Final

Urban Water Management Plan

2010

VOLUME I



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KEY ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

ABAG	Association of Bay Area Governments
Act	Urban Water Management Planning Act
AF	Acre-feet
AFY	Acre-feet per year
BMP(s)	Best Management Practice(s)
CD(s)	Compact Disc(s)
City	City of American Canyon
Corps	United States Army Corps of Engineers
CUWCC	California Urban Water Conservation Council
DWR	California Department of Water Resources
EIR	Environmental Impact Report
ERP	Emergency Response Plan
ETo	Evapo-transpiration of Common Turf Grass
GIS	Geographical Information System
gpcd	Gallons per capita per day
HET(s)	High Efficiency Toilet(s)
mgd	Million gallons per day
MOU	Memorandum of Understanding
O&M	Operations and Maintenance
SWRCB	California State Water Resources Control Board
UFW	Unaccounted for Water
UGB	Urban Growth Boundary
USGS	United States Geological Survey
UWMP	Urban Water Management Plan

EXECUTIVE SUMMARY

ES.1 PURPOSE AND REQUIREMENTS

Water purveyors, such as the City of American Canyon, are required to prepare an Urban Water Management Plan (UWMP) every five years. This requirement is in accordance with Water Code Section 10610 et. seq. (UWMP Act) for agencies with 3,000 connections or the serve more than 3,000 acre-feet per year. State grant eligibility is tied to compliance with the UWMP Act.

The purpose of UWMPs is to coordinate land use and water supplies planning, illustrate the potential economic consequences of drought conditions, and help agencies plan for long-term water supply needs and drought contingencies.

ES.2 CHANGES FROM 2005 UWMP

While the overall volume and reliability of the City's water supply has not changed substantially since 2005, a number of factors have influenced projected water demand. As a result, there is a better near-term balance between water demand and water supply than was anticipated in the 2005 UWMP. Factors that have reduced projected demands on the potable water system include:

- Development and implementation of the City's Zero Water Footprint (ZWF) Policy which has the result of reducing projected future demands;
- Development and implementation of Senate Bill x7-7 (SBx7-7) water use targets, which also require demand management; and
- Completion of the first-phase of the City's recycled water program, which results in the conversion of irrigation demands from the potable water system to the recycled water system.

This 2010 UWMP does anticipate potential dry year supply shortages but these shortages occur after 2030.

ES.3 BASELINE & TARGETS

A new requirement for the 2010 UWMP is SBx7-7, the Water Conservation Act of 2009. This new requirement is commonly referred to as the "20 percent by 2020 law" because it requires a water purveyor to reduce its water use by 20 percent by year 2020. In addition, SBx7-7 also requires the water purveyor to meet an interim water use target by 2015.

The 20 percent reduction is calculated from the average water use during a 10-year base period between 1994 and 2010. Water purveyors are allowed to select which 10 years, within the 1994-2010 period, to use for the baseline. This UWMP uses the 10-year base period from 1999 to 2008. This UWMP calculates two potential baselines for the City, one includes all urban water use and the second excludes large process water users, which is allowed by SBx7-7. This UWMP also develops several potential targets for the City, based on methodology outlined by the Department of Water Resources (DWR). Water purveyors are allowed to select their specific targets from among those developed using the DWR

methodology. Table ES-1 presents the City's options for baselines and targets and the amount of conservation required to meet the targets. For comparative purposes, the 2010 actual total water use of 137 gpcd is also shown in Table ES.1. This current water use is substantially below most of the calculated targets. It should be noted, however, that 2010 use was abnormally low due to the drought and also the economic downturn that affected water use. The City can anticipate some "bounce-back" from these abnormally low use levels and still meet its targets.

Table ES.1
Summary of Baselines and Targets

	Method 1 Include Process Water		Method 1 Exclude Process Water		Method 3 Include Process Water		Method 3 Exclude Process Water	
	2015	**2020**	**2015**	**2020**	**2015**	**2020**	**2015**	**2020**
Baseline Compared to Targets								
Baseline (gpcd)	209	209	190	190	209	209	190	190
Target (gpcd)	188	167	171	152	167	124.5	157	124.5
Reduction Required from Baseline to Meet Target	**-21.0**	**-42.0**	**-19.0**	**-38.0**	**-42.0**	**-84.5**	**-33.0**	**-65.6**
Current Use Compared to Targets								
2010 water use (gpcd)	137	137	120	120	137	137	120	120
Target (gpcd)	188	167	171	152	167	124.5	157	124.5
Reduction from 2010 Use to Meet Target	**NA***	**NA***	**NA***	**NA***	**NA***	**-12.5**	**NA***	**NA***

* Current Water Use is lower than the target

Based on this analysis, it is recommended that City select the targets developed using Method 1 and the process water exclusion because this results in the least required conservation. Based on these recommendations, the City's baseline and targets would be:

Baseline water use	190 gpcd (base period 1999-2008)
2015 water use target	171 gpcd
2020 water use target	152 gpcd

The City adopted these baselines and targets at its September 6, 2011 meeting. The City has the option to revisit and reset its targets when it prepares its 2015 UMWP.

ES.4 COMPLIANCE WITH WATER CONSERVATION COMMITMENTS

The City entered into a Memorandum of Understanding (MOU) with the California Urban Water Conservation Council (CUWCC) to implement conservation best management practices (BMPs). The City has not historically implemented all 14 BMPs nor has it been able to keep consistent records due to staffing level constraints. However, the City has still managed to reduce its overall water use and to put policies in place that will manage demand in the future.

In order to acknowledge the City's real accomplishments related to demand management and remain in compliance with the MOU, it is recommended that the City adopt an allowed option to achieve BMP compliance known as the "GPCD Option." This GPCD option would require the City to reduce water use by 18% by 2018. The GPCD target is computed using a CUWCC-defined base water use period from 1997 to 2007. Unlike the SBx7-7 target, there is no provision to exclude process water. With this option, the City's CUWCC Baseline and target are:

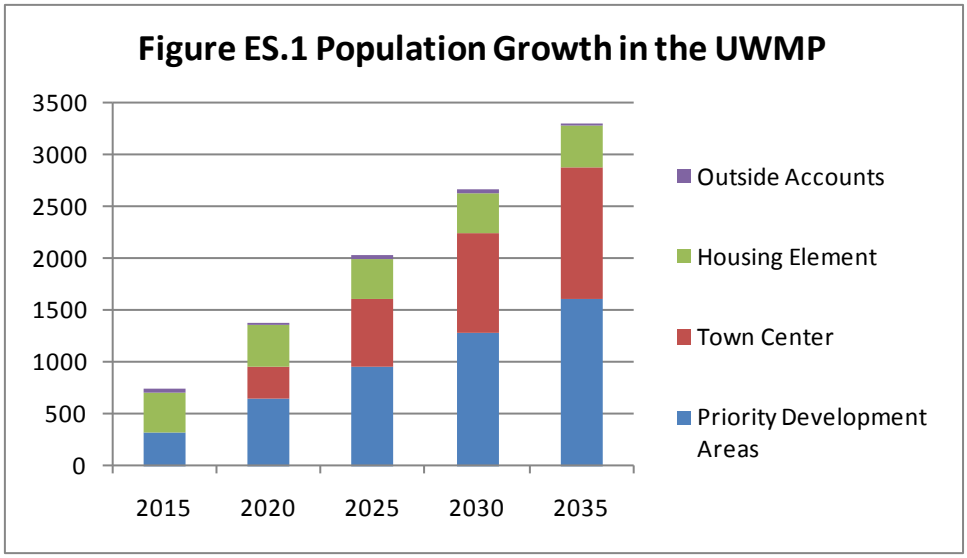
Baseline water use	203 gpcd (base period 1997-2006)
2018 GPCD target	167 gpcd

This target is close but not the same as the SBx7-7 water use target described earlier. Using this method will also result in simplified monitoring and reporting and provides the City with greater flexibility to implement its ZWF Policy, without the constraint of mandatory BMP implementation.

Because the CUWCC target is above the recommended SBx7-7 target, meeting the 2020 target should result in meeting the GPCD target.

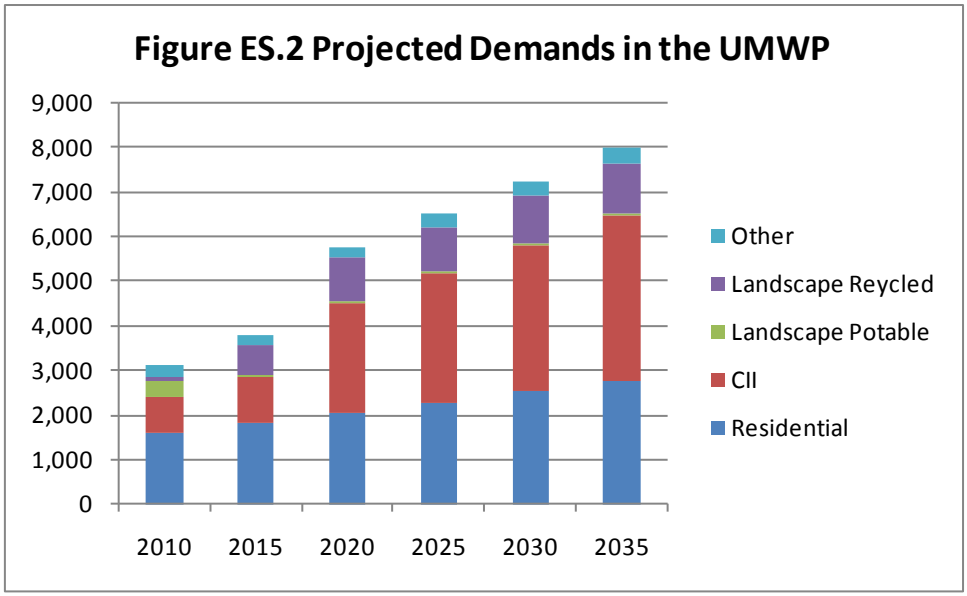
ES.5 DEMAND PROJECTIONS

The demand projections were developed based on City's projections of planned growth. Anticipated growth in the UWMP is illustrated in Figure ES.1.



The projected growth is from infill (using the Housing Element), the proposed Town Center development and the Priority Development Areas (PDAs).

The projected demands are based on anticipated growth in the City's population and anticipate non-residential demands from the City's entire water service area (which includes the Napa Airport Business Park). These anticipated demands are illustrated in Figure ES.2.



Because of the City's developed policies and the required water conservation targets, the demand projections for the 2010 UWMP are lower than what was projected in the 2005 UWMP.

ES.6 SUPPLY

The City's water supply sources have not changed since the 2005 UWMP. The supply sources are primarily:

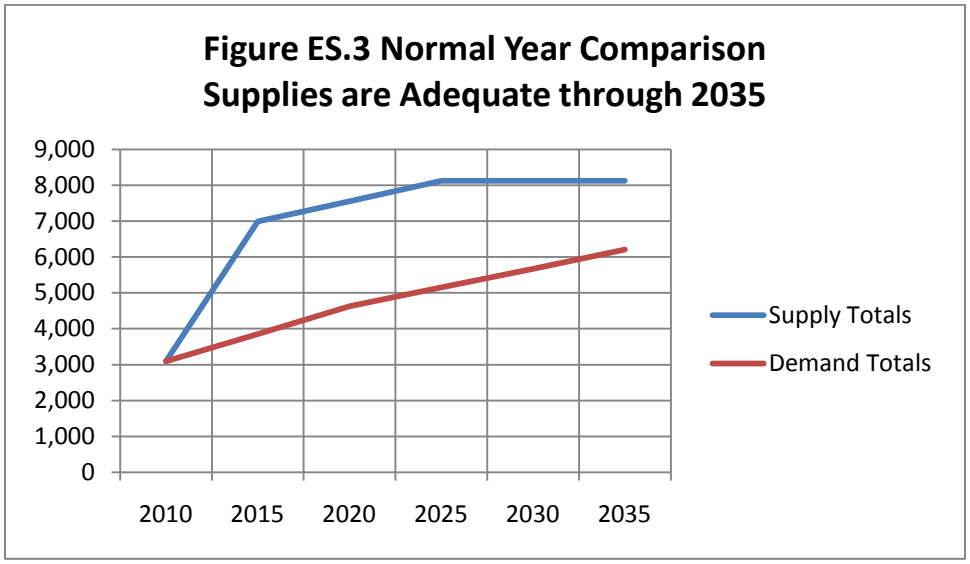
- State Water Project
  - 5,200 acre-feet per year maximum Table A allotment
  - 60 percent reliability in normal years; 22 percent in single-dry, and 38 percent in multiple-dry water years
- Vallejo Permit Water
  - 500 acre-feet per year maximum entitlement
  - 100 percent reliability in normal years; 75 to 85 percent in dry years
- Vallejo Treated Water
  - 3,207 acre-feet per year maximum contract amount (assuming City purchases all options in future years)
  - 100 percent reliability in normal years; 75 to 85 percent in dry years
- Vallejo Emergency Water
  - 500 acre-feet per year maximum contract amount
  - 100 percent reliability under "emergency" conditions as defined in the contract
- Recycled Water
  - Up to 1,000 acre-feet per year maximum delivery from the City's system, a minimum of 666 acre-feet of which must be delivered by 2015 to comply with the City's grant contracts

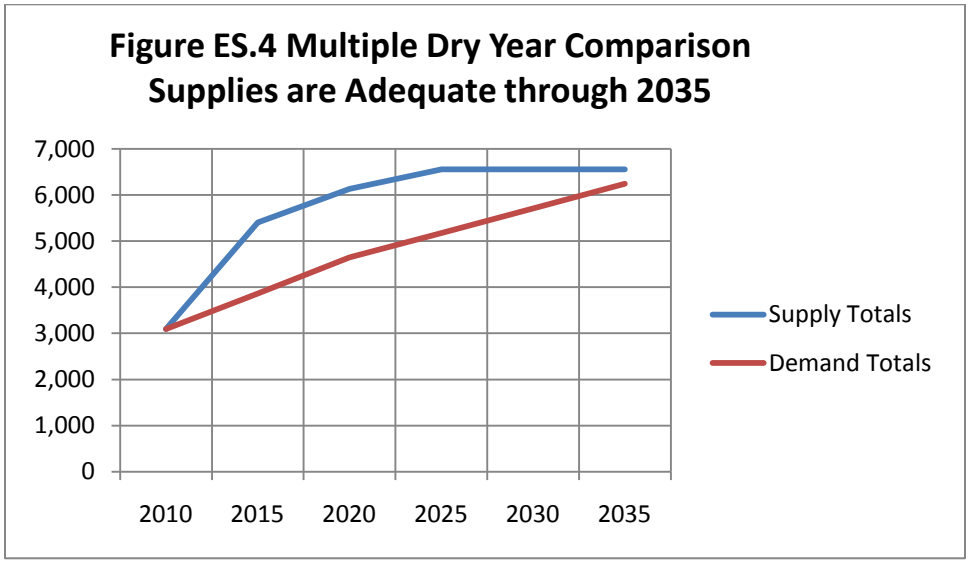
- 300 acre-feet per year committed deliveries from Napa Sanitation District (Napa Sanitation District has recycled water service rights in the Napa Airport Industrial Area)

The City has several water supply projects being investigated at this time but all are at the preliminary stage. Projects include: the Garden Bar project (reservoir project on the Bear River in Sutter County); a Groundwater Investigation study with the City of Napa; and the Jameson Canyon Reservoir project with the City of Napa. Continuing to explore other options to State Water Project water will improve the City's water supply reliability.

ES.7 SUPPLY AND DEMAND COMPARISONS

The City's combined projected water supplies are sufficient to meet projected demands during normal water year conditions. Under single-dry water year conditions, the supply is generally sufficient until after 2030 when shortages begin to appear. Under multiple-dry water year conditions, the supply is sufficient through 2035, though the demand curve trend suggests that shortages will appear shortly thereafter. Figures ES.3 through ES.4 illustrate these scenarios.





This is an improvement from the City's water picture in the 2005 UWMP. The main reason for this is the adopted City Council policies pertaining to new development that will manage water demands from now into the future. These water policies allow development to occur, consistent with the General Plan, but within the City's water supply constraints. The City is also diligently purchasing options for Vallejo treated water and continuing to pursue other water supplies to improve its overall supply reliability.

ES.8 CONCLUSIONS

1. Since 2005, demand management and recycled water have improved reliability
2. State requirements for demand reduction will curb demands in the future
3. Dry Year shortages are still anticipated after 2030
4. The Zero Water Footprint Policy is unique and powerful tool to comply with State requirements and manage future demands
5. Recommendations on baselines, targets and CUWCC compliance aim to preserve flexibility inherent in the Zero Water Footprint Policy
6. Strong Council leadership on water policy has resulted in water use flexibility.

SECTION 1
PLAN PREPARATION

1.1 INTRODUCTION

The State Legislature has declared that "every urban water supplier should make every effort to ensure the appropriate level of reliability in its water supply sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years." This Urban Water Management Plan (UWMP) was prepared by the City of American Canyon (City) to meet the requirements of the Urban Water Management Planning Act as envisioned by the Legislature.

1.1.1 PURPOSE

The purpose of developing a UWMP is to evaluate whether a water supplier can meet the water demands of its water customers as projected over a 20- or 25-year planning horizon. This UWMP will assist the City in coordinating its water supply plans with other multi-year plans, especially land use plans. This evaluation is for a 25-year planning horizon and is accomplished through analysis of current and projected water supply and demand for normal, single-dry or multiple-dry water year conditions. Additionally, the purpose of the UWMP is to:

- Identify measures to be implemented or projects to be undertaken to reduce water demands and address water supply shortfalls;
- Identify stages of action to address up to 50 percent reduction in water supplies during dry water years;
- Identify actions to be implemented in the event of a catastrophic interruption in water supplies;
- Assess the reliability of the sources during normal, single-dry and multiple-dry water years;
- Identify when, how and what measures the City could undertake in order to meet the State Legislature's call for a 20 percent per capita reduction in urban water use statewide by 2020; and
- Serve as a foundational document for SB 610 Water Supply Assessments.

The City supplies potable and irrigation water to a population of approximately 20,000 people. The City's supply sources are:

- State Water Project (SWP) raw water;
- Permit water (raw water) from the City of Vallejo (Vallejo);
- Treated water from Vallejo;
- Treated water from the City of Napa (Napa);
- Recycled water from the City's water treatment plant; and
- Recycled water from Napa Sanitation District (NSD) that serves a portion of the City's water service area that overlaps with NSD's sewer and recycled water service area.

1.1.2 LAW

The State of California's Urban Water Management Planning Act (Act) requires an urban water supplier with 3,000 or more connections, or that supplies at least 3,000 acre-feet per year (AFY) of water, to submit a UWMP to the California Department of Water Resources (DWR) every five years. The City has over 5,000 connections and meets the threshold for this State requirement.

For the 2010 UWMP, a new requirement, the Water Conservation Act of 2009 (also referred to as SBx7-7), was passed by the California legislature and approved by the Governor in November of 2009. SBx7-7 amended the Act to require a 20 percent statewide reduction in urban potable water use by the year 2020. The water use reduction required by each water supplier varies by region and includes water use targets measured in daily per capita use to be met by 2020 as well as interim water use targets to be met by 2015. Each water supplier's 2010 UWMP will establish the baseline use from which targeted reductions are made, making the 2010 UWMP a particularly important document.

1.1.3 STRUCTURE OF THE PLAN

The outline of this UWMP generally follows the *Guidebook to Assist Water Suppliers to Prepare a 2010 Urban Water Management Plan* developed by DWR. The guidelines can be found in the following website link: *http://www.water.ca.gov/urbanwatermanagement/guidebook/*.

This document is organized in six sections and appendices as shown on the Table 1.1 and contains all the information required by the UWMP guidelines and Act.

Table 1.1
Structure of the Plan

Section	Title	Key Elements
1	Plan Preparation	Introduction
		Coordination
		Plan Adoption, Submittal and Implementation
2	System Description	Service Area Physical Description
		Service Area Population
3	System Demands	Baselines and Targets
		Water Demands
		Water Demand Projections for Retailers
		Water Use Reduction Plan
4	System Supplies	Water Sources
		Groundwater
		Transfer Opportunities
		Desalinated Water Opportunities
		Recycled Water Opportunities
		Future Water Supply Projects
5	Water Supply Reliability and Water Shortage Contingency Planning	Water Supply Reliability
		Water Shortage Contingency Planning
		Drought Planning
		Water Quality
6	Demand Management Measures (DMMs)	Description of DMMs
		Implementation of DMMs

1.1.4 LEVEL OF PLANNING

The Act specifies the required content of each UWMP and allows for the level of detail provided in each UWMP to reflect the size and complexity of the water supplier. The Act requires projections in five-year increments for a minimum of 20 years. This UWMP considers a 25-year planning horizon through year 2035.

The Act does not require that a UMWP contain the level of system-specific detail that would be included in a water system master plan. The Act specifically exempts UWMPs from review under the California Environmental Quality Act (CEQA)[1]. Additionally, Water Supply Assessments (Water Code Section 10631) and Water Supply Verifications (Water Code Section 66473.7) may rely on the UWMP as a foundational document for findings required in these documents.

1.1.5 ASSUMPTIONS

The evaluation and projections in this document are based on the City's current understanding of its water supply contracts with other agencies and its planned (future) water supply projects. This document is a "living" document (i.e., intended to be updated every five years) and as the City's water supply picture changes, the updated UWMP will incorporate those changes accordingly. The City, therefore, has the ability to amend this UWMP at any time as permitted in Water Code Section 10612(c).

1.2 COORDINATION

This section describes the various agencies and stakeholders that were involved in the UWMP preparation and the agencies that the City communicated with to obtain input and information in preparing this UWMP.

1.2.1 AGENCY COORDINATION

The City meets regularly with other water purveyors. In particular, the City meets at least monthly with its water wholesaler, the Napa County Flood Control and Water Conservation District (District) and with other State Water Project (SWP) member units who purchase water from the District. Member units include the cities of American Canyon, Napa, Calistoga, St. Helena and the Town of Yountville. This monthly coordination has been instrumental in coordinating water supply and demand analyses for the preparation of this document. The City also meets with the City of Vallejo for the purchase of Vallejo treated water and raw water.

