APPENDIX J.4

Water Supply Assessment

Agenda Date: September 13, 2011

Sacramento County Water Agency

Water Supply Assessment for The Ranch at Sunridge

Prepared by Sacramento County Water Agency
September 2011

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INTRODUCTION

BACKGROUND

The California Water Code (Water Code) requires coordination between land use lead agencies and public water purveyors. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet both existing demands and demands of planned development.

Water Code Sections 10910 – 10915 (inclusive) require land use lead agencies: 1) to identify the responsible public water purveyor for a proposed development project, and 2) to request a "Water Supply Assessment" (WSA) from the responsible purveyor. The purpose of a WSA is to demonstrate the sufficiency of a purveyor's water supplies to satisfy the water demands of a proposed development project while still meeting the current and projected water demands of existing customers. Water Code Sections 10910 – 10915 delineate the specific information that must be included in a WSA.

THE PROPOSED DEVELOPMENT PROJECT

The Ranch at Sunridge Project (Project) is a 530.2-acre area comprising a portion of the Sunrise Douglas Community Plan located within the City of Rancho Cordova (City). See Figure 1 for project location. The City has identified the Sacramento County Water Agency (SCWA) as the responsible water purveyor for the Project and has requested that SCWA prepare a WSA in accordance with Water Code Sections 10910 – 10915.

WATER SUPPLY ASSESSMENT OBJECTIVE

The objective of the Ranch at Sunridge WSA is to demonstrate that the planned water supplies of SCWA are sufficient to meet the demands of the Project in addition to the existing and projected water supply obligations of SCWA.

OVERVIEW OF THE RANCH AT SUNRIDGE WSA

The Project lies entirely within the boundaries of SCWA's Zone 40. Figure 2 shows the boundaries of the Project. The water demands associated with the Project have been included and addressed in the latest Zone 41 Urban Water Management Plan (UWMP) (SCWA, 2011)[1] and in the development of the Zone 40 "conjunctive use" program[2] as described in the Zone 40 Water Supply Master Plan (WSMP) (SCWA, February 2005)[1].

[1] This document, as well as all other documents referenced in this WSA, are on file at the County of Sacramento, Municipal Services Agency, Department of Water Resources, 827 7th Street, Room 301, and are available for review upon request.

[2] Conjunctive use entails the combined use of groundwater and surface water to meet demand, with the intent of providing 100 percent reliability. In "dry" years, the use of groundwater is maximized (although some surface water is delivered). In "wet" years, surface water diversions are maximized, while groundwater extractions are reduced. Such a program maximizes environmental benefits to surface water streams in "dry" years, while providing an opportunity for the groundwater basin to recover through natural recharge in "wet" years.

