwater Sustainability Agency (GSA) has adopted a Groundwater Sustainability Plan (GSP) or has an approved Alternative Plan; and
- A copy of the GSP or Alternative Plan.

3.3.2. Description of the Aquifer

As discussed above, groundwater is the principal source of municipal water supply in the Coachella Valley. CVWD provides domestic water to most of the developed portions of the Coachella Valley and along approximately two thirds of both sides of the Salton Sea in the Imperial Valley. CVWD obtains water from the Whitewater River (Indio) Subbasin and Mission Creek Subbasin.

The San Andreas Fault drives a complex pattern of branching fault lines within the Coachella Valley that define the boundaries of the four (4) subbasins that make up the Coachella Valley Groundwater Basin[26]: the Mission Creek, Whitewater River (Indio), San Gorgonio Pass, and Desert Hot Springs Subbasins.[27] The Whitewater River (Indio) is shared by CVWD, Desert Water Agency (DWA), the Cities of Indio and Coachella, Myoma Dunes Water Company, and numerous private groundwater users.

As described by the California Department of Water Resources (DWR), the Coachella Valley Groundwater Basin is bounded on the north and east by non-water bearing crystalline rocks of the San Bernardino and Little San Bernardino Mountains and on the southwest by the crystalline rocks of the Santa Rosa and San Jacinto Mountains. A bedrock constriction separates the Whitewater River (Indio) Subbasin from the San Gorgonio Pass Subbasin on the northwest. The Salton Sea is the eastern boundary and the subbasin's primary discharge area. A low drainage divide forms a short boundary with the West Salton Sea Groundwater Basin to the southeast.

The Coachella Valley Groundwater Basin can be described as a giant tilted bathtub full of sand, with the high end at the northwest edge of the Coachella Valley near the community of Whitewater and the low end at the Salton Sea. The aquifer underlies the Cities of Palm Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, and Coachella, and the unincorporated communities of Thousand Palms, Thermal, Bermuda Dunes, Oasis, and Mecca.[28]

The subbasins present in the Coachella Valley Groundwater Basin are the Mission Creek, Desert Hot Springs, San Gorgonio Pass, and Whitewater River (Indio) Subbasins. The Whitewater River (Indio) Subbasin includes five subareas: Palm Springs, Thermal, Thousand Palms, Garnet Hill, and Oasis. The Palm Springs Subarea is the forebay or main area of recharge to the subbasin, and the Thermal Subarea comprises the pressure or confined area within the basin (Exhibit 6). The other three are peripheral areas having unconfined groundwater conditions. The subbasins with their groundwater storage reservoirs are defined without regard to water quantity or quality. They delineate areas underlain by geologic formations, which readily yield stored water through water wells and offer natural reservoirs for the regulation of water supplies. In the western portion of the Whitewater River (Indio) Subbasin, groundwater is unconfined, whereas to the south and southeast groundwater is mostly confined except on the edges of the subbasin where unconfined conditions are found. Depth to groundwater varies widely in the southeast part of the subbasin. Some wells near the Salton Sea historically delivered artesian flow, and returns to artesian flow have been seen in recent years.

The Whitewater River (Indio) Subbasin comprises a major portion of the Coachella Valley floor and encompasses approximately 400 square miles. The historical fluctuations of water levels within the Whitewater River (Indio) Subbasin indicate a steady decline in levels throughout the subbasin prior to 1949. Post 1949 levels in the lower Thermal Subarea (south of Point Happy in La Quinta), which is where imported Colorado River water is used for crop irrigation, rose sharply. However, water levels continued to decline elsewhere in the subbasin. With the use of Colorado River water from the Coachella Branch Canal, the demand on the

[26] California Department of Water Resources (DWR) (2003).
[27] United States Geological Survey (USGS)(1974).
[28] SGMA Alternative Groundwater Sustainability Plan Bridge Document for the Indio Subbasin (December 2016).

groundwater basin declined in the east Coachella Valley (generally southeast of Washington Street and Point Happy). Water levels in the deeper aquifers rose from 1950 to 1980. However, afterwards these levels began to decline again due to increasing urbanization and groundwater usage. The 2014 and 2016 CVWMP Status Reports provided an analysis of progress in eliminating the overdraft and explained that although groundwater levels are declining in the Cities of Palm Desert and Rancho Mirage areas, groundwater levels are increasing in the east Coachella Valley and in the vicinity of the City of Palm Springs. The reports further discussed how the period from 2003 to 2013 involved no occurrence of overdraft and actually resulted in slightly more water being recharged back into the aquifer than what was pumped or lost through flows to the Salton Sea.

As shown in Table 13, DWR estimated that the Coachella Valley Groundwater Basin contained a total of approximately 39.2 million acre-feet (AF) of water in the first 1,000 feet below the ground surface, much of which originated from runoff from adjacent mountains. However, the amount of water in the aquifer has decreased over the years due to pumping to serve urban, rural and agricultural development in the Coachella Valley, which has withdrawn water from the aquifer at a rate faster than its natural rate of recharge.

Table 13
Groundwater Storage Coachella Valley Groundwater Basin

Subbasin	Subarea	Storage (AF)
San Gorgonio Pass		2,700,000
Mission Creek		2,600,000
Desert Hot Springs		4,100,000
Whitewater (Indio)		
	Palm Springs	4,600,000
	Thousand Palms	1,800,000
	Oasis	3,000,000
	Thermal	19,400,000
	Garnet Hill	1,000,000
	TOTAL	**39,200,000**

Source: California Department of Water Resources, 1964.

The historic declining water table in the Whitewater River (Indio) Subbasin led to a determination by CVWD and Desert Water Agency (DWA) that a management program was required to stabilize water levels and prevent other adverse effects such as water quality degradation and land subsidence. CVWD's East and West Whitewater River Subbasin Groundwater Replenishment Programs are reducing declining water levels in this subbasin. Groundwater recharge in the West Whitewater River Subbasin Area of Benefit began in 1973 and the benefits of recharge can be seen in recent groundwater level measurements.

As presented in the CVWD's Engineer's Report on Water Supply and Assessment 2018-2019 for the Mission Creek, West Whitewater River, and East Whitewater River Subbasin Areas of Benefit (AOBs), groundwater production was estimated to be 208,439 AF during 1999 for the West Whitewater River Subbasin Management Area. The reported production for 2016 and 2017 was 148,395 AF and 155,543 AF, respectively. Groundwater production within the East Whitewater River Subbasin AOB was estimated to be 168,300 AF during 1999. The reported production for 2015, 2016, and 2017 was 113,706 AF, 113,333 AF, and 117,444 AF, respectively.[29]

Surface runoff and subsurface inflow are significant sources of recharge to the Whitewater River (Indio) Subbasin. Average historical natural recharge is approximately 49,000 acre-feet per year (AFY).[30] In addition, the Whitewater River Groundwater Replenishment Facility (WRGRF) northwest of the City of Palm Springs receives SWP Exchange Water from the Colorado River Aqueduct, which has a maximum capacity of 300,000

[29] Coachella Valley Water District Engineer's Report on Water Supply and Replenishment Assessment for the Mission Creek Subbasin Area of Benefit, West Whitewater River Subbasin Area of Benefit, and East Whitewater River Subbasin Area of Benefit 2018-2019 (Table VI-3 and VII-1).

[30] Coachella Valley Water District, 2010 CVWMP Update (December 2010).

AFY.[31] In 2016, the Metropolitan Water District of Southern California (MWD) delivered approximately 35,699 AF to the WRGRF. In 2017, MWD's delivery to the WRGRF consisted of 35,000 AF of water under CVWD's "35 TAF" Agreement, 244,698 AF of Advance Delivery Water, and 106,296 AF of SWP Exchange and Carry-Over Water, for a total of 385,994 AF which is the largest quantity of replenishment water ever delivered in a single year to the WRGRF.

Of the total amount of SWP Exchange Water, on average, 90% has been delivered to the West Whitewater River Subbasin Management Area, and 10% has been delivered to the Mission Creek Subbasin Management Area. However, the production comparison between these management areas is currently 92% to 8%, respectively. In 2017, the total amount of water delivered for replenishment within the West Whitewater River Subbasin Management Area was 385,994 AF, total recharge of 3,318,182AF, since 1973.

In addition to direct replenishment activities at the WRGRF, CVWD has implemented a program of non-potable in-lieu replenishment via source substitution. According to CVWD's records, there are approximately 80 golf courses in the West Whitewater River Subbasin Management Area and 69 golf courses in CVWD's West Whitewater River Subbasin Area of Benefit (AOB).[32] In 2010, CVWD developed a new non-potable water use agreement requiring golf courses with access to Coachella Canal or recycled water to meet a minimum of 80% of irrigation demand from those sources. To date, there are 22 water users within the West Whitewater River Subbasin AOB which have been converted from groundwater extraction to non-potable Coachella Canal or recycled water for irrigation water use. Three of these 22 golf courses (Desert Falls Country Club and Palm Valley Country Club Challenge and Championship courses) were converted in 2017, and two additional golf courses in the West Whitewater River Subbasin AOB (Marriott's Shadow Ridge Resort and Emerald Desert Country Club) are proposed for conversion by the end of FY 2018.[33] CVWD plans to continue installing facilities needed to increase non-potable water deliveries as a substitute for groundwater pumping.

As mentioned above, a direct recharge program is currently operating in the East Whitewater River Subbasin AOB.[34] Colorado River water is conveyed to the subbasin via the Coachella Branch of the All-American Canal, which is used primarily for agricultural use. The Coachella Canal also delivers supplies to the Thomas E. Levy Groundwater Replenishment Facility (TELGRF) located in the southwestern part of the subbasin. The TELGRF is located one mile south of Lake Cahuilla and upslope of Bureau of Reclamation Dike 4, a major flood control dike, near Avenue 62 and Madison Street. This location is ideally suited for a large-scale recharge facility for the Thermal Subarea, given its proximity to Lake Cahuilla and its relative freedom from the aquitard, which is a barrier to groundwater recharge. CVWD recently began construction on a new groundwater replenishment facility in the City of Palm Desert that will add up to 25,000 AFY of Colorado River water into the aquifer.

Since 1997, 343,398 AF of water has been recharged at the TELGRF. The CVWMP indicates this facility should be able to recharge approximately 40,000 AFY. CVWD replenished 37,495 AF and 34,614 AF in 2016 and 2017 at the TELGRF, respectively. CVWD also completed construction of a pilot recharge facility and several monitoring wells at the base of the Martinez Canyon alluvial fan in March 2005. This facility is now out of service but was designed to recharge approximately 4,000 AFY and received 665 AF of recharge water in 2012 and 441 AF in 2013.

No water has been delivered to the Martinez Canyon site since 2013. CVWD continues to monitor groundwater in the Martinez Canyon area to assess any changes in water quality or supply conditions that would support

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31 Department of Water Resources, *California's Groundwater*, Bulletin 118, Coachella Valley Groundwater Basin, Indio Subbasin, (February 27, 2004).

32 Coachella Valley Water District Engineer's Report on Water Supply and Replenishment Assessment for the Mission Creek Subbasin Area of Benefit, West Whitewater River Subbasin Area of Benefit, and East Whitewater River Subbasin Area of Benefit 2018-2019.

33 Ibid.

34 Coachella Valley Water District Engineer's Report on Water Supply and Replenishment Assessment, Upper Whitewater River Subbasin Area of Benefit 2013-2014, 2014-2015.

groundwater replenishment at this site in the future. Total water replenished at the East Whitewater River Subbasin AOB facilities is 343,398 AF since 1997.[35]

The annual amounts of water delivered for recharge at the WRGRF are shown in Table 14, below.

Table 14
Colorado River Exchange Water Delivered to the West Whitewater River Groundwater Replenishment Facility

Year	Recharge Delivery (AF/Y)	Year	Recharge Delivery (AF/Y)	Year	Recharge Delivery (AF/Y)
1973	7,475	1988	1,096	2003	902
1947	15,396	1989	12,478	2004	13,244
1975	20,126	1990	31,721	2005	165,554
1976	13,206	1991	14	2006	98,959
1977	0	1992	40,870	2007	16,009
1978	0	1993	60,153	2008	8,008
1979	25,192	1994	36,736	2009	57,024
1980	26,341	1995	61,318	2010	228,330
1981	35,251	1996	138,266	2011	232,214
1982	27,020	1997	113,677	2012	257,267
1983	53,732	1998	132,455	2013	26,620
1984	83,708	1999	90,601	2014	3,533
1985	251,994	2000	72,450	2015	865
1986	298,201	2001	707	2016	35,699
1987	104,334	2002	33,435	2017	385,994
				TOTAL	**3,318,182**

Source: Engineer's Report on Water Supply and Replenishment Assessment 2017-2018. Mission Creek, West Whitewater River, and East Whitewater River Subbasin Areas of Benefit.
Engineer's Report on Water Supply and Replenishment Assessment 2018-2019. Mission Creek, West Whitewater River, and East Whitewater River Subbasin Areas of Benefit.
1. Delivered water quantities vary as a result of varying State Water Project delivery reliability, drought and advance deliveries associated with the exchange agreement.

3.3.2.1. Aquifer Adjudication

The Whitewater River (Indio) Subbasin is not adjudicated. CVWD has divided the portion of the subbasin within its service area into two AOBs: the West Whitewater River Subbasin AOB and the East Whitewater River Subbasin AOB. The dividing line between the AOBs is an irregular line trending northeast to southwest between the Indio Hills north of the City of Indio and Point Happy in La Quinta. The West Whitewater River Subbasin Management Area is jointly managed by CVWD and DWA under the terms of the 2014 Whitewater Water Management Agreement. The East Whitewater River Subbasin AOB is managed by CVWD.

CVWD shares a common groundwater source with other PWSs, including DWA, Coachella Water Authority (CWA), Indio Water Authority (IWA), and the Myoma Dunes Mutual Water Company. Other groundwater users include some individual residents mostly in rural areas, farmers, golf courses, businesses, and commercial facilities. DWA and CVWD both operate groundwater replenishment programs in which groundwater pumpers (other than minimal pumpers) pay a per acre-foot charge that is used to pay the cost of importing and recharging the aquifer.

[35] Coachella Valley Water District Engineer's Report on Water Supply and Replenishment Assessment for the Mission Creek Subbasin Area of Benefit, West Whitewater River Subbasin Area of Benefit, and East Whitewater River Subbasin Area of Benefit 2018-2019.

3.3.2.2. Status of the Aquifer

The Whitewater River (Indio) Subbasin is the largest of the four subbasins in the Coachella Valley Groundwater Basin[36] that has been designated by DWR as medium priority subbasin. The groundwater supply of the Whitewater River (Indio) Subbasin consists of a combination of natural runoff, inflows from adjacent basins, and returns from use of groundwater, recycled water, and imported water. The groundwater supply is supplemented with artificial recharge using imported SWP Exchange Water and Colorado River water. The long-term average of natural inflow from mountain-front runoff is about 46,000 AFY.

In 2016, Groundwater Sustainability Plan (GSP) Emergency Regulations were developed by DWR under the Sustainable Groundwater Management Act (SGMA) to regulate groundwater basins. The GSP Emergency Regulations require that an annual report be prepared for non-adjudicated groundwater basins to be submitted to DWR on April 1 of each year, following adoption of a GSP or submission of an Alternative Plan.

Currently, the Whitewater River (Indio) Subbasin is managed by four agencies: CVWD, CWA, DWA, and IWA. In response to the SGMA requirements, these four agencies prepared the first Indio Subbasin Annual Report for Water Year 2016-2017 (Annual Report) in 2018. According to the Annual Report, CVWD, CWA, DWA, and IWA maintain a total of 54 California Statewide Groundwater Elevation Monitoring (CASGEM) (Exhibit 8) wells and 270 additional wells in this subbasin. During Water Year 2016-2017, approximately 266,247 acre-feet (AF) of groundwater have been extracted from the Whitewater River (Indio) Subbasin from wells that report production as required by the CWC (Graph 1). CVWD and DWA are authorized agencies to collect replenishment assessments from groundwater producers. Their respective legislations mandate the installation of water meters on all wells producing more than 25 acre-feet per year (AFY) for CVWD and 10 AFY for DWA. In addition, the subbasin lost up to 11,614 acre-feet of water due to evaporation, evapotranspiration, and subsurface outflow to adjacent basins (Table 15).

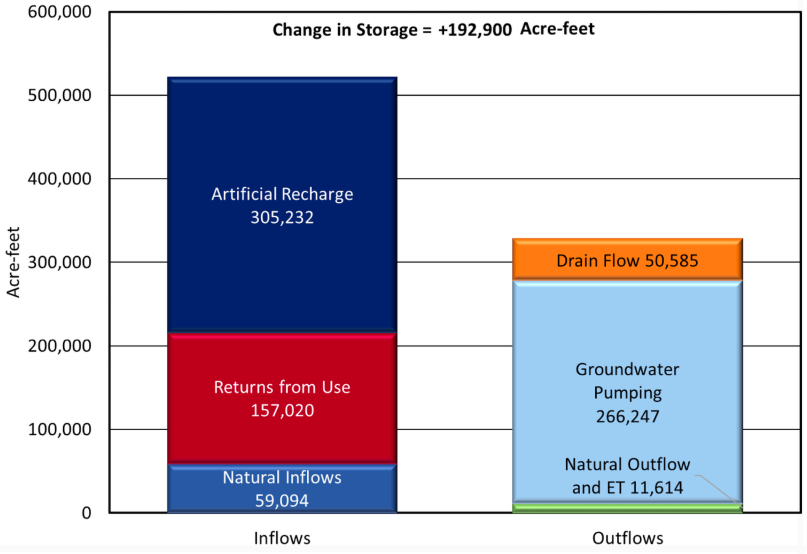
Table 15 and Graph 1 show the groundwater balance in the Whitewater River (Indio) Subbasin for Water Year 2017 (October 1, 2016 through September 30, 2017). During Water Year (WY) 2017, approximately 563,169 AF of water was delivered for direct use within the Whitewater River (Indio) Subbasin and 305,232 AF was delivered for aquifer recharge, for a total of 868,401 AF. In addition, the subbasin received approximately 157,020 AF from infiltration of applied irrigation water, septic tanks percolation, and wastewater percolation and 59,094 from natural flows. Because of the large amount of recharge, the change is storage for the subbasin was positive 192,900 AF for WY 2016-2017.

Table 15
Water Year 2016-17
Groundwater Balance in the Indio Subbasin

Inflows	
Infiltration of natural runoff	45,953
Subsurface inflows from adjacent basins	11,405
Infiltration of applied irrigation water	144,730
Wastewater percolation	8,552
Septic tank percolation	3,738
Artificial recharge	305,232
Salton Sea intrusion	1,736
Total Inflow	+521,346

[36] 2018 Coachella Valley Integrated Regional Water Management & Stormwater Resource Plan, prepared by Coachella Valley Regional Water Management Group In Collaboration with the Planning Partners.

Table 15 Water Year 2016-17 Groundwater Balance in the Indio Subbasin	
Outflows	
Groundwater pumping	266,247
Net drain flow to Salton Sea	50,585
Evaporative losses	6,361
Evapotranspiration from the shallow aquifer	4,619
Subsurface outflow to adjacent basins	634
Total Outflow	-328,446
Change in Groundwater Storage	**+192,900**
Source: 2018 Coachella Valley Integrated Regional Water Management & Stormwater Resource Plan, prepared by Coachella Valley Regional Water Management Group In Collaboration with the Planning Partners.	



Graph 1: Water Year 2016-2017 Water Balance - Whitewater River (Indio) Subbasin[37]

Outflows from the Whitewater River (Indio) Subbasin were significantly higher than groundwater production in the 1970s and early 1980s due to high drain flows when water levels were high. After extended periods of decline, both the ten- and twenty-year running average change in storage have shown upward trends since 2009.

According to the historical data, this subbasin was at its minimum storage in 2009, which was the first year of operation for the TEL GRF and before significant water conservation efforts were implemented. Since 2009, groundwater production has reduced by 25 percent and replenishment activities have increased. Consequently, the subbasin has recovered over 650,000 AF of groundwater in storage, about one-third of the depletion in 2009.[38] This demonstrates the progress made through implementation of the CVWMP.

California Department of Water Resources (DWR) Bulletin 108 (1964) and Bulletin 118 (2003) are the most current bulletins published by the DWR that characterize the condition of the aquifer as a whole. In Bulletin 108, DWR noted that the amount of usable supply in the overdrafted aquifer was decreasing. CVWD estimates annual overdraft in its Engineer's Reports on Water Supply and Replenishment Assessment.

[37] Indio Subbasin Annual Report For Water Year 2016-2017.

[38] 2018 Coachella Valley Integrated Regional Water Management & Stormwater Resource Plan, prepared by Coachella Valley Regional Water Management Group In Collaboration with the Planning Partners.

Over the last ten-year period, urban per capita water use has decreased as a result of ongoing conservation programs. In addition, imported water supplies have increased. As a result, the 2014 CVWMP Status Report shows that overdraft has not occurred between 2003 and 2013, and with continued implementation of 2010 CVWMP Update Programs overdraft will be eliminated by 2022. The recent 2016 CVWMP Status Report is implementing more stringent conservation strategies (e.g. Turf Reduction Programs) to eliminate the overdraft.

Historical overdraft in the Coachella Valley has caused groundwater levels to decrease in portions of the Coachella Valley, particularly in the mid-Coachella Valley region of Rancho Mirage, Palm Desert, and Indian Wells, and has raised concerns about water quality degradation and land subsidence. Groundwater overdraft is manifested not only as a prolonged decline in groundwater storage, but also through secondary adverse effects including decreased well yields, increased energy costs, water quality degradation, and land subsidence. Groundwater levels in the west Coachella Valley near Palm Springs have also historically decreased. However, in the last ten years, groundwater level increases have been seen in the Palm Springs area where artificial recharge has successfully raised water levels.

The effectiveness of the Groundwater Replenishment Program has been demonstrated by rising water levels in the Palm Springs area and by slowing water level declines in the mid-Coachella Valley portion of the Whitewater River (Indio) Subbasin. According to the 2016 CVWMP Status Report, it is anticipated that long-term groundwater overdraft will be eliminated by 2022 in the Coachella Valley with increased groundwater levels in the Palm Springs area and the eastern Coachella Valley, which exceeds the goal set by the CVWMP to eliminate overdraft by 2030. However, groundwater levels in the mid-Coachella Valley area will continue to decline until programs are implemented in this area to reduce groundwater pumping.

3.3.2.3. Changing Climate Conditions and New Water Use Efficiency Framework for California

California has experienced extremes of drought and flood. Recent climate change model forecasts reflect that it will continue to see these extreme conditions. It is imperative that the State finalize and implement a strong and consistent conservation and efficiency framework to help assure a resilient and secure water future.

The four-year period between fall 2011 and fall 2015 was the State's driest since record keeping began in 1895. High temperatures worsened its effects, with 2014 and 2015 being the two hottest years in the State's recorded history. Between 2014 and 2015, a state of emergency was declared, followed by several executive orders continuing the state of emergency and extending government assistance. On May 9, 2016, the Governor issued another executive order establishing a new water use efficiency framework for California. The order established longer-term water conservation measures, including permanent monthly water use reporting, new urban water use targets customized to fit the unique conditions of each water supplier, requirements to reduce system leaks and eliminate clearly wasteful practices, strengthen urban drought contingency plans, and improve agricultural water management and drought plans. In late 2016 and early 2017, a series of winter storms produced record-level rainfall, resulting in the removal of the "exceptional drought" designation from the State's drought monitor and the Governor's declaration ending the Statewide drought emergency.

On May 18, 2016, the State Water Resources Control Board (SWRCB) adopted a Statewide water conservation approach (effective from June 2016 through January 2017) that replaced the prior percentage reduction-based water conservation standard with a localized "stress test" approach. This approach mandates that urban water suppliers act to ensure at least a three-year supply of water to their customers under drought conditions similar to those experienced from 2012 through 2015.

In response to the "stress test" regulation, CVWD, DWA, Mission Springs Water District (MSWD), CWA, IWA, and Myoma Dunes Mutual Water Company (MDMWC) all self-certified that sufficient water had been identified to meet all anticipated demands with existing conservation programs and plans in place, effectively placing their local conservation targets at 0%.[39]

[39] 2017/2018 Groundwater Replenishment & Assessment Program by DWA.

Based on reports to the SWRCB, CVWD's cumulative water savings (as compared to 2013) through January 2017 was 22.6%, that of DWA 23.9%, that of MSWD 16.9%, that of CWA 21.1%, that of the City of Indio 22.7%, and that of MDMWC 29.1%.

In March 2017, about 76% of the State was identified as drought-free; and, on April 7, 2017, after 22 months of restrictions, Governor Brown proclaimed an end to the drought state of emergency, with the exception of Fresno, Kings, Tulare, and Tuolumne counties. Water reporting requirements and prohibitions on wasteful practices remain in place.