Table 1.2 (DWR Table 1) identifies the various agencies that the City has coordinated with during the UWMP preparation process. The City notified these agencies directly of its intent to review and update the 2005 UWMP. A copy of this letter is included in Appendix A.

[1] Water Code Section 10652

Table 1.2 (DWR Table 1)
Coordination with Appropriate Agencies

Coordinating Agencies	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved/ No information
Napa County Flood Control and Water Conservation District	✓			✓	✓	✓	
Napa County Planning Department	✓			✓	✓	✓	
Napa County Local Agency Formation Commission	✓			✓	✓	✓	
Napa Sanitation District	✓			✓	✓	✓	
City of Napa	✓			✓	✓	✓	
City of Vallejo	✓			✓	✓	✓	
North Bay Water Reuse Authority	✓			✓	✓	✓	

1.2.2 PUBLIC PARTICIPATION

Urban water suppliers are required by the Act to encourage active involvement of the community within the service area prior to and during the preparation of its UWMP. The Act also requires urban water suppliers to make a draft of the UWMP available for public review and to hold a public hearing regarding the findings of the UWMP prior to its adoption. The City posted a public notice in the local newspaper notifying the public of the City's intent to prepare its UWMP and also included an insert in the April water bills notifying its customers of the City's UWMP preparation. The notices asked for public input during the preparation of the UWMP. Copies of these public notices are presented in Appendix A.

Table 1.3 identifies the public participation activities and the participants.

Table 1.3
Public Participation and Outreach

Date	Description	Participants
Feb. 17, 2011; Apr. 6, 2011; Jul. 27, 2011	Blue Ribbon Committee	City Council Members, residents, developers, vineyard owners, business owners, agency representatives.
Feb. 28, 2011	Letters sent to Interested Parties	See List on Table 1.2 (DWR Table 1)
Mar. 1, 2011	Public notice of UWMP preparation	[Vallejo Times-Herald]
Aug. 26, 2011	Draft UWMP 2010 released	City, General Public
Aug. 26, 2011	Public Hearing Notice	[Vallejo Times-Herald]
Sep. 6, 2011	Draft UWMP Public Hearing	City, General Public

The findings of the Draft UWMP will be presented before the City Council on September 6, 2011. The meeting will be publicly noticed and the public given the opportunity to offer comments to the UWMP and to ask questions regarding the findings. A copy of the public notices and the resolution of adoption are included in Appendix A.

1.3 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The Plan will be considered for adoption on September 6, 2011. The Final UWMP incorporates comments made by the City Council and the public. The Final UWMP is available for public viewing at the following website link: *http://www.cityofamericancanyon.org* and at the Second Floor Public Counter in City Hall, 4381 Broadway Suite 201, during normal business hours. A copy of the Final UWMP will be submitted to DWR, the California State Library, and the Napa County Flood Control and Water Conservation District no later than 30 days after adoption by the City Council. Comments to the Final UWMP made by DWR and the City's responses to the comments will be added to the website for the public's information.

Implementation of the 2010 Final UWMP will be the responsibility of the City Public Works Director and generally consists of the activities shown on the table that follows.

Table 1.4
Plan Implementation

Description	Guidance Document(s)	Activity	Timeframe
Mandatory water conservation policies	Ordinance of the City of American Canyon, State of California, Establishing a Water Conservation Plan	Implement Water Conservation Plan	During drought conditions, water supply shortages, or limitations of water delivery conditions
City Recycled Water System Expansion	State Water Board Grant Contract Water Waste Ordinance, Recycled Water Implementation Plan and Administrative Policy 2011-02 on management and allocation of recycled water	Add additional customers to the recycled water system consistent with SWRCB grant contract.	Deliver 666 AFY of recycled water by 2015.
Zero Water Footprint for New Development	Zero Water Footprint Policy and Administrative Policy 2011-03 Implementing the Zero Water Footprint Policy	Acquiring alternative water supplies. Establishing a water demand/mitigation toolbox for customer use	Ongoing
Agricultural Water Policy	Administraive Policy 2011-01 on Management and Allocation of Raw Water	Identifying and acquiring alternative supplies for current SWP raw water users (including groundwater and recycled water). Establishing an agricultural water conservation program	Ongoing

SECTION 2
SYSTEM DESCRIPTION

This section describes the physical characteristics of the City's water service area as well as current and projected population for the service area.

2.1 PHYSICAL AND POLITICAL ATTRIBUTES

The City is located approximately 35 miles northeast of San Francisco at the southern end of Napa County. The City's water service area encompasses the city limits, as well as the industrial/commercial area to the north along State Highway 29, including the Napa Airport Industrial Park (Figure 2.1). The service area is approximately 5 square miles and includes residential, commercial, industrial and agricultural users. Elevations in the existing service area range from approximately 5 feet above mean sea level to approximately 150 feet above mean sea level.

The water system is owned and operated by the City and governed by a 5-member City Council. City management staff for the water system consists of a City Manager, a Public Works Director, a Water Systems Manager and a Public Works Superintendent.

The water distribution system contains multiple pressure zones. The principal water mains in the distribution system range in size from 14 to 20 inches. Most of the distribution grid piping in the older sections of the City range in size from 4 to 8 inches, while the newer areas are served by pipes 8 to 12 inches in diameter.

2.2 CLIMATE

The City's climate is typical of that of the Napa and Solano County areas, characterized by summers that are dry and warm, and winters that are relatively mild with the majority of rainfall occurring during this season. The regional averages of the rate of evapo-transpiration of common turf grass (ETo), rainfall, and temperature are summarized in Table 2.1.

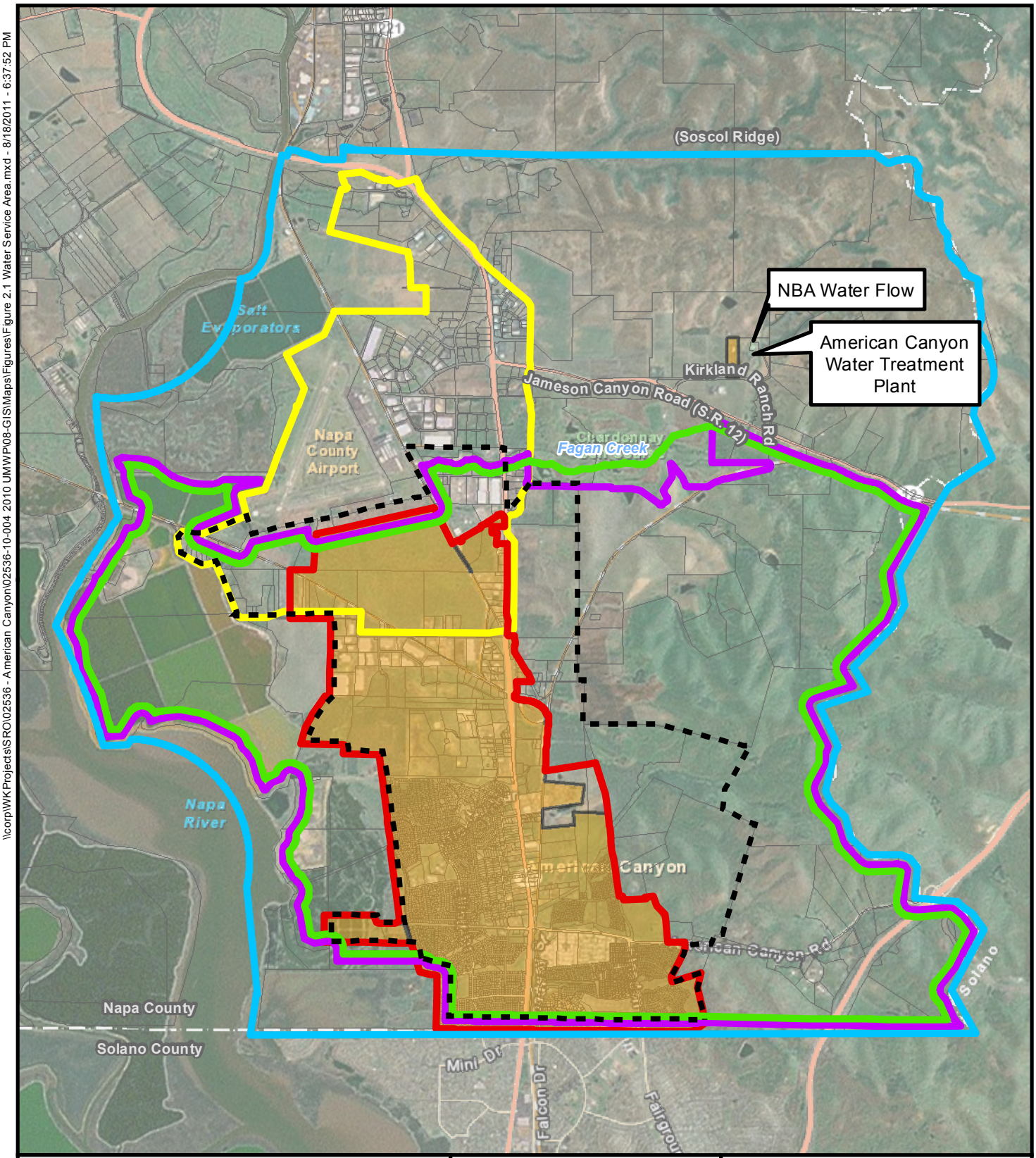


Figure 2.1
Water Service Area Map

City of American Canyon
2010 Urban Water Management Plan

WINZLER & KELLY
www.w-and-k.com

Cartography: AF

\\corp\WKProjects\SRO\02536 - American Canyon\02536-10-004 2010 UMWP\08-GIS\Maps\Figures\Figure 2.1 Water Service Area.mxd - 8/18/2011 - 6:37:52 PM

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Table 2.1
Climate

	Standard Average ETo[a], in	Average Rainfall[b], in	Average Temp[b], °F
January	0.82	5.14	47.7
February	1.49	4.4	51.2
March	3.09	3.3	53.6
April	4.57	1.64	56.7
May	5.46	0.69	61.0
June	6.61	0.21	65.6
July	6.89	0.02	67.7
August	6.18	0.07	67.4
September	4.71	0.32	66.8
October	3.52	1.36	62.2
November	1.41	2.98	54.2
December	1.02	4.55	48.1
Annual	**45.77**	**24.68**	**58.5**

[a] Eto data was obtained from CIMIS website, Station 109, Carneros, San Francisco Bay Region.
[b] Data obtained from NOAA website, Napa State Hospital, years 1893-2010.

The average annual rainfall and annual ETo for the region are approximately 25 and 46 inches per year, respectively. ETo is a measurement of water evaporation combined with plant transpiration and is expressed in the form of a rate, typically inches per time period. In other words, ETo is the amount of water needed for common turf to grow in a specific region.

The average annual ETo for the region is approximately 21 inches more than the average annual precipitation. Because of this difference, and because 90 percent of the annual precipitation occurs between the months of November and April, growing turf in this region requires a significant amount of irrigation during the dry season.

2.3 SERVICE AREA POPULATION

The City has grown steadily since 1980. During the period from 2000 and 2010, the City had a residential population growth rate of nearly 100 percent (nearly doubling), according to the 2010 Census. The City also serves customers outside the city limits. The "outside-city" water users number approximately 163 accounts. The majority of the customers are commercial and industrial businesses in the Napa County Airport Industrial Area. Approximately 28 "outside city" accounts are single-family residential customers, in the City service area but outside of the City limits. These customers represent "legacy" accounts that were originally connected and served by the American Canyon Water District, a predecessor to the City.
In order to arrive at estimates of historic population, the City secured census data from the California Department of Finance (CDOF) for the years 2000 and 2010, historic population data from CDOF for the years 1996 through 1999 and made an estimate of the "outside City" population based on Napa County's average household size of 2.8 persons. Table 2.2 presents this historic population data.

Table 2.2
Estimated Service Area Population

Calendar Year	Estimated City Population [a]	Estimated "Outside City Population [b]	Estimated Total Population
1996	9,158	78	9,236
1997	9,307	78	9,385
1998	9,435	78	9,513
1999	9,558	78	9,636
2000	9,774	78	9,852
2001	10,679	78	10,757
2002	11,584	78	11,662
2003	12,489	78	12,567
2004	13,394	78	13,472
2005	14,300	78	14,378
2006	15,331	78	15,409
2007	16,362	78	16,440
2008	17,392	78	17,470
2009	18,423	78	18,501
2010	19,454	78	19,532

a. 1996 through 1999 population from CDOF website 4/1/11
2000 and 2010 population from Census data
Population is linearly interpolated between 2000 and 2010
b. Outside City population is number of accounts x 2.8 persons

Population projections from 2010 forward were developed based on discussions with the City's Community Development Director. While, previous 2009 Association of Bay Area Governments (ABAG) growth projections do not accurately reflect 2010 Census information, the City has been coordinating housing projections with ABAG's projections. The population projections for the City are presented in Table 2.3 (DWR Table 2). These projections include the draft 2010 ABAG housing projections (see Appendix B) and make a modest allowance for growth in the "outside City" connections.

In developing estimates for future water demands, the draft 2010 ABAG housing projections for population for the potential development projects are referenced. ABAG 2009 forecasts a healthy jobs growth rate in American Canyon, increasing by 96 percent between 2010 and 2035. For ABAG planning source documents, see: http://www.onebayarea.org/pdf/Initial_Vision_Scenario_Report.pdf

As noted above, the 2010 existing City population was obtained from the 2010 National Census. For population projections within the city limits (and for those areas that are anticipated for annexation in the future), the estimated additional population was based on multiplying 3.4 persons per household by the number of expected new dwelling units. The figure of 3.4 persons per household was obtained from the 2010 National Census. The 2010 Census uses an average for the number of persons per single-family and multi-family units and does not separate by type. For purposes of this UWMP, the average of 3.4 persons per household was used for projecting population for either single or multi-family units. For 2010 Census, see: *http://www.dof.ca.gov/research/demographic/state_census_data_center/census_2010/view.php*

For population outside the city limits but within the City's service area, population was estimated based on the number of residential water billing accounts with an assumed growth rate of one new residential customer added per 5-year period and based on 2.8 persons per household. The figure of 2.8 persons per household outside the City limits is based on the 2010 Census for Napa County.

Table 2.3 (DWR Table 2)
Population – Current and Projected

	2010	2015	2020	2025	2030	2035	Data Source
Population - In City	19,454	22,356	26,589	28,158	29,246	30,334	2010 Census/2009 ABAG/ Planning
Population - Outside City Customers	78	81	84	87	90	92	Water Billing & Planning
Total Service Area Population	**19,532**	**22,437**	**26,673**	**28,245**	**29,336**	**30,426**	

Notes:
1. The City's Housing Element (2007-2014) was used to determine 2015 projection.
2. ABAG 2010 Draft Housing Projections were used to determine new housing units for the Priority Development Area (PDA) and projected to come online from 2010-2035.
3. For more detail on population projections and the sources, refer to Appendix C.

Potential development projects in the City's service area are identified below. A copy of the population projection worksheet is included in Appendix C.

- Priority Development Area. This potential project consists of development of approximately 1,600 multifamily dwelling units within the Highway 29 Commercial Corridor. Implementation of the Priority Development Area will require City approval of a Specific Plan that identifies potential residential locations, design standards, and interface issues with existing and future commercial development and State Highway 29. For this UWMP, buildout for this development is assumed to occur by year 2035.
- Mixed-Used Town Center. This potential project consists of approximately 320 acres east of the railroad tracks, north of Vintage Ranch and south of Watson Lane. The City has a pre-annexation agreement with the Town Center applicant and estimates 1,600 dwelling units in the project, along with 150 hotel rooms and approximately 80,500 square feet of commercial uses. For this UWMP, buildout for this development is assumed to occur by year 2025.
- Montalcino at Napa Valley. This is a resort and golf course development in the Napa County Airport Industrial Area in the City's water service area. The Environmental Impact Report for this project has been approved by Napa County and the City has issued a "will serve" letter. The project anticipates approximately 68 acre-feet per year of potable water from the City and 300 acre-feet per year of recycled water from Napa Sanitation District. For this UWMP, recycled water delivery is estimated to occur by year 2020.

There will be other developments approved between now and 2035 which have not yet been submitted for consideration. For these developments, the UWMP assumes development consistent with the General Plan. For the City's General Plan and current Housing Element, see:

http://www.ci.american-canyon.ca.us/index.aspx?page=115

SECTION 3
SYSTEM DEMANDS

This section describes the City's urban water system demands. It presents the calculations for the City's baseline (base daily per capita) water use and interim and final water use targets, including a detailed description of how the baseline and targets were calculated. The calculations follow the guidance provided in DWR's publication *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use For the Consistent Implementation of the Water Conservation Bill of 2009*. Background information and the approach used to develop baselines and targets are also included.

This section quantifies the current water system demands by category and projects them over the planning horizon of the UWMP. These projections include water sales to other agencies, system water losses, and water use target compliance. The future water demands are based on the assumed reduction in per capita daily use determined from planning for and implementing actions associated with SBx7-7.

3.1 BASELINES AND TARGETS

Among the new requirements for completing a 2010 UWMP under SBx7-7, is the requirement for each urban water supplier to develop a baseline daily per capita water use, a per capita water use target for 2020, and an interim water use target for 2015. When calculating the baseline, suppliers are allowed to exclude some water uses, including industrial process water uses, from the calculation. This exclusion can be advantageous because it can reduce the amount of conservation needed from non-industrial sectors. Because the City has a significant industrial water use sector, baselines have been developed with and without the process water exclusion in order to allow the City to evaluate its options.

3.1.1 BASELINE DAILY PER CAPITA WATER USE

The baseline daily per capita use is the water supplier's average gross daily per capita use in gallons. The baseline includes all water entering the delivery system, including water losses. The baseline does not include recycled water delivered within the supplier's service area, water placed into long-term storage, water conveyed to another urban water supplier, water conveyed to agriculture and, in some cases, industrial process water.

The City has a complex water delivery system. It delivers water to urban customers and agricultural customers and it delivers recycled water within the City limits. In addition, Napa Sanitation District is able to deliver recycled water to the Napa Area Industrial Park, which is within the water service area but outside the City limits. Table 3-1 provides a summary of the water entering the City's system for the period from 1996 to 2010. The summary illustrates water delivered to urban customers; water delivered to agricultural customers and recycled water deliveries. The summary also illustrates that the City saw a significant drop in total water entering the system in 2009 and 2010. There are several likely reasons for this reduction including:

- The City's Zero Water Footprint Policy, which was adopted in 2007, and effectively serves to limit water use by new development;
- The City's Drought Ordinance, which was adopted in 2009, in response to reduced availability of State Water project water;

- The City's recycled water project, which has been phased in since 2006, and which converted a number of landscape irrigation connections from the potable to the recycled water system in 2010; and
- The economic recession during 2009 and 2010, which resulted in a decline in the number of active accounts and water demands.

Table 3.1

Summary of Historical Water Entering the System (AFY)

Calendar Year	Table A Water						Vallejo Water (Urban Use)			Recycled Water	TOTAL
	Urban Deliveries			Agricultural Deliveries							
	Conventional Plant	Napa Treated	Membrane Plant	Hess	Sutter	NBA # 2	Montevino Main	Montevino ByPass	Vallejo Treated		
1996	1,754.00	-	-	-	-	46.89	-	-	-	-	1,800.89
1997	1,654.81	26.33	-	-	-	68.26	-	-	129.46	-	1,878.86
1998	1,706.45	-	-	-	-	35.75	-	-	85.26	-	1,827.46
1999	1,740.99	94.55	-	-	-	46.22	-	-	157.49	-	2,039.25
2000	1,850.00	152.40	-	180.02	-		-	-	186.78	-	2,369.20
2001	1,940.01	513.10		37.43	33.45	72.81	2.23	7.31	2.49	-	2,608.83
2002	2,149.82	645.70		64.93	0.07	29.99	1.15	12.46	8.96	-	2,913.08
2003	2,095.22	926.10		41.99	33.38	60.05	0.03	3.45	46.90	-	3,207.12
2004	1,925.78	1,374.00	115.75	53.95	39.07	103.63	3.91	35.85	5.19	-	3,657.13
2005	1,843.56	225.62	1,436.73	57.89	28.51	55.99	2.61	35.53	29.18	-	3,715.62
2006	1,497.35	476.38	1,427.36	36.69	20.00	51.64	2.99	38.47	87.66		3,638.54
2007	1,759.09	398.82	1,507.55	54.04	44.42	75.71	3.36	37.21	104.04	23.46	4,007.70
2008	1,650.12	658.03	1,535.45	-	38.31	71.29	2.96	32.35	137.62	67.36	4,193.49
2009	1,518.76	540.30	1,110.27	-	27.54	26.61	1.94	29.52	149.71	48.53	3,453.18
2010	1,527.73	306.11	1,099.39	4.74	2.98	24.86	0.85	24.47	32.74	73.00	3,096.87

In order to calculate its baseline, the City removed recycled water deliveries and agricultural deliveries from the total water entering the system. Table 3.2 presents the water deliveries that will be used in the baseline calculation.

Table 3.2
Summary of Water Deliveries Included in Baseline Calculation

Calendar Year	Total Water Entering System	Deliveries to Agriculture	Recycled Water Deliveries	Total Water Included in Baseline Calculation (Total less Deliveries to Ag and Recycled Water)	
	(AFY)	(AFY)	(AFY)	(AFY)	(MGD)
1996	1,800.89	46.89	-	1,754.00	1.57
1997	1,878.86	68.26	-	1,810.60	1.62
1998	1,827.46	35.75	-	1,791.71	1.60
1999	2,039.25	46.22	-	1,993.03	1.78
2000	2,369.20	180.02	-	2,189.18	1.95
2001	2,608.83	143.69	-	2,465.14	2.20
2002	2,913.08	94.99	-	2,818.09	2.52
2003	3,207.12	135.42	-	3,071.70	2.74
2004	3,657.13	196.65	-	3,460.48	3.09
2005	3,715.62	142.39	-	3,573.23	3.19
2006	3,638.54	108.33	-	3,530.21	3.15
2007	4,007.70	174.17	23.46	3,810.07	3.40
2008	4,193.49	109.60	67.36	4,016.53	3.59
2009	3,453.18	54.15	48.53	3,350.50	2.99
2010	3,096.87	32.58	73.00	2,991.29	2.67

The purpose of developing a baseline daily per capita water use is to have a baseline from which to derive the water use target for 2020 and the interim target for 2015. The baseline daily per capita water use is developed for each water supplier based on a 10-year average beginning no earlier than 1994 and ending no later than 2010. If in 2008 more than 10 percent of an urban water supplier's deliveries were recycled water, a 15-year average may be used.