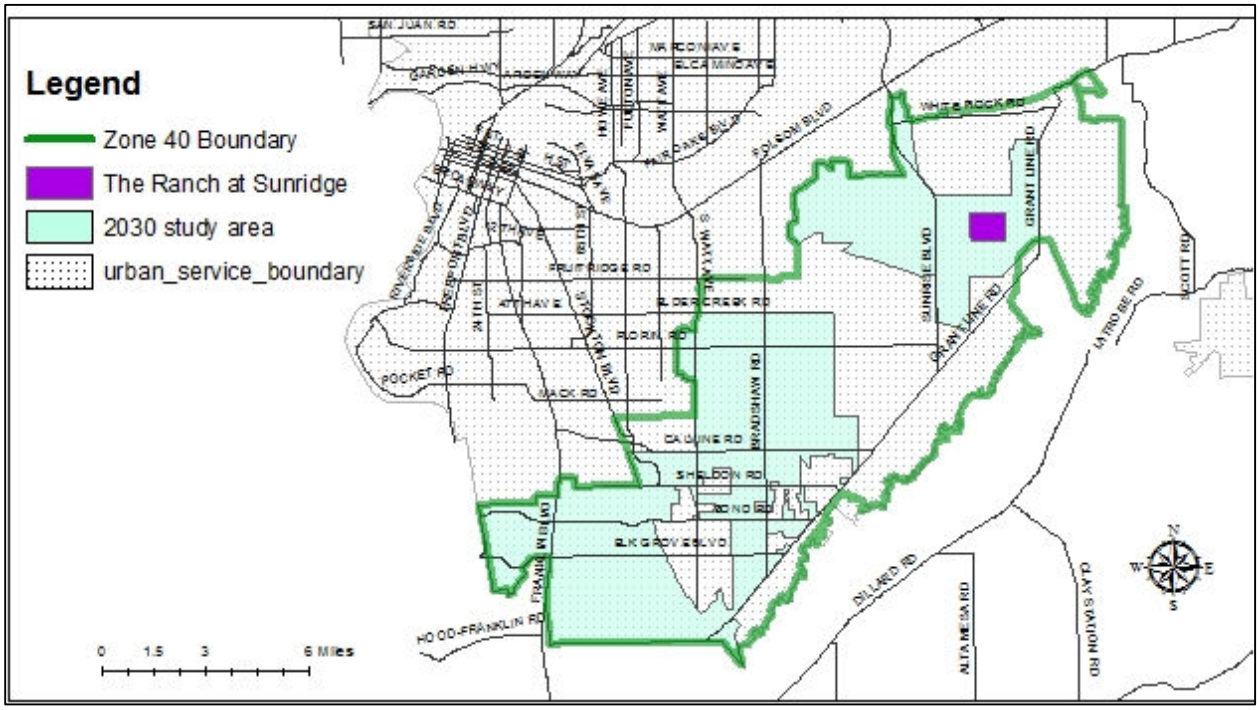


Figure 1 The Ranch at Sunridge Location Map

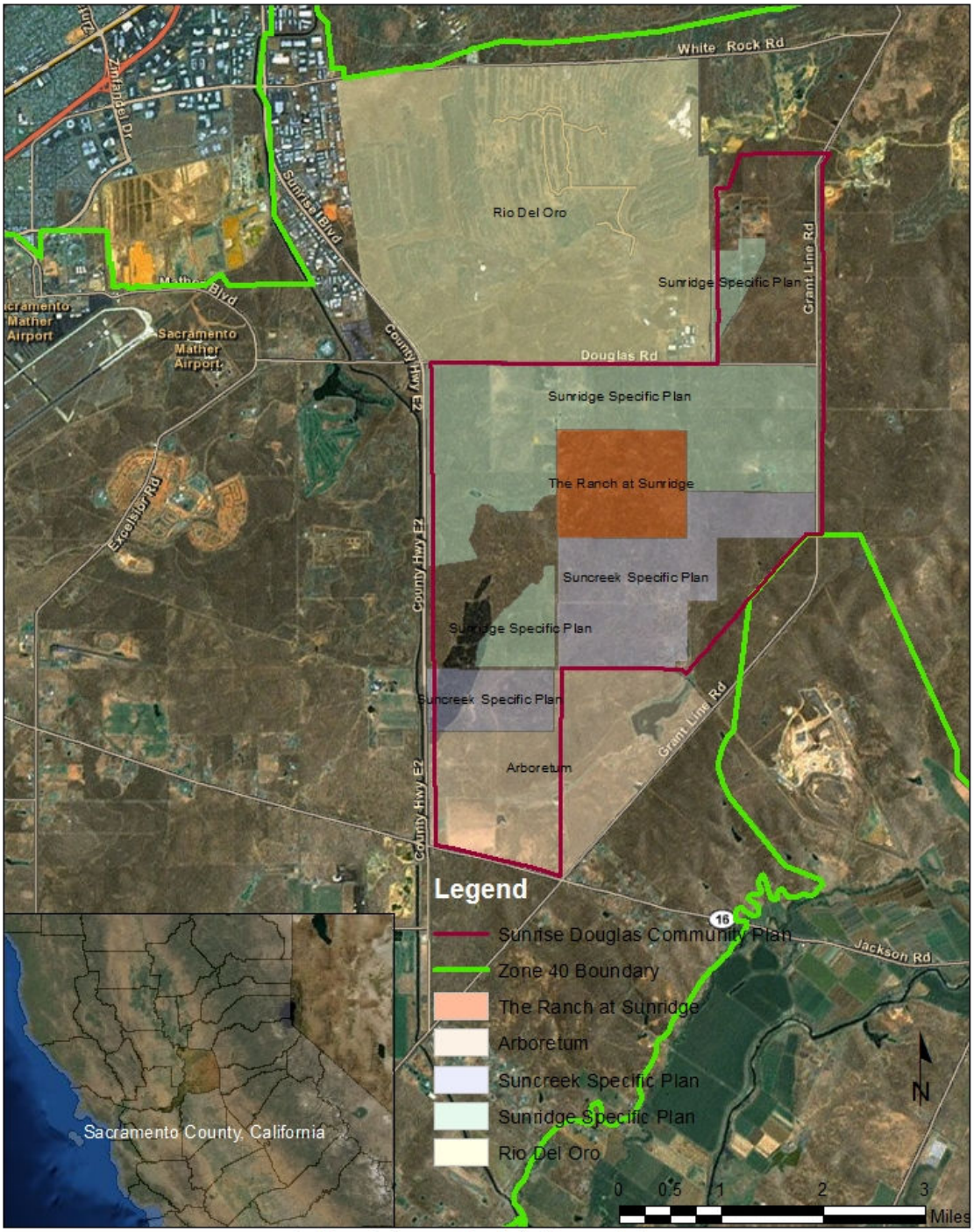
Accordingly, the WSA for the Project contains information derived from the UWMP[1] and other various water supply planning documents prepared in support of the Zone 40 conjunctive use program including:

- The Zone 40 Water Supply Master Plan (WSMP), (SCWA, February 2005)[1];
- The Zone 40 Water System Infrastructure Plan (WSIP), (SCWA, April 2006)[1];
- The Central Sacramento County Groundwater Management Plan (MWH/SCWA, February 2006)[1];
- The Final Environmental Impact Report (FEIR) for 2002 Zone 40 Water Supply Master Plan (EDAW, December 2004)[1];
- The FEIR for the Water Forum Proposal (FEIR – WFA), Sacramento City-County Office of Metropolitan Water Planning, October 1999[1]; and
- The Water Forum Agreement (WFA)[3], Sacramento City-County Office of Metropolitan Water Planning, January 2000[1].

[3] Begun in 1993, the Sacramento-Area Water Forum (Water Forum) is comprised of representatives from the business, environmental, public interest, and water purveyor communities (including the Cooperating Agencies). The co-equal objectives of the group are:

- To provide a reliable and safe water supply for the region's economic health and planned development through year 2030
- To preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

After a six-year, consensus-based, stakeholder process, the Water Forum Action Plan (referred to after its adoption as the Water Forum Agreement), which prescribes a regional conjunctive use program for the lower American River and the connected groundwater basin. In addition, the Water Forum completed an Environmental Impact Report (EIR) for the Water Forum Proposal was completed (State of California Clearinghouse Number 95082041). The document was certified by the two lead agencies (the City of Sacramento and the County of Sacramento) in 1999.



The Ranch At Sunridge

SACRAMENTO COUNTY WATER AGENCY
DEPARTMENT OF WATER RESOURCES

Figure 2 The Ranch at Sunridge Project Boundary

WSA FOR THE RANCH AT SUNRIDGE PROJECT

Water Code Sections 10910 – 10915 delineate the specific requirements of a WSA. The WSA for the Project is structured according to those requirements.

DETERMINE IF PROJECT IS SUBJECT TO CEQA [Section 10910 (a)]

The City has made the determination that the Project is subject to CEQA.

IDENTIFY RESPONSIBLE PUBLIC WATER SYSTEM [Section 10910(b)]

The City has identified SCWA as the responsible public water provider for the Project.

DETERMINE IF UWMP INCLUDES WATER DEMANDS [Section 10910(c)]

The total area for the Project is estimated to be 530.2 acres. The projected annual water demand for the project is 1,101.2 acre-feet per year (AF/year), including system losses. The proposed land use and projected water demand for the Project is provided in Table 1. Table 2 shows the water demand projection over the next 20 years in five-year increments.

Table 1 Proposed Land Use and Water Demands Estimate for the Project

Land Use Description	Land Use Classification[1]	Area (acres) [1]	Unit Water Demand Factor[2] (AF/acre/year)	Water Demand (AF/year)
Single Family Low Density	Single Family	142.3	2.89	411.25
Single Family Medium Density	Multi-Family Low Density	105.4	3.70	389.98
Multi Family High Density	Multi-Family High Density	12.2	4.12	50.26
Commercial	Commercial	13.5	2.75	37.13
Parks	Public Recreation	38.0	3.46	131.48
Major Roads	Right-of-Way	20.5	0.21	4.31
Wetland Preserve	Vacant	174.0	0.0	0.0
Detention Basin	Vacant	24.3	0.0	0.0
Subtotal		**530.2**		**1,024.4**
System Losses 7.5%				76.8
Total Demand				**1,101.2**

Note(s): (1) The land use classification and acreage information were provided by the project proponent in May 2011, and (2) The unit water demands provided in this table are consistent with the WSMP.