On May 31, 2018, Governor Brown signed Assembly Bill (AB) 1668 and SB 606, which are jointly designed to overhaul California's approach to conserving water. The measures impose a number of new or expanded requirements on state water agencies and local water suppliers and provide for significantly greater State oversight of local water suppliers' water use, even in non-drought years. They were adopted in response to Governor Brown's May 2016 executive order, which called to make water conservation a "way of life" in California.[40]

AB 1668 and SB 606 require the SWRCB, in coordination with the DWR, to establish long-term urban water use efficiency standards by June 30, 2022. Those standards will include components for indoor residential use, outdoor residential use, water losses, and other uses.

For indoor residential use, the new laws set a standard of 55 gallons per person per day through January 1, 2025.[41] After that, the amount will be incrementally reduced over time. For the development of outdoor residential use standards, the bills require DWR to conduct studies of landscaping and climate throughout the State by 2021. DWR will then provide the resulting data to SWRCB and local water suppliers for development of urban water use objectives. In addition, the bills will require local water suppliers to calculate and comply with their water use objectives and report those objectives and actual use to DWR. New five-year drought risk assessments and water shortage contingency plans must also be incorporated into Urban Water Management Plans (UWMPs). CVWD continues to stay engaged in the regulatory activity related to this and other legislation.

The calendar year 2017 turned out to be the third hottest year in the State's recorded history after 2014 and 2015, and it had the hottest summer in the State's recorded history. However, the 2016-2017 water year was the second wettest water year in California history, exceeded in total runoff only by the 1982-1983 water year. DWR's eight-station precipitation index for 2016-2017 set a new record of nearly 95 inches, as compared to the long-term average of 50 inches.[42] The record precipitation of 2016-2017 led to record deliveries of SWP Exchange Water at the WRGRF during 2017. However, despite a promising beginning to the water year in late 2017, rainfall in the early months of 2018 has been below average, and dry conditions are beginning to resume. According to the National Integrated Drought Information System (2018), about 66% of the State is experiencing "abnormally dry" conditions, and about 37% of the State is experiencing moderate to severe drought conditions.

Even though the State is out of the "exceptional drought" designation, CVWD and other agencies continue to control overdrafts in the subbasins by implementing water management and landscape policies, as discussed below.

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40 California Water Boards Website - California Statutes on Making Conservation a California Way of Life - Assembly Bill (AB) 1668 and Senate Bill (SB) 606-May 31, 2018.

41 California Legislative Information Website - Assembly Bill No. 1668 – Chapter 15

42 Water Year 2017: What a Difference a Year Makes by California Department of Water Resources (2017).

3.3.2.4. Overdraft Mitigation Efforts

Water Management and Conservation Programs

Coachella Valley Water Management Plan Update

CVWD maintains water management policies within its 2010 CVWMP Update to comprehensively protect and augment the groundwater supply. As discussed in the 2010 CVWMP Update, CVWD is reducing reliance on groundwater sources by fully utilizing available Colorado River Water, SWP water, and recycled water supplies. In addition, CVWD implements source substitution and conservation measures to reduce demands on the aquifer. The goal is to reach a 20 percent reduction in the overall water demand by 2020, pursuant to SBx7-7. CVWD anticipates this water use reduction level will be permanent. In compliance with the Sustainable Groundwater Management Act (SGMA), CVWD has submitted the 2010 CVWMP Update to DWR for approval as its Alternative Plan.

Coachella Valley Water District Landscape Ordinance 1302.3

CVWD's Landscape Ordinance 1302.3, revised in August 2017 in compliance with the State of California drought revisions, requires a series of reduction methods, including requirements that new developments install weather-based irrigation controllers that automatically adjust water allocation. Additional requirements include setbacks of spray emitters from impervious surfaces, as well as use of porous rock and gravel buffers between grass and curbs to eliminate run-off onto streets. With the exception of turf, all landscaping, including groundcover and shrubbery, must be irrigated with a drip system. Also, the maximum water allowance for landscaped areas through CVWD's service area has been reduced. This new reduction goal requires that developers maximize the use of native and other drought-tolerant landscape materials and minimize use of more water-intensive landscape features, including turf and fountains.

Source Substitution

Source substitution is the delivery of an alternate source of water to users currently pumping groundwater. The substitution of an alternate water source reduces groundwater extraction and allows the groundwater to remain in storage, thus reducing overdraft. Alternative sources of water include municipal recycled water from Water Reclamation Plants (WRP)-7 and WRP-10 and the City of Palm Springs Wastewater Treatment Plant, Colorado River Water, and re-use of water used in aquaculture. CVWD's long-term source substitution projects include the following:

- Conversion of existing and future golf courses in the eastern Coachella Valley from groundwater to Colorado River Water;
- Conversion of existing and future golf courses in the western Coachella Valley from groundwater to recycled water and/or Colorado River water via SWP Exchange water;
- Conversion of existing and future golf courses in the eastern Coachella Valley from groundwater to Colorado River water via the Mid-Valley Pipeline;
- Conversion of agricultural irrigation from groundwater to Colorado River water, in both the Oasis Subarea and Mecca Subarea; and
- Conversion of some municipal use from groundwater to treated Colorado River water within Improvement District No. 1(ID-1).[43]

Examples of effective alternative source substitution efforts already undertaken include the following:

- CVWD has a non-potable water system that delivers treated recycled water from three water reclamation plants, blends it with canal water and delivers to golf courses, schools, and open spaces for irrigation. Approximately 8,750 AF of recycled water was delivered in 2015.

[43] Coachella Valley Final Water Management Plan (2002) by CVWD.

- CVWD has completed construction of a 54-inch diameter pipeline to deliver Colorado River water to the Mid-Coachella Valley area for use with CVWD's recycled water for golf course and open space irrigation. Over 50 golf courses within CVWD's service area now use either recycled or canal water, or a combination of both. This reduces pumping from the groundwater basin.

- CVWD has secured rights to Colorado River water and participated in the construction of the All-American Canal and the Coachella Branch of the All-American Canal. Beginning in the late 1940's, CVWD worked with the U.S. Bureau of Reclamation (USBR) and constructed a distribution system to deliver Colorado River water to the farms in the eastern Coachella Valley. This system delivered 245,894 AF of Colorado River Water in 2006, and increased deliveries to approximately 342,000 AF in 2015.

- CVWD recharges the Coachella Valley Groundwater Basin with Colorado River water at three locations. The largest recharge program is operated at the WRGRF. The TELGRF recharges up to 40,000 AFY in the eastern Coachella Valley. The Mission Creek Groundwater Replenishment Facility (MCGRF) recharges up to 35,000 AFY in the Mission Creek Subbasin. A new groundwater replenishment facility is under construction in Palm Desert and is expected to add up to 25,000 AFY of Colorado River water into the aquifer.

- CVWD has secure rights to SWP water and negotiated exchange and advanced delivery agreements with the MWD to exchange CVWD's SWP water for MWD's Colorado River water source. The SWP Exchange Water is used to recharge the aquifer in the western Coachella Valley. This recharge program was started in 1973 and has replenished the aquifer with almost three (3) million AF of water.

- CVWD plans to utilize treated semi-perched brackish groundwater for irrigation purposes. A desalination pilot study was completed in 2007.

- CVWD has worked with an aquaculture farm and developed water efficiency programs that include water treatment and reuse.

- CVWD intends to implement expansion of the Oasis Subarea irrigation system. This project will reduce groundwater pumping by extending Colorado River Water delivery to the Oasis Slope.

Conservation Programs

CVWD continues to work with the cities in its jurisdiction to limit the amount of water that is used for outdoor landscaping, and maintains an ongoing turf rebate program (when funds are available) to encourage homeowners to replace turf areas with desert-friendly landscaping. As a result of the adoption of Statewide indoor water conservation measures requiring low flush toilets, shower and faucet flow restrictors, and other devices, the amount of water used inside homes has been significantly reduced.

CVWD adopted water budget-based tiered rates in 2010 to discourage excessive water use and implemented a 20 percent urban water use reduction target by 2020. The most current CVWD budget-based tiered rates were adopted in July 2016, under CVWD Ordinance 1430. CVWD is also working with the golf course industry to reduce water use at local courses. In 2014, CVWD began a partnership with the Southern California Golf Association and formed the Golf and Water Task Force to reduce overall golf course water use by 10 percent. Key activities being implemented are the establishment of water budgets to limit golf course groundwater pumping and a region-wide golf course turf reduction program. With the large number of new communities constructed around golf course throughout the service area, these conservation programs have reduced impacts of new development on the aquifer.

The Project will be required to implement the CVWD conservation measures in order to assure the most efficient use of water resources and to meet and maintain the 2020 water conservation goals throughout the life of the Project. In addition, the Project will strictly adhere to CVWD's landscape ordinance.

Currently, there are more than 120 golf courses in the Coachella Valley. Roughly 115 golf courses are within CVWD boundaries and use either groundwater, recycled water, or Colorado River water (Canal water) for irrigation. CVWD is currently providing non-potable water (recycled water and Canal water) in-lieu of groundwater to 60 golf courses, and CVWD is working to convert and additional 42 golf courses from groundwater to non-potable water supplies.[44] CVWD has adopted a landscape and irrigation ordinance that establishes maximum allowable turf areas and sets water budgets for all new golf courses. In addition, CVWD has introduced the Golf Course Turf Removal Program to further reduce water demands by the Coachella Valley's golf courses. In November 2016, CVWD was awarded a $1 million grant from the USBR to implement this program. By 2018, CVWD had assisted in the removal of 24 acres of turf from golf courses.

The City of Palm Desert also plans to adopt a Golf Course Turf Removal Program at the Desert Willow Golf Course surrounding the proposed Project, and is anticipated to remove up to 1,035,325 square feet of turf and replace it with low water demand landscaping. This will reduce irrigation water consumption and offset the proposed Project's water demand by approximately 106.75 AF every year (see Section 2.2.2).

Historical Groundwater Use

The 2002 CVWMP, 2010 CVWMP Update, and CVWD's and DWA's annual Engineer's Report on Water Supply and Replenishment Assessment review the historical use of groundwater in the Coachella Valley. In 1936, groundwater use was estimated to be 92,400 AFY and it increased steadily to about 376,000 AFY in 1999. The groundwater use in 2009 dropped to about 358,700 AFY due to a combination of water conservation efforts, source substitution projects and the effects of the ongoing economic recession.[45]

Historically, approximately 93,357 AF, 175,673 AF, 186,690 AF, and 211,014 AF of groundwater had been produced from the West Whitewater River Subbasin Management Area in 1977, 1987, 1997, and 2007, respectively. In 2017, approximately 155,543 AF was produced from the West Whitewater River Subbasin Management Area, a reduction of 55,471 AF (26 percent) since 2007.[46]

The historical fluctuations of groundwater levels within the Whitewater River (Indio) Subbasin indicate a steady decline in the levels throughout the subbasin prior to 1949. With the use of Colorado River water from the Coachella Canal after 1949, groundwater demand on the groundwater subbasin declined in the east Coachella Valley (generally east and south of Washington Street) below Point Happy and the groundwater levels rose sharply. Water levels in the deeper aquifers rose from 1950 to 1980. However, since the early 1980s, water levels in this area have again declined, at least partly due to increasing urbanization and groundwater usage.[47]

Groundwater Sufficiency Analysis

The 2015 UWMP reports CVWD's actual service area urban water demand at 92,974 AF in 2015. Projected urban water demand in the 2015 UWMP for the year 2040 is anticipated to be 194,300 AF.

As described in Section 2, buildout water demand of the Project is estimated to be approximately 165.21 AFY, or 9.34 AF per acre, of which approximately 106.75 AFY could be offset by the turf reduction program on the surrounding Desert Willow Golf Course.

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44 Indio Subbasin Annual Report for Water Year 2017-2018, Table 8-1.

45 Coachella Valley Water Management Plan 2010 Update - Final Report (January 2012); https://www.cvwd.org/ArchiveCenter/ViewFile/Item/265; Accessed October 2018.

46 Coachella Valley Water District Engineer's Report on Water Supply and Replenishment Assessment for the Mission Creek Subbasin Area of Benefit, West Whitewater River Subbasin Area of Benefit, and East Whitewater River Subbasin Area of Benefit 2018-2019.

47 Coachella Valley Water Management Plan 2010 Update - Final Report (January 2012); https://www.cvwd.org/ArchiveCenter/ViewFile/Item/265; Accessed October 2018.

With almost 30 million AF of combined storage followed by groundwater management planning adopted in the 2015 UWMP and 2010 CVWMP Update, the aquifer has sufficient available water to supply the Project and other present and anticipated needs for normal year, as well as one or more multiple dry years, over the next 20 years.

Additional Water Sources

Groundwater will provide the primary water supply for the Project. This WSA/WSV focuses on the adequacy of groundwater to meet the water demands of this Project. Additional water sources are considered as a supplement to groundwater in that they are used to recharge the aquifer, serve as a source substitution for groundwater, or are used for irrigation in other locations in the subbasin.

The Project is implementing a Golf Course Turf Removal Program to offset its water demand by approximately 106.75 AFY. In addition, the Project will install a groundwater well on the site to fulfill the surf lagoon's water demand, which is estimated at 73.04 AFY.

Colorado River Water

The Coachella Branch Canal is an extension of the All-American Canal, which brings Colorado River water into the Imperial and Coachella Valleys. Under the 1931 California Seven Party Agreement, CVWD has water rights to Colorado River water as part of the first 3.85 million AF allocated to California. CVWD is in the third priority position along with the Imperial Irrigation District (IID). This priority is ahead of the 550,000 AF allocation to the MWD, which has the lowest priority of the California Seven Parties.

California's Colorado River supply is protected by the 1968 Colorado River Basin Project Act, such that the Colorado River supplies to Arizona and Nevada after 1968 must be reduced to zero before California's supply will be reduced below 4.4 million AF in any year. It is estimated that this reduction is about 1.5 million AF. This reduction together with the reduction by California agencies with lower priorities than CVWD results in a reduction in excess of 2 million AF in Colorado River Water available to the Lower Basin States before the Colorado River supply available to CVWD is impacted. This assumes that the California agricultural agencies with rights to Colorado River Water are using less than 3.85 million AF.

Historically, CVWD has received approximately 330,000 AFY, the base entitlement, of Priority 3a Colorado River Water. Table 16, below, shows the diversions of Colorado River water after measured returns at Imperial Dam to CVWD for the period from 1964 through 2015. The 2003 Quantification Settlement Agreement (QSA), involving several of the California Colorado River contactors, provides contractual obligation for the supply to CVWD. A number of lawsuits have unsuccessfully challenged the QSA agreements and transfers in State and federal courts, and thus the validity of the QSA has been upheld.

The 2003 QSA was entered into and between CVWD, IID and the San Diego County Water Authority (SDCWA). The QSA quantifies distribution allotments of Colorado River water rights in California, including CVWD's Colorado River rights, for the next 75 years. The agreements provide for additional transfer of Colorado River allocations to CVWD from the IID and MWD. Under the QSA, as shown in Table 17, CVWD will receive up to 459,000 AFY of Colorado River Water.

Water from the Coachella Canal provides a significant supply source for the east Coachella Valley. In 1999, the Coachella Canal supplied over 60 percent of the water used in the east Coachella Valley, but provided less than one (1) percent of the water supply to the west Coachella Valley. Most of the canal water was used for crop irrigation in the east Coachella Valley.

Table 16
Annual Coachella Valley Water District Colorado River Diversions at Imperial Dam – 1964 to 2017
(After Measured Returns)

Year	Diversion Volume (AF)	Year	Diversion Volume (AF)	Year	Diversion Volume (AF)	Year	Diversion Volume (AF)
1964	526,417	1978	509,491	1992	309,367	2006	329,322
1965	524,686	1979	530,733	1993	318,990	2007	311,971
1966	489,429	1980	531,791	1994	326,102	2008	299,064
1967	465,053	1981	452,260	1995	326,697	2009	308,560
1968	478,583	1982	454,868	1996	331,473	2010	306,141
1969	495,082	1983	326,266	1997	338,466	2011	309,348
1970	449,263	1984	355,789	1998	337,466	2012	329,576
1971	470,683	1985	337,002	1999	333,810	2013	331,137
1972	511,476	1986	339,702	2000	342,871	2014	349,372
1973	522,356	1987	322,625	2001	329,367	2015	342,074
1974	558,864	1988	331,821	2002	331,107	2016	356,358
1975	570,987	1989	359,419	2003	296,808	2017	335,321
1976	524,800	1990	369,685	2004	318,616		
1977	508,635	1991	317,563	2005	304,769		

Sources: USBR Website-Colorado River Accounting and Water Use Report, Arizona, California, and Nevada, "Decree Accounting Reports."
United States Bureau of Reclamation Report for Colorado River Accounting and Water Use Report: Arizona, California, and Nevada (May 2017).
*Latest United States Bureau of Reclamation Report for Colorado River Accounting and Water Use Report: Arizona, California, and Nevada (Table 5; May 2018).
https://www.usbr.gov/lc/region/g4000/4200Rpts/DecreeRpt/2017/2017.pdf

In 1995, CVWD began operating the Dike No. 4 pilot recharge facility in La Quinta. This facility successfully demonstrated the adequacy of this site to recharge the aquifer. The Dike No. 4 site was expanded in 2009, put into full operation, and renamed the TELGRF. Future development and associated increases in water demand, as well as quality concerns, are expected to increase use of Colorado River water for domestic purposes. Determining the best way to treat this water in order to substitute for and decrease the area's dependency on groundwater is an important objective of the 2010 CVWMP Update and the 2015 UWMP. The 2010 CVWMP Update calls for the annual treatment and distribution of as much as 62,000 AF of Colorado River water for domestic use.

Table 17 Coachella Valley Water District Deliveries Under the Quantification Settlement Agreement			
Component	**2015 amount (AFY)**	**2026-2047 Amount (AFY)**	**2048-2077 Amount (AFY)**
Base Entitlement	330,000	330,000	330,000
1988 Metropolitan/IID Approval Agreement	20,000	20,000	20,000
Coachella Canal Lining (to SDCWA)	-26,000	-26,000	-26,000
To Miscellaneous/Indian PPRs	-3,000	-3,000	-3,000
First IID/CVWD Transfer	36,000	50,000	50,000
Second IID/CVWD Transfer	0	53,000	0
MWD/ CVWD SWP Transfer	35,000	35,000	35,000
Total Allocation	**392,000**	**459,000**	**456,000**
Less Conveyance Losses and Regulatory Water	-14,000	-14,000	-14,000
Total Deliveries to CVWD	**378,000**	**445,000**	**442,000**
Source: CVWD 2015 UWMP Table 6-3.			

State Water Project Water

CVWD and DWA are SWP contractors for the Whitewater River (Indio) Subbasin. The SWP includes 660 miles of aqueduct and conveyance facilities extending from Lake Oroville (near Sacramento) in the north to Lake Perris (near Riverside) in the south. The SWP has contracts to deliver 4.1 million AFY to 29 contracting agencies. CVWD's original SWP water right (Table A amount) was 23,100 AFY and DWA's original SWP Table A amount was 38,100 AFY for a combined Table A amount of 61,200 AFY. In 2004, CVWD purchased an additional 9,900 AFY of SWP water from the Tulare Lake Basin Water Storage District located in the central San Joaquin Valley, which brought CVWD's SWP allotment to 33,000 AFY.

In addition, CVWD and DWA have also negotiated an exchange agreement with MWD for 100,000 AFY of SWP Table A water. MWD has permanently transferred 88,100 AFY and 11,900 AFY of its SWP Table A amounts annually to CVWD and DWA, respectively. This exchange agreement increases the total SWP Table A amount for CVWD and DWA to 178,100 AFY, with CVWD's portion equal to 126,350 AFY. This agreement provides that CVWD and DWA generally receive this SWP Exchange Water during wet years, which allows the two agencies to recharge the groundwater basin and operate a conjunctive use program, storing water in wet years and pumping the groundwater basin in dry years.

In 2007, CVWD and DWA made a second purchase of SWP water from the Tulare Lake Basin Water Storage District. CVWD purchased 5,250 AFY and DWA purchased 1,750 AFY. In 2007, CVWD and DWA completed the transfer of 12,000 AFY and 4,000 AFY, respectively, from the Berrenda Mesa Water District (southern San Joaquin Valley) for a total Table A amount of 16,000 AFY. Therefore, the total SWP Table A amount for CVWD and DWA is 194,100 AFY, with CVWD's portion equal to 138,350 AFY. Table 18 summarizes CVWD and DWA total allocations of Table A SWP water to be delivered when available.[48]

[48] Coachella Valley Water Management Plan 2010 Update, Final Report (2012).

Table 18 State Water Project Water Sources (AFY)						
	Original SWP Table A	**Tulare Lake Basin 2004 Transfer**	**Tulare Lake Basin 2007 Transfer**	**Metropolitan Water District 2003 Transfer**	**Berrenda Mesa 2007 Transfer**	**Total**
CVWD	23,100	9,900	5,250	88,100	12,000	138,350
DWA	38,100	--	1,750	11,900	4,000	55,750
Total	**61,200**	**9,900**	**7,000**	**100,000**	**16,000**	**194,100**
Source: Coachella Valley Water Management Plan 2010 Update (Table ES-2), Final Report (2012). https://www.cvwd.org/ArchiveCenter/ViewFile/Item/265						

SWP contractors make annual requests to the DWR for water allocations and DWR makes an initial SWP Table A allocation for planning purposes, typically in the last month before the next water delivery year. Throughout the year, as additional information regarding water availability becomes available to DWR, its allocation/delivery estimates are updated. Table 19 outlines the historic reliability of SWP allocation deliveries, including their initial and final allocations.

Table 19 California Department of Water Resources State Water Project Table A Water Allocations 1988-2017					
Year	**Initial Allocation (%)**	**Final Allocation (%)**	**Year**	**Initial Allocation (%)**	**Final Allocation (%)**
1988	100	100	2003	20	90
1989	100	100	2004	35	65
1990	100	100	2005	40	90
1991	85	30	2006	55	100
1992	20	45	2007	60	60
1993	10	100	2008	25	35
1994	50	50	2009	15	40
1995	40	100	2010	5	50
1996	40	100	2011	25	80
1997	70	100	2012	60	65
1998	40	100	2013	30	35
1999	55	100	2014	5	5
2000	50	90	2015	10	20
2001	40	39	2016	10	60
2002	20	70	2017*	60	85
2003	20	90	2018**	15	35
			Average	**31**	**61**
Source: California Department of Water Resources, State Water Project, Notices to Water Contractors. * 2017 State Water Project Allocation –http://www.water.ca.gov/swpao/docs/notices/17-01.pdf; Accessed November 2018. ** 2018 data provided by CVWD on 4/23/19.					

As noted previously, CVWD and DWA do not directly receive SWP water. CVWD and DWA have entered into an exchange agreement with MWD that allows MWD to take delivery of CVWD and DWA SWP Table A water. In exchange, MWD provides an equal amount of Colorado River water (SWP Exchange Water) that MWD transports through its Colorado River Aqueduct, which crosses the north end of the Coachella Valley near the Whitewater River. The delivery agreement allows for advanced delivery and storage of water, thereby providing better and more efficient water management. Water is only recharged when SWP Exchange Water is

available. The large storage capacity of the Coachella Valley aquifer and the large volume of water in storage allow CVWD and DWA to pump from the aquifer for a number of years without recharging. Large amounts of water can be recharged into the aquifer when the water is available.

Factors Potentially Impacting State Water Project Delivery Reliability

DWR issues the State Water Project Delivery Capability Report (SWPDCR) every two years, with the most recently adopted 2017 SWPDCR. This report accounts for impacts to water delivery capability associated with climate change and recent federal litigation (Appendix B). The 2017 average long-term reliability of future SWP Table A deliveries through 2035 is projected to be 62 percent.

This allocation percentage is based on computer modeling of the State's watersheds, and past hydrology adjusted for factors that affect capability. In considering future water supply needs in the 2010 CVWMP Update, CVWD considered an even lower SWP delivery capability to allow for the uncertainty of future court decisions, SWRCB actions, the State and Federal Endangered Species Acts and other restrictions, modeling errors, levee failure, and relaxation in the Biological Opinions for endangered species as the result of better science.

There are three significant factors contributing to uncertainty in the delivery capability of SWP water: 1) possible effects from climate change and sea level rise; 2) the vulnerability of the Sacramento-San Joaquin Delta levees to failure, and 3) greater operation restrictions imposed by the United States Forest Service and National Marine Fishery Service in response to decreasing populations of endangered fish species.

CVWD also considers purchases of additional Table A amounts from SWP contractors as they become available.