Average water use over a 5-year period beginning no earlier than 2003 and ending no later than 2010 is also calculated to confirm whether the proposed 2020 per capita water use target meets the legislation's minimum water use reduction requirement of at least 5 percent. In other words, if the calculated 2020 water use reduction target does not represent at least a 5 percent reduction, the urban water supplier must lower that 2020 target to meet the 5 percent minimum reduction requirement.

Table 3.3 (DWR Table 13) illustrates that the City's baseline is calculated using a 10-year average because its recycled water supply was less than 10 percent of the total water supply. It also illustrates the that City will be calculating its baseline over the period from 1999 to 2008 and its 5-year averaging period, used to calculate compliance with the 5 percent minimum reduction requirement, will be the period from 2003 to 2007.

Table 3.3 (DWR Table 13)
Baseline Period Ranges

Base	Parameter	Value	Units
10- to 15-Year Base Period	2008 total water deliveries	4,193	AFY
	2008 total volume of delivered recycled water	67.36	AFY
	2008 recycled water as a percent of total deliveries	1.58	percent
	Number of years in base period[a]	10	years
	Year beginning base period range	1999	--
	Year ending base period range[b]	2008	--
5-Year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	--
	Year ending base period range[c]	2007	--

[a] If the 2008 recycled water percent is less than 10 percent of total water deliveries, then the base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the base period is a continuous 10- to 15-year period.

[b] The ending year must be between December 31, 2004 and December 31, 2010.

[c] The ending year must be between December 31, 2007 and December 31, 2010.

Table 3.4 (DWR Table 14) illustrates the City's baseline calculation. The population data included Table 3.4 is brought forward from Table 2.2. The gross daily water entering the system includes all water entering the water delivery system, except deliveries to agricultural and recycled water users. The calculation results in a baseline of 209 gpcd.

Table 3.4 (DWR Table 14)
Base Daily Per Capita Water Use — 10-Year Range

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	1999	9,636	1.78	185
Year 2	2000	9,852	1.95	198
Year 3	2001	10,757	2.20	205
Year 4	2002	11,662	2.52	216
Year 5	2003	12,567	2.74	218
Year 6	2004	13,472	3.09	229
Year 7	2005	14,378	3.19	222
Year 8	2006	15,409	3.15	205
Year 9	2007	16,440	3.40	207
Year 10	2008	17,470	3.59	205
Base Daily Per Capita Water Use				**209**

Notes:
1. Population from Table 2.2
2. Daily System Gross Water Use from Table 3.2

As discussed above, each urban water supplier must calculate a 5-year baseline for a period between 2003 and 2010 and adopt a target that results in at least a 5 percent reduction from that 5-year baseline. As illustrated below in Table 3.5 (DWR Table 15) the City's 5-year base daily per capita water use is 216 gpcd.

Table 3.5 (DWR Table 15)
Base Daily Per Capita Water Use — 5-Year Range

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	12,567	2.74	218
Year 2	2004	13,472	3.09	229
Year 3	2005	14,378	3.19	222
Year 4	2006	15,409	3.15	205
Year 5	2007	16,440	3.40	207
			Base Daily Per Capita Water Use	**216**

As required by SBx7-7, that 5-year average of 216 gpcd is multiplied by 95 percent. The result is 205 gpcd. The City's 2020 per capita water use target cannot exceed this value.

3.1.2 BASELINE DAILY PER CAPITA WATER USE WITH THE PROCESS WATER EXCLUSION

SBx7-7 allows an urban water supplier to exclude industrial process water use from its gross water use if one or more of the following criteria are met:

a) Total industrial water use is equal to or greater than 12 percent of gross water use;

b) Total industrial water use is equal to or greater than 15 gallons per capita per day;

c) Non industrial water use is equal to or less than 120 gallons per capita per day if the water supplier has self-certified the sufficiency of its water conservation program with the DWR; or

d) The population within the supplier's service area meets the criteria for a disadvantaged community.

Because the City has several significant industrial water users, the process water exclusion has been evaluated. While the City does not have a distinct billing category for its process water users, process water use was separated out of billing data for each known process water customer. Consistent with the 2010 UWMP guidelines, irrigation use at industrial sites has not been excluded from gross water volume in the gpcd calculation. As Table 3.6 indicates, the City's process water is on average 9% of the total deliveries or 18 gpcd. The City qualifies for the process water exclusion because the process water use exceeds 15 gpcd.

Table 3.6
Process Water Use

Year	Gross Water Use, AFY	Process Water, AFY	% of gross	Population	Process Water, gpcd
1999	1,993	176	9	9,636	16
2000	2,189	189	9	9,852	17
2001	2,465	193	8	10,757	16
2002	2,818	236	8	11,662	18
2003	3,072	291	9	12,567	21
2004	3,460	316	9	13,472	21
2005	3,573	414	12	14,378	26
2006	3,530	285	8	15,409	17
2007	3,810	351	9	16,440	19
2008	4,017	355	9	17,470	18
2009	3,351	258	8	18,501	12
2010	2,991	383	13	19,532	18
Average Process Water Use			9		18

In order to calculate the baseline, with the process water exclusion, the City reviewed the total water entering the system and subtracted process water use. This calculation is illustrated in Table 3.7

Table 3.7
Summary of Water Deliveries Included in Baseline Calculation with Process Water Exclusion

Calendar Year	Total Water Entering System	Deliveries to Agriculture	Recycled Water Deliveries	Process Water Deliveries	Total Water Included in Baseline Calculation (Total less Deliveries to Ag, Process and Recycled Water)	
	(AFY)	(AFY)	(AFY)	(AFY)	(AFY)	(MGD)
1999	2,039.25	46.22	-	176.00	1,817.03	1.62
2000	2,369.20	180.02	-	189.00	2,000.18	1.79
2001	2,608.83	143.69	-	193.00	2,272.14	2.03
2002	2,913.08	94.99	-	236.00	2,582.09	2.30
2003	3,207.12	135.42	-	291.00	2,780.70	2.48
2004	3,657.13	196.65	-	316.00	3,144.48	2.81
2005	3,715.62	142.39	-	414.00	3,159.23	2.82
2006	3,638.54	108.33	-	285.00	3,245.21	2.90
2007	4,007.70	174.17	23.46	351.00	3,459.07	3.09
2008	4,193.49	109.60	67.36	355.00	3,661.53	3.27

Table 3.8 (DWR Table 14) illustrates the City's baseline calculation with the process water exclusion. The population data included in Table 3.8 (DWR Table 14) is brought forward from Table 2.2. The gross daily water entering the system includes all water entering the water delivery system is brought forward from Table 3.7. The calculation results in a baseline of 190 gpcd.

Table 3.8 (DWR Table 14)
Base Daily Per Capita Water Use — 10-year Range
(with Process Water Exclusion)

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	1999	9,636	1.62	168
Year 2	2000	9,852	1.79	181
Year 3	2001	10,757	2.03	189
Year 4	2002	11,662	2.30	198
Year 5	2003	12,567	2.48	198
Year 6	2004	13,472	2.81	208
Year 7	2005	14,378	2.82	196
Year 8	2006	15,409	2.90	188
Year 9	2007	16,440	3.09	188
Year 10	2008	17,470	3.27	187
			Base Daily Per Capita Water Use	**190**

Notes:
1. Population from Table 2.2
2. Daily System Gross Water Use from Table 3.7

A 5-year baseline, using the period from 2003 to 2007, was also calculated with the process water exclusion. Table 3.9 illustrates this calculation.

Table 3.9
Base Daily Per Capita Water Use — 5-Year Range
(with Process Water Exclusion)

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	12,567	2.48	198
Year 2	2004	13,472	2.81	208
Year 3	2005	14,378	2.82	196
Year 4	2006	15,409	2.90	188
Year 5	2007	16,440	3.09	188
			Base Daily Per Capita Water Use	**196**

As required by SBx7-7, that 5-year average of 196 gpcd is multiplied by 95 percent. The result is 186 gpcd. The City's 2020 per capita water use target cannot exceed this value, if it uses the process water exclusion.

Both the baseline and 5-year average are lower with the process water exclusion, and therefore the targets will be lower as well. However, the process water exclusion may result in less required reductions in terms of water volume. In order to assist the City with its decision regarding baselines and targets, targets are also calculated, with and without the process water exclusion, in order to allow the City to review its full range of options.

3.1.3 INDIVIDUAL AGENCY TARGETS (2015, 2020)

The purpose of SBx7-7 is to reduce statewide urban per capita water use by 20 percent by the year 2020. Each individual urban water supplier must develop a water use target for the year 2020 as well as an

interim water use target for the year 2015. Depending on an agency's base daily per capita water use, an individual water agency may have targets which result in something more or less than 20 percent reduction compared to current use. Agencies not in compliance with SBx7-7 by July 1, 2016, with some exceptions, will not be eligible for state water grants or loans.

There are four methods that an urban water supplier may use to develop its 2015 and 2020 water use targets. Three methods were provided in SBx7-7 and the fourth was subsequently established by DWR. The four methods are generally described below. A more complete description can be found in DWR's *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* dated March 2011.

- Method 1 : 80 percent of Base Daily Per Capita Use;
- Method 2: Performance standards based on actual water use data for indoor residential water use, landscaped area, and commercial, industrial and institutional (CII) water use;
- Method 3: 95 percent of the San Francisco Bay hydrologic region's target ; and
- Method 4: Water Use Targets based on residential performance standards and specific savings goals for CII and Landscape use and for water losses. Actual savings can be obtained from any sector.

Methods 1 and 3 were applied in this analysis. Method 2 requires data specificity that is not currently available to the City, such as parcel-specific landscaped area for all property. If this data becomes available, the target can be re-evaluated using Method 2 in the 2015 UMWP. Method 4 is a provisional method. The City has concluded it would rather base its planning on a definitive, easily administered method. The City may re-evaluate the method used in 2015.

Urban Water Use Target Method 1 Evaluation: 80 Percent of Base Daily per Capita Water Use with Process Water Included

The City's gross baseline, as illustrated in Table 3.4 (DWR Table 14) is 209 gpcd, calculated over the period from 1999 through 2008.

- Based on a 10 percent reduction of the base daily per capita water use, the 2015 interim target is 188 gpcd; and
- Based on a 20 percent reduction of the base daily per capita water use, the 2020 target is 167 gpcd.

Because these are below the 5-year baseline 5 percent target of 205, these targets do need to be adjusted.

Urban Water Use Target Method 1 Evaluation: 80 Percent of Base Daily per Capita Water Use with Process Water Exclusion

The City's baseline with the process water exclusion, as illustrated in Table 3.8 is 190 gpcd.

- Based on a 10 percent reduction of the base daily per capita water use, the 2015 interim target is 171 gpcd; and
- Based on a 20 percent reduction of the base daily per capita water use, the 2020 target is 152 gpcd.

Because the 2015 and 2020 targets with the process water exclusion are below the 186 gpcd, maximum these targets do need to be adjusted.

Urban Water Use Target Method 3 Evaluation: 95 Percent of the Hydrologic Region Target

The third method allows the water supplier to select 95 percent of the hydrologic region's 2020 target as its target. The applicable hydrologic region for the City is Region 2 – San Francisco Bay, with a regional target of 131 gpcd. This is illustrated on Figure 3.1

- Based on meeting the regional hydrologic target in 2015, without the process water exclusion, the target is 167 gpcd;
- Based on meeting the regional hydrologic target in 2015, with the process water exclusion, the target is 157 gpcd; and
- Based on meeting the regional hydrologic target the 2020 target is 124.5 gpcd regardless of whether or not process water is excluded.

3.1.4 SUMMARY

Table 3.10 provides a comparative summary of the options for baselines and targets. It also compares the City's current use to the various options for 2020 targets. Current use is below most options for 2020 targets, likely reflecting a combination of City policies encouraging conservation, the recent connection of a number of irrigation accounts to the recycled water system and the economic recession. Because current use is below most 2020 target options, the City can anticipate some "bounce-back" in water use and still be in compliance with SBx7-7.

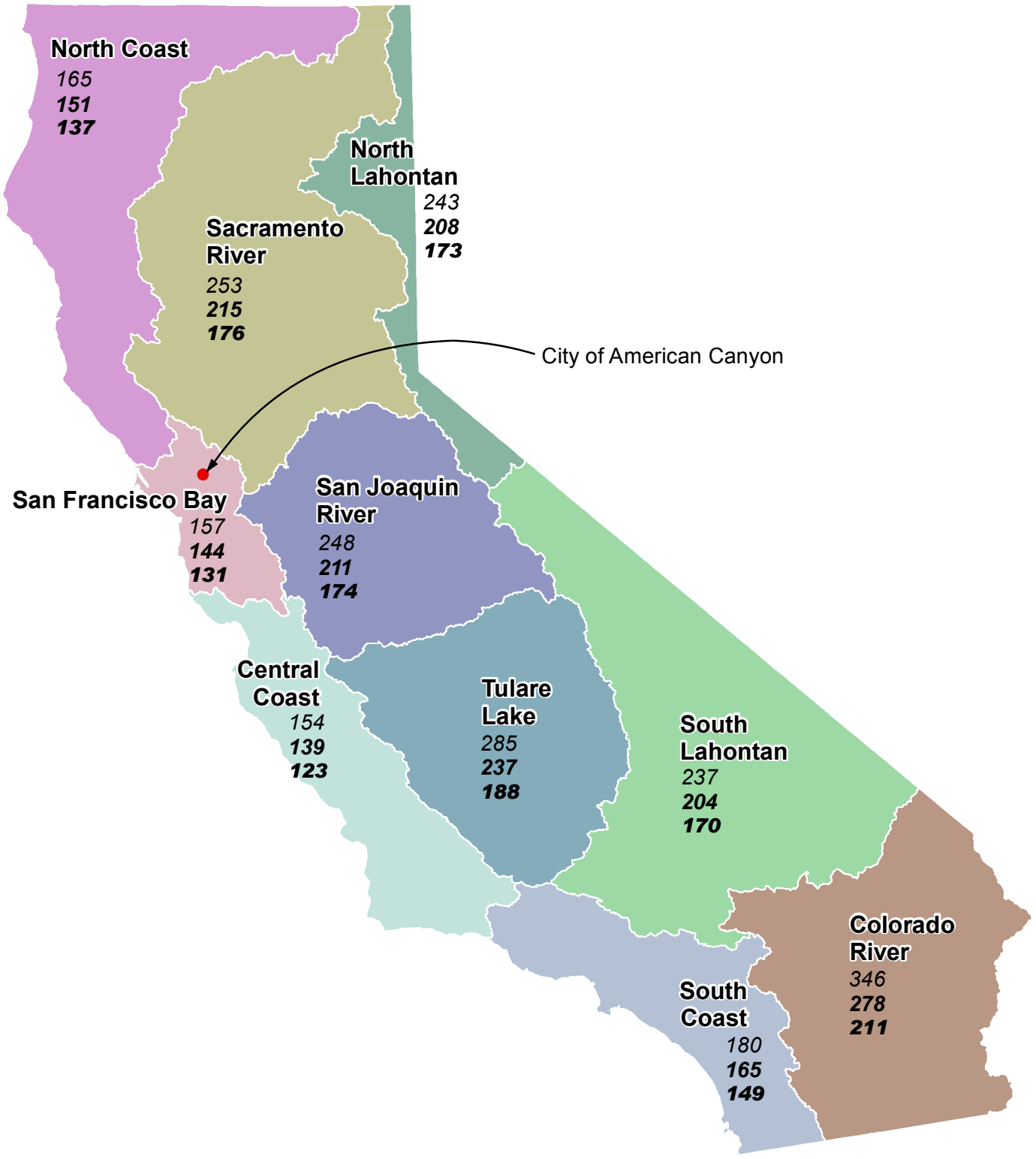
Table 3.10
Summary of Baseline, Targets and Current Use

	Method 1 Include Process Water		Method 1 Exclude Process Water		Method 3 Include Process Water		Method 3 Exclude Process Water	
	2015	**2020**	**2015**	**2020**	**2015**	**2020**	**2015**	**2020**
Baseline Compared to Targets								
Baseline (gpcd)	209	209	190	190	209	209	190	190
Target (gpcd)	188	167	171	152	167	124.5	157	124.5
Reduction Required from Baseline to Meet Target	**-21.0**	**-42.0**	**-19.0**	**-38.0**	**-42.0**	**-84.5**	**-33.0**	**-65.6**
Current Use Compared to Targets								
2010 water use (gpcd)	137	137	120	120	137	137	120	120
Target (gpcd)	188	167	171	152	167	124.5	157	124.5
Reduction from 2010 Use to Meet Target	**NA***	**NA***	**NA***	**NA***	**NA***	**-12.5**	**NA***	**NA***

* Current Water Use is lower than the target

There are several factors that can influence the City's consideration of baseline and targets. These include:

- Which option results in the highest baseline and targets?
- Which option results in the least required conservation?
- Which option best promotes the City's existing policy structure around water use?



J:\02536 - American Canyon\02536-10-004 2010 UMWP\08-GIS\Maps\Figures\AC Hydrologic Regions.mxd - 5/13/2011 - 3:53:30 PM

Cartography: RMR

Legend

Region Water Use Targets

in gallons per capita per day

157 Baseline (1995-2005)

144 Interim Target (2015)

131 2020 Target

0 40 80 Miles

1 inch = 81 miles

N

Sources: Department of Water Resources (DWR) Hydrologic Regions

Figure 3.1
Hydrologic Region Map

City of American Canyon
2010 Urban Water Management Plan

WINZLER & KELLY

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Method 1, without the process water exclusion, results in the highest baseline and targets. However, as indicated in Table 3.10, the City's 2010 per capita water use is actually lower than all but one of the required targets, indicating that the City has substantial flexibility to manage its demand reduction program to meet its established policy goals, including its Zero Water Footprint Policy, all of which are described in Section 3.2.

Method 1, with the process water exclusion, yields lower baseline and targets but also results in the least required conservation from non-process water users. As indicated in Table 3.10, when Method 1, without the process water exclusion, is used to compute the 2020 water use reduction target the required savings from the baseline is 42 gpcd. When Method 1, with the process water exclusion, is used to compute the 2020 target the required savings from the baseline drops to 38 gpcd. This means non-process water users need to achieve less conservation in order to meet the targets.

The City has several other policies that encourage water use efficiency and best management practices for all user classes, including process water users. These are described in Section 3.2.2 and provide assurance that if the City elects to use the process water exclusion to set its baseline and targets, it is still able to encourage water use efficiency from its process water users.

By using the process water exclusion, the City would establish a framework that allowed it to serve additional process water needs in the future without frustrating its compliance with the requirements of SBx7-7. This methodology may be more consistent with the City's Administrative Policy 2011-03 on the implementation of the Zero Water Footprint Policy which focuses providing a range of tools to all of its water users to assist them in maintaining reliable and cost-effective water service.

At its September 6, 2011 meeting the City adopted a baseline of 190 gpcd, reflecting the process water exclusion. The City adopted the Method 1 targets, calculated with the process water exclusions. These are 171 gpcd for 2015 and 152 gpcd for 2020.

3.2 WATER DEMANDS

Water demands were calculated from billing and water supply metering data provided by the City. The City's billing data is sorted by water use sector classification. The water use classifications are generally defined below.

- Single-family accounts serve free-standing homes with a dedicated water service line and meter and serve only one legal dwelling unit.
- Multi-family accounts serve premises that are residential in nature and consist of more than one dwelling unit, including mobile home parks. Service is provided through a single metered water connection. Because a single multi-family account serves more than one dwelling unit, there is no direct correlation between the number of residential accounts in the City's billing system and the population of the City.
- Commercial/Industrial accounts serve nonresidential premises classified as retail stores, restaurants, office buildings, laundries and other service establishments which cannot be classified as a large industrial, raw water, landscape service, recycled water, or residential.
- Industrial Process Water accounts serves premises whose annual water use is in excess of four thousand two hundred units (ccf) per year, that are located within city limits and separately connected to the water system, and whose predominant water use is for industrial purposes.
- Institutional/Governmental accounts serve churches, lodges, and government or public buildings.

- Landscape accounts are metered accounts used exclusively for irrigation purposes. Landscape accounts can be served by either potable or recycled water.
- Agricultural accounts provide raw water to agricultural users.
- "Other" accounts reflect fire services, temporary metered connections, and connections that cannot be classified as residential, commercial, industrial process, landscape or agriculture.

3.2.1 2005 AND 2010 WATER DELIVERIES

Tables 3.11 (DWR Table 3) and 3.12 (DWR Table 4) summarize the City's total potable water deliveries in 2005 and 2010. While agricultural, recycled water and industrial process water deliveries were not included in the data used to calculate the City's baseline and targets, these deliveries are included in Tables 3.11 and 3.12 because they represent demands on the City's water system that must be served by the City's supply. Tables 3.11 and 3.12 also include unmetered uses such as hydrant flushing or water losses.

Table 3.11 (DWR Table 3)
Water Deliveries — Actual, 2005 (AFY)

	2005				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	4,517	1,568			1,568
Multi-family	8	143			143
Commercial/Industrial	229	463			463
Industrial Process Water*	5	414			414
Institutional/Governmental	13	66			66
Landscape Potable	78	299			299
Landscape Recycled	-	-			-
Agriculture (Raw SWP Water)**	3	142			142
Other	17	78			78
Total	**4,870**	**3,173**	**0**	**0**	**3,173**

* Reflects the accounts used to calculate the process water exclusion

** Reflects the Hess, Sutter and NBA # 2 meters

Table 3.12 (DWR Table 4)
Water Deliveries — Actual, 2010 (AFY)

	2010				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	4,656	1,426			1,426
Multi-family	23	164			164
Commercial/Industrial	286	409			409
Industrial Process Water*	5	383			383
Institutional/Governmental	13	36			36
Landscape Potable	85	324			324
Landscape Recycled	13	73			73
Agriculture (Raw SWP Water)**	3	32.58			32.58
Other	17	11			11
Total	**5,101**	**2,859**	**0**	**0**	**2,859**

* Reflects the accounts used to calculate the process water exclusion
** Reflects the Hess, Sutter and NBA #2 meters

3.2.2 PROJECTED WATER DELIVERIES

The City has adopted several polices that enhance its ability to both manage demand in its system and assure that the quality of water it delivers matches the intended use. These policies influence the methodology used to calculate projected water demand.