Table 2 Water Demand Growth Projection in Five-Year Increments for the Project

Year	2010	2015	2020	2025	2030
Water Demand (AF/year)	0	330.4	881.0	1,101.2	1,101.2

Inspection of Figure 1-1 in the WSMP indicates that the Project is located within the 2030 Study Area as defined in the WSMP, and in the SCWA's Service Area as defined in the UWMP.

The projected water demands associated with the Project is contained in the WSMP. During the development of the WSMP, there was no detailed land use information available for the Project except that it was projected to be "mixed land uses". The WSMP uses a unit demand factor of 2.51 AF/year/acre for "mixed land uses" to estimate the water demands for the Project area and other areas with the same land use classification for overall planning purpose.[4] Based on this unit demand factor, the WSMP projected a total water demand for the Project of 1,330.8 AF /year. The projected demand WSMP is greater than the water demand calculated for the currently proposed Project shown in Table 2 above (1,330.8 AFY/year as compared to 1,101.2 AFY/year). Accordingly, the water demands associated with the Project are accounted for in the WSMP.

The projected water demands associated with the Project is also accounted for in the UWMP. The water demands shown in the UWMP through 2035 are an estimated gallons per capita per day (GPCD) target chosen by SCWA and are based on the projected population. Establishing a GPCD target is a new requirement for the UWMP in accordance with Senate Bill (SB) x7-7, adopted in November 2009. Because the population projection for the Project area is included in the total population projection for SCWA, the water demand associated with the Project is considered accounted for in the UWMP. Therefore, it is reasonable to conclude that the data from the UWMP can be relied upon to meet current and projected demands (see Water Code Section 10910 (c)(2)).

The UWMP has identified SCWA's Zone 40 water demand in normal, single dry, and multiple dry years in 5-year increments for the 25-year projection (2010 to 2035), as shown in Tables 7-1, 7-2, and 7-3 of the UWMP. As indicated above, the Project's water demands are included as part of the Zone 40 demands in these tables. A summary of the pertinent data from these tables is presented in Table 3 below.

Table 3 SCWA Zone 40 Water Demands in Five-Year Increments

Water Year	2010	2015	2020	2025	2030	2035
Normal Year (Table 7-1, UWMP) (1)	34,511	44,425	50,662	57,583	67,565	77,712
Single Dry Year (Table 7-2, UWMP) (2)	34,511	44,425	50,662	57,583	67,565	77,712
Multiple Dry Year (3) (Table 7-3, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Multiple Dry Year (3) (Table 7-3, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Multiple Dry Year (3) (Table 7-3, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712

Notes:
(1) Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.
(2) Single-dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single-dry year for the Sacramento River watershed.
(3) Multiple-dry year period is generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. 1989-1992 is a multiple-dry year period for the Sacramento River watershed.

[4] This unit water demand factor represents a weighted average demand for a typical mixed land uses area that includes residential, commercial, recreation, and open space. Without detailed land use information, it is a relatively reliable method for water demand estimation for general water supply planning purposes.

IDENTIFY EXISTING WATER SUPPLIES FOR THE PROJECT [Section 10910(d)]

SECTION 10910(d)(1)

Section 10910(d)(1) requires identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed Project and a description of the quantities of water obtained by SCWA pursuant to these water supply entitlements, water rights, or water service contracts in previous years.

Use of Groundwater

The Project water demands will ultimately be met by a combination of groundwater and surface water. Initial demands for the Project will likely be met by groundwater extracted from the North Vineyard [a.k.a. Excelsior] Well Field (NVWF) south of Mather Field and possibly the Mather Housing wells located at Mather Field. Groundwater from NVWF will be conveyed to and treated at the Anatolia Water Treatment Plant (WTP) located to the northwest of the project area. After treatment, the groundwater will be distributed to the Project area through the existing and future water distribution system. Surface water will not be available to the Project and surrounding areas until the North Service Area (NSA) pipeline and terminal storage tanks are constructed. The NSA pipeline is the transmission pipeline that will convey treated surface water from SCWA's Vineyard Surface Water Treatment Plant (VSWTP) to the NSA.

SCWA currently exercises, and will continue to exercise, its rights as a groundwater appropriator to extract groundwater from the groundwater basin (Central Basin) underlying Zone 40 for delivery to its customers[5]. The UWMP has identified Zone 40 current and projected groundwater pumping in normal, single dry, and multiple dry years in 5-year increments for the 25-year projection (2010 to 2035), as shown in Tables 4-11 through 4-16 of the UWMP. A summary of the pertinent data from these tables is presented in Table 4 below.

Table 4 Zone 40 Current and Projected Groundwater Pumping in Five-Year Increments

Water Year	2010 (Table 4-11, UWMP)	2015 (Table 4-12, UWMP)	2020 (Table 4-13, UWMP)	2025 (Table 4-14, UWMP)	2030 (Table 4-15, UWMP)	2035 (Table 4-16, UWMP)
Normal Year (1)	35,000	20,000	15,000	20,000	25,000	15,000
Single Dry Year (2)	39,930	46,300	48,800	61,300	64,500	68,600
Multiple Dry Year (3)	36,232	32,500	30,500	38,500	37,200	36,800
Multiple Dry Year (3)	37,464	35,000	33,500	42,000	41,200	41,300
Multiple Dry Year (3)	38,080	36,250	35,000	43,750	43,200	43,550

Notes:
(1) Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.
(2) Single-dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single-dry year for the Sacramento River watershed.
(3) Multiple-dry year period is generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. 1989-1992 is a multiple-dry year period for the Sacramento River watershed.

[5] The groundwater basin underlying Zone 40 has not been adjudicated.

For the Zone 40 portion of the Central Basin, a long-term average annual yield of 40,900 AF/year has been identified in both the WFA and WSMP. Additionally, as a signatory to the WFA and a member of the Sacramento Central Groundwater Authority (Groundwater Authority), SCWA recognizes the Water Forum-defined long-term sustainable average annual yield of the underlying groundwater basin of 273,000 AF/year.

Use of Surface Water

The SCWA conjunctive use program includes the delivery of surface water within the Zone 40 boundaries as part of a comprehensive program to maintain the long-term, regional balance of the groundwater basin (see WSMP). Currently SCWA has obtained two sources of surface water supplies totaling up to 75,751 AF/year available on a long-term average:

- Appropriative Water

  In February 2008, the State Water Resources Control Board (SWRCB) approved SCWA's appropriative right permit application to divert water from the American and Sacramento Rivers (Permit 21209). Water under this permit is considered "intermittent water" that is typically available during the winter months of normal or wet years. These flows could range up to 71,000 ac-ft/yr. The long-term average availability of this supply is 21,700 AF/year. Note that the long-term availability for appropriative water in WSMP and UWMP is updated.