Surface Water

Surface water supplies come from several local rivers and streams, including the Whitewater River, Snow Creek, Falls Creek, and Chino Creek, as well as a number of smaller creeks and washes that discharge into the Coachella Valley. In 1999, surface water supplied approximately three percent of the total water supply to the western Coachella Valley to meet municipal demand, and virtually none to the eastern Coachella Valley. Because the surface water supply is directly affected by variations in annual precipitation, the annual supply is highly variable. Since 1936, the estimated historical surface water supply has ranged from approximately 1,400 to 9,000 AFY, averaging about 5,800 AFY.

The majority of local surface water is derived from runoff from the San Bernardino and San Jacinto Mountains, with lesser amounts from the Santa Rosa Mountains. This runoff either percolates in the streambeds or is captured in mountain-front debris basins where it recharges the groundwater basin. According to the estimates developed for the 2010 CVWMP Update, since 1993, an average of approximately 60,000 AFY of surface water recharged the Whitewater River (Indio) Subbasin.

Recycled Water

Wastewater, when highly treated and disinfected, can be reused for landscape irrigation and other purposes; treated wastewater is not suitable for potable use, but is suitable for groundwater recharge. Recycled wastewater has historically been used for irrigation of golf courses and municipal landscaping in the Coachella Valley since the early 1960s. In addition, fish farm effluent is available in certain localized areas of the eastern Coachella Valley and is being recycled for reuse. The Project is anticipated to use approximately 8.54 AFY of recycled water for landscaping.

Desalinated Semi-Perched Brackish Groundwater

The 2010 CVWMP Update identifies desalinated semi-perched brackish groundwater as a future additional local water supply available for use in the Whitewater River (Indio) Subbasin. CVWD plans to use treated semi-perched brackish groundwater for irrigation purposes. It is planned that semi-perched brackish groundwater will be desalinated to a quality equivalent to that of canal water for irrigation use. The amount of semi-perched brackish groundwater that would be treated and recycled in the future depends on supply availability, the amount of additional water supplies needed, and the cost of treatment and brine disposal. According to the 2010 CVWMP Update, the amount of water recovered through semi-perched brackish groundwater desalination could range from 55,000 to 85,000 AFY by 2045.

Treated semi-perched brackish groundwater could be delivered to the Canal water distribution system and used as a non-potable supply for agricultural, golf course and landscape irrigation, and potentially for potable water supply. Since the desalinated semi-perched brackish groundwater is local water, it would be available for use throughout CVWD's service area.

A brackish groundwater treatment pilot study and feasibility study was completed in 2008 and recommended a combined source water strategy involving wells and direct connection to the open drain outfalls. Such a combined approach will provide additional flexibility and reliability to this new water supply. This study concluded that semi-perched brackish groundwater can effectively be treated for reuse as non-potable water and potentially as new potable water.

Permanent Water Purchases

To further help meet its long-term supply needs, CVWD purchases Table A Amounts (allotments) from SWP contractors as they have become available. Additional purchases from the SWP and from others with water rights, mainly in the Central Valley of California, will be evaluated as they become available to determine whether they meet CVWD's needs. If they do, CVWD may purchase additional SWP water rights.

Summary of Primary and Additional Water Sources

Table 20, below shows CVWD's existing water supply entitlements, rights, and service contracts.

Table 20
Existing Coachella Valley Water District Water Supply Table A Amounts
Water Rights and Water Service Contracts

Supply		Existing Supplies AFY	Entitlement	Right	Contract	Other	Ever Utilized?
Groundwater	Whitewater (Indio) Subbasin	Unspecified[1]				X	Yes
Coachella Canal Colorado River Water	Coachella Canal 2003 QSA	459,000[2]			X		Yes
SWP Exchange Water[3]	SWP Contracts and MWD Exchange Agreement	138,350[4]	X	X			Yes
Recycled Water	CVWD and DWA	14,188[5]				X	Yes

Source: CVWD 2015 UWMP.
1. CVWD shares a common groundwater source that has not been adjudicated.
2. As quantified in the Quantification Settlement Agreement between IID, MWD and DVWD, October 2003.
3. Imported SWP Exchange Water is not used as a direct water supply source, but rather is used to recharge groundwater in the Coachella Valley.
4. Includes Original Table A Amount, Tulare Agreement and MWD Agreement.
5. Indio Subbasin Annual Report for Water Year 2017-2018.

3.4. Analysis of Water Supply and Demand

Analysis of water supply and demand for the Project WSA/WSV is based on the 2015 UWMP and the 2010 CVWMP Update. In accordance with SBx7-7, CVWD's 2015 UWMP sets interim and final urban water use targets for complying with California's 2020 conservation program based on DWR's defined Target Method

No. 1 which provides for an agency goal of 80 percent of baseline demands. The 2015 UWMP relies on and summarizes the water supplies and water supply program details in the 2010 CVWMP Update.
The 2010 CVWMP Update is a 35-year plan to reliably meet current and future water demands in a cost effective and sustainable manner. The Planning Areas for the 2010 CVWMP Update is the Whitewater River (Indio) Subbasin, including Salton City in Imperial County and areas north of the Banning Fault that are within the MSWD/DWA service areas.[49] The 2010 CVWMP Update evaluates all of the water demand and supplies in the Planning Area through 2045, for all water users including urban, agricultural, and golf, and provides a preferred alternative water supply plan for meeting demands. The 2010 CVWMP Update evaluates long-term risks to water supplies, such as reduced SWP capability and reduced SWP supplies, and provides contingencies for addressing these risks. The elements of the preferred alternative are imported water supplies, recharge, source substitution, and conservation. The preferred alternative identifies projects and programs that implement these plan elements.

In 2005, Riverside County was experiencing rapid growth. Recognizing the need for more accurate growth forecasts, the Riverside County Center for Demographic Research (RCCDR) was established under the joint efforts of the County of Riverside, the Western Riverside Council of Governments, the Coachella Valley Association of Governments, and the University of California Riverside for the development of demographic data and related support products to serve all of Riverside County. The RCCDR was tasked with developing the Riverside County Population Projections 2006 (RCP-2006) growth forecast to provide agencies with a consistent and standard set of population, housing, and employment forecasts. The Southern California Association of Governments adopted the RCP-2006 for use in its regional growth forecasts.

The 2010 CVWMP Update relies on the RCP-2006. The 2014 CVWMP Status Report updated the population projections based on the RCP-2010, which are lower. These updated projections are relied on in the 2015 UWMP.

Although the growth forecast indicated significant future growth for the Coachella Valley, these forecasts were based on potential development that had not yet been approved by the County or by cities within the Coachella Valley. Prior to 2008, there was substantial development pressure to transition from agricultural to urban land uses. As agricultural land converts to urban uses, the characteristic of its water demands and infrastructure will change. The 2010 CVWMP Update reflects these changes in its water demand projections and the ways that water is used in this area. As urban development occurs, land that currently is irrigated with untreated Coachella Canal water could begin utilizing groundwater replenished with canal water or use treated canal water for indoor use and untreated canal water for outdoor use.

Tribal land in the Coachella Valley makes up over 49,000 acres. While much tribal land in the western Coachella Valley has been developed to varying degrees, a substantial amount of tribal land in the eastern Coachella Valley is undeveloped. An understanding of the timing and degree of development on tribal lands is important. All of the Coachella Valley tribes have developed one or more casinos, which have provided tribes with important economic opportunities. As development continues in the Coachella Valley, it is expected that additional growth will occur on the remaining tribal lands.

In other portions of the Coachella Valley, development of tribal land is closely coordinated with the Coachella Valley cities in which it is located. RCP-2006 and RCP-2010 growth forecasts are assumed to include development of these lands.

According to the CVWD's 2015 UWMP, CVWD anticipates using treated Canal water as an urban potable supply starting in 2025 to reduce the amount of groundwater pumping; by 2040, Canal water is projected to meet 28 percent of total urban potable demand, while the rest is met by groundwater. CVWD also intends to supply untreated Canal water and desalinated semi-perched brackish groundwater for urban landscaping to offset groundwater pumping. Recycled water currently serves golf customers, with a small portion of the total recycled water supply serving Homeowners' Associations (HOAs) and minor landscapers totaling less than 400

[49] Coachella Valley Water Management Plan 2010 Update, Figure 1-1; http://www.cvwd.org/DocumentCenter/Home/View/2130; Accessed October 2018.

AFY. The projected growth in recycled water supplies consists of golf and agriculture customers that are currently served by private groundwater wells.

As shown in Table 21, the 2015 UWMP projects that the percentage of water from each of the current water supply sources will change significantly by 2040, relative to current conditions.

Table 21
Current and Projected Average Urban Water Supply (AFY)

Water Supply	Additional Detail on Water Supply	Projected Water Supply				
		2020	2025	2030	2035	2040 (opt)
Groundwater	Potable urban use	113,400	102,100	112,700	106,600	101,000
Purchased or Imported Water	Treated canal water for potable urban use in East Valley[1]	0	18,000	18,000	31,000	40,000
Urban Potable Subtotal		**113,400**	**120,100**	**130,700**	**137,600**	**141,000**
Purchased or Imported Water	Untreated Canal water	1,200	11,200	17,000	26,300	33,300
Desalinated Water	Desalinated drain water for non-potable urban use	0	5,000	10,000	15,000	20,000
Urban Non-potable Subtotal		**1,200**	**16,000**	**27,000**	**41,300**	**53,300**
Recycled Water	WRP-7[2]	3,400	3,700	4,000	4,300	4,600
Recycled Water	WRP-10[2]	10,900	11,300	1,700	12,100	12,500
Recycled Water	WRP-4[2,3]	0	17,700	15,100	17,500	19,200
Recycled Water Subtotal		**14,300**	**27,700**	**30,800**	**33,900**	**36,300**
Total Retail Supply		**128,900**	**163,800**	**188,500**	**212,800**	**230,600**
Purchased or Imported Water	Sale of Canal water to IWA for potable use	5,000	10,000	20,000	20,000	20,000
Total Wholesale Supply		**5,000**	**10,000**	**20,000**	**20,000**	**20,000**

Source: CVWD 2015 UWMP, Table ES-3.
1. Total Colorado River allotment will increase from 397,000 AF in 2016 to 459,000 AF in 2026. Colorado River water supply does not sum to total right because of nonurban supply not shown on this table and projected wholesale to other agencies.
2. Recycled water safe yield is based on total projected flows at each WWTP; surface discharge and percolated wastewater effluent is not included in the reasonably available supply estimates.
3. Assumes tertiary treatment is not available until after 2020 at WRP-4.

3.4.1. Effects of the 2008-2011 Great Recession

Riverside County was hit particularly hard by the economic downturn that started in 2008. The recession resulted in a lower than projected growth rate for the Coachella Valley and, because the planning period for the 2010 CVWMP Update is through 2045, the effects of the recession on growth in the Coachella Valley have begun and will continue to attenuate over the long-term. The 2010 CVWMP Update incorporates these factors as it is assumed that development within the Coachella Valley will continue and that the Riverside County Planning growth forecast is applicable in the long term.

In CVWD's 2010 CVWMP Update (2014 CVWMP Status Report), the RCP-2010 population projections were considered, and future water demands were reevaluated. Using RCP-2010 results in an estimated 22 percent lower urban water demand in 2035 and a 13 percent higher agricultural water demand. Overall demand would be about 14 percent lower in 2045. It is important to note that this is not an elimination of demand but a deferral of demand to later years. Growth will continue but at a slightly slower rate.

Water conservation is a major component of future water management. CVWD is committed to reducing its urban water use by 20 percent by 2020. Therefore, CVWD has been conservative in the calculation of 2015

and 2020 urban conservation targets. 2010 U.S. Census data was not available to be used in the preparation of the 2015 UWMP. CVWD used 2000 Census data. CWC Section 10608.2 allowed urban water suppliers to update 2020 urban targets in the 2015 UWMP based on the availability of 2010 Census data. Because CVWD's recalculated urban conservation targets were higher than those committed to in the 2010 UWMP, CVWD retained its 2010 targets of 540 gallons per capita per day (gpcd) by 2015, and 473 gpcd by 2020, which will result in greater water savings. CVWD's actual 2015 water use was 383 gpcd. Drought restrictions played a significant role in achieving this reduction.

The golf industry represents a significant water demand sector in the Coachella Valley and is expected to remain so in the future. CVWD, working in cooperation with the Southern California Golf Association and the local golf community, has established a Golf and Water Task force to reduce overall golf course water use by ten percent.

The 2010 CVWMP Update assumes that fish farm and duck club growth will be much lower than projected in the 2002 CVWMP. Some of the large fish farms have moved from the traditional fish farming business. The replacement use at these farms is suspected to significantly reduce the water demand. Based on available information, fish farm demand of 8,500 AFY and duck club demand of 2,000 AFY was assumed.

It was also assumed that growth occurring on tribal land will be similar to other areas in the Coachella Valley, and land uses will be proportional to growth that occurs on non-tribal land in the eastern Coachella Valley. Corresponding water demands are calculated based on this growth assumption.

The 2010 CVWMP Update increases the water conservation requirement during the next 35 years. A 14 percent reduction in agricultural water use is targeted by 2020. For urban water use, CVWD's Landscape Ordinance 1302.3, updated in 2017, will govern the irrigation demands of new golf courses as well as reduce the demands of existing golf courses by 10 percent.

The 2010 CVWMP Update water demand projections for the Whitewater River (Indio) Subbasin, for the period of 2010 to 2030 in five-year intervals, increases from 678,000 AFY in 2010 to 783,300 AFY in 2030, or 15 percent.[50] During this same period, using RCP-2006 projections, the population in the Coachella Valley is estimated to increase by over 100 percent, or about four percent per year. In the 2014 CVWMP Status Report, RCP-2010 projections were used and the Whitewater River (Indio) Subbasin water demand was revised to 691,500 AFY in 2030, a 12 percent reduction.

The Great Recession also affected the CVWD's improvement projects. However, on June 13, 2017, CVWD Board of Directors approved a $369 million operating and capital improvement budget for fiscal year 2017-18 to keep domestic water rates stable.[51] CVWD is allocating sufficient budgets for improvement project within the Coachella Valley to provide water services to its customers.

3.4.2. Groundwater and Groundwater Storage

As supply and demand change, the amount of groundwater in storage changes to make up the difference between demand and supply. Other than canal water and recycled wastewater, all water delivered to urban water users is obtained from the groundwater basin. The Coachella Valley Groundwater Basin has the capacity of approximately 39.2 million AF. It currently contains about 25 million AF and acts as a very large reservoir. It is capable of meeting the water demands of the Coachella Valley for extended periods.

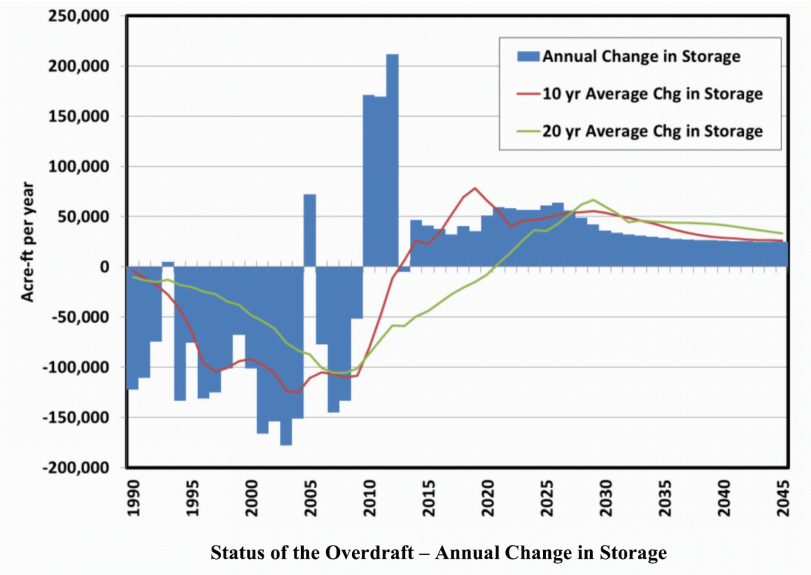
As discussed in the 2010 CVWMP Update, CVWD has many programs to maximize the water resources available to it, including groundwater recharge with its Colorado River and SWP supplies, recycled wastewater, substitution of groundwater uses with canal water, and conservation, including tiered water rates, a landscaping

[50] Status Report for the CVWD's 2010 CVWMP Update, https://www.cvwd.org/ArchiveCenter/ViewFile/Item/474.
[51] CVWD Website News- CVWD approves budget, keeps domestic water rates stable, http://www.cvwd.org/CivicAlerts.aspx?AID=213.

ordinance, and outreach and education. The 2010 CVWMP Update and CVWD groundwater replenishment programs establish a comprehensive and managed effort to eliminate overdraft.

Graph 2 illustrates the long-term progression towards eliminating overdraft with successful implementation of the 2010 CVWMP Update and 2015 UWMP programs. These programs allow CVWD to maintain the groundwater basin as its primary water supply and to recharge the groundwater basin as other supplies are available.

The 2014 CVWMP Status Report evaluated progress on eliminating overdraft. The report illustrates the effectiveness of the CVWMP programs and shows that overdraft did not occur in the ten years from 2003 to 2013. The report also shows that, with continued implementation of CVWMP programs, overdraft will be eliminated in 2022. The effectiveness of CVWD's programs is clear and shows that there will be a steady increase in water in storage with limited disruption to this pattern through 2045.



Graph 2. Status of the Overdraft – Annual Change in Storage

3.4.3. Coachella Canal Water

Colorado River supplies available to CVWD under the 1931 Seven Party Water Priority 43 Agreement and QSA are considered in the 2015 UWMP and 2010 CVWMP Update. CVWD has maximized delivery of these supplies by participating in canal lining projects. In 2008 the canal was fully lined.

The annual reporting of CVWD Colorado Diversions at Imperial Dam for the period 1964 to 2008 were prepared as required by the U.S. Supreme Court decree. CVWD's average annual diversion for this 45-year period was 402,702 AFY. CVWD's average annual diversion for the period 1983 to 2008 (26 years of decree records) was 328,698 AFY. The difference of 74,004 AFY is the result of the water conserved by the lining of the first 49 miles of the Coachella Branch of the American Canal by the USBR under repayment contract with CVWD.

The QSA assures that CVWD receives a quantified allotment of Colorado River supplies. The QSA has been unsuccessfully challenged in State and federal courts and remains in effect. In the most recent 6-year period (2008 to 2013), the annual average diversion was 313,971 AFY.

3.4.4. Additional Table A Amounts

As SWP contractors, CVWD and DWA have a combined allocation of 194,100 AF. According to the 2017 SWPDCR update, there is 77% likelihood that more than 2.235 million AFY of SWP Table A water will be delivered under the current estimates to the SWP contractors.

According to the CVWD's Engineer's Report on Water Supply and Replenishment Assessment 2018-2019 Mission Creek, East Whitewater River, and West Whitewater River Subbasin AOBs, in its efforts to maintain water supplies in the Coachella Valley, CVWD has requested its maximum 2017 Table A SWP allocation of 138,350 AF pursuant to the SWP Contract. DWA also requested its maximum 2017 Table A water allocation, which is currently 55,750 AF. During 2017, DWR allocated 85% of each Contractor's Table A Amount. However, CVWD, DWA, and MWD carried over 110,768 AF in SWP reserves for delivery during 2018.

3.4.5. State Water Project Reliability

The 2017 SWPDCR provides the SWP delivery amounts based on computer modeling that incorporates the historic range of hydrologic conditions (i.e., precipitation and runoff) that occurred from water years 1922 through 2003. Historic hydrologic conditions are adjusted to account for land-use changes (i.e., the current level of development) and upstream flow regulations that characterized 2017, and current sea levels reflecting sea level rise. By using this 82-year historical flow record, the delivery estimates modeled for existing conditions reflect a reasonable range of potential hydrologic conditions from wet years to critically dry years.

The DWR issues the SWPDCR every two years to assist SWP contractors in the assessment of the adequacy of their water supply. SWP delivery reliability is of direct interest to them and those they serve because it is an important element of their overall water supply. The most recent report, the 2017 SWPDCR, was released on December 15, 2017.

Many of the same specific assumptions on SWP operations described in the 2015 SWPDCR remained the same in the 2017 SWPDCR Update. These included, most notably, the effects on the timing and the amount of SWP and Central Valley Project (CVP) Delta diversions, by operating the system to meet the constraints spelled out in the 2008 and 2009 federal biological opinions (BOs). Hence, the differences between the 2015 and 2017 reports can be attributed primarily to inputs on operating assumptions that result in a realistic simulation study, with the least amount of foresight on the historical hydrology (October 1921-September 2003) used in the simulation.

SWP Delta exports have decreased since 2005, although the bulk of the change occurred by 2009 as the federal BOs went into effect, restricting operations of the CVP and SWP diversion pumps. The most salient findings in the 2017 SWPDCR are as follows:

- Under existing conditions, the average annual delivery of SWP Table A water estimated for the 2017 SWPDCR is 2.571 million AFY, 21 million AF more than the 2.550 million AFY estimated for the 2015 SWPDCR; and
- The likelihood of existing-condition SWP Article 21 deliveries (supplemental deliveries to Table A water) being greater than 20 million AFY has decreased by 2% relative to the likelihood presented in the 2015 SWPDCR.

Based on the 2017 SWPDCR Update, the current combined maximum SWP Table A amount is 4.173 million AFY. The estimated demands by SWP Contractors for deliveries of Table A water from the Delta under existing conditions is assumed to be the maximum SWP Table A delivery amount for the 2017 SWPDCR. Estimated demand for SWP Table A water is 1 million AFY higher than the 2015 SWPDCR since the maximum Table A demand amount for some SWP Contractors has changed in Table 4-1, according to the California State Water Project Bulletin 132. Please see Table 4-1 in 2017 SWPDCR for the maximum annual SWP Table A water

delivery amounts for SWP Contractors. Due to the fact that SWP Contractors have been requesting the full amount in recent years, the 2015 and 2017 SWPDCRs more accurately reflect the trend in demand.

3.4.6. Metropolitan Water District of Southern California Callback

In 1984, MWD, DWA, and CVWD entered into an advanced delivery agreement, which allowed MWD to store water from its Colorado River Aqueduct in the Coachella Valley. Prior to this agreement, DWA and CVWD were exchanging their annual SWP Table A amount with MWD for the same amount of water from MWD's Colorado River Aqueduct (SWP Exchange Water). This exchange is necessary because the SWP conveyance system does not extend into the Coachella Valley. The 1984 agreement allows MWD to deliver more water into the Coachella Valley during wet periods, or periods when it has excess water, and to build a credit that it can use to provide the water in exchange for DWA's and CVWD's Table A amounts during dry periods. This ability for advanced delivery and exchange creates a conjunctive use program among the three agencies.

In 2003, MWD, DWA, and CVWD entered into an exchange agreement whereby MWD transferred title to 100,000 AF of its SWP Maximum Table A amount to DWA and CVWD. Under the agreement, MWD obtained the right to callback the SWP water for its use for a maximum number of times in a given period of years. The 100,000 AF was divided into two 50,000 AF blocks. The 2015 UWMP assumes that MWD will periodically exercise its option to callback the 100,000 AFY. This is also in accordance with the 2010 CVWMP Update. The actual callback would depend on availability of MWD's supplies to meet its demands. Since 2003, MWD exercised its callback option one time, in 2005.

3.4.7. Long-Term Average SWP Deliveries

The amount of SWP supply that is available to CVWD for its own use was considered as the long-term average SWP supply. The published capability of the SWP water has decreased over time. Factors that could affect SWP capability considered in the 2015 UWMP and the 2010 CVWMP Update are:

- Uncertainty in modeling restrictions associated with biological opinions,
- Risk of levee failure in the Delta;
- Additional pumping restrictions resulting from biological opinions on new species of revisions to existing biological opinions;
- Impacts associated with litigations such as State and federal Endangered Species Act lawsuits, and
- Climate change impacts.

Due to these factors and the need to plan for higher contingency, the planning assumption in the 2010 CVWMP Update and the 2015 UWMP is that the long-term future average SWP capability will be at 50 percent until successful completion of the Bay-Delta conservation Plan and Delta conveyance facilities.

Groundwater basin recharge through direct and in-lieu (indirect) recharge is a major element of CVWD's water management activities. CVWD has spent over $43.5 million on the construction of the TELGRF in the eastern Coachella Valley and over $42 million on the construction of the Mid-Valley Pipeline to move canal water into the northern Coachella Valley for source substitution of groundwater. The Palm Desert Groundwater Replenishment Facility, currently under construction, is estimated to cost $9.8 million; much of its funding is from replenishment assessment charges paid by public and private entities that use wells to pump groundwater. The protection of the aquifer storage will be addressed through additional water supply purchases, water conservation, and source substitution similar to the ones described in the 2010 CVWMP Update.