3.2.2.1 CITY POLICIES REGARDING DEMAND MANAGEMENT

Since the adoption of its 2005 UWMP, the City has adopted or amended five policy documents that outline its demand management strategy both within its corporate limits and within its water service area.

- The "Zero Water Footprint" (ZWF) Policy: Adopted in October of 2007, this policy requires that new development must be configured in a manner that results in "no loss in reliability or increase in water rates for existing customers due to a requested increase in water demand". Generally, the ZWF set up a system whereby any new development (residential or non-residential), or the expansion of existing commercial and industrial development, occurring after October 23, 2007, needs to mitigate all new water demands. Mitigation can include offsetting new demands with conservation savings elsewhere in the water service area, offsetting demands onsite, or, at its own cost, assisting the City in purchasing new water supplies from other water providers.
- Municipal Code Section 13.10 New Water and Sewer Connections and Services: Originally adopted as Ordinance 2000-08, this section of the Municipal Code generally limited all new industrial water users within the City's water service area to a total use of 650 gallons per acre per day (gpad) and outlined requirements for new development to dual-plumb and connect to recycled water when available. In 2008, this section of the Municipal Code was amended to also capture the intent of the ZWF by allowing offsets and new supply options to be included in the calculation of the gpad cap.
- Administrative Policy 2011-01 on the Management and Allocation of Raw Water: Adopted in May 2011, this Administrative Policy has a goal of shifting the City's raw water customers (new and existing) from the State Water Supply to alternative supplies. The Policy specifically references recycled water and groundwater as possible alternative supplies and also provides for the development of an agricultural water conservation program.

- Administrative Policy 2011-02 on the Management and Allocation of Recycled Water: Adopted in May 2011, this Administrative Policy has a goal of providing recycled water as a substitute for potable water as a first priority to the City's parks and then to other users for irrigation purposes. This Administrative Policy compliments Municipal Code Section 13.10, which requires dual-plumbing with purple pipe, and establishes a framework for allocating the recycled water resource and encouraging the development of privately-owned seasonal, recycled water storage facilities.
- Administrative Policy 2011-03 on the Implementation of the Zero Water Footprint Policy: Adopted in May 2011, this Administrative Policy has a goal of assigning or shifting commercial, industrial and new residential water demands from the State Water Project supply to more reliable alternate sources of water. This Administrative Policy further articulates the manner in which the City will consider and evaluate new development proposals and provides guidance on acceptable methods for offsetting new water demands within the existing water system or bringing new water supplies to the City.

Copies of these policy documents are included in Appendix D.

3.2.2.2 Methodology Used to Project Future Demands

Collectively, the policy documents described above could serve to hold water demands at 2007 levels indefinitely. Practically, however, it is likely that new development will employ some combination of offsets and new supply purchases in order to mitigate its impacts. To calculate projected water demands in 5-year increments to 2035, the demand factors, outlined in Table 3.13 have been employed. These factors are not intended to represent design criteria for new development. As described above, new development must offset its demands to comply with the ZWF. Rather these factors are used to project the potential demand, by water use sector, associated with new development in order to confirm that demand projections can be offset by known water supplies available for purchase or development. These factors and the projections outlined in Tables 3.14 through 3.19 can be used by the City to monitor growth, water use and supply availability.

Table 3.13

Demand Factors

Water Use Sector	Demand Factor	Source
Single Family Residential	274 gpd	2010 Average Use
Multifamily Residential	190 gpd	70% of SFR Demand
Commercial/Industrial/Institutional	675 gpd/acre	Historic average of deliveries
Landscape Potable	43 AFY	2010 Landscape Use less Planned Recycled Water Conversions
Landscape Recycled	2.5 AF/acre	ETo for turf grass + allowance for system efficiency
Agricutultural (Raw)	0 gpd	Administrative Policy 2011-01
Agricultural Recycled	105 AFY	Historic average agricultural deliveries

In order to estimate growth rates, the following methods have been employed.

For the Single Family Residential Sector: The number of accounts is projected to grow from 4,656 to 6,256 by 2025 as the 1,600 units in the Town Center Area build out. The number of accounts is projected to grow at the same rate as population growth thereafter. As indicated in Table 3.13, all single family accounts are projected to have a use of 274 gpd.

For the Multifamily Residential Sector: The Priority Development Area described in Section 2 is anticipated to add 1,600 units by 2035, which translates to 64 units per year or 320 units for each 5-year planning increment. Each unit is anticipated to have a demand of 190 gpd. Because multifamily accounts are not submetered, the addition of 1,600 units will not add 1,600 accounts. For the purposes of projecting growth it is assumed that each new "account" will include 40 units and total demand of 7,600 gpd. Based on these assumptions, the City will add 8 new MFR accounts (320 units/40 units per account) every 5 years.

For the Commercial/Industrial and Institutional (CII) Sector: Accounts are projected to grow at the same rate as population. Accounts may include new commercial, industrial or institutional uses, including schools and public buildings. To develop projections of potential demand increase the total acreage of vacant land within the City's water service area that is zoned for commercial and industrial uses was multiplied by 675 gpda. To estimate the total number of undeveloped commercial and industrial acres within the City's service areas, GIS data of City's service area was used. An image of the parcels designated as vacant commercial or industrial was layered over a recent aerial photograph of the City's service area. This served as a method to remove parcels that had been recently developed. Of the 1,505.2 acres within the service area designated as vacant in the GIS database, 60.6 acres appeared to have been developed. This left a remaining 1,444.6 acres with commercial and industrial land use designations that were undeveloped, and therefore have the potential to require an increase in water use. Figure 3.2 illustrates the areas used in this calculation. Multiplying 1,445 vacant acres by 675 gpad, it is estimated that this sector could increase water demands by 1,052 acre-feet per year at build-out. Buildout is assumed to occur by 2035 and the projected demand increase was spread uniformly over this period averaging 218 AFY each 5 year period.

Industrial Process Water Users: Because of the City's ZWF, it is assumed that the City will not add additional Large Industrial Process Water Users without adding additional supply. All projected CII use is included in the CII Sector, which includes existing process water use.

For the Landscape (Potable) Sector: Because of the City's ZWF and Administrative Policy on the Management and Allocation of Recycled water, it is assumed there will be no new large landscape accounts served by potable water. New large landscape accounts will be connected to the recycled water delivery system. The City has recently completed the first phase of its program and is in the process of converting 45 customers with a total demand of 281 AFY to its recycled water system. As a result of this program, the number of landscape accounts served by potable water is projected to drop from 85 accounts in the year 2010 to 40 accounts before the year 2015. The total demand served in the Landscape (Potable) Sector is expected to remain constant at 43 AFY, which is the difference between the current landscape demand of 324 AFY and the 281 AFY that will convert to recycled water.

For the Landscape (Recycled Water Sector): The City financed the construction of its recycled water system, in part, with a grant from the State Water Resources Control Board. As part of this grant, the City committed to delivering a minimum of 666 AFY of recycled water annually by 2015, in order to offset demands on the State Water Project. The City's Recycled Water Implementation Plan[2] indicates that the Recycled Water System (pumps, pipelines and diurnal storage tank) has the hydraulic capacity to deliver up to 1,000 AFY with appropriate pipeline extensions. In addition, as noted in Section 2, Napa Sanitation District has committed to deliver 300 acre-feet of recycled water to the Montalcino at Napa development in the Napa Airport Industrial Area. This makes approximately 1,300 AFY of recycled water available to offset demands. In order to project recycled water demands the following assumptions are made:

By 2015, recycled water demands will average 666 AFY which includes the conversion of 105 AFY of raw agricultural water demands to recycled water;

[2] Winzler & Kelly, 2005

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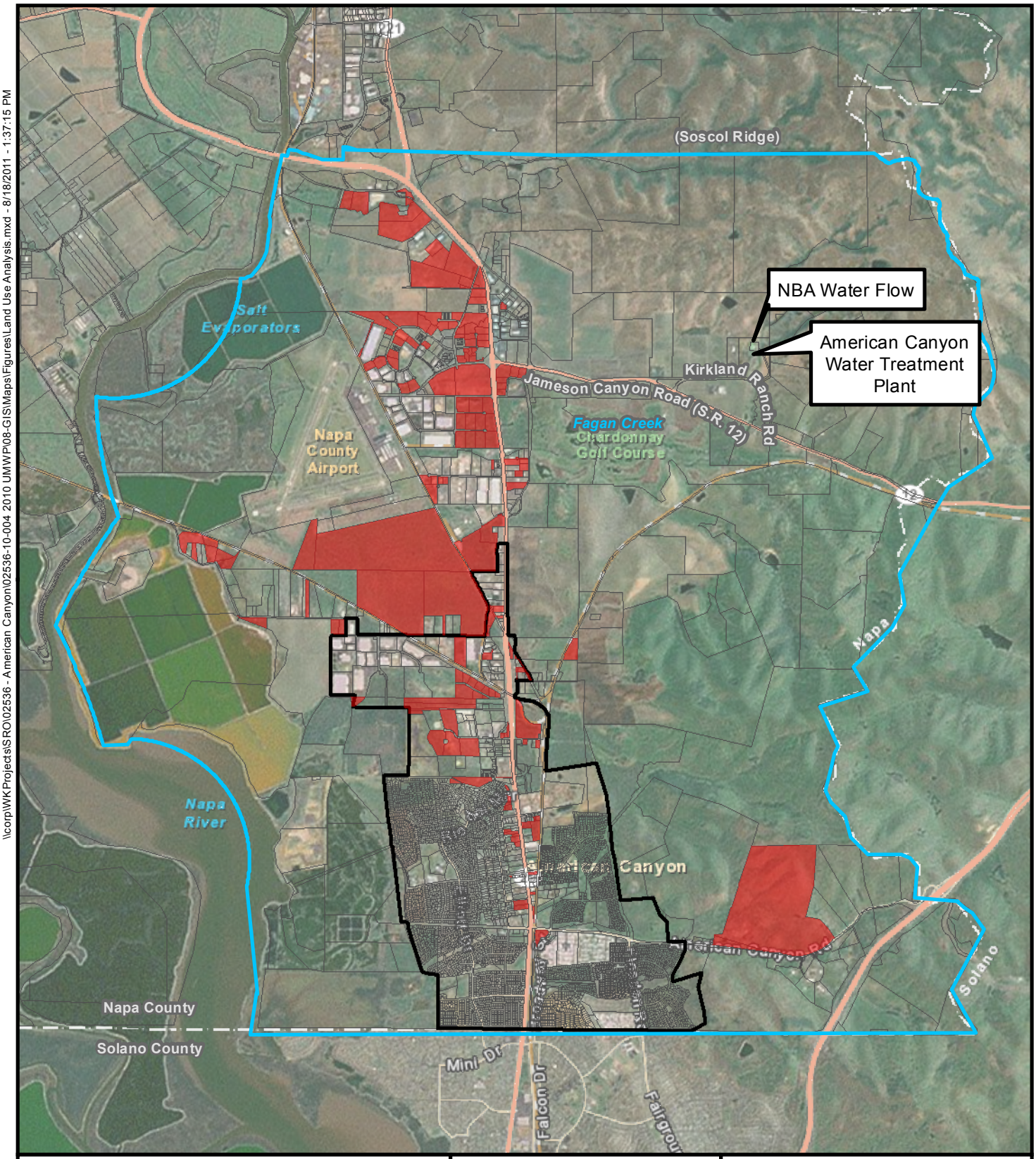

\\corp\WKProjects\SRO\02536 - American Canyon\02536-10-004 2010 UMWP\08-GIS\Maps\Figures\Land Use Analysis.mxd - 8/18/2011 - 1:37:15 PM

Cartography: AF

Sphere of Influence
Parcels
Vacant Commercial and Industrial Parcels
Water Service Area

0 2,500 5,000 ft

1 inch = 5,000 feet printed at 8.5x11

N

Sources: ESRI Basemap: Aerial and Transportation; City of American Canyon GIS: City Limits, Airport Industrial Area, Proposed Urban Limit Line, Water Service Area.

Figure 3.2
Vacant Commercial and Industrial Land Use Map

City of American Canyon
2010 Urban Water Management Plan

WINZLER & KELLY
www.w-and-k.com

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- By 2020, recycled water demands will average 966 AFY which reflects buildout of the Montalcino at Napa Project and 300 AFY of deliveries from Napa Sanitation District;
- After 2020, recycled water demands will increase by 1% per year as new development connects to the recycled water system.

Because the recycled water supply is not subject to the same type of contractual limitations as the potable water supply, the timing of new demands is not as critical as the timing of new potable demands, as long as the City meets its contractually required minimum deliveries of 666 AFY.

For the Agricultural Sector: It is assumed that by 2015, agricultural use of SWP water will be eliminated in accordance with Administrative Policy 2011-01. This demand averages 105 AFY. While Administrative Policy 2011-01 provides several possible alternatives for meeting agricultural demand, for this purposes of this UWMP, it is assumed those demands will be met with recycled water.

For the "Other" Sector: This sector includes temporary metered uses. These uses have created an average demand of 60 AFY over the past 5 years. The City's recycled water system is increasingly available for temporary uses, such as construction water but for the purposes of projecting demands, use is assumed at a constant 60 AFY.

Tables 3.14 (DWR Table 5) through 3.16 (DWR Table 7) below illustrate the number of accounts and volume of potable water use projected in 5-year increments through 2035.

Table 3.14 (DWR Table 5)
Water Deliveries — Projected, 2015 (AFY)

	2015				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	5,189	1,593	0		1,593
Multi-family	31	232	0		232
CII	368	1046			1046
Landscape Potable	40	43	0		43
Landscape Recycled*	46	666			666
Agriculture*	0	0	0		0
Other	20	60	0		60
Total	**5,694**	**3,640**	**0**	**0**	**3,640**

*** Assumes Agricultural Use Converts to Recyled Water and City acheives the minimum deliveries required by its contract with the State Water Board**

Table 3.15 (DWR Table 6)
Water Deliveries — Projected, 2020 (AFY)

	2020				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	5,722	1,756	0		1,756
Multi-family	39	300	0		300
CII	378	1264			1264
Landscape Potable	40	43	0		43
Landscape Recycled*	69	966			966
Agriculture	0	0	0		0
Other	20	60	0		60
Total	**6,268**	**4,389**	**0**	**0**	**4,389**

*** Assumes City's 666 AFY of minimum deliveries + NSD Deliveries to Montalcino at Napa**

Table 3.16 (DWR Table 7)
Water Deliveries — Projected, 2025, 2030, and 2035 (AFY)

	2025		2030		2035	
	Metered		Metered		Metered	
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	# of Accounts	Volume
Single family	6,255	1,920	6,788	2,084	7,321	2,247
Multi-family	47	368	55	436	63	504
CII	410	1482	440	1700	472	1918
Landscape Potable	40	43	40	43	40	43
Landscape Recycled*	76	1014	84	1065	92	1118
Agriculture	0	0	0	0	0	0
Other	20	60	20	60	20	60
Total	**6,848**	**4,887**	**7,427**	**5,388**	**8,008**	**5,890**

*** Assumes growth of 1% per year in recycled water deliveries**

3.2.3 WATER SOLD TO OTHER AGENCIES

The City does not sell water to other agencies. Table 3.17 (DWR Table 9) presents this information in DWR's required format.

Table 3.17 (DWR Table 9)
Sales to Other Water Agencies (AFY)

Water Distributed	2005	2010	2015	2020	2025	2030	2035
Name of Agency	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**

3.2.4 ACTUAL AND PROJECTED "OTHER" WATER DEMANDS

Water losses equaled approximately 15 percent in 2005; however, the City was able to reduce losses to 7.4 percent in 2010. It is projected that the City will maintain a water loss rate no higher than 7.5 percent through 2035.

The City's delivered raw water is not included in the table below because it was included as an agricultural demand. This information is illustrated in Table 3.18 (DWR Table 10) in DWR's required format.

Table 3.18 (DWR Table 10)
Additional Water Uses and Losses (AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Saline Barriers	0	0	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0	0	0
Conjunctive Use	0	0	0	0	0	0	0
Raw Water	0	0	0	0	0	0	0
Unaccounted-for System Losses	542	238	223	257	290	324	358
Total	**542**	**238**	**223**	**257**	**290**	**324**	**358**

3.2.5 SUMMARY OF TOTAL WATER USE

Table 3.19 (DWR Table 11) presents total water deliveries to potable water customers as well as other uses and losses.

Table 3.19 (DWR Table 11)
Total Water Use (AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries (from DWR Tables 3 to 7)	3,173	2,859	3,640	4,389	4,887	5,388	5,890
Sales to Other Water Agencies (from DWR Table 9)	0	0	0	0	0	0	0
Additional Water Uses and Losses (from DWR Table 10)	542	238	223	257	290	324	358
Total	**3,716**	**3,097**	**3,863**	**4,646**	**5,178**	**5,712**	**6,248**

Tables 3.20 and 3.21 below summarize projected water use for 2015 and 2020 and compare it to the 2015 and 2020 water use targets calculated for compliance with SBx7-7.

Table 3.20
Water Use Targets for the City of American Canyon (gpcd)

Year	Projected Water Use, AFY [a]	Population [b]	Projected Per Capita Water Use	SBx7-7 Water Use Target	Meets Target?
2015	3,197	22,437	127	188	yes
2020	3,680	26,673	123	167	yes

[a] From Table 3.19 with recycled water deliveries removed. Recycled water deliveries are not included in target compliance calculations.

[b] Population projections from Section 2

Table 3.21
Water Use Targets for the City of American Canyon Excluding Industrial Process Water (gpcd)

Year	Projected Water Use, Excluding Process Water AFY[a]	Population [b]	Projected Per Capita Water Use	Water Use Target, Excluding Process Water	Meets Target?
2015	2,814	22,437	112	171	yes
2020	3,297	26,673	110	152	yes

[a] From Table 3.19 with process water and recycled water deliveries removed. Process water and recycled water are not counted in the target compliance calculation.

[b] Population projections from Section 2

3.2.6 LOWER INCOME WATER USE PROJECTIONS

SBx7-7 includes a new requirement for identifying water use projections for lower income households. Under the statute, a lower income household is as defined under the California Health and Safety Code and is established to be 80 percent of the median income, adjusted for family size. Based on data from the *County of Napa 2009 Selected Economic Characteristics: 2008,* as well as City data from the 2000 Census, the percentage of households at 80 percent or less of the median income is 38 percent of the total households. Table 3.22 (DWR Table 8) shows the projected water demands for lower income households and is based on 38 percent of single family and multi-family residential projected water use. These projections are included in the total projections above.

Table 3.22 (DWR Table 8)
Lower-Income Projected Water Demands (AFY)

Water Distributed	2015	2020	2025	2030	2035
Lower Income residential	693	781	869	957	1,045
Total	**693**	**781**	**869**	**957**	**1,045**

Note: Single-family and multi-family are combined. It is assumed that each MF account as an average of 4 dwelling units.

3.3 WATER DEMAND PROJECTIONS FOR RETAILERS

The City receives potable water from a number of retailers as described in Section 4. Table 3.23 (DWR Table 12) illustrates the City's total potable and recycled water demand projections which are provided to the wholesalers. Sections 4 and 5 provide detail on how the City anticipates that it will combine its various supplies in order to meet the demands. While the City's projected demands are well below its total contracted water volumes, Section 5 discusses the factors that can impact the reliability of the City's supply and reasons that the entire contracted volume may not be available under all hydrologic conditions.

Table 3.23 (DWR Table 12)
Retail Agency Demand Projections Provided to Wholesale Suppliers (AFY)

Wholesaler	Contracted Volume	2010	2015	2020	2025	2030	2035
Potable Water Demand Projections (refer to Table 4.1a)							
SWP Table A Allotment [a]	5,200	5,200	5,200	5,200	5,200	5,200	5,200
Vallejo Permit Water	500	500	500	500	500	500	500
Vallejo Treated Water	Varies [b]	1,352	2,075	2,641	3,207	3,207	3,207
Vallejo Emergency Water (untreated)	only available when SWP is not curtailed	500	500	500	500	500	500
Recycled Water Demand Projections (refer to Table 4.1a)							
City Recycled Water[c]	1,000	73	666	666	714	765	818
NSD Recycled Water[d]	300	-	-	300	300	300	300
Total Project Demands		**7,625**	**8,941**	**9,807**	**10,421**	**10,472**	**10,525**

[a] Includes 500 AFY from Kern County SWP and Napa treated water. Demand includes deliveries and losses less recycled water

[b] 1,352 AFY in 2015; 2,641 AFY in 2020; 3,207 AFY in 2025 - 2035.

[c] System hydraulic capacity is 1,000 AFY. Minimum deliveries to meet State Water Contract are 666 AFY

[d] 300 AFY committed through EIR process for Montalcino at Napa

3.4 WATER USE REDUCTION PLAN

As described above, the City has implemented significant policy changes for new development since the completion of the 2005 UWMP including:

- *The ZWF Policy*
- *Modifications to Municipal Code Section 13.10*
- *Administrative Policy 2011-01 on Management and Allocation of Raw Water*
- *Administrative Policy 2011-02 on Management and Allocation of Recycled Water*
- *Administrative Policy 2011-03 on Implementation of the ZWF*

Together these policies provide the City with the framework to manage water demands and meet its 2015 and 2020 water use targets as required by SBx7-7. Because the City's current demands are already well below the adopted targets, the established demand management policies will be key tools for maintaining compliance.

3.4.1 CURRENT PLAN AND ECONOMIC IMPACTS

The ZWF Policy clearly assigns the costs of managing new demands to new development and avoids impacts on existing ratepayers (who are currently meeting the SBx7-7 targets and should therefore not experience new costs associated with compliance).

SECTION 4
SYSTEM SUPPLIES

This section describes the various water supply sources that the City currently uses and proposes to use during the planning horizon of this UWMP.