- CVP Water

  CVP water is described under three different contracts, as follows.

  - SMUD 1 Assignment - 15,000 AF/year of SMUD's CVP contract water has been assigned to SCWA under the terms of an agreement with SMUD. The long-term availability of SMUD1 water is 13,000 AF/year.
  - SMUD 2 Assignment - 15,000 AF/year of SMUD's CVP contract water has been assigned to SCWA under the terms of an agreement with SMUD. The long-term availability of SMUD2 water is 13,000 AF/year.
  - CVP Water Public Law 101-514 ("Fazio" Water)
    SCWA has entered into a contract with the U.S. Bureau of Reclamation (USBR) for 22,000 AF/year of Central Valley Project (CVP) supplies from the American River pursuant to Public Law (PL) 101-514 (often referred to as "Fazio water"). Of this 22,000 AF/year, 7,000 AF/year has been subcontracted to the City of Folsom for diversion from Folsom Lake. The remaining 15,000 AF/year will be diverted by SCWA from the Sacramento River. The long-term average availability of this supply is 13,551 AF/year.

There are two future surface water supplies, POU water and water transfers, planned for in the WSMP to meet build-out water demand. The timing for acquiring these two surface water supplies will be determined by demand growth in Zone 40.

- POU water refers to surface water obtained through a water wholesale agreement with the City of Sacramento (City) whereby the City will sell surface water to SCWA for use in the portion of Zone 40 that lies within the City's American River POU. The amount of water required to serve the POU area is estimated to be 9,300 ac-ft/yr.
- Water transfers refers to surface water obtained through a water purchase and transfer agreement that SCWA would enter into with other entities that currently hold surface water rights upstream of SCWA's points of diversion. According to the WSMP, the amount of water needed is estimated to be 5,200 ac-ft/yr.

Contract documents, agreements, and applications for appropriative water and CVP water supplies are available for review (see footnote 1). Table 5 (or Table 4-3 in UWMP) shows all the surface water entitlements, water rights, and water services contracts to meet the build-out water demand in Zone 40.

Table 5 Water Supply Entitlements, Water Rights, and Water Service Contracts to Meet Zone 40 Build-out Water Demand

Water Supply Sources	Wholesaler Supplied Volume (Yes/No)	Status of Contract, Permit, and Agreement	Availability in Wet Years	Availability in Dry Years	Long-term Average	Reliability
Supplier-produced groundwater to serve Zone 40 [1]	no	Existing	27,300	Up to 69,900	40,900	High
Wholesaler – (City of Sacramento) to serve portion of Zone 40 in City of Sacramento's American river POU[1]	yes	Planned	9,300	9,300	9,300	High
Supplier-produced surface water to Serve Zone 40: U.S. Bureau of Reclamation – CVP Supply (SMUD 1, SMUD 2, and Fazio Water) [1]	yes	Existing	45,000	8,700	38,000	Moderate
Supplier-produced surface water to Serve Zone 40: Appropriative Water – SWRCB Permit 21209 [1]	no	Existing	Up to 71,000	0	21,700	Low
Other Water - Water Transfer [1]	no	Planned	0	9,600	5,200	Moderate to High
Recycled water for Zone 40 [1]	yes	Existing	4,400	4,400	4,400	High
Remediated groundwater to serve Rio del Oro in Zone 40	no	Existing	8,900	8,900	8,900	High
Zone 40 Subtotal			165,900	110,800	128,400	

Notes:

1. *Source: The Zone 40 Water Supply Master Plan. Groundwater pumping rates in wet and dry years are modeling results determined by the build-out demand and the availability of surface water. Groundwater pumping rates can be lower or higher than the numbers identified in the table as long as the long-term average is maintained below 40,900 ac-ft/yr.*

Table 6 presents the quantities of surface water supply pursuant to these water rights and contract entitlements in five-year increments beginning in the year 2010 through 2035 under normal, single dry, and multiple dry years.

Table 6 Zone 40 Current and Projected Surface Water Supply in Five-Year Increments

Water Year	2010 (Table 4-11, UWMP)	2015 (Table 4-12, UWMP)	2020 (Table 4-13, UWMP)	2025 (Table 4-14, UWMP)	2030 (Table 4-15, UWMP)	2035 (Table 4-16, UWMP)
Normal Year (1)	12,320	35,000	42,500	50,000	66,800	81,200
Single Dry Year (2)	7,390	8,700	8,700	8,700	18,000	27,600
Multiple Dry Year (3)	11,088	22,500	27,000	31,500	45,300	59,400
Multiple Dry Year (3)	9,856	20,000	24,000	28,000	41,300	54,900
Multiple Dry Year (3)	9,240	18,750	22,500	26,250	39,300	52,650

Notes:
(1) Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.
(2) Single-dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single-dry year for the Sacramento River watershed.
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SECTION 10910(d)(2)

Section 10910(d)(2) requires SCWA to demonstrate that water supplies required to serve the Project actually exist. Section 10910(d)(2) defines what constitutes "proof".

Section 10910(d)(2)(A)

This subsection requires written contracts or other proof of entitlement to the water supplies identified for the Project. The contracts and agreements for the surface water supplies are available for review at the offices of the County of Sacramento, Municipal Services Agency, Department of Water Resources (see footnote 1).

Initial water demands in the Project will likely be met with groundwater. SCWA will exercise its right as a groundwater appropriator to extract groundwater from the basin for delivery to the Project. In the long-term, the water demands of the Project will be met in accordance with the conjunctive use program described in the WSMP.

Section 10910(d)(2)(B)

This subsection requires a copy of the capital outlay program for financing the delivery of the identified water supply to the Project. The documents described below are available for review at the offices of the County of Sacramento, Municipal Services Agency, Department of Water Resources (see footnote 1).

A financing plan for the construction of groundwater and surface water facilities needed to realize the conjunctive use program identified in the WSMP has been approved by SCWA's Board of Directors (Board). The financing plan, as outlined in Chapter 7 of the WSMP, identifies the necessary water facility projects and estimated costs associated with implementation of said conjunctive use program (Capital Improvement Program or CIP).