Available supplies and water demands for CVWD's service area were analyzed in the water supply conditions of the 2015 UWMP to assess the region's ability to satisfy current and future urban water demands, including those of the Project, under three scenarios: a normal water year, a single dry year, and multiple dry years. According to the 2015 UWMP, the urban water demands in the CVWD service area (retail supply totals) are estimated to grow from 114,600 AFY in 2020 to 194,300 AFY in 2040. Total buildout water demand of the

Project is estimated to be approximately 165.21 AFY, or 9.34 AF per acre, from which approximately 106.75 AFY could be offset by the turf reduction program and 8.54 AFY would be provided from the use of non-potable water for landscaping water demands.

The following tables provide CVWD's projected water supplies and demands in a normal year, single dry year, and multiple dry years. These tables combine retail and wholesale numbers to simplify the presentation. It should be noted that the retail supplies and demands presented in the tables below include recycled water delivered to CVWD's non-urban customers based on DWR's standardized tables and the 2015 UWMP Guidebook. However, as discussed in Sections 4 and 6 of the 2015 CVWD UWMP, recycled water is not considered an urban water supply and is not delivered to CVWD's urban water customers. Instead, recycled water is used to offset the groundwater pumping of private well owners (mainly golf courses) to eliminate overdraft. The wholesale demand and supply listed is the anticipated sale of raw Colorado River water to the IWA. These tables indicate that CVWD will be able to meet current and future urban water demand needs through groundwater pumping, recharge with Colorado River water, and distribution of treated Colorado River water during normal, single dry, and multiple dry years.

DWR requires the supply reliability tables to include both potable and recycled water; this is summarized below in Table 22 for the average year.

Table 22
Normal Year Supply and Demand Comparison
Water Years 2020-2040

		2020	2025	2030	2035	2040 (Opt)
Retail	Supply Totals (AF)	128,900	163,800	188,500	212,800	230,600
	Demand Totals (AF)	128,900	163,800	188,500	212,800	230,600
	Difference (AF)	0	0	0	0	0
Wholesale	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Difference (AF)	0	0	0	0	0

Source: CVWD 2015 UWMP, Table ES-2 and 3.
Adapted from DWR Table 7-2 R and DWR Table 7-2 W.

CVWD does not use recycled water in its urban water supply; therefore, a version of this table without recycled water is presented in Table 23, which more accurately represents CVWD's urban water supply reliability.

Table 23
Normal Year Supply and Demand Comparison
Urban Supply Only

		2020	2025	2030	2035	2040 (Opt)
Retail	Supply Totals (AF)	114,600	136,100	157,700	178,900	194,300
	Demand Totals (AF)	114,600	136,100	157,700	178,900	194,300
	Difference (AF)	0	0	0	0	0
Wholesale	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Difference (AF)	0	0	0	0	0

Source: CVWD 2015 UWMP, Table ES-1 and 2.

Urban water supplies during the single dry year are 100% reliable. Thus, the supply and demand comparison for the single dry year, shown in Table 24, is the same as the average year.

Table 24 Single Dry Year Supply and Demand Comparison Water Years 2020-2040						
		2020	**2025**	**2030**	**2035**	**2040 (Opt)**
Retail	Supply Totals (AF)	128,900	163,800	188,500	212,800	230,600
	Demand Totals (AF)	128,900	163,800	188,500	212,800	230,600
	Difference (AF)	0	0	0	0	0
Wholesale	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Difference (AF)	0	0	0	0	0
Source: CVWD 2015 UWMP, Table 7-3. Adapted from DWR Table 7-2 R and DWR Table 7-2 W.						

Table 25 presents the urban supply and demand comparison without recycled water.

Table 25 Single Dry Year Supply and Demand Comparison Urban Supply Only						
		2020	**2025**	**2030**	**2035**	**2040 (Opt)**
Retail	Supply Totals (AF)	114,600	136,100	157,700	178,900	194,300
	Demand Totals (AF)	114,600	136,100	157,700	178,900	194,300
	Difference (AF)	0	0	0	0	0
Wholesale	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
	Difference (AF)	0	0	0	0	0
Source: CVWD 2015 UWMP, Table ES-1 and 2.						

Similar to the single dry year, the multiple dry year urban water supply reliability is 100 percent. Table 26 summarizes the multiple dry year supply and demand comparison.

Table 26 Multiple-Dry Water Years 2010-2035 (AFY)							
			2020	2025	2030	2035	2040 (Opt)
Retail	Year 1	Supply Totals (AF)	128,900	163,800	188,500	212,800	230,600
		Demand Totals (AF)	128,900	163,800	188,500	212,800	230,600
		Difference (AF)	0	0	0	0	0
	Year 2	Supply Totals (AF)	128,900	163,800	188,500	212,800	230,600
		Demand Totals (AF)	128,900	163,800	188,500	212,800	230,600
		Difference (AF)	0	0	0	0	0
	Year 3	Supply Totals (AF)	128,900	163,800	188,500	212,800	230,600
		Demand Totals (AF)	128,900	163,800	188,500	212,800	230,600
		Difference (AF)	0	0	0	0	0
Wholesale	Year 1	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Difference (AF)	0	0	0	0	0
	Year 2	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Difference (AF)	0	0	0	0	0
	Year 3	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Difference (AF)	0	0	0	0	0
Source: CVWD 2015 UWMP, Table 7-7 (Page 7-12).							

Table 27 presents the urban supply and demand comparison without recycled water.

Table 27 Multiple-Dry Water Years 2010-2035 (AFY) – Urban Only							
			2020	2025	2030	2035	2040 (Opt)
Retail	Year 1	Supply Totals (AF)	114,600	136,100	157,700	178,900	194,300
		Demand Totals (AF)	114,600	136,100	157,700	178,900	194,300
		Difference (AF)	0	0	0	0	0
	Year 2	Supply Totals (AF)	114,600	136,100	157,700	178,900	194,300
		Demand Totals (AF)	114,600	136,100	157,700	178,900	194,300
		Difference (AF)	0	0	0	0	0
	Year 3	Supply Totals (AF)	114,600	136,100	157,700	178,900	194,300
		Demand Totals (AF)	114,600	136,100	157,700	178,900	194,300
		Difference (AF)	0	0	0	0	0
Wholesale	Year 1	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Difference (AF)	0	0	0	0	0
	Year 2	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Difference (AF)	0	0	0	0	0
	Year 3	Supply Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Demand Totals (AF)	5,000	10,000	20,000	20,000	20,000
		Difference (AF)	0	0	0	0	0
Source: CVWD 2015 UWMP, Table 7-7 (Page 7-12).							

3.4.8. Summary

As summarized below in Table 28, projected water demand associated with the Proposed Project is approximately 165.21 AFY, or 9.34 AF per acre, which represents 0.09 percent of CVWD's total projected

Urban Water demand in 2040. After accounting for offsets associated with implementation of the turf reduction program at the Desert Willow Golf Course (106.75 AFY), the net total water demand for the Project is expected to be 58.46 AFY. This represents approximately 0.03 percent of the total projected water supply of 194,300 AF in 2040.

Per the 2015 UWMP and the 2010 CVWMP Update, CVWD included water for new development that it assumed would occur within its service area. The projected demand for the project will therefore account for only a small fraction of the projected demands.

Table 28
Impact of Project Demand on Projected Urban Water Supply

DSRT SURF	2040[2]
Total CVWD Projected Supply	194,300 AF
Project Demand	165.21 AF
Project Demand	9.34 AF per acre
% of Total Projected Supply	0.09
Net Project Demand with Implementation of Turf Reduction Program	58.46 AF (3.30 AF per acre)
% of Total Projected Supply	0.03

Source: Total supply extrapolated from 2015 UWMP, Table 7-4**.**

4. Conclusions

Based on the analysis in this Water Supply Assessment/Water Supply Verification (WSA/WSV), the projected total water demand for the DSRT SURF Project (Project) will be 165.21 acre-feet per year (AFY), or 9.34 acre-feet (AF) per acre. This represents approximately 0.14 percent of the total projected water supply of 114,600 AF for 2020, and would represent 0.09 percent of the total projected water supply of 194,300 AF for 2040 as shown in the Coachella Valley Water District's (CVWD's) 2015 Urban Water Management Plan (UWMP). According to CVWD's 2015 UWMP, available water supplies are sufficient to meet the anticipated demand for 2020 through 2040 during normal, single dry, and multiple dry water years. In addition, after applying the water demand offsets associated with implementation of the proposed turf reduction program at the Desert Willow Golf Course (106.75 AFY), the net total water demand for the Project is expected to be 58.46 AFY. This represents approximately 0.05 percent of the total projected water supply of 114,600 AF for 2020, and would represent 0.03 percent of the total projected water supply of 194,300 AF in 2040. CVWD has sufficient water supplies to meet the total water demands of the Project for the next 20 years. This result is derived based on the volume of water available in the aquifer, CVWD's Colorado River contract supply, State Water Project (SWP) Table A amounts, water rights and water supply contracts, and CVWD's commitment to eliminate overdraft and reduce per capita water use in CVWD's service area.

The domestic water supply (potable) for the Project will be from the Whitewater River (Indio) Subbasin in the Coachella Valley Groundwater Basin. Groundwater storage will be used in dry years to make up the difference between the demand and the supply. This groundwater subbasin has a storage capacity of approximately 29.8 million acre-feet (AF), simulating the benefit of a very large reservoir, and is capable of meeting the water demands of the Coachella Valley for extended normal and drought periods.[52]

[52] CVWD 2015 UWMP (page 8-14).

It is anticipated that the Project will incorporate elements of CVWD's water conservation plan as required by SBx7-7. These include conservation elements for indoor and outdoor use. This may further reduce the ultimate Project water demands.

5. Water Supply Verification

5.1.1. General

A Water Supply Verification (WSV) has also been prepared for the DSRT SURF Project (Project) pursuant to the requirements of Senate Bill 221 (SB 221) because it includes a Tentative Parcel Map.

The purpose of SB 221 is to authorize the legislative body (or advisory agency) with tentative map approval authority to include as a condition in any tentative subdivision map a requirement that "a sufficient water supply will be available." (Gov. Code §66437.7(b)(1).) "Sufficient water supply" means the total water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. (Gov. Code §66437.7(a)(2).)

5.1.2. Water Source

As discussed in Section 2, Project domestic water supplies and associated landscape irrigation supplies will be provided from groundwater extracted from the Whitewater River (Indio) Subbasin. The Whitewater River (Indio) Subbasin is the largest of the four subbasins in the Coachella Valley Groundwater Basin;[53] the change is storage was a positive 192,900 acre-feet (AF) for water year 2017 (October 1, 2016 through September 30, 2017).

Currently there are approximately 324 monitored wells in the Whitewater River (Indio) Subbasin. The Project is proposing to install a groundwater well on the site to withdraw up to 73.04 acre-feet per year (AFY) of water from the Whitewater River (Indio) Subbasin for the surf lagoon.

5.1.3. Supporting Documentation

This WSV relies on the Coachella Valley Water District's (CVWD's) 2010 Coachella Valley Water Management Plan Update (2010 CVWMP Update) and 2015 Urban Water Management Plan (2015 UWMP), as permitted by Gov. Code §66437.7.

5.2. Factors of Reliability

5.2.1. General

Government Code Section 66473.7(a) requires that the following factors must be considered in the WSV:

1. The availability of the water supply over 20 years;
2. The applicability of CVWD's Water Shortage Contingency Analysis;
3. The reduction of water supply to a specific user by ordinance or resolution; and
4. The reasonable amount of groundwater supply that can be relied upon (i.e. natural sources as well as the supporting recharge water sources within agreements for Colorado River water and State Water Project (SWP) water.

5.2.2. Availability of Water Supply

The Coachella Valley has been primarily dependent on groundwater as a source of domestic water for several decades. The 2010 CVWMP Update and the 2015 UWMP both reviewed the historical use of water in the

[53] 2018 Coachella Valley Integrated Regional Water Management & Stormwater Resource Plan, prepared by Coachella Valley Regional Water Management Group In Collaboration with the Planning Partners.

Coachella Valley through 2015. In 1936, groundwater use totaled 92,400 AFY and increased steadily to about 376,000 AFY in 1999 and 398,510 AFY in 2007 in the Coachella Valley. Most recent annual water use for CVWD's total service area is approximately 639,857 AF (based on year 2015). Deliveries of Colorado River water and Metropolitan Water District of Southern California (MWD) SWP transfer water assist in offsetting groundwater use. Colorado River water deliveries have averaged approximately 332,301 AFY over the past five years, with MWD deliveries to the Coachella Valley expected to average over 60,000 AFY.

5.2.3. Coachella Valley Water District's Water Shortage Contingency

The CVWD developed its Water Shortage Contingency Plan during the 1986-92 drought pursuant to the requirements of the Government Code 10632.[54] CVWD implemented its water shortage contingency plan through a series of ordinances with phased water use restrictions and a drought penalty rate structure:

- Ordinance 1414 – Stage 2 – 10% Mandatory Reduction;
- Ordinance 1419 – Stage 3 – 36% Mandatory Reduction;
- Ordinance 1422 – Stage 3 – Adopt Additional Watering Restrictions; 36% Mandatory Reduction; and
- Ordinance 1426 – Stage 3 – Replace Previous Ordinances, 32% Mandatory Reduction.

After the State Water Resources Control Board's (SWRCB's) adoption of revised regulations in May 2016, CVWD repealed these ordinances and adopted Ordinance 1422.3 which establishes Stage 2 restrictions that remain in effect until the SWRCB rescinds its emergency regulations.

The key element of CVWD's water shortage contingency plan is an ordinance with phased water use restrictions and a drought-related rate structure as summarized in Table 29.

Table 29
Summary of Coachella Valley Water District's Water Shortage Contingency Plan

Stage*	% Supply Reduction	Water Supply Condition
I	10	Normal water supplies
II	10	10% reduction in total groundwater and imported supplies relative to long-term average conditions
II	20	25% reduction in total groundwater and imported supplies relative to long-term average conditions
IV	50	50% reduction in total groundwater and imported supplies relative to long-term average conditions

* Stage 1 is voluntary reduction, stages 2 through 4 are mandatory reductions.
The Stage 2 and 3 reduction targets are flexible and may be adjusted by CVWD Board action based on actual supply conditions.
Source: 2015 UWMP, Table ES-6.

5.2.4. Reduction of Water Supply

The Project is within the CVWD's service area. No reduction of water supply is expected to the Project area due to this Project's use of water resources, or due to CVWD's ongoing management of water resources and planning for growth within its service area and throughout the Coachella Valley. CVWD's Colorado River water rights and SWP Table A allotments will provide supplemental water for direct use and groundwater recharge to the Coachella Valley.

[54] CVWD's 2015 Urban Water Management Plan.

In addition, CVWD proposes to develop direct treatment of Colorado River Water for potable uses in the future. The Coachella Valley Groundwater Basin has the capacity to meet future demands. Based on the information provided in the 2015 State Water Project Delivery Capability Report (2015 SWPDCR), CVWD's Colorado River water rights, recycled water, and water conservation program, water supplies will be sufficient to meet the Project's demands and CVWD's existing and future demands. In the event that additional conservation and/or limitations are necessary, the Project would adhere to any and all limitations associated with this potential reduction in supply.

5.3. Impacts on Other projects

The Project involves residential, commercial, retail, recreational, and surf lagoon uses. The CVWD's 2015 UWMP considered residential, commercial, and retail for future water demand projections. In addition, recreational land uses (e.g., swimming pools, lakes, and duck ponds) are considered in CVWD's 2015 UWMP. A surf lagoon is a unique land use that was not specifically included in the CVWD's future water projections; however, it falls under the broader recreational land use category, and CVWD does not discourage distinctive recreational land uses.

As discussed above, the Project site is located within the Desert Willow Golf Course where approximately 143.08 AFY of water has been used to irrigate turf landscaping at the Firecliff and Mountain View Golf Courses. As part of the Project, these turf areas will be replaced with desert landscaping which would offset Project's water demand by up to 106.75 AFY.

Based on the Project's water consumption, and CVWD's available water supply, the Project will not impact other users' water needs. The Project will comply with CVWD conservation measures and its water-efficient landscaping requirements and could be required to fund additional supplies if demand increases substantially.

5.4. Rights to Groundwater

CVWD has the legal authority to manage the groundwater basins within its service area under the County Water District Law (California Water Code, Division 12). The Coachella Valley Groundwater Basin is not adjudicated. CVWD has the right to extract the groundwater as needed to supply this Project. In 2015, CVWD filed a Notice of Election with the California Department of Water Resources (DWR) to become a Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Agency (GSA), and has submitted the 2010 CVWMP Update as the Alternative to a Groundwater Sustainability Plan (Alternative Plan) for the Whitewater River (Indio) Subbasin.

5.5. Verification

This document provides verification that adequate water supply for the Project is available, as required by California Government Code Section 66473.7.

6. List of acronyms

AF	Acre-Feet
AFY	Acre-Feet per Year
AOB	Area of Benefit
AWWARF	American Water Works Association Research Foundation
CEQA	California Environmental Quality Act
CFS	Cubic Feet per Second
CVRWMG	Coachella Valley Regional Water Management Group
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CVWMP	Coachella Valley Water Management Plan
CWC	California Water Code
DWA	Desert Water Agency
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
IID	Imperial Irrigation District
IRWMP	Integrated Regional Water Management Plan
IWA	Indio Water Authority
MAWA	Maximum Applied Water Allowance
MDMWC	Myoma Dunes Mutual Water Company
MGD	Millions Gallons per Day
MWD	Metropolitan Water District of Southern California
PWS	Public Water System
QSA	Quantification Settlement Agreement
RWRCB	Regional Water Resources Control Board
SB 221	Senate Bill 221
SB 610	Senate Bill 610
SDCWA	San Diego County Water Authority
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
SWRCB	State Water Resources Control Board
SWSC	Supplemental Water Supply Charge
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
WRP	Water Reclamation Plant
WSA	Water Supply Assessment
WSV	Water Supply Verification

7. References

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Appendix A
Turf Reduction Location Map and Golf Course Landscape Architect's Analysis

PRELIMINARY

Golf Course Landscape Architect's Analysis

of

Desert Willow Golf Resort

Palm Desert, California.

The following is a summary of observations made by HSA Design Group regarding the golf course landscape at Desert Willow Golf Resort. The review, completed during a three day review of the golf courses, was initiated by turf reduction recommendations outlined in a golf course design review conducted by Hurdzan Golf Design in April of 2014.

Eventually, our comments will include recommended planting styles for the new desert areas, but we have also reviewed the overall appearance, maintenance and general maturation of the landscape throughout the golf course and the golf course boundaries.

General Recommendations:

- Many of the large plants throughout the course have become overgrown and are reaching their maturity. The *baccharis pilularis* continues to invade into many of the large desert landscape beds and in many areas has become terribly overgrown and obtrusive. We recommend that this plant be removed from all of the golf course areas. The *encilia farinosa* is also invading profusely as it gets irrigated from overspray from turf heads.
- Hurdzan's recommendations include a significant amount of area that is proposed for conversion of turf to desert landscape. We are proposing that the first 10 to 20 feet of border along the turf edge be converted to a "Sparse DG" zone. This zone would consist of mainly compacted DG with very sparse planting of upright type desert plants. The intent of this zone is to allow golf balls to roll through and back down into the turf, or if they do stay in the DG, they are "findable" and playable. This will maintain speed of play and reduce costs associated with trimming and maintaining plants in this playable zone.
- Beyond this zone the converted landscape areas will be planted with a desert palette consistent with the existing landscape throughout the course.
- Overspray of irrigation into the landscaped areas – especially around tees – promotes vigorous growth of many desert plants that become overgrown and require consistent maintenance to keep them under control. Overspray into landscape zones should be minimized at all costs in an effort to save money and maintain a natural desert environment.
- The golf course landscape that is closely adjacent to the clubhouse should reflect a more carefully maintained appearance. The areas adjacent to the first tees and the finishing holes should have more colors and textures to enhance the golfing experience.

- Due to budget restraints and a reduced maintenance budget, the course has created maintenance zones within the boundary of the project. Out of play zones essentially receive no maintenance at all, while some desert areas immediately next to play receive maintenance once a month or less. This approach is acceptable, as long as the out of play areas are not immediately visible to the golfing public. We recommend that a representative from the golf course and/or the City review the appearance of the landscape on a regular basis to determine zones that require more maintenance or specific attention.
- The maintenance personnel and operations department must be more diligent in reviewing course appearance on public courses. Private courses have members that play regularly and provide comments to the staff regarding issues that arise on the course. On a public course, the golfer is less likely to provide suggestions for maintenance or operational improvements for landscaped zones.

Hole by Hole observations:

The following observations go beyond the recommendations of the Hurdzan report to address issues that we feel should be considered as part of any work proposed for the course.

The Firecliff Course

Hole 1

- Improve the overall appearance of the #1 tees by introducing more colorful and textural plants.
- With the addition of the new tee to the left, does the tee on the right get eliminated?
- Recommend pruning, removal and/or replacement of various overly mature shrubs around the tee area.
- Add some color to backdrop planting at the green.

Hole 2

- Add screening to left of back sets of tees
- Selective removal of palms along lake edge behind green to open up filtered views to lake.

Hole 3

- Trim or remove trees along left side to open up views to left hand bunker.
- Remove turf connection to #2 to left of cartpath by green.
- Expand turf reduction at left of green.

Hole 4

- Trim tree front right of tees to view waste area.
- Third tee will be difficult to expand to right per the Hurdzan plans. Can expand left easily.
- Leave turf access to front left of green for carts
- Add small desert planting behind greenside bunker to screen traffic .

Hole 5

- Large sandy areas left of tees are unsightly, add landscape.
- Convert greenside turf removal to waste.
- Add trees behind green to screen views to 3 fairway.

Hole 6

- Remove and trim trees to open up view from tees to lake.
- Remove invasive palms from lake edge.
- Add screening shrubs to block views to pump station.

Hole 7

- Add dense screening plants along perimeter wall

- Add low shrubs on slope below tees.
- Opportunity to add more desert scape at front left of green along cartpath.

Hole 8

- Create isolated tee tops similar to all other holes.

Hole 9

- Remove stalks and tall plants as part of regular maintenance.
- Add desert landscape right side of new tees
- Selective pruning of trees and shrubs to promote bunker views
- Expand turf near fairway entry to reduce wear on grass.
- Create colorful, textural landscape at intersection of cartpath and main clubhouse path.

Hole 10

- Overspray is causing undesirable growth around tees.

Hole 11

- Selective shrub removal to open up fairway views but screen blowoff.
- Remove and clean out mature and dead plants at tees.
- Improve access and visibility to tees from cartpath.
- Shift 4th set of tees 10' to 15' to left to save tree to front right.
- Trees on right block view of fairway bunkers and golf hole
- Don't remove turf under tree canopies – lots of play in this area.

Hole 12

- Trim and remove shrubs blocking views from tees.
- Remove turf from steep slopes along cartpath.

Hole 13

- Convert area right of cartpath to waste area to make it playable.
- Change turf removal plan along cartpath to make fairway access more appropriate.
- Remove turf behind green and add landscape to screen cartpath and separate hole from 14.

Hole 14

- Shrubs left of 14 tees to be removed and replaced with a selection of lower growing, textural desert plants.
- Views to lake are stunning on this hole and are totally blocked now.

Hole 15

- Remove mature and unsightly plants at tees.
- Slope on right of landing area is very steep. Needs to be regraded to convert to desert scape.

Hole 16

- Add tall screening shrubs at wall to block view to adjacent area.

Hole 17

- Very difficult to expand tee to right due to grading.
- Selective removal of plants and palms to open up views to stream and GFRC.

Hole 18

- Selective removal and trimming of plants to open up tee shots and views to fairway.
- Palms and invading plants growing in stream need to be removed to open up views at tees and along fairway.

Mountain View Course

General Observations

The Moutain View course has a much more lush appearance to it since turf extends well beyond the normal play area of the golfer. There is an opportunity to remove more turf throughout this course and still maintain this lusher, greener feel.

Hole 1

- No immediate comments.

Hole 2

- More study of access to golf hole along fire access road is required.
- Add trees along right side to screen pads from golf hole.

Hole 3

- Selective trimming and removal of plants at tees.
- Add plants or vines along wall at tees.
- Remove and replace baccharis along right side of fairway.
- Do not remove turf along cartpath past fairway bunkers on left – leave for fairway access.
- Possibly remove turf next to path short of 2nd landing area.

Hole 4

- Remove non-naturalized trees that have invaded.
- Do not remove as much turf on left of fairway as shown.
- Add trees on left in landscape to screen adjacent pad.

Hole 5

- Tees on this hole have DG around them. Not consistent with remaining Mountain View course. Consider this approach at other holes for additional turf reduction.
- Remove stalks on agaves
- Expand desert scape along path.