4.1 WATER SOURCES

The City meets customer water demands by supplying water from the following existing sources:

- State Water Project (SWP) water;
- Permit (raw) water from the City of Vallejo (Vallejo);
- Treated water from Vallejo;
- Treated water from the City of Napa (Napa);
- Recycled water from the City's wastewater treatment plant; and
- Recycled water from Napa Sanitation District (NSD) that serves a portion of the City's water service area.

Other than recycled water from the City's wastewater treatment plant (WWTP) and NSD, all of the City's raw water supplies are transported via the North Bay Aqueduct (NBA) system. The City does not currently use groundwater as a supply source.

Table 4.1 (DWR Table 16) identifies the City's current and projected sources of water, which are discussed in detail in this Section. The water supply amounts shown for 2010 are actual figures. Future water supply amounts in Table 4.1 (2015 through 2035) reflect the manner in which the City anticipates it will use its supplies to meet the demands described in Section 3 (see Table 3.19). The supply amounts in Table 4.1 do not reflect the maximum supply available to the City. Rather they reflect the supply mix that City anticipates using to meet demands.

Table 4.1a identifies the City's current and projected sources of water and their full contractual limits, assuming no curtailment or shortages, and assuming that the City exercises its future option to purchase to the maximum amount available. Table 4.1a is provided as a summary reference of the various water supply agreements and sources and reflects the maximum potential water supply amounts in those agreements and sources. Note that Vallejo Emergency Water is only available if the City's SWP Table A allotment is curtailed due to environmental constraints. 500 acre-feet is shown on the table but not included in the total because it is not available if the full, 5,200 acre-feet of Table A allotment is not reduced by the State.

Table 4.1 (DWR Table 16)
Water Supplies – Current and Projected (AFY)

Water Supply Sources							
Water Purchased From:	Wholesaler Supplied Volume (Y/N)	(Actual) 2010	2015	2020	2025	2030	2035
SWP (Table A allotment) [a]	Yes	2,185	2,697	3,120	3,120	3,120	3,120
Vallejo Permit Water	Yes	500	500	500	500	500	500
Vallejo Treated Water [b]	Yes	33	-	-	43	527	1,010
Vallejo Emergency Water [c]	Yes	-	-	60	500	500	500
Napa Treated Water [d]	Yes	306	-	-	-	-	-
Dry-Year Water Bank [e]	No	-	-	-	-	-	-
Supplier-produced groundwater		-	-	-	-	-	-
Supplier-produced surface water		-	-	-	-	-	-
Transfers in		-	-	-	-	-	-
Exchanges In		-	-	-	-	-	-
City-produced Recycled Water		73	666	666	714	765	818
Napa Sanitation District Produced Recycled Water		-	-	300	300	300	300
Desalinated Water		-	-	-	-	-	-
Total (Refer to Table 3.19)		**3,097**	**3,863**	**4,646**	**5,178**	**5,712**	**6,248**

[a] Table A allotment is 5,200 AFY; 60% reliability for planning purposes (3,120 AFY max)

[b] Vallejo Treated Water contracted amount is 2,075 AFY in 2015; 2,641 AFY in 2020; 3,207 AFY in 2025 - 2035

[c] Vallejo emergency water supply is available up to 500 AFY when SWP Table A allotment is curtailed

[d] Napa treated water purchase is counted against SWP Table A allotment

[e] State or State water contractors-run program; year-to-year availability unknown

Table 4.1a
Maximum Potential Water Supply Amounts - Current and Projected (AFY)

Water Supply Sources	2010	2015	2020	2025	2030	2035
SWP (Table A allotment) [a]	5,200	5,200	5,200	5,200	5,200	5,200
Vallejo Permit Water	500	500	500	500	500	500
Vallejo Treated Water [b]	1,352	2,075	2,641	3,207	3,207	3,207
Vallejo Emergency Water [c]	500	500	500	500	500	500
Napa Treated Water [d]	0	0	0	0	0	0
Dry-Year Water Bank [e]	0	0	0	0	0	0
City-produced Recycled Water	1,000	1,000	1,000	1,000	1,000	1,000
Napa Sanitation District Produced Recycled Water	0	0	300	300	300	300
Total (excluding Vallejo Emergency Water)	**8,052**	**8,775**	**9,641**	**10,207**	**10,207**	**10,207**

[a] Table A allotment is 5,200 AFY (includes 500 AFY Kern County Water Agency SWP purchase)

[b] Vallejo Treated Water contracted amount based on City exercising options to buy maximum amount

[c] Vallejo emergency water supply of up to 500 AFY not available when SWP is not curtailed; shown on this table for illustrative purposes

[d] Napa treated water supply is zero in this table because it is counted against SWP Table A allotment

[e] State or State water contractors-run program; year-to-year availability unknown

4.1.1 STATE WATER PROJECT

SWP water is diverted from the Sacramento/San Joaquin Delta at the Barker Slough Pumping Plant and conveyed through the NBA system approximately 21 miles to the Cordelia Forebay. The SWP water is then conveyed an additional 6 miles to the Napa Turnout Reservoir at Jamison Canyon and conveyed via the City's transmission pipeline to the City's water treatment plant (WTP). The City's SWP entitlement is treated at the WTP or delivered as raw water to the City's agricultural (irrigation) customers. A map showing the City's water sources as shown in Figure 4.1.

4.1.1.1 TABLE A ALLOTMENT

The Napa Flood Control and Water Conservation District (District) executed a *Water Supply Contract* with the DWR for SWP water on December 19, 1963. The District subcontracts to member units throughout the Napa County, including the City. The SWP contract between the State and the District is included in Appendix E.

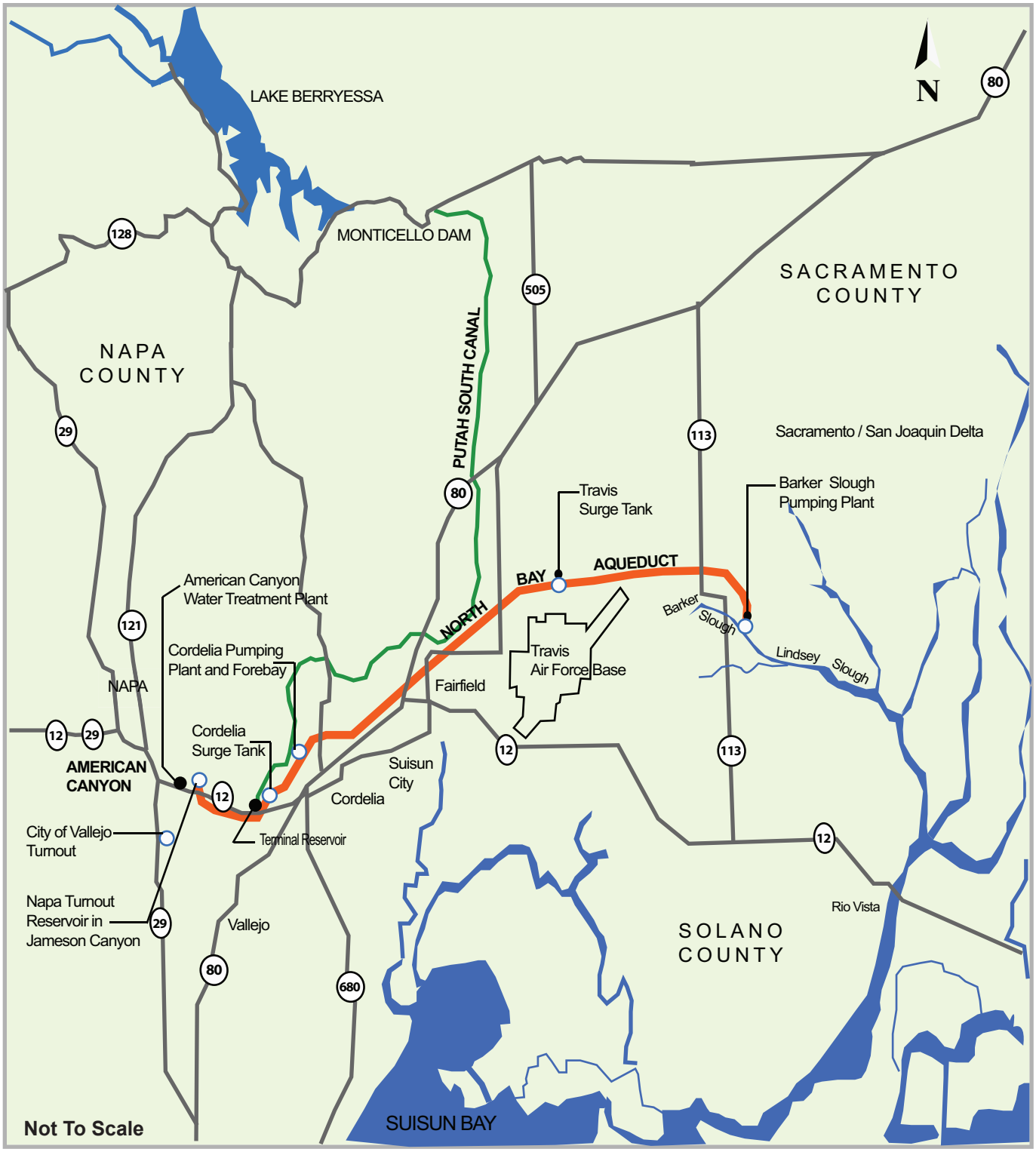
The City executed a *Water Contract for Water Supply from North Bay Aqueduct* with the District on January 4, 1967, which was last amended on December 21, 1982 (see Appendix E for copy of agreement). In the agreement, the City is allocated annual allotments of SWP water commonly referred to as "Table A allotment". The City's Table A allotment was accelerated in 2009 to its ultimate amount of 5,200 acre-feet per year starting in 2010. The City's current water contract with the District runs through 2035 with provisions for extensions. All member units to the SWP contract share in the same curtailment percentage as declared by the State of California for that water year.

4.1.1.2 KERN COUNTY WATER AGENCY PURCHASE

The District obtained an additional 4,025 acre-feet per year of SWP water from the Kern County Water Agency in 2000 and made this water available to its member units. Of that amount made available, the City purchased a water supply of 500 acre-feet per year of the Kern County SWP water in 2000. This amount increased the City's Table A allotment by 500 acre-feet per year. The water is conveyed through the NBA system and is treated at the City's WTP or delivered as raw water to the City's agricultural (irrigation) customers. The result is the City's ultimate amount of SWP Table A allotment increased from 4,700 to 5,200 acre-feet per year. The reliability of all SWP water is the same and does not differ no matter the original source.

4.1.1.3 DRY-YEAR WATER BANK

The City, along with a consortium of State water contractors, entered into an agreement with DWR. The agreement, entitled *2009 Drought Water Bank Agreement*, is for emergency water potentially available when there is a curtailment of SWP water and if rice farmers in the Sacramento Valley are willing to make their SWP water supply available to urban users of SWP water. This supply (commonly referred to as "dry-year water bank") is neither guaranteed nor reliable, but the City has purchased this water in the past (e.g., when SWP supply was curtailed by 60 percent in 2010). This potential dry-year supply does not reduce available SWP Table A allotment.



Source: City of American Canyon 2005 UWMP

Legend

- North Bay Aqueduct
- Putah South Canal

Figure 4.1
City's Water Sources

City of American Canyon
2010 Urban Water Management Plan

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4.1.1.4 Turn-Back Water Pool Program

DWR has a program for interested SWP contractors called the Turn-back Water Pool Program. SWP contractors may choose to sell Table A water it will not use or purchase turn-back pool water that is available through the program. For purposes of this UWMP, water from this pool program is not included in the reliability assessment or the various water supply tables because this program operates on an as-available basis. The amount of pool water available to the City is not a significant amount. During 2009, the City purchased 3 acre-feet of pool water and during 2010 it purchased 17 acre-feet. Information regarding the 2010 program is included in Appendix E.

4.1.2 Water Supplies from Vallejo

The City entered into a Water Service Agreement with Vallejo on May 1, 1996 (hereinafter referred to as the "Vallejo Water Agreement") to purchase various categories of water, described below. For a complete description of the various water supply sources, including water rights and licenses, from Vallejo, refer to the Vallejo Urban Water Management Plan. A copy of the Vallejo Water Agreement, along with addenda to the agreement, can be found in Appendix E.

4.1.2.1 Vallejo Permit Water

Vallejo has an appropriative water right for Sacramento Bay-Delta water under License 997848 from the State Water Resources Control Board (SWRCB) pre-dating the construction of the SWP. This water supply is commonly referred to by Vallejo as "permit water." Permit water is pumped from Lindsey Slough and delivered through the NBA system and is separate from the City's SWP Table A allotment.

On June 4, 1998, the Vallejo Water Agreement was amended (Addendum 2) to provide for a 3-party agreement for the "wheeling" of 500 acre-feet per year of permit water to the City of Calistoga (Calistoga). For Calistoga to receive the 500 acre-feet per year water supply, the City permanently transferred 500 acre-feet per year of its Table A allotment to Calistoga, and in turn, Vallejo provided 500 acre-feet per year of permit water to the City. According to Vallejo, permit water is more reliable than SWP water and is less prone to curtailment. On a year-to-year basis, the City has used permit water first before its other water supply sources. The reliability analysis in this UWMP for permit water is based on Vallejo's analysis in the Vallejo UWMP.

4.1.2.2 Vallejo Treated Water

The Vallejo Water Agreement provided for the City's purchase of 629 acre-feet per year of treated Vallejo water supply in 1996. Under the terms of the agreement, the City also has or had an option to purchase treated water supply during 5-year periods of time from 2001 through 2021. If the option for any of the years is not exercised by the dates established in the agreement, the option expires for that block of water supply. The cost of the treated water supply is high, and for this reason the City looks at each option carefully before making its decision to purchase. However, because this supply of water is reliable, the City has opted to purchase this supply as it becomes available (except in 2001) and should continue to do so in the future.

The year of the options to purchase blocks of treated water supply and the volumes are summarized below:

1996	629 acre-feet per year purchased (original agreement)
2001	723 acre-feet per year not purchased (option 1)
2006	723 acre-feet per year purchased (option 2)

2011	723 acre-feet per year purchased (option 3)
2016	566 acre-feet per year (option 4)
2021	566 acre-feet per year (option 5, final)
	3,207 acre-feet per year (ultimate total, excluding option 1)

4.1.2.3 VALLEJO EMERGENCY WATER

The Vallejo Water Agreement was amended (Addendum 1) on July 18, 1996 to provide for the City's purchase of up to 500 acre-feet per year (untreated water) for *emergency* purposes. Under the addendum, an emergency is defined as a condition whereby the City's SWP allotment is reduced due to environmental or other constraints. When the City's Table A allotment is not curtailed, emergency water is not available for purchase. In the reliability assessment presented in Section 5, Vallejo emergency water is included in single-dry and multiple-dry year conditions due to environmental constraints (see Appendix F for a summary of the SWP reliability report). The environmental constraints cited by the State are: i) restrictions on the SWP pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (June 2009) and National Marine Fisheries Service (December 2008), and ii) climate change, which is altering the hydrologic conditions in the State.

4.1.3 WATER PURCHASED FROM CITY OF NAPA

The City has an understanding with Napa for the purchase of treated water under emergency conditions or when the NBA system is off-line for maintenance or other reasons. This water source is not a water supply and is not included in the reliability assessment in this UWMP since it is only available during emergencies. Napa treated water, however, does provide operational flexibility (such as providing water to customers even when the City's water treatment plant is off-line for an extended period of time). During 2010 the City purchased 306 acre-feet of treated water when the plant was off-line for maintenance-related issues. Under this informal arrangement, the Napa treated water purchase counts against the City's SWP Table A allotment and is not an additional supply.

4.1.4 WHOLESALE WATER SUPPLIER(S)

Table 4.2 (DWR Table 17) illustrates the volume of water the City expects to receive from each wholesale contract it has for potable water and to the amount of recycled water it expects that Napa Sanitation District will deliver. (See Section 4.5 for a description of the institutional arrangement between the NSD and the City.)

Table 4.2 (DWR Table 17)
Wholesale Supplies – Existing and Planned Sources of Water (AFY)

Wholesale Sources	Contracted Volume	2015	2020	2025	2030	2035
SWP Table A Allotment	5,200	5,200	5,200	5,200	5,200	5,200
Vallejo Permit Water	500	500	500	500	500	500
Vallejo Emergency Water (untreated)	500	500	500	500	500	500
Vallejo Treated Water	Varies [a]	2,075	2,641	3,207	3,207	3,207
Recycled Water City	1000[b]	1,000	1,000	1,000	1,000	1,000
Recycled Water (Napa Sanitation District)	300 [c]	0	300	300	300	300

[a] Vallejo Treated Water contracted amount is 2,075 AFY in 2015; 2,641 AFY in 2020; 3,207AFY in 2025 - 2035

[b] This volume is based on estimated hydraulic capacity. City must deliver a minimum of 666 AFY to comply with State Water Board Contract

[c] This is the projected amount based on the Montalcino EIR and "will serve" letter from NSD

4.2 GROUNDWATER

As illustrated in Figure 4.2, the City is located over the Napa Lowlands Subbasin. As part of the 2005 UWMP, the City conducted a preliminary groundwater analysis to consider the potential for groundwater as a source of water. The analysis concluded that shallow groundwater beneath the valley floor is derived from mostly older alluvial floodplain and fan deposits. Almost all of the wells in the area within and surrounding the City have been constructed within the alluvium, at depths up to 200 feet deep. These wells produce approximately 45 gallons per minute (gpm) with some not reliable in the dry months of the year. The few wells that have been installed deeper (approximately 400 feet deep) and in various types of fractured bedrock have been found to be brackish and not sustainable. At this time, the City intends to explore groundwater as a viable municipal water source as opportunities present themselves.

The following tables are presented in order to meet DWR's required tables for groundwater pumping (even though the City has not pumped groundwater in the past and does not project pumping groundwater during this planning horizon). Table 4.3 (DWR Table 18) shows the amount of groundwater pumped in the past five years (2006-2010). Table 4.4 (DWR Table 19) shows the projected groundwater amounts.

Table 4.3 (DWR Table 18)
Groundwater – Volume Pumped (AFY)

Basin Name(s)	Metered or Unmetered	2006	2007	2008	2009	2010
No groundwater supply used						
Total groundwater pumped		**0**	**0**	**0**	**0**	**0**
Groundwater as a percent of total water supply		**0**	**0**	**0**	**0**	**0**

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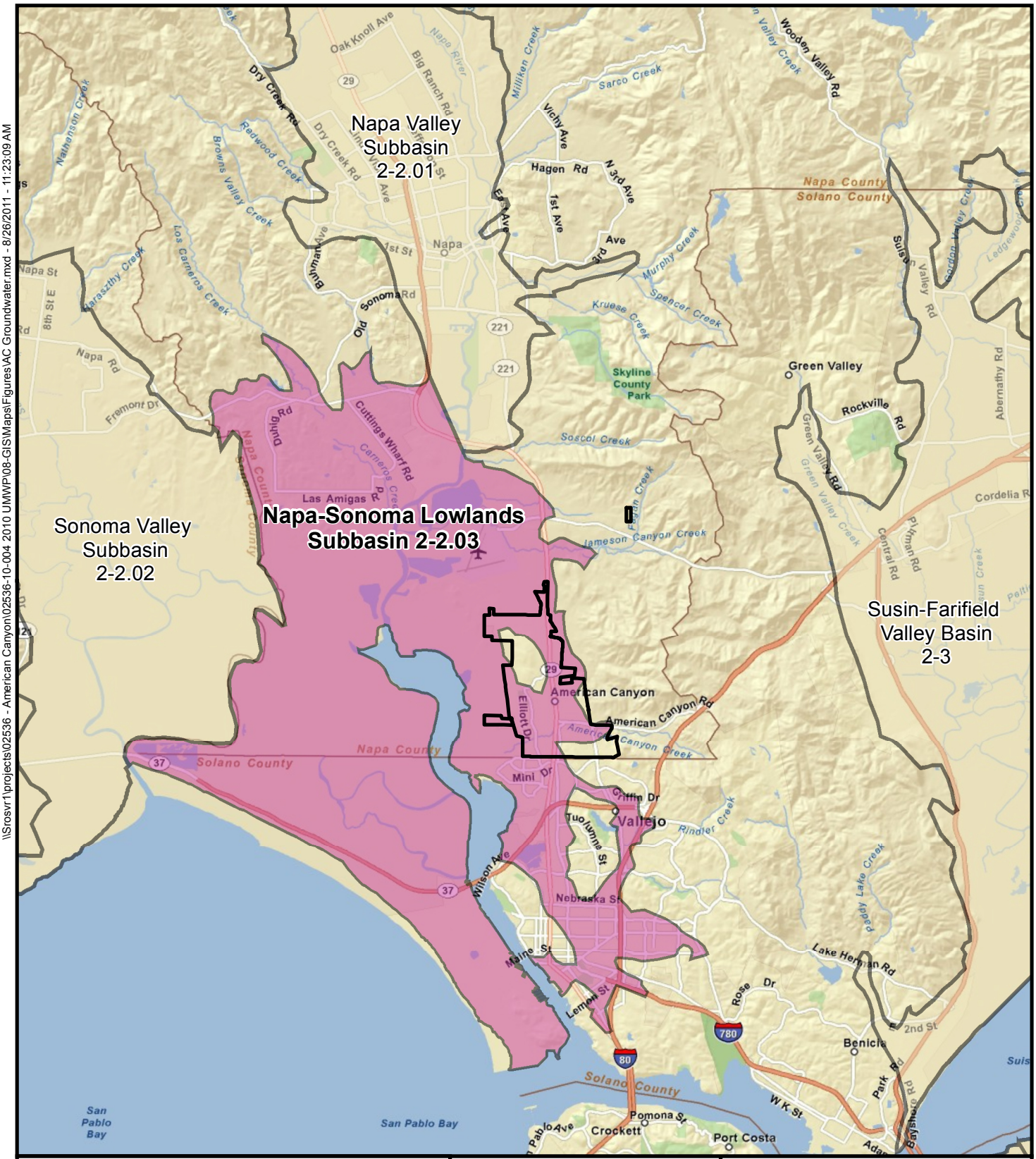

Legend

- Napa-Sonoma Lowlands Subbasin DWR Basin Number 2-2.03
- American Canyon City Limits

0 1.25 2.5 Miles

1 inch = 3 miles

N

Sources: Department of Water Resources (DWR) Hydrologic Regions: ESRI, DeLorme, AND, Tele Atlas, First American

Figure 4.2
Groundwater Basin and Subbasin Map

City of American Canyon
2010 Urban Water Management Plan

WINZLER & KELLY
www.w-and-k.com

Cartography: RMR

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Table 4.4 (DWR Table 19)
Groundwater – Volume Pumped (AFY)

Basin Name(s)	2015	2020	2025	2030	2035
No groundwater supply projected					
Total groundwater pumped	**0**	**0**	**0**	**0**	**0**
Percent of total water supply	**0**	**0**	**0**	**0**	**0**

Although the City does not project groundwater supplies in the future, the City is pursuing a groundwater investigation with the City of Napa for Napa's substitution for raw water irrigation, by Napa, and for emergency use by both cities.