In addition to the WSMP, the Feasibility Report for Sacramento County Water Financing Authority Series 2007 Revenue Bonds (Sacramento County Water Agency Freeport Project) (MWH, April 2007), and the Sacramento County Water Agency FY 2009/10 Water Rate Study Report (FCS Group) evaluated and updated the total cost and fee requirements of the Zone 40 conjunctive use program incorporating all future Zone 40 expenditures for major capital facilities (i.e., surface water treatment plants, groundwater treatment plants, major transmission mains, etc.) and annual operation and maintenance costs associated therewith. Funding to meet SCWA's capital and annual funding requirements was then implemented by the Board through the issuance of revenue bonds for certain projects and the adoption of user fee and development fee increases over time (most recently in 2009).

SCWA's capital outlay program includes the means for financing facilities to deliver the identified water supply to the Project. Specifically, all facilities needed to serve the Project are included in the CIP that was financed through the above described revenue bonds, user fee and development fee. The development fee and user fee, as described in Titles 3 and 4 of the Sacramento County Water Agency Code, will continue to provide revenue to finance all aspects of the Zone 40 conjunctive use program (including repayment of debt financing). Both fee programs are evaluated annually and adjusted, if necessary, to accommodate changes in the service area, water demands, needed capital projects, and required debt financing.

Section 10910(d)(2)(C)

This subsection requires identification of any federal, state, and local permits required for construction of the facilities identified for delivering the water supply to the Project.

Since adoption of the WSMP, SCWA has made significant progress in the development of its conjunctive use water supply program. SCWA, in cooperation with East Bay Municipal Utility District (EBMUD), has completed the Freeport Regional Water Project (FRWP). SCWA's portion of the project consists of participation in a large diversion facility on the Sacramento River just north of the community of Freeport, and a recently completed transmission pipeline that will convey surface water to:

1. SCWA's new VSWTP that is currently nearing completion at the northeast corner of the intersection of Florin Road and Knox Road for treatment prior to delivery to SCWA's customers, and
2. The Folsom South Canal where EBMUD will discharge their flows for conveyance to their service area in the East Bay.

The VSWTP is anticipated to be on line in late 2011. In order to deliver treated surface water to the Project and other surrounding projects, SCWA will need to construct a major water transmission pipeline, the NSA pipeline. SCWA approved an initial study/mitigated negative

declaration for this project pursuant to CEQA in September 2010. It is SCWA's intent to secure approval of the necessary permits and construction documents for this project so that it can be constructed prior to demand for water within the NSA exceeding the capacity of the groundwater system currently serving customers in this area. The timing of construction of the NSA pipeline cannot be precisely predicted at this time, as it will be dependent on demand growth in the NSA.

The various federal, state, and local permits for the construction of the FRWP and the VSWTP have been obtained. Copies of these permits are available for review at the offices of the County of Sacramento, Municipal Services Agency, Department of Water Resources (see footnote 1). Construction of the NSA pipeline and related facilities required for the delivery of surface water to the Project will also require a variety of permits as necessary. Additional site-specific environmental review and approval may also be needed for water storage tanks and other appurtenances that will be constructed in conjunction with the NSA pipeline. Any additional conveyance pipelines needed to complete the treated water system will be constructed within existing and future public right-of-way and easements. At this time, SCWA does not foresee any regulatory or legal impediments to completing any necessary further environmental review and obtaining those permits when the need arises.

Section 10910(d)(2)(D)

This subsection requires identification of any regulatory approvals required for delivery of the water supply to the Project.

Water production, treatment, and storage facilities will be added to SCWA's public water system permit issued by the California Department of Public Health (DPH) and the design of these facilities will require review and approval by DPH. No other regulatory approvals are anticipated.

IDENTIFY PARTIES DEPENDENT UPON PROPOSED SUPPLY [Section 10910(e)]

SECTION 10910(e)

Section 10910(e) states:

"If no water has been received in prior years by the public water system…, under the existing water supply entitlements, water rights, or water service contracts [identified to serve the proposed project], the public water system,…shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts to the same source of water as the public water system,…, has identified as a source of water supply within its water supply assessments."

The intent of this section is to identify any potential conflicts that may arise from the exercise of a water supply entitlement, water right, or water service contract to serve a proposed project if such water supply entitlement, water right, or water service contract has not been previously exercised.

Use of Groundwater

The water demands of the Project will be met with groundwater and surface water. SCWA has previously exercised its rights as a groundwater appropriator to meet the water demands of its customers and will continue to exercise those rights to provide treated groundwater supplies to the Project.

Use of Surface Water

The surface water supplies associated with SCWA's conjunctive use program fall into four categories:

1) Water supplies available through a current USBR CVP contract.
2) Water supplies available through SWRCB Permit 21209.
3) Water available through the City of Sacramento for use within the American River Place of Use (POU).
4) Surface water transfers identified in the WSMP.

The source of supply for surface water is the USBR CVP and SWRCB Permit 21209. Thus, the parties that could most directly be affected are other CVP contractors. Additionally, until such time as the SWRCB Bay Delta Water Rights Hearings are concluded, other parties that could be affected include: CVP contractors, State Water Project (SWP) contractors, water rights holders subject to Term 91 conditions, and riparian diverters downstream of SCWA's point of diversion. The point of diversion is at a site near the community of Freeport on the Sacramento River.

The source of supply for that portion of SCWA that lies within the POU is the City of Sacramento. Delivery of this water to customers within the POU has been included in the City of Sacramento's long-range plan for perfecting their American River water rights. The diversion location, timing, and volume of delivery are currently under negotiation.

Surface water transfers would require SCWA to enter into purchase and transfer agreements with other entities that currently hold surface water rights upstream of SCWA's points of diversion. According to the WSMP, the amount of water needed is estimated to be 5,200 AF/year. The timing for the acquisition of this water supply is yet to be determined.

DOES SUPPLY FOR PROJECT INCLUDE GROUNDWATER? [Section 10190(f)]

SECTION 10910(f)

The water demands of the Project will partially be met with groundwater extracted from the Central Basin. Consequently, Section 10910(f) requires additional information about groundwater to be presented in this WSA.

Section 10910(f)(1)

Section 10910(f)(1) requires a review of groundwater information contained in the UWMP relevant to the identified water supply for the Project. The appendix section of the UWMP includes a copy of the Central Sacramento County Groundwater Management Plan (CSCGMP, or Central Basin GMP) for the groundwater basin from which SCWA extracts groundwater; the Central Basin GMP was adopted by the Sacramento Central Groundwater Authority

(Groundwater Authority) in November 2006. The Central Basin GMP contains detailed information about the groundwater basin underlying the Central Basin (including Zone 40), groundwater supplies, and basin management objectives.

Section 10910(f)(2)

Section 10910(f)(2) requires a description of the groundwater basin and the efforts being taken to prevent long-term overdraft.