Hole 6

- Selective palm removal from stream edge to open up views to stream.
- Bunker near 2nd landing area is not shown in Hurdzan plan – does it get removed?
- Selective shrub removal and trimming at lake by green to open views to green.

Hole 7

- Remove turf at cartpath corner after it crosses fairway.
- Do not remove turf along path 200 yards off the tees.
- Create desert scape behind green to screen views to 8 tees.

Hole 8

- Remove palm in front of tees.
- Consider converting fairway to waste or SDS.
- The cartpath realignment near the green could be more aggressive to allow adjacent property pad to expand.

Hole 9

- Remove additional turf along cartpath on left in front of the resort.
- Remove turf along stream on right to help define golf hole.
- Remove turf in between rock along streambed.
- Expand turf removal behind bunker complex on the left.
- Remove turf behind green to screen cartpath.

Hole 10

- Trim plant material in arroyo area in front of tees.
- Convert turf to desert scape along path next to cartpath (3 areas)

Hole 11

- Extend desert scape at front right of tees to create separatation from 10 green.
- Do not remove as much turf as shown next to fairway.
- Option to move cartpath closer to fairway and provide access to fairway from south.
- Expand turf reduction behind fairway at green and provide narrow turf walk-on to green.

Hole 12

- Remove nose of turf in waste area.
- Expand turf removal along right side to provide more landscape buffer to pads.
- Remove additional turf behind left side fairway bunker complex and near green.
- Add trees behind green to screen views to 13 tees.
- Leave turf at right side of green since it is too steep to remove.

Hole 13

- Opportunity for additional turf removal on noses by tees.
- Opportunity for additional turf removal along left side by cartpath and at back left of green.

Hole 14

- Additional turf removal along left side of cartpath past fairway bunker complex.
- Maintain turf behind bunker on left for definition.
- Additional turf removal to back right of green.

Hole 15

- Trim trees at tees to allow better views to left side of golf hole.
- Additional turf removal at tees and to back right of green.

Hole 16

- Trim trees at tees to allow better views to right side of golf hole.
- Convert waste area to desert scape to reduce maintenance.
- Remove additional turf by cartpath past left side bunker complex.

Hole 17

- Add low planting in waste to convert to desert scape.
- Remove lantana “hedge” at lake and convert to turf.
- Remove additional turf at cartpath access to fairway.
- Expand narrow waste to make it more natural.
- Opportunity to remove additional turf behind green – review in field.

Hole 18

- Opportunity to remove additional turf in front of forward tees next to the stream.
- Proposed turf removal near bridge crossing to access fairway.
- Recommended turf removal in out of play areas on right side of stream and lakes.
- Opportunity for turf removal behind fairway bunker complex on left.
- Remove turf behind bunkers to back right of green and along stream to back left.
- Add plant material to screen parking lot from golfers exiting the 18th green.

Desert Willow Golf Resort

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort

FIRECLIFF COURSE

Holes 1, 4, 5, 9

1

LEGEND

- *WASTE AREA LANDSCAPE*
- *SPARSE DESERT LANDSCAPE*
- *DESERT LANDSCAPE*
- *SPARSE DESERT LANDSCAPE (HSA ADDED)*
- *DESERT LANDSCAPE (HSA ADDED)*
- *TURF AREA (HSA ADDED)*
- *ENHANCED PLANTING (HSA ADDED)*
- *SCREENING PLANTING (HSA ADDED)*
- *ADDITIONAL TREES*

Desert Willow Golf Resort

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort

FIRECLIFF COURSE

Holes 2, 3, 6, 7

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort

FIRECLIFF COURSE

Holes 8, 15, 16, 17

LEGEND

- *WASTE AREA LANDSCAPE*
- *SPARSE DESERT LANDSCAPE*
- *DESERT LANDSCAPE*
- *SPARSE DESERT LANDSCAPE (HSA ADDED)*
- *DESERT LANDSCAPE (HSA ADDED)*
- *TURF AREA (HSA ADDED)*
- *ENHANCED PLANTING (HSA ADDED)*
- *SCREENING PLANTING (HSA ADDED)*
- *ADDITIONAL TREES*

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort

FIRECLIFF COURSE

Holes 10, 11, 18

Desert Willow Golf Resort

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort

FIRECLIFF COURSE

Holes 11, 12, 13, 14

5

LEGEND

- WASTE AREA LANDSCAPE
- SPARSE DESERT LANDSCAPE
- DESERT LANDSCAPE
- SPARSE DESERT LANDSCAPE (HSA ADDED)
- DESERT LANDSCAPE (HSA ADDED)
- TURF AREA (HSA ADDED)
- ENHANCED PLANTING (HSA ADDED)
- SCREENING PLANTING (HSA ADDED)
- ADDITIONAL TREES

HSA DESIGN GROUP

Desert Willow Golf Resort

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort
MOUNTAIN VIEW COURSE
Holes 1, 5, 6

6

LEGEND

- WASTE AREA LANDSCAPE
- SPARSE DESERT LANDSCAPE
- DESERT LANDSCAPE
- SPARSE DESERT LANDSCAPE (HSA ADDED)
- DESERT LANDSCAPE (HSA ADDED)
- TURF AREA (HSA ADDED)
- ENHANCED PLANTING (HSA ADDED)
- SCREENING PLANTING (HSA ADDED)
- ADDITIONAL TREES

Desert Willow Golf Resort

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort
MOUNTAIN VIEW COURSE
Holes 2, 3, 4

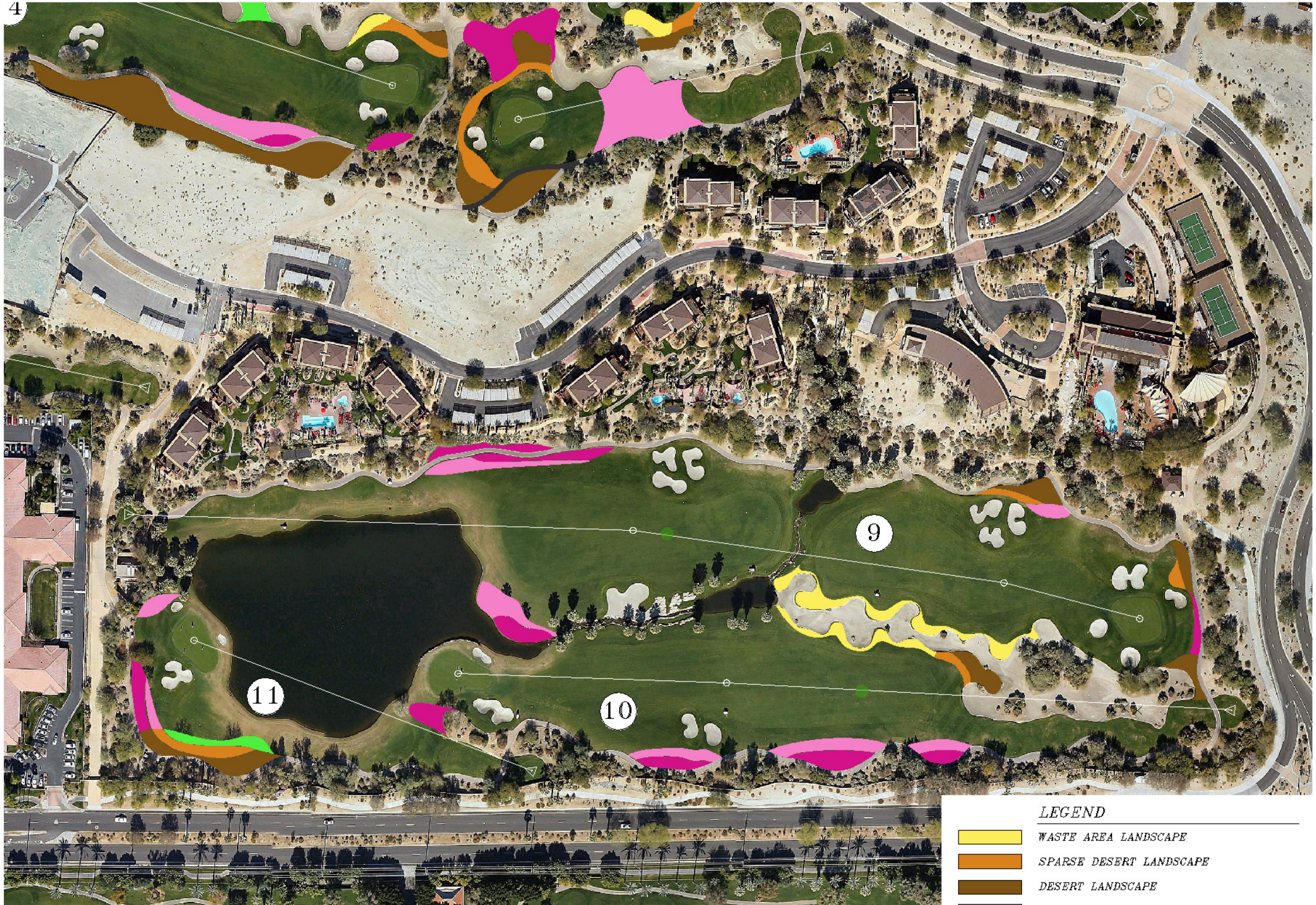
7

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort
MOUNTAIN VIEW COURSE
Holes 7, 8, 14, 15

8



LEGEND

- WASTE AREA LANDSCAPE
- SPARSE DESERT LANDSCAPE
- DESERT LANDSCAPE
- SPARSE DESERT LANDSCAPE (HSA ADDED)
- DESERT LANDSCAPE (HSA ADDED)
- TURF AREA (HSA ADDED)
- ENHANCED PLANTING (HSA ADDED)
- SCREENING PLANTING (HSA ADDED)
- ADDITIONAL TREES

Desert Willow Golf Resort

GRAPHIC SCALE

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort
MOUNTAIN VIEW COURSE
Holes 9, 10, 11

Desert Willow Golf Resort

GOLF COURSE LANDSCAPE DESIGN

Desert Willow Golf Resort
MOUNTAIN VIEW COURSE
Holes 12, 13

18
17
16
15
LEGEND
WASTE AREA LANDSCAPE
SPARSE DESERT LANDSCAPE
DESERT LANDSCAPE
SPARSE DESERT LANDSCAPE (HSA ADDED)
DESERT LANDSCAPE (HSA ADDED)
TURF AREA (HSA ADDED)
ENHANCED PLANTING (HSA ADDED)
SCREENING PLANTING (HSA ADDED)
ADDITIONAL TREES
GRAPHIC SCALE
GOLF COURSE LANDSCAPE DESIGN
Desert Willow Golf Resort
MOUNTAIN VIEW
COURSE
Holes 16, 17, 18
11

Appendix B
2010 CVWMP Update
Executive Summary

PREPARED FOR
COACHELLA VALLEY WATER DISTRICT

Coachella Valley Water Management Plan Update

FINAL REPORT

January 2012

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Water Consult
Engineering and Planning Consultants

Executive Summary

Executive Summary

The Coachella Valley Water Management Plan was adopted by the Board of Directors, Coachella Valley Water District (CVWD) in September 2002. The goal of the Water Management Plan is to reliably meet current and future water demands in a cost-effective and sustainable manner. The Board recognized the need to update the Plan periodically to respond to changing external and internal conditions. This 2010 Water Management Plan Update (2010 WMP Update) meets that need. It defines how the goal will be met given changing conditions and new uncertainties regarding water supplies, water demands, and evolving federal and state laws and regulations.

ES-1 THE COACHELLA VALLEY

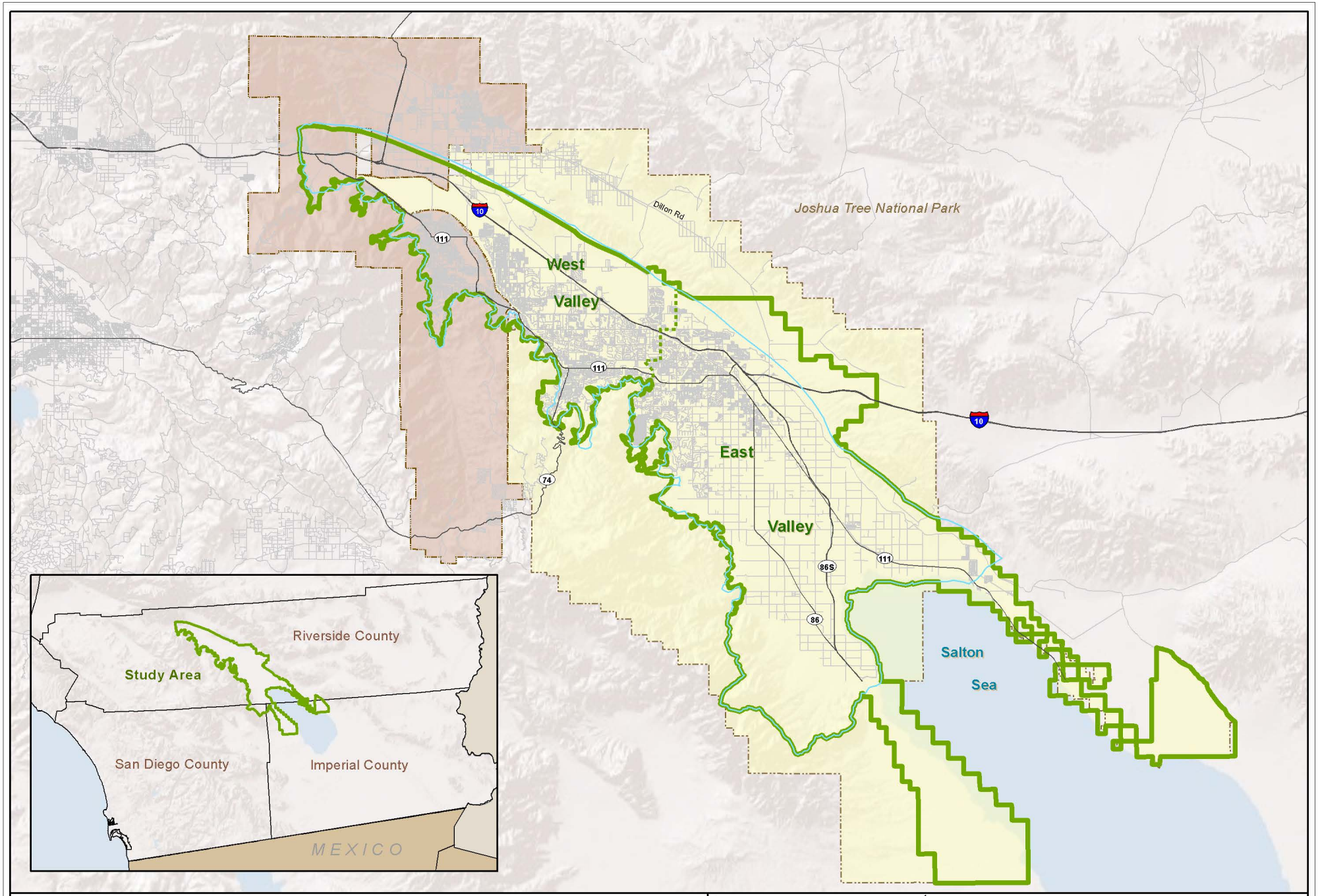
The Coachella Valley is located in the central portion of Riverside County. For purposes of this Water Management Plan, the Coachella Valley is divided into the West Valley and the East Valley. Geographically, the East Valley is southeast of a line extending from Washington Street and Point Happy northeast to the Indio Hills near Jefferson Street, and the West Valley is northwest of this line (**Figure ES-1**).

The West Valley includes the cities of Palm Springs, Cathedral City, Rancho Mirage, Indian Wells, and Palm Desert, a portion of the city of Indio, and the unincorporated communities of Sun City and Thousand Palms. The West Valley has a predominately resort/recreation-based economy. Water demand in the West Valley is supplied by several sources: groundwater, surface water from local streams, and recycled water. The East Valley includes the cities of Coachella, Indio, and La Quinta, and the unincorporated communities of Bermuda Dunes, Mecca, Oasis, Thermal, and Vista Santa Rosa. Historically, the East Valley has had an agricultural-based economy. Urban growth is occurring in the East Valley and is projected to continue in the future. East Valley water sources consist primarily of Coachella Canal water and groundwater, with a small amount of recycled fish farm effluent for agricultural uses.

The Coachella Valley's principal groundwater basin, the Whitewater River (Indio[1]) Subbasin, extends from Whitewater in the northwest to the Salton Sea in southeast. The basin has an estimated storage capacity of approximately 30 million acre-feet[2] (AF) (DWR, 1964). Water placed on the ground surface in the West Valley will percolate through the sands and gravels directly into the groundwater aquifer. In the East Valley, however, several impervious clay layers lie between the ground surface and the main groundwater aquifer. Water applied to the surface in the East Valley does not readily reach the lower groundwater aquifers due to these impervious clay layers. The only outlets for groundwater in the Coachella Valley are through subsurface outflow under the Salton Sea or through collection in drains and transport to the Salton Sea via the Coachella Valley Storm Channel (CVSC).

[1] The California Department of Water Resources (DWR) assigned the name "Indio Subbasin" in its Bulletin 108. CVWD and Desert Water Agency use the designation "Whitewater River Subbasin."

[2] One acre-foot (AF) is the amount of water that would cover one acre of land (approximately the size of a football field), one foot deep or about 326,000 gallons.



Source: DWR, ESRI, County of Riverside

ES-2 WATER MANAGEMENT IN THE COACHELLA VALLEY

Water management in the Valley began as early as 1915. With groundwater levels falling, the need for a supplemental water source was recognized for the Valley to continue to flourish.

The Coachella Valley Stormwater District was formed in 1915 followed by formation of CVWD in January 1918. CVWD's first directors quickly filed paperwork to secure rights to all unclaimed Whitewater River water, an important source for aquifer recharge. In 1918, a contract was awarded for construction of water spreading and recharge facilities in the Whitewater River northwest of Palm Springs.

CVWD next focused on obtaining imported Colorado River water. In 1934, negotiations with the federal government were completed, and plans were put in place for the construction of the Coachella Branch of the All American Canal. Construction of the Canal began in 1938, but was interrupted by World War II. The first deliveries of imported Colorado River water to East Valley growers began in 1949. The service area for Canal water delivery under the CVWD's contract with the U.S. Bureau of Reclamation (Reclamation) is defined as Improvement District No. 1 (ID-1). The impact of imported water on the Valley was almost immediate. By the early 1960s, water levels in the East Valley had returned to their historical high levels.

Although groundwater levels in the East Valley had stabilized, water levels in the West Valley continued to decline as growth occurred. Desert Water Agency (DWA) was formed in 1961 to import State Water Project (SWP) water into the Palm Springs and Desert Hot Springs areas. In 1962 and 1963 respectively, DWA and CVWD entered into contracts with the State of California for 61,200 acre-feet per year (AFY) of SWP water. To avoid the then estimated $150 million cost of constructing an aqueduct to bring SWP water directly to the Valley, CVWD and DWA entered into an agreement with the Metropolitan Water District of Southern California (Metropolitan) to exchange SWP water for Colorado River water.

Starting in 1973, the CVWD and DWA began exchanging their annual SWP allocation with Metropolitan for Colorado River water to recharge West Valley groundwater at the Whitewater River Recharge Facility. CVWD, DWA, and Metropolitan also signed an advance delivery agreement in 1984 that allows Metropolitan to store additional water in the Valley. Since 1973, the spreading facility had percolated in excess of 2.6 million AF of Colorado River water exchanged for SWP water.

By the 1980s, groundwater demand in the East Valley had again exceeded supplies, resulting in significant groundwater level decreases in some parts of the East Valley. Because relatively impervious clay layers in the Valley floor impede groundwater recharge in the East Valley, CVWD began looking for sites sufficiently far away from the main clay layer to allow groundwater recharge. In 1995, the CVWD began operating the Dike No. 4 pilot recharge facility located on the west side of the East Valley in La Quinta. The pilot successfully demonstrated the feasibility of East Valley groundwater recharge. The facility was expanded in 1998 to determine the ultimate recharge capacity at this location. In October 2009, the Thomas E. Levy Groundwater Replenishment Facility (Levy facility, formerly Dike 4) was dedicated. It has a current recharge capacity of 32,000 AFY, upgradable to 40,000 AFY.

Recycled water has been a priority water supply in the Valley since 1965. Currently, CVWD and DWA provide more than 14,000 AFY of recycled water for golf course and greenbelt irrigation purposes from four wastewater treatment facilities. While recycled water is available in the East Valley, it is not currently treated to sufficient levels for unrestricted reuse. Water conservation is also a key element of managing water demands.

ES-3 CURRENT CONDITION OF COACHELLA VALLEY GROUNDWATER BASIN

The demand for groundwater has annually exceeded the limited natural recharge of the groundwater basin. The condition of a groundwater basin in which the outflows (demands) exceed the inflows (supplies) to the groundwater basin over the long term is called "*overdraft.*" Overdraft has caused groundwater levels to decrease in significant portions of the East Valley. Groundwater levels in the West Valley have also decreased substantially, except in the areas near the Whitewater Recharge Facility where artificial recharge has successfully raised water levels.

Overdraft has serious consequences. The immediate and direct effect is increased groundwater pumping costs for all water users. With continued overdraft, wells will have to be deepened, pumps that are more powerful will have to be installed, and energy costs will increase as the pump lifts increase. The need for deeper wells and more powerful pumps will increase the cost of water for agriculture, municipalities, resorts, homes, and businesses. Continued decline of groundwater levels could result in a substantial and possibly irreversible degradation of water quality in the groundwater basin due to the intrusion of lower quality, high TDS water applied at the surface for irrigation and reduced drain flows carrying the salts out of the basin. Continued overdraft also increases the possibility of land subsidence. As groundwater is removed, the dewatered soil begins to compress from the weight of the ground above, causing subsidence. Subsidence can cause ground fissures and damage to buildings, homes, sidewalks, streets, and buried pipelines – all of the structures that make the Valley livable. Subsidence also reduces storage capacity in the aquifer. Continued overdraft would eventually stifle growth in the Valley, as it would not be possible to demonstrate that adequate water supplies exist to support growth.

The 2010 WMP Update uses a calculation of change in storage based on long-term local hydrology and imported water deliveries to estimate long-term overdraft. Since the local hydrology varies significantly from year to year, a long term average provides a better method for estimating the local inflows, which are dampened by the large storage volume of the basin. Because imported water recharge deliveries in the West Valley also vary widely from year to year, recharge is based on estimated long-term average SWP Exchange reliability rather than year-to-year values. Other inflows and outflows are estimated using the groundwater model. This approach dampens the variations in the annual change in storage and gives a more accurate indication of long-term overdraft. Based on these adjustments, the average annual overdraft for 2000 through 2009 is estimated to be 70,000 AFY. When the 2010 WMP Update was adopted in January 2012, CVWD and DWA experienced two years of very high recharge with nearly 461,000 AF recharged at Whitewater (including advanced deliveries).

ES-4 THE 2002 WATER MANAGEMENT PLAN

Continued decline of groundwater levels and ongoing overdraft is unacceptable. CVWD and DWA are charged with providing a reliable, safe water supply now and in the future. In order to fulfill obligations to Valley residents, these agencies must take action to prevent continuing decline of groundwater levels and degradation of water quality on a long-term basis. To meet responsibilities for ensuring adequate water supplies in the future, the CVWD and DWA initiated planning in the early 1990s. The comprehensive Water Management Plan developed in 2002 guides CVWD and DWA in efforts to eliminate overdraft, prevent groundwater level decline, protect water quality, and prevent land subsidence.

The 2002 Water Management Plan clearly identified the significant groundwater overdraft that had occurred over decades and, equally important, the threat of continued overdraft to the economy and quality of life in the Valley. It was based on then current projections of growth and corresponding water demand. The Plan identified the actions needed to eliminate overdraft while maintaining the quality of life and avoiding adverse impacts to the environment. The Plan area originally included the Whitewater River and Garnet Hill Subbasins. Portions of Desert Hot Springs Subbasin east of Indio and Coachella were added to the planning area for this Update, as shown in **Figure ES-1**.

ES-4.1 Goals and Objectives

The goal of the 2002 Water Management Plan is to reliably meet current and future water demands in a cost effective and sustainable manner. To meet this goal, four objectives were identified for the 2002 WMP:

1. Eliminate groundwater overdraft and its associated adverse impacts, including:
   - groundwater storage reductions
   - declining groundwater levels
   - land subsidence, and
   - water quality degradation,
2. Maximize conjunctive use opportunities,
3. Minimize adverse economic impacts to Coachella Valley water users, and
4. Minimize environmental impacts.