There is no groundwater management plan for this area, however, there is a technical memorandum entitled *Groundwater Planning Consideration and Review of Napa County Groundwater Ordinance and Permit Process* prepared for Napa County dated January 2011. The technical memorandum can be found at the following link: *www.countyofnapa.org/WorkArea/.*

4.3 TRANSFER OPPORTUNITIES

The City has an existing short-term and long-term water transfer opportunity with the City of Vallejo (referred to as Vallejo Emergency Water Supply). Under Addendum 1 of the Vallejo Water Agreement, an emergency is defined as a condition whereby the City's SWP Table A allotment is reduced due to environmental or other constraints. Under normal years where the City's Table A allotment is not curtailed, emergency water is not available for purchase. The amount of water the City can purchase is 500 acre-feet per year.

The purchase of the Kern County Water Agency SWP supply described in Section 4.1.1.2 is not considered a transfer opportunity since that purchase was completed in 2000 and is now part of the City's Table A allotment for SWP water supply. The City of Napa Treated Water Purchase is not considered a transfer opportunity since it is an informal arrangement for the purchase of water during emergency conditions or for operational flexibility. Since the Napa water purchase volume comes out of the City's Table A allotment, it is not considered a separate water supply.

Table 4.5 (DWR Table 20) presents this information in DWR's required format.

Table 4.5 (DWR Table 20)
Transfer and Exchange Opportunities (AFY)

Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume
City of Vallejo (Emergency Water)	Transfer	Short and Long Term	500
Agency	n/a	n/a	--
		Total	**500**

4.4 DESALINATED WATER OPPORTUNITIES

The City is not currently investigating options for independently producing desalinating water. However, the City does have interest in pursuing the purchase of desalinated water, should the opportunity arise, through regional development of the resource.

4.5 RECYCLED WATER OPPORTUNITIES

This section describes the wastewater characteristics, flows, and treatment facilities that are proximate to the City's water service area. The UWMP Act requires the following discussion regarding recycled water:

- Information on the recycled water supply including coordination with dischargers;
- Description of the wastewater collection and treatment systems in the service area;
- Quantity of treated wastewater that meets recycled water standards;
- Recycled water currently being used in the service area;
- Potential for recycled water use in the service area;
- Actions to encourage recycled water use; and
- A plan for optimizing recycled water use.

4.5.1 OVERVIEW AND SYSTEM DESCRIPTION

In addition to supplying water, the City provides all wastewater collection, treatment, disposal and reuse within its wastewater service area. The neighboring NSD provides wastewater collection, treatment disposal and reuse service for the City of Napa and portions of unincorporated Napa County north of Fagan Creek including the Napa Airport Industrial Park, which is located north of the City limits and the City's sewer and recycled water service areas but within the City's water service area. This minimizes demands on the City's potable water system in this area. Because of these overlapping service areas, recycled water service is coordinated between the City and NSD to maximize beneficial reuse of the resource.

4.5.1.1 CITY'S WATER RECYCLING SYSTEM

The City's wastewater collection system consists of gravity pipelines and five pump stations that transport wastewater to the City's WWTP located near the City's northwest limits. The City operates its collection system to segregate domestic wastewater from high strength industrial wastewater flows. Pump Station E, the Kimberly Pump Station and the Sunset Meadows Pump Station collect wastewater from largely residential areas and deliver approximately 75% of the flow to the WWTP. The Tower Road and Green

Island Road Pump Stations have capacities of 950 and 800 gpm respectively and transport wastewater from industrial areas in the northern part of the City. These stations discharge a combination of domestic and industrial wastewater to a common force main and deliver about 25% of the flow to the WRP.

A key component of the City's approach to water recycling is to operate separate treatment trains for the domestic and industrial waste streams. The WWTP includes headworks facilities, four parallel secondary/tertiary treatment basins that use Membrane Bioreactor (MBR) technology, an ultraviolet disinfection system and a chlorine contact basin and pumping system that is utilized for producing recycled water. One of the MBR basins is used to treat industrial wastewater, which is discharged. The other three trains are used to treat domestic wastewater, which can be discharged or routed through the chlorine contact basin for beneficial reuse.

The WWTP produces a very high quality effluent that meets the Title 22 standards for disinfected tertiary water, suitable for unrestricted use. Currently, the WWTP has the capacity to produce 1.0 million gallons per day (mgd) of Title 22 effluent. According to the City's Recycled Water Implementation Plan, the City's water recycling facilities, which include a chlorination basin, a pump station, transmission mains and a 1 million gallon storage tank, will have the capacity to deliver approximately 1,000 acre-feet of recycled water when complete. To date the City has constructed the chlorination basin, pump station, storage tank and the majority of the transmission system. A final pipeline segment, which will complete the looped transmission system, will be installed with the Town Center development.

The City currently operates its water recycling program under San Francisco Bay Regional Water Quality Control Board's General Order 96-11. Order R2-2002-0096 (NPDES Permit No. CA 0038768) covers the City's discharge to both North Slough and a constructed wetland that eventually flows to North Slough.

4.5.1.2 Napa Sanitation District's Water Recycling System

NSD delivers recycled water to the Napa Airport Industrial Park. NSD provides wastewater collection, treatment, disposal and recycling services to 33,000 connections in the City of Napa and unincorporated Napa County. NSD's collection system includes 250 miles of pipeline varying in size from 4 inches to 66 inches over a 23 square mile area.

NSD's Soscol Water Recycling Facility (SWRF) is a secondary and tertiary biological physical-chemical treatment facility that treats a mixture of domestic and industrial wastewater. NSD has completed upgrades to the SWRF, which include primary treatment, activated sludge facilities, sludge digestion and solids de-watering facilities.

The SWRF has a number of treatment options that include preliminary treatment (screening), primary treatment (clarifiers), biological secondary treatment (340 acres of oxidation ponds and/or activated sludge facilities), secondary clarification or sedimentation, sand filtration, chlorination, sludge digestion and solids de-watering facilities. The SWRF has a dry weather design capacity of 15.4 MGD. The wastewater is treated and discharged in various manners, depending on the source of the wastewater and the time of year. From November 1 through April 30 (the wet season period), approximately 14.7 MGD of treated wastewater is discharged to the Napa River. From May 1 through October 31 (the dry season period), discharge to the Napa River is prohibited and wastewater is either stored in the stabilization ponds or treated and beneficially reused for landscape irrigation in industrial parks, golf courses, pasture lands, feed and fodder crops, and drip irrigation of vineyards. The SWRF produces high quality recycled water meeting Title 22 unrestricted use standards. NSD participates with the North Bay Water Recycling Program (NBWRP) on regional efforts to identify and maximize opportunities for recycling.

4.5.1.3 SUMMARY

Table 4.6 (DWR Table 21) summarizes the current and projected quantity of wastewater collected and treated by the City and NSD.

Table 4.6 (DWR Table 21)
Recycled Water – Wastewater Collection and Treatment (AFY)

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
City Water Recycling Plant [a]							
Wastewater collected & treated in service area	1,820	1,957	1,665	2,160	2,386	2,634	2,850
Volume that meets recycled water standard	1,820	1,957	1,665	2,160	2,386	2,634	2,850
NSD SWRF [b]							
Wastewater collected & treated in service area				9,800	9,800	9,800	9,800
Volume that meets recycled water standard				2,598	2,598	2,598	2,598

[a] Wastewater volume assumed to increase at 2% per year which is consistent with projected population growth (see Table 2.2)

[b] North San Pablo Bay Restoration & Reuse Project Draft EIR/EIS May 2009

4.5.2 RECYCLED WATER USE - EXISTING AND PLANNED

As described above, both the City and NSD have developed infrastructure to deliver recycled water.

4.5.2.1 CITY'S RECYCLED WATER USE

The City has been working to develop a recycled water project since 2000. It received a State Water Resources Control Board Planning grant for its Recycled Water Master Plan and completed an updated implementation plan in 2005. These planning documents allowed the City to qualify for a Proposition 50 Recycled Water Construction Grant to develop a project that would serve approximately 1,000 acre-feet per year to 53 identified users. In 2009, the City amended its grant agreement with the State Water Board and eliminated a number of agricultural users from its proposed program, choosing to focus instead on offsetting urban demand. This 2009 amendment also recognized that some planned development, identified in 2005, had not occurred. The amended agreement provided for a minimum delivery of 666 acre-feet per year to 45 customers in a "Phase 1" system. Because of the hydraulic capacity of the City's pump station, storage tank and existing transmission facilities, the system can be "built out" to its hydraulic capacity of 1,000 acre-feet by completing a loop in the distribution system and extending distribution mains. As noted above, the transmission system loop is planned to be completed with Town Center Development.

In 2010 the City completed its Recycled Water Distribution System Project (the Phase 1 System). The project components included:

- Approximately 18,500 lineal feet of 6-inch to 20-inch distribution piping;
- A one million gallon reservoir to provide for the delivery of recycled water to urban users in and adjacent to the City;
- Installation of a recycled water meter, third recycled water pump and control system improvements at the City's WRP; and

- Connection of the initial 13 users to the recycled water system.

The City's grant agreement with the State Water Board requires that the remaining users be connected by 2012, and the City is systematically working to retrofit these connections. Appendix G contains the "Amended Facilities Plan Agreement" between the City and the State Water Board specifying the requirements for water deliveries. As noted above, expansions and extensions to the system can be made in the future to allow it to reach its full hydraulic capacity.

4.5.2.2 Napa Sanitation District's Recycled Water Use

NSD's 2005 *Strategic Plan for Recycled Water Use in the Year 2020* estimates that the total potential recycled water use for Napa Airport Industrial Park will be 226 acre-feet per year by 2020. Practically, NSD has agreed to provide up to 300 acre-feet per year to the proposed Montalcino at Napa Project for irrigation purposes. Appendix G also includes documentation of the NSD water commitment

4.5.2.3 Summary

The planned recycled water use in the City's service area, including recycled water supplied by the City and by NSD is included in Table 4.7 (DWR Table 23).

Table 4.7 (DWR Table 23)
Recycled Water – Potential Future Use (AFY)

User Type	Description	Feasibility	2015	2020	2025	2030	2035
Agricultural irrigation (City)	Agricultural customers	Existing	100	100	100	100	100
Agricultural irrigation (City)	Current raw water users	Technically Feasible. Likely to be funded as a ZWF offset by development	105	105	105	105	105
Landscape irrigation (City)	Irrigation accounts in Phase 1 system	Existing	281	281	281	281	281
Future Landscape irrigation (City)	Future Demands	Technically Feasible. Economically contingent on development	177	177	225	276	329
Future Landscape irrigation (NSD)	In Airport Industrial area	Technically Feasible. Economically contingent on development	0	300	300	300	300
Commercial & Industrial	Included with irrigation						
Golf course irrigation							
Wildlife habitat							
Wetlands							
Industrial reuse		Existing	3	3	3	3	3
Groundwater recharge							
Seawater barrier							
Geothermal/Energy							
Indirect potable reuse							
Other (type of use)							
	Total		**666**	**966**	**1,014**	**1,065**	**1,118**

4.5.2.4 LIMITATIONS ON USE OF AVAILABLE RECYCLED WATER

Existing and projected recycled water demands, up to the projected volume of 1,300 acre-feet per year can be served by the existing systems, with extensions to the transmission and distribution mains. Beyond this volume, the single largest limit on increased recycled water use becomes the availability of seasonal storage. The majority of recycled water demand occurs during the irrigation season, typically between May and October. For the City in particular, future recycled water use projections are very close to the summer time plant influent and recycled water production rates. So in order to expand recycled water use beyond current projections, both the City and NSD may need to store winter flows for reuse during the irrigation season. The construction of seasonal storage facilities is expensive compared to the alternative of winter time discharge. Table 4.8 (DWR Table 22) summarizes the volume and quality of water anticipated to be discharged during the planning period. The discharges will occur in compliance with seasonal limits of both the City and NSD's NPDES permits. These permits only allow discharge during winter months when irrigation demand is low.

Table 4.8 (DWR Table 22)
Recycled Water – Non-Recycled Wastewater Disposal (AFY)

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035
North Slough & Constructed Wetlands (City)	Tertiary	1,884	999	1,494	1,672	1,869	2,032
Napa River (NSD)	Secondary + [a]	7,202	7,202	7,202	6,902	6,902	6,902
	Total	**9,086**	**8,201**	**8,696**	**8,574**	**8,771**	**8,934**

[a] Treatment includes enhanced disinfection

While seasonal storage is more expensive than discharge, with the ZWF, it may be possible over time, for planned development to fund seasonal storage facilities in order to make more recycled water available.

4.5.3 COMPARISON OF PREVIOUSLY PROJECTED USE AND ACTUAL USE

In its 2005 UWMP, the City assumed that it would be able to serve recycled water to 53 new customers, representing 858 acre-feet per year of demand, by 2008. This was based on projections outlined in the City's 2005 Recycled Water Implementation Plan. The City anticipated receiving grant funding from the State Water Board through Proposition 50 to fund the projects outlined in its Implementation Plan.

In May 2009 the City submitted a deviation request to the State Water Board, requesting permission to downsize the planned project. The State Water Board approved an amended project description for a smaller project that would deliver 666 acre-feet per year of recycled water to 45 customers within the City's service area. As of March 31, 2010, the majority of the public infrastructure was completed to connect the 45 identified customers. The City is in the process of retrofitting the connections to receive recycled water. At the end of 2010, the City had connected 13 users. While this is below the projections made in the 2005 UWMP, the City is actively finalizing the completion of its retrofit program and anticipates full implementation of its approved 666 acre-feet per year program before 2015, in accordance with its grant commitment with the State Water Board.

Table 4.9 (DWR Table 24) presents the comparison between the 2005 projections and 2010 actual use in DWR's required format.

Table 4.9 (DWR Table 24)
Recycled water — 2005 UWMP Use Projection Compared to 2010

User Type	2010 Actual Use	2005 Projection for 2010
Agricultural irrigation	41	481
Landscape irrigation	32	281
Commercial irrigation	0	68
Golf course irrigation	--	--
Wildlife habitat	--	--
Wetlands	--	--
Industrial reuse	0	28
Groundwater recharge	--	--
Seawater barrier	--	--
Geothermal/Energy	--	--
Indirect potable reuse	--	--
	--	--
Other (type of use)	--	--
Total	**73**	**858**

4.5.4 PROMOTING RECYCLED WATER USE

The City has established ordinances and policies requiring the installation of purple pipe with new development and requiring the installation of separate irrigation meters for all non-residential landscapes. These policies facilitate the installation of recycled water infrastructure and incremental conversion to recycled water. Table 4.10 (DWR Table 25) presents this information in DWR's required format.

Table 4.10 (DWR Table 25)
Methods to Encourage Recycled Water Use (AFY)

Actions	Projected Results					
	2010	2015	2020	2025	2030	2035
Require the installation of "purple pipe" with new construction	X	X	X	X	X	X
Prohibit the use of potable water when recycled water is available	X	X	X	X	X	X
Continue cooperation with Napa Sanitation District to assure recycled water use outside the City's wastewater service area and in the City's water service area	X	X	X	X	X	X
Provide on-going technical assistance to users	X	X	X	X	X	X
Continue to be proactive in public education	X	X	X	X	X	X

4.6 FUTURE WATER PROJECTS

This section describes the various water supply projects that the City may undertake to meet total projected water use. In the City's 2005 UWMP, water supply projects included investigating purchase of additional SWP entitlements to add to the City's SWP Table A allotment. However, in order to improve the City's water supply reliability, the City has moved away from this strategy as too much of the City's water supply is water that is from the State and delivered through the NBA system. Other water supply projects that the City is currently investigating and implementing are described in the sections that follow.

4.6.1 DESCRIPTION OF WATER SUPPLY PROJECTS AND PROGRAMS

Planned water supply projects and programs are as follows:

- Recycled Water Project (City). The City has completed the installation of its grant funded recycled water program and is currently finalizing the irrigation system retrofits that will allow it to deliver 666 acre-feet per year to identified users. The City has policies in place that will require new development within the City's water service area to use recycled water. These policies will result in additional, incremental increases to recycled water deliveries concurrent with new development. The City estimates it can provide up to 1,000 acre-feet per year of recycled water with extensions to its existing transmission and distribution mains.
- Recycled Water Project (NSD): As stated in the Montalcino Project EIR and documented in a "will serve" letter to the developer, NSD has agreed to deliver up to 300 acre-feet per year of recycled water. This use is in the Napa Airport Industrial Park and can also offset demands on the City's system.
- Garden Bar Project. The City is participating in a feasibility study at this time for a new dam and reservoir project being undertaken by the South Sutter Water District. The project would be located on the Bear River approximately five miles upstream of Camp Far West Reservoir. If implemented, the Garden Bar Project would provide substantial flood control, water supply and hydroelectric power generation benefits. The project and related proposals have been the subject of various feasibility studies since the 1970's. The City has entered into a Memorandum of Understanding (MOU) with Napa (who is the agency that has a direct agreement with South Sutter Water District) to establish cost-sharing obligations for a reconnaissance study, oversight procedures and related obligations.
- Groundwater Investigation with City of Napa. This investigation with the City of Napa seeks substitution of groundwater for raw water irrigation and for emergency use. It is estimated that the City will be investigating a groundwater supply source for 500 acre-feet per year for irrigation use and 500 acre-feet per year for emergency use. Because this investigation is very preliminary, the desired 1,000 acre-feet per year for irrigation and emergency use is not included in Table 4.11 (DWR Table 26).
- Jameson Canyon Reservoir Project. A 1994 study was conducted to investigate the feasibility of constructing a reservoir approximately one mile south of the American Canyon Water Treatment Plant. At the time, three cities participated in the study: American Canyon, Vallejo and Napa. At the conclusion of the 1994 study, Vallejo chose not to pursue this project any further because the hydraulics of the reservoir did not work for Vallejo's water system. The study was then abandoned because it was necessary to find more partners to participate in future studies in order to make this project feasible. At this time, the City is investigating finding other partners that may be interested in participating in the project.

4.6.2 AMOUNT OF SUPPLY INCREASE

The projected amount of water that would be available to the City as a result of the water supply projects and programs listed in Section 4.6.1 is included in Table 4.11 (DWR Table 26).

Table 4.11 (DWR Table 26)
Future Water Supply Projects (AFY)

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Normal Year Supply	Single-Dry Year Supply	Multiple-Dry Year		
						Year 1	Year 2	Year 3
Expansion of City Recycled Water Program	2015	2035	Pace of Development [a]	334	334	334	334	334
NSD Recycled Water Program	TBD	2035	Pace of Development [a]	300	300	300	300	300
Garden Bar Project [b]	TBD	TBD	Unknown at this time	TBD	TBD	TBD	TBD	TBD
Napa Groundwater Investigation	TBD	TBD	Well siting, pumping volume	TBD	TBD	TBD	TBD	TBD
Jameson Canyon Reservoir	TBD	TBD	Funding, interested partners	TBD	TBD	TBD	TBD	TBD
Total				**634**	**634**	**634**	**634**	**634**

[a] Assumes "existing" deliveries of 666 AFY consistent with State Water Board Contract. 344 AFY of additional deliveries would maximize the hydraulic capacity of the City's system. City and NSD have policies in place to

[b] This project is very preliminary at this stage and no definitive information is available at this time.

SECTION 5
WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

This section compares the water demand information developed in Chapter 3 and the water supply information developed in Chapter 4. Comparisons are provided under DWR's required range of hydrologic conditions including the Normal, Single Dry Year and Multiple Dry Year scenarios. This section also describes the City's water shortage contingency and drought planning as required by Water Code Section 10632.

5.1 SUMMARY OF FACTORS AFFECTING SUPPLY

The City has four sources of water supply: surface water supplies from the State Water Project, Vallejo treated water and Napa treated water; and recycled water produced by the City and NSD. Because the Napa treated water is an emergency supply that "counts" against it SWP Table A allotment, it is not included as a "normal" water supply source. The City's supply projections indicate that its 2035 water supply portfolio is composed of the following water supply sources under normal year conditions:

- 66 percent SWP water;
- 31 percent Vallejo water; and
- 3 percent recycled water.

Table 5.1 (DWR Table 29) summarizes the various factors that affect the City's supplies. This table does not include the City's emergency water supplies as those supplies are mainly used for operational flexibility and during catastrophic emergencies.

Table 5.1 (DWR Table 29)
Factors Resulting in Inconsistency of Supply

Water Supply Sources	State Water Project (SWP)	Vallejo Permit Water	Vallejo Treated Water	Recycled Water
Specific Sources Name (if any)	Bay-Delta surface water via Barker Slough	Bay-Delta surface water via Barker Slough	Blended source via City of Vallejo Water Treatment Plant	Napa Sanitation District plant and American Canyon plant
Limitation Quantification (Year 2035)	4,700 AFY Table A and; 500 AFY Kern County purchase (total 5,200 AFY)	500 acre-feet per year	1,043 acre-feet per year	1,300 acre-feet per year (combined hydraulic capacity)
Legal	Agreement expires 2038; will need to extend	Pre-1914 appropriative rights make this supply very reliable; no expiration date	Options must be purchased by specific date; No expiration date	None
Environmental	Biological Opinions from FWS and NMFS issued in 2008 and 2009 affect water exports from the Delta through the SWP system.	Same as SWP since this water comes from the same source and delivered through the North Bay Aqueduct system.	None since this is water coming directly from the Vallejo water treatment plant.	WDR permit requirements affect the cost of treatment
Water Quality	Barker Slough water quality issues mainiy pertaining to TOC and turbidity affect the cost of treatment at the City's plant.	Same as SWP since this water comes from the same source and delivered through the North Bay Aqueduct system.	None since this is water coming directly from the Vallejo water treatment plant and must meet drinking water standards.	WDR permit requirements affect the cost of treatment
Climatic	Vulnerable to climatic conditions as this directly affects the SWP system and hence, deliveries from the SWP system.	Appropriative rights make this supply more reliable than SWP and has not been curtailed in the past.	Vallejo water supply is more robust and not as vulnerable to drought conditions as compared with SWP.	Recycled water is the least vulnerable supply during drought conditions.
Additional Information	As SWP water is curtailed, Dry-Year water bank water may become available.		Cost for exercising the option to purchase is high.	Capital cost and O&M costs are high and limits the City's ability to implement this supply source.