For the Project, SCWA would pump groundwater from the South American Sub-basin as defined by the California Department of Water Resources (DWR) Bulletin 118. According to Bulletin 118, the South American Sub-basin is defined as the area bounded on the west by Interstate 5 and the Sacramento River, on the north by the American River, on the south by the Cosumnes and Mokelumne rivers and on the east by the Sierra Nevada. The Central Basin covers a major portion of this basin.

Groundwater in the Central Basin is generally classified as occurring in a shallow aquifer (Laguna or Modesto Formation) and in a deep aquifer (Mehrten Formation). The Laguna or Modesto Formation consists of older alluvial deposits of loosely to moderately compacted sand, silt, and gravel deposited in alluvial fans. These deposits are moderately permeable and have a thickness of about 100 to 650 feet. The deeper Mehrten Formation is a sequence of fragmented volcanic rocks which crops out in a discontinuous band along the eastern margin of the basin. It is composed of black volcanic sands, stream gravels, silt, and clay inter-bedded with intervals of dense tuff breccia. The sand and gravel intervals are highly permeable and the tuff breccia intervals act as confining layers. The thickness of the Mehrten Formation is between 200 and 1200 feet. Groundwater is located from 20 to 100 feet below the ground surface depending on when and where the measurement is taken. The base of the potable water portion of the deep aquifer is located approximately 1,400 feet below the ground surface.

Intensive use of groundwater over the past 60 years has resulted in a general lowering of groundwater elevations. Over time, isolated groundwater depressions have grown and coalesced into a single cone of depression that is centered in the southwestern portion of the basin, approximately 15 miles southwest of the project site. Groundwater level trends through much of the basin have generally declined consistently from the 1950s and 1960s to about 1980 by 20 to 30 feet. From 1980 through 1983, water levels recovered by about 10 feet and remained stable until the beginning of the 1987-1992 drought; however, wells in the vicinity of Rancho Cordova appear to have recovered less than other wells in the basin since 1995 (generally less than 10 feet). From 1995 to 2003 most groundwater levels recovered to levels that were generally higher than levels prior to the 1987 through 1992 drought. Much of this recovery can be attributed to the increased use of surface water in the Central Basin, and the fallowing of previously irrigated agricultural lands transitioning into new urban development areas. In the central portion of the Central Basin, where the Project site is located, groundwater level trends observed in California Department of Water Resources monitoring wells generally vary between 40 feet above to 40 feet below mean sea level over the period of the 1950's through the 2000's.

Recharge of the aquifer system occurs along active river and stream channels where extensive sand and gravel deposits exist, particularly along the American, Cosumnes, and Sacramento

rivers. Additional recharge occurs along the eastern boundary of Sacramento County at the transition point from the consolidated rocks of the Sierra Nevada to the alluvial-deposited basin sediments. This recharge is classified as subsurface recharge along with underground flow into and out of the basin with adjacent groundwater basins. Other sources of recharge include deep percolation from applied surface water and precipitation.

As mentioned previously, the estimated long term annual sustainable yield of groundwater from the Central Basin is 273,000 AF/year. Currently, groundwater extractions are estimated to be 250,000 acre-feet per year (excluding remediation).

The determination of the sustainable yield of the Central Basin (273,000 acre-feet per year) was negotiated by the Water Forum Groundwater Negotiating Team (GWNT) and involved a complex process that developed the long-term average annual pumping limit of the basin. The long-term average annual pumping limit is described as the hydro-geologic process under which groundwater can be pumped and not exceed average natural recharge over a long-term period of time. Under sustainable conditions, natural recharge is said to be able to make up for variations in the amount of pumping that occurs over the long-term, given wet and dry periods in the hydrologic record.

First, the GWNT developed future land and water use projections. Then the impacts associated with increased water demands, assuming that demand is met solely by groundwater, were described. These results were then compared with 1990 baseline conditions to provide the level of impact that could be expected if groundwater pumping were increased beyond baseline conditions.

Four quantifiable factors were used to determine the level of impact:

- Water quality degradation
- Dewatering of wells
- Higher cost of pumping
- Ground subsidence

Based on these four factors, a series of groundwater model runs quantified each condition in 10-year increments, beginning in 1990 and ending in 2030. Each model run was set up to reflect future land and water use conditions; then 70 years of historical hydrology were applied to each model run to determine how the aquifer might behave under wet and dry conditions.

After comprehensive review and analysis of the resulting data, the GWNT concluded that using 2005 levels of groundwater pumping (interpolated from the 2000 and 2010 modeling results) would provide the highest quantity of groundwater yield from the basin while minimizing impacts associated with the four factors of concern. Accordingly, the GWNT determined the 2005 pumping rates equated to a long-term pumping average annual pumping limit of approximately 273,000 acre-feet per year for the Central Basin.

Section 3.2 and Appendix E of the WSMP provide detailed descriptions of the Zone 40 conjunctive use program (see footnote 1). SCWA's operational approach for preventing overdraft of the groundwater basin underlying Zone 40 and optimizing the use of both

groundwater and surface water is discussed in detail in these sections. The FEIR for 2002 Zone 40 Water Supply Master Plan (see footnote 1) includes an extensive analysis of the effects of the Zone 40 conjunctive use program on the groundwater basin and on various recharge sources. A summary of the conjunctive use program is as follows:

SCWA's conjunctive use program is a coordinated approach to manage surface water and groundwater supplies to maximize the yield of available water resources. The conjunctive use program for SCWA includes the use of groundwater, surface water, remediated water and recycled water supplies. The program also includes the construction of a surface water diversion structure, a surface-water treatment plant, water conveyance pipelines; and groundwater extraction, treatment and distribution facilities.

This conjunctive use program relies on an abundance of surface water in wet years when as much surface water as possible will be diverted, within entitlement limitations, minimizing the use of groundwater. During these years the groundwater aquifer will be allowed to naturally replenish. In dry years, when surface water availability is reduced, SCWA will pump more groundwater from the replenished aquifer. Using surface water and groundwater conjunctively makes it easier for SCWA to meet demands in a single dry year or in multiple dry years. The goal of the conjunctive use program is to meet all demands during wet and dry years.

SCWA has adopted policies to insure systematic, incremental implementation of its conjunctive use program. These policies are also consistent with the terms of the WFA, which is intended to maintain a long-term sustainable groundwater supply. The policies are included in the SCWA's UWMP and WSMP, which include specific action items to assure implementation, specifically, development of additional surface water supply and treatment facilities to provide water during wet years, development of groundwater facilities to provide groundwater during dry years, in-lieu "banking" of groundwater during wet years, development and implementation of demand management and water conservation strategies, development of water reclamation facilities to meet non-potable demands, and development of a financing plan to implement these action items.