The 2002 WMP included five major elements:

- water conservation (urban, golf course, and agricultural),
- substitution of surface water supplies (Colorado River water, SWP water, recycled water) for urban, agricultural, and golf course uses in lieu of pumping groundwater,
- continued groundwater recharge at the Whitewater Recharge Facility and development of two new groundwater recharge facilities in the East Valley,

- increasing surface water supplies, and
- monitoring of groundwater production, levels, water quality and land subsidence.

Within each element, the 2002 WMP identified specific actions to aid in eliminating overdraft. Many of the elements of the 2002 WMP have been accomplished as described in **Section ES-4.2**.

ES-4.2 Accomplishments Since 2002

The actions to eliminate overdraft pursuant to the 2002 WMP taken by CVWD, DWA, other water agencies, municipalities, and tribes are summarized below.

ES-4.2.1 Water Conservation

A broad range of water conservation actions was included in the 2002 WMP. Most of those actions have been achieved, some ahead of schedule.

Urban Conservation

CVWD first passed a Landscape Ordinance in 2003. The ordinance was updated in 2007, and changes were made in 2009 for consistency with the State's updated model landscape ordinance. The ordinance has been adopted by nearly all Valley cities. The ordinance sets a maximum applied water allowance for new developments, requires efficient irrigation systems, specifies the use of climate appropriate plant materials, reduces applied water runoff and overflow, reduces non-recreational turf at golf courses, and mandates smart irrigation controllers on all new landscapes. The ordinance, in combination with other water conservation measures, results in a significant reduction in existing and new water use.

CVWD established an urban water conservation program in 1988. A water conservation coordinator was appointed in 2007, and the program now has a full-time staff of twelve employees. In 2009, CVWD established tiered domestic water pricing for customers based on individual water budgets. A turf buy-out partnership was established with the cities of Cathedral City, La Quinta, and Palm Desert. CVWD also provides weather-based irrigation controllers to eligible customers in participating cities. CVWD maintains water efficient demonstration gardens at the CVWD offices in Coachella and Palm Desert. CVWD sponsors well-attended semi-annual landscape workshops and tours, and creates displays for special events. CVWD produces the popular book, "*Lush & Efficient: Landscape Gardening in the Coachella Valley*," and various other publications. Analysis of water use for CVWD's 2011 Urban Water Management Plan shows water usage has declined by 18 percent compared to average usage from 1996 through 2005.

DWA offers large water users (condominiums, public parks, and businesses) comprehensive irrigation system water audits at no charge and assists in implementing recommended improvements. In partnership with CVWD and Cathedral City, DWA furnishes irrigation controllers at cost to customers. Free controllers are provided with new water meter installation. In addition, DWA recently installed artificial turf and recycled water drip-irrigation for

xeriscaping at its operations center (DWA website, 2010). The City of Palm Springs also promotes water efficiency programs including landscape water training programs and rebates for water efficient toilets (City of Palm Springs website, 2010). Analysis of per capita water use for DWA's 2011 Urban Water Management Plan indicates a comparable 18 percent reduction in water use. Indio and Coachella have also implemented water conservation programs that are described in their respective Urban Water Management Plans. Their plans show 14 percent and 20 percent per capita demand reductions compared to their respective demand baselines.

Agricultural Conservation

The 2002 WMP established a goal of seven (7) percent agricultural water use reduction through conservation. Based on a comparison of the average water use per acre in the 2000 through 2002 period, agricultural water use has generally declined about 9.9 percent through 2008. While this estimate may be due in part to variations in weather conditions, crop water needs, and crop patterns, it represents a significant decrease in agricultural water use over the period. Agricultural water conservation measures included irrigation scheduling, salinity management, and irrigation uniformity evaluation programs for irrigators.

Golf Course Conservation

The 2002 WMP goal was to reduce water demand at existing courses by at least five percent by 2010 and for new courses by up to 25 percent compared to historical use by existing courses. Actual use per irrigated acre in the West Valley, where data are available, indicates a reduction of about 14 percent compared to the 2000 to 2002 average. Adoption of the 2009 Landscape Ordinance throughout the Valley is expected to reduce water use by new courses through turf limitations by about 22 percent compared to existing courses. CVWD initiated a program of monitoring golf course water use to ensure that maximum water allowances are not exceeded. A symposium for golf course operators to promote golf course water conservation is held each year.

Stakeholder Review and Input

In 2006, CVWD completed, with extensive stakeholder involvement, a Water Management Plan Implementation Program. This effort included review, evaluation, and prioritization of water conservation programs and other elements of the 2002 WMP by stakeholders with recommendations to the CVWD Board (Water Consult, 2006). The Board uses the recommendations in the Implementation Program to guide development of annual budgets.

ES-4.2.2 Additional Water Supplies

The 2002 WMP identified the need for CVWD and DWA to acquire additional water supplies to manage current and future groundwater overdraft. Supplies identified included the Colorado River, State Water Project, other transfers, recycled water, and desalinated drain water.

Quantification Settlement Agreement

In 2003, CVWD, IID, and Metropolitan, along with the State of California and Reclamation, successfully completed negotiation of the Quantification Settlement Agreement (QSA). The QSA quantifies the Colorado River water allocations of California's agricultural water contractors for 75 years and provides for the transfer of water between agencies. Under the QSA, CVWD has a base allocation of 330,000 AFY. In accordance with the QSA, CVWD has entered into water transfer agreements with Metropolitan and IID that increase CVWD supplies by an additional 159,000 AFY as shown in **Table ES-1**.

As of 2010, CVWD received 368,000 AFY of Colorado River water deliveries under the QSA. This includes the base allocation of 330,000 AFY, the Metropolitan/IID transfer of 20,000 AFY, 12,000 AFY of the IID/CVWD First transfer, and 35,000 AFY of Metropolitan/SWP transfer. CVWD's allocation will increase to 459,000 AFY of Colorado River water by 2026. After deducting conveyance and distribution losses, approximately 428,000 AFY will be available for CVWD use.

Table ES-1
CVWD Deliveries under the Quantification Settlement Agreement

Component	2010 Amount (AFY)	2045 Amount (AFY)
Base Allocation	330,000	330,000
1988 Metropolitan/IID Approval Agreement	20,000	20,000
Coachella Canal Lining (to SDCWA)	-26,000	-26,000
To Miscellaneous/Indian PPRs	-3,000	-3,000
IID/CVWD First Transfer	12,000	50,000
IID/CVWD Second Transfer	0	53,000
Metropolitan/SWP Transfer	35,000	35,000
Total Diversion at Imperial Dam	**368,000**	**459,000**
Less Conveyance Losses [1]	-31,000	-31,000
Total Deliveries to CVWD	**337,000**	**428,000**

Note:
1 Assumed total losses after completion of All-American and Coachella Canal lining projects

State Water Project

CVWD and DWA have made significant progress toward meeting the 2002 WMP goal of 140,000 AFY average delivery target (103,000 AFY to Whitewater Recharge Facility; 37,000 AFY via Mid-Valley Pipeline (MVP)) of SWP Exchange water in the Whitewater River Subbasin. CVWD's and DWA's SWP Table A Amounts[3] are used to replenish both the Upper Whitewater River and the Mission Creek subbasins. Per an interagency agreement, water for

[3] Each SWP contract contains a "Table A" exhibit that defines the maximum annual amount of water each contractor can receive excluding certain interruptible deliveries. Table A Amounts are used by DWR to allocate available SWP supplies and some of the SWP project costs among the contractors.

recharge is allocated in proportion to pumping in each subbasin. CVWD's and DWA's Table A water is exchanged with Metropolitan for a like amount of Colorado River water from Metropolitan's Colorado River Aqueduct (CRA).

Under the 2003 Exchange Agreement, CVWD and DWA acquired 100,000 AFY (88,100 AFY and 11,900 AFY, respectively) of Metropolitan's SWP Table A water as a permanent transfer. In any given year, the agreement allows Metropolitan to call-back the 100,000 AFY and assume the entire cost of delivery if it needs the water. This transfer became effective in January 2005.

In 2004, CVWD purchased an additional 9,900 AFY of SWP Table A water from the Tulare Lake Basin Water Storage District (Tulare Lake) in Kings County, CA. In 2007, CVWD and DWA made a second purchase of 7,000 AFY of SWP Table A water from Tulare Lake: 5,250 AFY for CVWD and 1,750 AFY for DWA. In 2007, CVWD and DWA completed the transfer of 16,000 AFY of SWP Table A water (12,000 AFY and 4,000 AFY, respectively) from the Berrenda Mesa Water District (Berrenda Mesa), effective in January 2010. With these transfers, the combined SWP Table A Amounts for CVWD and DWA total 194,100 AFY, with CVWD's portion equal to 138,350 AFY and DWA's portion equal to 55,750 AFY. **Table ES-2** summarizes CVWD and DWA total allocations of SWP Table A water.

Table ES-2
State Water Project Sources

	Original SWP Table A (AFY)	Tulare Lake Basin 2004 Transfer (AFY)	Metropolitan 2003 Transfer[1] (AFY)	Tulare Lake Basin 2007 Transfer[2] (AFY)	Berrenda Mesa 2007 Transfer[2] (AFY)	Total (AFY)
CVWD	23,100	9,900	88,100	5,250	12,000	138,350
DWA	38,100	—	11,900	1,750	4,000	55,750
Total	61,200	9,900	100,000	7,000	16,000	194,100

Notes:
1 Transfer became effective on January 1, 2005.
2 Transfer became effective on January 1, 2010.

SWP supplies vary annually due to weather and runoff variations and regulatory limitations on exports from the Delta. When the 2002 WMP was prepared, average SWP supply reliability was estimated to be about 82 percent. Under current conditions, DWR estimates the SWP can only provide about 60 percent of the Table A Amounts indicated in CVWD's and DWA's contracts based on an 82-year hydrologic average (DWR, 2011). The current availability of SWP Table A Amounts is presented in **Table ES-3.** In the absence of state and federal actions in the Bay Delta to improve supply reliability and to protect and enhance the Delta ecosystem, it is anticipated that long-term average SWP reliability (deliveries) could decrease to 50 percent of the Table A Amounts over the next twenty years. Additionally, growth and associated groundwater production increases in the Mission Creek Subbasin will result in more SWP Exchange water being delivered to that subbasin reducing supplies for the Whitewater River.

Other Water Transfers

In March 2008, CVWD and DWA entered into separate agreements with DWR for the purchase and conveyance of supplemental SWP water under the Yuba River Accord Dry Year Water Purchase Program. This program provides dry year supplies. The amount of water available for purchase in a given year varies and is based on DWR's determination of the Water Year Classification. The available water is allocated among participating SWP contractors based on their Table A Amounts. CVWD and DWA may be able to purchase up to 5,600 AFY, and 1,820 AFY, respectively. These agreements provide for the exchange of these supplies with Metropolitan for Colorado River water in accordance with the existing exchange agreements. CVWD and DWA received a total of 5,300 AF of water from this source in 2008 and 2009.

Table ES-3
Current (2010) SWP Supply Availability (60% Reliability)

SWP Components	AFY [1]
Table A Amount (Base)	194,100
Average Deliveries with Current SWP Reliability (60%) [2]	116,500
Less Average Metropolitan Callback [3]	(32,900)
Net Average SWP Supply [4]	83,600
Whitewater River Subbasin Recharge (93% of net) [5]	77,800
Mission Creek Subbasin Recharge (7% of net)	5,800

Notes:
1 Values shown are rounded to nearest 100 AFY.
2 Current reliability is based on California DWR's 2009 SWP Reliability Report.
3 Average supply conservatively assumes Metropolitan calls back its 100,000 AFY transfer in four wet years during a 10-year period.
4 Net supply is calculated by deducting the Metropolitan callback from the Table A Amount with current SWP Reliability.
5 Allocation of SWP water to Upper Whitewater River and Mission Creek subbasins is based on production in each basin.

In 2008, CVWD also executed an agreement with Rosedale-Rio Bravo Water Storage District (Rosedale) in Kern County for a one-time transfer of 10,000 AF of banked Kern River flood water that is exportable to CVWD. Deliveries to CVWD began in 2008 and will be completed by December 31, 2012.

Desalinated Drain Water

The 2002 WMP recommended that a drain water desalination facility commence operation between 2010 and 2015 with a 4,000 AFY facility to treat agricultural drainage water for irrigation purposes. The facility would be expanded to 11,000 AFY by 2025. Product water would be delivered to the Coachella Canal distribution system for non-potable use.

A brackish groundwater treatment pilot study and feasibility study was completed in 2008 (Malcolm-Pirnie, 2008a and 2008b). Reverse osmosis (RO) was recommended to meet water quality goals and provide additional flexibility in the level of water quality produced should the facility's objectives change in the future. The recommended approach to brine management was

to convey the RO concentrate via pipeline to constructed wetlands located at the north shore of the Salton Sea. This study concluded that agricultural drainage water can be treated for reuse as non-potable water and potentially as new potable water.

Recycling of Municipal Effluent

CVWD and DWA currently deliver approximately 14,000 AFY of recycled water in the West Valley for golf course and other large irrigation uses. Wastewater generated in the West Valley that is not reused for irrigation is percolated into the groundwater basin. Current recycled water usage in the East Valley is approximately 700 AFY for agricultural irrigation. East Valley wastewater that is not reused is discharged to the CVSC.

ES-4.2.3 Source Substitution

Source substitution involves the delivery of alternative water supplies, such as Coachella Canal water or recycled water, to replace of groundwater pumping. Significant efforts have been made to implement source substitution projects in the Valley.

Mid-Valley Pipeline (MVP)

In the West Valley, the demand for non-potable water typically exceeds the available recycled water supply, especially in the summer months. Golf courses using recycled water currently must supplement that supply with local groundwater to meet their demands. This limits the amount of overdraft reduction that is possible to the available recycled water supply. Groundwater modeling shows a local pumping deficit (overdraft condition) that cannot be remedied by recharge at Whitewater. The MVP is a pipeline distribution system to deliver Colorado River water to the Mid-Valley area for use with CVWD's recycled water for golf course and open space irrigation. This source substitution project will reduce groundwater pumping for these uses. Construction of the first phase of the MVP from the Coachella Canal in Indio to CVWD's Water Reclamation Plant No. 10 (WRP-10) (6.6 miles in length) was completed in 2009.

At WRP-10, Canal water supplements recycled water for delivery to large irrigators. There are eight golf courses and five other users in the West Valley currently connected to the WRP-10 recycled water system that can receive both recycled water and Canal water via the MVP. If these courses meet at least 90 percent of their irrigation needs with non-potable water, 2,700 AFY of additional groundwater pumping will be eliminated. There are four golf courses adjacent to the MVP that can be connected to the system with minimal construction, thus making them ideal candidates to receive Canal water through the MVP. Construction of Phase 1 of the MVP included outlets along the pipeline to serve these courses. However, pipeline connections to deliver Canal water from the MVP to each course have yet to be constructed. When these four courses are connected, about 4,500 AFY of additional pumping could be eliminated. At least ten additional courses can be connected to the MVP downstream of WRP-10 with relatively simple pipeline connections, reducing pumping by another 11,200 AFY. When fully implemented, the MVP system will be capable of eliminating about 50,000 AFY of groundwater pumping.

Pilot Study of Canal Water Treatment for Urban Use

As projected growth occurs in the East Valley and farms are converted to urban land uses, agricultural demand for Canal water will decrease. To avoid increased urban groundwater pumping and to use the Valley's Colorado River water supply fully, there will be a need to treat Canal water for urban use. The 2002 WMP anticipated this need and proposed that treatment be provided beginning in the late 2020s with about 32,000 AFY being treated by 2035. Present projected domestic water demand coupled with reduced agricultural demand is expected to increase this amount substantially. Potable use will require Canal water treatment to meet drinking water standards. In anticipation of constructing potable water treatment facilities, CVWD completed a pilot treatability study for Canal water in 2008 (Malcolm-Pirnie, 2008c). This study investigated alternative approaches to treatment of Colorado River water delivered for urban use. The study recommended that blending treated Colorado River water with local groundwater be further evaluated to ensure customer satisfaction.

ES-4.2.4 Groundwater Recharge

Groundwater recharge is a critical component of basin management that involves putting water directly into the groundwater basin through surface percolation ponds. The 2002 WMP included continuing recharge at the existing Whitewater Recharge Facility in the West Valley, proposed recharge in the East Valley using Colorado River water at Dike 4, now the Thomas E. Levy Groundwater Replenishment Facility (Levy facility), and recommended another major recharge facility at Martinez Canyon.

Whitewater Recharge Facility – West Valley

The 2002 WMP established a future average annual recharge target at this facility of about 100,000 AFY. The Whitewater River Recharge Facility has a recharge capacity in excess of 300,000 AFY. Because this capacity is enough to capture the full SWP Table A amount with additional capacity for supplemental recharge, no recharge capacity expansion is required. The available capacity is valuable for conjunctive use operations by CVWD and DWA as well as Metropolitan or other interested parties. Currently, the SWP Exchange supply is expected to provide about 78,000 AFY for the Whitewater facility on average. Under future conditions, it is possible that average recharge at Whitewater could be limited to the available future supply of about 61,400 AFY of SWP Exchange, unless it is augmented with other supplies. To reach the 100,000 AFY recharge goal for the Whitewater facility, CVWD and DWA would need to acquire additional SWP Table A Amounts or other imported water sources.

Thomas E. Levy Groundwater Replenishment Facility - East Valley

Construction of the full-scale Levy facility was completed in mid-2009. Located on the west side of the Valley in La Quinta, this facility has an estimated average recharge capacity of 40,000 AFY. The current capacity may be limited by hydraulic, water delivery, and maintenance constraints within the Canal water distribution system to an average of about 32,000 AFY. Construction of an additional pipeline to the Levy facility and pumping station from Lake Cahuilla may be required in the future to reach the 40,000 AFY capacity on a consistent basis.

Martinez Canyon Pilot Recharge Facility Feasibility Assessment – East Valley

The Martinez Canyon pilot recharge facility began operation in 2005 and currently recharges about 3,000 AFY. When this project is expanded to full scale, it is expected to recharge up to 40,000 AFY.

ES-4.2.5 Groundwater/Subsidence Monitoring

CVWD maintains an extensive ongoing groundwater production, level, and water quality monitoring program throughout the Valley. The program includes monitoring of potential saltwater intrusion from the Salton Sea. The data are periodically reviewed to determine impacts of management actions on overdraft and water quality. The data are also applied to re-calibrate the groundwater model that assesses the impact of proposed management actions.

The United States Geological Survey (USGS), working with CVWD, completed subsidence monitoring reports for the Coachella Valley in 2001 and 2007. The reports indicated that subsidence was taking place in varying degrees throughout the Valley.

These studies to date have not confirmed the relationship between land subsidence and declining water levels. The USGS Scientific Investigation Report 2007-5251 states, "Although the localized character of the subsidence signals is typical of the type of subsidence characteristically caused by localized ground-water pumping, the subsidence may also be related to tectonic activity in the valley." This report also concludes additional monitoring is needed to permit meaningful interpretations of the aquifer-system response to water level changes. CVWD's Board of Directors has approved additional funding to continue these cooperative subsidence studies with the USGS. Future studies include additional monitoring designed to evaluate the potential relationship between declining water levels and land subsidence. Potential land subsidence caused by declining water levels was addressed by mitigation measures described in the 2002 Coachella Valley Water Management Plan Programmatic Environmental Impact Report (CVWMP PEIR).

ES-5 2010 WMP UPDATE

Significant actions have been taken since 2002 to alleviate overdraft in the long term. Changes in internal and external factors mandate new activities and increased levels of current activities to eliminate overdraft and assure reliable long term water supplies to the Valley. These new activities are identified in the 2010 WMP Update.

ES-5.1 Population and Water Demand

Since 2002, significant changes have occurred in projections of population and future water demands, including:

- Significantly increased population growth, mainly in the East Valley (**Figure ES-2**);
- Changes in land use from agricultural to urban land use and water demand in terms of both quantity and quality;

- Development on tribal lands and related water demands;
- Potential development located northeast of the San Andreas fault in the spheres of influence (SOI) of the cities of Indio and Coachella;
- Projected urban development outside the 2002 WMP study area and corresponding increases in water demands;
- Uncertainty in the timing of growth and water demands.

Figure ES-2 shows the difference in population projections used in the 2002 WMP and projections used in the 2010 WMP Update. The 2010 WMP Update provides water for approximately 500,000 more people in 2045 than the 2002 WMP.

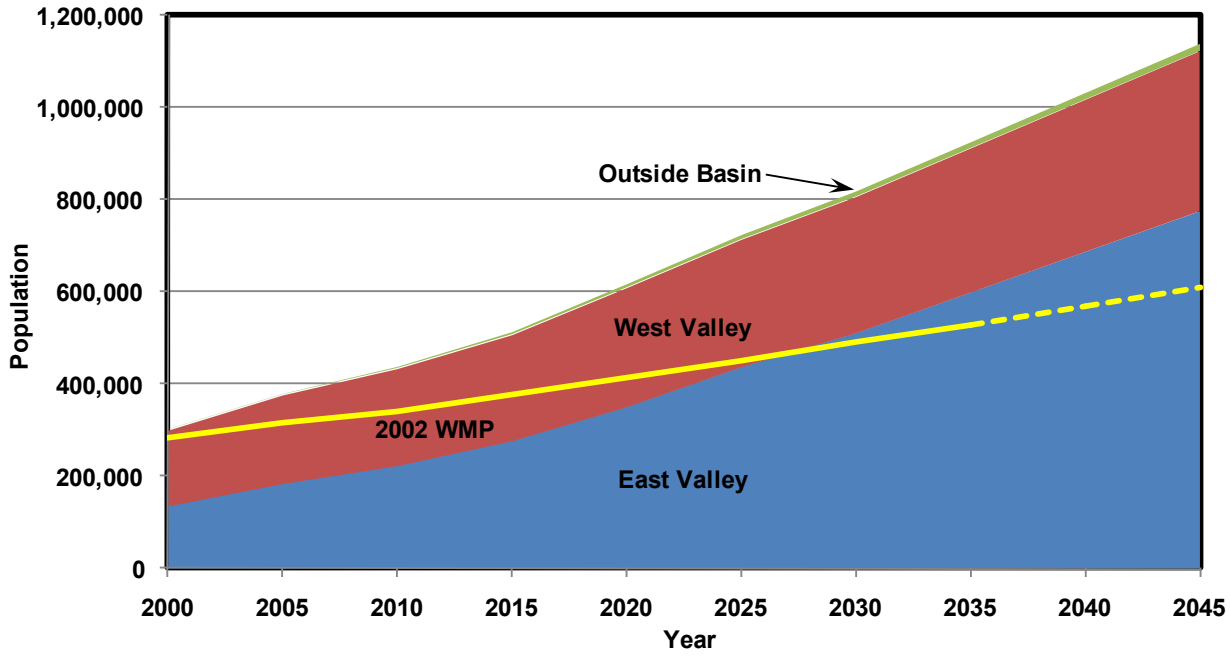


Figure ES-2
Comparison of Population Projections for the Coachella Valley

ES-5.1.1 Future Water Demands

Projected water demands for 2045 resulting from projected population growth and associated assumptions regarding land uses and water demands for land uses are shown by economic sector in **Table ES-4**. Water use by new development is expected to be more efficient due to plumbing code requirements and the Landscape Ordinance. Consequently, water demands are expected to be less than projected in the 2002 WMP. Factoring potential variations in future land use and growth forecasts into these demand projections, water demands in 2045 could range from 793,600 AFY to 971,500 AFY with a mid-range planning value of 885,400 AFY as shown on **Figure ES-3**. If the growth projection in the 2002 WMP, with assumed water conservation measures, were projected to 2045, the projected demand would be approximately 950,000 AFY.

The reduction in projected demand results primarily from the conversion of agricultural lands to urban use and increased water conservation factored into the 2010 WMP Update.