5.2 HYDROLOGIC RELIABILITY

The hydrologic basis years are summarized in Tables 5.2 (DWR Table 27). This information is supported by the data and analysis presented in the DWR's SWP delivery reliability report, 2009. The City's water year data and reliability analysis for its main water supply sources (DWR and Vallejo treated water) relies heavily upon the information and reliability analysis conducted by the State for the State Water Project. For this reason, the basis years selected below are from DWR based on their SWP Delivery Reliability Report, 2009 (see Appendix F).

Table 5.2 (DWR Table 27)
Basis of Water Year Data

Water Year Type	Base Year(s)
Average Water Year	Avg. of 1922-2004
Single-Dry Water Year	1977
Multiple-Dry Water Years	1990-1992

Table 5.3 (DWR Table 28) represents the City's historic water supply reliability, based the 2015 demand pattern projected in Table 4.1 for 2015 assuming normal water year conditions. Because of its cost, Vallejo treated water is used last after all other water supply sources are fully used to their maximum available amount.

Table 5.3 (DWR Table 28)
Supply Reliability – Historical Conditions (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project [a]	2,697	1,144	1,976	1,976	1,976
Vallejo Permit Water [b]	500	425	425	400	375
Vallejo Treated Water [c]	0	1,785	1,462	1,487	1,512
Vallejo Emergency Water [d]	0	500	500	500	500
Recycled Water (Napa San)[e]	0	0	0	0	0
Recyled Water (City)[e]	666	666	666	666	666
Total	**3,863**	**3,854**	**3,854**	**3,854**	**3,854**
Percent of Average/Normal Year		100%	100%	100%	100%

This table represents 2015 water supply (see Table 4.1 for 2015 projected supply)

[a] SWP reliability is 60% for normal, 22% for single-dry and 38% for multiple-dry water year conditions.

[b] Vallejo permit water, based on Vallejo's 2005 analysis is 100% for normal, 85% for single-dry, and 85%/80%/75% for multiple-dry water years.

[c] Vallejo treated water, based on Vallejo's 2005 analysis, is the same reliability as for Vallejo permit water for the normal, single-dry and multiple-dry water years; contract amount in 2015 is 2,075 AFY.

[d] Vallejo emergency water is available when SWP Table A allotment is curtailed.

[e] Recycled water is highly reliable and estimated at 100% reliability under all conditions. Hydraulic capacity of City system is used

Tables 5.4 through 5.8 reflect the City's projected water supply reliability, based on its available contracted supplies. The reliability analysis used in this UWMP is based on the analysis provided by the wholesaler:

- Vallejo Water Supplies. The reliability percentages for Vallejo water is based on the City of Vallejo UWMP 2005 (at the writing of this report, the 2010 update for Vallejo had not been completed). The percent of normal supply numbers for treated water and permit water are the same and are 85 percent for a single-dry year, 85/80/75 percent for multiple-dry years. For Vallejo Emergency Water, since this is specifically emergency water due to environmental constraints and other emergencies, 100 percent is used for all water years.
- SWP Water Supply. The reliability percentages for SWP water is based on DWR's reliability report shown in Appendix F. The report used 22 percent for single-dry years and 38 percent for multiple-dry years.

- Recycled Water Supply. Recycled water is less vulnerable to hydrologic water year conditions. For both the American Canyon treatment plant and the Napa Sanitation District treatment plant, each facility disposes water to the Napa River as well as reuses some of the treated water for recycled water deliveries. During dry year conditions, because of the discharges to the river, a reliability of 100 percent is used for this supply of water.

Table 5.4
2015 Supply Reliability (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project [a]	3,120	1,144	1,976	1,976	1,976
Vallejo Permit Water [b]	500	425	425	400	375
Vallejo Treated Water [c]	2,075	1,764	1,764	1,660	1,556
Vallejo Emergency Water [d]	0	500	500	500	500
Recycled Water (Napa San.) [e]	0	0	0	0	0
Recycled Water (City) [e]	1,000	1,000	1,000	1,000	1,000
Total	**6,695**	**4,833**	**5,665**	**5,536**	**5,407**
Percent of Average/Normal Year		72%	85%	83%	81%

This table represents 2015 water water supply.

[a] SWP contract is 5,200. Reliability is 60% for normal, 22% for single-dry and 38% for multiple-dry water year conditions.

[b] Vallejo permit water, based on Vallejo's 2005 analysis is 100% for normal, 85% for single-dry, and 85%/80%/75% for multiple-dry water years

[c] 2015 contract availablity is 2,075 AFY. Vallejo treated water has the same reliablity as Vallejo Permit Water

[d] Vallejo emergency water available when SWP Table A allotment is curtailed

[e] Recycled water is highly reliable and estimated at 100% reliability under all conditions.

Table 5.5
2020 Supply Reliability (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project [a]	3,120	1,144	1,976	1,976	1,976
Vallejo Permit Water [b]	500	425	425	400	375
Vallejo Treated Water [c]	2,641	2,245	2,245	2,113	1,981
Vallejo Emergency Water [d]	0	500	500	500	500
Recycled Water (Napa San.) [e]	300	300	300	300	300
Recycled Water (City) [e]	1,000	1,000	1,000	1,000	1,000
Total	**7,561**	**5,614**	**6,446**	**6,289**	**6,132**
Percent of Average/Normal Year		74%	85%	83%	81%

This table represents the 2020 water supply

[a] SWP contract is 5,200. Reliability is 60% for normal, 22% for single-dry and 38% for multiple-dry water year conditions.

[b] Vallejo permit water, based on Vallejo's 2005 analysis is 100% for normal, 85% for single-dry, and 85%/80%/75% for multiple-dry water years

[c] 2020 contract availablity is 2,641 AFY. Vallejo treated water has the same reliablity as Vallejo Permit Water

[d] Vallejo emergency water available when SWP Table A allotment is curtailed, as needed; 100% reliability assumed since SWP water is curtailed under normal and dry years.

[e] Recycled water is highly reliable and estimated at 100% reliability under all conditions. Hydraulic capacity of City system is used

Table 5.6
2025 Supply Reliability (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project [a]	3,120	1,144	1,976	1,976	1,976
Vallejo Permit Water [b]	500	425	425	400	375
Vallejo Treated Water [c]	3,207	2,726	2,726	2,566	2,405
Vallejo Emergency Water [d]	0	500	500	500	500
Recycled Water (Napa San.) [e]	300	300	300	300	300
Recycled Water (City) [e]	1,000	1,000	1,000	1,000	1,000
Total	**8,127**	**6,095**	**6,927**	**6,742**	**6,556**
Percent of Average/Normal Year		75%	85%	83%	81%

This table represents the 2025 Water Supply

[a] SWP contract is 5,200. Reliability is 60% for normal, 22% for single-dry and 38% for multiple-dry water year conditions.

[b] Vallejo permit water, based on Vallejo's 2005 analysis is 100% for normal, 85% for single-dry, and 85%/80%/75% for multiple-dry water years

[c] 2025 contract availablity is 3,207 AFY. Vallejo treated water has the same reliablity as Vallejo Permit Water

[d] Vallejo emergency water available when SWP Table A allotment is curtailed, as needed; 100% reliability assumed

[e] Recycled water is highly reliable and estimated at 100% reliability under all conditions. Hydraulic capacity of City system is used

Table 5.7
2030 Supply Reliability (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project [a]	3,120	1,144	1,976	1,976	1,976
Vallejo Permit Water [b]	500	425	425	400	375
Vallejo Treated Water [c]	3,207	2,726	2,726	2,566	2,405
Vallejo Emergency Water [d]	0	500	500	500	500
Recycled Water (Napa San.) [e]	300	300	300	300	300
Recycled Water (City) [e]	1,000	1,000	1,000	1,000	1,000
Total	**8,127**	**6,095**	**6,927**	**6,742**	**6,556**
Percent of Average/Normal Year		75%	85%	83%	81%

This table represents the 2030 Water Supply

[a] SWP contract is 5,200. Reliability is 60% for normal, 22% for single-dry and 38% for multiple-dry water year conditions.

[b] Vallejo permit water, based on Vallejo's 2005 analysis is 100% for normal, 85% for single-dry, and 85%/80%/75% for multiple-dry water years

[c] 2030 contract availablity is 3,207 AFY. Vallejo treated water has the same reliablity as Vallejo Permit Water

[d] Vallejo emergency water available when SWP Table A allotment is curtailed, as needed; 100% reliability assumed

[e] Recycled water is highly reliable and estimated at 100% reliability under all conditions. Hydraulic capacity of City system is used

Table 5.8
2035 Supply Reliability (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project [a]	3,120	1,144	1,976	1,976	1,976
Vallejo Permit Water [b]	500	425	425	400	375
Vallejo Treated Water [c]	3,207	2,726	2,726	2,566	2,405
Vallejo Emergency Water [d]	0	500	500	500	500
Recycled Water (Napa San.) [e]	300	300	300	300	300
Recycled Water (City) [e]	1,000	1,000	1,000	1,000	1,000
Total	**8,127**	**6,095**	**6,927**	**6,742**	**6,556**
Percent of Average/Normal Year		75%	85%	83%	81%

This table represents the 2035 water supply

[a] SWP contract is 5,200. Reliability is 60% for normal, 22% for single-dry and 38% for multiple-dry water year conditions.

[b] Vallejo permit water, based on Vallejo's 2005 analysis is 100% for normal, 85% for single-dry, and 85%/80%/75% for multiple-dry water years

[c] 2035 contract availablity is 3,207 AFY. Vallejo treated water has the same reliablity as Vallejo Permit Water

[d] Vallejo emergency water available when SWP Table A allotment is curtailed, as needed; 100% reliability assumed

[e] Recycled water is highly reliable and estimated at 100% reliability under all conditions. Hydraulic capacity of City system is used

5.3 LEGAL & ENVIRONMENTAL CONSTRAINTS

There are factors that cause or have the potential to cause inconsistent supply to meet demands and are due to legal, environmental, water quality or climatic issues. These factors that affect the reliability of the City's water supply are described in this section.

5.3.1 STATE WATER PROJECT SUPPLY RELIABILITY

The large majority of water that the City receives is from the SWP. DWR issued a 2009 Delivery Reliability Report and the reliability analysis is based on this report. A copy of the Executive Summary of the 2009 Delivery Reliability Report is included in Appendix F.

The DWR reliability report is based on a model of what SWP deliveries could be based on a percentage of SWP full allocations. The analysis is based on several environmental factors including the Biological Opinions (BO) of U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS). The BO for FWS was issued in December 2008 and the BO for NMFS was issued in June 2009. The BO affects SWP pumping operations and SWP exports from the Delta. The report concludes that projected long-term average delivery amounts of Table A allotments have decreased from previous estimates.

The single-dry water year reliability stated in the 2009 report is 11 percent based on the driest year on record (1977). However, there have been some improvements to the operating criteria for the SWP through Decision 1641. Based on these new operating criteria, SWP delivery has been estimated at 22

percent by the Metropolitan Water District as stated in their 2010 *Regional Urban Water Management Plan*. For this UWMP, the projected deliveries of SWP Table A allotment are:

- 60 percent for average and normal water year conditions;
- 22 percent for single-dry water year conditions; and
- 38 percent for multiple-dry water year conditions.

5.3.2 VALLEJO WATER SUPPLY RELIABILITY

The City purchases raw water and treated water from the City of Vallejo (Vallejo). The two categories of Vallejo water have different reliabilities and are further described in the paragraphs that follow. Another water supply is Vallejo raw water emergency supply. This emergency supply of water is available to the City only when its SWP supply is curtailed. In other words, this supply is only available when the City receives less than its requested SWP water that is conveyed via the NBA system.

5.3.2.1 VALLEJO PERMIT WATER

The City receives "permit water" from Vallejo which, although conveyed via the North Bay Aqueduct (NBA) system, is not the same as SWP water. Permit water is an appropriative water right that Vallejo has under a license with SWRCB. According to Vallejo representatives, permit water is not subject to the same curtailment conditions as the SWP. Historically, Vallejo has not experienced a curtailment of its permit water allocation, even under severe drought conditions. In the previous UWMP, 90 percent reliability was used in the reliability analysis. However, based on Vallejo's reliability analysis in its 2005 UWMP, the reliability of the permit water is being reduced to match what was stated in the Vallejo 2005 UWMP: 100 percent for normal water years, 85 percent for single-dry, 80 percent for second-dry, and 75 percent for third-dry water years.

5.3.2.2 VALLEJO TREATED WATER

Another key water supply is Vallejo treated water. Under the terms of its agreement with Vallejo, the City's delivery of treated water would be cut at the same level as Vallejo residents under a drought condition. To date, Vallejo water customers have not experienced mandatory water rationing because Vallejo has had adequate supplies even during historical drought conditions. In the previous UWMP, 100 percent reliability was used in the reliability analysis. However, based on Vallejo's reliability analysis in its 2005 UWMP, the reliability of the permit water is being reduced to match what was stated in the Vallejo 2005 UWMP: 100 percent for normal water years, 85 percent for single-dry, 80 percent for second-dry, and 75 percent for third-dry water years.

5.4 WATER QUALITY CONSTRAINTS

The main source of water that the City receives is from the SWP and this water is from the Barker Slough watershed. This watershed is located in the larger Sacramento River watershed, and drains an area approximately 14.5 square miles in Solano County. In addition to the Barker Slough watershed, a portion of the treated water supply that the City receives from Vallejo comes from the Solano Project, which is water stored in Lake Berryessa.

The City's SWP water and Vallejo permit water are delivered to the American Canyon Water Treatment Plant through the NBA. The treated water that the City receives from Vallejo is delivered through an intertie connection following treatment of the water at Vallejo's Fleming Hill Water Treatment Plan. The source of

the Vallejo treated water is Lake Berryessa and the Barker Slough. The source water for the Vallejo treated water is conveyed to Vallejo by a separate pipeline from the Cordelia Forebay.

The City consistently meets all drinking water standards, though the source water occasionally poses treatment challenges during storm events when elevated levels of turbidity and total organic carbon (TOC) occur. Low pumping rates at Barker Slough during the winter results in extended period of turbidity and TOC into the NBA. In order to reduce the significance of the potential contaminations sources, the cities and districts receiving NBA water have been working with Napa Flood and the Solano County Water Agency to evaluate watershed management practices that could improve water quality.

All California Department of Health Services (CDPH) standards are consistently met. For this reason, the use of these water supplies due to water quality issues is considered to be unlikely. However, the cost of treatment is an ongoing concern and the NBA water customers need to continuously collaborate to work towards the implementation of watershed best management practices (BMPs) within the areas that drain into Barker Slough.

Table 5.9 presents this information in DWR's required format.

Table 5.9 (DWR Table 30)
Water Quality – Current and Projected Water Supply Impacts

Water source	Description of Condition	2010	2015	2020	2025	2030	2035
State Water Project	No impacts to supply	--	--	--	--	--	--
Vallejo Permit Water	No impacts to supply	--	--	--	--	--	--
Vallejo Treated Water	No impacts to supply	--	--	--	--	--	--
Recycled Water	No impacts to supply	--	--	--	--	--	--

5.5 SUPPLY AND DEMAND COMPARISONS

The projected three-year supplies available to the City are presented in Table 5.10 (DWR Table 31).

Table 5.10 (DWR Table 31)
Supply Reliability – Current Water Sources (AFY)

Water Supply Sources	Average/Normal Water Year Supply	Multiple-Dry Water Year Supply		
		Year 1	Year 2	Year 3
State Water Project	3,120	1,976	1,976	1,976
Vallejo Permit Water	500	425	400	375
Vallejo Treated Water	2,075	1,764	1,660	1,556
Vallejo Emergency Water	0	500	500	500
Recycled Water	1,000	1,000	1,000	1,000
Total	6,695	5,665	5,536	5,407
Percent of Normal Year		**87%**	**85%**	**83%**

Basis year is 2015 (refer to Table 5.3); for Normal year supply, refer to Table 4.1

The analysis that follows compares the projected Normal Year water supply available to the City and projected customer demands from 2010 to 2035, in five-year increments shown in Table 3.19 (DWR Table

11). Comparisons of supply and demand under Normal, Single Dry and Multiple Dry Years are included in Tables 5.11 (DWR Table 32) through 5.13 (DWR Table 34).

Table 5.11 (DWR Table 32)
Supply and Demand Comparison – Normal Year (AFY)

	2015	2020	2025	2030	2035
Supply Totals (from Tables 5.3 through 5.7)	6,695	7,561	8,127	8,127	8,127
Demand Totals (from Table 3.19)	3,863	4,646	5,178	5,712	6,248
Difference (supply minus demand)	2,832	2,915	2,949	2,415	1,879
Difference as % of Supply	42%	39%	36%	30%	23%
Difference as % of Demand	73%	63%	57%	42%	30%

Table 5.12 (DWR Table 33)
Supply and Demand Comparison – Single Dry Year (AFY)

	2015	2020	2025	2030	2035
Supply Totals (from Tables 5.3 through 5.7)	4,833	5,614	6,095	6,095	6,095
Demand Totals (from Table 3.19)	3,863	4,646	5,178	5,712	6,248
Difference (supply minus demand)	970	968	917	383	-153
Difference as % of Supply	20%	17%	15%	6%	-3%
Difference as % of Demand	25%	21%	18%	7%	-2%

Table 5.13 (DWR Table 34)
Projected Supply & Demand Comparison during Multiple Dry Year Period (AFY)

		2015	2020	2025	2030	2035
Multiple Dry Year - First Year Supply	Supply Totals (from Tables 5.3 through 5.7)	5,665	6,446	6,927	6,927	6,927
	Demand Totals (from Table 3.10)	3,863	4,646	5,178	5,712	6,248
	Difference (supply minus demand)	1,802	1,800	1,749	1,215	679
	Difference as % of Supply	32%	28%	25%	18%	10%
	Difference as % of Demand	47%	39%	34%	21%	11%
Multiple Dry Year - Second Year Supply	Supply Totals (from Tables 5.3 through 5.7)	5,536	6,289	6,742	6,742	6,742
	Demand Totals (from Table 3.19)	3,863	4,646	5,178	5,712	6,248
	Difference (supply minus demand)	1,673	1,643	1,564	1,030	493
	Difference as % of Supply	30%	26%	23%	15%	7%
	Difference as % of Demand	43%	35%	30%	18%	8%
Multiple Dry Year - Third Year Supply	Supply Totals (from Tables 5.3 through 5.7)	5,407	6,132	6,556	6,556	6,556
	Demand Totals (from Table 3.19)	3,863	4,646	5,178	5,712	6,248
	Difference (supply minus demand)	1,545	1,486	1,379	845	308
	Difference as % of Supply	29%	24%	21%	13%	5%
	Difference as % of Demand	40%	32%	27%	15%	5%

5.6 SUMMARY OF SUPPLY AND DEMAND ANALYSIS

The City's combined projected water supplies are sufficient to meet projected demands during normal water year conditions. Under single-dry water year conditions, the supply is generally sufficient until year sometime after 2030, which shortfalls begin to appear. By 2035, the dry year shortfall is estimated at 3%. Under multiple-dry water year conditions, the supply is sufficient through 2035.

This is a difference in the City's water picture from their 2005 UWMP scenarios. The main reason for this is that the City Council adopted water policies pertaining to new development that will manage their water demands now and into the future. The City is also diligently purchasing options for Vallejo treated water and continuing to pursue other water supplies to improve their water supply reliability. These water policies will allow the City to allow development to occur, consistent with their General Plan, but within their water supply constraints.

5.7 WATER SHORTAGE CONTINGENCY AND DROUGHT PLANNING

This section provides information required by Water Code Section 10632. The City has adopted a Water Shortage Emergency Plan within Section 13.14 of its Municipal Code, which is included as Appendix H of this UWMP.

5.7.1 ACTIONS IN RESPONSE TO WATER SUPPLY SHORTAGES (WATER CODE 10632(A))

Water Code Section 10632(a) requires a description of the actions to be undertaken by the urban water supplier in response to water supply shortages of up to 50%. This section also requires the water supplier to outline the specific water supply conditions that are applicable at each stage of action.

The City Council also has the authority to declare a water shortage emergency. This authority is contained in Section 13.14.070 of the Municipal Code. Emergencies are declared in four stages with specific reduction methods used for each stage. Table 5.14 (DWR Table 35) summarizes the consumption reduction methods that the City has the authority to use.

Table 5.14 (DWR Table 35)
Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage
1 Voluntary Conservation	Irrigation morning and evening only	10%
	Inspection/repair/adjustment of irrigation systems	
	Reduction in irrigation run times for weather	
	Reduction of irrigation run time if runoff occurs	
	Utilization of incentives/rebates/giveaways to replace fixtures and appliances	
	Utilization of city information on water use efficiency, meter reading, leak repair	
2 Mandatory Water Alert	Restriction of irrigation hours	20%
	Restriction on hours for vehicle washing	
	Prohibition on filling or refilling swimming pools	
	Prohibiton on the use of non-recycling ornamental fountains	
	Prohibition on use of fire hydrants for other than fire fighting	
	Prohibition on runoff, failure to repair leaks and washing hard surfaces	
	Water upon request in restaurants	
	Prohibition against use of water for construction dust control	
	20% reductions for vehicle washing facilities	
3 Mandatory Water Emergency	All Stage 2 Prohibitions	30%
	Prohibition agains lawn irrigation with potable water	
	Prohibition agains new landscapes unless they meet drought resistant criteria	
	Prohibition against watering unless a handheld nozzle or drip system for established plantings is used	
	Prohibition against new plantings	
4 Mandatory Severe Water Emergency	All Stage 1,2,3 Prohibitions	50%
	Mandatory water rationing based on established water banks in effect	

5.7.2 MINIMUM WATER SUPPLY DURING THE NEXT THREE YEARS (WATER CODE 10632(B))

The minimum water supply available during the next three years during a multiple year drought is shown in Table 5.10 (DWR Table 31), above.