As a part of the Groundwater Authority, SCWA has committed to the implementation of the Central Basin GMP. The Central Basin GMP contains five basin management objectives (BMO) designed to maintain a safe, sustainable and high quality groundwater resource within the Central Basin. These BMOs, in conjunction with the program component action items, focus on managing and monitoring the basin to benefit all groundwater users in the basin and are intended to be specific enough to result in numerical criteria for the basin, but also flexible enough to be modified or adapted to new information on groundwater basin behavior over time. The five BMOs are summarized below:

1. Maintain the long-term average groundwater extraction rate at or below 273,000 acre-feet per year.
2. Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum "solution."
3. Protect against any potential inelastic land surface subsidence by limiting subsidence to no more than 0.007 feet per 1 foot of drawdown in the groundwater basin.

4. Protect against any adverse impacts to surface water flows in the American, Cosumnes and Sacramento rivers.
5. Water quality objectives:
    a. Total dissolved solids (TDS) concentration of less than 1,000 milligrams per liter (mg/l).
    b. Nitrate (NO_3) concentration of less than 45 mg/l.
    c. Volatile organic compounds (VOC).

The Groundwater Authority intends to achieve these objectives by implementing the following program component action items:

1. Stakeholder involvement; including public outreach, involving other agencies inside and adjacent to the basin, developing relationships with state and federal agencies, and pursuing partnership opportunities.
2. Monitoring program; including groundwater elevation monitoring, groundwater quality monitoring, land surface elevation monitoring, surface water/groundwater interaction monitoring, establishing protocols for collection of groundwater data, and establishing a data management system.
3. Groundwater resource protection; including well construction policies, well abandonment and destruction policies, wellhead protection measures, protection of recharge areas, control of the migration and remediation of contaminated groundwater, and control of saline water intrusion.
4. Groundwater sustainability; including demand reduction.
5. Planning integration; including existing integrated planning efforts, urban water management planning, DWSAP program, land use planning, and integrated groundwater and surface water modeling.

The Central Basin GMP also has an implementation plan that defines specific actions or trigger points and associated remedy activities linked with each of the BMOs. Once a trigger point has been reached, the Groundwater Authority must decide on a course of action.

Water quality analysis of the aquifers underling the Central Basin has shown that groundwater quality found in the upper aquifer system is of higher quality than that found in the lower aquifer system. This is principally because the lower aquifer system (specifically the Mehrten Formation) contains higher concentrations of iron and manganese, and higher concentrations of total dissolved solids (TDS). Notwithstanding these findings, the lower aquifer typically meets water quality standards as a potable water source. Water from the upper aquifer (specifically the Laguna Formation) generally does not require treatment (unless high arsenic values are encountered), other than disinfection for public drinking water systems.

The UWMP addresses water supply and demand issues, water supply reliability, water conservation, water shortage contingencies, and recycled-water usage for the areas within Sacramento County where SCWA provides retail water services, including the Project site. Together, the WSMP and UWMP outline a comprehensive conjunctive use program. Many of the facilities required to implement this conjunctive use program are now, or soon will be, complete and operational.

Section 10910(f)(3)

Section 10910(f)(3) requires a description of the volume and geographic distribution of groundwater extractions from the basin for the last five years.

Table 7 identifies past volumes of groundwater extracted by SCWA in Zone 40 between 2000 – 2010.

Through the water supply master planning process, SCWA identified a system of sixteen separate well fields throughout Zone 40. A distributed groundwater extraction strategy was selected because it would minimize drawdown effects of pumping by spreading extraction over a wide geographic area. The spatial distribution of the SCWA's current and future well fields is shown in Figure 3.

Table 7 Historical Groundwater Pumping in Zone 40, 2000 – 2010

Year	(Acre-Feet)
2000	20,022
2001	22,306
2002	22,949
2003	22,745
2004	25,790
2005	29,184
2006	31,162
2007	31,249
2008	34,225
2009	34,249
2010	32,171

Section 10910(f)(4)

Section 10910(f)(4) requires a description of the projected volume and geographic distribution of groundwater extractions from the basin.

Groundwater use is projected to decrease from the current level once the VSWTP comes online, but it will increase over time as water demand continues to grow in Zone 40. In wet and normal years, groundwater pumping will be minimized because surface water becomes the major water supply source. In dry years, groundwater pumping will increase significantly as surface water availability is considerably reduced. Table 4 identifies projected groundwater pumping necessary to meet Zone 40's water demands from 2015-2035 in normal, single dry, and multiple dry years. Reduction in projected pumping in wet/normal years between 2010 and 2035 reflects the phasing and availability of surface water facilities and supplies from the VSWTP. Over time, groundwater production will stabilize as SCWA's conjunctive use program is fully implemented.