Table ES-4
2045 Baseline Water Demand Projection for the Coachella Valley

Component	2045
Agricultural	
Crop Irrigation	166,300
Total Agricultural Demand	**166,300**
Urban	
Municipal	537,000
Industrial	2,300
Total Urban Demand	**539,300**
Golf Course Demand	**169,500**
Fish Farms and Duck Clubs	
Fish Farms	8,500
Duck Clubs	2,000
Total Fish Farms and Duck Clubs	**10,500**
TOTAL DEMAND	**885,400**

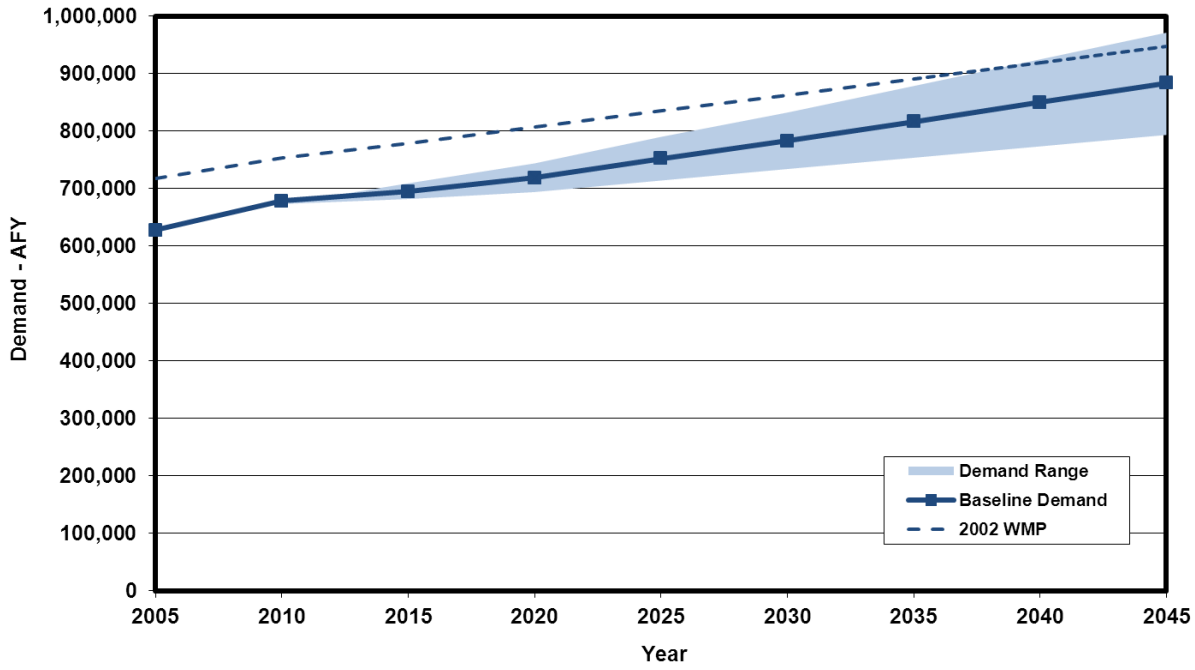


Figure ES-3
Projected Water Demands in the Study Area

ES-5.1.2 Demand Uncertainty

Future water demands are based on the latest approved population growth projections (2006) by Riverside County and assumptions regarding impacts of population growth on land uses, impacts of water conservation on water uses, and resulting water demand associated with each type of land use. There are a number of uncertainties inherent in the demand projections, including:

- Growth forecasts or rates of growth may be too high or too low
- Impacts of economic booms and busts
- Reductions in fish farm operations
- Rates of development on Tribal lands
- Rate of agricultural/vacant land conversion to urban use
- Future water demand factors for various land uses
- Growth outside the Whitewater River subbasin
- Number of future golf courses developed in the East Valley
- Acceptance and effects of water conservation measures

Figure ES-3 shows the range in potential future water demands for the study area.

ES-5.2 Future Water Supply Needs

In addition to changing water demands, changing external factors could affect Valley water supplies:

- SWP allocations fluctuate annually due to snowpack and runoff variations, and the environmental needs in the Bay-Delta.
- Recent environmental rulings have restricted the State's ability to move water through the Delta to the SWP, potentially decreasing supply reliability and deliveries. The degree to which the long-term supply of the SWP will be affected is uncertain.
- The outcome of efforts underway to prepare the Bay-Delta Conservation Plan (BDCP), which is intended to restore the Delta's ecosystem and improve water supply reliability, is uncertain.
- The QSA has been upheld in the appeals court but, as of plan adoption, environmental litigation is still pending, creating uncertainty in future Colorado River supplies.
- Climate change could affect the long term supplies of both the SWP and Colorado River and water demands within the Valley.

These changing conditions and uncertainties reinforce the need for a flexible long term Plan and for updating the Plan periodically.

Additional water supplies needed by 2045 are evaluated for four water supply scenarios that incorporate the uncertainties associated with current supply sources, with the exception of climate change. A 10 percent supply buffer addresses potential climate change impacts and other currently unforeseeable factors affecting future water supplies. **Table ES-5** shows the future water supply needs range from 300,000 to 461,000 AFY. The 2010 WMP Update identifies how this future need will be met through a combination of water conservation measures and new supply development. **Figure ES-4** presents the future water supply plan assuming Scenario 2 without the supply buffer.

Table ES-5
Water Supply Needs – 2045

Scenario	QSA Validated	Delta Conveyance Improvements	Demand (AFY)	Demand with 10% Buffer (AFY)	Available Supply (AFY) [1]	Additional Supply Required (AFY)
1	Yes	Yes	885,400	974,000	674,300	299,700
2	Yes	No	885,400	974,000	640,900	333,700
3	No	Yes	885,400	974,000	546,300	427,700
4	No	No	885,400	974,000	512,900	461,100

Note:
1 Available supplies consist of local runoff and streamflow, recycled water, returns from use, Canal water and SWP Exchange water minus anticipated drain flows and subsurface outflows from the basin as explained in Section 7.2.

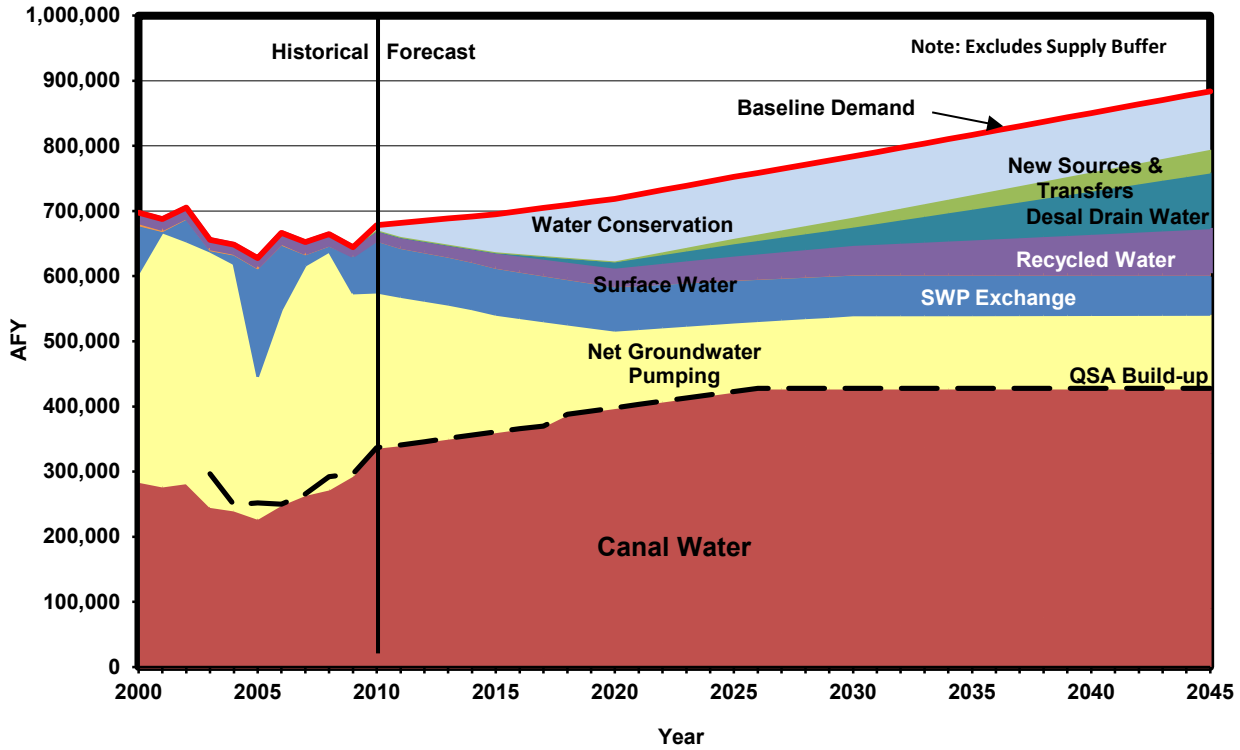


Figure ES-4
Water Supply Mix for 2010 WMP Update

ES-5.3 What is New in the 2010 WMP Update?

The 2010 WMP Update identifies proposed ways and means of meeting future water needs in light of changing conditions and uncertainties. To meet future needs, the 2010 WMP Update includes many new features in the areas of water conservation, source substitution, new supplies, and groundwater recharge. The 2010 WMP Update emphasizes enhanced cooperation in Plan implementation. The 2010 WMP Update incorporates a "bookends" approach to define target ranges for each major supply group and incremental "building blocks" of projects to deal with uncertainties in future demands and supplies.

Revised Goals: The basic goal of the WMP remains the same but has been modified to reflect a more holistic planning approach: "to reliably meet current and future water demands in a cost-effective and sustainable manner." The underlying objectives of the WMP have been refined as follows to reflect the water resources uncertainties facing the Valley:

- Meet current and future demands with a 10 percent supply buffer
- Eliminate long-term groundwater overdraft
- Manage and project water quality
- Comply with state and federal laws and regulations
- Manage future costs
- Minimize adverse environmental impacts

Bookends on Demands and Supplies: To account for the uncertainty and potential variability in demands, the 2010 WMP Update assigns bookend targets (ranges) for each of the major categories of water supplies (see **Section 6)**. The book-ends represent reasonable minimum and maximum amounts for potential supply and project development. Depending on the actual demands that are encountered in the future, the 2010 WMP Update elements can be implemented within these ranges to meet demands.

Building Block Approach: The 2010 WMP Update incorporates a flexible approach to meeting future needs that reflects uncertainties in supplies, demands and future circumstances by combinations of Plan elements. For example, the 2010 WMP Update includes an aggressive program of water conservation for urban, golf course and agricultural water users. However, there are limits in terms of cost, effectiveness, and acceptability of water conservation activities. As those limits are reached, other Plan elements for meeting future needs also can be adjusted. One source of supply is desalination of drain water, the most expensive alternative for providing new supplies. This source will only be implemented as other sources of supplies reach practical limits. Therefore, the Plan includes a range of 55,000 to 85,000 AFY for desalination of drain water. The actual amount of water from this source will depend upon how much can be obtained first from other, lower cost sources.

Enhanced Cooperation in Plan Implementation: The Plan emphasizes cooperation among municipalities, local water agencies and tribes in regional planning and implementation. This occurs through the implementation of activities described in the 2010 WMP Update,

implementation of related planning activities (see **Section 1.0**), and the development of monitoring and data sharing programs among CVWD, other water agencies, cities, and tribes to better manage Valley water resources.

ES-5.4 2010 WMP Update Elements

In developing the 2010 WMP Update, CVWD evaluated the success of 2002 WMP elements and determined future needs, supplies, and uncertainties. Like the 2002 WMP, the 2010 WMP Update has the same five major elements:

- Water conservation (urban, golf course, and agricultural)
- Increasing surface water supplies for the Valley from outsides sources
- Substitution of surface water supplies for groundwater (source substitution)
- Groundwater recharge
- Monitoring and evaluation of subsidence and groundwater levels and quality to provide the information needed to manage the Valley's groundwater resources

Activities included in the 2010 WMP Update in each of these elements are described below.

ES-5.4.1 Water Conservation

New water conservation targets and actions are included for agriculture, urban, and golf course water users. In addition to the water conservation included in the baseline demand projections, the 2010 WMP Update includes a minimum water conservation target of 117,300 AFY by 2045 as shown in **Table ES-6**. This amount could increase to 147,000 AFY to provide a portion of the supply buffer.

Table ES-6
Ranges of Potential Water Conservation Savings – 2045

Type of Conservation	Low Range [1] (AFY)	High Range [2] (AFY)
Urban	82,400	106,200
Agriculture [3]	23,300	23,300
Golf Courses	11,600	17,400
Total	**117,300**	**146,900**

Notes:
1 The low range represents the minimum amount of demand reduction required assuming successful completion of the BDCP and provides a portion of the supply buffer.
2 The high range represents the amount of demand reduction required if the BDCP is not successful and provides a portion of the 10 percent supply buffer.
3 Agricultural savings decline over time as agricultural land is converted to urban uses.

Agricultural Conservation

The new agricultural conservation target is a 14 percent savings by 2020 utilizing a phased approach. The first phase will involve low cost voluntary programs. Depending on the success of those programs, more expensive and vigorous programs could be implemented, as needed. If the 14 percent target can be achieved, the agricultural conservation program is expected to save about 39,500 AFY of water in 2020, decreasing to 23,300 AFY by 2045 as agricultural land uses transition to urban uses. Progress toward meeting agricultural conservation goals will be evaluated and reported every five years.

Urban Conservation

The urban water conservation program will be expanded and enhanced in order to meet changing demands and to comply with the State's requirement of a 20 percent reduction in per capita water use by 2020 compared to average per capita usage for the period of 1995 through 2004. This program could save at least 39,700 AFY by 2020 and achieve a 39 percent reduction in per capita demand by 2030 as it is applied to new growth.

Achievement of the state's 20 percent conservation target in conjunction with on-going conservation programs could result in urban water savings of 82,400 to 106,200 AFY by 2045 depending on the water supply scenario. Progress toward achieving the urban water conservation goals will be reported in urban water management plans prepared on five year intervals.

Golf Course Conservation

The golf course conservation target is a savings of 11,600 to 17,400 AFY by 2045. For existing courses, the minimum target is a 10 percent reduction in water use through golf course irrigation system audit, and soil moisture monitoring services. The 2009 Landscape Ordinance will apply to all new golf courses with turf limitations of 4 acres of per hole and 10 acres for practice areas. Progress toward meeting golf course conservation goals will be evaluated and reported every five years.

ES-5.4.2 Additional Supplies

Table ES-7 summarizes the range of additional supplies that will be developed.

Acquisition of Imported Supplies

CVWD and DWA will continue to acquire additional imported SWP water supplies by transfer or lease where cost-effective, given Delta environmental restrictions and conveyance capacity limitations. For this update, a planning range of 50,000 to 80,000 AFY of average annual supply has been identified to meet future needs including the supply buffer. This amount includes about 35,000 AFY to meet estimated demand east of the San Andreas fault; the amount will be refined as planning proceeds for this area. Changes to the assumed call-back frequency for the MWD 100,000 AFY SWP transfer could provide up to 33,000 AFY of additional supply to the

Whitewater River Subbasin. Option-type contracts could be considered to meet a portion of the supply buffer.

Table ES-7
Range of Additional Supplies Through 2045

Action	Low Range (AFY)	High Range (AFY)
Bay-Delta Conveyance Improvements	0	33,400
Purchases and Transfers [1]	50,000	80,000
Changes to MWD Call-back Provisions [1]	0	32,700
Increased Recycled Water - East and West Valleys	14,000	63,000
Recycled Water Use East of San Andreas Fault	10,800	10,800
Canal Water Loss Reduction	0	10,000
Desalinated Drain Water	55,000	85,000
Stormwater Capture – East Valley	0	5,000
Groundwater for Non-potable Use East of San Andreas Fault	9,700	9,700
Total	**139,500**	**329,600**

Note:
1 High range represents potential supplies with Bay Delta conveyance improvements and no call-back.

Increased Recycled Water Use

Recycled water in the West Valley is currently used beneficially, either through direct non-potable use or percolation for wastewater disposal. At least 90 percent of all wastewater generated in the West Valley will be recycled for direct non-potable use. All wastewater generated by new growth in the East Valley will be recycled. All wastewater from development east of the San Andreas fault could be recycled for irrigation or groundwater recharge to meet demands in that area and reduce the need for additional imported water supplies. Up to 34,500 AFY of recycled water could be utilized in the West Valley, and 33,000 AFY of recycled water could be utilized in the East Valley. Up to 10,800 AFY of recycled water could be utilized in the new growth area east of the San Andreas fault for direct non-potable uses by 2045.

Canal Water Loss Reduction

Water losses in the All-American Canal in the first 49 miles of the Coachella Canal may be as high as 10,000 AFY. Reducing this loss could increase the amount of water delivered to the Valley. CVWD will determine water lost to leakage in the first 49 miles of the Coachella Canal, evaluate the feasibility of corrective actions to capture the lost water, implement cost-effective water saving measures, and work with IID to share losses.

Desalinated Drain Water

A demonstration scale facility will be constructed to gain operational experience in desalinating drain water and brine disposal. Between 55,000 and 85,000 AFY of drain water and shallow

groundwater will be recovered, desalinated, and distributed for non-potable and potable uses in the East Valley. The amount of desalinated water needed will depend upon the resolution of Bay-Delta issues and the resulting amount of SWP water available.

Stormwater Capture

Stormwater capture has been identified as a potential method for increasing local water available for either groundwater recharge or direct use. CVWD will conduct a study to investigate the feasibility of additional stormwater capture in the East Valley. Feasible stormwater capture projects will be developed in conjunction with new flood control facilities as development occurs in the East Valley. For planning purposes, the potential yield is assumed to be 5,000 AFY based on a reduction in evaporation losses with more efficient capture and percolation.

Development of Local Groundwater Supplies for Non-Potable Use

Growth in the areas northeast of the San Andreas fault will create additional demands for both potable and non-potable water. CVWD, the City of Coachella, and the City of Indio will jointly conduct an investigation of groundwater in Fargo Canyon Subarea of the Desert Hot Springs Subbasin to determine the available supply and suitability for use in meeting non-potable demands (outdoor irrigation) of development east of the San Andreas fault. Based on assumed development, up to 9,700 AFY of groundwater could be developed in this area.

ES-5.4.3 Source Substitution

Due to the expected changes in water use patterns from continued development, source substitution will receive increased emphasis in the future to eliminate overdraft and ensure full use of the Valley's available surface water supplies. The ranges of reduction in groundwater overdraft due to source substitution programs are shown in **Table ES-8**.

Table ES-8
Range of Groundwater Pumping Reductions Due To Source Substitution

Action	Low Range (AFY)	High Range (AFY)
Mid-Valley Pipeline	37,000	52,000
Agricultural Canal Water Conversion	5,300	32,000
Oasis Area Conversion to Canal Water	0	27,000
East Valley Golf Course Conversion	43,900	51,700
West Valley Golf Course Conversion	15,200	17,800
Canal Water for Indoor Urban Use – East Valley	48,000	90,000
Canal Water Use for Outdoor Use – East Valley	95,000	115,000
Total	**244,400**	**385,500**

Mid-Valley Pipeline

The MVP system delivers Canal water and recycled water to golf courses in lieu of their pumping groundwater. Activities to fully implement the MVP include preparing an MVP system master plan to lay out the future pipeline systems, near-term expansions to connect golf courses along the MVP alignment and extensions of the existing non-potable distribution system, and completion of construction of the remaining phases of the MVP system by 2020 to provide up to 37,000 AFY of Canal water and 15,000 AFY of WRP-10 recycled water on average to West Valley golf courses.

Conversion of Agricultural and Golf Course Use to Canal Water

It is expected that agricultural use of groundwater could decrease from about 66,000 AFY in 2009 to about 7,000 AFY by 2045, a decrease of 59,000 AFY or 89 percent. A large portion of this reduction could come from the Oasis area that does not currently have access to Canal water. The Oasis area distribution system feasibility study will be updated to include future conversion to serve urban non-potable water. Cost-effective facilities will be constructed. If conversion of the Oasis system is feasible, it could deliver up to 27,000 AFY of Canal and desalinated drain water for irrigation.

In the 2010 WMP Update, it is estimated that for existing East Valley golf courses having Canal water access, Canal water use will increase to 90 percent of demand by 2015. Conversion to Canal water by East Valley golf courses will reduce groundwater use by 43,900 AFY or more.

Colorado River Water for Urban Use

In light of the projected increase in population and change of land use from agricultural to urban in the East Valley, treated Colorado River water for indoor residential use will be essential. In addition, untreated Colorado River water will be used in the future in large developments in the East Valley for outdoor purposes, i.e., lawn and park irrigation. These measures are necessary to reduce overdraft and to insure continued full use of the Valley's Colorado River water supplies.

This program will offset the reduced Canal water use by agriculture as agricultural land use transitions to urban development in the East Valley. Canal water will be treated to meet future indoor urban water demands in the East Valley. The target for urban indoor use of Canal water ranges from 48,000 and 90,000 AFY by 2045.

Dual source plumbing systems will be a feature of new development in the East Valley to provide outdoor use of untreated Canal water. Untreated canal water should provide 67 percent to 80 percent of the landscape demand for new development. This will result in the utilization of 95,000 to 115,000 AFY of non-potable Canal water by 2045. Where found to be cost-effective, existing developments will be retrofitted with distribution systems to provide for outdoor use of untreated Canal water.

ES-5.4.4 Groundwater Recharge

Groundwater recharge will be expanded to reduce overdraft. The ranges of groundwater recharge operations at various facilities under the 2010 WMP Update are shown in **Table ES-9**.

Table ES-9
Range of Groundwater Recharge

Facility	Low Range (AFY)	High Range (AFY)
Whitewater	61,000 [1]	100,000
Levy	40,000	40,000
Martinez Canyon [2]	20,000	40,000
Indio	0	10,000
Total	**121,000**	**190,000**

Notes:
1 Recharge is limited by available supply.
2 High range will depend on overdraft conditions and implementation of East Valley source substitution projects.

Whitewater Recharge Facility

Operation of the Whitewater Recharge Facility will continue with the goal of recharging an average of at least 100,000 AFY of SWP exchange water over the long-term. Unused SWP water and available desalinated drain water from the QSA will be transferred to the Whitewater Recharge Facility. Additional water acquired by transfer or lease will augment the existing SWP exchange water.

Thomas E. Levy Recharge Facility

The Levy facility will recharge 40,000 AFY on average. A second pumping station and pipeline will be constructed if needed to achieve and sustain 40,000 AFY of deliveries for recharge.

Martinez Canyon Recharge

Siting studies, land acquisition, environmental compliance, design, and construction will be conducted for the full-scale Martinez Canyon facility. The project will be implemented in phases with an initial capacity of 20,000 AFY with potential future expansion to as much as to 40,000 AFY based on groundwater overdraft conditions and implementation of East Valley source substitution projects.

Groundwater Recharge in Indio

The City of Indio will evaluate the feasibility of a nominal 10,000 AFY groundwater recharge project in Indio and construct if feasible. The final capacity will be based on pilot studies conducted by Indio.

Investigation of Groundwater Storage Opportunities with IID

CVWD will work with IID to identify options for storing Colorado River water on behalf of IID with currently planned Valley recharge facilities or additional facilities, including facilities to recover the stored water for use by Canal water users if necessary when IID calls for its stored water.

ES-6 WATER QUALITY MANAGEMENT

ES-6.1.1 Additional Groundwater Treatment for Arsenic

CVWD will work with other agencies to assist communities having high levels of arsenic in groundwater supplies to connect to the potable water system. As needed, CVWD will expand its arsenic treatment facilities to allow treatment of additional wells and construct water transmission pipelines as needed to meet future demands.

ES-6.1.2 Development of Salt/Nutrient Management Plan

The State Water Resources Control Board (SWRCB) requires preparation of a salt/nutrient management plan by 2014 as part of the 2009 State Recycled Water Policy. As stated in the Policy, its purpose is to "establish uniform requirements for recycled water use and to develop sustainable water supplies throughout the state" (SWRCB, 2009). CVWD will work with other Valley water agencies, tribes, and stakeholders to develop a salt/nutrient management plan that meets the State requirements and allows the cost-effective recycling of municipal wastewater in the Valley.

ES-6.1.3 Drainage Control

For both basin management (groundwater level and salt export), as well as the prevention of adverse impacts, the existing drainage system should be maintained, replaced as needed, or expanded as urban development occurs. CVWD will investigate alternative methods for funding the drainage system, conduct an investigation of the improvements needed to continue system operation in the future, and maintain and expand the drainage system.

ES-7 MONITORING AND DATA MANAGEMENT

Monitoring and data management programs aid in evaluating the effectiveness of the water management programs and projects identified in the Plan and to identify needed changes in management strategy and/or implementation.

The existing hydrologic monitoring program of weather data, streamflow data, well data (drilling logs, production, water levels), surface and ground water quality monitoring, and subsidence monitoring should be maintained and expanded. Key features of the expanded program are described below.

ES-7.1 Water Quality

CVWD will work with water agencies, tribes and cities to develop a coordinated water quality monitoring program to ensure that local water quality concerns and state/federal regulatory issues are addressed.

ES-7.2 Subsidence

CVWD will continue the USGS subsidence monitoring/reporting program and construct additional extensometers at critical locations to monitor subsidence, as needed.

ES-7.3 Water Resources Database

CVWD will work with water agencies, cities and tribes to develop a shared water resources database. The database could include well ownership data, well logs, groundwater production, water level and water quality data.

ES-7.4 Groundwater Model Update and Recalibration

Prior to the next Plan update, the CVWD groundwater model will be updated, recalibrated and peer reviewed.