5.7.3 CATASTROPHIC SUPPLY INTERRUPTION PLAN (WATER CODE 10632(C))

The City has completed a Water System Emergency Response Plan (ERP) in accordance with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The ERP was created for events caused by human intervention including terrorist attacks and natural disasters. The City's ERP identifies the City's standardized response and recovery protocols to prevent, minimize, and mitigate injury and damage resulting from emergencies or natural disasters. The goals of the ERP include:

- Rapidly restoring water service after an emergency;
- Ensuring adequate water supply for fire suppression;

- Minimizing water system damage;
- Minimizing impact and loss to customers;
- Minimizing negative impacts on public health and employee safety; and
- Providing emergency public information concerning customer service.

The ERP includes emergency planning and water system information, including mutual aid agreements, emergency resources, emergency water supply calculations, and information on alternate water supplies. The ERP also contains emergency response chain-of-command information, concepts of operation, notification procedures, water quality sampling procedures, emergency response training, and action plans.

Although these documents provide the response procedures that the City will employ should such disasters be realized, they are summarized, rather than included in their entirety, in the UWMP due to the confidential nature of the information they contain.

The City's ERP contains specific action plans that have been developed to address major events that could cause a catastrophic interruption of the City's water supply. The threats considered include:

- Earthquake
- Floods
- Winter Storm
- Power Outage
- Contamination to Water System
- Structural Damage from Explosive Device
- Vandalism
- SCADA System Intrusion
- IT System Intrusion
- Chemical Release
- Water Supply Interruption
- Bomb Threat

In regard to natural disasters, the City is most vulnerable to an earthquake. The City is located in a seismically active zone, and its main water transmission main located less than half of a mile from the West Napa Fault Zone. A seismic event of sufficient magnitude could cause numerous breaks in the water distribution system. The overall extent of damage to the water system would be dependent on the magnitude, proximity, and associated acceleration of the seismic event.

The City has adequate capabilities to respond to emergencies associated with minor damage and common malfunctions of the water system. An adequate supply of spare parts is stocked and readily available. However, the degree of damage capable from seismic activity and other major events could make stocking adequate spare parts and other supplies impractical for City employees and on-site resources. As a result, recovery time would be dependent upon response time of off-site suppliers and contractors.

If a regional power outage were to occur, the City could continue to supply water to its customers, but at a reduced rate. The NBA provides gravity flow from two 5-million gallon welded steel reservoirs to the American Canyon treatment plant. There is a permanent emergency generator that operates the conventional treatment plant to ensure that the conventional plant would remain operational. The City also has connections to hook up a portable emergency generator at the booster pump station.

In regard to potential terrorist events, the City has evaluated the existing security measures in place at each component of the water system. Based on the evaluation, the City has identified actions that can be undertaken to decrease the vulnerability of the system. Table 5.15 below summarizes these actions.

Table 5.15
Preparation Actions for Catastrophes

Decision Stage Process	Actions Taken	ERP Activation Level
Stage 1 Possible Threat	- Evaluate available information - Determine if a threat is possible	- Implement precautionary response actions
Stage 2 Credible Threat	- Determine that threat is credible by establishing corroborating information: - Highly credible source - Health Department/customer reports - Unusual monitoring results	- Activate portions of ERP - Initiate internal and external notifications - Issue public health advisory - Initiate water sampling and analysis - Consider partial or full activation of EOC
Stage 3 Confirmed Major Event	- Confirm threat by verifying definitive evidence and information that establishes the major event - Perform water sampling and analysis	- Fully implement ERP - Immediately initiate appropriate action plans - Fully Activate EOC

5.7.4 PROHIBITIONS, PENALTIES, AND CONSUMPTION REDUCTION (WATER CODE 10632(D)-(F))

Section 13.14.060 of the Municipal Code specifies prohibited water uses. Section 13.14.065 requires the use of recycled water by nonresidential customers if the recycled water is available. Table 5.16 presents this information in DWR's required format.

Table 5.16 (DWR Table 36)
Water Shortage Contingency – Mandatory Prohibitions

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Escape of water through breaks or leaks in customers plumbing	Permanent Prohibition
Irrigation in a manner or to an extent which allows excessive runoff	Permanent Prohibition
Washing cars, boats, trailers or other vehicles with a hose not equipped with a shutoff nozzle	Permanent Prohibition
Water for non-recycling decorative fountains	Permanent Prohibition
Water for single pass evaporative cooling systems for air conditioning	Permanent Prohibition
Water for new non-recirculating conveyor car wash systems	Permanent Prohibition
Water for new non-recirculating industrial clothes washing systems	Permanent Prohibition
Use of potable water when recycled water of adequate quality is available	Permanent Prohibition

The consumption reduction methods that the City can use in various water shortage emergencies were previously presented in Table 5.13 (DWR Table 35) above.

Section 13.14.120 of the Municipal Code outlines the City's enforcement process which is presented in Table 5.17 below. In addition to enforcement mechanisms, the City has the authority to enact drought surcharges under the authority of Section 13.14.100 of the Municipal Code.

Table 5.17 (DWR Table 38)
Water Shortage Contingency – Penalties and Charges

Penalty or Charge	Stage When Penalty Takes Effect
Imposition of drought surcharges	Any Stage
Personal contact with the customer	Any Stage
Delivery of written notice	Any Stage
Installation of a flow restricting device	Any Stage
Imposition of water waste fees	Any Stage

5.7.5 EFFECT ON REVENUES AND EXPENDITURES (WATER CODE 10632 (G))

In order to understand the potential impacts of supply reduction on revenues and expenditures, the City has analyzed the effects of 20%, 30% and 50% reductions in water delivered. For the purpose of this analysis, FY 2010-2011 budget data was used.

The City's water rates include a monthly meter charge and a volume charge for all classes of customers. However the monthly meter charge varies by the size of the meter. The volume charge is set at $3.22 per unit[3] for multi-family and non-residential use and is tiered for single family residential units. The City estimates that the "average" single family unit will have a water bill of $46.18 per month consisting of the $5.32 meter charge and $40.86 in volume charges based on using 14 units of water. This estimate indicates that approximately 88% of the City's water revenue is derived from volume charges and these are the charges that will be reduced if consumption is curtailed. Table 5.18 below illustrates the effects of a 20%, 30% and 50% reduction on water sales revenue assuming that consumption based revenue makes up 88% of the total revenue.

Table 5.18
Water Shortage Contingency – Effect of Reduced Water Sales on Total Revenue

Percent Consumption Reduction	Percent of Revenue Generated from Consumption Charge	Percent Reduction in Revenue
(a)	(b)	(a)*(b)
20%	88%	18%
30%	88%	26%
50%	88%	44%

The effect of potential revenue reductions on overall expenditures and reserve balances is illustrated in Table 5.19 below. The calculations assume that the City experiences some modest savings in its water treatment plant costs as a result of producing less water.

The table illustrates that the City is able to manage even a 50% reduction in supplies with funding available from its current reserves. The City also has the ability to assess drought surcharges, which are not accounted for in these calculations. However, as demands grow in the future, the City will need to take more actions to manage supply reductions and the revenue impacts will be more severe. The City will continue to monitor its reserves in order to assure that reserve funding remains available to manage unanticipated reductions in demand.

[3] A "unit" is 748 gallons

Table 5.19

Water Shortage Contingency – Effect of Reduced Supply on Revenues & Expenditures

	Normal	20% Reduction in Supply[a]	30% Reduction in Supply[b]	50% Reduction in Supply[c]
Revenues				
Water Service Charges	$4,227,000	$3,466,140	$3,127,980	$2,367,120
Recovered Water Charges	$0	$0	$0	$0
Service Applicaiotn Fees	$30,000	$30,000	$30,000	$30,000
Reconnect Fees	$20,000	$20,000	$20,000	$20,000
Meter Installation Fees	$30,000	$30,000	$30,000	$30,000
Water Penalties	$60,000	$60,000	$60,000	$60,000
Other Fees & Charges	$1,500	$1,500	$1,500	$1,500
Recycled Water Charge	$0	$0	$0	$0
Interest Earnings	$64,000	$64,000	$64,000	$64,000
Miscellaneous Revenue	$1,000	$1,000	$1,000	$1,000
Sales of Surplus Equipment	$500	$500	$500	$500
Make Whole Agreement[d]	$60,000	$60,000	$60,000	$60,000
Totals	**$4,494,000**	**$3,733,140**	**$3,394,980**	**$2,634,120**
Expenditures				
Treatment Plant	$2,884,400	$2,595,960	$2,451,740	$2,163,300
Water Distribution	$1,018,000	$1,018,000	$1,018,000	$1,018,000
Non Departmental	$341,100	$341,100	$341,100	$341,100
Debt Service	$205,000	$205,000	$205,000	$205,000
Capital Projects	$0	$0	$0	$0
Totals	**$4,448,500**	**$4,160,060**	**$4,015,840**	**$3,727,400**
Surplus (Deficit)	**$45,500**	**($426,920)**	**($620,860)**	**($1,093,280)**
Reserves				
Available Balance	$2,614,700	$2,614,700	$2,614,700	$2,614,700
Used to Cover Operations		($426,920)	($620,860)	($1,093,280)
Ending Balance	**$2,614,700**	**$2,187,780**	**$1,993,840**	**$1,521,420**

[a] As indicated in Table 5.9 the City can manage a 20% reduction in supply with actions to reduce demand by 2.4%.

[b] As indicated in Table 5.9, the City can manage a 30% reduction in supply with actions to reduce demand by approximately 14.6%.

[c] As indicated in Table 5.9, the City can manage a 50% reduction in supply with actions to reduce demand by approximately 39%.

[d] Napa County Agreement No. 2325 (FCWCD), August 27, 1985 for the realignment of the NBA line.

5.7.6 WATER SHORTAGE CONTINGENCY ORDINANCE (WATER CODE 10632(H))

As noted above, the City has adopted a Water Shortage Emergency Plan which was codified by Ordinance in Section 13.14 of the Municipal Code. This Ordinance has recently been updated and the update is attached.

5.7.7 MECHANISMS FOR DETERMINING ACTUAL REDUCTIONS (WATER CODE 10632(I))

The City's supply turnouts are all equipped with water meters. In addition, each potable and recycled water customer is metered. Non-residential landscape irrigation is metered separately from indoor use at most non-residential sites. The City reads meters on a monthly basis and is able to document both demand reductions and a-typically high water use. The City contacts individual customers to resolve issues related to a-typically high water use.

SECTION 6
DEMAND MANAGEMENT MEASURES

Demand management measures (DMMs) are water conservation measures. The DMMs listed in the UWMP Act correlate to the California Urban Water Conservation Council's (CUWCC) original Best Management Practices (BMPs) for water conservation. The 2010 UWMP Guidebook uses the terms DMMs and BMPs interchangeably. The CUWCC revised and updated its BMP program in December of 2008 and its BMPs no longer correlate identically to the DMMs described in the 2010 UWMP Guidebook. The Act requires that if an agency is a CUWCC signatory, it must document compliance with the CUWCC program in its UWMP. The City is a signatory to the CUWCC's Memorandum of Understanding.

The purpose of this section is to provide a description of the City's currently implemented and planned water conservation programs. This section is also meant to correlate these programs to the "water use reduction plan" meant to achieve the 2015 and 2020 water use targets required to be set by the Water Conservation Act of 2009 and to document voluntary compliance with the CUWCC's Memorandum of Understanding.

6.1 DESCRIPTION OF DEMAND MANAGEMENT MEASURES

The City had planned to fully fund its water conservation program in the years following the 2005 UWMP for full implementation of all of the CUWCC water conservation BMPs. However, due to the economic downturn, funding for water conservation has been limited because the City's overall financial health has been significantly impacted.

The City has had to prioritize to which programs resources are directed. The City has continued implementation of its recycled water plan, which though not a BMP listed in the CUWCC's MOU, does offset potable water use. Additionally, the City created a Blue Ribbon Water Committee comprised of City Council members and members of the public to develop an overall water management strategy for the City.

Since the publication of the 2005 UWMP, the City has developed several water management policies. The implementation of the new development policies will have the effect of increasing water efficiency as well as provide a vehicle for funding water conservation programs, as described below in Section 6.4.

6.2 CUWCC GPCD OPTION BASELINE AND TARGET

Historically the CUWCC required a signatory agency like the City to work on all 14 BMPs in a prescribed fashion until it achieved a certain "saturation rate" in its service area, in order to stay in compliance with the Memorandum of Understanding. Compliance with the Memorandum of Understanding is necessary for agencies to be eligible for State grants and loans for water and wastewater systems. Starting in 2009, the CUWCC provided a new option for BMP compliance, the "CUWCC GPCD Option." This option allows members to selectively implement the BMPs that are best suited for their service areas as long as they achieve a certain water use "target" (which is not necessarily identical to the targets adopted under the Water Conservation Act of 2009). According to DWR's 2010 UWMP Guidebook, a CUWCC member is in compliance with the DMM reporting requirements of the Water Conservation Act if the member is in compliance with its CUWCC GPCD Option reporting requirements. The requirements for CUWCC GPCD Option compliance are as follows:

- Provide potable water gpcd for each year in the baseline period

- Develop 2018 gpcd target and five biennial gpcd targets
- Provide supporting data to calculate gpcd for this period's potable water gpcd
- Provide calculations showing the reporting period's potable water gpcd is less than or equal to that period's biennial gpcd target
- Provide completed water supply, water use, and Foundational CUWCC BMP reporting forms for 2009 and 2010
-

Because the City has been prioritizing water conservation activities to focus on replacing aging water delivery pipelines, repairing leaks, and implementing the City's recycled water plan, the City has chosen the CUWCC gallon per capita per day (GPCD) Option for compliance with the CUWCC MOU.

The CUWCC's GPCD Option requires calculation of a baseline and conservation target but uses a different methodology from the Water Conservation Act of 2009. The CUWCC GPCD Option requires a specific baseline time period (1997-2006), whereas the Water Conservation Act of 2009 allows calculation over a rolling 10-15 year period beginning as early as 1989. The CUWCC GPCD Option requires an 18 percent reduction by 2018, whereas the Water Conservation Act of 2009 requires a nominal 20 percent reduction by 2020. Despite these differences in methodology, the CUWCC GPCD option provides the City with the best method to simultaneously achieve its 2015 and 2020 targets while staying in compliance with the CUWCC's Memorandum of Understanding.

The City's baseline for the CUWCC GPCD Option compliance is 203 gpcd. (The City's baseline according to requirements of the Water Conservation Act of 2009 is 209 gpcd.) The City's 2018 target for the CUWCC GPCD Option is 167 gpcd. Spreadsheets presenting data for calculating the CUWCC GPCD Option baseline, targets and use are presented in Appendix I. Copies of the CUWCC reporting forms listed above are also presented in Appendix I.

A comparison of the City's water use targets are presented in Table 6.1 below. Please note that though CUWCC GPCD Option does not allow for the exclusion of process water, it is anticipated that the City will meet the 2018 CUWCC GPCD Option without the exclusion.

Table 6.1

Water Use Targets for the City of American Canyon (gpcd)

Year	SBx7-7 Target without process water exclusion	SBx7-7 Target with process water exclusion	CUWCC MOU GPCD Option Target (Voluntary)	Projected Per Capita Water Use w/out process water exclusion[b]	Projected Per Capita Water Use with process water exclusion[b]	Meets Target?
2015	188	171	NA	127	112	Yes
2018	NA	NA	167	125	111	Yes
2020	167	152	NA	123	110	Yes

[a] The projected per capita water use for the year 2018 was derived by a straight line calculation between 2015 and 2020.

[b] Calculated using population projections presented in Table 2.2 and water use projections from Tables 3.10 and 3.11.

The City's water use in 2010 was 137 gpcd, well below the City's 2018 target.[4] The 2010 use is considered atypically low due to the current economic conditions in the City and is expected to increase as the economy improves. However, the City is expected to be below the CUWCC GPCD Option target largely because its new development policies are designed to increase water use efficiency throughout the service are.

6.3 DMMs Currently Being Implemented

As permitted by the Water Conservation Act, the City has attached the CUWCC reporting forms in lieu of supplying a narrative of DMMs being implemented. These documents are presented in Appendix I.

The City is implementing various water conservation BMP programs, as budget and staffing levels allow. These include participation in a regional clothes washer rebate program, offering high efficiency toilet rebates, offering water savings devices at public outreach events, and implementation of a leak detection program. Though the first two programs may not be at full compliance levels, they are adding to the City's realized water savings. Anticipated water savings are presented in Section 6.5.

6.4 Other Measures (Additional DMMs Currently Being Implemented Beyond the DMMs Listed in the UWMP Act)

Since the adoption of its 2005 UWMP, the City has adopted or amended five policy documents that outline its demand management strategy both within its corporate limits and within its water service area.

- The "Zero Water Footprint" (ZWF) Policy: Adopted in October of 2007, this policy requires that new development must be configured in a manner that results in "no loss in reliability or increase in water rates for existing customers due to a requested increase in water demand". Generally, the ZWF set up a system whereby new any new development (residential or non-residential), or the expansion of existing commercial and industrial development, occurring after October 23, 2007 needs to mitigate all new water demands. Mitigation can include offsetting new demands with conservation savings elsewhere in the water service area, offsetting demands onsite, or, at its own cost, assisting the City in purchasing new water supplies from other water providers.
- Municipal Code Section 13.10 New Water and Sewer Connections and Services: Originally adopted as Ordinance 2000-08, this section of the Municipal Code generally limited all new industrial water users within the City's water service area to a total use of 650 gallons per acre per day (gpad) and outlined requirements for new development to dual-plumb and connect to recycled water when available. In 2008, this section of the Municipal Code was amended to also capture the intent of the ZWF by allowing offsets and new supply options to be included in the calculation of the gpad cap.
- Administrative Policy 2011-01 on the Management and Allocation of Raw Water: Adopted in May 2011, this Administrative Policy has a goal of shifting the City's raw water customers (new and existing) from the State Water Supply to alternative supplies. The Policy specifically references recycled water and groundwater as possible alternative supplies and also provides for the development of an agricultural water conservation program.
- Administrative Policy 2011-02 on the Management and Allocation of Recycled Water: Adopted in May 2011, this Administrative Policy has a goal of providing recycled water as a substitute for potable water as a first priority to the City's parks and then to other users for irrigation purposes. This Administrative Policy compliments Municipal Code Section 13.10, which requires dual-

[4] This was calculated from water use and population data presented in Table 3.4.

plumbing with purple pipe, and establishes a framework for allocating the recycled water resource and encouraging the development of privately-owned seasonal, recycled water storage facilities.

- Administrative Policy 2011-03 on the Implementation of the Zero Water Footprint Policy: Adopted in May 2011, this Administrative Policy has a goal of assigning or shifting commercial, industrial and new residential water demands from the State Water Project supply to more reliable alternate sources of water. This Administrative Policy further articulates the manner in which the City will consider and evaluate new development proposals and provides guidance on acceptable methods for offsetting new water demands within the existing water system or bringing new water supplies to the City.

Copies of these policy documents are included in Appendix D.

6.5 CONSERVATION SAVINGS

On October 23, 2007, the City adopted water conservation guidelines. These guidelines serve as a plan for potable water use reduction for the City. Recycled water use plans, water conservation BMPs, and water conservation requirements for new development, including the ZWF policy, are addressed in this plan. The plan and associated procedural memoranda are included in Appendix D.

Table 6.2 illustrates the demand projections from the 2005 UWMP and the d3eamdn projections from the 2010 UWMP which highlights the conservation saving planned to be achieved through the City's various strategies and policies. The City's water service area and land use designations have remained the same since that time.

Table 6.2
Conservation Savings from ZWF Policy Implementation (AFY)

	2010	2015	2020	2025	2030	2035
2005 UWMP demand projections for all sectors	4,959	6,080	6,232	6,387	na	na
Current demand projections for all sectors	3,097	3,863	4,646	5,178	5,712	6,248
Water Savings from ZWF [a]	1,862	2,217	1,586	1,209	na	na

[a] 2009 water savings are likely a combined result of the 2007 ZWF, the 2009 Drought Ordicance and the economic recession which slowed planned growth.

As table 6.2 illustrates, the City's various policies are expected to result in significant water conservation savings. Because the ZWF Policy, in particular, allows developers to fund implementation of the most cost effective water savings measures, the actual savings may occur in any sector. Developers will select which of the DMMs they will fund in order to keep their development within the ZWF policy.

In addition to water use savings which will be realized from the ZWF policy, there will also be reductions in the use of potable water from the expansion of the recycled water delivery system. Additionally, it is expected that the current level of water conservation will continue, regardless of new development funding via the ZWF. The projected water conservation savings derived from existing water conservation savings, the ZWF policy, and the use of recycled water for large landscapes is presented below in Table 6.3.

The projected water savings in Table 6.3 below do not include the projected savings from distribution of water saving devices such as low flow showerheads, kitchen aerators, and toilet dams. Because it is not known how many of those devices are actually installed in homes, it is difficult to quantify those savings.

Table 6.3 does include projected savings from the toilet rebate program, the clothes washer program, and the system leak detection program.

Table 6.3
Conservation Savings (AFY)

	2010	2015	2020	2025	2030	2035 [a]
High Efficiency clothes washers	3	3	3	3	3	3
High Efficiency toilets	0.6	0.6	0.6	0.6	0.6	0.6
Water Leak Reduction Program	223	223	223	223	223	223
Conservation Reduction from Policy Implementation	1,862	2,217	1,586	1,209	na	na
Reduction of potable use with RW	32	333	333	333	333	884
Total savings	**2,121**	**2,777**	**2,146**	**1,769**	**NA**	**NA**

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