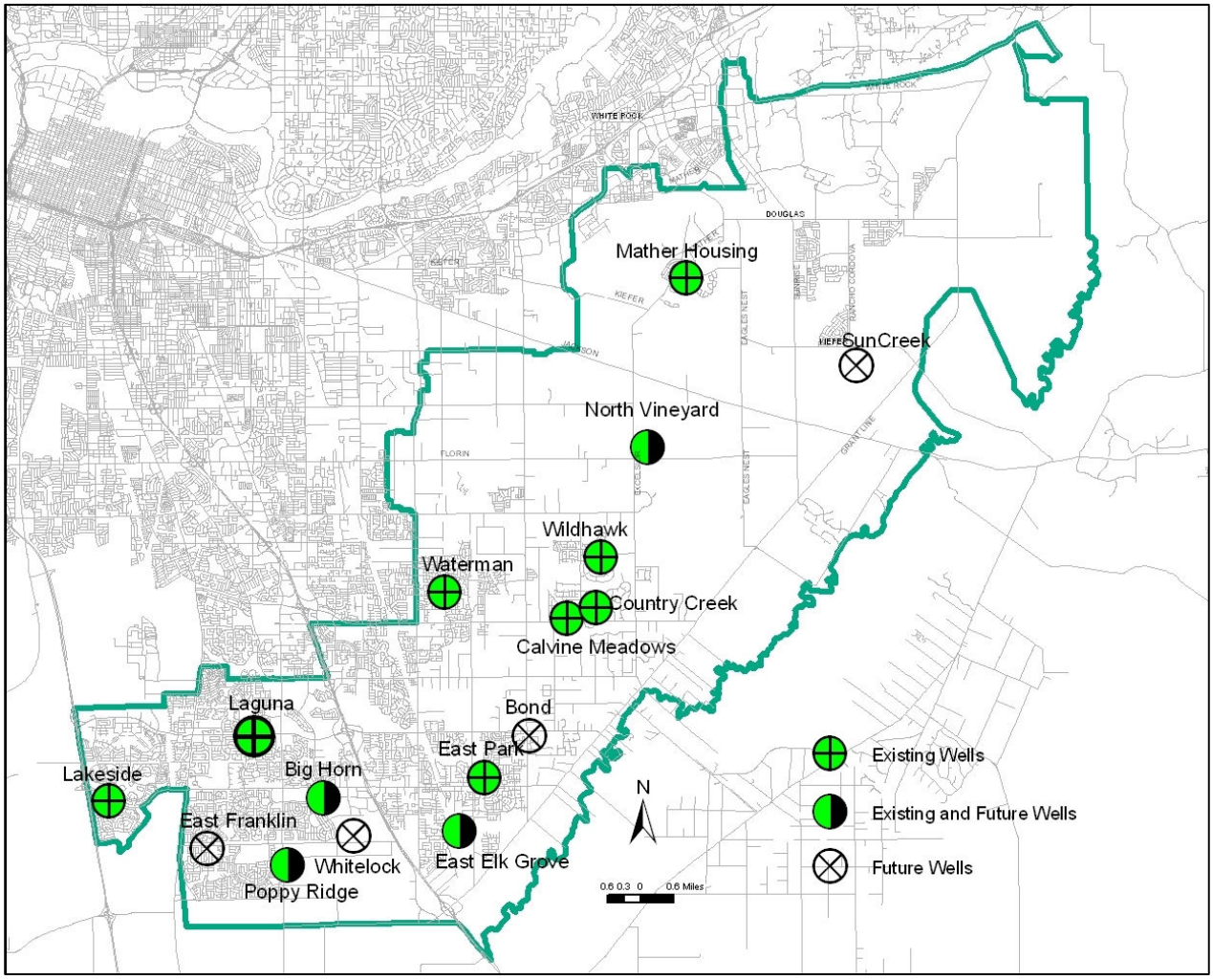

Figure 3 Spatial Distribution of SCWA's Existing and Future Well Fields

Section 10910(f)(5)

Section 10910(f)(5) requires an analysis of the sufficiency of the groundwater basin to meet the demands associated with the Project.

The WFA defined a long-term sustainable average annual yield of 273,000 AF/year for the Central Basin and provided for SCWA's groundwater needs as identified in the WSMP. The WSMP describes a conjunctive use program that identifies and projects a long-term sustainable average annual yield of 40,900 AF/year to meet identified water demands (including the demand associated with the Project).

SCWA's conjunctive use program has been extensively analyzed and documented in the WSMP, the FEIR for 2002 WSMP, certified in February 2006, the FEIR – WFA, certified in 1999, and the WFA (See footnote 1). All referenced documents have been subjected to thorough technical peer review and public scrutiny.

DETERMINATION OF SUFFICIENCY

SCWA determines that it has identified sufficient water supplies to meet the water demands of the Project.

SCWA makes this determination based on the information provided in this WSA and on the following specific facts:

- SCWA's conjunctive use program is a sustainable water supply program that provides a 100-percent reliable water supply while protecting environmental values and stabilizing the groundwater basin underlying Zone 40.
- SCWA's conjunctive use program has been extensively analyzed and documented in the WSMP, the FEIR for 2002 WSMP, certified in February 2006, the FEIR – WFA, certified in 1999, and the WFA (See footnote 1). All referenced documents have been subjected to thorough technical peer review and public scrutiny.
- The Project will be served by water supplies made available through SCWA's conjunctive use program.
- A financing plan for SCWA's conjunctive use program for constructing facilities required for delivering groundwater and surface water to the Project has been approved by the Board through its adoption of the WSMP, Bond Feasibility Reports, and the Sacramento County Water Agency Code.

The UWMP quantifies SCWA's total projected water supplies during normal, single dry, and multiple dry water years over a 25-year projection in five-year intervals. A summary of the pertinent data from these tables as it applies to Zone 40 is presented in Table 8.

Table 8 Zone 40 Water Supply in Five-Year Increments (AF/year)

Water Year	2010	2015	2020	2025	2030	2035
Normal Year (Table 7-1, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Single Dry Year (Table 7-2, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Multiple Dry Year (1) (Table 7-3, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Multiple Dry Year (2) (Table 7-3, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Multiple Dry Year (3) (Table 7-3, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500

Notes:
(1) Normal/Average year is a year in the historical sequence that most closely represents median runoff levels and patterns. Average is defined as the median runoff over the previous 30 years or more. By this definition, 1993 is a normal/average year for the Sacramento River watershed.
(2) Single-dry year is generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. 1977 is a single-dry year for the Sacramento River watershed.
(3) Multiple-dry year period is generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. 1989-1992 is a multiple-dry year period for the Sacramento River watershed.

The UWMP demonstrates that the total projected water supplies for Zone 40 under normal, single dry, and multiple dry years meet the proposed water demands (including existing and other projected future demands) over the next 25 years. A summary of the pertinent data from these tables is presented in Table 9.

Table 9 Zone 40 Water Supply Sufficiency Analysis in Five-Year Increments (AF/year)

Water Year	2010	2015	2020	2025	2030	2035
Normal Year						
Total Supply (Table 7-1, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Total Demand (Table 7-1, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Sufficiency (Supply Minus Demand)	13,809	13,575	13,738	21,817	36,135	31,788
Single Dry Year						
Total Supply (Table 7-2, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Total Demand (Table 7-2, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Sufficiency (Supply Minus Demand)	13,809	13,575	13,738	21,817	36,135	31,788
Multiple Dry Year (1)						
Total Supply (Table 7-3, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Total Demand (Table 7-3, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Sufficiency (Supply Minus Demand)	13,809	13,575	13,738	21,817	36,135	31,788
Multiple Dry Year (2)						
Total Supply (Table 7-3, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Total Demand (Table 7-3, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Sufficiency (Supply Minus Demand)	13,809	13,575	13,738	21,817	36,135	31,788
Multiple Dry Year (3)						
Total Supply (Table 7-3, UWMP)	48,320	58,000	64,400	79,400	103,700	109,500
Total Demand (Table 7-3, UWMP)	34,511	44,425	50,662	57,583	67,565	77,712
Sufficiency (Supply Minus Demand)	13,809	13,575	13,738	21,817	36,135	31,788