ES-7.5 Water Quality Model

CVWD will initiate development of a model capable of simulating the water quality changes in coordination with preparation of the salt/nutrient management plan.

ES-7.6 Water Demand and Conservation Monitoring

Water purveyors will monitor and report demands by water use sector and correlate demands with implementation of water conservation measures to determine the effectiveness of water conservation measures in achieving goals and the need for additional measures.

ES-8 PLAN COSTS

The cost of not eliminating overdraft would be far more than the cost of the actions needed for eliminating overdraft identified in the 2010 WMP Update. Cost of overdraft includes increased subsidence with its impacts on individual homes, commercial structures, and infrastructure (streets, highways, water and sewer lines, and other utilities), water quality degradation, and increased pumping costs. Colorado River supplies would go unused as agricultural land is converted to urban land, and groundwater pumping would increase without alternative sources of supplies. At some point, it would not be possible to demonstrate the availability of water supplies to support new growth.

The estimated cost to implement the 2010 WMP Update is shown in **Table ES-10** for the period 2011 through 2045. Capital, operation and maintenance cost, total cost, and average annual cost are shown for each Plan element in 2010 dollars. These are total costs, not incremental costs,

and include the costs of many current activities such as groundwater pumping, acquisition of Colorado River water, current levels of recycling and water conservation, and groundwater recharge. The costs shown are the total costs for the entire Valley.

Table ES-10
Cost by Plan Component
2011-2045

Component	Total Capital Cost $millions	Total O&M Cost $millions	Total Cost $millions	Average Annual Cost[1] $millions
Water Conservation	$ 1	$ 230	$ 231	$ 6.6
Recycled Water	161	153	314	9.0
Colorado River Water		409	409	11.7
SWP Water		1,907	1,907	54.5
Delta Conveyance		472	472	13.5
Desalinated Drain Water	462	277	739	21.1
Groundwater Pumping and Treatment	135	1,950	2,085	59.6
Water Transfers	0	282	282	8.1
Other New Water		262	262	7.5
Source Substitution	1,142	782,	1,924	55.0
Recharge	48	181	229	6.5
Total Cost	**$1,949**	**$6,907**	**$8,856**	**$253.0**
Average Annual Cost [1]	$56	$197	$253	

Note:
1 Average annual cost is the total cost divided by 35 years.

The total estimated capital cost through 2045 is $1.95 billion. Total O & M cost is $6.91 billion bringing the total cost of the Plan implementation to $8.86 billion over 35 years. The average annual cost is $253 million. This annual cost does not reflect the amortized cost of capital projects that may be bond-funded over several decades, thus increasing the annual cost of capital projects.

ES-9 IMPLEMENTATION AND IMPLEMENTATION COSTS

In developing the 2010 WMP Update, CVWD relied on the latest population projections developed by Riverside County. CVWD does not develop population growth projections for use in water management planning. The 2006 Riverside County projections were prepared before the recent recession, which has slowed growth and is expected to have negative effects on growth in the near term. Over the long term, growth will continue. Future population projections will be adjusted in terms of the timing and magnitude of growth. These realities necessitate adjustment of Plan implementation to meet actual near term needs and continued updates of the Water Management Plan in the future to reflect revised population projections.

Near Term Projects to Meet Water Management Needs

Even with the current recession and lack of growth, continuation of existing projects and a few new projects are needed to reduce overdraft and its adverse affects. Ongoing projects that will be continued include:

- Whitewater Recharge with SWP Exchange Water and SWP purchases
- Implementation of the QSA
- Levy Recharge operating at current level of 32,000 AFY
- Martinez Pilot Recharge at current level of 3,000 AFY
- Water conservation programs at current levels, including implementation of the Landscape Ordinance
- Recycling in the West Valley
- Increased use of Canal water by golf courses with Canal water connections
- Conversion of East Valley agriculture to Canal water as opportunities arise
- Groundwater production/level/quality monitoring
- Cooperative subsidence monitoring with USGS

Assuming that growth remains relative low during the next five years, CVWD will focus on three new or expanded activities to reduce overdraft and comply with state regulations:

- Increased use of the Mid-Valley Pipeline project to reduce overdraft in the West Valley by connecting golf courses and reducing groundwater pumping by those courses.
- Implementation of additional water conservation measures, including the Landscape Ordinance, to meet the State's requirement of 20 percent conservation by 2020.
- Preparation of a salt/nutrient management plan for the Valley by 2014 to meet SWRCB Recycled Water Policy requirements

Long Term Projects

Projects to eliminate and control overdraft that are likely to be needed as future growth occurs are described in the 2010 WMP Update. These projects include:

- Additional water conservation.
- Desalinated drain water.
- Additional water transfers.
- Additional recycled water.
- Canal water treatment for urban indoor use.
- Canal water treatment for urban outdoor irrigation.
- Recharge in the Indio area.

As growth ramps up, the projects will be implemented based on cost effectiveness and need.

Implementation Costs

In 2010, Valley water agencies expended approximately $414 million on all water and wastewater management activities. This total cost includes approximately $106 million per year on activities associated with eliminating overdraft. Since 2002, CVWD and DWA have invested over $240 million in water conservation, supply acquisition and facilities to reduce overdraft. During the next five years (2011-2015), it is estimated that Valley water agencies will expend an additional $5.4 million on activities to eliminate overdraft, assuming growth remains slow.

As growth occurs, additional projects to control overdraft will be needed. Ultimately, costs associated with growth to eliminate and control overdraft could approach an additional $100 million per year in capital project and annual operations and maintenance costs.

Much of the future costs, both capital and operation and maintenance, will not be borne by CVWD. These costs will be borne by developers, other water organizations, and Valley municipalities. Capital costs and operation and maintenance costs associated with new growth will be paid by new growth. For example, the entire cost of systems for treating and delivering Colorado River Canal water for indoor use in East Valley developments and development of dual plumbing systems to provide untreated water to those developments for outdoor use will be paid for by new development.

ES-10 CONCLUSION

Groundwater overdraft is a significant problem in the Coachella Valley. The 2002 Water Management Plan was developed to identify and guide the long term implementation of measures to eliminate groundwater overdraft in the Valley. Since completion of the 2002 Water Management Plan, much has been accomplished by Valley water agencies and agricultural, municipal/residential, and golf course water users to reduce overdraft. Water conservation efforts have expanded, out-of-basin water supplies have increased, surface water and recycled water use is being used in lieu of groundwater, and new groundwater recharge facilities are online and an additional facility is being developed.

However, changing future demands and water supply uncertainties require additional actions to eliminate groundwater overdraft in the future, which are identified in the 2010 WMP Update. Continued implementation of the Water Management Plan will result in unavoidable costs for water users and water agencies alike. Each agency, including CVWD, will consider costs, available resources, funding mechanisms and priorities to eliminate overdraft in a timely manner. The success of the Plan to date indicates broad support for eliminating overdraft and the threats to the economy and quality of life in the Coachella Valley.

The CVWD Board of Directors certified the Supplemental Program EIR and adopted the 2010 WMP Update on January 24, 2012.

Appendix C
Cloward H2O Water Perfected
Water Demand Analysis

Desert Wave Surf Resort

Preliminary Engineering Review & Comments

Date: **05 July 2018**

Prepared by: **Dan Aldred, M.E.**
Reviewed by: **Allen Clawson, P.E.**

2696 N. University Ave., Ste 290, Provo, UT 84604 USA ● T: +1.801.375.1223 ● www.clowardh2o.com

Table of Contents

Introduction & Overview

CLOWARD H_2O was engaged by Desert Wave Ventures to provide assessment of the current engineering approach and estimates provided by Wavegarden and others regarding construction of the Surf Resort Lagoon at Desert Willow Resort, Palm Desert, CA and to give our professional comments regarding the 5 following items.

1. Preliminary Structural Engineering, Waterproofing and related issues
2. Option of including an underwater acrylic viewing panel
3. Water Quality Management System Approach and related issues
4. Water Demand Analysis
5. Water Temperature & Cooling Estimates

It is our intent to offer our professional assessment based on our knowledge, experience and our interpretation of the end goals. Our objective is to ensure the best possible surf lagoon for the owners in terms of safety, functionality, quality, maintenance, and cost.

Preliminary Structural & Waterproofing Review

Geotech Report prepared by Sladden Engineering:

The report is dated October 18, 2006 and specifically addresses the construction of villas. It does not address the construction of the proposed Surf Lagoon. Although most of the information is still applicable, the report should be updated to address the unique features and load of the Proposed Surf Lagoon.

The surf lagoon has a still water level that is as much as 9 ft (2.75 m) deep in the center. 9 ft of water weighs 562 pounds per square foot (psf), which is a very heavy load (a uniform freeway load is only 250 psf, as comparison). The load will fluctuate with the wave and will cause a dynamic loading. There is currently 3 to 4 feet of loose material on site. The geotechnical engineer needs to provide subgrade preparation requirements, including fill requirements and compaction requirements for an allowable bearing pressure that will accommodate the actual loading conditions.

The site is located in relatively close proximity of potentially active seismic faults. The walls may need to be designed for the additional lateral pressure due to seismic forces. The geotechnical engineer needs to provide the equivalent fluid pressure for lateral seismic forces to be added to the active and at-rest pressures provided in the report.

The type of cement recommended in the report may need to be revised based on the surf lagoon structure and systems.

The slab-on-grade recommendations in the report are for typical paving areas, similar to parking lots and roads. The slab-on-grade recommendations need to be expanded to include the slabs that will be associated with the proposed structure, specifically addressing the loads on the slabs as well as the expansion and contraction and shrinkage of the 6-acre facility.

Wavegarden Structural & Waterpoofing Design:

The Wavegarden design does not appear to be based on actual soil bearing pressures with in-situ soil conditions but rather on presumed conditions that might be typical of a target construction site. Specific bearing pressures or other site conditions (or presumed conditions) are not referenced and no calculations are provided. Thus, the structural systems employed are difficult to evaluate other than to point out potential areas of concern or alternative approach.

- The report establishes a “construction level” of +3.5m. The sections show wall profiles that are +4.0m with footings that are 1.3m thick. Please clarify if the quantities and volumes in the report are based on the actual heights of the walls and thicknesses and widths of the footings
- Are the footing widths shown in the drawings based on a soil bearing pressure that would be reasonable for this site.
- Are footings quantities included in the included take-off?
- Are any site subgrade preparation costs included in the take-off?
- This structure most likely would need to comply with ADA regulations. The main beach access as shown has a slope of 11.8% which exceeds the maximum 8% slope that is allowed for ADA accessibility. It may be that an alternative accessible access ramp will be necessary to provide for compliance with ADA standards.
- More information needs to be provided with regards to the construction, reinforcing, jointing, and waterproofing of the slab-on-grade Lagoon Floor.
- Concrete mix should comply with the ACI durability requirements for structures that retain water.
- We recommend that concrete exposed to water be reinforced for water-tightness, with proper cover, similar to a water tank, and or protected with waterproofing. A liner could also be installed below the slab as secondary waterproofing. An alternate design would be to use the slab as a ballast, with less reinforcing, but epoxy coated or equal, and the liner be the primary waterproofing.
- Shrinkage cracks should be avoided or minimized by the use of a low shrinkage concrete mix, properly placed pour strips with water-stops, and proper curing and reinforcing. Friction can be minimized by using one or two sheets of vapor barriers as slip sheets below the slabs. A liner could also be used below the slab as secondary waterproofing as well as acting as a slip sheet.
- All construction will need to comply with the California Building Code.

Concrete Coatings

Polyurea and/or Polyurethane hybrids will work. We have worked with and know most of the N. American polyurea manufacturers and their product differentiations relatively well. However, it is important to note that when polyurea is applied to concrete, (with the proper surface prep specified by the manufacturer), the real work horse is the primer. It is critical for proper application and durability that all concrete cracks, bug holes, voids, etc. be filled/repaired prior to the application. To get adequate coverage, a minimum of 60 mil coating is strongly recommended.

The PRO’s for polyurea are:

- Elastomeric
- Fast gel / cure time

- Chemistry is generally 'more' forgiving to environmental conditions
- Contiguous monolithic layer.
- Good Re-coat windows.

The CON's for polyurea are:

- Any concrete outgassing will cause blisters, bubbling & delamination.
- Difficult to repair should future needs be required.
- The application is applied high pressure, with a heated hose with equal (50%-50%) pump distribution of resin to catalyst. Any equipment mix-ratio hiccup will cause future product delamination issues. (6.5 acres ~ 283,000 ft^2 – likely that something will happen…)
- Odorous - Isocyanate pre-polymers

An alternate product that we have been recommending is Polymorphic Polymer Coatings [PPC].

Our coating consultant partner Specialty Coating Services [SCS] has used this product on +millions ft^2 over the years with superior results in primary containment applications. SCS recommends a 2 coat application with a 15 mil minimum thickness per application.

The PRO's for PPC Resin are:

- Has virtually the same coefficient of expansion as concrete. Does not peel/ crack.
- pH 1-14 continuous immersion, 2 - 4 hour full cure, -40 to 160F application temps.
- 18,600 PSI compressive strength
- No re-coat windows….very simple to repair should future needs be required.
- The PPC Resin does not require a primer and is used to repair concrete slab flaws.

The CON's for PPC Resin are:

- Odorous - styrene is the PPC Resin carrier.

Acrylic Viewing Panel Option

Preliminary evaluation of the impact of incorporating an acrylic viewing panel in one or both of the side walls was carried out. This would be structurally very similar to a large aquarium viewing panel placed in a submerged or partially submerged condition. In this case we postulated a full, standard sized acrylic sheet which would result in a total viewing area about 20' wide and 6' high. Four qualified vendors were contacted for comparison of application approach and cost – each being told it was for a large commercial pool in Southern California but with no further detail.

The panel would be embedded within the side wall, supported on all 4 sides which reduces the total thickness necessary. A recessed area in the deck, or an underground viewing area would then need to be constructed along the side of the lagoon.

The sill, jams and header of this window would be designed to be integral with the reinforced concrete structure of the lagoon wall such that no structural load is placed on the acrylic. The acrylic is then placed within the opening secured and sealed. Costs obtained include supply, delivery, setting and sealing of the acrylic and were all very comparable as might be expected.

Total installed cost range of the 6'x20' window, based on the 4 companies contacted, is:
$49,000 - $52,000

Water Quality Management System

Review of Wavegarden Proposed Treatment System Approach

The Wavegarden standardized and containerized system has been developed by their in-house team with input from other industry professionals and tested at their facility in Spain. Though no specific details are provided our knowledge of the prototyping and evaluation process that Wavegarden has been engaged in for the last several years allows us to presume with reasonable certainty. Their basis of design and statements related to clarity, chemical residuals and the appropriate use of UV and ozone are right on target. Their approach to evaluating the specific requirements based on location, water source and other constraints is also well conceived. We find only one concern, while commendable, it is unlikely that the system fits within a standard 40' container.

The proposed system is similar in most respects to a standard pool water treatment system employing a screening stage, high rate filtration, water chemistry chemical monitoring and dosing along with the appropriate use of ozone and UV sanitation.

However, depending on environmental analysis (primarily water source and local soils) there may need to be additional filtration stages or polishing. Most standard filters remove particles down to 10-20 micron. This works well in a high turnover environment such as a swimming pool but in the large volume surf lagoon with high turnover measured in days not hours or minutes the rate of contamination entering the pool can be much greater than the removal rate. This requires high efficiency filtration technologies that are not typical in swimming pool application.

Depending on the results of this analysis, the treatment process might look something like the one or the other of the following:

A: Screening [1/4"] → Pre-Filter [100 micron] → Ozone → Post Filter [<10 micron] → UV [optional] → Polishing Filter Side-stream → Chemical (chlorine & pH adjustment) dose

B: Screening [1/8"] → Ozone → High Rate Ballasted Clarifier → Post Filter [<10 micron] → Chemical (chlorine & pH adjustment) dose

C: Screening [1/8"] → Flocculation → High Rate Ballasted Clarifier → Ozone →Chemical (chlorine & pH adjustment) dose

Regardless of the exact system components, the flow rate (based on a 24 hr turnover) is 4,000 - 5,000 gpm requiring pipe sizes on the order of 20" and a 75 Hp pump (or multiple smaller pumps adding to a similar total) to drive it. The stage one screen alone will need to be about 40 ft^2 with an auto-cleaning mechanism such as a drum filter.

While it is likely that a portion of the system could be containerized there would still be a considerable amount that is built in place. Within the limits and constraints mentioned above, and without the benefit of a more detailed design, we estimate the required footprint of the complete treatment system to be in the range of 700 to 1,200 ft^2 including some working space for operations staff and required utilities, chemical storage, air handling, etc.

Vacuuming

Wavegarden mentions the importance of a system to vacuum the lagoon bottom removing material settled to the bottom when the wave is not operating. Typical pool vacuums range from 12" – 41" wide, not nearly large enough to be effective for this application.

Vacuum systems with enough size and capacity to accomplish this task are still in early stages of implementation. We have been involved in design and testing of several prototypes and are

aware of and working with (to some degree) at least three manufacturers who are in some stage of development. Within the next year or so we expect that this technology may be available and will be of great benefit to operating these large bodies of water with low turnover rates.

Water Demand Analysis

Review of Wavegarden Water Demand Analysis

The Wavegarden water demand analysis is based on a highly simplified equation given in their report but not identified or validated in any way; $E = 90 * t + 500$ where ***E*** is annual evaporation in mm, *t* is average temperature in °C. Despite the lack of documentation of this simplified approach the results are within a reasonable range and thus we would consider them valid. Wavegarden goes on to attribute various adjustments to the base evaporation including wave action (+30-60%), average rainfall (117 mm/yr), spills, leaks, drag-out, filter backwash, and other maintenance activities (2 m^3/day) for a grand total of 82,770 m^3 (~22 million gallons) annually.

Other than the overly simplified evaporation calculation, we believe the Wavegarden analysis of water demand to present an accurate explanation of the various water loss vectors and challenges.

CH2O Water Demand Analysis

In our internal analysis we calculated two different methods: The first method uses 25+ year weather data for average monthly temperatures, humidity, wind, cloud cover and solar radiation rates. This method is a part of a fairly evolved routine we use in our standard analysis of pools to calculate energy balance and has proven over the years to be very accurate. The second method utilizes published monthly pan evaporation rates for the area. Both methods result in a base value for E that is then adjusted based on similar factors to the Wavegarden analysis for wave operation losses and operational factors. These factors are intentionally conservative to account for peak values as opposed to averages.

The results of the two estimating methods were comparable though the pan evaporation derived values were about 20% higher than the theoretical weather – based estimates. Our calculations for monthly values and annual totals are given in Table 1.

Table 1: Water Loss, Temperature and Cooling Estimates

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Water Loss Estimates												
Average Montly Water Loss (gal/month)	555,800	748,100	1,261,100	1,624,500	2,137,500	2,436,700	2,351,200	2,094,700	1,282,500	1,197,000	726,800	491,700
Average Daily Water Loss (gal/day)	17,929	26,481	40,681	54,150	68,952	81,223	75,845	67,571	42,750	38,613	24,227	15,861
Total Annual Water Loss Estimate (gal/yr)	16,907,600											
Temperature Estimates												
Avg. Steady State Water Temperature Estimate (F)	67.5	72.7	77.4	83.0	87.8	91.0	92.7	90.8	85.1	78.0	69.9	66.0
Chilling Estimates												
Chilling Capacity Req'd to maintain < 85 F (BTU/hr)	-	-	-	-	1,006,000	3,821,000	6,207,000	3,668,000	-	-	-	-
Tons of Chilling	-	-	-	-	84	318	517	306	-	-	-	-
Total Montly Power Equivalent (kWh)	-	-	-	-	132,038	501,506	814,669	481,425	-	-	-	-
Water to cool with Evaporation alone (gal)	-	-	-	-	4,677,900	17,767,650	28,862,550	17,056,200	-	-	-	-

Water Temperature & Cooling Analysis

In estimating water demand we modified our standard energy balance routine to derive anticipated steady state average monthly water temperatures, assuming no cooling is applied (see table above). A maximum target operating water temperature of 85 F was chosen. The resulting differential temperature was then used to calculate daily chilling power necessary to cap the water temperature at the maximum value. An operational day of 10 hours is used to compensate for peak demand and the fact that the majority of heating occurs during mid-day.

In this way we were able to determine the cooling load and approximate equipment size and power required to maintain water temperatures below the maximum target value. See Table 1.

Three key methods of chilling mechanics are commonly used in large water bodies either independently or in combination with each-other to create the best efficiency possible for the application.

1. Refrigeration cycle cooling (air, water or ground source)

   This method employs mechanical chillers the same used in air conditioning systems and are commonly called heat pumps. Refrigerant circulating through a heat exchanger is expanded and absorbs heat from the lagoon water. On the other end of the refrigeration cycle the heat is expelled through condensing coils to an in-exhaustible heat sink such as ambient air, large body of water or to coils in the ground. Water source heat sinks are commonly either a large lake, ocean or cooling tower chilled water loops. The ground source refrigeration can be somewhat more efficient in warm environments but is also dependent on soil type and soil moisture content.

2. Evaporative cooling (Cooling Tower)

   Cooling towers operate by circulating warm water through a packed column with a large volume of airflow in a counter current setup. Thus, as water is falling through the column, air moving through the column causes high rates of evaporation to occur thus cooling the water. These are commonly used in many industrial processes and building services. The main drawback is the high volume of water loss through evaporation. 1 ton of chilling is equivalent to 12,000 BTU/h and consumes approximately 3 gpm of water.

   The Lagoon could be fit with cooling towers to operate when water temperatures rise near the target maximum. This would dramatically increase water demand

3. Geothermal cooling

   This method refers to using the ground as a heat sink – either directly or more commonly, in conjunction with a refrigeration cycle heat pump to improve efficiency. Either horizontal tubing coils or deep boreholes can be employed depending on geology of the site.

There is a great deal of work to be done to determine the best efficiency mode of operation if it is decided that the lagoon should be cooled. Local empirical studies should be carried out to validate the estimates prior to this engineering effort. Real world temperature rise data from existing bodies of water of similar depth in the region would help to hone in on the best practice approach to cooling.

CLOWARD H_2O
WATER PERFECTED

Estimated Utility Loads

Feature Properties																Water Usage				Sanitary Sewer Loads	Electrical Loads			Heat Loads	Est. Room Size	Chilling Loads	
Series #	Feature Description	Area	Volume	Turnover Time	Treatement Flow Rate	Feature Flow Rate	Filters per Module	Filter Surface Area	RMF Tank Volume	Backwash per System	Estimated Filter Run	Average backwash	Evaporation Loss		Total Average Water Usage	Peak Sewer Flows	Treatment Power	Feature Power	Combined Power	Max Usage					
													Peak	Average											
		ft^2	gal	min	gpm	gpm		ft^2	gal	gal	day	gal/day	gal/day	gal/day	gal/day	gal/day	kW	kW	kW	BTU/hr	ft^2	BTU/hr	tons	
100	Surf Lagoon	236,720	6,900,000	1,800	3,833	0	2	1625	841	3,364	3	1,121	84,654	45,177	46,298	3,364	159	0	159	0	2,600	3,000,000	250		

Surf Lagoon Water Loss Calculation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals	Notes:
(1) Avg. Open Water Evaporation Data (in/mo)	2.60	3.50	5.90	7.60	10.00	11.40	11.00	9.80	6.00	5.60	3.40	2.30	6.60	Average monthly evporation data
(2) 2010 Open Water Evaporation Data (in/mo)	2.56	3.39	6.13	7.18	9.69	9.87	9.64	9.18	7.87	4.77	3.88	2.25	6.40	
Open Water Evaporation Estimate (gal/month)	383,800	516,700	870,900	1,121,900	1,476,100	1,682,800	1,623,700	1,446,600	885,700	826,700	501,900	339,600	11,700,000	Total Annual Evaporation
Wave Operation Factor	1.20	1.23	1.29	1.35	1.42	1.51	1.56	1.54	1.43	1.33	1.24	1.20	1.36	18,600,000 (With one drain/fill cycle)
Avg. Backwash Loss (gal/day	748	885	1,019	1,121	1,201	1,346	1,529	1,402	1,246	1,121	989	863	1,123	Average daily Backwash losses
Average Operating Water Loss (gal/day)	15,600	23,400	37,300	51,600	68,800	86,000	83,200	73,300	43,500	36,600	21,700	14,000	46,300	Average daily Evaporation
Average Operating Water Loss (gal/mo)	483,600	661,050	1,156,300	1,548,000	2,132,800	2,580,000	2,579,200	2,272,300	1,305,000	1,134,600	651,000	434,000	16,900,000	Annual Loss excluding drain/fill
Annual Drain/Fill (gal)						6,900,000							23,800,000	